Green Enterprises: A pathway to Women's Economic Empowerment

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Abstract

Approximately 80 per cent of Nepal's rural population, predominantly women, rely on Non-Timber Forest Products (NTFPs) for their livelihoods. Despite ample studies on NTFPs, their role in economically empowering women is scant. Taking the case from four community forests in Nawalparasi, this paper examines how NTFPs such as the leaves of *Shorea robusta* (Sal) and *Phoenix loureiroi Kunth* (Thakal) are evident means to empower women. To understand how the process empowered women, the researchers emphasise their firsthand observations to serve as valuable data, complemented by key informant interviews (n=55), workshops (n=2), and formal and informal observations.. The results show that the annual harvestable yield of Sal leaves (3 CFs) and Thakal leaves are 207020.75 kg and 5089.35 kg respectively. This would create 448565 days of green employment opportunities for marginalised women and men. The research concludes that involving women in the inventory process aids in enhanced technical forestry knowledge, increased control over access to resources, attitude change, and shifts in power relations Hence, incorporating NTFPs in community forest operational plans and upscaling is recommended to promote economic, technical, and socio-cultural empowerment for both women and men.

Keywords: Inventory, Operational plans Sal and Thakal Leaves, Green jobs

INTRODUCTION

Nepal has demonstrated a significant increase in forest cover in both community forestry- a participatory, decentralised forest management regime and private forestry. Community Forestry is an autonomous institution that has played a significant role in conserving degraded forests (Baral *et al.* 2019; DFRS 2015; Oldekop *et al.* 2019) Formulated with the twin goals of providing forest resources for the poorest of the poor and conserving the forest ecosystem (Acharya 2002; Baral 2018; Nightingale 2006), community forestry offers ample spaces for inclusion of women and marginalised communities. Strategically, women in Nepal have been recognised as the primary users of forests as (i) forests are one of the most accessible economic resources for women and (ii) a significant proportion of women (57.19%) are engaged in the management of natural resources such as agriculture and forestry. Nevertheless, they are widely reported to be marginalised in the decision-making processes, as only 6 per cent women lead the CFUG (Bhandari *et al.* 2018; Giri and Darnhofer 2010).

The community forest regime has formal rules towards gender equality, but the informal values and practices are still masculine (Wagle *et al.* 2017). However, culture, tradition, and religious beliefs are still accepted. Additionally, divisions of labour and authority, household and family responsibilities, and physical abilities also play a large part in determining

what men do and what women do (Shacetonkl *et al.* 2012). These limitations have restricted women in the economic activities by ignoring the equitable, social and economic benefits to women and the marginalised communities that is far from desirable in forest governance and management (Tyagi and Das 2017). This is a commonly observed phenomenon in forestry business including small-scale enterprise too. In most instances, women's access to resources is often mediated by their relationship with men through marriage, divorce or widowhood (Sunderland *et al.* 2014).

Despite the huge potential of offering low-carbon solutions to enhance income and employment, forest-based enterprises in Nepal are among the less successful sectors (Rai *et al.* 2016). The enormous challenges in maintaining economic profitability, sustaining production, income and employment opportunities have been attributed to a range of policy and operational constraints in raw material supply, transportation, processing and marketing which make forestry a less attractive sector for investment and innovation (Adhikary *et al.* 2019; Paudel *et al.* 2018). Communities, especially those from low socio-economic backgrounds, including women, depend on forest products from community forestry for their livelihoods and entrepreneurial opportunities (Paudel *et al.* 2022). However, the studies on the potentiality of forest as an option for women's entrepreneurs are a relatively new topic in Nepal. Furthermore, there is limited research focused on investigating gender distinctions within community-based institutions created for the management of natural resources (Leone 2019).

