

The subsistence structure of the Lamba people in the Sudan savanna in the northern part of Togo, West Africa

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Abstract

Field work was carried out in a village about 5 kilometers west of the town of Kadjala, Nyamtougou Prefecture, in the Kara Province of the Republic of Togo, West Africa, and three studies were made from 1980 to 1981, from 1982 to 1983 and in 1984. In this paper I describe and discuss the subsistence activities practiced by agriculturalists living in the Sudan savanna, based on data concerning the food procuring activities and consumption behaviors of the Lamba people. The data were gained through a direct observation and questionnaires method during the above-mentioned periods in the field study, which will make a great contribution to analysis and elucidation of their subsistence strategies to avoid famine or seasonal starvation in arid regions.

The savanna agrilucturalists' passion for active adoption for cultivation of not only indigenous species but also imported ones, the amount of time they invest in agriculture, their planting of second crops and their many uses of cultivated fields may together form the keystone to their subsistence strategies. Also, artificial manipulation is applied not only to vegetation but also to livestock and poultry. The Lamba are among the Palaeonigrific peoples, who have a history of pressure and suppression by other peoples that have forced them into marginal areas, resource-poor regions in which to eke out a living. However, their ecological subsistence strategies helped them not to have been suppressed or annexed by another major people.

Key words: Sudan savanna, Northern Togo, the Lamba, subsistence strategies, Palaeonigrific peoples

Introduction

The West African people developed wild plants as crops in ancient times:
sorghum, pearl millet, fonio, and so on.

In Sub-Saharan West Africa, between the extremely arid Sahara Desert or Sahel zone and the extremely humid Gulf of Guinea, there is a progression of overlapping belts, each exhibiting a different phase of vegetation. In order from the area receiving the least rainfall, these are the Sahel (meaning 'frontier' in Arabic: a semi-desert region at the southern edge of the Sahara), the Sudan savanna, the Guinea savanna (the ecotone, known as the Middle Belt in Nigeria, between the

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Table 1 The vegetation in West Africa

Zone	Duration of dry months (annual rainfall)	Major subsistence	Vegetation		
			Height of undergrowth	Distance between trees	Major plant species* ¹
Sahel	7.5-10.0 (less than 600 mm)	Oasis agriculture, Pastoralism and Foodland cultivation		singly; sparse	<i>Euphorbia sudanica</i> , <i>Caralluma dalzielii</i> , <i>Adenium obesum</i> ; Liana (<i>Leptadenia hastate</i> , <i>Cissus quadrangularis</i>); Geophytes (<i>Urgi- nea altissima</i> , <i>Aloe</i> spp.)
Sudan savanna zone	5.0-7.5* ² (500-1000 mm)	Rainfall agriculture (rotational bush fallow: cereals dominant)	1.0-1.5 m	8-15 m (singly; sparse)	<i>Adansonia digitata</i> (baobab), <i>Butyrosper- m parkii</i> (karité), <i>Parkia biglobosa</i> (neré), <i>Dyoppyros mespiliforinis</i> , <i>Tamarindus indica</i> Trees: <i>Acacia</i> sp., <i>Gapparis</i> sp., <i>Commiphora africana</i> , <i>Maytenus senegalensis</i> Herbs: <i>Aristida kerskingii</i> , <i>Chloris pilosa</i> <i>Ctenium</i> sp., <i>Loudetia</i> sp., <i>Hypparrhenia</i> sp.
Guinea savanna zone	2.5-5.0 (1000-1750 mm)	Rainfall agriculture (rotational bush fallow: cereals dominant)	1.5-3.0 m	6-15 m (fire-resistant)	<i>Anogeissus leiocarpus</i> , <i>Daniellia oliverri</i> , <i>Ceiba pentandra</i> Grasses: <i>Hyppurhenia</i> spp., <i>Pennisetum</i> spp., <i>Imperata cylindrical</i>
Tropical rain forest	more than 100 mm per month* ³	Rainfall agriculture (rotational bush fallow: root crops dominant)		dense; full of many species with climbing vines	<i>Musanga cecropioides</i> , <i>Antiaris africana</i> , etc.

*¹ Refer to Brunel, *et al.* (1984) as to the details of plants in Togo. See also Table 2.

*² The fluctuation of annual average rainfall and temperature is greater than that of the Guinea savanna zone.

*³ It needs more than 6 months with monthly rainfall of 100 mm to form and maintain the tropical rain forest, but it does not, in a year, exceed 2 to 3 months with less than 25 mm in monthly rainfall.

savanna and the tropical rain forest), and the tropical rain forest extending along the Gulf of Guinea from Sierra Leone to Central Africa (Table 1). In Togo and Benin, formerly called Dahomey, however, where the savanna extends southward as if wedging itself in from the north, there is an interruption in the tropical rain forest called the Dahomey Gap.

The peoples of West Africa have become almost independent from the ancient Egyptian civilization, where the staple grains were emmer and barley, and developed their own distinctive agriculture centered on cultivation of food crops indigenous to this region, including grains, beans, plants used for production of edible oils (oil palm and sesame), and so on.

In the Sahel, which has a long dry season of seven-and-a-half to ten months in a year, the principal subsistences are oasis agriculture and pastoralism. Traditional rain-fed agriculture is found throughout the regions south of the Sahel. The huge savanna, which extends 4,500 km from east to west between Lake Chad and the Atlantic Coast, and about 1,000 km from north to south, has since ancient times been called Sudan, meaning "land of black people" in Arabic. Here, utilizing the floodplain formed on the inland delta in the bend of the Niger River (Nakao, 1969; Kawada, 1995), various cereals are cultivated, such as indigenous rice (*Oryza glaberrima*) and fonio or hungray rice (*Digitaria* spp.), pearl millet (*Pennisetum americanum*) which can be grown in even the driest areas, sorghum or Guinea corn (*Sorghum bicolor*), etc. These plants were already established as crops before the introduction of other crops cultivated in foreign areas. Furthermore, in the more humid areas such as the northern edge of the tropical rain

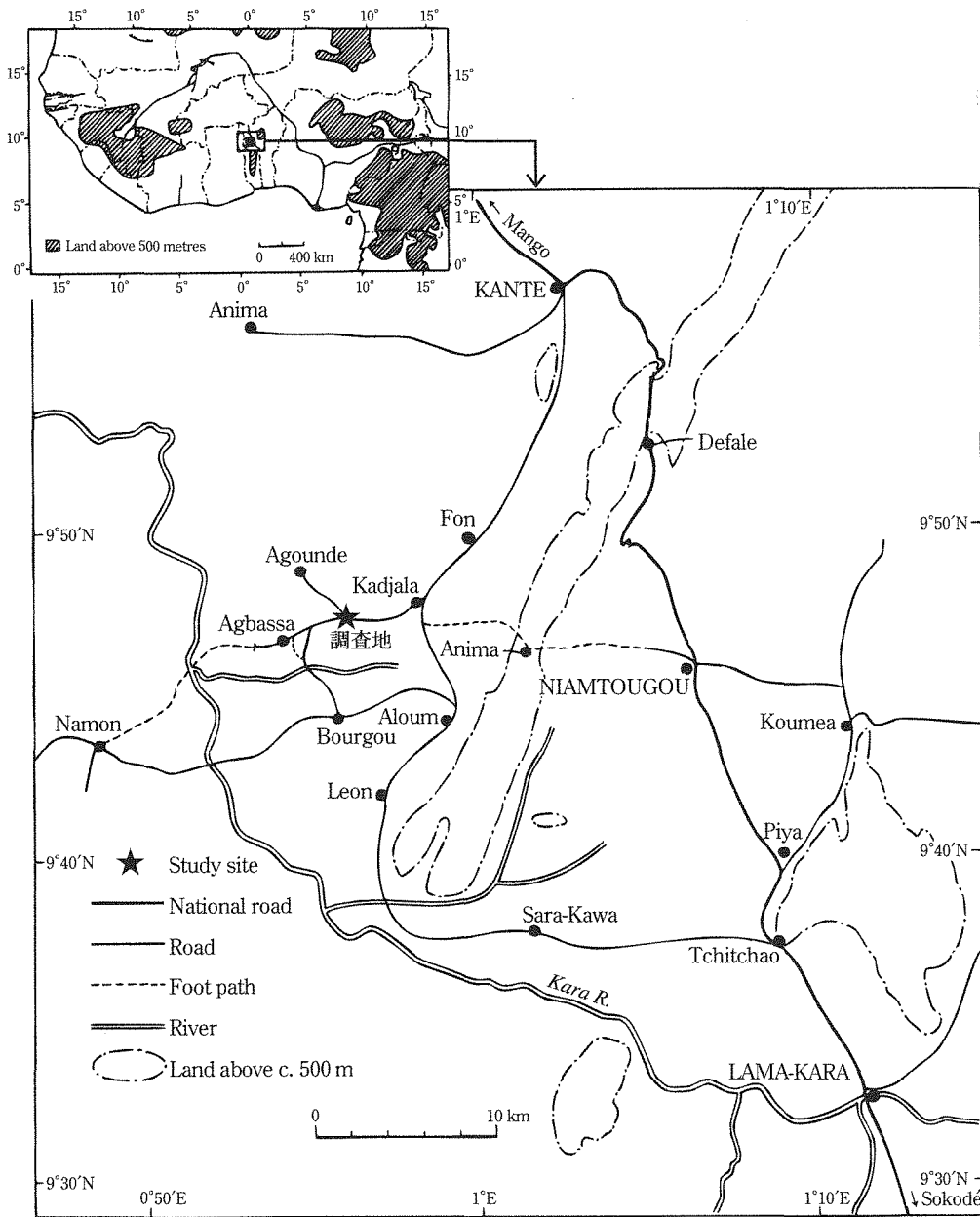


Fig. 1 Study site

forest and the Guinean savanna, the cultivation of indigenous yam species such as white Guinea yam (*Dioscorea rotundata*) and yellow Guinea yam (*D. cayensis*) had already been developed previous to the Common Era as well.

