An Alternative Raw Material in Handicraft-Making by Using the Oil Palm Fronds: A Community Based Tourism Exploratory Study at Kota Belud, Sabah

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ABSTRACT

A handicraft-making provides an opportunity for local communities to represent cultural expression, and a community’s heritage rendering to the visitors. The handicraft-making is a major contributor to employment and has the potential to increase the communities’ revenues in handicraft selling. In Kota Belud, most of raw materials used by the community in handicrafts-making were obtained from the natural resources such as bamboo, rattan, plants from forest to produce an iconic handicraft to Kota Belud, for example tudung saji (food cover). As an introduction, the oil palm fronds are always considered as waste in oil palm plantations, after fronds lopping to harvest the oil palm fruit. The oil palm fronds contained lignocellulosic materials potentially as raw materials in handicraft production. The raw material of vascular bundles extracted from oil palm fronds, has been prepared as plaiting material. The main aim of this study was to introduce an alternative raw material which is to utilise the oil palm fronds and the appropriateness of oil palm fronds in the handicraft-making. In this study, a total of 15 handicraft makers as respondents were randomly selected at Kota Belud village. Respondents were also provided with pulur rattan used as its main frame. Each respondent was required to produce one type of craft based on their own choice. A self-administered questionnaire was conducted to get feedback after they completed the handicrafts-making. Based on the study, 47% of respondents viewed the vascular bundles of oil palm fronds as very suitable, whilst 53% of respondents viewed the raw material as suitable in handicrafts-making. None of the respondents felt it was not suitable as a raw material. All respondents felt that the appearance of handicrafts from palm oil vascular bundles is beautiful and identical as compared with handicraft made from rattan. Majority of respondents thought that the vascular bundles of oil palm fronds were very easy to dye and only 13% viewed as it is easily to dye. A total of 53% of the respondents think that dyeing and finishing the material with varnish will make very beautiful handicrafts, whilst 40% felt that the dyeing and finishing with varnish produce a beautiful appearance of the handicraft. However, 7% of respondents felt that it did not give any changes of appearance on the handicraft even after applying dye and varnish. In addition, 47% and 33% of respondents felt that it was very easy and easy to weave the vascular bundles, respectively. Some of the 20% respondents felt that it was difficult to plait using the vascular bundles between the rattan frames. The respondents viewed that the handicrafts made from palm fronds vascular bundles is comparable with handicrafts from rattan and other materials, with prices between RM10-RM30 or more based on its size. Respondents also said that the vascular bundles are fragile and easily break, therefore the quality of the raw material must be improved. Most respondents would like to produce handicrafts of vascular bundles in the event that there is no supply of raw materials. Through this study handicraft such as basket, egg basket, a
small vase, dish mat, pot mat, hand fan, candy containers, beans container and jewellery container can be produced.

**Keywords:** Community Based Tourism – Handicraft – Oil Palm Fronds – Alternative Resource for Handicrafts making

**INTRODUCTION**

The tourism industry is a popular industry nowadays, especially for Sabah, or more commonly known as North Borneo by foreign tourists. Sabah state famous for its unique natural and cultural heritage used as primary tourism products. Additionally, the development of tourism products that are not only physical products but also non-physical products that can provide experience and create appreciation of tourists towards host traditional dances, ethnic custom practices and traditional art crafts.

Sabah is also renowned for its diverse indigenous communities that represented more than 30 ethnic groups. Sabah with its myriad of ethnic cultures offers diverse experiences for the culture-seeking traveller. Sabah with each tribe generally unique to a particular district, lending to a distinctive way of village living, music, dance and festivals, as well as unique handicrafts. According to the Sabah Development Corridor report (2006), there is great demand for local handicrafts and souvenirs among tourists in Sabah with that an average of 7%-10% of tourist expenditure is on handicraft. Handicraft production is already an active tradition among many of Sabah’s natives, to name a few of local ethnics such as Kadazandusun, Murut, Bajau, Rungus, Lundayeh and Melayu Brunei, and already supplying their homemade traditional handicrafts to local retailers. Therefore, due to the tourism based handicraft industry can contribute economic income and jobs creation for local residents, the Sabah State Government has urged that to establish the concept of “One Village One Product” (New Sabah Times, 2013). The main purpose of the project development of “One Village One Product” is to emphasise on the encouragement of the local community to participation in the craft activities that are professionally managed. The involvement of the local community in crafts industry could generate revenue on an ongoing basis; use the strength of local identity, and utilizing of local raw materials as a basis for commercial products. The expression concept of "One Village One Product" also embraced the principles of Community Based Tourism. In summary, with the community based industry it is hoped that tourism can generates various jobs and business opportunities and helps to equalize economic opportunities, as well as to keeps rural residents from moving to the overcrowded cities (UNWTO, 2010). The community based tourism can also be viewed as a community and economic development tools that serves certain ends and the rural communities can turned to tourism as a way to diversify their economy activities as to response to the global demand towards nature and community based tourism (Briedenhann & Wickens, 2004; UNWTO, 2010; Davis & Morais, 2004; Murphy, 1985).

