

THE FOOD CULTURES OF THE SHIFTING CULTIVATORS IN CENTRAL AFRICA: THE DIVERSITY IN SELECTION OF FOOD MATERIALS

Kaori KOMATSU

Graduate School of Science, Kyoto University

ABSTRACT This paper sketches out the food culture characteristics among three groups of shifting cultivators in the forest areas of central Africa to investigate the principles of food selection and food diversity. The food cultures in this region commonly combine ball-shaped principal starchy food (PSF) and some side dish of sauce with stewed materials. While all the people of three groups conduct cultivation with vegetatively reproductive crops in and around the tropical forest, there is a difference in the materials actually used in their diet. From the food diaries recorded for an entire year, the ratio for each food materials of the principal starchy food and the side dish was calculated and compared. Food selection in each group is analyzed through the factors of 1)availability, 2)utility and 3)acceptability. While all the three groups show strong preference for maintaining variety in the diet, each group generates the variety in a different way.

Key Words: Food diversity; Congo; Cameroon; Selection of food materials; Shifting cultivators.

INTRODUCTION

In the African tropical forest, there is a diversity of plant and animal food resources. The people in the forest have their own choices of food from the vast list of available resources. Takeda and Sato (1993) reported that Ngandu people, shifting cultivators in the Congo forest, considered as food 91 plant species out of 414 recorded, and 287 animal species out of 437 recognized by the people themselves. Nearly a half of these species considered as food actually appeared in the annual food diary. Ichikawa (1993) also reported that Mbuti people, hunter-gatherers living in Ituri forest, used more than 100 plant species and more than 200 animal species as food, while there were much more potential resources. The issue is, therefore, the principles on which the people select their daily food materials from such a wide repertoire.

This paper aims to sketch out the characteristics of food cultures observed in the forest peoples, then to compare among different groups the selection principles for food materials and diversity. The focus of this paper is the selection of food materials for meals. A "meal" constructs the basic eating behavior of daily life, with set manners for serving and eating. Among many studies for understanding the food selection paradigm, "Food and Nutrition" (Fieldhouse, 1986), which attempted to classify cultural and social significance of food, provides an invaluable guide. Fieldhouse (1986, p.35) stated that, "the interrelationship of food habits with other elements of cultural behavior and with environmental forces" was the absolute important factor for food choices, which I try to describe in this paper.

I classified the factors for food selection in each society into the following three categories in this paper: availability, utility and acceptability. Availability means the possibility of obtaining food material, which includes environmental conditions, cultural diffusion of food materials and conditions of their circulation. Of these, natural environmental conditions play a significant role especially in self-sufficient society. Utility means attributes of material concerning nutritional value and other physiological factors which generate a specific flavour. Acceptability is more complicated than the other two factors. It generally reflects cultural factors such as concept of food and eating, social values concerning religion and communal identity, cultural preference shared in a society and personal preference.

The food cultures of shifting cultivators in the forests of central Africa show certain common features. First, they have a combination of some main dish, non-seasoned and much consumed, which can be referred to as the "principal starchy food (PSF)" (T. Ankei, 1990:13), and some side dish, seasoned thick sauce for dipping the PSF in. This combination itself is commonly observed among the cultivators of sub-Saharan Africa, although the materials of PSF differ from place to place. PSF is most commonly ball-shaped or rolled in leaves, despite the variety of ingredients (Center for Japanese Tour Culture Studies, 1981). PSF materials are comprised mainly of vegetatively reproducing crops in tropical forest zone, whereas they are made from cereals in savanna zone. The vegetatively reproducing crops include yam, taro, cocoyam, cassava and plantain.⁽¹⁾ Materials for side dishes are wild animals, fish, wild and domestic plants which are stewed in a pot or pan. While the important features are shared among different meals of different groups of people, each group shows a set of peculiar characteristics for selecting food materials from a wide inventory.

This study is based on data collected from three villages, situated in the forest areas of central Africa (Fig. 1). There are preceding research on related topics in this area. T. Ankei (1990) has catalogued food materials and constructed flow-charts of cooking methods among the Songola people in former Zaire. She reported that the Songola people had 2,099 different dishes created through a combination of food materials and cooking methods. There are also detailed cooking recipes reported from the Bandundu region of former Zaire (Gissangi, 1980), and of diverse ethnic groups in Cameroon (Grimaldi et Bekia, 1985). Takeda (1990) approached his study of nutrition from ecological anthropology, tracing the flow of food from its procurement to consumption among the Ngandu people, also in former Zaire. In Cameroon, to the west of the study area in this paper, there has been a comparative research on the diet among three ethnic groups in the coastal area (Koppert, et al., 1993), in which rich animal resources were reported. A nutritional report on the Batouri region, only 100 km from Lindi, one of the study sites in this paper (Masseyeff, et al., 1958), by contrast, pointed out the lack of energy and protein in this area.

The three villages focused in this paper are situated in the mixed vegetation of semi-deciduous forest and swamp forest of northern Congo (Djoube village), in semi-deciduous forest of south-eastern Cameroon (Mondindim village), and on the ecotone from semi-deciduous forest to savanna to the north (Lindi village). All the three villages are comprised of shifting cultivators who belong to the language group called "Equatorial Bantu" (Murdock, 1959). Although natural environments of the three villages vary as will be described later, all the villagers utilize both the forest and

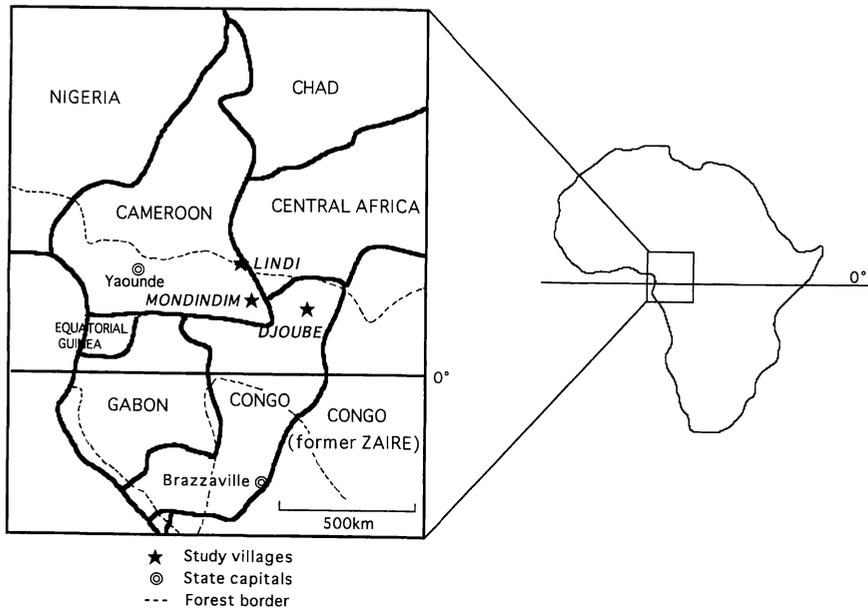


Fig. 1. Study area.

river, where many wild animals, fish and wild and domestic plants are available.

RESEARCH METHOD AND SUBJECTS

I. Research Subjects

1. Djoube village

Djoube village is situated at $2^{\circ} 25' N$ latitude and $17^{\circ} 28' E$ longitude, Dongou District, Likouala Region, Republic of Congo (Fig. 1). It is 155 km upstream from the Dongou town along Motaba River, a branch of Oubangui-Congo River. The vegetation around the village consists of riverine forests with raffia palm, swamp forests and dry-land semi-deciduous forests.

The year is divided into the rainy season from May to November and the dry season from December to April. Annual precipitation is about 1,793 mm and the annual mean temperature is $25.6^{\circ}C$.⁽²⁾ There is not a month in which the precipitation is under 50 mm (Tsutiya, 1972).

On the upper and middle reach of Motaba River, various minor ethnic groups of shifting cultivators live on small dry land areas in the forest. People had formerly lived scattered in the forest, but were concentrated to the riverside by the colonial government in the 1920's. Djoube is one of the villages formed at that time. Djoube villagers call themselves "Bobanda," which other peoples around Djoube also use to call them.

However, they do not integrate themselves into a larger group than their village community.⁽³⁾ The population of the village numbered 138 in September, 1992. Their language is classified as Bondongo, Bantu C group (Guthrie, 1967). At present, the Djoube people is comprised of 11 paternal kin groups (*di-kanda*), who formerly lived separately in the forest.

The Aka hunter-gatherers lead a seasonal nomadic life, based at a semi-permanent camp adjacent to the Djoube village. They form pseudo-kinship relationship with Djoube villagers. The villagers give the Aka agricultural produce and durable consumer goods and the Aka help the villagers with manual labor. However, there is a strict prohibition of intermarriage between the villagers and the Aka. Therefore at present nobody has actually affinal relationship with the other group.

There are other groups along the Ibenga River, 60 km north from Motaba River, whose language is close to that of Bobanda. Until recently, Djoube people married the members of the same or similar language group within the village, or in other groups along the lower part of Motaba River and in the Ibenga River. Recently, they sometimes marry the peoples along the upper part of Motaba River, with whom they communicate easily with a dugout canoe.

Djoube principal mode of subsistence consists of shifting cultivation and fishing. Formerly, the shifting cultivation had been done mainly in the primary forest. However at present, as the primary forest has decreased near the village, the villagers also use the secondary forest and even the oil palm forest occasionally.⁽⁴⁾ The main crop is plantain, with cassava and maize as important supplementary crops. These are mix-cropped with taro, yam, sweet potatoes, melon for eating seeds, chili pepper, sugarcane, papaya and pineapple. There are two types of cassava: bitter cassava with hydrocyanic acid and sweet cassava without it. Mainly the bitter cassava is eaten at Djoube. Men cut down the trees in the fields, whereas other field chores such as slashing small shrubs and herbaceous grass, planting, weeding and harvesting are carried out by women. Fishing is conducted throughout the year, in particular, fishing with baskets set in weirs at the end of the rainy season and fish bailing at the end of dry season. Seasonal fishing is conducted often at the fishing camps situated at a half-to-one day distance from the village. The intensive seasonal fishing is done at the site inherited from the paternal kin group. Villagers also hunt in the forest with traps and guns. Inexhaustible palm wine is fermented naturally from palm sap flowing out from cut raffia palms growing along Motaba River. Gathering palm wine is the most important daily work of men practiced without a holiday. There is a semi-wild oil palm grove around the village. Extracting oil from oil palm fruits, which is cut by Aka men, is a work for women. Villagers till the cacao field for cash income, but purchase of cacao nuts by the government or companies is not reliable every year.

