



Royal Government of Bhutan
Ministry of Agriculture and Forests
Department of Forests and Park Services
Social Forestry and Extension Division



Case study
Rural enterprise development of NWFPs

Wild Mushrooms

Social Forestry and Extension Division
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Foreword

The role of non-wood forest products in Bhutan has evolved over the years from subsistence to commercialization; from small scale, domestic use to items of trade and export. A good number of enterprises have risen in recent times, which utilize NWFPs in one form or another and have found markets internally as well as through export. Products such as essential oils, herbal teas, soaps, to name a few, are of NWFP origin, manufactured within Bhutan and entering competitive markets around the world. Rural communities have also had their capacities developed to apply basic processing techniques to their harvests to reap better returns than previously possible.

As these upcoming enterprises rely on mostly wild NWFPs at the moment, it is important that we understand the value chains that make up these products and reduce the pressure on natural resources; to ensure their sustainability in the long run. Required interventions must be learned in order to avoid depleting our resources and provide long term benefits to those in more disadvantaged parts of the country.

Regarding this, the Social Forestry & Extension Division has carried out case studies for various key non-wood forest products in order to better understand and highlight the constraints faced in sustainably managing and trading these, said NWFPs. These case studies were carried out through literature review, followed by primary data collection through interviews and focus group discussions with traders & harvesters in select areas of Bhutan and finally analysing these acquired data to come up with results and insights.

It is therefore my pleasure, to impart the knowledge gained through these extensive exercises so that the future of Bhutan's NWFP resources as well as NWFP based enterprises may be secured and significant strides may be taken towards achieving economic self-sufficiency.



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Wild Mushrooms in Ura Gewog, Bumthang

1. Wild mushrooms

Wild mushrooms have been prioritised as NWFPs that have particularly great potential in the export market (Tobgay, 2008). Some of the popular wild edible mushrooms include Sangey shamou (*Tricholoma matsutake*), Sisi shamou (*Cantherellus cibarius*), Shiitake mushroom (*Lentinus edodes*), Oyster mushroom (*Pleorutus ostretus*), Ngala shamou (*Lyophellum shimeji*), Jili namcho (*Auricularia auricula*) *Rozites caperata* (Dungshi shamou). Other mushrooms include Bjichu kangroo (*Calvaria* spp.), Ga shamou (*Clitocybe odora*) and Taa shamou (*Polyporus* spp.) (Dithal, 2009).

Amongst these, *Tricholoma matsutake* is the most valuable and expensive. It is popularly known as *Sangay shamou* meaning Buddha mushroom. It is a symbiotic fungus belonging to the ectomychorrhizal group, obtaining its nutrients from the roots of the living trees which basically serve as hosts. The host trees are *Pinus* sp., *Picea* sp., *Tsuga* sp. and *Quercus* sp. This high value mushroom is exported to Japan. It is an important source of income for rural communities. The trade is localized and has developed only in a few Dzongkhags where this mushroom grows. The local communities in the Matsutake mushroom-growing areas have formed a community organization for sustainable harvesting of the mushroom (Dithal, 2009).

In Bhutan, particularly for the small farmers given the terrain and the small landholdings, mushroom collection (both wild and cultivated) is not only their source of cash income but will also be their source of livelihood. Wild edible mushrooms have been collected and consumed from times immemorial. Mushroom collection during the season has been one of the important activity generating both income and employment, as the market demand for mushrooms especially for Matsutake mushroom are growing every year. Collection of wild edible mushroom has been a common activity and it is gaining popularity across the country. Mostly women and children are involved in the collection of mushrooms, fern shoots and sale at the roadside and in the local markets. The mushrooms contribute to household food security, nutrition and also help to generate additional employment and income (source).

It is an important source of income for the village communities of Geneykha as the capital city Thimphu being the most popular place for its trade. Though its trade is much developed at Geneykha in Thimphu, it is also found in the districts of Haa, Paro and Bumthang. Geneykha has formed a community forest for the sustainable harvesting of Matsutake mushrooms.

The two important factors essential for sustainable harvesting practices; the resource use rights and the rules are well established for the CFs (Peldon, 2017).

1.1. Wild Mushrooms in Ura

Ura is located in the Dzongkhag of Bumthang with its altitude ranging from 2,800-5,000 meters above sea level. The main livelihood of the people living in Ura is agriculture. The cash crops available in Ura Gewog are potatoes and mushroom (sangay shamu). The major Business Opportunities for Ura Gewog are in the following areas was identified as Mushroom collection (BOIC, 2015).

The community of Ura Geog have come up with the mushroom group formation. *Shingkhar, Pangkhar, Somthrang, Shingneer, and Ura Doshi* are the 5 mushroom groups formed in the Gewog. Based on the traditional collection system and management, all the five mushroom collection groups under Ura Gewog have come to an agreement to keep the entire mushroom growing area as one collection unit (5150 ha). It is decided that members from any of the five groups can collect wild mushrooms from any area within this designated collection area.