Among the popular community based tourism involvement is representing handicrafts as cultural tourism attraction to the visitors (Goodwin and Santilli, 2009). A handicraft-making provides an opportunity for local communities to represent cultural expression, and a community’s heritage rendering to the visitors. The handicraft-making is a major contributor to employment and has the potential to increase the communities’ revenues in handicraft selling. For instance, handicrafts amongst the indigenous people of Sabah are produced in a wide range items which are mainly for functional rather than for decorative use. These include household and domestic items, farming and hunting equipment, ritual and ceremonial objects. Traditionally, the handicrafts-making are influenced by both environmental resources and culturally determined needs. Most of the source of materials used in handicraft-making are harvested from forest, such as bamboo, rattan, palms or
coconut plants, forest tree bark and fibre for making sompoton (musical instrument) baskets, houses and fencing, hats, traditional clothing and so on. Since the forest resources as materials to make craft became scarce, an alternative resource is needed in order to supply materials in handicraft making continuously. The ideas of the study are to introduce oil palm tree frond as material resources, to determine the potential of it in making handicraft and the opinions of the suitability of palm oil fronds as a raw material for handicrafts.

**Oil Palm Tree and Frond: A Brief History**

Oil palm (*Elaeis guineensis* Jacq.) is one of the main crops in Malaysia to produce palm oil and Sabah is among the major state in supplying palm oil. According to the Malaysian Palm Oil Board (MPOB), in 2012, Sabah had the largest area under oil palm cultivation at 1,442,558 hectares out of the national total of 6 million hectares (ha) (Malaysian Palm Oil Board, 2013). Oil palm (*E. guineensis*) is a plant that originated from African countries (Hartley, 1976). *Elaeis* genus is a member of the group and is classified in the family Cocoeinae Palmae. This palm plant has a main stem that can reach heights up to 20 m. The frond is a compound leaf type with a length of 3 m to 5 m (Corley, 1976). Mature trees typically have 35-50 fronds each year (Coble, 1979). Fronds are arranged in a spiral on the main stem. Frond length is between 7 m and 8 m, consists of the petiole, rachis and leaflets. Petiole is short portion that connects to the stem. Rachis is the centre of the leaves. Rachis stretch between 1-1.5 m is attached to the petiole and covered with spines. Rachis over 5-6 m is the support of leaflets. Leaflets located in two rows on both sides of the rachis. Leaflets 3-5 cm in size width and length of 80-120 cm. Fronds have leaflets 150-250 consisting of midribs and leaves (Ng, 2003). Initially, before the oil palm fruit is harvested, palm fronds are pruned to prior to fruits harvesting. Pruned oil palm fronds are considered as waste in oil palm plantations. However, it was found out that the oil palm frond has its potential as raw materials for handicraft production because of the lignocellulosic material content (Bakansing, 2002). One of the potential products that can be introduced from oil palm fronds is to make handicrafts.

An oil palm frond is a structure connected to the main stem of palm. It is composed of a compound leaf petiole, rachis and leaflets. Leaflets composed of midribs and leaves. Oil palm fronds contain xylem cells to transport water and phloem cells to transport food. It also contains many parenchyma cells. Xylem cells consist of fiber cell and the vessel element cells. Phloem cells consist of sieve tube and companion cells. All cells contained in a structure called vascular bundles. Vascular bundles are connected from the main stem to the tip tree fronds (Bakansing, 2002). Vascular bundles in the stems and fronds forming long strands that form a solid structure on the trunk and fronds. This structure is not wood but contain the lignocellulosic material that gives support to the fronds to maintain the shape and position on the tree. Oil palm fronds consist of the epidermis (skin), cortex, vascular bundles and ground parenchyma. The size and shape of vascular bundles showed differences in different parts (Figure 1). Vascular bundles in the cortex are oval in shape, size and contain more fiber. Vascular bundles in the centre of fronds are round shape and the diameter size is not uniform. Fiber bundles found among vascular bundles and surrounded by parenchyma (Bakansing, 2002). In the fronds, the cortex contains fiber for the support and strength to the structure. Meanwhile, the vascular bundles in the centre of the cells are used for water and food transportation.