In swamp areas, a dugout canoe with a paddle is an important means of transportation. It takes three days by paddling to Dongou at the mouth of Motaba River, or a whole day even by a out-board engined canoe which is rarely available. Regular (once a month) vedette service from Dongou stops in the dry season. There is no market nor shop in the village; the access to industrial goods is limited to the times when villagers go to Dongou or Impfondo, or when peddlers visit the village by a vedette (Table 1).

Table 1. Comparison of natural and social environments among three villages.

village	Djoubé	Lindi	Mondindim
country	Republic of Congo	Republic of Cameroon	Republic of Cameroon
location	2° 25' N, 17° 28' E	4° 05' N, 15° 08' E	2° 41' N, 15° 18' E
vegetation	riverine forest/ swamp/ semi-deciduous forest	semi-deciduous forest/ savanna	semi-deciduous forest
annual mean temperature	25.6°C	24.7°C	25.2°C
annual precipitation	1,793 mm ¹⁾	1,539 mm ²⁾	1,519 mm ³⁾
months with precipitation under 50 mm	none	two months	none
ethnic group	Bobanda ⁴⁾	Kako	Kako
establishment of village	1920's, from scattered villages in the forest, forced by colonial government	several generation ago from the village 70 km to the west	1950's, from Lindi
cropping system	mixed-cropping of several crops	mixed-cropping of two crops	mixed-cropping of several crops/ mixed-cropping of two crops
main crops	plantain, bitter cassava	bitter cassava	bitter cassava, plantain

1) see note 2

2) see note 5

3) see note 7

4) see note 3

2. Lindi village

Second village is Lindi located at 4° 05' N latitude and 15° 08' E longitude, Kadei District, East Province, Cameroon (Fig. 1). The village is on the eastern part of the distribution of Kako, whose population total is about 70,000. The population of the village was 101 in December, 1994, mostly Kakos. Kako language is spoken in the village. This village split several generations ago from the village situated 70 kilometers to the west. Before the former village was founded, the people had lived in the Republic of Central Africa on the opposite side of Kadei River. Like many other Kako villages, Lindi is situated on the border between the tropical forest and the Guinea savanna (Copet, 1977). Small forest patches and the Guinea savanna form a mosaic vegetation around the village. Dry season is from December to April, and rainy season is from May to November. The annual precipitation is about 1,539 mm. Rainfall concentrates in the rainy season, and there are two months with less than 50 mm of rainfall. The annual mean temperature is 24.7°C.⁽⁵⁾ The village is situated 15 km to the main road, or more than 100 km to Batouri, the district capital. There are stores at a village 4 km from Lindi, and also a market is held once a week at the junction with the main road.

People at Lindi inhabit and cultivate mainly the savanna area, whereas they hunt both in forest and savanna area. The main crops are bitter cassava, maize, sesame, peanuts and okra. They also plant plantain, sweet cassava, sweet bananas, pineapple, tobacco and other crops. While people in the forest mix crops in the field, Lindi villagers never mix major PSF crops in the field. Bitter cassava is planted in one of the fields, mixed with maize, sesame or peanuts, occasionally with tobacco. The other crops are planted in other fields. Many households obtain cash income from the coffee sale. Shifting cultivation is mainly done by women, whereas coffee cultivation is usually men's work, except for the harvest when everybody helps.

Kadei River is one kilometer to north-east from the village. Diverse fishing is conducted throughout the year, such as using hooks, gadget hooks, stationary nets, casting nets, fishing baskets of various size or fish bailing. Hunting is carried out with various types of traps, bows-and-arrows and bow-guns.

3. Mondindim village

Mondindim is a part of Ngola village,⁽⁶⁾ situated at 2° 41' N latitude and 15° 18' E longitude, Moloundou subdivision of Boumba and Ngoko Division, East province of Cameroon (Fig. 1). This village is situated on the road penetrating the tropical forest, 120 kilometers to the south from Yokadouma, the division's capital. There are two dry seasons (December to February, July to August) and two rainy seasons (March to June, September to November). Annual precipitation is about 1,519 mm and there is no month with less than 50 mm of rainfall. The mean temperature is 25.2°C.⁽⁷⁾ The road between Yokadouma and Moloundou on the international border is maintained in good condition, because several tens of large timber-carrying trucks pass the road everyday to and from the depots of timber companies in the nearby forest. Regular bus service connects the villages along the road. There are some shops in neighboring villages and vendors often visit the village. Several groups of shifting cultivators live along the road. The Baka hunter-gatherers also live in adjacent areas to these cultivators and they now conduct cultivation by themselves. The population of Mondindim was 137 in January, 1995. Mondindim is a composite village which consists of plural ethnic groups.⁽⁸⁾ Such a type

of village is generally found in south-eastern Cameroon, especially in the south of Yokadouma. Many languages are spoken in such villages.

The first immigrants to Mondindim were two Kako brothers and their families who came around 1950 from Lindi village, 160 kilometers north in a straight line. According to them, the major reason for their immigration was to collect wild rubber, which was bought by colonial government. When they arrived in the area, there had already been settlements on both sides of present Mondindim. Some were those of the Mboman, shifting cultivators, and the others were the Baka camps in nearby forest. Since then, village population has increased with the arrival move of relatives from Lindi, a Yanguere man who is their maternal relative and his family, their wives from the villages near Lindi and wives' relatives, and their wives from neighboring groups accompanied by their relatives. Each patrilineal kin group forms its own sections in the village along the road extending about 2 km long. Marriages between Baka women and cultivator men are not rare in this area, which is in sharp contrast to the situation at Djoube.

Major livelihood in Mondindim is shifting cultivation, fishing and hunting. Villagers sometimes clean the fields in the secondary and riverine forests in addition to the primary forest. A large maize harvest can be expected at the riverine fields. Main crops in the fields are bitter cassava, plantain, maize, peanuts and melon seeds. Secondary crops are cocoyam (*Xanthosoma* sp.), yam, sweet potato, pumpkin, sweet cassava, okra, papaya, oil palm, sugarcane, chili pepper and tobacco. Villagers also plant in kitchen gardens certain Solanaceae plants for seasoning the soup and other plants for seasoning the sauce. Many men also have cacao fields near the village. While cacao is an important source of cash income, its harvest is unstable, due to the diseases and pests, and large price fluctuation. Felling trees in the fields and maintenance of cacao fields are done by men, whereas other field chores are done by women. Husband and wife often cooperate in field chores. Hunting is frequently undertaken, with traps and bow gun, in particular, but gun hunting is restricted in Cameroon. Lokomo River runs one kilometer to the south and Boumba River four kilometers to the west. In these rivers, villagers fish throughout the year, using hooks, gadget hooks, stationary nets, casting nets, fishing baskets and hands.

II. Study Method

The research was conducted in Djoube for a period of 11 months intermittently from November 1991 to November 1992 and from November 1996 to January 1997. I asked for the help of local male assistants to keep a meal diary of the village households from December 1991 to February 1992, and from April 1992 to October 1992. Two assistants took charge of 5 households in December, two assistants, 4 households from January to February, and one assistant, 3 households from April to October. The assistants visited the households every three hours during the daytime from December to January, each evening or next morning after February and asked the villagers about meals and recorded the results in Lingala and local language.⁽⁹⁾ The recorded data include the name of the cooks, food materials, condiments and recipes used for the meals. I focused on seven households, of which two consisted of a husband and two wives, one of whom was from a neighboring village where bitter cassava is mainly eaten for PSF. One of the husbands

of the monogamous household was born in another district.

The research periods at Mondindim and Lindi in Cameroon covered a total of 8 months from December 1993 to March 1994, from November 1994 to January 1995 and February 1997. The research was conducted by direct observation and interviews. I also asked three men in Mondindim to keep a meal diary of their own households from November 1994 to September 1995, and one man in Lindi from December 1994 to September 1995. The household in Lindi consisted of ethnic Kako members, the households in Mondindim were a Kako husband with a Kako wife, a Kako husband with a Mbomam wife, and a Kako husband with one Kako wife and one Bangandou wife. The cooks, food materials, cooking methods and co-eating members were recorded in the diaries in French and Kako languages.

The diaries were recorded every other weeks in the three villages. Other observational and interview data were also used in the analyses of the following chapters.

FOOD CULTURES AT THREE VILLAGES

I. Food Culture at Djoube Village

Women usually cook in a kitchen hut or in the corner of a living room. In polygamous households, each wife had her own fireplace for cooking. The fireplace is made of three stones. A drying and preserving rack is hung over most of the fireplace. The meals are served usually in each household and sometimes with guests. A main dish of PSF and a side dish are served for a few persons. Villagers sit on stools or on raffia mats and eat with fingers, dipping a piece of PSF in the sauce.

Meals are served once to several times a day. While most meals are served in the morning and in the evening, the frequency and the time of meals are not always fixed. Women do not always cook in the kitchen all day, especially when they work out in the fields throughout the day. On such an occasion, they most often roast plantain in the field, or simply eat fruits such as papaya. Every morning and evening, men go to collect palm wine and drink a large quantity under the palm tree on the river bank, at a meeting place by the river, or in the village. They share some of the wine with the women and children waiting in the village. Palm wine is rich in nutrition,⁽¹⁰⁾ and supplements their dairy meals.

There are several behavioral taboos (*ekila*) including those imposed on food and eating behavior. The taboos are imposed on age-group, sex, patrilineal kin group or specific time in the life cycle. The most strict taboo is the one imposed on a widow, which includes food taboo for certain kind of meat, fish and specific types of plantain and their cooking method.

The villagers are self-sufficient. They only buy a few industrial products such as salt as a necessity, rice for the sick and sugar as luxury. They often give away as gift or trade meat, fish, plantain and palm oil. The PSF(*mbegu*) is mainly made with plantain, supplemented by tubers and roots such as cassava, taro, yam and sweet potatoes (Table 2).

There are mainly three kinds of recipe for unripe plantain (*ma-kemba*), the most important PSF: *mpika*, which is pared and boiled, *kpakpale*, which is pared, steamed and

Table 2. List of PSF materials.