Table 1: List of the 5 mushroom groups in Ura Geog

Name of group	No. of members	Location/village
Thangthong Shamoi Tshogpa	25	Pangkhar
Somthrang Shamoi Tshogpa	17	Somthrang
Kuenjung Shamoi Tshogpa	36	Shingkhar
Phapten Shamoi Tshogpa	39	Shingneer
Urephey Sarshong Shamoi	61	Ura Doshi

Table 2: List of wild mushrooms in Ura Gewog (MG)

Sl. no.	Local Name	Dzongkha	English	Scientific name
1	Jele namchu	Sue-shing shamo	Wood Ear	Auricularia auricula
2	Shangay shamo	Shangay shamo	Pine mushroom	Tricholoma matsutaka
3	Ngla shamo	Ka-shing		Lyoplyllum

		shamo		shimeji
4	Romimo	Bjichu kangroo		Romaria botrytis
5	Sela shamo			Tricholoma sp.
6	Bangku namchu			Unidentified
7	Dumsing shamo	Ato-shamo	Russulla-like waxy cap	Hygrophorus russulla
8	Lami/Tabue shamo	Golay shamo		Calathelasma imperiala
9	Dungshing shamo	Dungshing shamo	Himalayan Gypsy	Rozites caperata

Sangay Shamo (*Tricholoma matutaka*) is exported, mostly to Japan. Exporters come to Ura Geog to buy the mushroom directly from the mushroom collectors. Other mushrooms are collected for sell in the local market and for home consumption. Another mushroom known as Jele Namchu (*Auricularia auricula*) has appeared to be one of the new high price mushrooms for export (MG). The residents of Ura Geog in Bumthang started generating income from wild mushrooms since 1987. A household in the mushroom season from July through September earns an average annual income of Nu. 8776 (MG).

2. Value Chain

2.1. Somthrang Shamo Tshogpa (NWFPs Management Group)

From the five originally formed NWFPs Management Groups for wild mushrooms in Ura, only the Somthrang Shamo Tshogpa is functioning as of the end of 2019. The Somthrang Shamo Tshogpa was formed in 2007, originally for the collection of medicinal plants. However, the group was right after formation transformed with the help of the National Mushroom Centre for the collection of wild mushrooms. The Somthrang Shamo Tshogpa is now operating for 10 years and involves all 18 households in Somthrang Chiwog.

i) Group management and governance

In the beginning, the Somthrang Shamo Tshogpa faced difficulties to implement the group by-laws. The major difficulty was to sell the wild mushrooms through the group and deduct from the selling price 5% as group royalty to the savings fund. The group's committee thus used a stratagem, they sold the mushrooms for a higher price already including the

royalty (e.g. instead of selling for Nu. 200 they sold for Nu. 220 and deducted directly the royalty).

Moreover, the group collected a membership fee from all households in the first two years, Nu. 500 in the first year, and Nu. 300 in the second year after group formation. Already from the third year onwards the group had substantial savings in their saving fund and started to give loans to community members.

The Somthrang Shamo Tshogpa started from the third year onwards (2010) to give loans to the community members from their group saving funds. They started to give loans after their account reached Nu.100,000. Annually, the group gives loans based on demand. Except one household, all the households in Somthrang make use of the loan scheme and take loans varying from 5000-30'000 Nu. The interest rate for the loans is 10%. As soon as the account reaches Nu.500,000, the group intends to reduce the interest rate.

ii) Wild harvest of mushrooms

There are around 60 species of mushrooms in Ura Gewog, and around 30 species are edible mushrooms. Up to 15 species of edible mushrooms are harvested from the wild for home consumption, however only 5 mushroom species for commercial purposes. In Ura, the following mushrooms are collected by individuals for commercial purpose (Table 1)

Table 3: Wild mushrooms collected for commercial purpose in Ura

Local name in Shingkar	Local name in Somthrang	Scientific name
Shangay shamo	Shangay shamo	Tricholoma matsutaka
Ngla shamo	Ngla shamo	Lyoplyllum shimeji
Quina	Jili namcho	Auricularia auricula
Lhamimu	Dapi shamo	Romaria botrytis / Calathelasma imperiala
Brungshing	Brungshing	Rozites caperata

The harvesting season of wild mushrooms is from July to September, in Somthrang till mid-October. In Shingkar, people collect mushrooms individually and in a competitive manner. In Somthrang, only the harvest of shangay shamo (*Tricholoma matsutaka*) is partly organised, the other wild mushrooms are also harvested on individual levels.

