Traditional knowledge of processing and use of the Himalayan giant nettle (*Girardinia diversifolia* (Link) Friis) among the Gurungs of Sikles, Nepal

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Research

Abstract

The Himalayan giant nettle (*Girardinia diversifolia* (Link) Friis) has been widely used throughout the mountainous regions of Nepal as a source of fiber (**puwa**) for weaving ropes, thread, porter's tumplines, mats, sacks, and **bhangra** (a piece of traditional Gurung clothing). Ethnic groups such as Gurungs, Magars, Rais and Tamangs are the major exploiters of **puwa** fiber in Nepal. This study investigates the traditional knowledge of the processing and use of **puwa** fiber among the Gurungs of Sikles, in the trans-Himalayan region of Nepal. **Puwa** products have much cultural value for Gurungs in Sikles. Women are responsible for most of the **puwa** related activities and most of the woven products are used within households. Although **puwa** has become established as an important non-timber forest product for generating income among rural communities in the mountainous and Himalayan regions of Nepal, its economic potential has yet to be realized in Sikles.

Introduction

Nepal is considered one of the richest countries in terms of indigenous traditional knowledge (ITK) due to its diversified ecology, geography, and many ethnic communities (MEDEP 2010, Sharma *et al*. 2009). The indigenous groups, including Gurungs, Magars, Tamangs, and Rais have long practiced the traditional technology of weaving with handlooms using wild fibers as raw materials (Deokota & Chhetri 2009, Dunsmore 1998, MEDEP 2010, Sharma *et al*. 2009). Fibers (bast) can be extracted from the bark of different plants such as *Cannabis sativa* L., *Girardinia diversifolia* (Link) Friis, *Urtica dioica* L., *Boehmeria macrophylla* Hornem., *Boehmeria platyphylla* Buch.-Ham. ex D. Don, and *Ficus semicordata* Buch.-Ham. ex Sm. (Clarke 2007, Deokota & Chhetri 2009). *G. diversifolia* is an important non-timber forest product (NTFP) that has been harvested for its natural fiber in the Himalayan region (ANSAB 2010, Barakoti & Shrestha 2009, WWF 2007).

The Himalayan giant nettle or stinging nettle (*G. diversifolia*, Urticaceae) is a widely distributed self-sustaining perennial herb found in the mountainous and hilly regions of Nepal (Barakoti & Shrestha 2009). It is locally known as **allo** (in eastern part Nepal) or **puwa** (in western Nepal) (Barakoti & Shrestha 2009, Friis 1981, Singh & Shrestha 1988). It is a shade-tolerant herbaceous plant growing about 1.5-3 m high, and having numerous slender stinging hairs (Singh & Shrestha 1988). This plant grows abundantly in the open forests and moist riverside habitats between the altitude of 1,200 to 3,000 m (ANSAB 2010, WWF 2007).

The **puwa** stem is stout and erect, and contains fibers with unique properties (strong, smooth, light, and white) which

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make it useful for making many products (MEDEP 2010). **Puwa** fiber is processed, spun and woven traditionally to produce durable jackets, porter's head bands or straps, ropes, mats, fishnets, large grain-sacks, mats, bags, and blankets in the mountainous areas of Nepal (Barakoti & Shrestha 2009, Clarke 2007, Thapa 2003). Additionally, the **puwa** plant is used for various purposes such as food, fodder, and medicine in the rural communities (ANSAB 2010, WWF 2007). In Nepal, the wide range of products derived from the **puwa** plant makes it an important functional and social component of the mountainous Himalayan regions (ANSAB 2010, MEDEP 2010, Thapa 2003, WWF 2007).

The objective of this research was to investigate the traditional knowledge of processing and use of **puwa** fiber among the Gurung people in Sikles. The Gurungs are the predominant ethnic group living in the Annapurna region today as well as for centuries past, and they are rich in culture and traditional skills (Macfarlane & Gurung 1992).

Study Area

The study was conducted in Sikles, Nepal, a traditional Gurung village located on the southern belt of the Annapurna Conservation Area. It lies in the Parche Village Development Committee (VDC) of Kaski and is situated about 24 km northwest of Pokhara, the headquarters of Kaski District, Gandaki Zone and the Western Developmental Region. It lies between the altitudes of 1,100 m to 3,331 m above sea level and has a minimum air temperature of about 5°C in winter (December-February) and a maximum air temperature of about 30°C in summer (April-August) (Khanal & Watanabe 2006).