English name	scientific name	Djoube	Lindi	Mondindim
plantain	<i>Musa sp.</i>	○	○	○
bitter cassava	<i>Manihot esculenta</i> Granz	○	○	○
sweet cassava	<i>Manihot esculenta</i> Granz	○	○	○
taro	<i>Colocasia esculenta</i> (L.) Schott	○	×	○
yautia (macabo)	<i>Xanthosoma sagittifolium</i> (L.) Schott	×	○	○
yam	<i>Dioscorea</i> spp.	○	○	○
sweet potato	<i>Ipomoea batatas</i> (L.) Lam.	○	?	○
pumpkin	<i>Cucurbita</i> spp.	○	○	○
—	<i>Dioscoreophyllum cumminsii</i> (Stapf) Diels	○	×	×
maize	<i>Zea mays</i> L.	○	○	○
bread fruit	<i>Artocarpus altilis</i> (Park.) Fosberg	△	×	×
rice	<i>Oryza sativa</i> L.	△	△	△
wheat	<i>Triticum aestivum</i> L.	△	△	△

- self-supplied in the village
 △ brought from outside the village
 × not eaten

lightly mashed on a board with a beating stick, *di-doko*, which is pared, steamed and mushed well and elaborately with a stick into a ball-shape. *Di-doko* is indispensable for a formal meal, ritual meal and meal for guests. Even for an ordinary meal, men often eat *di-doko*, whereas women and children often eat *kpakpale* or *mpika* instead. Four other recipes for unripe plantain are known: roasting for snack, boiling with cassava leaves, drying for preservation, and deep frying (Table 3). Ripe plantain is called *ntela*, which has nine local recipes.

There are eleven local recipes for bitter cassava (*kuakila*).⁽¹¹⁾ Not all women know all of these recipes. The common daily recipes are: *bokonde* which uses prepared dry cassava, *fufu* which uses prepared and floured cassava, and *baton de manioc* (cassava bar), a steamed roll of cassava paste wrapped with Marantaceae leaves. To prepare bitter cassava, it is peeled and soaked in water for two days after harvest to remove the hydrocyanic acid. On the third day, tuber becomes soft and hydrocyanic acid is removed. To make *bokonde*, cassava from which hydrocyanic acid is removed is dried in the sun. Dried cassava can keep for several months. When cooking, dried cassava is soaked in water and steamed on a standing basket woven with vine.

To make cassava flour, the wet cassava free of hydrocyanic acid is kept in a basket of vines or sack woven with plastics for a few days. Fermented cassava acquires a peculiar flavor during steeping. After fibrous parts are removed, this is dried in the sun for one or two days, then pounded with mortar and pestle. Cassava flour can be preserved for months. For cooking *fufu*, a little cassava flour is first put into boiling water in a pot and stirred. Then, quite a quantity of remaining flour is poured into boiling water, and the pot is removed from the fire. The cook secures the pot with her legs and the content is stirred with a stick until it thickens into a mound-shaped thick porridge. This is formed into several balls and served on plates. There are several recipes for preparing *baton de manioc*, a steamed cassava paste rolled in leaves. The preservability and softness vary

Table 3. List of PSF recipes with vernacular names.

materials	recipes	Djoubé	Lindi	Mondindim	
plantain	unripe	1 boiled alone or boiled with other materials	●	●	●
		2 steamed and lightly mashed with a beating stick	●		
		3 steamed and mashed well into a ball-shape with a beating stick	●		○
		4 steamed and pounded into a ball-shape with mortar and pestle		○	●
		5 roasted in hot ashes	●	○	●
		6 boiled with cassava leaves	●		
		7 deep fried	○		
		8 dried with fire (for preservation)	○		
		9 dried with fire and pounded into powder (for making thick porridge)			○
	ripe	10 steamed	●	○	○
		11 deep fried	●	○	○
		12 roasted	●	○	●
		13 thick porridge	○		●
		14 uncooked	○		
		15 boiled with skin, peeled and pounded into paste	○		
		16 dried with fire for preservation and pounded into paste		○	○
		17 boiled with skin, peeled and pounded into paste with palm oil	●		
		18 boiled with skin and dried with fire (for preservation)	○		
		19 boiled with cassava leaves	○		
total		16 (9)	7(1)	10 (5)	
bitter cassava	1 flour kneaded with boiling water into mound	● ¹⁾	●	●	
	2 steamed leaf-roll of cassava paste (long, thin and twisted)	●			
	3 steamed leaf-roll of cassava paste (short, thin and straight)	● ²⁾	○	○	
	4 steamed leaf-roll of cassava paste (long, thin and bent)	● ²⁾		●	
	5 steamed leaf-roll of cassava paste (short, wide and flat)	○	○	○	
	6 steamed leaf-roll of cassava paste (long, thin and straight)	○	●	○	
	7 dumpling (steamed, round-shaped)	○			
	8 steamed, roasted or deep fried	●		○	
	9 steamed or roasted (after dried and resoaked in water)	●		○	
	10 steamed or roasted in leaf	●			
	11 squeezed and roasted in pan		○	○	
	12 thick porridge	○			
	13 thin porridge		○	○	
	14 dried without soaking in water	○			
	15 soaked in water after steamed	○	?	○	
total		11 (6)	6 (2)	10(2)	

● recipe with vernacular names and observed directly/recorded in the food diaries

○ recipe with vernacular names but not actually observed/recorded in the food diaries

1) All recipe for bitter cassava (except 14 and 15) involves soaking cassava in water for a few days for removing hydrocyanic acid before other process.

2) Recipe 3 and 4 for bitter cassava have the same name as *mosombo*. Recipe 4 is, however, correctly called *mosombo mabunya*, which means bent *mosombo*.

with the cooking method and shape. A soft *baton* does not last long. *Baton de manioc* has no common vernacular name, but there are several vernacular names for the final shapes wrapped with the leaves: thin and straight *mosombo*, narrow, long and twisted *mondembe*, and wide and flat *mongbele*. Adjectives are often added to the generic names to denote the variations, for example, *mabongola* (re-kneaded), *machacha* (sieved) or *mabunya* (both edges folded), each deriving from the cooking process.

Most of the sweet cassava, taro, yam and sweet potatoes are simply steamed or boiled. They are sometimes roasted, deep fried and boiled to make a paste.

Side dish (*bema*)⁽¹²⁾ consists mostly of sauce with stewed meat, fish, vegetables and other materials. The most popular fish dish is cooked as follows: dry fish is soaked in water, bones removed, and then broken into fragments. It is boiled with a little salt, chili pepper and some water. After the water is almost gone, it is removed from the fire, and oil palm is poured on it. Other materials often added to this are grated or pounded young cassava leaves (*monkume*) and shredded wild *Gnetum* leaves (*koko*, *Gnetum bucholizianum*).⁽¹³⁾ Fresh fish and wild game are cooked in a similar way. Each kind of fish and meat has its own taste and flavor. The fish dried over the fire has a peculiar flavor different from the fresh one, whose taste is smooth and simple. Fish is dried for adding the special flavor as well as for preservation. Palm oil is one of the most important condiments⁽¹⁴⁾ (Table 4). It has three local varieties: *maita*, squeezed from boiled and pounded pulp of the fruit, *mosaka*, squeezed from boiled and pounded fruit after much water is added, and *kambili* which is boiled *maita*. Each of these has a different flavor and utility and used in different recipes and at different timings in the cooking process.

Plant materials such as *monkume* or *koko* are sometimes cooked only with oil palm, salt and chili pepper, without fish or meat. If there is a small quantity of fresh fish, they are wrapped with Marantaceae leaves with salt, chili pepper and occasionally oil palm, and roasted in the hot ashes. Men sometimes roast fresh animal meat and intestines, which is rare in the village.

II. Food Culture at Lindi

The cooking place, fireplace and their general characteristics at Lindi are similar to those of Djoube. Each household cooks separately in its own house or kitchen. There are five sections (*dja*) in the village, each consisting of houses of close relatives. Each section has a communal place in the center, at which all the male members and their male guests take meals together. Two concentric circles are formed: a men's circle in a communal place and a women's circle around it. They squat and eat with their fingers from large plates or bowls placed in the center. Before and after the meal, they wash their hands with water poured from a bowl. Meal is eaten up quietly and quickly. When the children and women carry out the meal from each kitchen, all the members in the section gather around it in a minute, start eating quietly, and finish in five minutes, then go back to their own places. The numbers of meal are irregular, from twice to five times a day. Sometimes snacks are eaten in each household when there is only a small quantity of food or when only tubers are available. I have not fully investigated the taboos concerning food and eating at Lindi, but, they seemed to be similar to those at Mondindim.

Table 4. List of condiments in three villages.

	English name	scientific name	Bobanda(Djoube)	Kako(Lindi, Mondindim)	Djoube	Lindi	Mondindim
salt	refined salt	—	mongba	nalerne	▲	▲	▲
oil	palm oil	<i>Elais guineensis</i>	maita	banga	▲	▲	▲
	refined oil	—	maita	muto	▲	▲	▲
nuts and seeds	peanuts	<i>Arachis hypogaea</i>	nguba	wuwundu	▲	▲	▲
	melon seeds	<i>Cucurbita</i> sp.	mosuku	njako, sondo, ful	1(1)	3(3)	1(1)
	sesame	<i>Sesamum indicum</i>	—	ngwal	×	●	○
	—	<i>Irvingia</i> sp.	mopayo	peki, telem, payo	1(1)	2(1)* ¹	2(1)* ¹
	—	<i>Ricinodendron heudelotii</i> * ²	—	gopo	×	○	●
	—	<i>Panda oleosa</i>	munkana	kana	○	○	●
viscid plants	cacao shoot	<i>Theobroma cacao</i>	—	cacao	×	●	●
	—	<i>Triunfetta</i>	—	nbaya	×	●	●
	—	<i>Beilschmiedia</i> sp.	—	danbu	×	●	●
	—	<i>Irvingia</i> sp.	—	peki, telem	×	2(0)* ¹	2(2)* ¹
ash salt	solid type	<i>Musa</i> sp. / <i>Elais guineensis</i>	mokwa	bakwa	●	●	●
	liquid type	<i>Musa</i> sp. / <i>Elais guineensis</i>	mai ya mokwa	molokmekwa	●	●	●
spices	chilli pepper	<i>Capsicum</i> sp.	konji	ndon	●	●	●
	basil	<i>Ocimum</i> sp.	—	welele	×	●	●
	turmeric	<i>Curcuma domestica</i>	—	kokoblanco	×	●	●
	—	not identified	—	kemo	×	○	●
	ginger	<i>Zingiber officinale</i>	—	jinja	×	●	○
	—	<i>Solanum incanum</i>	—	piliyanga	×	●	●
	—	not identified	—	mazut	×	×	●
	—	<i>Piper guineensis</i>	—	ndongete	×	○	●
	—	<i>Afrotyrax lepidophyllus</i>	njembe	yembe	●	○	●
	—	<i>Aframomum</i> sp.	disomboloko	—	●	×	×
	leek	<i>Allium</i> sp.	sibulu	—	●	×	×
bitter fruits	—	<i>Solanum melongena</i>	—	njo	×	●	●
	—	<i>Solanum aethiopicum</i>	—	pil	×	●	●
others	consomme	—	—	kimaji	×	▲	▲
	onion	<i>Allium cepa</i> L.	onion	onion	▲	▲	▲
	tomato	<i>Lyopersicon esculentum</i> Mill.	tomate	tomate	▲	▲	▲
	citron	<i>Citrus</i> sp.	djidolo	citoron	●	●	●
	sugar	—	sukele	suklu	▲	▲	▲
	solid salt	—	—	kwayanga* ³	×	▲	▲
total					17(16)	35(28)	35(31)

● self-supplied and directly observed or recorded in the food diaries

○ known as self-supplied condiment, but not directly observed or recorded in the food diaries

▲ supplied from the outside of the villages and directly observed or recorded in the food diaries

× not used

X(Y) X: the number of materials known as condiment

Y: the number of condiments directly observed or recorded in the food diaries

(1) *peki* and *telem* are used both as nuts and viscid plants.

