

Chapter III Use of Fiber Plants in Ghana and Commercial Possibilities

In this research project, field survey was conducted in the Republic of Ghana in August and September, 2009. This chapter summarizes the report of the field survey such as the likely usage and the distribution status for each material.

Improvements by utilizing the material characteristics are also proposed in terms of design and technical aspects. As an example, "Cool Africa" is proposed.

3-1 Current State of the Use of Fiber Plants

3-1-1 Materials for baskets, mats, and textiles

This section describes the three types of everyday household items, namely, textiles, baskets, and mats, among those that use natural materials in Ghana based on the data obtained in the field survey. However, in this example, baskets refer only to those that are made from stems.

1) Natural fibers such as gramineae that are used for baskets

In the savannah region in the north of Ghana, basket weaving using grass is popular. The climate of the savannah region is not suitable for stable farming due to the harsh dry season. In the southern region of Ghana which has a tropical rainforest climate, palm plants are produced in abundant quantities, such as rattan, raffia, and oil palm. In the northern region that has a severe dry season, it is difficult to produce baskets by collecting such plants. Production of baskets using the grass stems of gramineae means utilization of natural fibers suitable for the climate and natural environment of the savannah.

Basket-making is suitable for such a natural environment and they have been produced and used as a means for self-sufficient livelihood. Baskets are mainly made by women, although, men are also engaged in this activity.

Recently, baskets that are produced using the traditional basket-making techniques are popular as export items. Such baskets are referred to as "Bolga baskets" and are mainly exported to Europe and America.

Bolga baskets are made of *Vetiveria nigriflora* and *Panicum maximum*, the grasses called 'kinkase' in local that grow in the outskirts of Bolgatanga and Kumasi. Some researchers say that *Phragmites karka* is also used for the basket making. The stem is torn in two pieces and is used for weaving by either twisting or not twisting the strings.



Photograph 3-1-1: Bolga baskets

Research was also conducted on the traditional baskets produced in the outskirts of Bolgatanga, and these types are "pio", "tapo", and "zehen". Stems of sorghum and kenaf are used for pio. Stems of sorghum are used for the body or core material of a basket and kenaf is used as a string for fastening the stems. Kenaf is used for tapo and 'kinkase' is used for zehen.

Research on basket production was conducted in Bolgatanga in the Upper East Region and its fringe rural village, Nyariga. The author collected some gramineae grasses from the area along the side of the road while traveling to the North from the outskirts of Kumasi. The Plant Laboratory, University of Ghana was requested to do an analysis of the plant types. The plants whose analysis was requested include ① grass that was collected in Nyariga for basket production, ② some types of grasses that were collected from the outskirts of Kumasi and ③ grasses that were collected from outskirts of Bolgatanga. In Japan, analysis of the same grasses was done again by The Weed Science, Agronomy and Horticultural Science, Graduate School of Agriculture, Kyoto University for confirmation.

In Nyariga, a survey was conducted on the techniques and materials in the Nyariga Craft Society. In the Sirigu Women Organization for Pottery and Art also, a survey was conducted on the basket production that is associated with tourism. For the history and current situation of the commercialization of baskets, interviews were conducted in the Zonal Office of the Ghana Export Promotion Council. For basket distribution, a survey was conducted on the basket market that is opened twice a week in Bolgatanga City.



Photograph 3-1-2: 'Kinkase', collected in Nyariga. photograph taken by the author



Photograph 3-1-3: Making the base of a basket. Photograph taken by the author in Nyariga.



Photograph 3-1-4: Tool for draining off water from the seeds of zehen and parkia after they are washed. A soft basket with attractive mesh is created by weaving straws of *Phragmites karka* without being twisted. This type of basket, however, cannot withstand weight as a container. Market of Zebira (Bokwa district)



Photograph 3-1-5: Pio and sorghum, photograph taken by the author in Nyariga.



Photograph 3-1-6: Bag woven of kenaf strings (tapo). In the Upper East district, a bag woven of kenaf strings is called a tapo and is used as a shoulder bag for males. Photograph taken by the author in Nyariga.