Agricultural peoples dependent on cereal crops are vulnerable to crop damage caused by birds such as the Sudan dioch (a type of weaver: *Quelea quelea*), insects such as desert locust (*Schistocerca gregaria*), migratory locust (*Locusta migratoria*) and/or grasshoppers (*Oedaleus senegalensis*) which appear periodically in large numbers, and unexpected droughts resulting

from the undependability of the rainfall. Unlike agriculturalists, who are dependent on roots and tubers (especially cassava) for most of their calorie intake, however, the agriculturalists, for whom the staple foods are sorghum and other grains, do not have to deal with the serious problem of protein deficiency called *kwashiorkor*. As for example, protein comprises 10% of the weight of dried sorghum, they do not need to obtain protein-rich food so much. On the other hand, because the amount of grain harvested depends on climatic conditions, especially rainfall, there is a higher risk of temporary famine such as "pre-harvest hunger" or "hunger month" (Annegers, 1973 a, 1973 b) when the stock runs out before the next harvest, and there is indication of a large incidence of marasmus (energy deficiency), especially during the lean period between harvests.

Field work was carried out in a village (Fig. 1) about 5 kilometers west of the town of Kadjala, Nyamtougou Prefecture, in the Kara Province of the Republic of Togo, during the following periods of time: November, 1980- February, 1981; October, 1982- early March, 1983; mid June-early September, 1984. In this paper I describe and discuss the subsistence activities practiced by agriculturalists of the Sudan savanna, based on data concerning the food procuring activities and consumption behaviors of the Lamba people gained through a direct observation and questionnaires method during the above-mentioned periods in the field study, which will make a great contribution to analysis and elucidation of their subsistence strategies to avoid famine or seasonal starvation in arid regions.

Study site and method

The Lamba people live in the Nyamtougou and Kante (Kande) Prefectures of Kara Province in northern Togo. The population of about 70,000 is distributed throughout part of the Atakora mountain range, which stretches from Northern Togo to Benin. With the exception of the Bafilo district, it is a generally hilly, poor region 200-250 meters above sea level (Fig. 1). Small numbers of agro-pastoralist sedentary Fulbe, Kabre (or Kabiye), Losso, Bassari and Konkomba peoples also dwell intermingled in this region.

The households of the Lamba center around a patriarch, whose family live in huts joined together by walls from mud with dried cattle dung and fonio straw. The compounds generally have an entrance on the west side (Fig. 2). Traditionally, the huts have cylindrical walls and conical plaited grass roofs, but there are some rectangular huts as well. In places of concentrated population, commercial tin is used for roofing instead of grass. Compounds are scattered, the distance between them ranging from several meters to about a kilometer.

The Ketowa family have established their home 5 kilometers away from the center of Kadjala where the village head (chef de canton) lives. The family composition of this household is shown in Fig. 3.

The rain brought on by the Guinea Monsoon begins in May and continues until October, but the rainfall reaches its peak in August. The average annual rainfall is usually about 1,100 mm, which means this region is blessed with a higher humidity than most other parts of the Sudan savanna. In November, a hot wind harmattan wind accompanied by sandstorms blows in from the Sahara Desert, marking the arrival of the real dry season. Due to the sandstorms brought by this wind, everything in sight is covered with a whitish film caused by harmattan haze, and this situ-

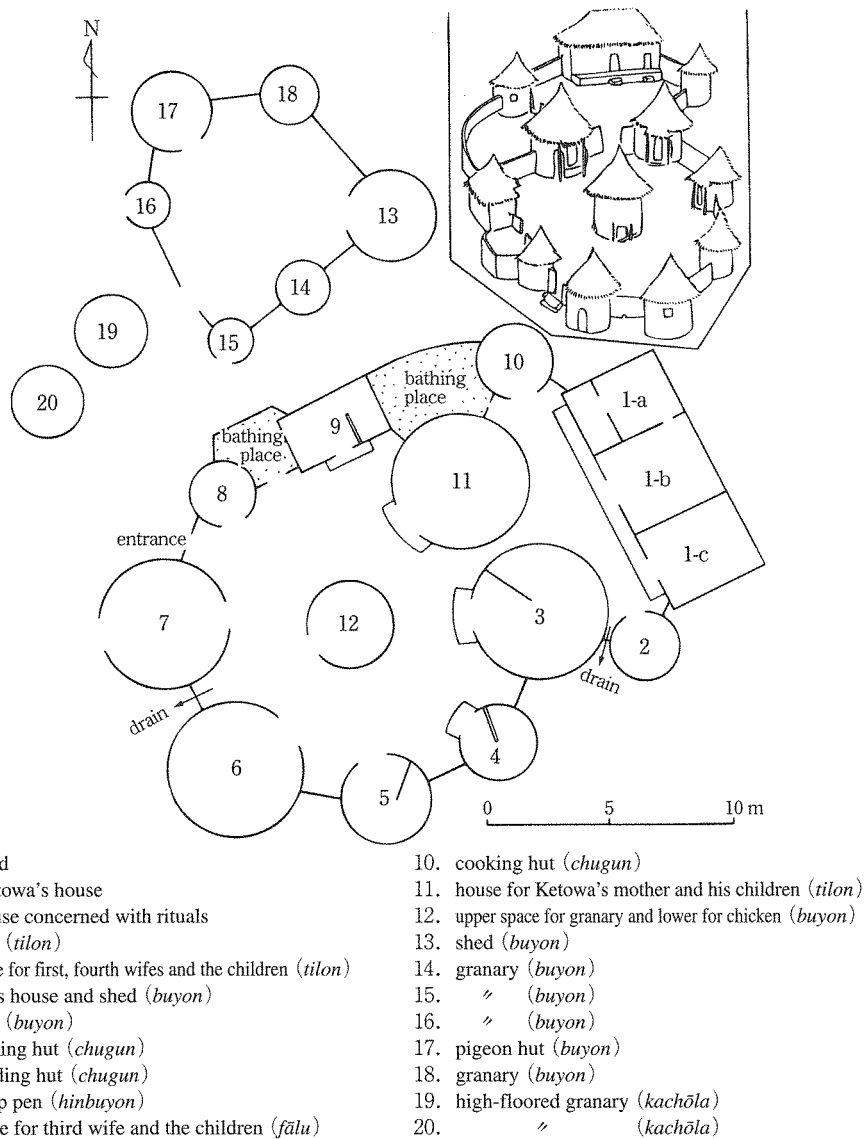


Fig. 2 The compound of the Ketowa's family

ation continues until February. It is said that the harmattan provides inorganic nutrients to the soil of the Savanna farmlands, where there is hardly any use of fertilizer, and the stronger the wind, the greater the benefits (Fujii, 1988). After the harvesting of principal crops such as sorghum, bush-firing is carried out. In the dry period of December and January, temperatures sometimes fall below 20°C degrees. During these cold spells, the people often warm themselves by heating the huts with wood fires before sleeping, and burning materials such as old millet stalks, ears left after threshing, baobab pods, and so on outside the compound in the early morning.

Markets (#1), which used to be held every 3 or 4 days, have been held weekly on a specific day since late December 1980 in accordance with a communique from the Government Office.

In order to ascertain labor-intensity, division of labor by sex and its seasonality, as well as

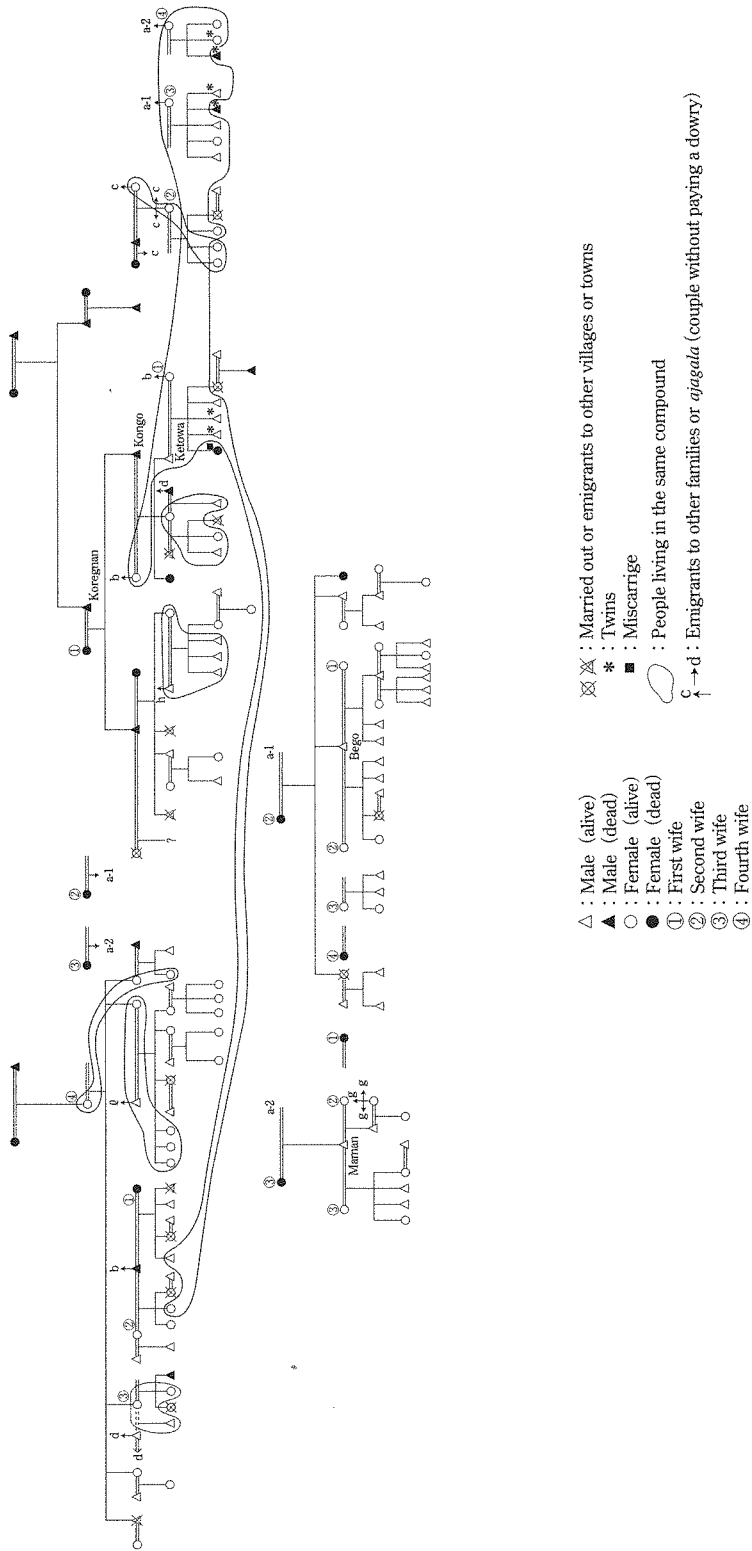


Fig. 3 Koregnan Ketowa's family

the actuality of consumption of agricultural produce, gathered foods, etc., I rented a living space in the compound of the Ketowa family, and carried out research while living there. Concentrating mainly on the Ketowa family, subsistence activity was recorded by means of direct observation for over 30 minutes each time, as well as direct verification with the individuals concerned. This data was classified according to content, sex, and time (observation frequency per ten day unit, dividing each month into three segments). A 'second wife', however, who lived about 300 meters west of the compound with her elderly mother and two small daughters, was not included in the observations although she came to the Ketowa's compound occasionally. Two young boys who attended an elementary school about 3 km away and helped only on Saturdays and Sundays when there were no school, were also excluded from the observations. Members of the household engaged in labor thus consisted of two adult men, four adult women (the mother and three wives), and one young girl. Refer to Takeda (1990 b) as to the detailed description and its analysis, based on the above-mentioned data (#2).