Based on ethnicity, at the time of this study, 81% of the total populations were Gurung, followed by 11% Kami, and 8% Damai. Altogether, there are approximately 360 households with more than 4,000 inhabitants in Sikles. Agriculture is the main occupation in Sikles, often supplemented by animal husbandry and other activities such as service in the British and Indian armies. The village is influenced by the patriarchal society of Nepal and thus, men and women are assigned different social and economic roles.

At the time of this study, more than 86% of households derived their subsistence from agriculture and a smaller fraction were also involved in other income generating activities including jobs (3%), labor (5%), business (2%), and other activities (3%). Locally made tools like hoes, spades, sickles, wooden ploughs and animal drawn implements were used for farming activities.

Methods

This paper aims to assess the traditional knowledge of processing and use of the **puwa** by taking advantage of data gathered in one of the remote communities of Nepal. Information quoted in this paper was collected during fieldwork in 2010. Prior to primary data collection, one of the authors interacted with the villagers (e.g., a mothers' group, youth group, community leaders, and VDC officials) in order to get acquainted and to explain goals of the research.

An in-depth household interview was carried out by employing a self-administered questionnaire survey. A total of 60 elderly respondents (between the ages 40-50) were randomly selected and interviewed. The main reason for selecting elderly respondents is that **puwa** related activities are mostly carried out by old age groups in the village. Interviews were usually conducted with heads of households, of whom the majority were female. Interviews were carried out in the Gurung language. The questionnaire consisted of four parts. The first part of the household questionnaire focused on demographic structure (e.g., caste, gender, family member, and occupation). The second part pertained to socioeconomic information (e.g., health, education, annual income, and sources of income). The third part referred to the processing and use of **puwa** in the village (e.g., time of bark collection, methods of bark collection, processes of treatment and making yarn, spinning and weaving of yarn into different products, use of **puwa** products). The fourth part of the questionnaire dealt with the issues related to economic aspects of **puwa** products (e.g., cost of different **puwa** products, market opportunities, and livelihood opportunities).

In addition to the questionnaire, key-informants were interviewed to collect qualitative data about the processing and use of **puwa** in the village using informal, loosely structured, and open-ended interviews. Six key-informants were the eldest people in the village, youth leader, mothers' group leader, a staff member from the Annapurna Conservation Area Project (ACAP), community leader or village head and a woman in Pokhara from Sikles.

Results

Collection of bark or fiber

The Himalayan giant nettle plant is abundantly found in the vicinity and especially in the higher part of the village. According to the household respondents (96%), extraction of **puwa** fiber is experienced as a laborious and time-consuming task due to the numerous stinging hairs which cover the plant exterior. Fiber is extracted mechanically and both men and women are involved during extraction. However, nearly 60% of the household respondents revealed that most work related to the **puwa** plant is done by women since men frequently travel abroad for employment.

As explained by the eldest respondent, villagers wrapped their hands in **puwa**-made fabric to extract the fiber; oth-

ers extracted the fiber with their bare hands. However, 85% of the household interviewees responded that at present they use thick gloves or plastics to protect their hands while collecting fiber. In Sikles, **puwa** fiber is collected from wild areas. First, they separate the cementing substances such as leaves, wax, pectin and resin from the plant. Then the green bark is peeled by hand. According to the key-informant (interviewed in Pokhara), the amount of bark collected depend on the skill of the harvester.

In the village, the collection of fiber is done according to schedule of their household works. As suggested by the key-informant (ACAP staff), bark can be collected two times a year: in the months of June-July and in January. According to 90% of household respondents, fiber is mostly collected in the month of January because by the end of December staple crops such as paddy rice, millet, and maize have been harvested and people can spare time for bark collection. In Sikles, **puwa** fiber is harvested from nearby forested areas including Pore Jow, Loure and Kyonje. In addition, villagers travel distances to sites in Yeedi, Mere Pro, and Dhyoesero if they need fiber in bulk. Through the survey, respondents indicated the time needed to reach **puwa** pockets or areas for collection (Figure 1). Only 14% of the respondents needed more than 4 hours to reach the **puwa** pockets.