Photograph 3-1-7: Kenaf strings. In West African countries like Ghana, fibers that are extracted from the strong bark of kenaf are made into strings and usually used as binders. Photograph taken by the author at the market of Zebira (Bokwa district).

2) Natural fibers used for the production of mats

In Ghana, some mats are produced using natural fibers and are used for various purposes in daily life. As hardly any research has previously been conducted on mats, the survey was difficult. The field survey was initially commenced by carefully observing the markets and houses and some types could be identified by the University of Ghana. A survey on mats was conducted entirely within the schedule for Ghana survey.

On the outskirts of the capital, Accra, and the outskirts of Takoradi, the coastal region of Southern Ghana, the author frequently saw hung mats (photograph 3-1-8) from openings as blinds. At the market of Takoradi, mats produced in the Volta region were sold. On the outskirts of Tarkwa of the Western Region, mats are made of leaf rachises from the raffia palm, which are used for drying farm crops such as cacao, and used as bedding by spreading out on the floor (photograph 3-1-9) and blinds by spreading out on the roof.

In the Faowanye village near Beposo in the Western Region, the author could observe mat production (photograph 3-1-10). As the material for mats, the grass stems called Mbew in Fante language and achacha in Ewe language is used, and for binding the stems, fibers of *Agave sisalana* of Agavaceae are used.¹ The type of Mbew could not be identified.

The yam grass used as blinds in the Brong-Ahafo Region and the grass that is used for making fences on the outskirts of Tamale in the Northern district were a type of *Andropogon* of gramineae. In the Volta Region, a survey was conducted on the mats made from the Cyperaceae and Typhaceae plants.



Photograph 3-1-8: Blinds hanging from the opening. Photograph taken by the author at the craft village of Accra.



Photograph 3-1-9: Mat used for bedding. Photograph taken by the author at the Esaman village on the outskirts of Tarkwa, Southern region of Ghana.



Photograph 3-1-10: Making a mat. Photograph taken by T. Takahata at the Faowanye village on the outskirts of Beposo.

¹ In Kenya, baskets are produced using sisal, which were not seen in Ghana.

In the field survey, mats made from a variety of natural fibers could be observed. However, only raffia palm, grass of *Andropogon gramineae* grass, *Cyperaceae* plants, and *Typhaceae* plants could be identified. For the others, although the local names could be identified, their types could not be confirmed by the University of Ghana. Although some types could not be identified, it was clarified that a variety of natural fibers are used as the materials for tools in daily life such as mats.



Photograph 3-1-11: Making a mat. Photograph taken by T. Takahata in the Volta Region

3) Textiles

The natural fibers that were assumed in the prior research and for which field research was conducted as textile materials are cotton, raffia, kyenkyen, and kapok. According to Kawada, the function of garments in Western Africa was until recently more of a symbol of prestige connected to royal authority than it was for the purpose of protecting bodies from the external environment [Kawada 1997]. In the Kumasi region of Ghana, a symbolic structure has been formed that is connected with the Ashanti Empire that was established at the end of the 17th Century. The garments include cotton garments and those of bark fabrics.

For textiles, research was conducted on the fabrics called Kente in Bonwire on the outskirts of Kumasi in the center of Ghana, dyed fabrics called Andikra in Ntonso, and the fabrics used for a smock-type garment called "Fugu" on the outskirts of Tamale in the North East region of Ghana. Information on cotton cultivation was collected at SARI (Savannah Agriculture Research Institute) of Tamale. Cotton is cultivated in Ghana and yarns are produced in the spinning factories on the outskirts of Accra. The interviews



Photograph 3-1-13: Male weaver wearing a Kente. Generally, no shirts are worn under Kente. Photographed by the author in Bonwire.

conducted in the cotton fabric production region revealed that raw cotton and cotton threads produced in foreign countries such as Burkina Faso and Nigeria are used in addition to the cotton and cotton threads produced in Ghana.



Photograph 3-1-12: Loom for weaving Kente. Photographed by the author in Bonwire.