(2) *Ricinodendron heudelotii* (Baill.) Pierre ex Pax

(3) *kwayanga* is explained as "marine salt," which is a condiment of Hausa people.

(4) The botanical specimens were collected by Mr. Hanawa and identified by Dr. J. M. Moutsambote of Laboratoire de Botanique in Congo, and identified by the laboratory of I.R.A. in Cameroon. For the identification of plants in Cameroon, I referred to the AFlora Committee (1991), Purselove (1968), Hotta et al.(1989) and the advice of Dr. M. Ichikawa. For vernacular names in Djoube, I referred to the data of Mr. Hanawa.

Food materials are basically supplied from the villagers' fields, rivers and the forest. They buy refined cooking oil, consomme cubes, rice, sugar and solid gray condiment called *kwayanga*⁽¹⁵⁾ in addition to salt which is indispensable to cooking. They also occasionally buy fresh beef or cattle viscera at a nearby market.

Bitter cassava flour is kneaded with boiling water into a ball-shaped *kamo* and dipped in sauce for daily meals. There are several other recipes for bitter cassava, but they are rarely used (Table 3). Bitter cassava is soaked in water for two or three days after harvesting to remove the hydrocyanic acid. Then it is pared, fibrous parts taken away, and dried under the sun. Before cooking, it is pounded with mortar and pestle and sieved into fine flour. This flour is poured into boiling water little by little. The pot is removed from the fire, and the flour is stirred with a stick until it is shaped into a mound. *Kamo* is pulled off from the ball using fingers, rounded in the palm, then dipped in sauce when eaten. Occasionally, steamed plantain, tubers or roots are also served at meal (Table 2).

The sauce (*jambo*) in which *kamo* is dipped is a stew with various materials. Fish, shrimps, crabs are often used in stews at Lindi, situated near Kadei River. The sauce is made of the stew of these materials normally, whereas sometimes it is prepared without stewing as in the case of wild leaves (*koko*, *Gunetum vucholzianum*) which are only shredded, and mixed with water, salt and chili pepper. Basic condiments are salt and chili pepper, to which ground nuts, spices and other condiments are added. Oily nuts and seeds, in particular, sesame and peanuts, are very important condiments at Lindi (Table 4). The peculiar condiment in this area is the viscid substance extracted from certain plants like cacao shoots, fern and some seeds. These substances and the resulting sauce are both called *molu*. *Molu* from cacao and fern are tasteless, but their viscid touch in the mouth is much preferred. Even side dishes made with only *molu* of cacao, salt and chili pepper were eaten.

III. Food Culture at Mondindim

Food culture of Mondindim has been formed by Kako immigrants from the border area of the semi-deciduous forest and Guinea savanna. The people of Mondindim have accepted both wild and cultivated products in the tropical forest as well as other elements of the food habit from their forest-dwelling neighbors such as the Mbomam and the Bangandou.

The cooking place, fireplace and their characteristics are similar to those at Djoube. Meals are two or three times a day. Men take meals at a communal place in each section (*dja*), whereas women usually eat in the kitchen or in front of it mostly with other household members, sometimes also with their neighbors or relatives. There was a man converted to Islam in Mondindim, but his food repertory was not so much influenced by Islam.

The taboo concerning behavior and food is generally called *kiyo*, and imposed on a particular sex, age-group and time in a life cycle. It is stricter on women than on men, but in particular, on pregnant woman.

The villagers are self-sufficient for most of the food materials. The purchased materials include salt, refined cooking oil, consomme cubes, onions, tomatoes, rice, sugar, and *kwayanga*, similar to Lindi. Sugar is added to gruel rice, maize flour or cassava flour to feed babies and the sick, but it is rarely used in drinks such as coffee.

Trade of meat and fish is common in the village. Plantain and cassava flour are also traded occasionally.

The PSF materials are bitter cassava, plantain, tubers and roots (Table 2). Most of the bitter cassava is cooked as *kamo*, as at Lindi. There are several recipes for preparing *baton de manioc* (Table 3). There are also several other recipes adopted from the forest dwelling neighbors, although these recipes rarely appeared in the daily meals. In Mondindim, plantain, other roots and tubers than cassava are served frequently in daily meals, but not in the style of the mother village, Lindi, but similarly to villages of the Mbomam and the Bangandou neighbors in the forest. Major cooking methods of plantain are the same as those of the neighbors: boiled (*pelu kwende*), or boiled, pounded and shaped into a ball in a mortar (*kimo*). However, plantain is not mashed using a board with a beating stick, in contrast to in Bangandou. Cocoyam, sweet cassava and yam are simply boiled and eaten.

Side dish is mostly sauce with meat, fish, wild leaves or young cassava leaves. Mondindim villagers have adopted the frequent use of palm oil from the forest neighbors, although most of the materials for the side dish are the same as Lindi (Table 4). The villagers have also adopted *sosok* soup from the neighbors. For *sosok* soup, the bitter fruits of Solanaceae plant are steamed, mashed, and added into boiling water with chili pepper. *Sosok* is steamed on plantain and served with plantain.⁽¹⁶⁾ It is never served with *kamo*, but occasionally taken with boiled tuber or roots.

SELECTION OF FOOD MATERIALS

I. Frequency of Food Materials

1. PSF materials

The ratios of materials per 100 PSF dishes are shown in Fig. 2. At Djoube, plantain accounted for 79 per 100 PSF dishes, and bitter cassava, only 13. The PSF material of Djoube is thus specialized in plantain. Cassava is only a substitute of plantain in times of shortage.

At Lindi, by contrast, bitter cassava accounted for as much as 95 per 100 PSF dishes, mostly served as *kamo*.

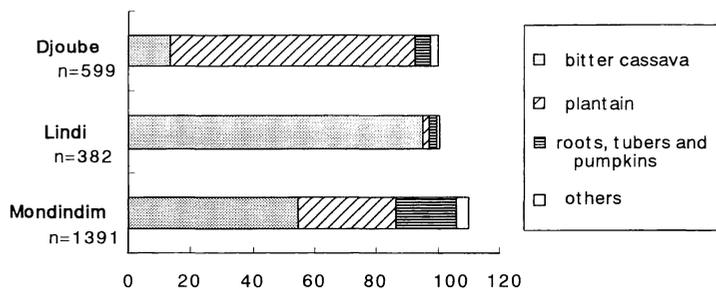


Fig. 2. The average ratio of materials per 100 PSF dishes.

In contrast with these two villages, at which PSF materials are specialized, there is a variety of materials at Mondindim. While the ratio of bitter cassava is 55 per 100 PSF dishes, plantain accounted for 32. Roots, tubers other than bitter cassava and pumpkins accounted for 20 per 100 PSF dishes comprised of sweet cassava, yam, sweet potato, pumpkins and taro, in the order of frequency. Plantain, tubers, roots and pumpkins are often boiled together in the pot. In 119 (26.4%) cases of boiled PSF out of 450 recorded, two or more materials were cooked together (maximum was 4 materials).

2. Side dish materials

The ratios of side dish materials appearing per 100 side dishes are shown in Fig. 3. The most important material at Djoube is fish, accounting for 78 per 100 side dishes. Of secondary importance are cultivated plants (21 per 100 side dishes), wild plants (14) and wild animals (11). In particular, young leaves of cassava and wild leaves of *koko* (*Gunetum bucholizianum*) are the important vegetable materials. Fish is usually stewed with these leaves. In other words, 78 per 100 side dishes at Djoube contain fish, either with cassava leaves or with *koko*.

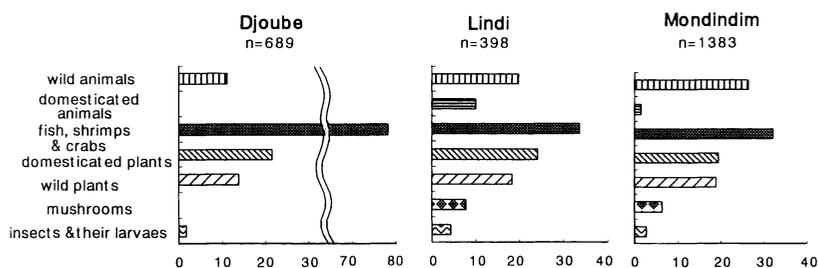


Fig. 3. The average ratio of materials per 100 side dishes.

In contrast with the materials at Djoube which are rather monotonous, those at Lindi and Mondindim show a wide variety. Fresh water fish and shrimps accounted only for about 30 per 100 side dishes, although these are the most important materials. Wild meat, cultivated and wild plants each accounted for about 20 per 100 side dishes. Domestic animals, mushrooms and insects were also recorded. Various other plants than cassava and *koko* leaves are also cooked.

Average number of materials per side dish is 1.26 at Djoube, 1.18 at Lindi, 1.07 at Mondindim. The average is rather higher at Djoube because fish and plants are often cooked together, whereas they are usually cooked separately at Lindi. The lower average at Mondindim is due to the fact that 9% of PSF dishes were served with the soup made with condiments.⁽¹⁷⁾

3. Condiments

Salt and chili pepper were excluded from the analysis because these were recorded for over 80% of side dishes at all the three villages with no difference among the villages.