Agriculture

The crops cultivated by the Lamba people are shown in Table 2.

The cash crop for which labor intensity is highest among the crops is cotton. Most crops are used for household consumption or bartering, but part of the sorghum and peanut crops are sold for cash.

It is usual to cultivate a portion of land for five or six years and then leave it fallow for a year or two. Matters such as the specific number of years and the manner of crop rotation, however, seem to depend on the arbitrary judgement of the individual farmer rather than a strict adherence to a fixed order. As a general tendency, the fallow period is followed by the planting of sorghum, and then of fonio. Fields other than those around the house are located at various walking distances, from a few minutes to almost an hour away. In the fields around the compound the main crop is sorghum, but a very small amount of pearl millet is cultivated continuously, and cowpeas are mixed into the crops in the form of undergrowth. Okra is also cultivated in very small amounts, but it is grown separately from the other crops.

In Kadjala a national celebration is held on April 27 to mark the Independence Day of Togo. This is also the standard time to begin the planting.

Among the food crops grown in the rainy season, the first to be harvested are the yams, followed by fonio, corn and cassava. The harvesting of sorghum, the staple food, is completed in the middle of the dry season.

The use of chemical fertilizer for cotton and corn crops has been adopted recently in accordance with directions from the local agencies of the national government in charge of agricultural affairs. Around the compound, night soil and garbage may serve some purpose in fertilizing the soil, but fertilization is not carried out on the main sorghum fields. After the harvesting of principal crops such as sorghum is over, however, it is permissible to pasture cows in the fields full of stalks with the ears removed, and the fertilizing effect of cow excrement is known. In addition, at the time of ploughing by using a hoe called *hagwon* with a large blade, grass gets ploughed into the soil where it decomposes to serve as natural fertilizer, and the ash from the bush-firing carried

Table 2 Food plants of the Lamba

(A) Cultivated food plants

Common name	Local name	Scientific name	*1	*2	Period collected (observed in the study site)	Remarks
<u>Cereals</u>						
Sorghum	māta (pl. māla)	<i>Sorghum bicolor</i>	CC	s	Nov.12-Jan.4	
Pearl millet	amāta (pl. amāla)	<i>Pennisetum americanum</i>	C	s	July 23-Dec.17	
Rice	mānu (pl. mǎn)	<i>Oryza sativa</i>	C	s	Oct.23-Dec.3	
Fonio	abiyon (pl. abisu)	<i>Digitaria exilis</i>	CC	s	July 30-Oct.17	black fonio (<i>D. iburua</i>) is not cultivated
Maize	wāmata (pl. wāmala)	<i>Zea mays</i>	CC	s & ca	Aug.14-Oct.6	
<u>Root crops</u>						
<u>Yams</u>						
Bush yam	hielu (pl. hie)	<i>Dioscorea prae-hensilis</i>	CC	t		
Water yam	tosun (pl. tusun)	<i>D. alata</i>	C	t	July 24-Mar.3	
Aerial yam	bandēm	<i>D. bulbifera</i>	R	t		
Sweet potato	agundēlo (pl. agundelasu)	<i>Ipomoea batatas</i>	C	t	Nov.7-Dec.7	
Cassava	bandusun (pl. =)	<i>Manihot esculenta</i>	C	t	Oct.6-Jan.29	
Cocoyam	polopolon (pl. pulopulin)	<i>Colocasia</i> sp.	R	t		
	mangani (pl. manganina)	<i>Xanthosoma</i> sp.	R	t & l	Feb.16	
<u>Legumes</u>						
Cowpea	sinda (pl. sina)	<i>Vigna</i> spp.	CC	s	s: July 14-Nov.16 l: July 20-Dec.5	leaf: called <i>chahan</i> (pl. <i>chahasu</i>)
Bambara groundnut	agulansūlu (pl. agulansūwui)	<i>Voandzeia subterranea</i>	C	s	Nov.17-Dec.12	
Geocarpa bean	bulubun (pl. bulubulunna)	<i>Kerstingiella geocarpa</i>	R	s	Nov.17	
Peanut	bangansūlu (pl. bangaisūwui)	<i>Arachis hypogaea</i>	C	s	Aug.18-Nov.15	
<u>Vegetables</u>						
Okra	mānda (pl. māna)	<i>Abelmoschus esculentus</i>	CC	f	Aug.3-Nov.25 l: June 27-Oct.13	
Roselle	chandonta (pl. chandona)	<i>H. sabdariffa</i>	C	cl	Nov.24-Dec.29 l: June 16-Dec.8	leaf: called <i>chahalon</i> (pl. <i>chahata</i>)
Hibiscus	agonbilu (pl. agonbila)	<i>H. asper</i>	R	l	June 20	
Nightshade	candōta (pl. candōtana)	<i>Solanum dasuphyllum</i>	C	f	July 28-Aug.26	dried fruit: used as a sauce in dry season, too
∕	bembalu	<i>S. aethiopicum</i>	R	l	Oct.6	
∕	chilu (pl. chili)	<i>S. macrocarpon</i>	C	f	Nov.4	fruit: usually eaten raw
Tomato	chumate (pl. chumatuna)	<i>Lycopersicon esculentum</i>	R	f	Oct.6	leaf: used as a sauce used as a sauce
Snake gourd	chumate (pl. chumatuna)	<i>Trichosanthes ? anguina</i>	R	l & f	Nov.3	
Pumpkin	kambulu (pl. kāma)	<i>Cucurbita pepo</i>	R	f	Oct.24-Dec.10	
Fame flower	bimbulu (pl. bima)	<i>Talinum triangulare</i>	R	l	June 19-Nov.21	
Night jute	ofulon	<i>Corchorus olitorius</i>	R	l	June 27-July 16	
Amaranthus	ansalutihelon	<i>Amaranthus</i> sp.	R	l	June 27	
Bird chili	sowan (pl. sōsu)	<i>Capsicum annum</i>	C	f		
Water melon	kēkan (pl. kekasu)	<i>Citrullus lanatus</i>	C	s	July 24-Jan.28	sown among the yam mounds & eaten raw

Common name	Local name	Scientific name	*1	*2	Period collected (observed in the study site)	Remarks
?	chōgon	<i>Raphionacme brownii</i>	R	t	July 21	
Bungu	kokon (pl. kokon)	<i>Ceratotheca sesamoides</i>	C	s & l	Ocr.9-Jan.20	
Sesame	shōkan (pl. shōkasu)	<i>Sesamum indicum</i>	C	s	Dec.3-Dec.26	
Fruits						
Mango	mangon (pl. mangan)	<i>Mangifera indica</i>	C	f	Dec.2-Mar.6	
Papaya	fulufulun (pl. fulufuluta)	<i>Carica papaya</i>	R	f	Nov.25-Feb.10	
Orange	lemon (pl. lemun)	<i>Citrus</i> sp.	R	f	Oct.14-Jan.22	

(B) Gathered food plants

Common name	Local name	Scientific name	*1	*2	Period collected (observed in the study site)	Remarks
Baobab	tita (pl. tita)	<i>Adansonia digitata</i>	CC	p	June 26-Mar.6 June 26-Mar.6 June 15-Mar.3	pulp: called <i>tilum</i> (pl. =) seed: called <i>catalan</i> (pl. =) leaf: called <i>andilan</i> (pl. <i>andilasu</i>) calyx: called <i>fudda</i> (pl. <i>fula</i>)
Red-flowewd silk cotton tree	fulon (pl. fulan)	<i>Bombax buonopozense</i>	C	cl	Dec.11-Jan.12	
Silk cotton tree (=kapok)	kumun (pl. =)	<i>Ceiba pentandra</i>	C	l	Jan.10-Mar.1	seed: called <i>bambilu</i> (pl. <i>bambi</i>)
Locust bean tree	solon (pl. solum)	<i>Parkia biglobosa</i>	C	p	Nov.3-Feb.12 June 21-Nov.21	leaf: called <i>bahelon</i> (pl. <i>baheta</i>) pulp: called <i>suddon</i> (pl. <i>sudda</i>) seed: called <i>chibangalon</i>
Shea butter tree	shumun (pl. =)	<i>Butyrospermum parkii</i>	C	s	July 15-Mar.5 May-April	seed: called <i>chombagan</i> (pl. <i>chombāth</i>)
Akee	basun (pl. bāsa)	<i>Blighia sapida</i>	R	a	Nov.11	eaten raw when ripe
Cashew tree	aja (pl. ajana)	<i>Anacardium occidentale</i>	R	f	Feb.15-Mar.7	
Oil palm	won (pl. wān)	<i>Elaeis guineensis</i>	R	m & k	Feb.14-Feb.17	
Doum palm	kolinjan (pl. kolinjasu)	<i>Hyphaene thebaica</i>	R	p & ra	Oct.29	available in the market
Palmyra palm	bolopolon (pl. bolopulun)	<i>Borassus aethiopum</i>	R	f	Oct.29	available in the market
Lippia	hāson (pl. hāsun)	<i>Lippia rugosa</i>	R	l	Nov.6-Dec.5	
?	findofindon (pl. findofindun)	<i>Psorospermum corymbiferum</i>	R	l		
?	komban	?	R	s		seed used as a sauce
?	alumafyandon	<i>Gyphostemma</i> sp.	R	f	Wet season	fruit: called <i>afulao</i> (pl. <i>afulana</i>)
Custard apple	olulon (pl. olulota)	<i>Annona senegalensis</i>	R	f	Wet season	
?	panyalon (pl. panyala)	<i>Vitex donoana</i>	C	f	July 4-July 28	
?	mbabu (pl. mbabuna)	<i>Strychnos</i> sp.	R	f	Dry season	
?	ujejelon (pl. ujejeluta)	<i>Nauclea latifolia</i>	R	f	Jan.14-Jan.15	fruit: called <i>pōhosilu</i> (pl. <i>poya</i>)
?	amangeran (pl. amangerasu)	<i>Mitragyna inermis</i>	R	f	Dec.1-Jan.4	fruit: called <i>amangalu</i> (pl. <i>amangali</i>)
?	kawon (pl. kāta)	<i>Gardenia erubescens</i>	C	f	Feb.15	fruit: called <i>candonta</i> (pl. <i>candeona</i>)
?	bintalon	?	R	f	Nov.29	
Mushrooms	afotolu (pl. afoda) etc.	?	R	ms	July 4-Sept.8	8 species are used as a sauce