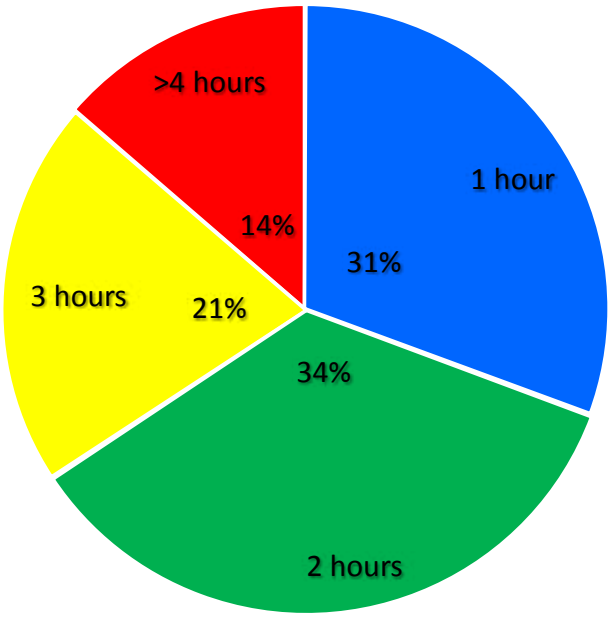

Figure 1. Time to reach **puwa** (*Girardinia diversifolia* (Link) Friis) pockets from Sikles village, Nepal.

Separation or processing of* puwa *fiber.

After extraction, the green fiber is transformed into white fibrous material or **puwa**-textile (**ni ru** in Gurung language) using a multi-step process. However, the processes of converting green fiber into **puwa**-textile varies from household to household. 60% of the households responded that the collected green fiber is sun dried for 2-3 days, while the remaining 40% responded that they start processing from the next day after harvest. After sun drying, the green bark is boiled with ash for 3 hours. According to the key-informant (mothers' group leader), approximately 7 kg of wood-ash is added to process 9 kg of dry fiber. Once boiled, the fiber is set aside for 20-24 hours. As suggested by the household respondents, sometimes they keep the sun dried fiber in the ceiling of houses for long term storage (Figure 2A).

Figure 2. Processing *Girardinia diversifolia* (Link) Friis, fibers in Sikles village, Nepal. **A**) Sun-dried fiber stored for long-term, and **B**) beating boiled fiber with a wooden mallet, **bhogu**.

The boiled fiber is washed with fresh water, usually in a running stream accompanied by frequent beating with a wooden mallet, **bhogu** (Figure 2B). The beating and washing of the fiber is repeated 3-4 times. According to the key-informant (in Pokhara), the main purpose of beat-

Figure 3. Processing *Girardinia diversifolia* (Link) Friis, fibers in Sikles village, Nepal. **A**) Beating sun dried fibers, and **B**) loosening the beaten fibers.

ing and washing is to produce a shiny and smooth fiber for textiles. After the fiber is repeatedly beaten and washed, it is then sun dried for 9-10 hours. Thereafter, the sun dried fiber is mixed with rice husks (**dhutto**) and again sun dried for 8 hours in order to make it soft and fine. The fiber is beaten, washed and sun dried 2-3 times more times and finally when the fiber becomes soft and a white shiny color, it is ready for spinning into yarn.

Spinning

According to the key-informant (in Pokhara), traditionally women are responsible for all stages of processing **puwa** fiber and weaving **puwa** products. The sun dried fiber after subsequent beating and mixing with **dhutto** is ready for making yarn. However, the fiber has to be beaten again to make it easier for spinning (Figure 3).

As depicted in the Figures 4 & 5A, the fiber is converted into soft silky material manually. Finally, the fiber is ready for making yarn. The **puwa** thread or yarn is made using a traditionally self-constructed hand spindle, made of wood by local carpenters called **katuwa** or **charkha** (Figure 5B). Based on the estimation given by the household respondents, about 450 gm of **puwa** thread can be generated from 1 kg of dry fiber. 80% of the household interviewee responded that they make a yarn on part-time basis during the evening time as they have to be busy in the field or other household activities during day time. However, 20% respondents replied that they make a yarn regularly during day time. According to the interviewed key-informant (eldest person in the village), usually women gather and share information in the evening time and simultaneously make yarn together.

Figure 4. Manually processing *Girardinia diversifolia* (Link) Friis, fibers in Sikles village, Nepal.

