DIFFERENTIATION OF SUBSISTENCE FARMING PATTERNS AMONG THE HAYA BANANA GROWERS IN NORTHWESTERN TANZANIA

Satoshi MARUO
Graduate School of Human and Environmental Studies, Kyoto University

ABSTRACT The Haya, densely settled in the western Lake Victoria basin of Tanzania, have developed a unique banana-based farming system over centuries. The land use is characterized by intensively cared home garden called *kibanja*, and open grassland, *lweya* where cattle grazed. Cattle manure has much contributed to the farming in *kibanja*.

Household survey revealed current farming patterns that have differentiated since the independence of Tanganyika in 1961. *Lweya* has become important also as major bitter cassava field (*musiri*) of due to increased land pressure, decline of cattle husbandry, and decline in soil fertility. At the same time penetration of cash economy has given market values to banana, their staple crop. Consequently many households became *musiri*-dependent while some specialized on *kibanja* farming.

Despite increased cultivation in *lweya*, the prime importance of *kibanja* continues due to preference in banana and sociocultural appreciation. *Lweya* has served as a buffer against various internal and external impacts, providing options for individual households. Thus the social differentiation process took place under the field of rural dynamics deep-rooted in their inherent recognition of the environment.

Key Words: Haya; Agricultural change; Banana; Home garden; Grassland utilization; Farming strategy.

INTRODUCTION

The Haya is one of major ethnic groups of Tanzania with a population of over one million, most of who densely settle in the Lake Victoria basin. They are known as banana growers in the country for its indigenous culture thrived. The indigenous banana cultivars are taxonomically called 'East African Highland banana', found only in and around the Great Lakes region. For the Haya those bananas have long played a greatly significant role as a staple foodstuff and the ingredient for local beer.

Haya farming is characterized by intensive land use and management of banana-based home garden. Being sustainable and productive, intensive home garden farming is the most widespread permanent agricultural system in tropical Africa, and found in areas with high population density (Okigbo, 1990). There are only a few examples of banana-based home garden system in the world. High population density is the reality in the banana producing area of East African highlands including Buhaya, the Haya homeland. Population density reportedly surpassed 100 persons per km^2 for the Chagga in north Tanzania

(Fernandes *et al.*, 1984), the Ankole in southwestern Uganda (Kasfir, 1993), and the shoreline population of Lake Victoria in southern Uganda (Odoul & Aluma, 1990).

During the last few decades many of African indigenous agriculture have experienced dynamic changes induced by environmental, socioeconomic and political impacts. Population growth can be the key factor in such changes, which may lead toward agricultural intensification. Hyden *et al.* (1993), showing agricultural intensification in most of the 10 densely populated areas in Africa, highlighted the great ingenuity of African farmers in coping with increasing population. Ingenuity is apparent in the variety of farmer performance such as diversification into cash crops or off-farm enterprises, from which current dynamics in African rural communities can be generated. For the Haya, serious land shortage was predicted by the end of 20th century in some densely populated areas of the region (Rald & Rald, 1975). In reality, rapid population growth among other factors has affected Haya subsistence economy since the independence of Tanganyika in 1961. There have been recent studies on the Haya farming system, socioeconomic (Nkuba, 1997; Smith, 2001), and agroecological (Rugalema *et al.*, 1994; Bosch *et al.*, 1995; Baijukya & de Steenhuijsen Piters, 1998). Nkuba (1997) categorized Haya households into three groups on the basis of economic ranking, identified each profile, and claimed the necessity to generate suitable technologies for each group. However, he did not take the whole farming patterns into account, but only the home garden farming. Crop cultivation in grassland is an integral part of the Haya farming system, and has prevailed among the households. Therefore need to be studied to the comprehensive farming systems and rural dynamics clarify the significance of Haya ingenuity.

This study analyzes the process of agricultural changes in a densely settled Haya village since independence, thereby clarifying their endeavors against socioeconomic changes. Household analysis was adopted to identify the current farming strategies in the Haya rural community, since productive activity, consumption, and common residence are all based on the household unit. This paper first describes the current status of Haya farming and land use patterns. Secondly major socioeconomic impacts affecting the agricultural activities are pointed out. Finally the uniqueness in the Haya agrarian changes is discussed in the sociocultural context.

THE STUDY AREA AND THE HAYA PEOPLE

I. General Background of the Study Area

This study is based on 7 months of fieldwork since 1997 in Busingo subvillage, Muleba District, Kagera Region (Fig. 1). Busingo village is located on Kamachumu Plateau, which lies about 30 km south of Bukoba, the regional capital town. The plateau area generally shows better yields of banana within

the region due to less pest damage and crop disease owing to its high altitude. The elevation of Busingo sub-village is about 1400 m above sea level. The whole region has a bimodal rainfall pattern of the tropical humid savanna climate. The major rainy season is from March to May and the minor from late September to December. The annual rainfall in the study area is about 1400 mm, ranging from over 1500 mm in the north to less than 1000 mm in the south. The daily temperature ranges from 15.7°C (mean minimum) to 23.8°C (mean maximum), with the annual temperature rather constant at about 20°C. According to a 1998 survey, Busingo sub-village had 150 households (33 were female-headed households) with a total population of 761 (Fig. 2). The population density was estimated to be as high as 318.4 persons per km^2. All the villagers belonged to the Haya clans except for one elder herdsman from Rwanda. Approximately 85% of the villagers were Roman Catholic, followed by 10% Muslims and 5% Protestants.

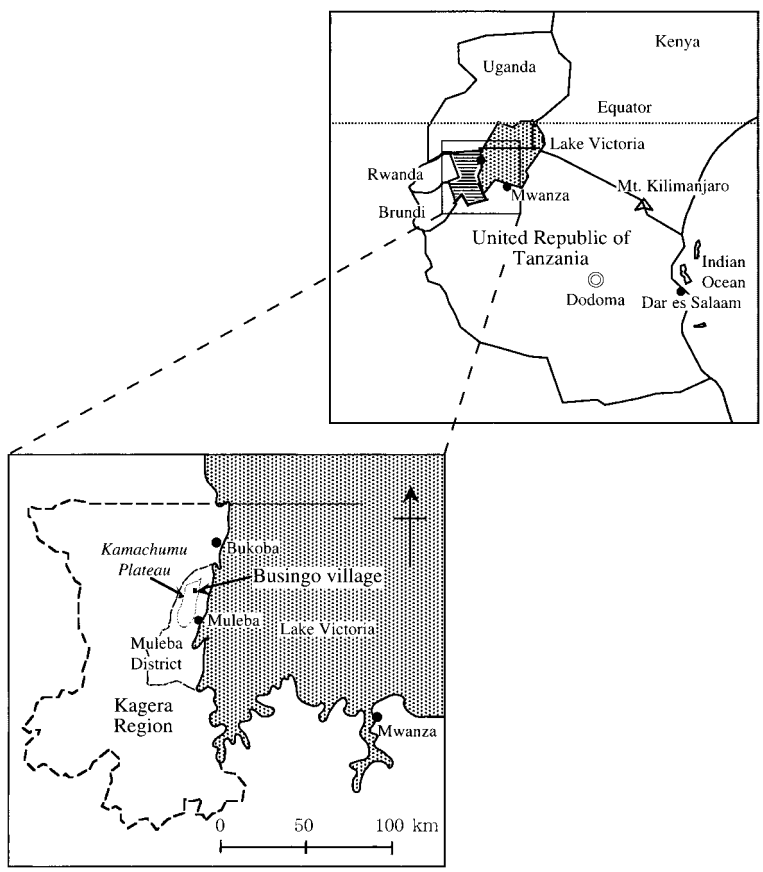

Fig. 1. Location of Busingo Village and Kagera Region, Tanzania.

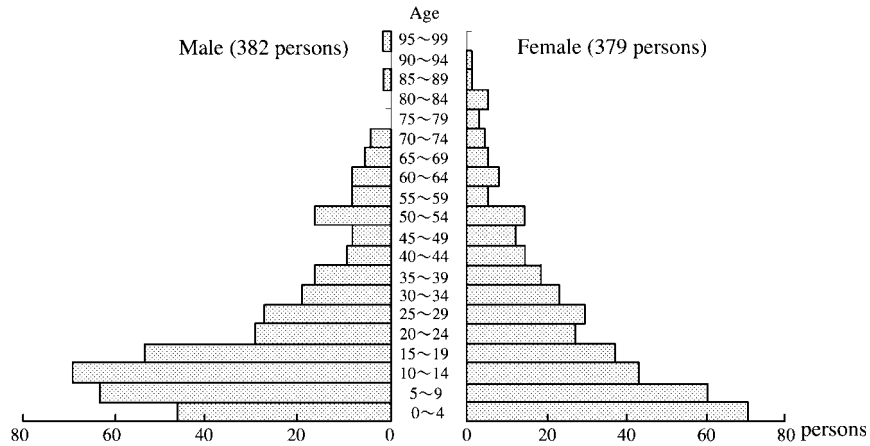

Fig. 2. Population Pyramid of Busingo Village in 1998.