(C) Bartered or purchased food plants

Common name	Local name	Scientific name	*1	*2	Period collected (observed in the study site)	Remarks
<u>Cultivated food plants</u>						
Zinger	afawo (pl. afawona)	<i>Zingiber officinale</i>	R	rh		
Onion	alubāsa (pl. alubasana)	<i>Allium sepa</i>	C	f & l		dried leaves: used as a sauce
Banana	ayabalu (pl. ayaba)	<i>Musa sapientum</i>	R	f		
Sugarcane	chumbugōli (pl. chumbugolina)	<i>Saccharum officinarum</i>	R	ca		
Bitter cola	gūlu (pl. guya)	<i>Cola nitida</i> & <i>C. acuminata</i>	C	s		See also Note 7.
Coconut palm	kobālu (pl. kobaya)	<i>Cocos nucifera</i>	R	k		
Lime	lemon (pl. lemun)	<i>Citrus</i> sp.	R	f	Oct.5-Feb.1	
<u>Gathered food plants</u>						
?	amilu (pl. amiya)	?	R	f		called <i>amō</i> in Kabre
?	anida (pl. anita)	?	R	f		

*1 Frequency cultivated or utilized as food

CC: very common

C: common

R: rare

*2 Part eaten

a: aril, ca: cane, cl: calyx, f: fruit, k: kernel, l: leaf, m: mesocarp, ms: mushroom, p: pulp, ra: radicle, rh: rhizome, s: seed, and t: tuber

out in the dry season is returned to the soil as inorganic fertilizer.

When a field is being prepared for planting with sorghum after two or three years of fallow, the ploughing process (*halum tudun*) begins with the felling of standing growth other than useful plants and their saplings. As in the case of the ploughing of a field after one or two years of fallow, they first use a tool called *tiita* consisting of a slender pole about 1.2 meters in length with a rope tied to each end. Such a fallow is called *halum afudugun*.

The user holds a rope with each hand, places one foot on the pole, and moves forward leveling down the weeds. After the leveled weeds are cut close to the roots with a sickle, the ground is ploughed by moving backwards with the large-bladed *hagwon* hoe, so that ridges are formed as the cut grass is ploughed into the soil. Because the roots of the grass are left in the soil when it is ploughed up, the result is usually a situation where crops and weeds are in competition. For this reason, interim hoeing, including weeding, is carried out several times between planting and harvest.

Operations such as ploughing and interim hoeing are carried out as group labor called *tubballo* by 7 or 8 people. If the work lasts from morning till evening, the owner of the field acts as host, providing sorghum beer called *chukutuu* and meals. If the work is finished by noon, the host sometimes does not offer even sorghum beer.

1. Sorghum

Sorghum is now one of four major cereals cultivated in the world. There are thousands of the varieties, but the origin has been considered to be very close to the wild species (*Sorghum bi-*

color) and to be firstly cultivated in the Sahel zone (Doggett, 1976; Harlan and Stemler, 1976).

Rozelle and cowpeas are sometimes planted in sorghum fields, but the amount of rozelle is very small, and cowpeas grow as undergrowth in the sorghum fields close to the compound.

Sorghum planting is carried out by communal labor. The men hold large-bladed *hagwon* hoes with both hands, arrange themselves in a more or less horizontal line, and move backwards in the same direction while hoeing the ground. When they reach the end of the field, they move back again in the opposite direction, using the hoes to plough the ground into ridges.

Next, the women make holes in the soil with poles, and the sorghum seeds, carried in containers such as calabash bowls, are thrown into the holes, about 3 or 4 seeds per hole. As they go along, they cover the holes by treading on them with alternate feet.

Between planting and harvesting, interim hoeing and weeding are carried out by the men three times. The first weeding operation, called *alian malanda*, takes place in June or July, when planting is practically finished. At this time, fields with a low sprouting rate may be replanted, and weeds are removed as the new seeds are covered over with soil using the *hagwon* hoe.

Rarely, the seedlings are transplanted after tearing off the tips of the leaves. The second operation, carried out when the sorghum stalks have grown to about 1-1.5 meters, is called *aluma malanda*. At this time, after weeding with the *hagwon* hoe, the bases of the stalks are covered with the earth to protect against strong wind and rain.

Finally, a third operation, called *alela malanda*, is carried out after the beginning of the dry season, when the sorghum stalks have reached a height of about 3 meters and the lower leaves have turned reddish brown. At this time, the dead leaves are removed to improve ventilation, and the bases of the plants, where the rain has washed away the soil leaving the roots exposed, are covered again with the earth to strengthen them, so that the ears may fully ripen. These *alian malanda* and *aluma malanda* agricultural works are not necessarily done by communal labor. Parents may instruct their boys to cultivate small-scale fields and fields around the compound, or the work may be done by a woman using a small bladed hoe called *bundan*.

This weeding and interim hoeing are carried out up to the time when harvesting begins in early November. Additionally, in October when the ears ripen, children of all ages go to the fields and frighten away the birds by shouting and waving their arms or beating a can or stainless steel bowl.

When the ears are judged to be fully ripened, the men, maintaining an upright position, stamp down the stalks close to the base with their feet. After this, the men and women together cut off the ears with knives. Reaping is carried out from mid-November to early January. The ears are placed in round piles in one part of the field, then collected by the women in metal basins and carried back to the compound. After the ears have been dried in the sun in the inner yard of the compound, etc., they are beaten with a flail to remove dirt and dust. At this time, the kernels that come off are allotted to immediate consumption, while the greater part of the grain is left on the ears and stored in sorghum granaries made of mud, called *buyon*, or in high-floored granaries made of woven grass, called *kachyola*.

The stalks with the ears cut off are left lying in the fields, although the neighboring Kabre people have the practice of standing long stalks against large trees such as baobab trees to make a shady place for storing seed yams. During the middle of the dry season, from late January to

March, the dried-out stalks are collected in one place and burned. In some cases, however, the sorghum stalks around the compound are cut off to about one third their original height and left standing like a fence of spears.

There are a few people who plant early-ripening sorghum, but only in very small amounts which may be of some use for consumption during the lean period between harvests. Although planting times might have been different even within the same field due to its large area, and some of the sorghum has been replanted, it is usually all harvested around the same time because the ears are cut after they have fully ripened.

Concerning consumption of sorghum, the allotted supply for the day is brought out of the granary by the men. The women thresh it with a flail and grind it two or three times in a stone mortar to make flour. After the flour is sifted through a sieve, it is mixed with other flour such as cassava and made into a porridge called *maata*.

2. Fonio: Hungry rice (*Digitaria* sp.)

The fonio cultivation is geographically restricted to West Africa. Additionally, 10 to 15 varieties of fonio are cultivated in the upper area of the Niger River (Takezawa, 1990). Accordingly, Portères (1976) stresses the place of its origin is situated in the upper area of the river inhabited by the Mande people who have had a traditionally deep-rooted, socio-cultural relationship with fonio.

Digitaria species have been cultivated since around 5,000 B.C. and is the oldest food crop in the Sudanese savanna region.

Because it is so small-grained that one gram is said to contain 2,000 grains (Purseglobe, 1972), it has been nicknamed 'hungry rice' in English. Two varieties of *Digitaria* are cultivated. *Digitaria iburua* is used mainly for making beer, since the ears do not come off easily, and has been cultivated by some of the Lamba agriculturalists living in the Atakora mountain range which extends from northern Togo to Benin, according to a report by Portères (1976). In most places, however, the usual variety cultivated is *Digitaria exilis*.

For planting, the women scoop up the fonio grains in their hands and scatter them. Next, they cover them lightly with earth using a small-bladed *bundan* hoe. Often, there is a small amount of roselle and pearl millet seeds mixed with the fonio grains. For a while after sprouting, a fonio field has the appearance of being covered by a soft, light green carpet in the fonio field.

Harvesting begins from August, but before that weeding is done about twice by either one woman alone, or by cooperative labor of three, four, or at most five women. They pull the weeds out with their hands or with the *bundan* hoe, and when their hands get full of weeds, they deposit them at one spot in the field.

When the stalks grow upright to a height of about 40 cm, whitish heads begin to appear at the tips. The time when these heads turn a brownish color, often coincides with the peak of the rainy season. Around the time when the rain and the weight of the heads cause them to lean over, flocks of wild birds come along to peck at the heads. In order to rid the fields of these birds, which are difficult to see because they hide among or under the stalks and heads, the girls and boys come to the fields to chase them away two or three times a day, early in the morning, at noon, and in late afternoon. The children bring lit torches from the house and make fires to

smoke the birds out, clap their hands, shout, etc. Sometimes they also use a slingshot called *afudalan* woven from palmyra palm leaves. At times adults fire shotguns or use catapults called *tai*.