Often, men control the most valuable forest resources that can be sold on the market, such as timber, whereas, women's control over resources may be more commonly centered on the management and use of fuelwood, fodder and non-timber products (Agarwal 2009; Beaujon and Kuriakose 2017). Generally, women's use of forest resources tends to center on low-return products and activities, while men control the production and commercialisation of more profitable forest resources, usually timber in the Nepalese case. This requires recognising that women and men differ in their knowledge, preferences and use of forest resources and that these preferences shape the priorities and concerns of different groups within forest communities (Colfer *et al.* 2016). Thus, in the Nepalese sub-tropical forest, people tend to see *Shorea robusta* (Sal, hereafter) forest for its timber value and undermining the other values that it offers to the people. This is because Sal is famous for its robustness and people tend to ignore the other dimensions it offers as the prevailing management approach is centered around timber (Baral *et al.* 2020). Many community forests (CFs) have gender-blind operational plans (CFOP), predominantly emphasising only timber management and recognising space for NTFP in a general category for all minor forest products. In the long run, this gap negatively impacts, restricting marginalised groups' access to the most needed minor forest resources for their livelihood (Khadka *et al.* 2014)there has been little study of how new development strategies, such as Reduced Emissions from Deforestation and Forest Degradation (REDD+).

Thus, this paper derives insights from a 30-month action research project, "Economic Empowerment of Women through Forest Solutions (WEE-FS)" implemented in Nawalparasi (E) district. We illustrate an innovation in the field of transformation of marginalised indigenous women forest users from the role of "informal users" into

"procedural managers of minor forest species" through a technique of "adopting scientific forest resources inventory" by the women themselves. The inventory process opened up their thoughts towards a wider horizon of ownership over knowledge about forestry operational system. We take the case of Sal and *Phoenix loureiroi Kunth* (Thakal, hereafter) leaves to demonstrate that these minor non-timber forest products have the potential to be themeans of women's economic empowerment.

Green Enterprise And Women's Empowerment

Forest inventory is a mandatory provision in the CFOP that are meant to serve as a basis for day to day management of the forest (Baral *et al.* 2018). Approved management plans offer use rights to the local communities and allow them to sustainably extract timber and non-timber forest products. It establishes exclusive use rights over the forest resources that allows the CFUGs to earn profits from the timber and non-timber forest products they extract as well as conserve and manage the forest for their long-term benefit (Bocci and Mishra 2021). However, in practice, the focus of the management plans lies in timber management which largely ignores the non-timber products such as leaves and undergrowth like Thakal in Sal forest. The focus on timber-centric forest management requires increased technical interventions that undermine women's interest in the forest. This is hugely reflected in the current forms of CFOPs where the sustainable harvesting and management of minor forest products are not accounted for in the inventory systems, especially in timber-centric management plans. This is because there is a significant gender differentiation associated with the collection and use of forest products (Sunderland *et al.* 2014).

Generally, women do not face any restrictions in accessing minor products like leaves, grass, and firewood, which tend to be easy to access for them as long as the products are for household use (Basnyat *et al.* 2018). However, once the materials are converted into products for the market, the women have to meet several legal requirements (Baral *et al.* 2023). In the WEE-FS implementing CFUGs, the group of women form enterprise groups. Since the women have close relation with the forest, they identified bio plate and bowl (here after duna tapari) enterprise from the Sal leaves and handicrafts made from Thakal as an appropriate enterprise to them. The bio plate and bowl made from Sal are the traditional products used by Nepali women since immortal and have no complications in picking leaves from the forest. But, the challenges are faced when the entrepreneurs want to sell the products in the market. To meet the legal and technical requirements, even the minor forest products needs to be prescribed in the CFOP to ensure sustainable raw material harvesting.

The Forest Act 2019 stated that extracting any form of forest product for commercial purpose must be provisioned on the operation plan of community forestry (GoN 2019). These explicit permissions for raw material collection would be based on a proper inventory of each resource to ensure sustainable management and harvest (Baral *et al.* 2023). Furthermore, the Forest Regulation of 2022 recognised 23 species of plant-based forest products, including Sal leaves and Thakal leaves, which have royalty rates of NPR 1 per kilogram and NPR 1 per bhari, respectively. To address this prevailing royalty law, conducting an inventory of NTFPs to identify the annual harvestable stock is crucial (GoN 2022). Hence, this paper attempts to illustrate in detail, how the leaves inventory

process empowers women by involving them into the process of engagement in terms of economic, technical, and socio-political participation and benefit sharing.

MATERIAL AND METHOD

Study Area

The study was carried out in Devchuli and Gaidakot Municipality of Nawalparasi (E) district, the project sites of the "Economic Empowerment of Women through Forest Solutions". The sites were selected based on high forest coverage and inhabitation of the indigenous community. The study was conducted in four community forests (Table 1) of the selected districts (Figure 1). It overlays the geographic range of inner Terai, Chure and Mahavarat ranges with the forest type of hill Sal forest, lower temperate oak forest, lower tropical Sal & mixed broad-leaved forest, riverine Khair-sissoo forest and upper tropical riverine forest (Jackson 1994).