Condiments at Djoube considerably differ from those at the other two villages (Fig. 4).

Palm oil is added to most of the side dishes. Ash salt, made from oil palm inflorescence, accounted for barely 4 per 100 side dishes besides palm oil. In contrast with Djoube, at Lindi and Mondindim a variety of condiments are used, such as palm and other refined oils, nuts and seeds, viscid plants, ash salt, spices, bitter *sosok* fruits. There is no such typical condiment at Lindi and Mondindim as the palm oil at Djoube.

There is also a difference between the condiments of Lindi and Mondindim, despite the similarity observed in the importance of nuts. At Lindi, various spices and viscid plants are important, whereas in Mondindim palm oil and bitter fruits comprise the important condiments next to the nuts. The frequent use of palm oil and the use of bitter fruits by Mondindim villagers are probably influenced by their new neighbors in the forest.

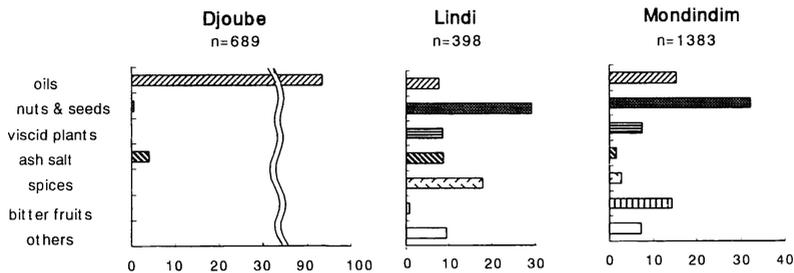


Fig. 4. The average ratio of condiments per 100 side dishes.

II. Seasonal Change in the Food Materials

1. PSF materials

The materials of PSF at Lindi and Djoube are specialized toward bitter cassava and plantain, respectively. However, the utilization patterns show seasonal change (Fig. 5). At Lindi, the use of bitter cassava exceed other materials throughout the year, while plantain at Djoube is replaced by bitter cassava from May to September. The two utilization patterns of the villages are mainly caused by the difference in harvest stability. As described below, bitter cassava harvest is steady throughout the year. Plantain harvest shows a comparatively low stability. Although the Djoube villagers try to diversify the breeds of plantain to ensure stable harvest throughout the year, there is still a possibility that plantain runs short over several months. This was exactly the case in 1992, when the research was conducted. Bitter cassava is mainly treated as a substitute during the period of plantain shortage at Djoube. Cassava is apparently not preferred, which is exemplified by the fact that there are the months when cassava is not eaten at all in spite of its availability. The low proportion of plantain in Fig. 5 reflects its shortage during this period. In fact, the author herself found it hard to obtain plantain at that time. At Lindi, by contrast, plantain is rarely prepared as PSF, although it is available from the fields. Plantain is primarily sold to the people from Republic of Central Africa.

While PSF materials are specialized at Djoube and Lindi, it is not the case at Mondindim.

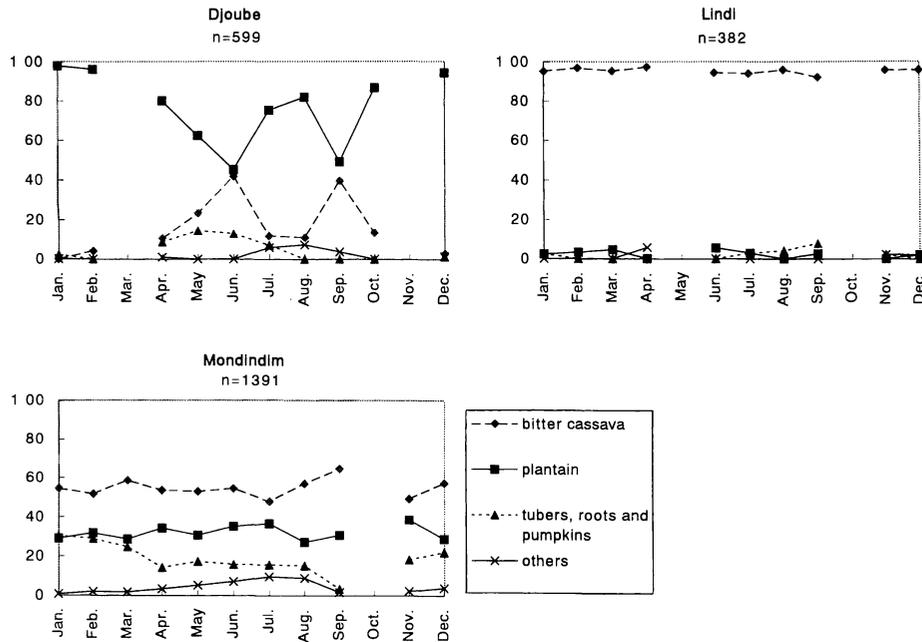


Fig. 5. Monthly change in the ratio of materials per 100 PSF dishes.

The Mondindim villagers plant various crops in the fields and serve them constantly, thus maintaining PSF variation throughout the year.

2. Side dish materials

Fish accounted for the highest proportion of the side dish materials at Djoube, especially from January to April when fish accounted for more than 90 per 100 side dishes (Fig. 6). Fish consumed in these months are caught by group fishing conducted from November to December (the end of rainy season) and March (the end of dry season). Another characteristic of side dish materials at Djoube is a stable supply of animal protein throughout the year, because fish is frequently supplied by men even in the seasons without dried fish stock. The plants used as side dish materials were mainly cassava leaves and *koko*, neither of which had clear seasonality.

The seasonal changes in the side dish materials at Lindi and Mondindim are more complicated. The materials supplying animal protein accounted for 51-75 per 100 side dishes at Lindi and 50-71 at Mondindim. These materials consist of fish, shrimp, crab, wild and domesticated animal meat and insects. Wild and cultivated plants accounted for 30-54 per 100 side dishes at Lindi, and 27-50 at Mondindim. Insects, gathered intensively in August and September, and mushrooms also contributed to increasing the variety of side dish.

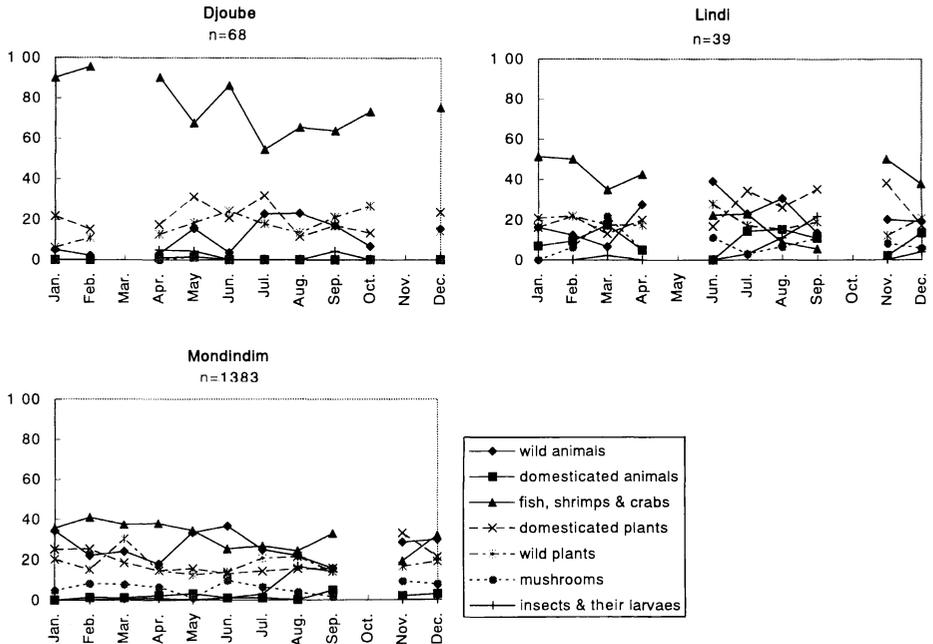


Fig. 6. Monthly change in the ratio of materials per 100 side dishes.

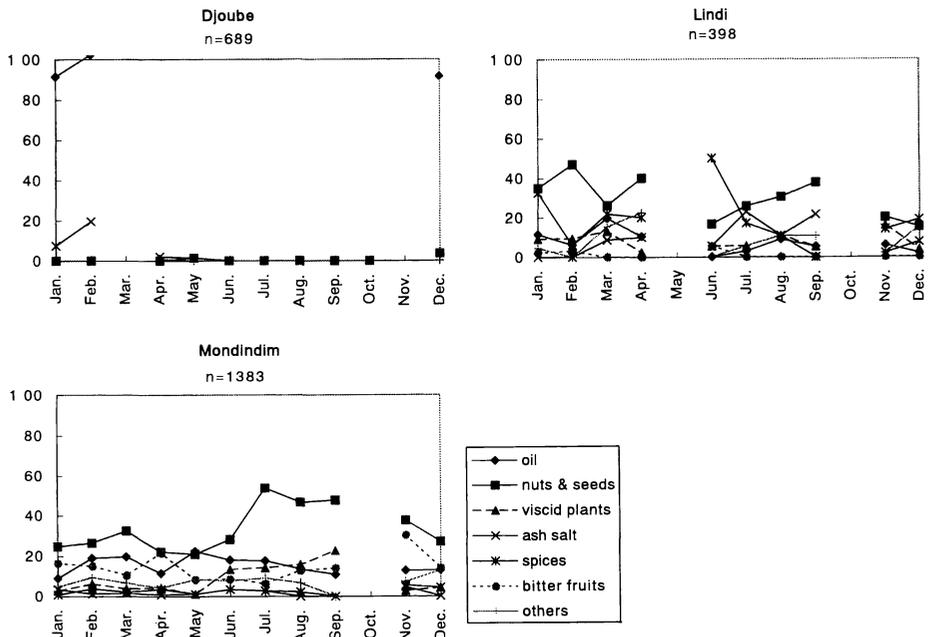


Fig. 7. Monthly change in the ratio of condiments per 100 side dishes.

3. Condiments

There is no seasonal change in the use of condiments at Djoube (Fig. 7). Palm oil is added to almost all the dishes throughout the year.⁽¹⁸⁾ While the condiments show a monthly change at Lindi, why so is not clear. Monthly change in the condiments is not associated with particular material of PSF nor with side dish material. Although there are suitable or unsuitable combinations between side dish materials and condiments, there is no one-to-one correspondence between these two elements. Monthly change in the condiments is, therefore, not directly based on the change in the side dish materials. Neither is this change seemed to be caused by availability, because most of the condiments can be gathered or cultivated all year round except sesame, peanuts and *payo* (*Irvingia*) nuts.