Shangay shamo (*Tricholoma matsutaka*)

Toward the end of the 5th Bhutanese month (June) the chairperson of the Somthrang group monitors the area and measures the sprout height of Shangay shamo and takes pictures. These pictures are sent to National Mushroom Centre and traders in Thimphu. If the sizes are adequate, the National Mushroom Centre informs the trader in Thimphu (Karma). The traders then apply for the required collection and export permits and inform BAFRA. Only after all required formalities are done, the National Mushroom Centre gives the collection permits to the Somthrang group. Moreover, the Japanese traders are also informed as well.

On the first day of collection, the Japanese traders arrive at Somthrang to check on the quality and to place their orders to the group. In the following days, the group begins collection. There is no system of collection applied and the collection takes place on individual and competitive basis. There is also no timing set, and no set number of collectors from one household.

An individual can collect up to a maximum of 5 kg and a woman, 2-3 kg per collection day. With an average of around 1 kg collected per day. These collectors proceed for collection every single day between the months of July and October.

Group members are only allowed to collect Sangay shamo with a stick used to uproot the mushrooms and by the use of specific airy baskets (no plastic or closed containers), which were recommended by the Japanese traders and the National Mushroom Centre. Not complying to these rules will result in a fine of Nu. 500. Moreover, after uprooting the mushrooms, these collectors are required to press the soil back into place.

Other wild mushrooms are also collected on an individual level in Somthrang. In Shingkar the following quantities of wild mushrooms are collected for commercial purpose (Table 2), per individual.

Table 4: Collection of wild mushrooms in Shingkar

Local name in Shingkar	Scientific name	Occurrence	Harvest in good season	Harvest in bad season
Shangay shamo	<i>Tricholoma matsutaka</i>	Sporadic growth,	50-70 kg per household	20-25 kg per household
Ngla shamo	<i>Lyophyllum shimeji</i>	Abundant, found in one spot, but the	7 kg per household	3-4 kg per household

		growing season is very short		
Quina	<i>Auricularia auricula</i>		½ kg per household	< ½ kg per household
Lhamimu	Romaria botrytis / Calathelasma imperiala		Not much collected, not much demand because of poor taste	
Brungshi	Rozites caperata	Found in one spot	Not much collected, not much demand because of poor taste	

The collection of wild mushrooms by outsiders, mostly civil servants, is considered in both, Shingkhar and Somthrang, as the primary challenge. On weekends, many cars are parked along the road as outsiders come in groups for the collection of mushrooms. Moreover, garbage left behind in the forests after picnics is a major issue, which was raised by the interviewed.

Some interviewed collectors suggested that civil servants earn Nu.30,000-40,000 additionally from the collection of mushrooms on top of their regular salaried income. Farmers in Shingkhar and Somthrang also argued that they cannot compete with this collection as they are also engaged in agricultural works and cannot always be present in the forests for the collection of wild mushrooms.

Moreover, in both chiwogs, people were aware of their rights to penalise outsiders. However, they found this very difficult because outsiders would get away and escape any justice, and the collectors would have to put up a fight in order to impose fines. Moreover, as the outsiders are mostly civil servants it is very difficult for the collectors to impose their rights to educated individuals. In Somthrang it was argued that the other groups would also most likely be functioning if it would be easier to control the collection of wild mushrooms by outsiders.

iii) Local processing and value addition

Shangay shamo is cleaned with the use of a special cleaning paper, which is provided to the collectors by the traders. Shangay shamo is sold fresh, and differentiated into two grades, A and B. The over-matured and inferior quality mushrooms (e.g. broken) are dried and sold to the same Thimphu (trader) for the domestic market.

The trader from Thimphu (Karma) organises the transport of the mushrooms. From Somthrang, Shangay shamo is send daily (after lunch

around 1-2pm) to Chamkhar for refrigeration. The mushrooms collected are weighted and records are kept by the trader.

The collected mushrooms are dried over the fire place in the house on a wire frame for around 2-3 days. In the past, electric driers were distributed by the National Mushroom Centre to selected households. The electric driers are not used, as the fire dried taste of mushrooms is preferred by the buyers.

Table 5: Fresh to dry mushroom weight conversion

Local name in Shingkhar	Scientific name	Fresh vs. dried mushroom
Shangay shamo	<i>Tricholoma matsutaka</i>	10 kg fresh mushroom give 1 kg dry mushroom
Ngla shamo	<i>Lyoplyllum shimeji</i>	20 kg fresh mushroom give 1 kg dry mushroom

Matsutake mushrooms are graded into two categories Grade A and Grade B, with a difference in prices for these grades. Figure 4 gives the income generated by the CFMGs from the sale of Matsutake mushrooms annually (2014-2016). Almost half of the income comes from mushroom in Geynekha though mushroom is a seasonal based commodity. (source).

iv) Income generation

In Somthrang, the quantities of shangay shamo (*Tricholoma matsutaka*) are recorded by the Thimphu trader (Karma). The collectors are paid every 10 days in cash. In the first years, the group used to deduct Nu. 20 per kg as royalty to the group, however, they stopped after three years of practice. Ngala shamo is at times sold through the Thimphu trader (Karma) or along roads. There is good demand; however, it is difficult to collect ngala shamo.