II. Historical Background of the Haya and their Banana

The present group of Haya[(1)] can be traced back its origin to a Bantu cultivator, and a Nilotic pastoralist Hinda. According to Ogot (1984), the Bantu group first settled in the forest and cultivated tuber and cereal crops such as yam (*Dioscorea* spp.), finger millet (*Eleusine coracana*) and sorghum (*Sorghum bicolor*). Several small-scaled societies were formed by the 13th century. The Hinda, an offshoot of the Hima dynasty from the present Uganda, came into the area from the north by the 15th century. They soon controlled the majority of the cultivators, and consequently, the society became hierarchically three-tiered, where 3 royal Hinda clans controlled about 20 of other Hinda clans, and the cultivators composed of about 100 clans (Pokorny, 1973). The latter two groups were not clearly differentiated. They gradually developed a barter system between agricultural and animal products. The long-term interaction and intermarriage formed the current Haya (Mafeje, 1998; Katoke, 1975). Several small dynasties were found and developed by the offsprings of the Hinda founder. With no influential dynasty, the small dynasties continued as chiefdoms even during the colonial periods, and were abolished at the independence in 1961. In the late 1960s Tanzania adopted the 'Ujamaa Policy' of villagisation in the name of African socialism. However, the programme had less influence on Buhaya as they had already developed a layered society with densely populated settlements. The study village has a long history that counted 12 generations according to oral tradition since the founder came to settle in Busingo.

The introduction of banana (*Musa* spp.) into the interlacustrine area, Schoenbrun (1993) argued from linguistic evidence to have occurred between AD 800 and 1300. According to other studies, the intensive farming pattern has developed at least for some hundred years, probably after the Hinda brought the long-horned cattle known as 'Ankole' to Buhaya by the 15th century (Ehret, 1984; Tibazarwa, 1994). Cattle manure helps to maintain soil fertility for stable

banana production. Therefore it can reasonably be argued that the Haya banana-based culture thrived only after they had cattle in their farming system.

KEY COMPONENTS OF THE HAYA ENVIRONMENT

A typical landscape of Buhaya is mainly made of two components; a collective of '*kibanja* (pl: *bibanja*)', the banana-based home garden and '*lweya*', the open grass and bush land.[2] As Allan (1965) called the land use pattern "strange and possibly unique", for its large green blocks of banana grove contrasting with the open grassland, resembling islands in the sea.

Kibanja is a mix-cropped garden based on banana and coffee stands. Haya farmers cultivate and grow various kinds of crops, trees, spices and local herbs in each *kibanja*. Shape and size of *kibanja* greatly vary among the households. Remarkable differences in size were observed among 15 sample households, the minimum holding being only 0.08 ha and the maximum holding 0.90 ha, and 0.44 ha on average. *Kibanja* is used also for dwelling, and encompasses the homestead, lavatory and footpath to the neighborhood. It is also of social importance, for the Haya people hold wedding and funeral ceremonies at *kibanja* of the family concerned. According to customary land tenure, *kibanja* basically belongs to the respective clan in the patrilineal Haya society. When a Haya man gains independence from his parents, the father allocates some portion of *kibanja* to him.

Individual *kibanja* is abutted by the next and in many cases the Haya plant boundary markers such as dracaena (*Dracaena afromontana*). One collective of banana gardens often includes over hundreds of *kibanja*, which has historically formed one basic unit of rural society. Soil fertility in the area is rather low due to nutrient-poor parent material or as a consequence of long-term erosion (Bosch *et al.*, 1995). The present landscape has been established through a long selection by the Haya's ancestors. The early settlers chose to settle where bananas could be grown well, and then formed an indigenous type of a village called '*kyaalo*'.[3]

Lweya is, on the other hand, a general term for open grassland in Buhaya, including land with rocky earth or a steep slope. The grasslands, most of which are more or less easily accessible from villages, have always been as important as *kibanja*. *Lweya* offers space for cattle grazing and crop cultivation, which partly supports the banana-based farming. Various grass growing in *lweya* are also utilized for some specific purposes (Table 1). And edible grasshoppers and termites are caught or trapped in *lweya* seasonally to serve as important protein sources. Shrubs provide essential fuel wood, although less and less these days. Thus *lweya* has been utilized routinely and multipurposely by every villager.

Land holding system on *lweya* plot can basically be derived from that of *kibanja*. Lweya can contemporarily be held by a clan, individual, or by the village council. In the first two cases, a *lweya* plot is exclusively used by a certain villager and mostly transferred to his son or to a member of his clan

after his death. Such a plot can sometimes be found adjacent to the holder's *kibanja*. *Lweya* land managed by the village council is used communally and has contributed to the farming system by offering every villager grazing land and arable land.

In *lweya*, the Haya make small plots for crop cultivation on grass fallow base. The plot is called '*musiri*,' where most households make ridges once or twice a year. *Musiri* can be found not only in *lweya* but also in the periphery of *kibanja*, though the latter is very uncommon in Businga. In contrast to intensive *kibanja* farming, *musiri* cultivation is rather extensive in management.

It is on these two components, *kibanja* and *musiri*, that the Haya perform their husbandry described in detail as follows.

Table 1. Major Grass Species Grown in *Lweya* and its Utilization.

The Haya Name	Scientific Name	Utilization and Remark
ekinshwi	*Eragrostis olivacea*	-an indigenous species for carpeting earthen floor, more durable (about 2 months)
		-a local plant considered to signify soil unsuitable for banana growing
eyojwa	*Loudetia kagerensis*	-an indigenous species for carpeting earthen floor, less durable (about 1 month)
		-easily decomposed and turned into good compost
eunda	*Hyperthelia dissolute*	-an indigenous species for roof thatching
		-also popular for mulching grass nowadays used in *kibanja*
egunga	*Loudetia arundinacea*	-an indigenous species for roof thatching
		-also popular for mulching grass nowadays used in *kibanja*
enkeke	*Eragrostis mildblaedii*	-recently favored for mulching grass
		-fodder especially for calves
olumbugu	*Digitaria scalarum*	-popular but useless grass, often grown in relatively fertile *lweya*
eshanje	*Hyparrhenia* sp.	-mulching grass though less easily turned into compost
(*omushanje*)		-formerly used for squeezing banana juice, before independence in 1961
		-sometimes utilized as thatching grass in the *eunda* free area
ekishojo	*Imperata cylidrica*	-once unused, but today often used for squeezing banana juice
	var. africana	-nowadays used as thatching grass around urban Bukoba
esharaganyi	?	-mulching grass
eshindashinde	?	-indigenously used for wrapping edible grasshoppers caught in *lweya*
		-mulching grass often used together with *enkeke*

SUBSISTENCE FARMING PATTERNS AMONG THE HAYA

I. *Kibanja* Home Garden Farming

As a farming space, *kibanja* is a perennial garden not only for banana but for various crops and plant species (Table 2). The Haya have an intimate knowledge of the crops and the microenvironment of his own *kibanja*. Major crops grown in *kibanja*, besides banana and coffee, are maize (*Zea mays*) and commonbean (*Phaselous vulgaris*), an essential indigenous protein source for the Haya diet. Those two are cultivated mainly for subsistence and densely cropped once a year between banana stands. At the beginning of short rainfalls in September, maize is sown in most gardens by hand, followed by the bean after about a week. Many other crops are rather minor and randomly arranged according to the preference of each household. Agricultural calendar for major crops in *kibanja* is shown in Fig. 3.

Coffee (*Coffea* spp.) has been the most important cash crop since the introduction of the arabica type (*Coffea arabica*) by missionaries in the early 20th century.(4) However, its production stagnated mainly due to unfavorable selling price. Banana and coffee are mostly grown mixed. The arrangement in *kibanja* shows a tendency for banana more grown closer to homestead and coffee more around the margins. This is partly because infertile soils of the peripheral area are often not sustainable for banana growth. With such spatial arrangement, *kibanja* have historically provided the Haya with a permanent cultivation space for both the staples and the main cash crop.

The management of the perennial crops, including banana, is basically the responsibility of men. In contrast, southern Ugandan women do perform this role in the neighboring banana-growing zone (Odoul & Aluma, 1990). A vegetatively propagated crop, banana grows and multiplies under most humid conditions. It basically needs less labour input than other starch crops for the whole management. In spite of this, the Haya farmers have developed more land-intensive permanent husbandry with accumulated local knowledge and with several kinds of indigenous agricultural tools. Linguistically, the detailed classification of banana parts reveals the Haya's deep knowledge of the crop (Fig. 4). The local varieties of banana grown by the Haya can be divided into three according to utilization. These are: the cooking banana ('*kitooke*'), brewing banana ('*mbire*'), and roasting banana ('*nkonjwa*'). '*Kitooke*' is the most important banana as staple food, and consumed boiled often with the commonbean. *Kitooke* is the dominant component in most gardens, constituting more than half of total banana stands in *kibanja*. All varieties of East African Highland banana are either to *kitooke* or *mbire*, most of which have been transmitted over generations. Average number of cultivated banana counted 26 local varieties among the 16 sample households of Busingo. Intraspecies diversity in the study area has been preserved by multi-variety cropping on the *kibanja* level.