Kente refers to a "congratulatory ceremonial fabric" and is produced by two ethnic groups called Ashanti and Ewe. [Iseki 2000: 156]. Conventionally, silk threads were used, but, mainly rayon threads made in China are used currently. One fabric is created by stitching together narrow fabrics of a little more than 10 centimeters in width. The sizes differ between the fabric for men and the fabric for women. A foot treadle loom is used for weaving Kente and a reed of plain weave and a reed of pattern weave are used (photograph 3-1-12). Its



Photograph 3-1-14: Male wearing an Adinkra. Photograph taken by the author at the market in Kumasi.

feature is the geometric patterns designed by combining plain weave and pattern weave in many colors such as orange, green, and blue (photograph 3-1-13) or in two-tone colors based on white and navy blue. By stitching narrow fabrics together, more prismatic combinations of geometric patterns are created, presenting a more attractive design. The fabric is worn by wrapping it around the body as a robe.

Adinkra is fabric produced by pressing patterns on a cotton fabric and is used for funerals and mourning ceremonies. Like Kente, this is a symbolic fabric associated with the royal authority of the Ashanti Empire. In this research, production of Adinkra in the Ntonso village was observed. Adinkra is produced by printing patterns using a pattern block created by a gourd with black liquid extracted from the tree bark called 'badie' (*Bridelia ferruginea*). This block printing method is still used (photograph 3-1-15), however, mostly screen printing is applied.

On the outskirts of Tamale in the northern region of Ghana, there is a kind of men's garment called either a smock or a "fugu" (photograph 3-1-16). A smock is made by stitching thick narrow hand-woven cotton fabrics (some use hand spun threads) and this garment is popular as its dignified appearance shows the social prestige. In this



Photograph 3-1-16: Male wearing a smock. Photograph taken by the author in Techiman.

research, the author observed weaving in the Shishev village on the outskirts of Tamale. Fabrics are woven using a foot treadle loom. At the market in Tamale, smocks are sewn and sold and the author observed the actual demonstration. For the cotton threads as the raw material, industrial yarns in the southern region of Ghana are mainly used; however, some use hand-spun yarns also. On the outskirts of Tamale, the author observed a female spinning yarns from cotton. Hand-spun yarns are not sold at markets and are used for personal consumption.

Garments produced by using fabrics were originally worn only by the people of high ranks connected with royal authority; however, currently, such garments have become popular among the economically well-off middle-class people and the domestic demand within Ghana is increasing.

The bark fabric called 'kyenkyen' in the Ashanti language could not be verified in this survey. 'Kyenkyen' is produced by stretching the bark of a tree (photograph 3-1-17) called *Antiaris toxicaria* (*A. welwitschii*, *A. africana*) by pounding. Since production of bark fabrics used for



Photograph 3-1-15: Block printing in Adinkra. Photograph taken by the author in Ntonso.

For the cotton threads as the raw material, industrial yarns in the southern region of Ghana are mainly used; however, some use hand-spun yarns also. On the outskirts of Tamale, the author observed a female spinning yarns from cotton.



Photograph 3-1-17: Kyenkyen in the Borivi forest. Photograph taken by the author.

ceremonies has been discontinued, the fabrics are now used as souvenirs. During this study, however, the fabrics could not be seen in the shops either.

Kapok, whose scientific name is *Ceiba pentandra*, is a tree that produces cottons in fiber form. The author observed people who carried kapok cotton that was collected in the North, made cotton filled pillows, and were selling them on the spot (photograph 3-1-18). Interviews conducted by the author revealed that this type of cotton is used for fabrics since the fibers cannot be spun to create yarns as they are straight.

In the Democratic Republic of Congo (Former Zaire), raffia was famous for its fabric material. However, in Ghana, the author could not witness weaving using raffia fibers. The author witnessed that raffia trunks are used for buildings, leaf stems are used for baskets, and fibers collected from leaves are used for binding. However, in Ghana, yarns are not made by spinning fabrics and producing fabrics using the yarns.



Photograph 3-1-18: Selling Kapok cotton alongside the road.
Photograph by the author in

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3-1-2 Materials for baskets and furniture - with palm and bamboo as the core

This section mainly describes the fiber plants that are used for baskets and furniture based on the varieties of palm and bamboo that were examined locally.