Four community forests, namely Namuna Mahila (Women) CF, Amarjyoti CF, Sankhadevi CF, and Deurali CF, were selected to include NTFP inventory and harvest plans in their CFOPs, with a specific focus on empowering women entrepreneurs. Namuna Mahila CF and Amarjyoti CF are situated in Devchuli Municipality, while Sankhadevi CF and Deurali CF fall under Gaindakot Municipality. Since the early 2000s, the government initiated the handover of these community forests to their respective communities to ensure their

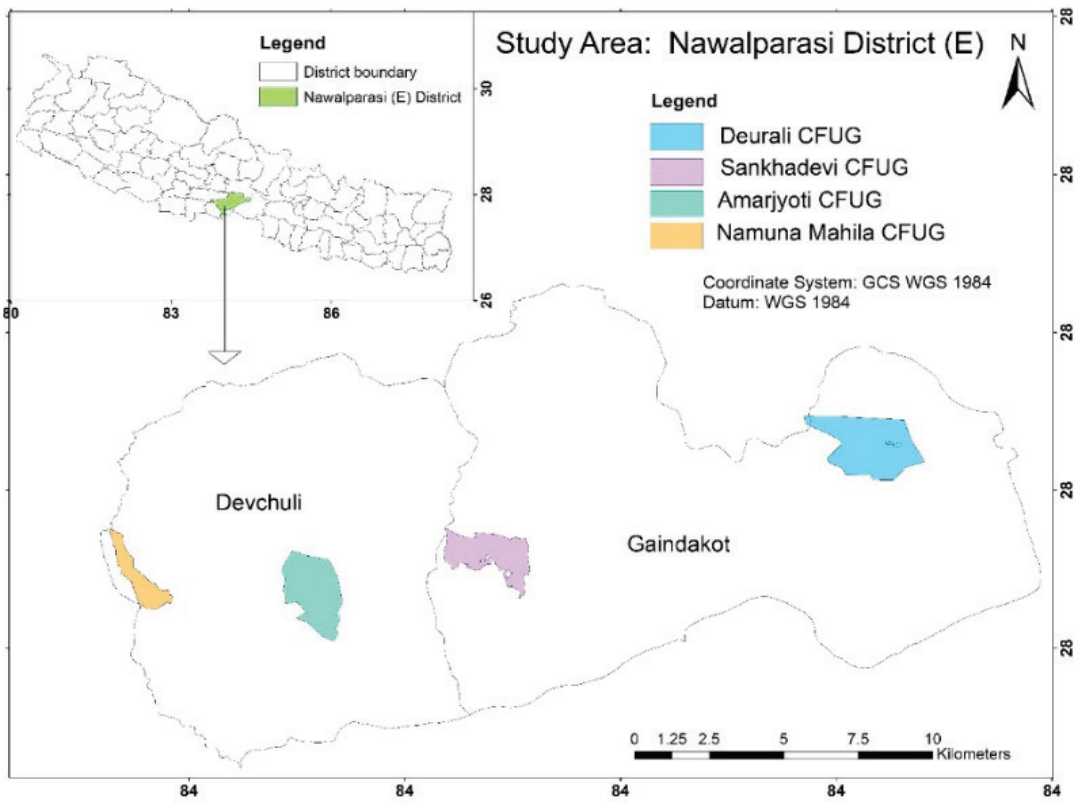

Figure 1: Map of the Study area: Nawalpur (E)

protection, conservation, and sustainable utilisation by the communities. Among the four CFs, Deurali CF has the largest area, covering 951.41 hectares, whereas Namuna Mahila CF has the smallest area, spanning 92.94 hectares during the study period but now the area has increased to 144. 3 ha after handing over a section of national forest to the same group.

All CFUGs are categorised as natural forests, predominantly dominated by Sal (*Shorea robusta*) trees, with Thakal being the prominent on-ground feature. The entrepreneurs have chosen to focus on duna tapari enterprise as they are actively engaged in collecting and shaping the Sal leaves into duna tapari. This practice showcases women's cultural and sustainable connection with nature and engagement in duna tapari enterprises is not only preserving the traditional indigenous knowledge but also transferring it to the younger generations in Amarjyoti CF, Sankhadevi CF, and Deurali CF. In Namuna CF, the Thakal handicraft enterprise is a new enterprise for the women. Consequently, respective inventories were conducted in each CFUG to support these initiatives (Table 1).

