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Palawan Cotton Project



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Introduction

There are many species of cotton and different species were independently domesticated in the old and New Worlds. The four species of cotton grown for commercial uses today are *Gossypium hirsutum*, *Gossypium barbadense*, *Gossypium arboreum* and *Gossypium herbaceum*. The New world cotton *G. hirsutum*, also known as upland cotton or Mexican cotton, is the most widely cultivated, making up more than 90% of cultivated cotton worldwide. The Old World cottons are *G. arboreum*, possibly domesticated in Pakistan around 7,000 years ago and *G. herbaceum*, traditionally grown in African open forests and grasslands. Today there are many varieties derived from these four species that have been selectively bred and cross-bred to suite various conditions and to improve desired traits and yield, but in general they prefer warm, humid climates of about 21-37°C and a defined wet and dry seasons.

One possibility would be to introduce the *G. Hirsutum*, but based on studies conducted in Luzon and Mindanao, this would require water and fertilizer input as well as intensive spraying of insecticides to combat infestation by bollworm and ballweevil in order to make it profitable. However, in our previous work in south Palawan, we encountered what looks to be *G. arboreum*. Although this is not the species of cotton normally grown for industrial scale cotton production, due to its shorter fiber length and lower yield, it can still be used to create thread by hand spinning. Hand-spun cotton, and other derivative products, have a much higher market value than the other NTFPs that these communities usually gather and sell as raw materials. In addition to this, *G. arboreum* can grow in the forest or buffer zones, therefore there is no need to clear the forest in order to benefit from it, and it is perennial, therefore trees need not be cut in order to harvest and financially gain from it. *G. arboreum* has also proven to be more resistant to pests, reducing the need for pesticides. Given these factors, the cultivation and processing of *G. arboreum* could provide a new livelihood options for Palawan's Indigenous communities that will bring better financial gains and reduce the need to convert forest to farmland.

Research Question

Can the growth, harvesting and processing of native varieties of cotton become a sustainable livelihood option for indigenous groups in Palawan?

Objectives

(Objective 1) Investigate occurrences of cotton in Palawan.

(Objective 2) Map the resources available of our partner community in order to assess potential for cotton production.

(Objective 3) Discuss with our partner community whether cotton production and processing is a livelihood they would like to engage in, and if so, what stages interest them (growing of cotton, spinning and/or weaving).

(Objective 4) Assess whether local varieties of cotton can be spun into thread.

Methodology

Step 1: Initial research, preparation of materials and organizing

- A. Create identification booklets will be used to communicate with local collaborators.
- B. Phone meetings with local community organizers to identify best areas to gather data on and collect samples of local varieties of cotton.
- C. Phone meeting with our selected community partners to arrange field visit and FGDs.

Step 2: Field visits and data collection.

Two trips were planned and undertaken to identify and collect samples of local varieties of cotton, based on reported sightings by our local contacts. One was to the municipality to El Nido and north Puerto Princesa, and another to the south of Palawan, covering the municipalities of Aborlan, Narra, Quezon, Rizal, Brookes Point and Bataraza.

Two trips were made to the Tagbanua community in Napsan, coordinated by our local community partners (**Byanyas Foundation**).

Activities:

- A. Forest walk with local community guides to collect samples and data on locally occurring varieties of *Gossypium sp.*
- B. Focused group discussion (FGD) with local community partners to discuss the challenges they face as community, and whether cotton production and processing would be something they are interested in exploring as a supplementary livelihood option.
- C. Resource assessment and mapping of community and environmental assets needed to successfully grow and propagate cotton

Step 3: Testing of cotton samples & identifying potential higher value products

- A. Test spin cotton samples.
- B. Discuss with **Rurungan sa Tubod Foundation and international partners** possibilities for product development. These may include but are not limited to: hand spun thread, fabric, towels.
- C. Consultations with agriculturalists and other Philippine cotton experts

Results

Objective 1: Sampling and collecting data on locally occurring varieties of cotton in Palawan

During the scouting trips to look for cotton plants and collect samples, we interviewed 12 local contacts who recognised the plant from pictures, and six were able to guide us to the sites where they were growing in their areas [figure 1]. It was known mostly as *bulak* or *tapas*, although one interviewee called it *kapas* and another remembered it from her hometown in Cuyo where it was called *cucillo/cucilyo*. Most of the plants we found were being cultivated, except for one that a farmer had found growing in his farm (not planted by him) and another that was found in a grove of kakawate (*Gliricidia sepium*). Non reported it as a plant they would see within the dense forest.