While the seasonal change in the condiments at Mondindim is smaller than that of Lindi, it is equally difficult to explain this change. The high proportion of nuts and seeds from July to September may result from the first harvest season of peanuts. However, the proportion of nuts and seeds is not high from December to January, the second harvest season of peanuts.

DISCUSSION

I. Availability and Utility of Food Materials

In the following section, the foci are put on the PSF materials as the core of meals, and the condiments which are influenced most by cultural factors because of their nutritionally (but not culturally) peripheral importance in the diet.

Availability of the food materials is influenced by natural environment, technology, circulation and other techno-environmental factors. In self-sustained cultivator societies, natural environment is one of the most important factors for availability, especially of PSF materials. PSF is the core of a meal and stable supply of PSF materials is crucial. While people are usually very conservative as to PSF preference, a new crop with higher productivity is likely to be accepted. One of the best examples for this is bitter cassava, which has been introduced from the New World after the 16th century and spread over central Africa after the 19th century (Prinz, 1993; Vansina 1990).

Plantain is suited to the humid tropical lowland. The most adequate precipitation for plantain cultivation is 2,000-2,500 mm a year with a minimum 25 mm a week. Plantain is difficult to grow with low precipitation in the dry season or without water preservability, because plantain is easily affected by the aridity. It takes 9-18 months to harvest. The plantain requires quick harvesting to prevent damage from birds. Plantain requires fertile land or fertilizer, and the shortage of soil nourishment directly affects its yield (Purseglove, 1972).

In contrast, bitter cassava can be cultivated even in areas with precipitation of less than 500 mm a year, but 1,000-1,500 mm is optimal. It is the crop suited for regions with a little and uncertain rainfall. Bitter cassava can be harvested one year after planting, and harvesting is possible up to 3-4 years (Purseglove, 1968). Although both plantain and cassava have high productivity,⁽¹⁹⁾ bitter cassava is more adaptive to areas with various climatic and soil conditions.

On mixed cropping in central Africa, Y. Ankei (1981) reported plantain yields of 4.9-11.5 ton/ha and bitter cassava yields of 9-20 ton/ha by the Songola people in Zaire. Fresco (1986) also reported that plantain yielded 2.3-4.7 ton/ha, bitter cassava 7.9-14.6 ton/ha at Kwango-kwilu of Zaire. Both areas have annual precipitation of 1,500-1,600 mm. Because plantain grows well in a fertile land, it was reported that people thought that plantain planted in the primary forest has higher yield than that in the secondary forest (Y. Ankei, 1981 ; Takeda and Sato, 1993). At Djoube, people also said the primary forest was more suitable for planting plantain than the secondary forest.

At Djoube, since the people usually clear fields in the primary forest with high water preservability, high yields for both plantain and bitter cassava are expected, because monthly precipitation is never less than 50 mm, the point which may impose stress on plant growth. At Lindi, villagers clear fields in the savanna with strong sun shine, a rather desirable condition for growing cassava. By contrast, this is not a suitable condition for growing plantain because there are two months with precipitation of less than 50 mm. At Mondindim, it is possible to grow both plantain and bitter cassava as main crops. When the Mondindim villagers clear fields in the primary forest, they do not fell the big trees because of hard work, which consequently provide shades to prevent plantain from drying and may result in high productivity.

Each of the main crops of the three villages is thus suited to the environmental conditions. However, since plantain yield has a relatively low stability than cassava, Djoube villagers practice mix-planting of plantain, roots and tubers, as insurance for the supply of adequate PSF throughout the year.

Both plantain and cassava are rich in energy, as plantain provides 135 kcal /100g and bitter cassava, 149 kcal /100g (Woot-Tsuen Wu Leung, 1968).⁽²⁰⁾ However, they contain less protein and lipid than other PSF materials, for plantain has only 1.2g of protein and 0.3g of lipid, and cassava has 1.2g of protein and 0.2g lipid.⁽²¹⁾ This nutritional disadvantage is supplemented by diverse foods procured by a combination of fishing, hunting and gathering with agriculture.⁽²²⁾

Among condiments, sesame is the most environmentally restricted, because it poorly tolerates water-logging, whereas it is strong against dryness (Purseglove, 1968). It is therefore difficult to grow sesame especially at Djoube where the land is humid and even liable to be water-logged. However, other condiments found at one of the three villages are available in the other two villages. Consequently, the difference in the use of condiments in three villages is less influenced by natural environment than in case of PSF materials.

In Lindi and Mondindim, viscid plants and bitter *sosok* fruits are popular condiments. These are also known among the Djoube neighbors whose ancestors immigrated to the area from Cameroon or Republic of Central Africa before 19th century. The Djoube villagers have therefore had plenty of time to incorporate these condiments into their diet, but they actually did not.

II. Selection of Food Materials Based on Acceptability

While selections of food materials is influenced by availability and utility, these factors suggest only the potential food repertoire. The PSF materials are selected deliberately among the potential materials suited to the natural environment, where only

one material may become attached to a special importance or plural materials are equally used.

At Bunzjanda, an adjacent village to Djoube, bitter cassava accounts for the highest proportion of PSF materials. At Djoube, by contrast, people value plantain over bitter cassava, although they actually depend on the latter during the time of plantain shortage. The Djoube villagers sometimes look down on their neighbors because they eat bitter cassava as their PSF. The women feel proud to serve a large amount of big plantains everyday. Plantain and dried fish have a special importance, and the more the women serve plantain and dried fish, the more their social value is reinforced. Plantain ball (*di-doko*) is absolutely necessary for a formal meal for guests or for rituals. It is also necessary for the women to prepare a formal meal of *di-doko* with a side dish of dried fish and palm oil when they need to secure Aka labor for felling the trees in the fields. Women share a part of plantain upon harvest with one another even when they have their own harvest. The Djoube village was formed with some kin groups who had formerly lived separately. Djoube villagers rarely cooperate in work or practice communal ceremony. Personal gift networks play an important role for smoothing social relationships among such people who are liable to be involved in social conflict or separated into smaller groups. Plantain and fish serve as a medium of good relationship in these networks. ⁽²³⁾ Plantain may also serve as a marker of identity for Djoube villagers against the upstream neighbors.

At Mondindim, both plantain and cassava, and other tubers and roots are cultivated. People at Lindi, their mother village, depends on bitter cassava for PSF, although they know how to plant plantain and other PSF materials, and actually plant a small quantity of them. The Mondindim neighbors in the forest, by contrast, depend on plantain, tubers and roots. The Mondindim villagers thus have accepted both the food material preferences of their forefathers and new neighbors. However, the basic meals of Mondindim is similar to that of the mother village, for cassava ball (*kamo*) is indispensable to a formal meal. Plantain is served in the morning or at noon with simple bitter soup (*sosok*) or without anything else. Plantain is often regarded as a light meal or snack.

The Mondindim case provides an interesting example for the influences of neighbors on the selection for food materials. The increased use of plantain as PSF by Mondindim villagers may have been related to their history of immigration into the forest as a small number of newcomers. The immigrant Kako group began their new life depending on the forest-dwelling Mbomam households. They have gradually increased the use of plantain as their PSF and learned the effective methods for its cultivation. Acceptance of the same daily food habit as that of the neighbors probably contributed to promoting their relationship. Keeping close association with their neighbors must have been indispensable to the Mondindim villagers, particularly in the beginning when they had no field and food of their own. In the second generation, when men married women from other ethnic groups with different food cultures, acceptance of neighbor's food habit may have accelerated. Such a process of the formation of a new food culture probably occurs commonly at immigrant villages of small number of people. However, the Mondindim villagers also retain much of the tradition of the mother village, especially, the use of bitter cassava for formal PSF. Their contradictory selections to incorporate the neighbors food habit but to differentiate from their neighbors' formal PSF materials are

based on social factors. Their frequent use both of plantain and bitter cassava, both of which are available in Mondindim, is the result of positive selection, rather than simple response to the natural and social environments.

Food materials of self-sustaining cultivators are closely related to the farming system. Like many other areas in tropical rain forest, many kinds of crops are mixed in the field at Djoube. Other roots and tubers than bitter cassava are, however, rarely recorded in the food diaries, although there are also sweet cassava, taro, yam and sweet potatoes, all of which are PSF materials. These are not considered as the materials of a formal meal, but used for snack or supplementary materials in case of scarcity of plantain or bitter cassava. It is necessary to investigate how the villagers evaluate plants as food materials and those as crops.

Kamo at Lindi and Mondindim, and *di-doko* at Djoube look similar when served, although these are cooked with different materials and methods. The recipe for cassava ball (thick porridge) is probably influenced by the cooking method of cereals in savanna areas of sub-Saharan Africa. In this area since ancient times, millet and other cereals are milled and kneaded into a ball with boiling water (Nakao, 1993). The plantain ball, boiled and pounded into a ball with mortar and pestle, seems to be influenced by the way yam is cooked in the area along the Guinea Coast. The yam ball, the PSF in this area (called "yam belt"), is called *fufu*, made with yam boiled and pounded into a ball with mortar and pestle. The two food cultures of cereals and yams share a similarity in the final shape of PSF. The cereal culture had probably influenced the tuberous food culture (Kasori, 1981). At any rate, in sub-Saharan Africa, ball-shaped starchy foods are basic elements of the food culture, probably associated with the development of earthenware. In other words, starchy food unsuitable for rolling into a ball is not easily accepted as an important food in this area.

Condiments are selected more arbitrarily than PSF materials. At Djoube, almost all the side dishes are prepared with the three major condiments (salt, chili pepper and palm oil), indispensable for meals, and other condiments are used occasionally. There are special places for squeezing palm oil with large implements and women cooperatively work there. At Lindi and Mondindim, in contrast, many kinds of condiments are cultivated in the kitchen garden, semi-domesticated around the settlement, or gathered in the forest and savanna, brought into the subsidiary use of other major crops, and are always ready for use in cooking.