Kibanja is a zero-tillage farmland and always covered with organic litter. Any type of crop residue such as banana leaves and maize stalks are utilized.

Table 2. Major Crops and Plant Species in *Kibanja*.

Common Name	The Haya Name	Scientific Name	Usage
banana	*engemu*	*Musa* spp.	food, beer, fruit, sale
yam	*ekilaila*	*Dioscorea alata*	food
potato yam	*kachere*	*D. bulbifera*	food
yellow yam	*kashuli*	*D. cayenensis*	food
—	*eikongo*	*D. burkilliana*	food
cocoyam	*ekikwara*	*Xanthosoma sagitifohum*	food
cassava	*ekigando*	*Manihot esculenta*	food
maize	*ekicholi*	*Zea mays*	food
sorghum	*omugusha*	*Sorghum bicolor*	food, fermenting ingredient
commonbean	*emperege*	*Phaselous vulgaris*	food
African spinach	*omulili*	*Amaranthus* spp.	food
tomato	*omunyanya*	*Lycopersicon esculentum*	food, sale
scarlet eggplant	*entura*	*Solanum aethiopicum Gilo*	food
African eggplant	*entongo*	*Solanum macrocarpon*	food, sale
onion	*ekitungulu*	*Allium cepa*	food, sale
pumpkin	*omwongo* (fruit)	*Cucurbita moschata*	food
gourd	*ekishushi* (fruit)	*Lagenaria siceraria*	container
sugarcane	*ekigusha*	*Saccharum officinarum*	food
red pepper	*omuguruma*	*Capsicum* spp.	spice
turmeric	*ebizari*	*Kaempferia* sp.	spice
ginger	*etangawizi*	*Zingiber officinale*	spice
tabacco	*etaaba*	*Nicotiana* spp.	cigarette
pineapple	*enanazi*	*Ananas comosus*	fruit
African oil palm	*omumeshe* (tree)	*Elaeis guineensis*	fruit
guava	*omupera* (tree)	*Psidium guavaja*	fruit, firewood
mango	*omunyembe* (tree)	*Mangirefa indica*	fruit, firewood
lemon	*omudimu* (tree)	*Citrus limon*	fruit, firewood
tangerine	*omuchenza* (tree)	*Citrus* sp.	fruit, firewood
orange	*omuchunkwa* (tree)	*Citrus* sp.	fruit, firewood
papaya	*omupapai* (tree)	*Carica papaya*	fruit
passion fruit	*omutunda* (tree)	*Passiflora edulis*	fruit
jackfruit	*omufenesi* (tree)	*Artocarpus heterophyllus*	fruit
coffee (robusta)	*ekihaya*	*Coffea Canephora*	sale, chewing
" (arabica)	*ekijungu*	*C. arabica*	sale
musizi	*omuhumula*	*Maesopsis eminii*	timber, firewood, wind breaker
markhamia	*omushambya*	*Markhamia lutea*	buiding poles, wind breaker
pigeon wood	*omuhuwe*	*Trema orientalis*	firewood
ficus	*omujuju*	*Ficus* sp.	canoe-making, firewood, sacred symbol
—	*omushasha*	*Sapium ellipticum*	firewood, wind breaker
—	*omusenenezi*	*Podocarpus* sp.	firewood, wind breaker
castor	*omujuna*	*Ricinus communis*	propping poles
red-hot poker tree	*omulinzi*	*Erythrina abyssinica*	firewood
dracena	*ekyanya*	*Dracaena afromontana*	boundary marker, grave
bamboo	*omushekeyanda*	*Arundinaria tolange*	propping poles
—	*olukenge*	*Cleistanthus amaniensis*	firewood
eucalyptus	*omukaritusi*	*Eucalyptus* sp.	firewood
elephant grass	*emindo*	*Pennisetum purpureum*	traditional hut-making

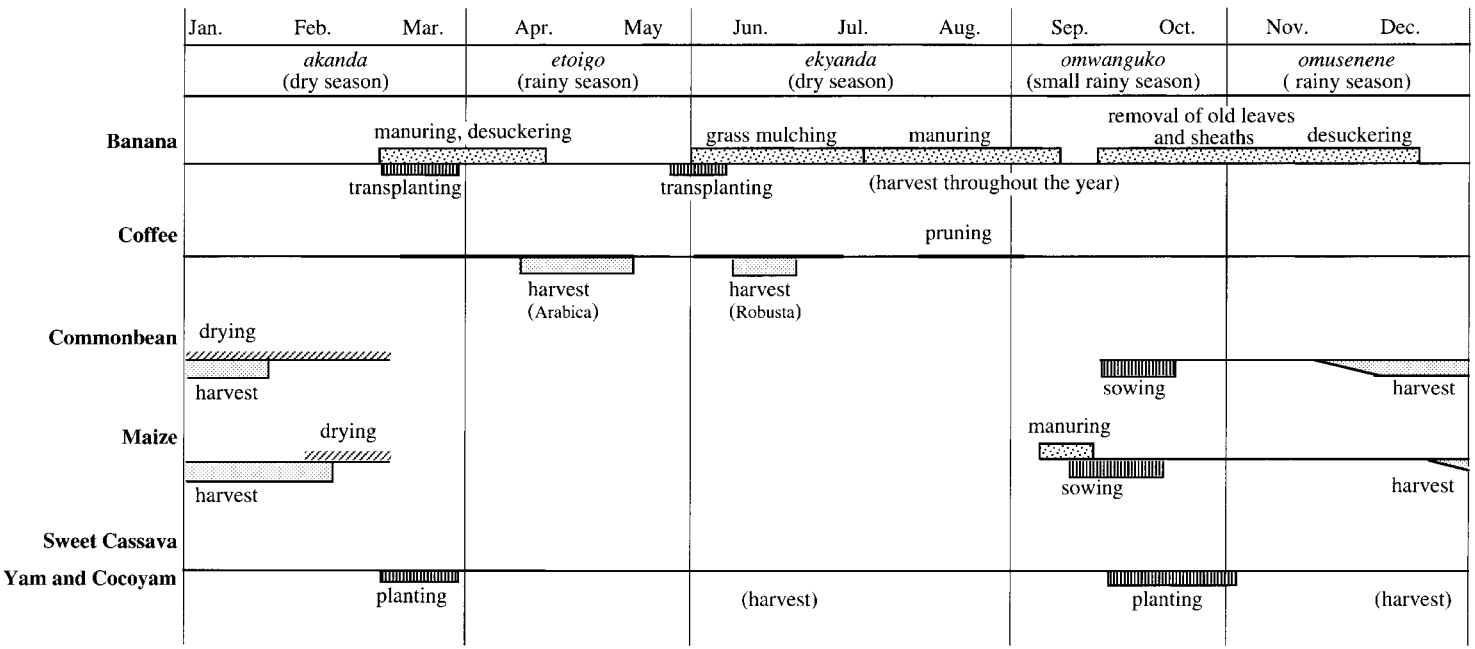

Fig. 3. Agricultural Calendar on Major Crops in *Kibanja.*

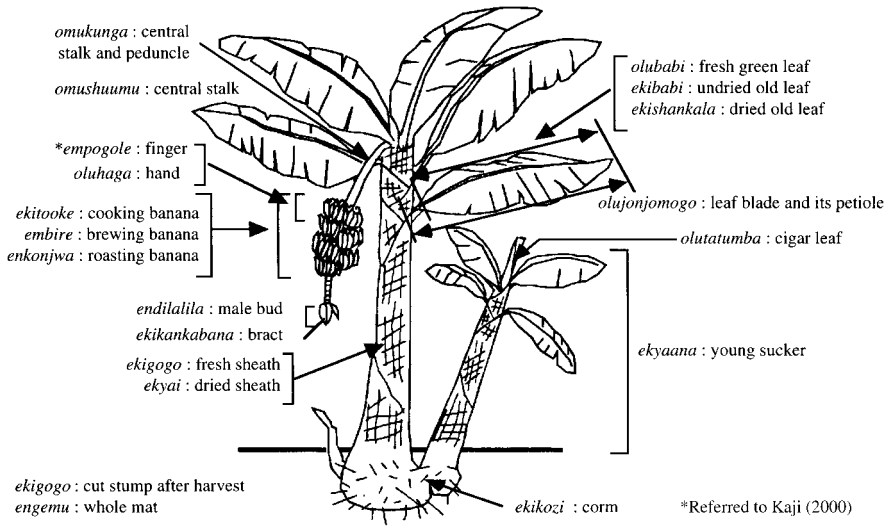

Fig. 4. The Haya Vocabulary on Banana Parts.