Locations

Most were growing in people's backyards or household gardens, near other cultivated shrubs and trees, like banana, and near fences. Based on our interviews, they are found in damp soil areas, near the coastlines and foot hills of the mountains. They seem to thrive in sunny areas but nestled around other foliage. All specimens found were either singular plants or pairs except for the ones in Maroyugon, which were a cluster of five plants.



Flowering and harvest time

The oldest plant we found was reported to be 29 years old (according to the interviewee who planted it). They were all around 7ft tall, similar to the Kimmayo variety of cotton found in the Cordilleras. The flowers were yellow. Based on the reports, it seems the locally found *Gossypium sp.* is a perennial shrub, that flowers all year round, although flowering rate is lower during the wet months. The correct time to



harvest would be in the dry months.

Uses in Palawan

Many said that they are being grown for ornamental purposes (the yellow flowers). In the past, the fibres would be spun (by hand) to make wicks for oil lamps or used for cosmetic purposes (as cotton balls/buds). The fibres can also be used for ventosa cupping (a Cuyo healing practice). One interviewee said that the roots can be boiled and drank to stop bleeding caused by childbirth, another uses the leaves to treat arthritis and body pains by heating them over a fire and wrapping them around affected areas. The seeds in the green cotton fruit are also reported to be eaten as a snack.





Identification of local varieties of cotton

Dra. Sopsop, the Dean of the College of Agriculture, Forestry & Environment at Western Philippine University (WPU), in Aborlan, was unable to verify the exact species of cotton based on the samples, but expressed interest in a future partnership to further study the locally occurring varieties of cotton, taxonomically as well as to test seed and plant viability and propagation and planting techniques.

Dr. Riñen, Director II, Region I, II & CAR at the Philippine Fiber Development Authority (PhilFIDA) identified the samples as *Gossypium arboreum* based on photographs we sent.



Objective 2: Mapping of Community Assets

The data gathered on the community assets was done through: 1) drone survey; 2) interviews with Byanyas Foundation, 3) two focused group discussions with community members.

The Tagbanua community of Napsan have a culture of hunting and gathering. Traditionally they lived on the food harvested from the forests and the ocean, although many also cultivate their own backyard gardens for food.

Illegal logging is still very prevalent in the area. As is slash-and-burn agriculture.

Other sources of income include making charcoal, fishing, gathering resin (almasiga), honey and other forest fruits and plants. Forest is being cleared to make way for agriculture and access to these sources of livelihood

In terms of crafts and skills, mat weaving is common, and there is one skilled basket weaver in the community. The mats (*banigs*) are made with undies pandan leaves. The basket weaver uses nito.

Through the drone survey we were able to see the remaining dense forest areas and the amount of land being used for agriculture surrounding the forested areas. The dense forest areas that provided the community with livelihood are getting



too far to make them worthwhile. We identified areas where cotton could be planted, in the buffer



zones between the agriculture areas and the forest.

Objective 3: Community Participation

This part was to assess whether the community a) had the environmental resources, b) skills and c) time/motivation to pursue the growing, harvesting and/or processing of cotton as an additional livelihood.

The receding forest boundary is making the gathering of NTFPs such as *almaciga* and rattan too difficult and time-consuming for the prices they are being bought at. All the participants in the FGD were open to new sources of income and they expressed interest in the idea of propagating and processing cotton, especially because some recognised it as a plant the older generations would propagate in their gardens to use as candle wicks or for cosmetic purposes.

Most participants identified land that they would be able to plant the cotton, and with some training they would have the necessary skills to propagate and harvest cotton lint.

Capacity Building

Due to the workshops and training organised by **Byanyas Foundation**, there are highly skilled carpenters in the community who could potentially produce the tools that would be needed to spin and weave cotton into higher value products.

The facilities (infrastructure and community coordination) of Byanyas Foundation could also be utilised in order to run the training that will be needed for the community to be able to produce higher value products from the raw cotton lint. These products could include but are not limited to hand-spun thread and hand-woven fabric.