Table 1: CFUG details

Name	Namuna Mahila CFUG	Amarjyoti CFUG	Sankhadevi CFUG	Deurali CFUG
Municipality	Devchuli	Devchuli	Gaindakot	Gaindakot
Date of handover	2008/05/14	2016/01/07	2009/07/15	2006/10/16
Area	144.17 ha	349.72 ha	291.82 ha	951.41 ha
Type of Forest	Natural forest	Natural forest	Natural forest	Natural forest
Dominant species	Sal	Sal	Sal	Sal
Major NTFP	Thakal leaves	Sal leaves	Sal leaves	Sal leaves
No. of households	317	1244	827	352
Indigenous HHs	208	551	193	267
Dalit HHs	48	193	37	23
Brahimin/Chhetri	60	498	597	62
Others (Madhesi)	1	2	0	0
Population	1734	6402	3480	1686
Men population	816	3232	1694	863
Women population	918	3170	1786	823

As the research is based on action research carried, it follows typically three phases i.e. sensitisation of the stakeholders, including CFUG executive committee members, entrepreneurs and the Division Forest Office (DFO- denotes the chief of DFO and his subordinates here after), on the significance of forest based enterprises to the women groups. This approach helped to identify gaps for operating forest based enterprise and need of minor forest products inventory in the CFOP was major one. The second phase was the implementation phase where, the sampling design, conducting inventory and prescribing the sustained yield of leaves as raw materials by engaging women was done. And finally, the outcomes of the method included improved access and control over the raw material, creating green jobs for women and men and improving women's technical know-how (Figure 2). The research was carried out between January and February of 2023.