The Haya farmers should have, through experience, known the positive effect of mulching on banana growth, though it would not necessarily be intentional practice. While harvesting a bunch, the pseudostem is cut at a certain height. The removed upper pseudostem is cut into pieces, then just scattered onto the ground. Just before the rainy seasons, old dry leaves and outer dry sheaths of all the pseudostems are removed. Those residues are also adequately littered and left in *kibanja*. According to the farmers, such practice prevents some pest damage and maintains stable banana production.

The *kibanja* farming system has been dependent on maintaining soil fertility with cattle manure and grasses derived from *lweya*. *Lweya* provides various grasses to feed cattle, which in turn provide their dung applied to the *kibanja* farm. Since cattle manure is believed to bring the best effect on banana growth, farmers place priority on manure rather than meat or milk. In fact they have put much manure into *kibanja* as well as other organic matter for many years. As already mentioned, they indigenously use various kinds of grass straw in daily life, such as for carpeting onto the unfloored living quarters or roof thatching. Replaced used straw is littered on *kibanja* nearby homestead, also serving as compost.

Thus the Haya have systematically developed their home garden as banana reproducing facility, which has been refined and handed down from generation to generation.

II. *Musiri* Cultivation in *Lweya*

Musiri is a crop field based on the grass fallow system. In the Buhaya history the Bantu cultivator is said to have once relied on finger millet. At that

time *lweya* was the only land for cultivation (Tibazarwa, 1994). Although this type of cultivation became more supplementary after finger millet had been replaced by banana, the Haya people never abandoned *lweya*. Out of 15 sample households, 13 managed *musiri* plots in communal *lweya* with the average acreage of 0.23 ha.

Several tuber crops, such as cassava (*Manihot esculenta*) and sweet potato (*Ipomoea batatas*), or legumes such as Bambara groundnut (*Vigna subterranea*) or groundnut (*Arachis hypogaea*) are cropped in *musiri* cultivation. Cassava is the most dominant. Almost all of the households managing *musiri* plots cultivate this crop. It is classified into two types: bitter cassava that contains potentially fatal prussic acid must be processed before eaten and sweet cassava which has less poisonous acid in its tubers that can be eaten raw. In Businga bitter cassava is more frequently grown in *musiri*. Bitter cassava can be monocropped with a density of roughly one plant per m^2, although sometimes grown with other crops. For example, a Businga woman who managed 3 *musiri* plots monocropped bitter cassava in a plot but mixcropped with Bambara groundnut in the other two. Stem cuttings at about 30 cm length are exclusively used for planting in the study area. And mostly they are planted in a slanted position. Horizontal planting is rarely found at the end of dry season. The increase in cassava fields created shortage of cassava stems to be planted, which inhibited production increase.

It is a women's job to handle all the production process of annual crops and therefore make their own *musiri* plots mostly on *lweya*. They are familiar with the nature of every grass species grown on *lweya* where annual gramineous grass is dominant. They can judge which plot is suitable for cultivation in each season by observing varieties or biomass of grass as well as soil color. With the first rain, women proceed to prepare land for cultivation. In communal *lweya* each woman chooses her cultivation area depending on her capability and will, then start making about five to ten long ridges in one season.(5) A woman first inverts soil using a hoe, and laterally keeps burying grass, then this turns into a new ridge. After repeating this work, she weeds the surface of the new ridges. New ridges are then left for a few months to decompose embedded grasses into the soils. Double cropping a year is more common nowadays. Planting and sowing usually start during the minor rainy season in January to early February, and during the latter of the main rainy season in May.

Musiri management needs relatively low labour input, except for weeding after planting or sowing. Weeding is not always practiced but usually done at least once in the rainy season. In fact *musiri* seems easy to manage, although the women are careful about the choice and preparation of the plot. The *musiri* plots in the communal *lweya* are cropped once and then fallowed for several years. In communal *lweya*, fallow period has shortened in Businga, which resulted from over-cropping due to population growth mentioned in the following section.

SOCIOECONOMIC CHANGES AFTER INDEPENDENCE

I. Adverse Trends in Population and Cattle Holding

The population growth and cattle holding are among some of the most significant causes that induced changes in the Haya farming activity. Between 1961 and 1998, human and cattle population showed distinctly adverse trends in Businga (Table 3). Total population increased more than double in less than 40 years, and young people under 19 years of age accounted for more than half of the total population in 1998. This is almost due to natural increase since there has been little migration from or into Businga. Table 3 indicates that rapid population growth is seen in both the increase of households and household size. The decline in infant mortality would have much contributed to the population growth. It was partly due to more available access to the public health services after independence for pregnant women.

In contrast, cattle holding dramatically decreased during the period. At the time of independence, each holder had 6 cows on average, and about half of households had access to cattle manure. However, currently, only one-sixth of households keep cows in Businga, and worse, most of the cattle holders keep only a few cows. According to an interview with 44 household heads, 27 had ever kept their own cattle, but 19 out of these 27 already had lost all of them by 1998. Some sold their cattle for cash, while others lost them to some epidemic. There were few measures taken against such situation at the village level, except that cattle dipping for disease prevention have been promoted by the District office for the last decades.

These changes in population and cattle holding are directly and mutually related to changes in land use and husbandry. The Haya people have customarily raised cattle mainly for their manure, which has much contributed to maintain their banana-based farming for years. Now that many households lost their cattle, individual accessibility to cattle and manure greatly affects the husbandry strategy by each household.

Table 3. Changes in Population and Cattle Holding in Businga between 1961 and 1998.

	1961	1998	change %
Total households	95	150	158
Total population	319	761	239
Average household size	3.4	5.1	150
Cattle holders	42	24	57
Ratio of cattle holders (%)	44.2	16.0	—
Total number of cattle	252*	98**	39

*Number of cattle in 1961 was estimated from interviews with the elderly generation.
**There is one household which has kept as many as 22 cows.

II. Major Impacts on the *Kibanja* Production System

1. Subdivision of *Kibanja*

The number of households increased from 95 in 1961 to 150 in 1998 (Table 3). In the Haya society where *kibanja* basically forms the household unit, increased households means increased number of *kibanja*. In case of Busingo with a very long history of at least 12 generations, almost all of the available land has already been developed into *kibanja* in early times. The fact indicates that there would have been little land available for home gardens even before independence. Therefore the increase in households after independence has resulted in the subdivision of *kibanja*.

Fig. 5 shows the relationship between the year and the acreage at the time of inheritance or acquisition of each *kibanja* among 15 sample households.(6) Clear difference can be found in the figure between the older households and the younger ones. All of the 5 elder household heads who inherited their own plots before independence had gained more than 0.40 ha, with the average of 0.61 ha. In contrast, plots of less than 0.40 ha were acquired by as much as 8 household heads out of the other 10 younger households which emerged after the late 1960s. The average acreage of these 10 was only 0.29 ha. Land allocation by patrilineal inheritance has apparently reduced the size of plots less in half for the last several decades. An extreme example shows that a young man inherited only 0.08 ha from his father in 1996 when he got independent. The plot is too small to produce enough banana or coffee to support his family, although he also gained 0.13 ha of *lweya* abutted to his *kibanja*. The man soon started to clear land and improved the soil of his *lweya* by putting straws or composts into soil. Since he did not have any access to cattle manure, he was at a disadvantage to develop *lweya* into *kibanja*. In spite of its difficulty, it is recognized among the Busingo farmers that such kind of efforts should be

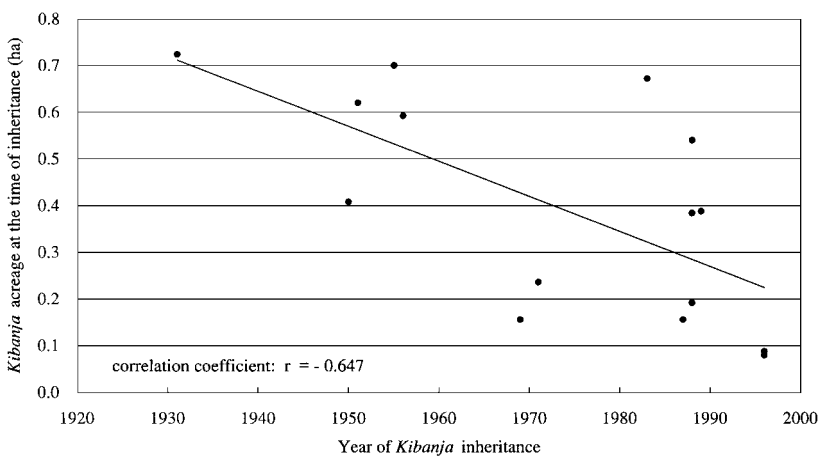

Fig. 5. Relationship between the Year of *Kibanja* Inheritance and its Acreage among the 15 Sample Households.

taken in recent years.