Sometimes members of the family (for example a parent and son) might selectively cut off a few ripe heads to see how the crop is doing, but the actual harvest is carried out in the form of cooperative labor by from four or five to seven or eight men. The cut fonio is bound into sheaves, and it is said that since only adult men can make the sheaves thick enough, this work cannot be done by young boys with small hands. On occasion, however, young boys were observed doing the harvesting themselves. It may be that the women's work of threshing goes more smoothly when the sheaves are thicker. Tying the *ryotolan* tool (#3) to the front of their waistbands with rope, the men move forward in a horizontal row bending forward, cutting the fonio with knives about 10 cm from the base. When the left hand is full of cut fonio, the person pulls out a bunch from the roots with his right hand and winds it tightly around the sheaf near the base. Next, pinning down the end of the sheaf with the point of the *ryotolan* tool, he binds it and tosses it behind him. These sheaves are gathered up by the women and children, and propped one at a time heads up circular fashion in one section of the cut field, forming a large ring. They leave them in this fashion in the field for two or three days to dry in the sun. Then, after threshing the portion required for immediate use, they cover the remainder with fonio straw to prevent bird damage.

This cutting at harvest time is the only contribution the men make to the work connected with fonio. The women carry it from the fields to the house in metal basins, and thresh it in the inner yard of the compound, etc. For threshing, they support themselves with both hands on the wall, and tread on five or six sheaves at a time with both feet, rolling them forward little by little.

The fonio brought back from the fields is not stocked immediately. After threshing, fonio which is not required for immediate consumption is stored in covered soil containers such as a *pundelian* container.

After the fonio is cut and gathered, the field is left alone for about a week or longer, depending on the rotation of the cooperative labor, after which there is a cooperative work of men only in which they use the *hagwon* hoe to plough up the earth containing the roots and short cut-off stalks, and make ridges.

If sesame is planted as an interim crop, they first dig up the earth along one side and plant the seeds, then plough the earth into ridges from the other direction and cover the seeds with earth. If the interim crop is Bambara groundnuts, they plant the beans one at a time after making ridges.

When sesame is planted as the second crop, it can be harvested from around October. In the rare case that sorghum is planted as the second crop, harvesting takes place in January of the following year.

Unlike other crops, it is not necessary to grind fonio in the stone mortar, but in order to remove the hulls, the grain is heated in a broken earthenware container, etc., and then pounded thoroughly with a pestle. After ascertaining that the grain has been pounded sufficiently, it is wind-sifted in a calabash bowl to remove the chaff, and then added to boiling water to make *maata* porridge.

3. Pearl Millet and Rice

Pearl millet, which is said to be the sturdiest crop against dry weather, is a regular crop for the peoples of the Sahel, but the amount of this grain cultivated by the Lamba is extremely limited. There are no fields specifically allotted to the cultivation of pearl millet, and it is usually planted together with sorghum. There are apparently some early-ripening types, but these are very few.

The rice cultivated by the Lamba is not the *Oryza glaberrima* type developed along the Niger River, but the Asian type (*Oryza sativa*). Rice fields are established in locations where water volume from rain reaches high levels. At a place where there are hardly any standing trees and the ground is covered with grass, four or five men first plough only one side of each row with the *hagwon* hoe. After sowing the rice seed on the ploughed side, they dig up the other side to make ridges. Thus, the rice is not planted only at the top of the ridges, but shoots come up between the ridges as well. Unlike sorghum fields, where vegetation is leveled using the weed-cutting tool called *tüta*, the earth and grass of the rice field are both ploughed up directly with the *hagwon* hoe, with the result that the weeds are also covered with soil in the ridges.

As soon as the rice sprouts, long, thin vinyl streamers are tied to poles stuck in the ground. The streamers flap in the wind, helping to prevent from bird damage.

Weeding of rice fields is done by hand by the women and girls using the *bundan* hoe, but harvesting is done by a cooperative work of men. The men stand side by side in a line at a right angle to the ridges and move forward, wielding the knife with their right hands and grasping the cut stalks with their left hands. The plants are cut about 10 cm from the base. When the blade of the knife becomes dull, they sharpen it on a flat stone brought to the field for that purpose. When a man's arm is full of rice stalks, he does not make it into a sheaf as in the case of fonio, but simply places it in a suitable place on the ground. The cut stalks are gathered up by the women, who also pull out by hands any plants left uncut. The women stand in pairs facing each other, tie the cut rice stalks into sheaves with woven grass rope or bark, and carry them home in metal basins.

4. Maize (Indian corn)

Weeding is usually done by a cooperative work of men, but it is sometimes done by girls in groups of two or three. In the case of maize, when the stalk has grown to a height of about 40 cm, they make holes in the ground with a pole near the base of the stalks, put in artificial fertilizer (manufactured in Lome with the cost 2,500 CFA per 50 kgs' bag), and use their hands and feet to cover the holes over again with soil. Fertilization is usually women's work, but is occasionally done by men as well.

Harvesting is carried out by men and women together during August and September. The ears only are cut off and taken home in bags. The ears are spread out several times in the courtyard to dry in the sun.

In 1984, about 2,000 ears of maize were harvested by the Ketowa family. The ears were of various lengths, averaging about 20 cm. These were used for household consumption or bartering.

5. Yams and other Rhizomes

Except for the women's role in stocking seed yams (excluding mudscraping in the river and transporting), the operations connected with cultivation of rhizome crops are almost all carried out by men. Mounds for yams are made in the dry season from December, while the work of stocking seed yams, which are buried in the ground for several days, and storing them in the storage hut called *chukulu* (#4) till planting time, is done in January. One important characteristic of yams is that the harvesting stretches out over a long period of time, unlike grain crops which are harvested during a concentrated period. In other words, they can keep growing under the ground, and there is very little damage from birds or insects. A further advantage over grains is that there is practically no need for weeding. The growing of yams does, however, require the intensive labor of making the mounds, mulching (sprinkling leaves, soil and straw over the tops of the mounds to protect the seed yams against heat and drying), and staking (setting up poles made of branches on the mounds for the vines to twine around).

Sweet potatoes and cassava are sometimes planted in small amounts in the same mound as the yams. The slope of the mound may be used for growing okra and peanut as well.

In a particular field containing 846 mounds, there were yams sprouting in 640 of the mounds, while there were no shoots at all in 134 mounds. Some of these mounds were also utilized for cassava and sweet potatoes, while one mound was planted with both. When a mound does not yield any shoots, the top of the mound may later be broken off with a hoe, the mound leveled to about half its original height, and finally stems and leaves of sweet potato placed on it under a covering of soil to attempt vegetative propagation. Vegetative propagation is sometimes attempted with cassava, as well, by putting part of the leaves, stems, etc., in the ridges made when a field is plowed up for planting fonio as an interim crop.

There are about 15 kinds of yam, but most are varieties of either bush yam (*Dioscorea prae-hensilis*) or water yam (*Dioscorea alata*). Cassava, which belongs to the Euphorbiaceae family, was brought back from the New World by the Spanish and Portuguese since the Sixteenth Century. It is an easy crop to cultivate, producing a good yield even when neglected, and for this reason it is widely cultivated by the various peoples of Africa, especially among the peoples in the tropical rain forest (Takeda, 1987, 1990 a; Takeda and Sato, 1993, 1996).

There are two types: bitter cassava, which contains more than 100 mg of cyanic glucosides per kilogram; and sweet cassava, which has cyanic glucosides in the skin only, and even there less than 50 mg (Bolhuis, 1972). Bitter cassava, which produces large yields, cannot be consumed raw, but must be detoxified by soaking in water for three or four days and heating (Takeda, 1987, 1990 b). Among the peoples of the Sudanese savanna region, cultivation of sweet cassava is more prevalent, although the Ngandu people in the Zaire River basin (Takeda, 1987) depend on the cultivation of bitter cassava because of the high yield.

The Lamba eat it raw, roast it over a fire, or, most commonly, peel off the outer skin, dry the cassava well in the sun, and pound it to a powder with pestle and mortar.

6. Other Food Crops

Peanuts are planted in May and can be harvested from mid-August to November. The sloping part of yam mounds may be used for peanuts, or they may be planted in small amounts in the

same ridges as maize. Peanuts are produced mainly as a finger snack food rather than as a major crop.

Among the neighboring Kabre people, I saw weeding and interim hoeing done by having two oxen pull a plough between the ridges, after which the women applied artificial fertilizer, but I have not observed a scene of this work among the Lamba.

Weeding is carried out by a *bundan* hoe consisting mainly of boys, sometimes aided by adult men.

For the harvesting, which takes place from mid August to November, the harvesters first grasp several stems in both hands and pull them out by the roots. These are put into a metal basin, carried to a nearby shaded spot, and the shells containing nuts are plucked off. Adults and children sit around talking, laughing and nibbling on raw peanuts as they do this job together.

For the planting of Bambara ground nuts, the men plough the soil into ridges with the *hagwon* hoe, and the women use sticks to poke holes in the ridges at suitable intervals of about 20 cm. The sowers remain in a standing position while throwing the seeds into the holes one at a time, and cover them lightly with earth. Because the plants are sometimes attacked by birds as soon as they sprout, making it necessary to replant them all, wood fires are lit near the field to produce smoke for keeping the birds away. Harvesting takes place from November to December. The entire family goes out to do the harvesting together with a *bundan* hoe. Because the pods easily separate from the roots, these plants are not simply yanked out of the ground in the same way as peanuts. Rather, the harvesters first dig out the roots, and then pull the plants out by the stems. They also dig in the soil to collect the remaining pods. Here again, they gather in the shade to pluck off the pods, but they do not usually eat Bambara ground nuts raw. After taking them home, they either boil them or dry them in the skins and make them into powder.

Items such as cowpeas, okra, roselle, etc., which are very frequently consumed as subsidiary foods in their daily life, are not grown in specifically allotted fields. They are often planted together with sorghum. In all cases, they are harvested from the middle of the rainy season to the beginning of the dry season, and the work is all left to the women.