According to Chan (1980), a total of 10.4 tonnes of dry weight per hectare of oil palm fronds are produced after lopping, and oil palm replanting also produced the dry weight of 14.5 tonnes per hectare of oil palm fronds monthly. In Sabah, it was estimated that about 4.0 million tonnes dry weight of palm frond produced in a month in the West Coast and Inland Sabah, and amounted approximately 48 million tons dry weight of palm frond produced in a year from both places (Pairin, 2007). Pairin (2007) also stated that the average biomass in the petiole and rachis of palm fronds is...
1.8 kg from both places. Meanwhile, Yusof and Muhamad (1997) indicated that in year 2020, Malaysia would have 1,729,174 ha of oil palm and the total weight of the dry leaves would be 13,643,185 tons / year and the total dry weight of the petiole is 7,141,490 tons / year.

Source: Chia Vui San (2009)

Figure 1: The Anatomy Structure of Palm fronds – Cross section of palm fronds. Palm fronds contain parenchyma and vascular bundles. A. The top of the fronds. B. The underside of the fronds. C & D. The edge of the frond.

a) Potential Uses of Palm Fronds

The lignocellulosic materials contained in the oil palm fronds are potentially in paper, composite boards and animal feeds production. In the study of Ishida and Abu Hassan (1992), oil palm fronds are widely used in the manufacturing of animal feed as its contained 70% of nutrients and 30% soluble carbohydrate contents. Mohd. Nor (1997) stated that paper can be made from pulp of oil palm fronds since it has a strong bond and high strength of lignocellulosic material. In addition, fiber and particles from oil palm fronds can also be used as a raw material in manufacturing composite board (Mohd. Nor et. al., 1994; Rahim and Swamy, 1994; Yusof Husin Basiron & Mohammed, 1997). Whereas, Pairin (2007) found that the oil palm fronds waste are used as mulching to reduce erosion and animal feed in the West Coast and Interior of Sabah. However, the common practice is to let oil palm fronds decay in the plantation area for nutrient cycle. There are also farm operators who burn oil palm fronds during the long drought.

b) Uses and Handicrafts From Oil Palm Fronds

Various types of crafts can be produced from oil palm as well as from other palms. According to Johnson (1998), petiole and fiber of oil palm fronds (Elaeis guineensis) is used as belts and a tool for climbing in Africa. Palmyra palm fronds (Borassus flabellifer) can be used to make hats and baskets. Chambira palm fronds (Astrocaryum chambira) is used to make bags and bed cradle (hammock). Palm-leaf fiber can also be used to create filters and the Raphia fiber can be woven into hats and
clothing. The community also utilize palm fronds to make roofs, cots, mats, baskets, fences, spikes, caps, spoons, bows, jewelry, clothing (skirts) and rope. Le Bar (1964) stated that the population on the island of Truk using palm fronds (Metroxylon amicarum, Nypa fruticans, Cocos nucifera, Areca catechu and Elaeis guineensis) to produce a range of equipment; stick used as a needle and fasteners, abrasive and rope made of fiber, while young leaves are used to make mats, wall, kayak pad, baskets and fans. Fronds are also used to construct the roof huts and shacks. In Malaysia, palm cane is used to produce various products such as baskets, containers, bags, pots, pot mat, binders, mats, furniture and cane. In Sarawak, leather palm fronds, Licuala and Salacca (Salak) are used to produce baskets. Salacca frond petiole is also used as a fishing rod. In general, all parts of the palm fronds can be used to produce products.

**METHODOLOGY**

Kota Belud town located at the northwest of Sabah and about 70km (approximately 2 hours drive) from the capital city of Kota Kinabalu. The ethnics of Bajau and Kadazandusun comprise the largest group in this town. The town is a gateway of Northern Borneo cultural hub and known for vivacious tamu (tradition open market). The town is also popular with its unique handicraft industry, and amongst of it such as tradition small machete and hand-made food cover (tudung saji) from Bajau ethnic; hand-weave basket and tradition cloths from the Kadazandusun. Most of the raw materials to make those handicrafts are obtained from the forest natural resources.