2. Popularization of Land Transaction and Local Banana Trade

Cash economy, which was introduced in the beginning of 20th century, has further penetrated the banana growers after independence. According to Corry & Hartnoll (1971), land transactions did not exist among the Haya before the colonial period and were said to be rather rare even in the 1940s, with undeveloped customary rules on land transactions. Land transactions was non-existent in conventional clan-based tenure, was developed in a relatively recent time with accumulation of capital mainly from coffee selling. Out of 15 sample households 3 have ever purchased additional *kibanja* within the Sub-village. All 3 households had more or less good access to cattle manure compared to the other 12 households, which may imply the relationship between the availability of such resource and the possibility of land extension. As with *kibanja*, *lweya* plots can also be bought and sold nowadays in other villages, but this is still uncommon in Businго with abundant grassland.

Coffee has been the only major cash crop throughout the century in the whole region as already mentioned. Especially from the 1950s to 1960s there was a coffee boom owing to favorable world market prices (de Steenhuijsen Piters, 1999). In the last several decades various kinds of consumer goods and services have become available, while the coffee price remained unreliable. As a result, the need for cash has recently made people seek other income sources. After the 1980s, some crops including maize and commonbean attained marketable values, and banana has also become more an important income source.

Banana used to be grown solely as a subsistence crop in Buhaya, with some exceptional uses such as ingredient of banana beer to be tribute to the Chief before independence, or gifts and bartering within neighboring villages. After independence, cooking banana gradually came to be traded at weekly village markets though only on a small scale. The situation in banana husbandry has changed further in the 1980s, when the demand for cooking banana arose in urban dwellers with economic liberalization in Tanzania. Most of the bananas have been carried to Mwanza south of Lake Victoria, the second largest city of the country. Consequently banana has become a highly marketable crop in Buhaya, and the Businго farmers started to trade it in those years. Moreover, improvements in transportation have promoted the increase of such local banana trade from 1990 onwards. According to a banana trader, the amount of banana dealt in Businго has risen more than four to five times since the late 1980s.

Not all banana varieties can be equally marketable, but some varieties of cooking banana are in high demand. Those varieties that give better yield, produce many clusters or long fruits, and have good appearance are appreciated. Such varieties often grow so vigorously that farmers usually cultivate them around their homesteads where the soil fertility is better in their own *kibanja*. Therefore the composition and arrangement of banana varieties grown by a farmer reveals the orientation by each farmer for banana sale.

In addition to the trade of cooking banana to urban areas, demand for brew-

ing banana has gradually increased for the latest decade. Nowadays it is a new cash source, especially for female-headed households. The women sometimes buy 20 or 30 bunches of those bananas from villagers, then brew and sell the beer sometimes at her homestead or, at the furthest, in the neighboring town.

III. Changing Grassland and Extension of Bitter Cassava Cultivation

Perception of *lweya* by the Haya has notably changed since independence. As shown in Table 4, Businго villagers have once recognized the importance of *lweya* firstly for cattle grazing, followed by supply of useful grass. Crop cultivation comes to the third position before the 1980s. Although *lweya* utilization remains multipurpose, over 85% of the villagers place priority in *musiri* cultivation in 1998. Decrease in cattle holding, and some social changes on grass utilization caused by villagers' new preference for corrugated iron roofing, are some of the underlying factors. However, *musiri* cultivation itself surely gained more importance in the study area.

The Haya farmers used to cultivate more cereal crops like finger millet or sorghum, and legumes like groundnut or Bambara groundnut on *musiri* plots. Sweet cassava was indigenously grown as an intercrop with Bambara groundnut in *musiri* or as a border crop of *kibanja* on a very small scale, while bitter cassava was introduced to this area rather recently. In the early 1940s when this area suffered a long drought, bitter cassava was likely to be first brought to Businго from the neighboring district. According to a villager, this new cassava served as a precious famine crop. At first bitter cassava was planted in *kibanja* as with sweet cassava. However, the farmers soon found that it obviously weakened banana plants grown nearby, so they stopped cultivating it in *kibanja*. What was worse, its wider canopy upon maturity disturbed intercropping in *musiri* cultivation. Luckily the famine gradually ended soon after the introduction of bitter cassava, and villagers returned to their customary banana-based diet and reduced bitter cassava cultivation in *musiri*.

Table 4. Change in the Relative Importance in *Lweya* Utilization.

Type of Utilization	Before the 1980s		1998	
	1st	2nd	1st	2nd
cattle grazing	13	5	4	8
cultivation	6	7	35	2
grass gathering	7	13	2	24
firewoods acquisition	1	2	0	1
tree plantation	0	0	0	5
property	0	0	0	1
total	27	27	41	41

*Data was compiled from interviews with 41 villagers, where they were asked to identify two of the most important current needs for *lweya*. Of the total interviewees, 27 provided information as to the situation before the 1980s.

Since the 1960s as population pressure increased year by year, the Haya increased crop production in *musiri* on which they had depended only a part of food supply. During the late 1960s yields of finger millet remarkably declined in Businго mainly due to soil deterioration. It means that the Haya conventional *musiri* cropping system, which was primarily formed by a series of Bambara groundnut-finger millet cultivation, rapidly deteriorated. Bitter cassava once again helped, and took the place of finger millet, which served in the staple diet of stiff porridge. It also was not as perishable as banana. Moreover bitter cassava was much more productive and more tolerant to poor soil condition than finger millet or any other crop. Sweet cassava, usually eaten boiled or raw as a light meal, is considered less storable and productive. Moreover, it had more risk to be easily robbed from the plots, since it could be eaten immediately after harvest. Those were all the reasons given by villagers as to why they favored bitter cassava to the sweet type. Thus the Haya have got to cultivate more bitter cassava rapidly.(7)

The trend toward more bitter cassava cultivation is an adaptation to the impoverishment of soil fertility. And it in turn changed *lweya* utilization, as shown by the rising intensity of *musiri* cultivation. According to the elder women who have cultivated *lweya* for many years, before the 1980s they could afford to leave cropped plots fallow for over 10 years after one harvest. However, the fallow period has shortened year after year since then. In case of easily accessible *lweya* around Businго, arable land is nowadays recropped after 3 to 5 years fallow, which is not long enough to make grass vegetation recover. Many villagers actually recognized the most significant cause for *lweya* degradation as overcultivation, although some pointed out decline in rainfall. To compensate for the situation, some gained access to other *lweya* further away from home.

DIFFERENTIATING FARMING PATTERNS ON THE HOUSEHOLD LEVEL

I. Current Consumption Trends in Banana and Other Staple Foodstuff

Banana is a perennial herbaceous crop that bears fruit all year around. However there exists a considerable seasonality in its yield. This nature is more likely to be related with various factors as solar radiation, soil moisture or intramat condition (Stover & Simmonds, 1987). In the study area the largest harvest normally comes between July and August, while November to January is considered as the small harvest season.

Fig. 6 shows the consumption trend of each staple foodstuff by 5 sample households in August (banana abundant season) and in December (banana shortage season). Banana, maize and yam are all harvested from *kibanja*, whereas cassava and sweet potato are mainly from *lweya* in Businго. Only rice is exclusively purchased at kiosks.(8) With regard to cooking banana, the consumption rate in December was below 50% among all the households. This

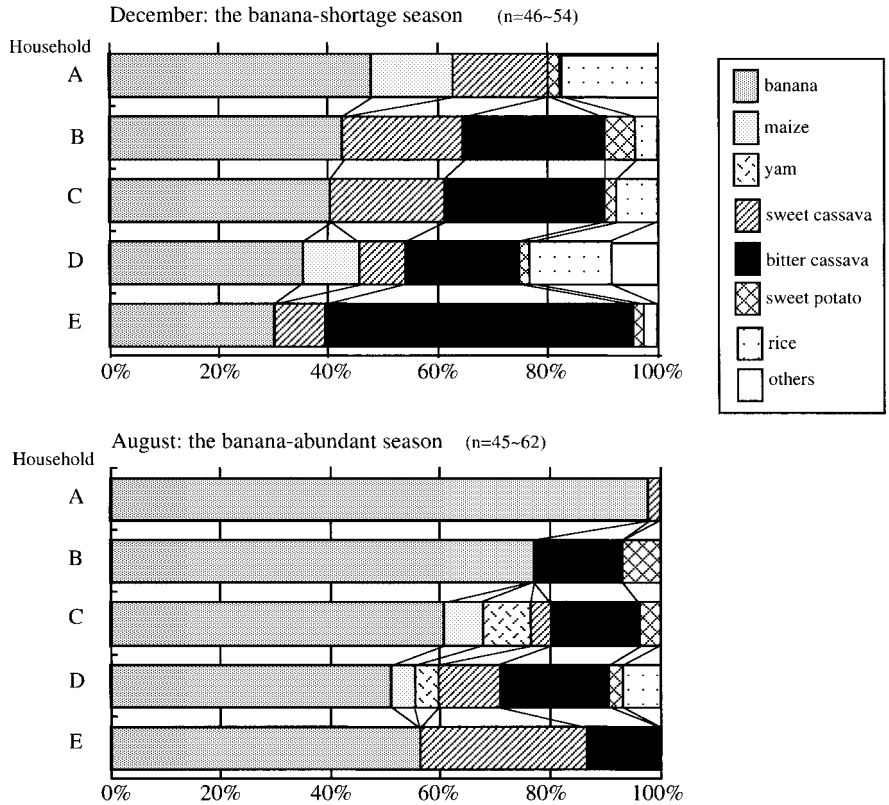

Fig. 6. Consumption Trend of Staple Foodstuff among the 5 Sample Households. *Data collected in December 1998 and August 1999.

means that banana could not be eaten everyday during this season. In August the rate reasonably rose in every household, so that all could afford to eat a banana at least once a day. In contrast, cassava consumption increased in December among all households, and 3 households out of 5 depended about half of their diet on cassava during the period. Maize consumption was low in both months since it is usually consumed more after harvest from January to March.