In Shingkhar, the collected wild mushrooms are sold to different traders, either fresh or dried. The offered price defines the selection of the trader. For shangay shamo, the traders from Chamkhar and Thimphu put their order to individuals and send somebody to pick up the mushrooms. Sometimes collectors are paid in cash, sometimes a payment to the bank account is made digitally. One individual from Shingkhar, sells his mushrooms directly to hoteliers in Wangdue.

Table 6: Differences in prices of mushrooms

Shingkar	Scientific name	Price for fresh mushroom	Price for dried mushroom	Price for fresh mushroom	Price for dried mushroom
Shangay shamo	Tricholoma matsutaka	A: Nu. 600 per kg B: Nu. 400 per kg	Nu. 7000 per kg	Nu. 600-700 per kg	Nu. 8000 per kg
Ngla shamo	Lyoplyllum shimeji	Nu. 200 per kg	Nu. 4500 per kg	Nu. 300 per kg	Nu. 5000 per kg
Quina	Auricularia auricula	Nu. 11-12 per g	na	na	Nu. 15 per g
Lhamimu	Romaria botrytis / Calathelasma imperiala	Nu. 30 per kg	na	Nu. 50 per kg	na
Brungshi	Rozites caperata	Nu. 1000 per kg	na	na	Nu. 2000 per kg

In Shingkar, the income from wild mushroom is perceived to be important for the individual household's income, being the second most important commodity, with up to Nu.40,000 annually.

3. Constrains and opportunities

The wild harvest of mushrooms is a profitable venture and is an important part of rural households income. However, it is not without factors holding it back. But where lies issues, also lies opportunities for improving the practice and making the process more sustainable and efficient.

Table 7 Constraints and Opportunities

	Constraints	Opportunities/ideas
Wild collection of raw materials	Extensive collection of wild mushrooms by outsiders, mostly civil servants Group management and good governance	Do awareness and sensitising campaigns with the help of the Gewog Administration. Implement patrolling and check posts to reduce collection by outsiders. Capacity building on management and good governance.
Processing and value addition	No processing or value addition	The over-matured and quality inferior mushrooms (e.g. broken) as well as mushrooms with minor taste can be used in processing. The group would be interested to start such a business.
Marketing	Improve marketing and branding of Ura mushrooms	Proper branding, labelling and packaging of dried mushrooms and proper marketing.

3.1. Non-functioning NWFPs Management Groups

The Management Plan for the Kuenjung Shamoï Tshogpa in Shingkhar (39 households) was drafted together with Forestry Officials and handed over to the community in August 2013, coinciding with the celebrations of the mushroom festival in Ura Gewog. The Kuenjung Shamoï Tshogpa in Shingkhar was, however, not able to keep up with the planned activities and the group is currently non-functional. The collection of wild mushrooms takes place today at the individual level.

According to Forestry Officials in Ura, the Kuenjung Shamoï Tshogpa (and the other 3 groups) are non-functional because the groups committee was not able to implement the group's by-laws effectively. For example, group members preferred to sell their wild mushrooms at individual level and thus without paying 5-10% of the market price to the group's saving fund, as accorded by the by-laws. Poor management and group governance is also seen as the reason for the group to be dysfunctional currently.

According to the interviewed collectors, the main challenge and reason for group failure is the extensive collection of wild mushrooms by outsiders. People were discouraged to implement their by-laws as outsiders, mostly civil servants residing in Ura Gewog, were collecting mushrooms in their area. Moreover, people reported the outsiders used to collect unsustainably and not according to harvesting guidelines and also leave garbage behind (after picnics) in the forest.

4. References

Annex 1: List of interviewees in Ura Gewog, 24-27 December 2019

NWFP/CF group, Department, Organisation	Interviewees	Designation
Phrumsengla National Park	Mr. Karma	Park Ranger
Shingkar (former Kuenjung Shamoi Tshogpa) (2 men and 10 women)	Yeshey Wangmo Pema Yangzom Kunzang Dema Thumpo Kencho Wangmo Sangay Zangmo Tshering Lhamo Rinzin Tshomo Sangay Buddha Dechen Wangmo Tsheirng Yangzom Rinchen Lhamo	
Somthrang Shamoi Tshogpa (2 men and 14 women)	Tenzinla Lhawang Dendup Karma Yeshey Pema Choden Tshewang Dolker Tshering Yangchern Karma Tshering Pemo Tshomola Rinchen Yangzom Karma Dema Jigme Choden Tshelthrim Dema Kencho Dema Sangay Pemo Thinley Dorji	