In this study, the vascular bundles of oil palm (Elaeis guineensis) fronds were used as raw material in the handicrafts making. The role of the oil palm fronds are acted as alternative raw materials for handicraft-making. A total of 300 oil palm fronds were collected from an oil palm plantation in Kota Belud, Sabah. The 4.5 - 5.0 meters oil palm fronds were cut into 4 equal parts. The epidermis (outer layer) was removed and vascular bundles were separated from parenchyma cells. Then, the extracted vascular bundles were washed with water to clean out remaining parenchyma cells. The oil palm vascular bundles were air dried under the shade. The dried vascular bundles and additional pulur rattan (as handicraft frame) were prepared as raw material for the respondents (handicraft-makers) to make handicrafts.

A total of 15 respondents of handicraft makers were selected from Kota Belud, Sabah. Each respondent were provided with raw materials consisted of vascular bundles and pulur rattan. The provided pulur rattan was used as the frame, while the vascular bundles of oil palm fronds used as weaving in between frames. Each respondent produced two of the same type of craft and size. Once handicraft was completed, respondents were required to fill out self-administered questionnaires to find out the suitability for use, colours, and features of the vascular bundles as raw materials in handicrafts making. The survey was also to find out opinion about the look of handicrafts, features and price estimates on produced handicrafts.

**RESULTS**

a) **Characteristic of Oil Palm Fronds Vascular Bundles**

Vascular bundles attained from oil palm fronds are in the form of white or pale yellow strands (Figure 1). The length and diameter are not uniform, and diameter sized between 0.5-1.0 mm. The length and diameter of strands of vascular bundles are not uniform that depending on the position of the vascular bundles in the frond. Vascular bundle strands are quite fragile and easily broken. Vascular bundles oil palm fronds can be coloured to improve its colour appearance (Figure 2).

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Figure 2: (A) Strands of vascular bundles of oil palm fronds without colour, and (B) The coloured strands of oil palm fronds vascular bundles (Nurain, 2007).

b) Produced Handicrafts

In this study, all respondents were able to produce handicrafts using the oil palm fronds vascular bundles. A total of 15 kinds of handicrafts were produced such as egg baskets, small baskets, fans, purses, trays, jewellery containers, small lidded baskets, small vases, bowls and floor plate (Figure 3). The diameter sizes of the produced crafts are between 6.5-32 cm in width and 1.5-36 cm in height.

Figure 3: Handicrafts made from oil palm fronds produced by the respondents.

Figure 3: (A) Egg baskets, (B) Small baskets, (C) Fans, (D) Jewellery containers, (E) Small lidded baskets, (F) Small vases, (G) Bowls and (H) Floor plate.

The respondents came from various ethnic background that were Bajau, Kadazandusun, Sino, Iranun and Murut, aged in their 20s to 30s. A total of 53% of respondents were only handicraft makers, whilst 27% were making and selling crafts. Only 20% of respondents were making, selling and accepting handicraft orders. Duration of experience in making crafts was different among handicraft makers. A total of 93% of the respondents has less than 5 years experienced, whilst 7% of respondents had more than 5 years experience in making handicraft.
d) Respondents Opinion

i) Opinions About the Suitability of Using Oil Palm Fronds Vascular Bundle Strands

In this study, respondents felt that the oil palm fronds vascular bundle strands are suitable to be used as raw materials crafts (Figure 4). A total of 47% respondents felt that the oil palm fronds vascular bundle strands is the most suitable as alternative raw materials in handicraft-making, while 53% of respondents say it is a suitable as raw material crafts. None of the respondents felt that it was inappropriate.

![Figure 4: Opinion on The Use of Oil Palm Fronds Vascular Bundles as Raw Materials](image)

ii) Opinions on Strands Appearance of Oil Palm Fronds Vascular Bundle

The majority of respondents felt that the strands of vascular bundle have an attractive appearance (Figure 5). A total 53% of respondents thought that the appearance of vascular bundles strands is very attractive and 47% felt that it is attractive.