7. Cotton

Cotton planting begins in June and July after planting of principal food crops is finished. First the adult males plough the ground into ridges using the *hagwon* hoe. The procedure is called *amun watunda*. This job is done by cooperative labor called *tubballo* and takes half a day or a full day.

When the seeds sprout, artificial fertilizer is put into holes poked in the ground nearby. This fertilizer costs 5,000 F/50 kgs' bag, making it twice as expensive as that used for maize. After this, there is the work of thinning out the plants. This procedure is called *abbason watunda*.

Interim hoeing, including weeding and spreading soil on the plants, is done by a *tubballo* work of men using *hagwon* hoe. Another interim hoeing is done before the early November cotton picking, and harvesting is finished in mid January, after which the cotton is consigned.

Packed in hemp sack, it is taken by the buyer to an area in front of the Agbassa Elementary School to be measured. As cotton seeds are not eaten nor used for oil, only the seeds needed for

next season's planting are kept, and the cotton is sent out with the seeds still attached.

Unlike the Kabre, neighboring ethnic group, who use a ready-made, commercially purchased plough drawn by two oxen, the Lamba work mainly in family units or cooperatively. Seeds are planted in the furrows by the women and children, sometimes joined by adult men. They poke holes in the ground with poles, about 50 to 60 cm apart, put five or six cotton seeds into each hole, using their feet to cover the holes over with soil.

Animal husbandry

Cattle, goat, sheep, dogs, cats, chickens, guinea fowl, pigeons, and ducks are kept and bred by the Lamba. However, ducks are neither kept in each household nor kept in large numbers. Although the settled Fulbe people keep horses in small numbers, they are not kept for draught purposes. They are ridden in times of big events, so they are a kind of status symbol. Neither the Fulbe nor the Lamba have the food habit of eating horse meat. Pigs are fed by the Kabre, but the meat of slaughtered pigs is purchased by non-Muslim people in the markets. Cattle are not usually used for work in the fields except by some Kabre.

Except for cattle that the Lamba entrust the Fulbe to keep, other domestic animals are bred by each household of the Lamba. The Lamba use cattle as a dowry in times of marriage, while the Fulbe make cheese from the milk, which is sold in the market and/or sold door-to-door among the Lamba's homes. In reward for the cattle keeping by the Fulbe, the Lamba work, weed, and harvest in the sorghum fields of the Fulbe concerned. In addition to this labor service, the Lamba must give them three gourd bowls of sorghum, too.

Sheep are kept in a pen inside the compound (Fig. 2). Grasses, herbs, and other fodder are not fed to them, but they are taken away outdoors to let them graze for two or more hours once or twice a day by little boys and/or girls. At these times, boys and girls have to watch herds of sheep to keep them away from the field and not to damage crops.

Goats are not bred in such sheep pens. They are usually fastened to trees with ropes, especially when crops are growing, so they do not graze outside the compound.

Chicken and guinea fowl are released outdoors in the daytime. When the fowl return to the neighborhood of the compound in the evening, they are driven into the compound by members of the household with arms stretched wide open. Sometimes, fowl flying to the branches of trees are threatened to fly down to the ground, by beating them with long sticks.

Pigeon huts are usually built outdoors separate from the main compound, while huts for other poultry are built in the lower part of the granaries inside the compound. But in the case of guinea fowl which still do not have the habit of returning back smoothly to the host family, their nesting places are located in some spaces in flour grinding huts or cooking huts, or on the branches of trees surrounding the compound. Moreover, they often lay eggs in the bush outside the compound, so the unexpectedly found eggs are carried home and incubated, using a hen with its eggs, or consumed at home. The low ability of the guinea fowl's incubation is the main reason why people frequently consume guinea fowl eggs rather than those of chickens (Takeda, 1985, 1990b). Two kinds of poultry eggs are incubated together using one hen. A 30 centimeter or so long string fastened to one leg of the hen is very useful to drive chicks back to their cage. A man

treads one end of the rope, captures the hen inside the cage (called an *olukun*) with ease and puts it into a cage, which finally attracts all the other young birds into the cage.

A man often carries the cage of the hen with chicks inside along with a stick to the field, then releases all the birds. The birds pick worms and small insects appearing on the surface of the fields dug with a hoe or in the bush. In the middle of his work, he also tries to look for a termite hill and breaks it down, and the lumps full of termites are fed to them. In feeding termites, he plucks two or three tail feathers of the hen and thrusts them through both nasal cavities horizontally, which makes the hen unable to peck termites properly. As a result, the hen loses the chance to pick more by itself, which gives more chance for the chicks. In addition, the hen continuously tries to turn over the clump of termites with its legs to disperse them, which will provide the chicks with more chances to pick.

When the hen and chicks are released inside the compound, they are always watched so as not to be preyed on by animals such as vultures and other carnivores. Otherwise, they are caged inside a big-sized colander made of bamboo, purchased from somewhere, when the people have no time to protect them during the daytime or at night.

Boys hang a cage (*kanlon*) made out of oil palm fronds under the eaves of the house, in which they keep the young birds of wild pigeons called *chafulan*. They feed these birds with sorghum, pearl millet, and drinking water with special care. After the birds have grown up, they will be sold in the market or consumed at home.

In addition to *chafulan* birds, small-sized birds called *titalu* (unidentified) are also kept in a *kanlon* cage. However, it has a special device to lure another bird of the same species into the cage. This cage is often hung under the trees when they go out to work.

In order to make chickens, guinea fowl and pigeons strong, young or adult, the Lamba cut off the end of the claws with a razor blade or pluck grown-up birds or let birds drink a little alcohol. Everybody knows how to cut off the claws with a razor blade. However, it needs a special technique to make female birds hasten to lay eggs by physically cutting the anus part with a razor, although these operators are restricted in number. It is commonly seen in the behavior of the people checking the belly of hens to see whether the eggs to be laid are inside or not.

The Lamba have a technique for castrating animals with a razor blade. They castrate male dogs, cats, goats and sheep. In the case of sheep, the castration contributes to adding fatty tissues of the animal with the delicacy, so it is highly valued with a higher price than a female one in the market. Castrated cats become more sedentary and do not leave the home, so they prefer castrated ones because of the same reason mentioned above. Cats and dogs are consumed by the Lamba, but all the people cannot eat because of the food taboos (Takeda, 1987, 1998). Refer to Takeda (1990) for the details of a dog's dissection, meat distribution among the Fulbe and the Lamba, and consumption.

Dogs are mostly used to do group hunting called a *lagon* in the dry season among the Lamba. They are useful as beaters to drive away the prey in the bush (Takeda, 1982). Moreover, dogs are usually called by the mother or baby attendant to clean the excrement and the remains around the anus of a baby or to eat the stuff vomited by a baby, and dogs often lie down outdoors, waiting for the stools of human beings (Takeda, 1990b).

Domestic animals such as guinea fowl, chickens, goats, sheep, dogs and cats are sacrificed in

times of rituals and festivals, but all these meats are distributed among the people and consumed. One exception is that a sacrificed kitten must not be eaten and should be buried in the ground.

Gathering

Lizards (*amanganjilu*, etc.), grasshoppers (*lagel*, *gunon*, etc.), scorpions (*pajyan*), etc., are eagerly caught by small children, young boys and girls.

Flying termites (*amola*), winged reproductives, which grow wings around the beginning of the rainy season, are eaten by the Lamba as by many other African peoples (Bodenheimer, 1951; Takeda, 1987, 1990a, 1998), but the Lamba do not eat soldier ants (Takeda, 1990 a; Takeda and Sato, 1993, 1996). Sometimes part of a termite hill is broken up and termites collected as feed for chicken and guinea fowl chicks. Throughout the rainy and dry seasons, the method of collecting termites is the same. First the termite hill is broken up, a hole is made, and into the hole is placed a leafy branch of *lulon* tree (unidentified) or *amangeran* shrub (*Diospyros mespiliformis*). After a while they pull it out, swarming with termites-feeding on the leaves, and put it into a metal basin.

By another method called *afusilu*, a pot is filled with split baobab pods, cut up and crushed stalks of sorghum and maize, etc. In a flat place along the trail of the anthill, the people dig out a small hollow, sprinkle some water, fix the pot upside down, and leave it for four or five days to lure the termites inside. The method of catching termites used by the Tamberma people is exactly the same as this in that they fix the pot upside down in the ground, but apparently the filling they use consists of locust bean tree bark and dried cattle dung (Wada, 1979; #6).

Grasshoppers caught unexpectedly by mothers when they go to draw water, collect firewood, etc., are given to the children. A type of crocket (*afunbalu*, pl. *afuma*) which comes out of the ground during ploughing is also an object of hunting. These creatures may be roasted on skewers over a fire and eaten by workers in the fields during rest periods.

Honey of wild bees (*Apis* spp.) may be gathered at night by men and boys, but this is done only occasionally. Hives made of stacked up inverted pots can sometimes be seen set up in trees, but there are rarely any bees inside.

Seven kinds of edible mushrooms (*afotolu*) are gathered by women on their way to and from working in the fields, drawing water or collecting firewood. These are dried and used in soup.

The fruit of the shea butter tree (*Butyrospermum parkii*) is gathered in March and April, and by May no more fruit is to be seen. This tree is as important as oil plant in the Sudan savanna region as the oil palm (*Elaeis guineensis*) is in the tropical rain forest in West and Central Africa, but the former is produced in much smaller quantities. Because of its high melting point, oil from the shea butter tree can be stored in solid form at normal temperature in a daily life. The fact that this tree has a high resistance to bush fires, which are done every dry season, is also a great advantage. The process of extracting oil from the shea butter tree is as follows. The fruits are gathered, the shells removed, and the seed albumen only is dried in the sun. The dried albumen, mixed with pebbles and sand, is placed on a piece of pottery and parched well. This is then crushed in a mortar, added to water in a pot and boiled. The supernatant fluid called *chombaath-nun* is skimmed off with a spoon and put into another container.