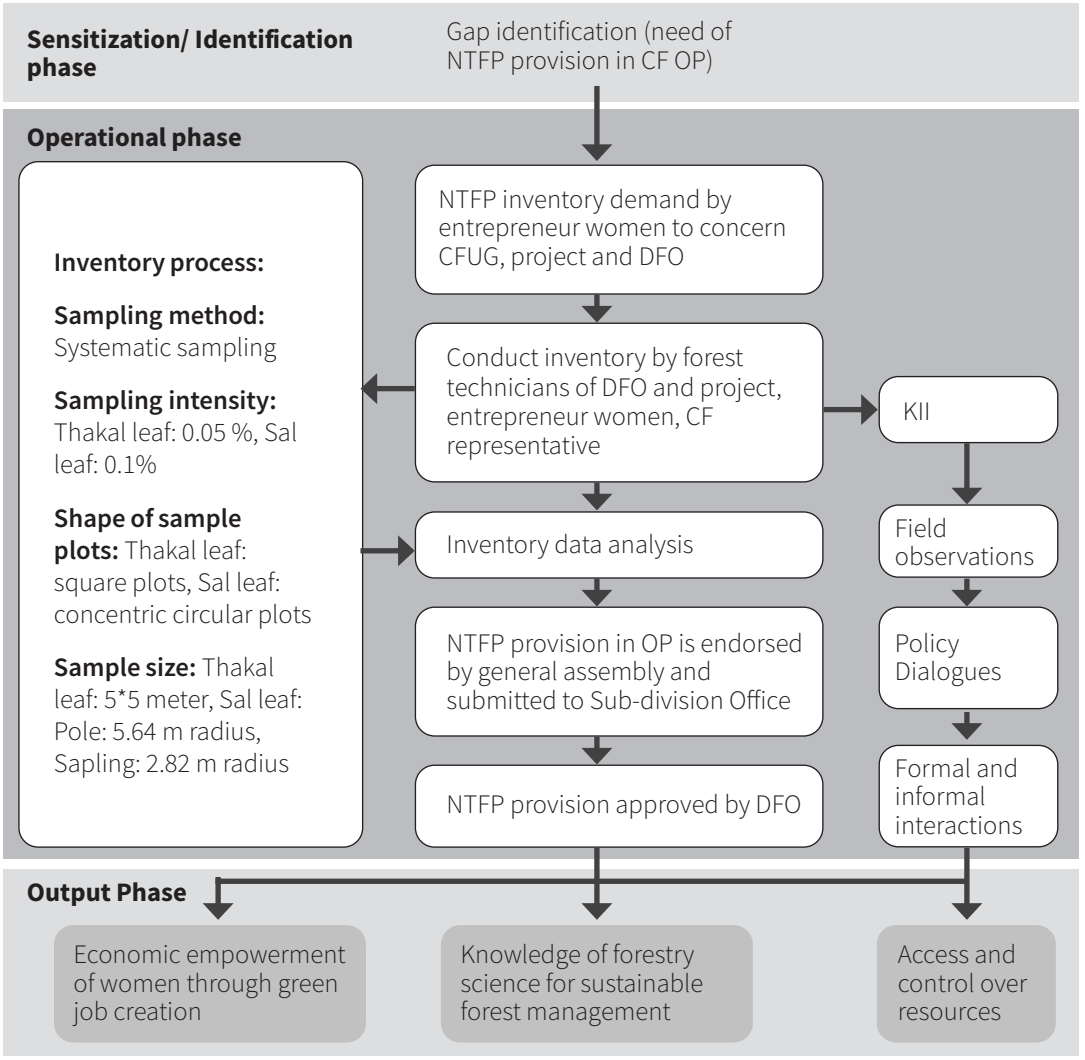

Figure 2: Research framework

Sampling Design

The systematic sampling design was done based on the NTFP inventory guideline, 2012. The guideline has set criteria which have been established for the collection of Sal and Thakal leaves. Thus, systematic sampling was applied in the four CFs. The sampling intensity for Thakal was 0.05 per cent and 0.1 per cent for Sal leaves, resulting in a total 169 plots, of which 151 were for Sal leaf inventory in three CFUGs. A concentric circular plot was laid out with a radius of 5.64 meters and 2.82 meters for the pole and sapling respectively for Sal leaf inventory while a square plot measuring 5m*5m was established for Thakal leaves inventory (Figure 3). A total of 18 sample plots were designed. Details are in Table 2.

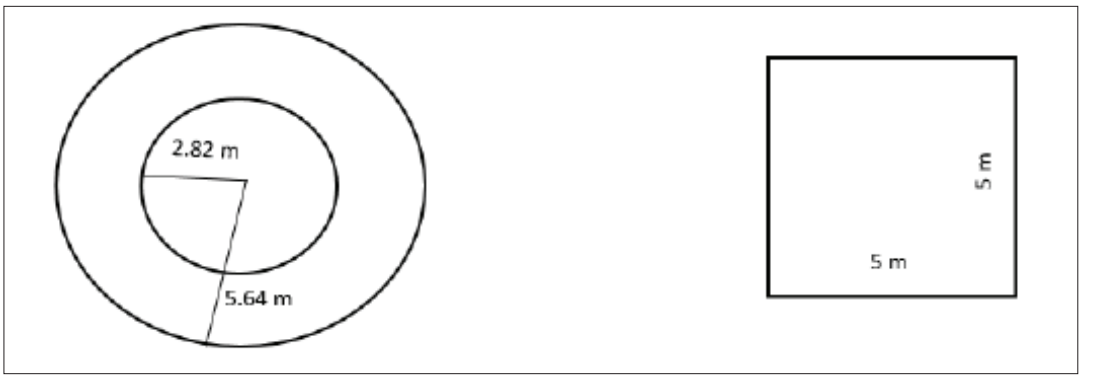

Figure 3: Concentric circular plot for sal leaf inventory (l) and square plot for thakal leaf inventory

Table 2: Sample plot design and layout of CFUG

Name of CFUG	Namuna Mahila	Amarjyoti	Sankha Devi	Deurali
Area (ha)	(92.94)	258.06	291.82	951.14
Sampling intensity %	0.05	0.1	0.1	0.1
Sample plots	18	28	30	93
Plot distance (m)	215	290	307	250

Stakeholders Coordination

Coordination with stakeholders such as DFO and his sub-ordinates, community forest user groups (CFUGs) executive committee, Local Government representatives were carried out to enhance acceptance of the inventory process. The first meeting between the sub-division forest office and the respective CFUG executive committee was held to discuss a defined forest area based on GPS points. The discussion was also shared with the respective Local Government Officials. The second meeting was held among the inventory participants to discuss their role during the NTFP inventory. Entrepreneur

women, forest guards, executive committee representatives, sub-divisional forest office representatives, and forest technical staff were also involved in the inventory process.