![Figure 5: Opinion on Appearance of Oil Palm Fronds Vascular Bundles Strands.](image)

iii) Opinions On The Staining of Oil Palm Fronds Vascular Bundles

The majority of respondents said that the vascular bundle strands is very easy to dye using Dylon and NCL brand dyes. The colours used for colouring are shades of pink, purple, green and blue. A total of 87% of the respondents think that it is very easy to be coloured, and 13% say it is easily coloured. Nothing said that it difficult to be coloured (Figure 6).

![Figure 6: Opinion on the Staining of Oil Palm Fronds Vascular Bundles.](image)
Opinions on Strands Appearances of Oil Palm Fronds Vascular Bundles After Staining

The majority of respondents said that it would improve the appearance oil palm fronds vascular bundles after the staining (Figure 7). A total of 53% respondents thought that the staining would create a very attractive appearance of vascular bundles, whilst another 40% respondents said that the staining will produce an attractive appearance of the vascular bundles. In addition, there were 7% of respondents given an opinion that the staining did not change in appearance of the raw material. However, none of the respondents indicate that the staining will result the appearance of the raw material to be unattractive.

Opinions on The Oil Palm Fronds Vascular Bundles Weaving Activity

A total of 80% of respondents felt that the oil palm fronds vascular bundle strands are easily woven (Figure 8). Of this total, 47% of respondents thought that it is very easy to weave and 33% of respondents stated that it is easily woven. Meanwhile, only 20% of respondents felt that the strands of vascular bundle are hard to weave. However, none of the respondents said that it is very difficult to plait.
vi) Opinions on Finishing Effects on Handicraft Appearance

In this study, the finished crafts, excessive strands, fibers or splinters will be burned by the using incinerators to get a neat craft surface. Then, varnish was applied to the craft in order to improve the appearance and durability of handicraft. A total of 97% respondents felt that the finishing with varnish on the surface will improve the appearance of handicraft (Figure 9). In addition, 40% of respondents felt that the finishing with varnish made the handicrafts look very attractive and 53% respondents said that finishing with varnish produce attractive handicraft. While only 6.7% respondents said that finishing with varnish does not change the appearance of handicrafts.

![Figure 9: Opinion on the Finishing with Varnish on the Handicraft Appearance.](image)

vii) Estimated Price of Handicrafts

The estimated prices given by the respondents for handicrafts are varied according to size, colour and finishing. The respondents felt that the price estimates for small crafts and applied/not applied with varnish is RM10.00 and below. Whereas, the estimated price for a medium sized craft, coloured/not coloured and applied/not applied with varnish is between RM10.00-RM20.00. The estimated prices for large handicrafts dyed and coated with varnish is between RM20.00-RM30.00.

DISCUSSION

Based on the respondents’ opinions, in general, the vascular bundles of oil palm fronds are suitable as a raw material for handicrafts-making. The material can be woven to form a needed handicraft for small and medium-sized, and it is also easily to be coloured using chemical dye. However, not all respondents felt that the raw material is very suitable as it is brittle when dry and easily broken when woven. Other than that, it is also quite difficult work to weave in a small size diameter. In order to overcome these hitches, the respondents have to employ 4-6 strands of vascular bundles during weaving activity. Nonetheless, the use of 4-6 strands turned out a neat-looking handicraft when completed. The length of the non-uniform raw materials of vascular bundles strands were also affected the determination of the beginning and end weaving. Therefore, the respondent had to even out vascular bundle strands in advance. This could lead in slowing down the work of the handicrafts-making. Additionally, the respondents also felt that if the craft to be produced from oil palm fronds, raw material supply must always be available because most of the handicraft makers prefer to buy raw materials from suppliers. From the respondents experience point of view, 1 to 2 units of small crafts can be made from a single oil palm frond.

The appearance of vascular bundles is attractive for handicrafts-making. However, the respondents felt that the quality of this raw material needs to be improved. The cleaned and primary colour of

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vascular bundles is in white or pale yellow. If the vascular bundles are not fully cleaned from parenchyma, the raw materials will hold some black stains due to fungal attack, and this may cause a less attractive handicrafts.

Most of the respondents in the study considered that to stain the vascular bundles of palm fronds with dye colour were very easy. The vascular bundle contains xylem cells on the outside that make it easy to absorb the dye, however, if the vascular bundles strands is not completely cleaned from its parenchyma, the staining process will result in uneven dye-colouring. The parenchyma cells that remain on the vascular bundle strands will avert the colorants absorption process, consequently created patches of dark colour on the strand surface. Therefore, the process of preparing the raw materials need to take seriously especially when cleaning the vascular bundles strands.