Objective 4: Testing of Samples

Spinning Tests

Initially, the goal of this scoping grant was to collect at least 1kg of the local cotton lint samples from plants found growing wild or cultivated as backyard crops in Palawan, in order for the Philippine Fiber Industry Development Authority, PhilFIDA, to do a fiber analysis in their Fiber Laboratory. However, due to the unseasonal rains brought on by La Niña, as well as the time constraints for this scoping research, we were unable to collect a sufficient amount of samples. The rains affect the flowers, which in turn affects the cotton bolls produced.

We were able to collect a small sample of cotton lint from a plant in Maryugon, and we brought these to Marcelino, an Ifugao weaver and member of the Kiangang weaver's association, in order for him to do a spin test on the cotton samples we were able to collect from Palawan. Although he wasn't able to do the full process, which involves washing and starching the cotton after the initial spin, he noted that it was spinnable, and that the fiber lengths seemed longer than their own varieties in Ifugao that they use to weave their traditional textiles. He also noted that the Palawan cotton was whiter than the varieties the Ifugao varieties,



Seed Viability Tests

A few of batches of seeds we were able to collect were not in good condition, possibly due to the unseasonable rains. These did not germinate. The samples we collected that had no visible signs of mould or insect infestation had a 80% germination rate. These have been handed over to our partner community and they have planted them in four trial areas in order to monitor growth and harvest a sample that can undergo the finer analysis by PhilFIDA.



NTFPs and Hazard Analysis

Current NTFPs harvested

- Almaciga (resin products)
- Cashew
- Coffee
- Lankawas
- Rattan, sold as a raw product for furniture and basket making.
- Pandan leaves, for mat weaving
- Nito, for food. It is also woven into plates and baskets

An all-hazards analysis of the Tagbanua tribes of Napsan

A big threat to the Tagbanuas' way of life, which is still largely reliant on hunting, gathering and fishing is deforestation. Due to outsider pressures and a lack alternative livelihood options, many are forced to participate in illegal logging and charcoal production as a means to earn money. The receding forest boundaries make their other sources of livelihood derived from the forest, such as the harvesting of almaciga, honey and rattan are becoming harder to gather. In addition, the growing population and monetary needs of the community could put too much pressure on the forest, past the point of sustainable harvesting.

The culture of slash and burn agriculture is also a major threat. It may have been considered a sustainable practice when the nomadic populations were small and the forest had time to regrow, but the rate at which it is been practiced today is changing the natural landscape, raising the temperatures and without the thick forest, ground waters levels are decreasing.

Climate change and rising sea temperatures are causing coral bleaching and may affect fish stocks. Rising sea water levels could also affect the water table in the coastal areas. The increase in strength and frequency of typhoons also poses a threat to the community.

Access to education in the area is limited, which means the younger generation will have limited



opportunities, if they can no longer rely on the natural resources.

Introduce new livelihoods and diversifying income generation

We propose reintroducing local varieties of cotton in order to provide alternative livelihoods that don't encourage encroaching on forest boundaries. This will decrease the pressures on the forest and allow for protected forest zones without threatening the economic opportunities of the local Tagbanua community. Cotton and coffee could be planted in the buffer zones between the forest and the areas used for agriculture, providing families with supplementary income that requires little monetary and labour investment, at least during initial stages.

Since the community doesn't have a tradition of spinning or weaving, initially they could sell the seeded cotton. Other products could be developed that make use of the cotton without requiring extensive training, such as making wicks for candles (beeswax is also locally available) and oil lamps, cigarette filters, coffee filters or use it as stuffing for pillows and toys.

With training, they can eventually produce higher value products such as hands-on cotton thread and hand-woven textiles, such as towels. Another option to add value to their products is using natural dyes to make coloured cotton yarns.



There is a growing community of artists and crafters in Palawan that use cotton for crocheting, macrame and knitting, as well as a growing awareness in the values of buying locally produced items. There is also a steady stream of tourists, another possible market for Palawan-made items.

Rurungan sa Tubod Foundation specialises in creating alternative livelihoods for women in the rural areas of Palawan. They successfully introduced piña weaving as an additional income opportunity that women are able to participate in whilst taking care of their children at home. Their trained weavers now also weave with silk, cotton and abaca. They could be potential buyers of locally-produced cotton thread. We also plan to work with them to build the training methodology that will introduce the skills needed to spin and eventually weave cotton.