Conducting Inventory in Field

The leaf inventory was led by one of the research team members, with support from the DFO officials, CF executive committee members, and the women's entrepreneur. The inventory process was guided by Community Forestry Inventory Guideline 2004; NTFP Inventory Guideline 2012; and Forest Regulation 2022. Garmin GPSMAP 64S devices were utilised to locate the coordinates of the sample plots in the field. A GPS error margin of +3 was taken into account for the plot locations. During the inventory process, the first confusion arose regarding the harvesting of Thakal leaves, as only a few selected leaves are useful. So, through the consultation with women entrepreneurs, only selected leaves (mostly 3-4) per clump were used in weaving handicrafts.

The second dilemma was how much Sal leaf should be extracted from the pole and sapling. For poles, the leaves that fell below the lower half of the pole's height were considered for inventory and harvest, while for saplings, the leaves were collected up to the lower one-third of the sapling total height. Furthermore, inventory of Sal and Thakal leaves have not been previously conducted by any institutions in Nepal, therefore, references related to leaf inventory were scarce. To address these issues, consultation and discussion were conducted with NTFP experts, DFO officials, CFUG members, and women entrepreneurs.

Sal Leaf Inventory

6-meter nylon rope was employed, labelled at 5.64 meters and 2.82 meters. One individual stood at the center, holding one end of the rope, while another person circled the area at 5.64 meters and 2.82 meters. Each pole and sapling within the radius were respectively labelled using oil paint. Leaves from those marked plants were collected. To ensure the sustainable management of the forest, Sal leaves from seedlings were left untouched, while only one-third of leaves from saplings and leaves up to 10 meters from the pole were collected. A hook made from bamboo and a sickle was used during the Sal leaves collection. Leaves collected from each sample plot were weighed using digital weighting machine and recorded separately for pole leaves and sapling leaves.

Thakal Leaf Inventory

A 30 meter measuring tape was used to establish the dimensions of the sample plots, assisted by four individuals stationed at each corner. Since Thakal is a shrub, counting and identifying the plants within the plot becomes efficient while marking the circular boundaries with the measuring tape. Only 1-2 leaves out of a total of 12-15 leaves per plant are suitable for crafting Thakal handicrafts. The arrangement of leaflets on the stem are either opposite or alternate. The uncracked leaves, even when folded, are useful for making Thakal products. Only those useful leaves with stems were collected using a sickle, and fresh weight was taken simultaneously with the help of a digital weighing machine. 1 kg of collected leaves with stems was separated from the stems after 12 hours and left to sun dry for three days. After three days, the dried weight of those leaves was recorded to calculate the conversion factor.

Key Informant Interviews (KII)

Key informants of this study were DFO officials (n=5), CFs chairperson (n=4), chairpersons of women entrepreneur chairperson (n=4),

and entrepreneur women (n=42), who were involved in inventory process. The interview was conducted in August 2023 to understand the implications of the NTFP inventory. The interview was focused on role of NTFP in livelihood of marginalised women, power dynamics within CFs and forest management. Furthermore, operational plans, cost-benefit analysis of each enterprise group, and annual progress report from CFOP were reviewed.

Policy Dialogues

To amplify the voices of these entrepreneurs, two policy dialogues workshops were organised in Devchuli and Gaidakot Municipalities of Nawalparasi (E). The women from the studied CFUGs interacted, shared experiences, issues and opportunities with the policy making institutions at the local level i.e. the Local Government, DFO, Banks and Gharelu Office.