Baobab leaves are gathered from both young and mature trees. In the latter case, young girls, etc., climb the trees without the help of a ladder, locally called *belon*, pick the leaves, throw them to the ground, and gather them up. The fruits are gathered in the dry season. They are often knocked out of the trees with long sticks. Those with hard shells that do not split open naturally are banged against stones, beaten with sticks, and so on, to break them. The dry white pulp and seeds inside are placed in a mortar and pounded lightly with a pestle to separate them. The pulp, which is winnowed to remove the fibre, is stored. The seeds are boiled, the seed-coats scraped off, and the albumen only is dried in the sun and used for *chudu* seasoning paste which is a kind of fermented paste and also called *daudawa* in the Mossi people of Burkina Faso, West Africa (Kawada, 1995).

From the locust bean (*Parkia biglobosa*), the parts used for food are the powdery yellow pulp called *sudda* and seed albumen called *chibagonalon*. In addition, the pod husks have thin outer skins called *adian*, used in prevention of cracks in the earthen walls and floors of the houses. When soaked in water, the color of the water turns red because of the *adian* element. This liquid is mixed with fresh cow dung, and applied to the earthen walls and floors, which are made from a mixture of laterite and termite hill earth (and sometimes fonio straw); these are then beaten with a beating stick to strengthen them.

Among the tall trees of the savanna is the silkcotton tree (*Bombax buonopozense*), which produces red blossoms during the dry season. The calyx called *fudda* of this plant is dried in the sun and used for food. After a windy night, for example, young girls gather up the fallen flowers from the ground. In the case of trees which are not very tall, the flowers may be knocked down with poles as well.

In the case of the kapok (*Ceiba pentandra*), another Bombacaceae tree, the young, newly sprouted leaves are knocked out of the tree with a long pole and used for food. The long, thin banana-like fruits burst open at the top of the tree, and the kapok cotton inside is knocked down before it can be blown away by the wind. The seeds called *bambiilu* are also used for fermented *chuuudu* paste. Kapok cotton is not generally used, but there are people who stuff pillows with it.

Among the Gramineae plants collected by the men in the dry season are *bosyuwelu* grass (*Londetia arundinacea*), used for making rope, as well as *kisyu* grass (*Andropogon ascinodes*) and *chasu* grass (*Cymbopogon giganteus*), used for roof thatching. Before burning the fields in the dry season, they use a sickle called *ogoto* to cut the herbs, which have faded to light brown and stand about 2 meters high. They tie these into bundles and stand them up around the house. Children, sometimes joined by unoccupied elderly people, take the *bosyuwelu* grass brought by the adults and work on it outside the compound, warming themselves by a fire. Their job is to break off the portion from the tip to the first joint, about 30-40 cm long. These end parts are used for rope-making, and the remaining portions are burned as kindling. The work of rope-making is done as cooperative labor by several adult men. After one of them has soaked the *bosyuwelu* grass in water, they put it on a rock, beat it with a stick till soft, and twist it into rope.

This rope is used for roof thatching, but some is sold or bartered at the market. The *kisyu* and *chasu* grasses used for roof thatching are made into sheaves of suitable thickness on the ground and then handed up to the men on the roof. These shaves are composed not only of freshly cut herbs but sometimes include old used thatch mixed in with the new. With the heads of

the stalks facing upwards, the sheaves are placed in layers beginning at the bottom of the roof and working around in circles toward the top. The sheaves are secured to the poles supporting the roof, using the *bosyuwelu* grass rope and bark of *wagon* vine (*Piliostigma thonningii*). After binding up the pointed peak of the roof with strips, they top it off with a bottomless earthenware or enamelware vessel.

Trees used for making charcoal called *maata* (pl. *maala*; #5) are *malon* trees (*Burkea africana*) and *chatachatan* trees (*Prosopis africana*) which women chop up with an axe (*laata*) when they can find the time. This is something I observed first in 1984, and since then too I have seen people from the Kadjala area bringing charcoal to the market. People who have the commercially marketed iron cooking stoves (there is someone in Lama-Kara who makes them) may use charcoal for cooking, but in daily life it is usual to use firewood. Thus, the women take the charcoal in sacks or metal basins to the markets of Kadjala and Bourogou to sell to people from areas where firewood is scarce. There are women who carry a sack of charcoal each on their heads from Kadjala over the Atakora mountain to the market at Nyamtougou, which is a trip of 5 hours, but these are mostly women from east of Kadjala. Charcoal making is not difficult, but not all women do it.

Hunting and fishing

Aside from the case of an African hedgehog called *anyai* caught by hand by a woman out to draw water, hunting activities were limited to men. Girls sometimes take an *afudalan* slingshot along when they go to chase birds, but I did not verify any actual case of success.

Rats such as *yulu* and *abuluge* (both unidentified) are caught by hand without any equipment. These small rodents are fed mostly to children.

Hunting with a gun called *bandun* is sometimes a matter of "killing two birds with one stone", when they shoot to chase away the birds who come to eat the fonio and hit some of the birds if they are lucky. The Ketowa family did not own a gun, but I heard the sound of gunshots made by men from other families. Hunting with guns is not a general hunting method among the Lamba.

Men and boys can often be seen taking *tai* catapults along when they go to work in the fields. Some people prepare clay balls ahead of time for shot, but usually they simply use whatever stones they can pick up on the spot. To make the catapult, they obtain a strip of rubber from tires at the market, and attach it to a forked stick. Catapults are also taken along on group hunts called *lagon*. Boys use them to try to hit a kind of *chafulan* pigeon, lizards, etc.

In addition, boys make bird lime called *keita* out of the gum on the seeds of the *kuninyon* tree (unidentified), but no instance of success was observed.

Agricultural tools such as *lalao*, with a long, slim blade, and a how called *ajalu*, with a handle bent into a V-shape, can be useful for throwing at wild animals come upon unexpectedly, or for beating strongly on the nest of a ground squirrel called *nambaatolu* to drive it out and catch it.

After the harvesting of sorghum, the stalks of which stand 3 meters tall, and when the fields have been burnt, is the best time for tracking due to easy visibility of game. The season of group hunting or *lagon* begins from around the middle of the dry season, when there is no worry of

trampling crops. On a day when there is no cooperative work project such as roof thatching or wall building, the men assemble, each with 2 or 3 throwing sticks in hand and accompanied by a hunting dog. The number of men in the group hunt can range from several to over a hundred. Some older men may take along a small bow called *ton* and quiver called *afugan* containing several arrows called *nyumbulu*. Usually, however, the men carry throwing sticks. One kind consists of a shaft not quite on a meter long, whittled from trees such as *tuhulun* tree (*Lannea acida*) or *amangeran* tree, with an iron ring or spring-shaped iron inserted into the tip; or an adze-like one, with a long, slim blade inserted in the tip of a forked stick (Takeda, 1982). Boys carry sticks without metal parts, so that it does not matter if they lose them. Some are simply sticks with the ends sharpened to a point, while others have been whittled into an adze shape, but in all cases, the center of gravity is closer to one end than to the other, in order to lengthen the distance of the throw and lessen unevenness of rotation. Spaced 10-20 meters apart, the hunters move forward in a horizontal row, thrusting their sticks at bush fowl (a kind of partridge) and wild and/or escape guinea fowl which jump out suddenly from the grass at their feet or from behind rocks. When rabbits and gazelles hidden in the bush dash out suddenly, the hunters throw their sticks and also send the dogs after the animal. They set fire to bush that has not yet been fired, and wait from afar for the animals to come running out.

The catch belongs to the one who brought it down, or to the owner of the dog that got it. Because the amount of catch is not very great, there is no strictly fixed primary distribution. It is quite different from that of the Ngandu (Bongandu) in central Zaire as to the meat-distribution (Takeda, 1990 a, 1996) or that of the hunter-gatherers in general.

During my field work period, animals captured consisted of 6 kinds of mammals, 7 kinds of fowl, and 3 kinds of reptiles.

As the Lamba are not favored with large rivers, they rarely catch large freshwater fish. With the exception of a young man living in Atakpame who caught a large catfish called *tendu* in the Kara River, practically the only fishing done is when boys catch small fish by hand as the bottoms of the pools or rivers start to become visible in the latter part of the dry season. The amount of these fish caught is very small, at best only enough to consume within the day, and there are only a few kinds.

Sedentary pastoralism-dependent young Fulbe girls sometimes come around from house to house with dried fish for barter (especially in exchange for sorghum) or sale, and people sometimes go to the Fulbe homes to buy dried fish. There are also women who bring back dried fish they have bought at places such as Nyamtougou to sell at the Kadjala and Agbassa markets, etc.

At the market canned dried sardines called *amani* and some fish caught in the Gulf of Guinea in the vicinity of Lome, capital of Togo, are available, but not so frequently consumed.

Discussion: Subsistence strategies of savanna agriculturalists for Sudan savanna

West African agricultural systems as described by Morgan and Pugh (1969), though differing in some details from the present day, are nevertheless extremely useful in understanding the West African agriculture in general. In contrast to the pastoralism suitable to the dry lands--and unrelated to oasis and other farming--that has been adopted in the Sahel, rainfall-dependent agriculture and/or rain-fed agriculture without the use of chemical fertilizers predominates in the sa-

vanna, in general in places where the population density is slight (at 50 persons per square kilometer or less).

However, in some high-density belts where the population is very dense (150 persons per square kilometer), such as the Jos Plateau in Nigeria or the Mandara District in Cameroon, terraced agriculture is conducted intensely, using stepped hills and stone walls to prevent landslides. Permanent cultivation characterizes densely populated regions such as Kano and its environs in Nigeria, where the plow is commonly used.

The most common type of agriculture found on the savanna of the Sudan is rotational bush fallow farming. The Lamba, for example, cultivate a patch of ground continuously for 5-8 years, then let it lie fallow for 1-2 years, after which they practice crop rotation by planting mainly sorghum. In short, they accord priority to grain crops and adapt root crops such as tubers or rhizomes to the grains. In addition to this dominant grain crop type, the Sudan savanna agriculturalists are perhaps most noted for their utilization of indigenous beans such as the Bambara groundnut (Bambara bean), developed as a food crop on the Sudan savanna, cowpeas and *Geocarpa* beans (see Table 2).