Consumption trend differed among the households. Household A holds as much as 4 pieces of gardens and has no *musiri* plot at all. Sweet cassava is mixcropped with banana in one of those gardens. They also produce enough maize. In this case, the household produced surplus banana even in December, and could afford sometimes to purchase rice or wheat flour by selling cooking banana or sweet cassava. Unlike household A, other 4 households commonly manage *musiri* plots in communal *lweya*. Households B and C obtained more than 3 quarter of staple foodstuff from their *kibanja*, whereas D and E consumed more cassava than B and C in the banana abundant season, August. The former two household heads are older and hold larger *kibanja* than the latter

household heads.

Such difference among the households can also be observed in the amount of banana harvested (Table 5). Household A produced and sold much more cooking bananas than the others, while it seemed very difficult for E to produce surplus banana.

II. Farming Strategies on the Household Level

Such difference in production and consumption among households can be grasped in the context of agricultural differentiation by households. Fig. 7 shows the relationship between Man Value size of *kibanja* and cultivated *musiri*

Table 5. Number of Banana Bunches Harvested in One Month among the 4 Sample Households.

Household	For consumption			For sale			For gifts or rewards		
	cooking banana	brewing banana	total	cooking banana	brewing banana	total	cooking banana	brewing banana	total
A	31	3	34	51	34	85	26	3	29
B	23	3	26	2	6	8	1	0	1
D	16	0	16	3	16	19	3	0	3
E	16	0	16	0	0	0	0	0	0

*Data was collected for 31 continuous days in August 1998.

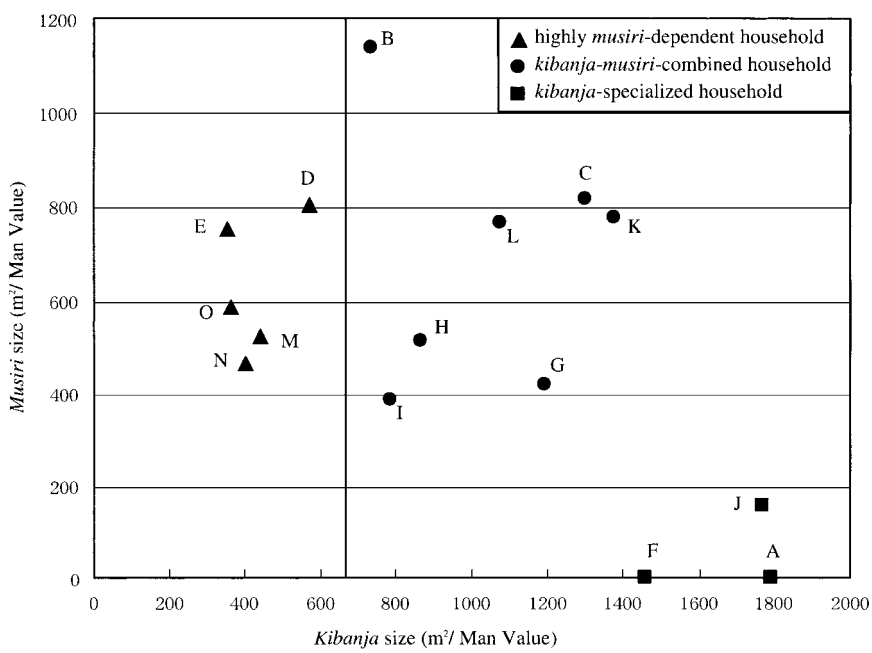

Fig. 7. Relationship between Relative Acreage of *Musiri* and *Kibanja* among the 15 Sample Households.
Note: Household A to E correspond with Fig. 6.
See appendix for basic information on the sample households.

among the 15 sample households in 1998 survey.(9) Negative correlation in the figure is nearly significant by t-test ($p<0.06$), which shows a rather large difference among those households. Those households with less *kibanja* tend to manage more *musiri* plots, while those with more *kibanja* seem to show less commitment to *musiri* cultivation. Somehow large investment is needed nowadays to acquire more *kibanja* land. On the other hand, a key factor in extending *musiri* plots in communal *lweya* is labour by women. All except one of the 15 households have only one or two women capable of *musiri* cultivation. According to the relative commitment to farming, the 15 households can be classified into three types. As shown in the figure, most households nowadays manage both *kibanja* and *musiri* plots. Among these, the households which by estimate produce enough bananas for annual consumption can be categorized '*kibanja-musiri*-combined' type, while those who cannot afford are classified into 'highly *musiri*-dependent' type. Some households fully or almost concentrating in *kibanja* farming can be considered '*kibanja*-specialized' type.

The pattern of '*kibanja-musiri* combined' farming varies among the households. The older households (e.g.: G, H, and I) are often found in this category, but with relatively small acreage of *musiri* plots. In most cases, they have not willingly changed their farming pattern since independence in 1961, and place priority on banana production for subsistence, not commerce. The elders explain that they have managed to maintain adequately the productivity of their garden through regular application of cattle manure. Due to such a fact those older households seem to be less dependent on bitter cassava cultivation than the younger households. The exception is household B, whose household head is over 80 years old, has abundant domestic labour, which enables him to manage more *musiri* plots in *lweya*. Moreover, the youngest son is a progressive farmer who has tried tirelessly growing some locally marketable vegetables in *musiri*. Some other households have acquired relatively large *kibanja* and engaged in off-farm activity. However undeveloped parcels of land remains in their *kibanja* due to the lack of input or labour.

Rough estimation indicates that approximately 668 m^2 of *kibanja* is needed to each Man Value on the assumption that an adult person consumes cooking bananas twice a day through out the year.(10) The value of 668 m^2 is not absolute but the estimate of an average acreage needed to sustain an adult person, since the banana yield can greatly vary from one *kibanja* to another. Fig. 7 indicates that some households do not have enough acreage to produce cooking banana. These are the 'highly *musiri*-dependent' households, which account for 5 out of the 15 households. Many younger households are included in this category, for they have generally been affected by the subdivision of *Kibanja* as mentioned earlier. Increasingly, younger small-scale households hold insufficient size of *kibanja*. Enlargement of *musiri* cultivation should be one possible modern strategy to satisfy domestic food demand. At the same time, the younger men tend to engage in non-agricultural enterprises as part-time watchmen in town or construction workers to earn cash income. Others, especially female-headed households, are often involved in producing and selling local banana

beer or illegal spirit.

In contrast, '*kibanja*-specialized' households as the third category have less or even no commitment to *musiri* cultivation. They can often develop surplus banana production as shown by household A. The household head born in 1968 acquired a relatively large *kibanja* with 11 cows through inheritance, and he has improved the plot by applying enough manure. Several years later, he sold all the cows in order to acquire another 3 plots of *kibanja* within the Sub-village. Presently, the household can produce surplus banana, as well as coffee bean, maize and even sweet cassava using relatively high input. They purchase plenty of manure from some cattle owners in the neighboring villages and also hire wage laborers. Capital accumulation from the profit may in turn again enable them to expand further. Mainly only the '*kibanja*-specialized' households can undertake such an extension strategy. Although there exist in this category another kind of household which cannot afford to engage in *musiri* cultivation due to shortage of family labour force, the high market-orientation is a major characteristic of those households.

Thus, roughly three types of households can be identified in the current Haya village. These different farming strategies likely arose since the 1960s after population pressure and penetration of cash economy became common in the study area.

III. Postindependent Changes of Farming Patterns

In Busingo, most households are currently involved with *musiri* cultivation in *lweya*, besides the management of home garden where both staple food and cash crop can be produced. Fig. 8 shows the post-independent change in land holding, in terms of *kibanja* and *musiri*, among the 5 households that existed from before the 1960s. At the time of independence, *musiri* cultivation seems to have been a supplementary activity. There might have been less food demand for consumption, so that the Haya did not have to grow cereal or bean more intensively than they needed for consumption. In contrast, relative *kibanja* size was larger, and every consumer likely held over 1500 m^2 of *kibanja*. Especially household F had a fairly large acreage per capita than others, since it was yet a small household consisted of a married couple at that time who had just acquired land. The other 4 households showed rather similar agricultural land use based on *kibanja*, which indicates that farming patterns in the early 1960s seemed more homogeneous villagewise. The significant transition in the key crop cultivated in *musiri* has occurred since then, from finger millet or sorghum to bitter cassava.