The interesting example for cultural preference in condiments is seen in the two kinds of seeds, *peki* and *telem*, both belonging to Irvingiaceae. There are two methods for preparing these seeds at Mondindim. In one method, kernels are taken out from the fruit, roasted or fried with oil, pounded with mortar and pestle into paste. Then the paste is put in a basket and hung over the fireplace. Some liquid oil falls onto a dish, whereas the solid remains in the basket. The solid part of *peki* and *telem* prepared in this way are used like peanuts, and added to the side dish for making it "oily," though some of oil has been actually removed from it. In the other method, seeds are taken out of their kernels, ground with a grinding board and ball, then poured into cold to a little boiling water. The viscid *peki* and *telem* which are prepared in this way are called *molu*, the general name of viscid plants including young shoots of cacao and other plants. The *molu* of *peki* and *telem* are not regarded to contain oil, though it actually contain much oil. The categorizing of condiments and the notion of "oiliness" therefore depends on their

cultural cognition.

III. Variety of Food Materials

The factors for food material selection at three villages have been analyzed. In this chapter the principles behind these selections are discussed.

At Djoube, both PSF and condiments lack variety. The PSF material is mostly plantain, and most of the condiments are limited to salt, chili pepper and palm oil. Thus, the principle of food material selection at Djoube is that the most preferred combination of materials is always selected. Instead, the villagers have a variety of cooking methods as shown in the various plantain recipes, each giving a different touch (Table 5).

At Lindi where only bitter cassava is used, PSF material is singular and cooking methods also lack variation. While the Lindi villagers know about many recipes of bitter cassava, they serve bitter cassava in the form of *kamo*, cassava balls. However, they have a long list of condiments and use them in practice. The list includes peanuts, sesame and other nuts and seeds, viscid plants, spicy barks, roots, fruits and herbs, and ash salts. They are grown wild, semi-domesticated or planted and are always ready for supplying various condiments. The principle for food material selection at Lindi is thus *kamo* meals given a variety by using various condiments.

Elements of the Mondindim food culture are both from its mother village and partly from their neighbors in forest. Therefore, they have many kinds of PSF materials, condiments and their combinations for daily use. Plantain, tubers and roots other than bitter cassava were observed in more than a half of PSF dishes in the morning, and bitter cassava was observed in 70 % of evening meals. The principle of food material selection at Mondindim is to attain variety in the meal both by PSF and condiments. The recipes for PSF are also much more varied than those of its mother village because both the recipes of their mother village and of their neighbors in the forest are incorporated.

The people in the three villages affirm their food material selection. The Djoube villagers show a strong preference to plantain, though some of the youth have accepted the taste of bitter cassava. Plantain shortage seriously affects the relationship with the Aka, who steal plantain from their field. The villagers also think that salt, chili pepper and palm oil are the necessity. They say they cannot cook a side dish, if they lack one of

Table 5. Comparison of the diversity of food materials among three villages.

village	Djoube	Lindi	Mondindim
main PSF materials	plantain	bitter cassava	bitter cassava/ plantain
condiments	17 (16) ¹⁾	35 (28)	35 (31)
numbers of PSF recipes	27 (15 varieties) ²⁾	13 (3) varieties	20 (7) varieties
	 wide variety	 middle variety	 narrow variety

1) In parentheses are the number of materials known as condiment. Out of parentheses are the number of condiments directly observed or recorded in the food diaries.

2) In parentheses are the recipes with vernacular names, observed directly or recorded in the food diaries. Out of parentheses are the recipes with vernacular names, but not observed directly or recorded in the food diaries.

the three. At Lindi, villagers serve cassava balls with a side dish cooked with various condiments every day. They prefer this combination and almost ignore other PSF materials which are also available. The women of Mondindim think that cassava balls are desirable as PSF for supper, but on the other hand, they also want a variety of PSF in their meals. While cassava is the most important material to them, there is also a tendency to maintain the variety of materials.

All the people at the three villages say that they want a variety in the meals. However, the meaning of “variety” is different among the three villages (Table 5). At Djoube it means various kinds of cooking methods of plantain and different kinds of materials for side dish. The “variety” in Lindi means the variety of materials for the side dish and condiments, whereas in Mondindim it means various kinds of both PSF and side dish materials and condiments. Therefore the people attain variety in meals at different levels of selection.

Some points are noteworthy concerning the principle of food selection. One is the suitable combination of food materials. For example, in the food culture of Mondindim, where there are elements from both the mother village and neighbors, the combinations of PSF and condiments do not occur at random. There are sets of materials suitably combined with PSF materials. For example, bitter fruits of *sosok* is used only with boiled plantain, and spices and viscid plants only for the sauce for bitter cassava balls (Komatsu, 1996). It is difficult to adopt a new food material which does not go well with the preexisting materials. Such suitability of a food combination depends on various factors of flavor, taste, smell and touch, but it is shared culturally, handed down in a group, and has changed through time.

Peoples at the three villages in this paper conduct vegetative reproductive cultivation in and around the tropical forest. The food cultures in this area have certain common characteristics such as the combination of ball-shaped PSF with a side dish of stewed sauce. A variety to their daily meal is desired, whereas the notions of variety differ from one society to another, as already stated above.

There are many levels for generating variation in the meals, including selection of food materials, combination of materials, cooking method and combination of dishes. At each level, the process for generating diversity generally takes place in two directions, internal differentiation and external diversification. In external diversification, new food materials are added to the existing inventory. In internal differentiation, on the other hand, a wider variety is produced in the use of the existing materials, which is attained by (1) differentiation of materials according to the breeds, parts or other subcategories of raw materials, (2) variation of preliminary arrangements of raw materials, (3) cooking methods, (4) combination of materials and (5) combination of dishes. In the process of such diversification and differentiation, new food materials, recipes and combinations are accepted by a community, given their respective names, thus established as a part of the food culture.

The condiments in Lindi reflect external diversification. A wide inventory of condiments in Lindi has been brought by incorporating many kinds of similar and different materials into their food culture. The PSF materials in Djoube, in contrast, reflect internal differentiation. Most of the PSF materials are comprised of plantain, but with a wide variety of cooking methods. Oil palm in Djoube also generates three kind of palm oil through different extracting methods.

A community may choose both directions toward enrichment of its food culture, as in the case of Mondindim. The large variety of meals at Mondindim may partly be due to the recent migration history and the food culture is now in the experimental stage. However, a change of habit through migration is not an unusual event for the Bantu-speaking people who have a long tradition of migrations throughout their history (Vansina, 1990, Wazaki, 1970). Mondindim is not, therefore, an exceptional example and is properly compared with Djoube, Lindi and other Bantu-speaking cultivators in Central Africa.

Whereas Mondindim villagers generated variety in meals by both external diversification and internal differentiation, Lindi villagers have attained it mainly through external diversification, and Djoube villagers, by internal differentiation. The direction toward generating variety in food culture of a particular group is usually found somewhere in the spectrum between the two directions. The location in the spectrum selected by each group depends on its cultural characteristics and historical background on which I wish to discuss in a forthcoming paper.

ACKNOWLEDGMENTS The researches were financed by the Ministry of Education, Culture and Science, Japan (Monbusho International Scientific Research Program Nos. 02041034, 04041062 and 06041046). The research authorizations were obtained from Ministère de l'Enseignement Supérieur, de la Science et de la Technologie (M.E.S.S.T.) in Congo and Ministère de la Recherche Scientifique et Technique (M.R.S.T.) in Cameroon. Dr. J. Dinga-Reassi, the former director of M.E.S.S.T. and Dr. B. Bikoi, the director of M.R.S.T., were gracious to offer me research permits. Dr. Ichikawa, the center for African Area Studies, Kyoto University, Dr. Terashima, Kobe-Gakuin University and Dr. Sato, Hamamatsu University of Medicine, the heads of the research teams, gave me the opportunities for the researches and instructive advice throughout my work. Dr. D. Kimura, Dr. K. Kitanishi and Mr. D. Tsuru gave me great help both in the research fields and in Japan. Mr. R. Hanawa permitted me to use the data collected in cooperation with him at Djoube and his own data obtained in Congo and Cameroon. Mr. and Mrs. Ohlin, Mr. and Mrs. Erickson, and Ms. S. Speer (Protestant Mission) in Impfondo, Mr. and Mrs. Iwasaki in Brazzaville, Mr. and Mrs. Oh'hata in Yaoundé and Sister M.-M. Sueyoshi (Catholic Mission) in Mindourou showed generous hospitality. Dr. J. M. Moutsambote (Laboratoire de Botanique) identified the botanical specimens collected in Congo. Dr. J. Tanaka, Dr. I. Ohta and other members of the Center for African Area Studies, Kyoto University, gave me much advice on my work. I would like to express great thanks to all the villagers in Djoube, Lindi and Mondindim, especially to Mr. Yemele-Gaston, the chief of Djoube, and his wives, Mr. Manyale-Antoine, my capable assistant, in Djoube, and Mr. Ngbangba-Pascal, the chief of Mondindim. Lastly, I greatly mourn over the loss of Mr. Anboutou-François, who was my gracious host in Lindi.

NOTES

(1) In the Guinea savanna zone extending between the tropical forest to the south and