Weaving

Puwa cloth is woven in a locally made wooden backstrap loom or handloom (**koira**) (Figure 6). According to the key-informant (mothers leader), both the quality and quantity depends on the skill of the spinner. A skilled spinner can weave up to 3 m of cloth per day if everything is ready. Traditionally, a variety of products were woven from the **puwa** thread including large grain

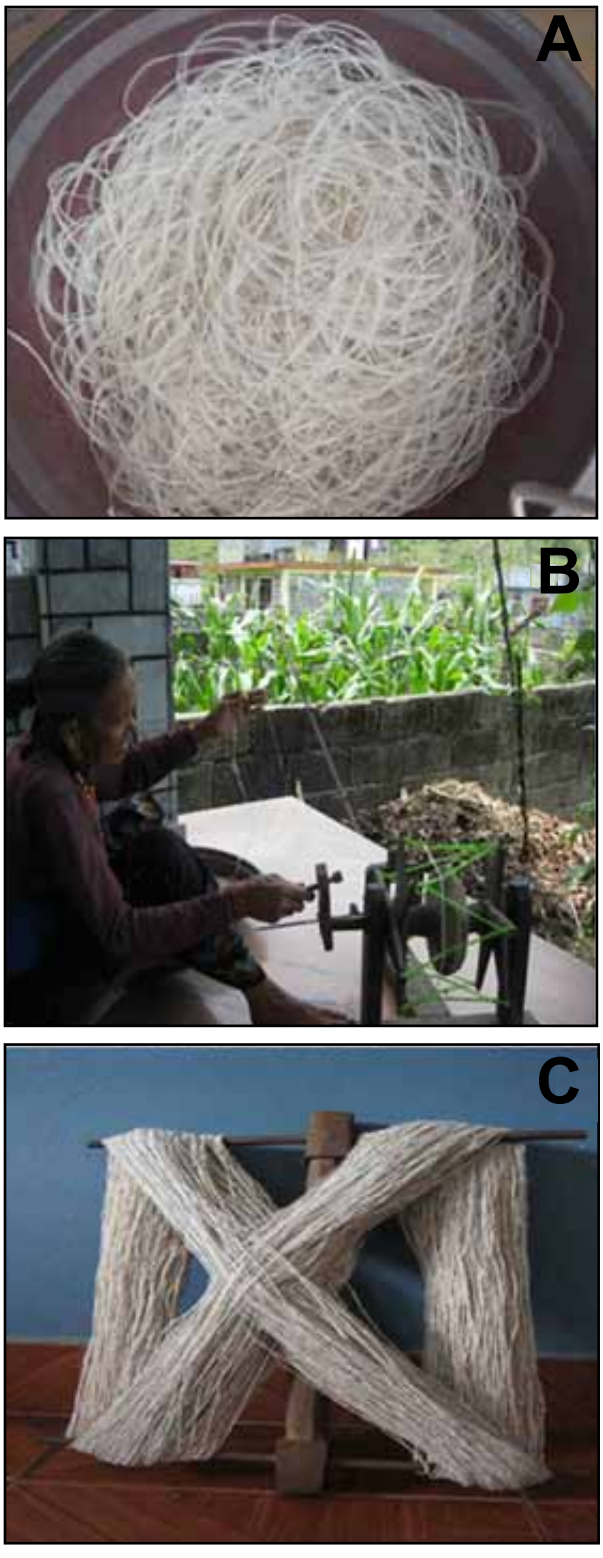

Figure 5. Processing *Girardinia diversifolia* (Link) Friis, fibers in Sikles village, Nepal. **A**) Fine fiber before spinning, **B**) using a hand spindle, **charkha**, and **C**) **puwa** thread or yarn.