Farming patterns in 1998 show the dramatic shift toward the extension of *musiri* cultivation. This occurred with the shift in relative importance from banana production in *kibanja* to bitter cassava in *musiri*. 4 households out of 5 have decreased per-capita *kibanja* acreage to less than half. Other 4 households also increased their *musiri* plots by more than double. The decrease in *kibanja* size in Man Value was mainly brought about by domestic popula-

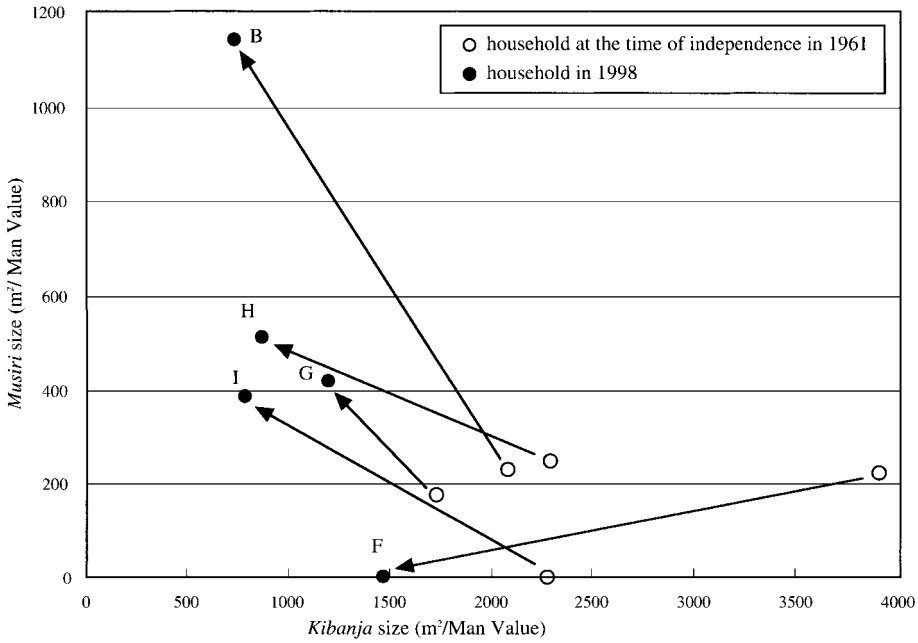

Fig. 8. Post-independent Change in Farming Patterns among the 5 Older Households.
Note: All the 5 households correspond with Fig. 7.
See appendix for basic information on the sample households.

tion growth and the resulting land allocation to their sons, because no household has extended *kibanja* through purchase among these 5 households. As a coping strategy with such land shortage of home gardens, many villagers have started growing more bitter cassava. In Busingo where communal *lweya* still exists, any villager has access to the fallow field. Hence the degree in expanding *musiri* cultivation depends on the subsistence strategy taken by each household.

The flow chart (Fig. 9) summarizes the contemporary changes in subsistence farming patterns described in the previous pages. Before independence, subsistence farming in the study area was largely based on *kibanja* system, and *musiri* cultivation was rather subsidiary. There were more cattle to help maintain soil fertility of *kibanja*, and *lweya* around village was significantly served as grazing land. Not only cooking banana but also brewing banana thrived well in every *kibanja* thanks to adequate application of cattle manure. Coffee was almost the only cash source for most households since there were less local markets for other crops.

In the 1960s when villagers experienced clear population growth and cattle decrease, banana yields dropped in many home gardens due to lack of inputs. Also the productivity of finger millet markedly fell during this period as *lweya* was made use more intensively for crop cultivation. The farmers gradually started to adopt bitter cassava cultivation instead of finger millet at the

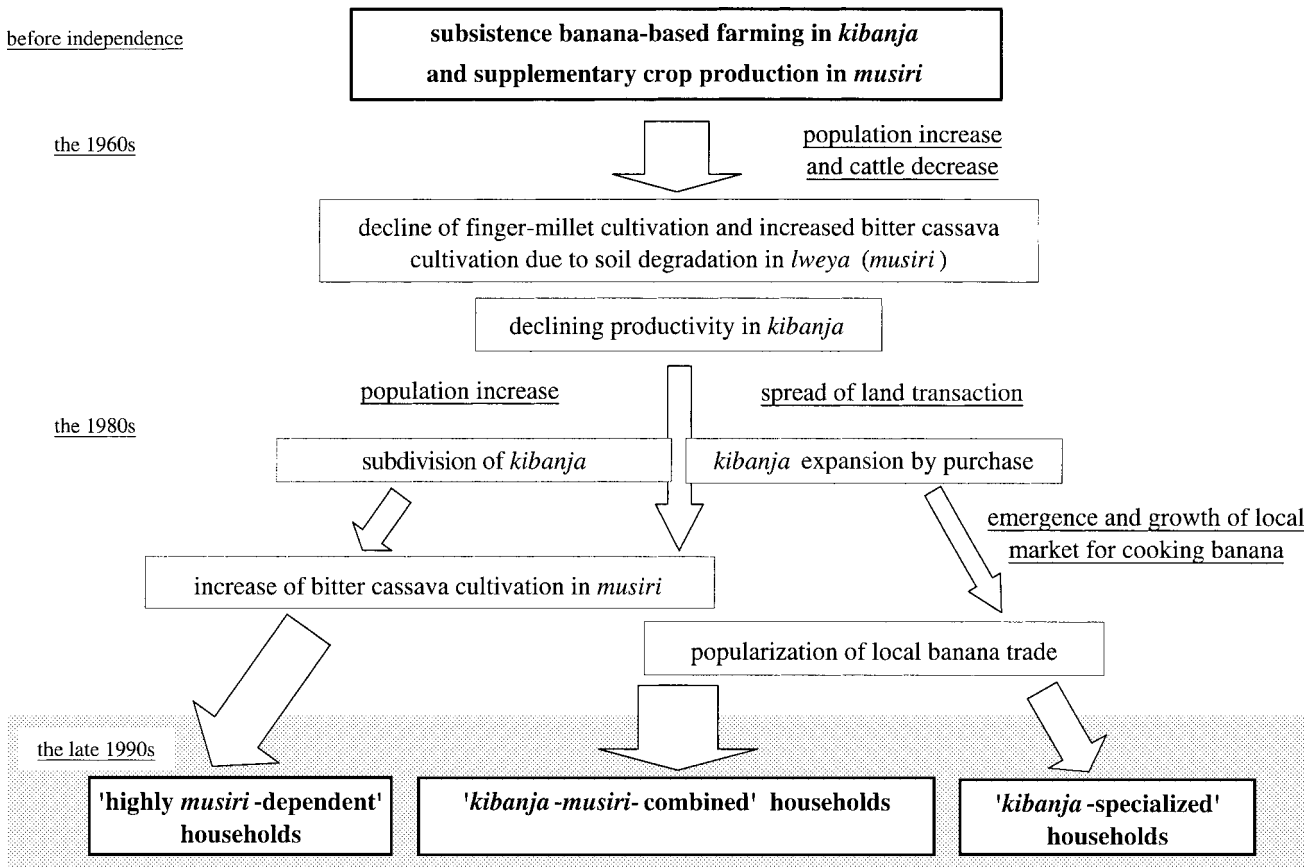

Fig. 9. The Differentiation Process of the Haya Subsistence Farming Patterns after Independence.

same period. By the early 1980s the population pressure reached a higher level, which then accelerated the subdivision of *kibanja*. Increasing domestic food demand and shortage of potential land for banana production led to the further extension of bitter cassava production in *lweya*. Buying and selling of land was customarily seldom occurred, but it became popular with time, especially after the national economic liberalization in 1986. Moreover banana has become locally marketable crop thanks to high demands from increasing town dwellers. As a result, some specific varieties are more favored by some market-oriented farmers. Thus, options taken by each household as a farming strategy have been diversified through changing economic environment, despite the fact that ecological conditions might have become undesirable.

The '*kibanja-musiri* combined' farming has been still shifting toward both decrease of *kibanja* land resource and expanding *musiri* cultivation. More dependence of foodstuffs on *musiri* is clearly observed, particularly among younger or female-headed households. Contrarily, some households have adopted *kibanja*-expansion strategy and developed '*kibanja*-specialized' farming. Therefore the current status of the Haya subsistence farming patterns can be positioned in the differentiation process on the household level.