1) Type of cyperaceae Scientific name: *Cyperus articulatus*

Baskets woven with the flattened cylinder-shaped stem of this plant are very delicate and demonstrate the craftsman's skill. Although only one design is available, the originality is unique.

The material can be easily obtained from the swamps of the area. In the Keta area of the Volta Region where this survey was conducted, basket weaving is practiced by farmers as a side job and baskets are produced in family units. In the area where the research was conducted, no particular producer integrates the products within the village and since products are sold to the buyers who visit the producers individually, the efficiency is low. Prices are dropping due to stagnant sales.

Based on this situation, it may be possible to increase the price and productivity of the local products by increasing new design variations and establishing an organization that integrates products in village units instead of family units.



Photograph 3-1-19: Vegetation site



Photograph 3-1-20: Basket of 30 cm to 42 cm in diameter and 30 cm in height. Price: 3 Cedis.

Mainly the elderly females are in charge of basket making while children learn.



Photograph 3-1-21: Basket of 8 cm in diameter and 10 cm in height. Price: 30 Pesowas.

Six baskets can be made per day.

Only purple and green are used as combinations of other colors were not popular although they have been produced.

The mesh size can be specified. The horizontal yarn was made of three layers and the vertical yarn was one layer.

2) Oil Palm Scientific name: *Elaeis guineensis*

Stems are used by tearing. Oil palm can be easily obtained from the areas that cultivate oil palm. As utility articles, the baskets made of oil palm are used for storing and carrying farm goods to the markets. The current basket size is determined based on the strength, however the marketability of the local products may be increased by producing baskets of finer and better finish. Due to its strength, oil palm can also be used as a material for making furniture.



Photograph 3-1-22: Products sold in the Akatsi market.

The prices are as follows:

Basket size;

65 cm in diameter at a height of 35 cm: 3.0 Cedis

45 cm in diameter at a height of 26 cm: 0.7 Cedis

20 cm in diameter at a height of 17 cm: 0.5 Cedis

Thirty or more buyers visit the market and sell the baskets to other markets in Accra City.



Photograph 3-1-23: Atsieve-Sogakophe district. Sieve for cassava flowers made from the same material

3) Wisteria or Rattan Scientific name: *Calamus rotang*, *Eremospatha spp.*, *accosperma spp.* etc.

Currently, rattan is difficult to obtain due to excessive harvesting and so production is decreasing. The extinction of rattan has become a serious problem and there is an urgent need for artificial cultivation.

The house furnishing products observed in Accra Special City and Takoradi City apply almost identical designs as those often seen in Asia. However, the quality is inferior. The quality variation is caused mainly by the irregular material conditions and not using "patterns" for manufacturing products. The major problem is that most workshops are located outdoors and so completed products and semi-completed products are exposed to the rain.



Photograph 3-1-24: Basket woven in the Anyreshi district. Highest quality. 4 Cedis. Two to three baskets can be produced per person per day.



Photograph 3-1-25: Typical outdoor workshop (Dwoulu district of Accra Special City)



Photograph 3-1-26: Wild rattan (Forest on the outskirts of Tarkwa City)



Photograph 3-1-27: State of rattan cultivation experiment Global Bamboo Company (Enyreshi district)

4) African Wild Date Palm Scientific name: *Phoenix reticulata*

The string made by drying and twisting the leaves of this plant is used mainly for tying up goods in the markets. The strings are also used as the material for the baskets for onions or as tying strings for fixing a beam to a post employing the traditional building method. The use of the material for a seating surface of furniture and decoration is also possible. This material can be comparatively easily applied to other products with much ease.

Strings are commercially produced in the area of the research field and the strings are widely distributed to other areas as well. The strings are also used for weaving mats that use *Cyperus articulatus* (*Andropogon gayanus*) as the main material.



Photograph 3-1-28: Bundle of woven strings.
50 Pesowa per bundle (20 yards).