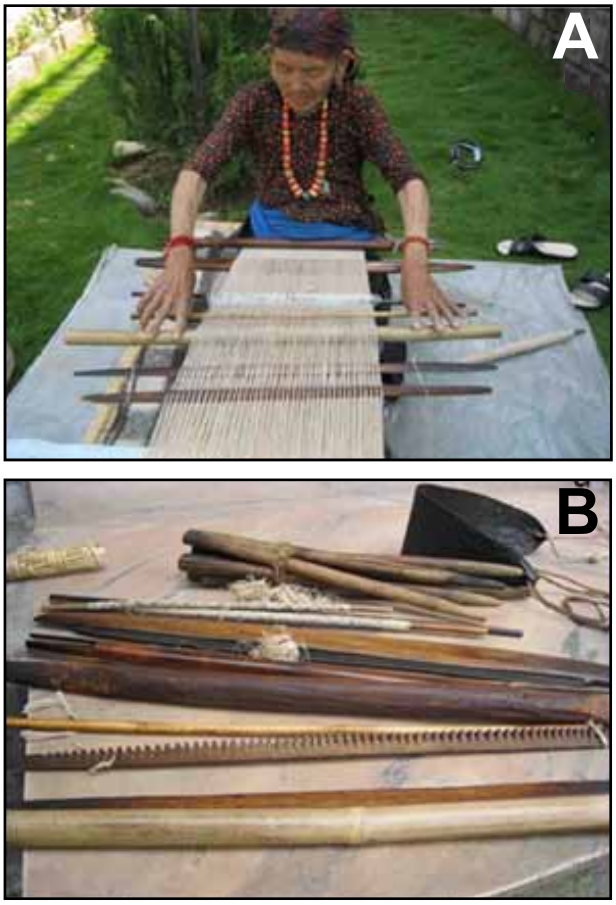

Figure 6. Weaving *Girardinia diversifolia* (Link) Friis, fibers into **puwa**-cloth in Sikles village, Nepal using **A**) a locally made woodenback-strap loom or handloom (**koira**). **B**) Disassembled loom parts.

storage sacks (Figure 7A), bags, porters straps (**namlo**), mats, **bhangra** (a piece of traditional Gurung clothing) (Figure 7B), and rope. According to the key-informant (in Pokhara), **puwa** fiber can be made into cloth with different thicknesses.

Puwa fiber products

According to the key-informant (community leader), large grain sacks (**kuldu** and **bhangra**-**rega**) are culturally the two most important products woven from **puwa** fiber among the Gurung of Sikles. The grain storage sack is commonly used for carrying and storing grains including rice, millet, maize, wheat and barley in Gurung households. The **bhangra** is a unique cross between a vest and a backpack. Based on the information provided by the youth leader, **bhangra** is distinctively Gurung and thus used by Gurung men to show their local affiliation at national event, in dances, and in Nepali events abroad. Traditionally, **bhangra** were used to carry many objects in the special pockets formed at the back of the wearer.

Figure 7. Finished products made from *Girardinia diversifolia* (Link) Friis, fibers in Sikles village, Nepal. **A**) a grain sack, and **B**) a piece of traditional Gurung clothing (**bhangra**) and a bag.

Two types of grain sack and **bhangra** are available in the village: soft (**masino kuldu** or **bhangra masino rega**) and rough (**gerdu kuldu** or **bhangra gerdu rega**). According to the key-informant (in Pokhara), soft and rough products are prepared from different **puwa** fiber and have different functions in the households as well. For example, if the **puwa** fiber is smooth and shiny it is used for weaving soft products, on the other hand if the **puwa** fiber is coarse or rough and not shiny then it is used for weaving rough products. Likewise soft sacks are used for carrying or storing rice and millet, whereas rough sacks are used for carrying or storing maize, wheat and barley. Similarly, soft **bhangra** is a part of Gurung cultural dress and is mainly used during feasts and festivals. Often it is offered as a gift to relatives in Pokhara or abroad. Rough **bhangra** is used for regular household activities such as farming, collecting firewood, and fodder. Table 1 shows the price of **bhangra** and grain sack in Sikles.

Table 1. Price of sacks and **bhangra** (a piece of traditional Gurung clothing) in Sikles, Nepal in 2010, according to a key informant interviewed in Pokhara, Nepal.

Product	Price (US$)
Soft sack	14.46
Rough sack	8.45
Soft **bhangra**	18.30
Rough **bhangra**	9.15

Other uses of the* puwa *plant among Gurung in Sikles

According to a key informant (community leader) every part of the **puwa** plant can be utilized. Uses include food, fodder, medicine, and textile production. Juice of the **puwa** roots can be used for treating gastritis, constipation and diabetes, while juice of the leaves is used for headache, fever, joint aches, and tuberculosis. However, more than 90% of the household respondents were unaware of the medicinal uses of the **puwa** plant. At present the **puwa** plant is only used as a fiber source in the Gurung households of Sikles.