Byanyas Foundation: Community Organiser

The goal of Byanyas Foundation is to work with the local Tagbanua tribes to set up protected forest areas and develop new livelihood opportunities in order to reduce the need for the overexploitation of natural

resources for economic needs. They have programs for sustainable, regenerative agriculture, to move away from the traditional slash-and-burn nature of farming in the area. They are also working on developing other livelihood opportunities for the Tagbanua community such as planting coffee and they are happy to explore cotton as another supplementary income generating option.

Together with the expertise of **Dra. Lita B. Sopsop (WPU)** our next steps would be to do the taxonomic identification of the local varieties of cotton, as well as monitor the trial plantings, in order to develop the planting and propagation manuals.

We will work with **Dr. Cristina Juan, Project Head and Senior Teaching and Research Fellow School of Languages, Cultures and Linguistics at Philippine Studies at SOAS (PSS)** to create the platform for the knowledge transfer site, so that these manuals are in a suitable form for the Tagbanua community to access.

If the planting trials produce suitable amounts of cotton seed and lint, we intend to revisit our initial proposal to send the samples to PhiFIDA for fibre analysis.

Another potential partner is **Global Seed Savers**, to help the community set up a seed library or to offer training on the proper collecting, handling and storing of seeds.



Discussion

The goal of the research was to assess the viability of local varieties of cotton as a source of livelihood for indigenous communities in Palawan. Unfortunately, due to limited time of the study, and the La Niña weather causing reduced flower and boll production, we were unable to collect sufficient lint to do a full fiber analysis. Dr Riñen identified the samples we collected as *G. arboreum*, but there is no existing research on the *G. arboreum* variety that grows in Palawan. As such, we recommend a further study, in partnership with the Western Philippine University, based in Aborlan, Palawan, in order to determine the potential yield and financial viability of the local varieties of cotton. The cotton from this study can also be used to get better data on the spinnability and quality of the spun cotton, which will determine its price. The buying price of seeded cotton is as 36 pesos a kilo, whereas organically grown, hand-spun cotton in the international market goes for approximately ₱700 per 100g. Locally, the price is around ₱500 pesos for 100g. As such, to make small-scale cotton production to be profitable, it is recommended that the community engage in the production of higher value products such as yarn or textiles. A trained spinner, using a spinning wheel, can produce up to 50g per day (Emi Daniels, Chief Engineer at Nooks Manufacturing International Corp.), so one can earn up to ₱250-350 a day. Minimum wage in Palawan is ₱329 a day, making spinning a competitive option for income. The other advantage of growing and spinning cotton is the capacity to earn from home, once trained, allowing for other household and child care tasks.

Non of the communities we spoke to in Palawan have experience growing cotton for the production of yarn or textiles, nor do they have any experience spinning cotton. But there is a precedent for the type of knowledge and technology transfer we hope to eventually accomplish. Rurungan sa Tubod Foundation (one of our local partners) has successfully created new livelihoods for their partner communities by introducing new skills and technologies needed to process piña (pineapple fibers), a plant that was found growing abundantly but never utilized.

To train one person to spin will cost approximately ₱25,000 (for trainer fees and living expenses whilst in training, based on Rurungan sa Tubod Foundation's previous training sessions). This would consist of one week of direct instruction and a further three weeks of practice and monitoring. This cost also includes the purchase of the thread produced during the training.

Members of the Tagbuana tribes of Samahan na Nagkakaisang Tagbanua sa Labtay (SANTALAB), through Byanyas foundation in Napsan, Puerto Princesa, already have experience growing crops that are new to them (such as coffee) and successfully learning new skills (such as building with bamboo), so the drive to learn to skills is present. The presence of trained carpenters and the infrastructure of Byanyas (woodworking tools, workshop areas and community training center) is an added benefit, as they could produce the ginning and spinning tools needed.

In conclusion, the potential earning capacity from ginning and spinning is competitive with local rates and other existing livelihood options. However a longer research study will be needed to gather data on yield capacity and growth rate of local varieties of cotton. Without this, we are unable to make recommendations on the number of plants needed in order to produce the raw cotton needed to make it a worthwhile enterprise.

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