Most of the respondents believed that the dye-colour on vascular bundle strands can improve the appearance and become more attractive. Coloration can vary the colour bands of vascular bundles that can help respondents determine the pattern or design of handicrafts. According to the respondents, staining could highlight the completed craft design when incorporating with natural colour and coloured strands on a basket weave. But there are also respondents who felt that neither natural colour nor coloured strands would change the handicraft appearance.

Majority of the respondents felt that the strands of vascular bundles were easy to plait in handicraft-making. There were 33% of respondents stated that it is easily woven, whereas another 20% of respondents indicated that it is hard to weave. There were several identified problems during the crafts weaving process using vascular bundle strands, and the most common problem was the strands of vascular bundle are easily broken during plaitting process. Other than that, the strands were forming sharp ends at the corner or bent parts of handicrafts. Sharp tips and splinters of strands were also formed if the strands were not in even length. The short strands or splinters would cause less neat plait. Sometimes the sharp-end of vascular bundles could cause minor injuries during weaving process. The length and diameter of the strips are not uniform that might lead to even cause of untidy finished craft. In addition, the presence of fiber bundles (a look like tiny hairs that come off the weaving process) mixed with vascular bundles also caused untidy appearance on the handicrafts. In terms of varnish application on the crafts, most of the respondents believed that it produces an attractive appearance and tidy handicraft. The application of varnish resulted on smoother surface, shiny and highlighted the natural colour and dye-coloured vascular bundle strands. In addition, the varnish also mainly provides a coating layer to reduce fungal attack and scratches on handicrafts.

Based on the opinion of the respondents, the estimated price for handicrafts varies based on size. Respondents also said that the price is determined by the cost of handicraft raw materials of rattan, varnishes, dyes and fuel. Handicrafts have been developed from the vascular bundles fronds are small and medium sized. Small crafts, for example, egg baskets, food containers, small pots and containers jewellery, can be sold for a price below RM10.00. Besides that, small handicrafts and coloured can be sold for a cheaper price. For medium-sized craft, such as baskets, containers and coverings pot can be sold with prices ranging from RM20.00 to RM30.00. While the larger sized craft of flower baskets, bags and trays can be sold for a price of 30.00, depending on the type of craft and the total consumption of raw materials. However, the price of handicrafts may be lower because the exact value of oil palm frond waste was not estimated and unknown. Price proposed by the respondents was based on market prices for handicrafts (e.g. rattan) made from readily available raw materials. Respondents also felt that the price will be cheaper if the vascular bundle strands are prepared by themselves. In addition, most respondents would like to produce handicrafts from oil palm fronds, if the supply of raw material is continuously available.

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CONCLUSION

In conclusion, the vascular bundle strands of oil palm fronds are suitable as a raw material for handicrafts-making, but the quality of the raw material in terms of beauty and strength needs an improvement. The potential of oil palm fronds as an alternative raw material in the handicraft making industry is high because these raw materials of oil palm frond waste are always available and plentiful. The study also demonstrated that majority of the respondents are keen to use the oil palm frond strands as an alternative resource in handicraft-making. In addition, the respondents were also able to diversify their market in handicrafts-making through other different types of raw material, besides the use of existing raw materials such as rattan and bamboo. With this, it can add to the creativity of handicraft-making and will increase sales of their handicraft products, plus expanding the tourism handicrafts at Kota Belud. On the other hands, it can also able to minimize the utilization of natural forest products by introducing these alternative raw materials of oil palm fronds in handicraft-making.

REFERENCES


Papers from the 6th Tourism Outlook Conference, 22-24 April 2013, Kota Kinabalu, Sabah, Malaysia <http://geog.nau.edu/igust/Sabah2013/>


Nurain Shahirah binti Majilis. 2007. *Berkas Vaskular Pelepah Kelapa Sawit (Elaeis guineensis) Sebagai Bahan Mentah Kraftangan*. Unpublished Final Year Project B. Sc. School of International Forestry, Universiti Malaysia Sabah


Papers from the 6th Tourism Outlook Conference, 22-24 April 2013, Kota Kinabalu, Sabah, Malaysia <http://geog.nau.edu/igust/Sabah2013/>