Discussion

The survey findings revealed that Gurungs of Sikles still use a traditional method of harvesting, processing, spinning and weaving **puwa**. Although villagers have been harvesting **puwa** fiber for generations, they still are collecting it from wild areas. During the survey it was noticed that none of the respondents were aware of the availability and sustainability of the raw material in natural habitats. As shown in the Figure 1, approximately 65% of the respondents needed 1-2 hours to reach the **puwa** pockets. Areas that are not so far from the village include: Pore Jow, Loure, and Kyonje. However, due to the current exploitation rate of **puwa** in these areas, villagers have to travel 3-4 hours to reach other **puwa** pockets: Yeedi, Mere Pro, and Dhyoesero. These areas are far away from the village and usually it is risky for one to go alone in these areas due to risk from wild animals (tigers, bears, and leopards). Villagers used to go in a group and stay 2-3 nights in the jungle whenever they decided to harvest from distance areas. In some parts of Nepal, **puwa** plant is already domesticated in community and other local forests thereby providing raw material on a regular and possibly sustainable basis (Barakoti & Shrestha 2009, Shrestha 2004, Thapa 2003).

Puwa fiber can be easily broken down or chemically degraded using high doses of caustic soda and sodium hydroxide (Deokota & Chhetri 2009). The main objective of pre-treatment is to remove pectin, hemicellulose, and lignin that binds the fiber together (Deokota & Chhetri 2009). Use of caustic soda can reduce the boiling time to half (ANSAB 2010). However, 80% of the household respondents did not know about other methods of pre-

treatment except boiling. The remaining 20% were aware of the function of chemical products, but these chemicals are not available in the village. Furthermore, none of the respondents had used chemical products for pre-treating **puwa** fiber. From an environmental perspective, the boiling method adopted by Gurungs of Sikles is probably safe although it consumes time.

The green **puwa** plant can be cooked immediately after collection. However, villagers prefer to dry it for 2-3 days, or to soak it in water for 2-3 days. Based on the information provided by the key-informant (in Pokhara), the main reasons for doing this are: (i) women are responsible for households activities including cooking, feeding, etc., and they do not have enough time; and (ii) while drying, the stinging properties of the **puwa** fiber become weaker. In the village 100% of the respondents were using locally made wooden **charkha** for spinning fiber. 10% of the respondents knew about other spinning devices, however, due to lack of knowledge about technology improvements have not yet been adopted by the village.

Although there is potential for converting this **puwa** sector into an income generating activity, there is a lack of market value and network for distribution of **puwa** products in Sikles. Woven products are mostly used within the Gurung households. However, during the survey it was found that some households sell **puwa** products, mainly **bhangra**, in Sikles. According to the key-informant (in Pokhara), villagers decide the price themselves, and the cost varies from 8-19 US$ per **puwa** product. 96% of the household respondents replied that they prepare **puwa** products only for household use. One has to pay the prices given in the Table 1 if they want to buy **puwa** products in the village. According to the key-informant (ACAP staff), during the festival of Deepawali, brothers used to go to their sisters house and take a gift either of clothes or cash, and in return sisters used to give soft **bhangra** to their brothers. Even if the brothers could not go to their sisters' house, it will be mailed to him. Thus, **puwa** products have cultural value for Gurungs in Sikles.

According to the ACAP personnel, in the early 1990s ACAP tried to encourage the use and commercialization of **puwa** products with the objectives of market promotion and transferring traditional knowledge into a local enterprise. However, the local entrepreneurs could not be sustained due to lack of market penetration and lack of incentives for the **puwa** products. Household respondents were asked to give their opinion about the future prospects of **puwa** products in Sikles. 30% of the respondents replied that use of **puwa** products is of lower priority and being replaced by nylon and jute sacks, which are readily and cheaply available in the market. 40% of the respondents replied that use of **puwa** products will be promoted as a local enterprise if they get incentives or subsidies from the government or other donor agencies. The remaining households were confident that the **puwa** sector will get more attention because it is environmental friendly.

Conclusions

The Gurungs of Sikles have been harvesting **puwa** fiber for generation to meet their households' demand. The traditional knowledge of **puwa** related activities has not been transferred into a commercial enterprise. The survey findings indicated that there is a need to introduce cost effective processing techniques, spinning, and weaving methods in Sikles. Furthermore, another pressing issue is that research and development activities related to **puwa** sector focus on domestication, cultivation, regeneration and commercialization by the communities in order to preserve their precious culture and to convert this traditional knowledge into a local enterprise.

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