Fonio, important as a famine food, has the advantages of fast growth which makes it possible to harvest it 90 days after planting, can be grown in desolate areas and in fairly poor soil. Fonio can also compete with weeds and can be planted in fields to prevent them from being taken over by weeds; it can also be planted as a second crop in fields from which sorghum has just been harvested. Also, in fields from which fonio has been harvested, a kind of sesame seed (another indigenous plant to West Africa, which, together with shea butter tree, is an important source of oil) and Bambara groundnuts can be planted to yield a second crop. Such fields are widely used. Yams are also an important food, which can be eaten shortly before the fonio crop comes in and is a good source of emergency food. At the same time, because yams can be dug up from the ground and used for a long period of time when grown as they are in the dry season, they serve as an important means of assuring the Lamba of a stable source of food. For this reason, use of the yams and the fonio allows the Lamba to avoid the hunger months and pre-harvest hunger seen among other savanna agriculturalists (Takeda, 1984).

The Lamba, who utilize sorghum and other protein-rich grains (10% protein by dry weight), also utilize okra and roselle, secondary food plants cultivated on the West African savanna. Okra is especially invaluable to the diets of the inhabitants of the savanna, as it is utilized frequently and over a long period of time.

The agriculturalists of the Sudan savanna have constructed a food system strongly dependent on vegetable foods, based on indigenous, high-protein minor grains supplemented by cultivated food plants such as beans developed for growth on the West African savanna and protein-supplemented with cultivated tubers such as yams. At the same time, although not a concomitant of organized cultivation but on a semi-cultivation level corresponding to what Clark (1980) called manipulation (or proto-cultivation), a historical background characterized by widespread, long-term protection and utilization of usable timber has made no small contribution to the nutritional balance essential to their lives. For example, a wide range of parts--including leaves, seeds and calyxes--of such semi-cultivated useful trees such as the locust bean (*Parkia*), baobab, bombax and palmyra palm is utilized as food. Also, it is not the case that only one part of each plant spe-

cies is utilized; rather, it is a characteristic of these peoples that many such parts are used, and many trees are used for a wide variety of non-food purposes. Therefore, saplings of such trees are not used for firewood and are not only not chopped down to clear land for cultivation but are even fenced off for protection. However, because the *Brachystegia* species belonging to the Legume family so dominant in Central and East African forests and/or woodland savanna does not exist at all in West Africa, despite the many uses (food and non-food) to which wild plants are said to be put by Irvine (1961), it is a fact that the number of plant types the Lamba use for gathering food is unexpectedly small.

With respect to cultivated plants, however, the savanna agriliculturalists' passion for active adoption of not only indigenous species but also introduced ones for cultivation, the amount of time they invest in agriculture, their planting of second crops and their many uses of cultivated fields may together form the keystone to their subsistence strategies. Also, artificial manipulation is applied not only to vegetation but also to livestock and poultry. For example, guinea fowls and chickens are caged, brought to the fields and released to eat the insects turned up from the earth at plowing. The farmers also supply their poultry with termites taken during tending of the fields. They set traps for termites by placing pots with stalks of sorghum or maize upside down in holes dug near anthills for several days, and they protect a mother bird and her young ones day and night by covering them with a large basket so that they may not be victim of carnivores and carnivorous birds. They sometimes clip the nails of chicks' claws in order to make them grow faster. Moreover, they also work to artificially induce faster laying of eggs. This attention to not only poultry but also livestock manipulation is no doubt one factor in their success in domesticating guinea fowl, despite not having lead to the domestication of larger mammals like goats, sheep or cattle and so on.

Unlike the East African savanna, the West African savanna, despite the original absence of grazing animals like the zebra, the wildebeest and Thomson's gazelle (Jewell, 1980), was nonetheless blessed with a rich array of game when the Sudan area started to desiccate about 4,000-5,000 years ago (Clark, 1980). Cave paintings drawn by hunter-gatherer peoples of the Palaeolithic era in Tassili in a corner of the Sahara Desert show people pursuing herds of animals. In addition to climatic change (the drying out of the area), another factor that may have lead to the paucity of game in the West African savanna these days was the artificial changes to the flora of the region by the presence of herding peoples and agriculturalists themselves. The pastoralists have moved south with their animals in search of forage during the dry season and north with the rainy season (transhumance or seasonal migration); over a long period of time this seasonal migration restricted the ranges of the wild animals that competed with the herds for food. At the same time, the process by which agriculturalists have retained and expanded their fallow lands in order to secure fields, which is a built-in consequence of slash-and-burn agriculture, merely has accelerated vegetational changes and spurred the creation of a monotonal landscape. In addition, the so-called "bush firing"--the practice of burning the fields each year after harvesting--has been also a contributing factor in driving the game to marginal areas and decreasing their numbers. In the collective hunting that would develop in the West African savanna, despite the large number of people mobilized and the extensive land covered, the limited number of animals taken also suggests that this activity was nothing more than a kind of sport undertaken during the leisure

months of the dry season. In other words, this was a kind of part-time hunting that contributed almost nothing to animal protein intake, limited as it was in duration and also in the volume of meat it could be expected to yield.

The Palaeonigrific peoples have a history of pressure and suppression by other peoples that have forced them into marginal areas in which to eke out a living in resource-poor regions (Froelich, 1968; Wada, 1988). The Lamba, too, are one such minor people. However, they have not been suppressed or annexed into another major people owing to the success in the ecological subsistence strategies in harsh environments, although they have fled to another place from attacks or battles with them. That is, from an ecological-anthropological standpoint it was fortunate for them that they laid most emphasis not on a tuber-oriented vegiculture utilizing mainly yams but on seed-culture such as rice and maizes, which require faster and earlier land shifts and territorial expansion (Harris, 1972). Factors that cannot be overlooked in explaining their ecological success include their dependence on a highly mobile food source and, additionally, their inclusion of protein-rich grains indigenous to the West African savanna in their food production system. That move freed them from the need to spend as much energy on securing protein as do the wholly hunter-gathering peoples, nor do they need to develop a number of different subsistence techniques, pursued opportunistically, as do the so-called multisubsistence strategists.

Finally, West Africa, which has seen the rise and fall of several ancient kingdoms, has long been a scene of active long-distance trade, as can be seen in the influence of people, tribal conflict and holy wars like the jihad of the Islamic peoples, the flow of goods and the trade in rock salt (Ritter, 1981) and cola nuts (Lovejoy: #7). Nor is the appearance in even the furthest corners of the region of markets large and small, convened from every 3-4 days to once a week and functioning as a place of exchange of both people and information, unrelated to this historical background. Therefore, people's subsistence activities with respect to the acquisition of food cannot be grasped purely in an ecological-anthropological context. Rather, a holistic approach taking account also of relevant socio-economic factors is required.

Notes

#1: Markets, which used to be held every 3 or 4 days, have been held weekly on a specific day since late December 1980 in accordance with a communique from the Government Office. These markets, which are the scene of grain buying, bartering of various things, sorghum beer drinking, etc., also cause the people to move about a great deal and provide increased opportunities for meeting acquaintances. The pickup vehicles and trucks that come from places such as Lama-Kara and Kante transport not only people setting up shop at the market, but also people coming back to the village. On the return trip, passengers include people headed for the big town hospitals or returning to work after vacation, causing the vehicles to be packed with people and baggage. At the Bourogou and Kadjala markets, where flour millers operate grinding machines, housewives and girls who want to avoid the trouble of doing their grinding on their own grindstones can be seen lining up with large metal basins of sorghum and Bambara groundnuts.

#2: It was not always possible to ascertain the beginning and ending time, and thus comparison

cannot be made on the basis of absolute quantity, in the case of some activities. In addition, when I did not stay in the research field for 10 or 11 consecutive days, I adjusted the data to express the frequency per 10 day unit. Concerning consumption behavior too, I made estimations on the basis of direct observation of the Ketowa family for ten day units. Thus, foods consumed while I was away from the Ketowa family, were not included in the research data. Food consumption observations were also adjusted to express frequency per ten-day unit.

#3: *Ryotolan* is a tool used for binding the sheaves of cut fonio, made from horns of antelope or cattle, trees such as *Prosopis africana*, etc. It is curved and pointed at one end.

#4: *Chukulu* is a hut unlike the raised floor granaries where sorghum is stored, but produces stored in these huts are in direct contact with the ground (see also Fig. 2).

#5: In Bangeli in the Bassar Province of Togo, charcoal only from the *chatachatan* tree (*Prosopis africana*) is used for ironmaking (see Wada, 1979) as to the traditional ironmaking process of the Bassari people.

#6: This activity for gathering termites for several days is also common in the Tamberma people (Wada, 1979).

#7: There are approximately 40 kinds of cola nuts available in the world, among which *Cola nitida*, *C. acuminata*, *C. verticillata* and *C. anomala* are valued among the people. These are all grown in the tropical rain forest which ranges from West Africa to central Africa, but *Cola nitida* is mostly favored among the local people.

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西アフリカ北部トーゴ・ランバ族のスーダン・サバンナにおける生業維持構造

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西アフリカ・トーゴ共和国北部のカラ州 (Kara Province) ニヤムトグー県 (Nyamtougou Prefecture) カジャラ (Kadjala) から5キロ離れた地区で1980年11月から1981年2月, 1982年10月から1983年3月と1984年6月から9月までの期間にランバ族の生態人類学的な現地調査を行った。

彼らは周囲の他民族からの圧力から逃れ, さほど天然資源が恵まれない過酷な環境に追い込まれたという歴史的な経緯をもつ, 弱小な古ニグロ人種 (Palaeonigrific) の一民族であったために, これまで人類学的な現地調査が希薄だった。

スーダン・サバンナに住む農耕民の生業維持機構を直接観察と参与観察および聞き込み法によって精査し, スーダン・サバンナの季節変化にともなう住民の生産・消費活動, 食物獲得活動と伝統的な民族技術等を記載・分析した。

特に集落のまわりの水が完全に干上がり, 食糧が払底し, 住民は飢餓に近い状況に陥る, 11月から始める乾季に焦点を当てて論述し, 考察した。しかし住民は, 高蛋白な固有種の雑穀類やマメ類の栽培, 早稲種や生育期間が短い作物の併用, 半栽培的な植物利用などで, 食糧危機を回避する方法をとりながら, 乾燥したスーダン・サバンナへの生業維持活動を展開していることが分かった。