The material is collected, dried, and stored, and it is once dipped in water, before being made into a string by twisting.
(Atravenu district)



Photograph 3-1-29: Example of application to the seating surface of furniture, Global Bamboo Company (Enyresi district)

5) African Fan Palm Scientific name: *Borassus aethiopum*

In the coastal area of the Volta region, dried leaves of this plant are used for a variety of weaving products such as fans, mats, and baskets. The trunks, which are very hard and strong, are used for poles and the beams of buildings. In particular, fans are also sold in other regions as useful tools for starting coal fires. Its rough large mesh is attractive.



Photograph 3-1-30: Trunks used for poles and beams of buildings



Photograph 3-1-31: Basket: 50 cm in diameter, 45 cm in height. 3 Cedis. Six baskets can be produced per day



Photograph 3-1-32: Mat used for drying chili peppers. 220 cm x 140 cm. 7 Cedis. Two mats can be produced per day.

6) Raffia Scientific name: *Raffia ruffia*, *R. vinifera*, etc.

Raffia cultivation was observed mainly in the South of Ghana.

In Ghana, raffia is more widely used as the material for baskets by tearing leaf rachises rather than textile fibers. Raffia is also used for trap baskets (fish traps), cacao bean drying sheets, bedding mats, and building materials.

In Ghana, raffia is also well recognized as the plant for collecting the raw material solution for palm wine and distilled spirits.

Due to its superior strength, rachis can also be used as a material for making furniture. (Simple benches are also made.)



Photograph 3-1-33: Basket (container for corn and palm kernels)



Photograph 3-1-34: Bedding mat. 2 to 3 Cedis per sheet. Raffia leaves are used as horizontal threads while raffia leaf rachises are used as vertical materials.



Photograph 3-1-35: Wardrobe made using raffia leaf rachises as the surface material.
Global Bamboo Company (Enyresi district)

7) Bamboo Scientific name: *Oxythenanthera* spp., *Bambusa vulgaris*

Bamboo grows extensively in the south of Ghana. Like rattan, bamboo is mainly used as furniture material in outdoor workshops. Many new products are also being made.

Five years ago company A started production of laminated bamboo timber and is experimentally selling the products in the domestic market. There seems to be many difficulties in making the business commercially viable. Initially, its price competitiveness was low as electricity and water are more expensive than in other countries (for instance, China) and in addition, the adhesive needs to be imported. As bamboos that naturally grow in Ghana are very hard and the knot bending flexibility is high, the yield is low when processed into lumber. Therefore, cultivation of bamboo that originated from China is being introduced due to its excellent processing adaptability.

Company B has commenced planting Chinese bamboo. In the system that is being developed, nursery plants are cultivated in fields. Plants that became grow successfully are replanted in the fields of contract farmers, and bamboo materials are re-purchased after three years. The author observed the mats woven using the Chinese bamboo and recognized its high product value.

Company C in Accra Special City also attempted production of boards. However, the company switched to Kebab sticks as board production is not commercially viable.

In Ghana, production of boards that require large scale mechanical process using bamboo as the material is considered to be unsuitable for its large facility investment risk. Kebab sticks, toothpicks, and more high-value added household goods seem to have more potential.



Photograph 3-1-36: Chinese bamboo nursery beds



Photograph 3-1-37: Roughly cracked bamboo. Substantially bent.



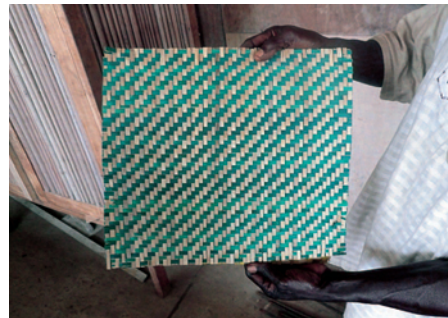
Photograph 3-1-38: Packet flooring (parquet flooring material)



Photograph 3-1-39: Bicycle with bamboo frame (Abonpe district of the Eastern district).



Photograph 3-1-40: Kebab sticks (Adinkrahene Concept Company)



Photograph 3-1-41: Place mat made of Chinese bamboo.
The quality equivalent to this product is desirable.