CONCLUSION AND DISCUSSION

The indigenous intensive farming developed by the Haya has been a stable system with a high population carrying capacity. Under the unfavorable condition of infertile land, they have historically enabled to sustain such husbandry by integrating cattle primarily as suppliers of manure for the system. However, the ecological balance seems to have been lost in the unprecedented dynamic socioeconomic changes since independence. The differentiation in farming patterns is the overall consequence of smallholder household's reactions to the postindependent changes.

Farmland is generally inherited through kinship, often together with other properties including livestock or grown trees. Different endowments of those properties among households, which can be arisen from such differences as household demography and economic condition, inevitably entail economic inequality and stratification in a community (Netting, 1993). Stratification is also related with household economic mobility, which involves various factors as land size and its potential, labour resource, generation, industriousness, or proximity to the market. Household A in the study exemplifies the advantage of having more endowment, which enabled them to change the kind of property from cattle to land, and consequently increase agricultural production for sale. However endowment is not the only instrument in mobilizing household activities. Various strategies adopted by even the disadvantaged households play a role. Some may choose to diversify into cash crops to sell in local markets. Others, especially younger households, may seek in non-agricultural activity as temporary migrant workers in small islands on the Lake. As a whole, economic

mobility in response to monetary economy has become more important for every smallholder household than ever.

Indigenous farming systems with intensive land use have developed in densely populated communities. In such cases, settlement pattern becomes less fluid as land resource is limited. In central Nigeria, the Kofyar have intensified farming due to population increase during the last century (Netting, 1993; Netting, *et al.*, 1993; Stone, 1996). The Kofyar first responded to increasing population by extending farmland to the adjacent frontier areas. After further population growth, they re-intensified indigenous hand cultivation on the frontier lands. Netting *et al.* (1993) argued that Kofyar adaptation to population change was based on their indigenous homestead agricultural system, which had defined property rights, individual decision-making, and household self-efficiency. These features are mostly applicable to the Haya, who have extended *musiri* cultivation as a coping strategy against increasing land pressure since independence. The Haya have never experienced large-scale migration to the frontier, partly due to available grassland around indigenous villages unlike the Kofyar.

Accessible grassland is the key component to the Haya farming system, since it is *lweya* that has always played an essential role in the subsistence economy and culture: *lweya* furnished cattle with feeding grass, which at last benefited *kibanja* in the form of manure. Grass, too, provided mulch which is recently more applied to *kibanja* with less available manure. Although the utilization pattern of *lweya* resource has been transformed, the grassland itself still serves multiple functions. As observed in the spread of bitter cassava cultivation, *lweya* has been capable of accepting exterior change as a buffer, which keeps open options for the individual household.

The banana-based home garden has been maintained as the primary component of the livelihood system in the study area. Although bitter cassava appears to be more advantageous than banana in terms of productivity, many farmers are reluctant to grow it in *kibanja* as already mentioned. Furthermore, maize and bean are mostly cropped in *kibanja* only once a year with insufficient annual yields, even though farmers realize it is climatically possible to double-crop. Such agricultural behavior explains that the Haya are not necessarily oriented toward maximization of food production, but likely care more about maintaining the reproduction facility of *kibanja*. Individual farmer is acquainted with ecological advantages of banana cropping in relation to their habitat environment. In other words, each household makes unique, very long-term options for the family's intergenerational security (Netting, 1993). Apart from banana, coffee would be one of the factors which contribute to continuation of the system. Even when the Haya farmers unwillingly accepted commercial coffee cultivation during the German colonial period, they persisted in conventional *kibanja* farming so that they simply planted coffee among the banana stands. As the result of such forced involvement with a cash crop into the system, *kibanja* became partly commercial farmland in addition to subsistence garden as early as in the 1910s. Such historically embedded system made it possible for

the Haya to adapt to postindepent further penetration of cash economy.

Besides, there is also a substantial social aspect for their persistence to *kibanja*. Historically the indigenous Haya village was formed on basis of a collective of *kibanja*, each of which transferred from generation to generation. The fact that elders can often trace the history of their garden indicates the importance of historical continuity of their land. It is in the married son's, possibly his family's, banana grove that a wedding ceremony is held in the patrilinal society. Any member of a family is buried near the homestead. Therefore, *kibanja* occupies a special position in time and space socio-historically and socioculturally.

The Haya farmers can be viewed both as the specialists of banana cultivation and the generalists of grassland utilization. Their contemporary reactions to dynamic changes by the Haya smallholders reflect their historical appreciation of the microenvironment: *kibanja* is to be sustained as their sociocultural core, and *lweya*, as a buffer space to flexibly receive the innovation factors. Thus the social differentiation process took place under the field of rural dynamics deep-rooted in their innate recognition of the environment. To see changing agricultural system and community dynamics, resource utilization should be grasped in a broader context with social, cultural and historical aspects.

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NOTES

(1) The group name of 'Haya' was named after some existing clan during the colonial period (Kimambo, 1969).
(2) The Haya term for grassland has usually been spelt as '*rweya*' in previous studies. However, Kaji (2000) adopted '*lweya*' for the word in his linguistic work. In this paper, the spelling '*lweya*' is used according to Kaji's work.
(3) In Busingo, one former '*kyaalo*' was divided at the time of independence into two subvillages administratively, one of which is the study village.
(4) Even before the introduction of arabica, robusta (*Coffea canephora*) was grown

in Buhaya to utilize as 'chewing coffee' which was boiled in herbs and then dried. Robusta is produced only in Kagera Region throughout Tanzania, which occupies over 80% of the coffee production in Muleba District.

(5) The existence of women's groups has played some role on location decision, cooperative working in *musiri* cultivation.

(6) Of 15 households, 14 inherited *kibanja* plots from their father, and one purchased his *kibanja* from his grandmother.

(7) Takeuchi (1993) argued that bitter cassava was first voluntarily accepted by the Congolese farmers between 16th and 18th century in Central Africa. It may have been introduced to Buhaya afterward through the northwestern route via Congo and Uganda.

(8) Only household A cultivates sweet cassava in *kibanja*, whereas the others produce it in lweya.

(9) Man Value represents an estimated consumption unit: whereby the value 1.0 is allotted for a male over the age of 14, 0.8 for a female over 14, 0.7 for a child between 6 and 14, and 0.4 for an infant under 6, respectively (Richards & Widdowson, 1936).

(10) The following 4 parameters were used in the estimation, mainly obtained through the field survey: (a) nearly 0.50 kg of fresh banana weight is consumed in each diet in Man Value; (b) 45% of weight is edible for a whole banana bunch; (c) the average bunch weight is 15.0 kgs (Mgenzi *et al.*, 1997); (d) the average planting density of cooking variety: 0.081 stand/m^2. From these values, *kibanja* acreage needed in Man Value unit a year can be estimated as; $(0.50\times2\times365/0.45\times15.0)/0.081=667.6$ m^2. In this estimation, it was supposed that just one bunch should be harvested annually from every banana stand.

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Author's Name and Address: Satoshi MARUO, *Graduate School of Human and Environmental Studies, Kyoto University, 46 Shimoadachi, Yoshida, Sakyo, Kyoto 606-8501, JAPAN. E-mail: maruo@jambo.africa.kyoto-u.ac.jp*

Appendix. Basic Imformation on the 15 Sample Households in 1998.

Household	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Householder head's sex	Male	Male	Male	Male	Male	Male	Male	Male	Male	Female	Male	Male	Female	Male	Male
Householder head's age	30	85	52	28	43	60	67	60	64	56	32	32	40	36	25
Clan	*muyango*	*musimba*	*musimba*	*musita*	*musimba*	*mutundu*	*musimba*	*murwani*	*musimba*	*musingo*	*mwangaza*	*murwani*	*musimba*	*musimba*	*murwani*
Religion	Catholic	Catholic	Catholic	Catholic	Catholic	Catholic	Catholic	Catholic	paganist	Catholic	Muslim	Catholic	Catholic	Catholic	Catholic
Household size	7	7	7	5	9	6	6	5	6	7	4	5	3	4	3
No. of males above age 14	1	2	3	1	1	2	4	1	3	1	1	1	0	1	1
No. of females above 14	1	4	1	1	4	3	1	1	1	2	1	1	2	3	1
No. of children from 6 to 14	3	0	3	3	3	0	0	2	2	3	2	2	0	0	0
No. of infants below 6	2	1	0	0	1	1	1	1	0	1	0	1	1	0	1
No. of *kibanja* plots	4	1	3	1	1	1	1	1	1	3	1	1	1	1	1
No. of *lweya* plots	1	1	1	0	1	1	1*	1	0	0	1	0	0	1	1
No. of *musiri* plots	0	7	5	5	2	0	2	3	3	2	4	4	2	3	3
Total *kibanja* acreage (m^2)	8400	4120	7680	1920	2360	7000	6200	3120	4080	9000	4400	3880	880	1560	800
Total *musiri* acreage (m^2)	0	6380	4810	2720	5000	0	2160	1840	2000	800	2480	2760	1040	1800	1280

* The household G borrows a portion of *lweya* from some other household.