- savanna to the north, yams and cassava are the main PSF materials. Harvesting yams in quantities are difficult in the tropical rainforest, because yams require a period of dry season to accumulate starch in the roots (Vansina, 1990).
- (2) Impfondo climate data was used for Djoube, because temperature data for Dongou, closer to Djoube than Impfondo, was not available. The precipitation at Dongou is 1,682 mm and that at Djoube may be close to this.
 - (3) Djoube villagers call the Aka Pygmy, Bambenga, and the neighboring groups upstream, the Kaka, distinguishing these neighbors from their own group. However, they do not make a clear distinction between the people downstream, whose cultures gradually change further downstream. Bobanda was integrated into Bondongo in a classification (Soret et al., 1961), and is close to Mbomotaba, classified in Bantu C 10 by Guthrie (1967).
 - (4) The villagers clear the undergrowth and set fire in the oil palm field (*toko*) around the village. This creates fields near the village with small effort for cutting trees, as well as making a better condition for oil palm growth by providing more ventilation.
 - (5) I used the climate data of Berberati, situated at 4° 15' N latitude and 15° 47' E longitude, Republic of Central Africa, for that of Lindi.
 - (6) Mondindim is administratively a quartier of Ngolla village. In this paper, I refer to the Mondindim village because it has a historical unity and also their own administrative chief.
 - (7) Moloundou climate data was substituted for that of Mondindim, which is situated at 2° 2' N latitude and 15° 10' E longitude, about 100 km south of Mondindim.
 - (8) The composition of the sixty adults at Mondindim were: Kako 25 (Male: 14, Female: 11), Gbaya 2 (F2), Yanguere 6 (M5: F1), Bangandou 5 (M1: F5), Mbomam 3 (M1: F2), Mbimo 2 (F2), Baka 17 (M7: F10). Their main residential areas were: Guinea-savanna area for Kako and Gbaya, forest area for Yanguere, Bangandou, Mbomam, Mbimo and Baka. Their languages were classified as: Equatorial Bantu for Kako, Mbomam and Mbimo (Kako was classified as A 90, Mbimo as A 80 by Guthrie, 1967, and the classification of Mbomam language is unknown.), Adamawa Eastern for Gbaya, Yanguere, Bangandou and Baka (Burnham et al., 1986, Copet, 1977, Greenberg, 1963). The identity with an ethnic group is chosen by the people themselves, generally through the paternal line. Most of the Baka live in their own sections. Only four Bakas live in the sections of other ethnic groups because of their relationships through marriage. The households with a Kako chief were central groups at Mondindim, and therefore, these households were analyzed in this paper.
 - (9) In the food diary, there were several days with only one meal or no meal, especially in the diaries recorded by the assistants. This is because informants did not record plantains, tubers roots or maize roasted in the field, regarding such food as a mere snack, not as a full-meal. Fruit is also rarely recorded. At Djoube, palm wine was rarely recorded, although almost all the people in Djoube drank much palm wine every day. The assistants mentioned palm wine only when they had not observed supper. In these cases they wrote, "they did not eat anything. They only drank palm wine." While all the materials eaten or drunk must be included for nutrition analysis, it was not necessary here to include the materials for snack and palm wine, because the aim of this study was to examine the characteristics of food cultures.
 - (10) Palm wine contains 34 kcal of energy, 0.4g of protein and rich minerals per 100 g

- (Woot-Tsuen Wu Leung, 1968: P.222, see oil palm wine instead of raphia palm wine.) Hanawa reported that the caloric intake with palm wine supplied almost a half of the necessary caloric intake (1996: p.357).
- (11) They are also classified into 22 detailed class by cooking methods.
 - (12) “*Bema*” means the side dish in a narrow sense, but an entire meal in a broad sense.
 - (13) There are “*Gnetum buchholzianum*” and “*Gnetum africanum*,” known as *koko* around the three villages. The two species are distinguished by the leaf size. One of the two species is by far the more important than the other judging from the gathering frequency (mainly *Gnetum buchholzianum* at Djoube and Lindi, mainly *Gnetum africanum* at Mondindim).
 - (14) “Condiments” are materials added for smell or texture as well as taste and flavour. The amount of condiment in the side dish is much less than that of other materials of side dish.
 - (15) They explain *kwayanga* as marine salt, or “salt of Hausa people.”
 - (16) Plantain is steamed. Bitter Solanaceae fruits are steamed on the plantain.
 - (17) Plantain, roots and tubers are sometimes eaten without any side dish, although bitter cassava is always accompanied by some side dish.
 - (18) The oil was omitted from entries through March to October because it became clear that it was added to almost all the side dishes.
 - (19) The yield is said to be 50 ton/ha for plantain and 64 ton/ha for cassava both under intensive cultivation. The yield of other crops in the tropical area are: 37t/ha for taro with irrigation and fertilizer, 32.5t/ha for yautia (macabo) with fertilizer and 25t/ha for yam (17.5t/ha in Africa.)(Purseglove, 1972)
 - (20) Taro contains 102 kcal per 100g; yautia (macabo), 137 kcal; yams, 71-135 kcal. (Woot-Tsuen Wu Leung, 1968)
 - (21) Taro contains 1.8g of protein per 100g; yautia, (macabo) 2.2g; yams, 1.4-3.5g. (Woot-Tsuen Wu Leung, 1968)
 - (22) Fish contains 11.9-27.0g of protein per 100g; young leaves of bitter cassava, 7.0g. (Woot-Tsuen Wu Leung, 1968)
 - (23) For men, palm wine plays an important role as a gift for smoothing the social relationships.

REFERENCES

- AFlora Committee 1991. AFlora: Catalog of useful plants of tropical Africa, Part 1: Forest areas. *African Study Monographs*, Supplementary Issue, 16: 1-195.
- Ankei, T. 1990. Cookbook of Songola: An anthropological study on the technology of food preparation among a Bantu-speaking people of the Zaire Forest. *African Study Monographs*, Supplementary Issue, 13: 1-174.
- Ankei, Y. 1981. Agricultural livelihood and economic activities of the Songola: slash-and-burn agriculturists in the tropical rainforest, Central Africa (in Japanese). *Anthropological Quarterly*, 12-1: 96-178.
- Burnham, P., E. Copet-Rougier, & P. Noss 1986. Gbaya et Mkako: Contribution ethnolinguistique a l’histoire de l’est-Cameroun. *Paideuma*, 32: 87-128.
- Center for Japanese Tour Culture Studies, ed. 1981. *Discovery of Food Cultures, the World Series 2, Cassava Culture and Porridge Culture*. Shibata syoten, Tokyo.

- Copet, E. 1977. *Nguelebok: Essai d'analyse de l'organisation sociale des Mkao Mbongendi*. École pratique des hautes études cinquième section, Paris.
- Fieldhouse, P. 1986. *Food and Nutrition: Customs and Culture*, Chapman and Hall, London.
- Fresco, L.O. 1986. *Cassava in Shifting Cultivation—A Systems Approach to Agricultural Technology Development in Africa*. Royal Tropical Institute, Amsterdam.
- Gisaangi, S. 1980. *La Cuisine de Bandundu*. Ceeba Publications, ceeba, Zaire.
- Greenberg, J. 1963. *The Languages of Africa*. Mouton, La Haye.
- Grimaldi, J., et A. Bikia 1985. *Le Grand Livre de la Cuisine Camerounaise*. SOPECAM, Yaoundé, Cameroun.
- Guthrie, M. 1967. *Comparative Bantu: An Introduction to the Comparative Linguistics and Prehistory of the Bantu Languages*. Gregg press LTD, Hants.
- Hanawa, R. 1996. Palm wine as means of expression—A case study on Bondongo shifting cultivators in Congo (in Japanese). In (J.Tanaka, M.Kekeya, M.Ichikawa & I. Ohta, eds.) *Anthropology of Natural Society, second series*, pp. 339-372, Academia Syuppankai, Kyoto.
- Hotta, M., et al., eds. 1989. *Dictionary of Useful Plants in the World* (in Japanese). Heibonsya, Tokyo.
- Ichikawa, M. 1993. Diversity and selectivity in the food of the Mbuti hunter-gatherers in Zaire. In (C.M. Hladik, A. Hladik, O.F. Linares, H. Pagezy, A. Semple & M.Hadley, eds.) *Tropical Forests, People and Food: Biocultural Interactions and Applications to Development*, pp. 487-496, UNESCO, Paris and The Parthenon Publishing Group, Lancs and New York.
- Kasori, T. 1981. Porridge culture (in Japanese). In (Center for Japanese Tour Culture Studies, ed.) *Discovery of food culture in the World Series 2, Cassava Culture and Porridge Culture*, pp. 132-257, Shibata syoten, Tokyo.
- Komatsu, K. 1996. The importance of combination of food materials among the shifting cultivators in southeastern Cameroon. *Journal of African Studies*, 48: 63-78.
- Koppert, G., J., A., Dounias, E., Froment, A., & P. Pasquet 1993. Food consumption in three forest populations of the southern coastal area of Cameroon: Yassa-Mvae-Bakola. In (C.M. Hladik, A. Hladik, O.F. Linares, H. Pagezy, A. Semple & M.Hadley, eds.) *Tropical Forests, People and Food: Biocultural Interactions and Applications to Development*, pp. 295-310, UNESCO, Paris and The Parthenon Publishing Group, Lancs and New York.
- Masseyeff, R., M.-L. Pierné & B. Bergeret 1958. Enquete sur l'alimentation au Cameroun dans la region de Batouri (Est-Cameroun). *Recherches et Etudes Camerounaises*, 1: 6-70.
- Murdock, G.P. 1959. *Africa: Its Peoples and Their Culture History*. McGraw-Hill Book Company, New York.
- Nakao, S. 1993. *Searching for the Origins of Agriculture* (in Japanese). Iwanami Syoten, Tokyo.
- Prinz, A. 1993. Ash salt, cassava and goitre: change in the diet and the development of endemic goitre among the Azande in Central Africa. In (C.M. Hladik, A. Hladik, O.F. Linares, H. Pagezy, A. Semple & M.Hadley, eds.) *Tropical Forests, People and Food: Biocultural Interactions and Applications to Development*, pp. 339-348, UNESCO, Paris and The Parthenon Publishing Group, Lancs and New York.
- Purseglove, J.W. 1968. *Tropical Crops: Dicotyledons*. Longman, Essex.
- Purseglove, J.W. 1972. *Tropical Crops: Monocotyledons*. Longman, Essex.
- Soret, M., Dizian, R. and A. Hallaire 1961. *Carte Ethnique de L'Afrique Équatoriale: Feuille N° 4 Ouesso*. O.R.S.T.M., Paris.
- Takeda J. and H. Sato 1993. Multiple subsistence strategies and protein resources of horticulturalists in the Zaire Basin: the Ngandu and the Boyela. In (C.M. Hladik, A. Hladik, O.F. Linares, H. Pagezy, A. Semple & M.Hadley, eds.) *Tropical Forests, People and Food: Biocultural Interactions and Applications to Development*, pp.497-504, UNESCO, Paris and The Parthenon Publishing Group, Lancs and New York.
- Takeda, J. 1990. 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. *African Study Monographs*, Supplementary Issue, 11: 1-75.
- Tsutiya, I., ed. 1972. *African Climates —Climate in the World, volume 2* (in Japanese), Kokon Syoten, Tokyo.
- Vansina, J. 1990. *Paths in the Rainforests, Toward a History of Political Tradition in Equatorial Africa*. The University of Wisconsin Press, Wisconsin.
- Woot-Tsuen Wu Leung 1968. *Food Composition Table for Use in Africa*. U.S. Department of Health, Education, and Welfare, U.S.A. and F.A.O., Rome.
- Wazaki Y. 1970. On the tribes of Mangola village (in Japanese). *Kyoto University African Studies*, 1: 47-79.

————— Accepted *January 20, 1998*

Author's Name and Address: Kaori KOMATSU, *Center for African Area Studies, Kyoto University, Shimoadachi-cho, Yoshida, Sakyo-ku, Kyoto 606-8501, JAPAN.*