Data Analysis

The variables were computed based on the NTFP inventory guidelines, 2012 using Excel for the inventory data. The required variables were the density of plants in each sample plot and weight of total harvestable leaf. Total analysis was calculated using the formula stated by NTFP inventory guidelines, 2012.

$$\text{Density/ha} = \frac{\text{Total number of plants of any species}}{\text{Total number of plot taken} * \text{area of sample plot}} * 10000$$

Sal Harvestable Leaves Stock

- $$\text{Average harvestable leaf weight from one pole} = \frac{\text{Total weight of harvested leaf from pole}}{\text{Total density of pole}}$$
- Per hector harvestable Sal leaves (pole) = per hector pole density * average harvestable leaf weight from one pole
- Annual harvestable yield from pole=Per hector harvestable sal leaves(Pole) * total productive CF area
- $$\text{Average harvestable leaf weight from one sapling} = \frac{\text{Total collected harfvested leaf weight from sapling}}{\text{Total density of sapling}}$$
- Per hector harvestable Sal leaves (sapling) = per hector sapling density * average harvestable leaf weight from one sapling
- Annual harvestable yield from sapling=Per hector harvestable sal leaves(sapling)* total productive CF area

For Thakal Harvestable Leaves Stock

- $$\text{Average harvestable leaf weight from one thakal} = \frac{\text{Total weight of harvested leaf from thakal}}{\text{Total density of thakal}}$$
- Per hector Fresh Thakal leaves = per hector Thakal density* average fresh harvestable leaf weight from one Thakal
- Conversion factor= sun dry weight of Thakal/ fresh weight of thakal i.e, in our case the conversion factor was 0.356.
- Per hector harvestable dry Thakal leaves = per hector Fresh Thakal leaves * Conversion factor.
- Annual harvestable dry thakal yield= Per hector harvestable dry Thakal leaves* total productive CF area.
- And for the qualitative data, the field reports, interviews and observations were used to develop narratives to explain the cases.

RESULTS AND DISCUSSION

Volume of Sal and Thakal leaves

This study found that the total annual harvestable yield from pole and sapling of Sal leaves were 89760 kg, 60243.24 kg and 57017.51 kg from Deurali CFUG, Amarjyoti CFUG and Sankhadevi CFUG respectively. Additionally, the total harvestable amount of Thakal from Namuna Mahila CFUG was 14,295.92 kg (fresh weight) and 5,089.35 kg (dry weight). Details in Tables 3 and 4.

Table 3: Volume of Sal leaves

Name of CFUG	Sapling density per ha	Pole density per ha	Average weight of collected leaves per sapling (gm)	Average weight of collected leaves per pole(gm)	Annual harvest-able yield from saplings (kg)	Annual harvest-able yield from pole (kg)	Total annual harvest-able yield (kg)
Deurali CFUG	846	106	189	485	NA	NA	89760
Amarjyoti CFGU	745	241	198.26	534.38	32155.80	28087.44	60243.24
Sankhadevi CFUG	436	197	281.89	449.46	33155.05	23862.46	57017.51

Table 4: Volume of Thakal leaves

Name of CFUG	Plant density per ha	Average weight of collected leaves per plant (gm)	Annual harvestable yield (fresh weight: kg)	Annual harvest-able yield (dry weight: kg)
Namuna CFUG	4779	32.19	14295.92	5089.35

The inventory results revealed the feasibility of the enterprise functioning through a sustainable supply of raw materials in the CFUGs. This data is incorporated in the respective CFOPs, endorsed through the respective general assemblies, and approved by the DFO.

Impact of NTFP Inventory Process on Women Empowerment

We examined the role of these leaves and the inventory process as well as the women's entrepreneurial journey for women's empowerment. Here, we follow Naila Kabeer (1999) idea of empowerment as an ability to make a choice in strategic life through different detentions: resources, agencies and achievements. It is a situation where women have the power to make their own choices and decisions.

Creation of Green Jobs for Women and Men

NTFP play a significant role in the Nepalese economy. The annual harvestable amount of leaf volume from four CFs has the potential to create 448565 days of green jobs. When we took the case of Thakal, we consider that eight hours of work is equivalent to a person days' work. The women can collect 25 kg of Thakal in four hours, which needs to be separated

from the stem for another three hours. Labor to dry the leaves is equivalent to one hour, and weaving the Thakal takes 8 hours. 0.356 (Table 5).

Table 5: Thakal leaf collection time

Time taken in hours	Leaf collection	Leaf preparation	Weaving	Total hours
Time (for 25 Kg)	4	4	8	16

The leaves lose their weight when dried, it is calculated using a conversion factor (0.356). Thus,

Dried thakal leaves = fresh thakal leaf * conversion factor

= 25 kg * 0.356 = 8.9 kg

Thus, with 8.9 Kg Thakal that can be manufactured in two person days can produce 26.7 bags (1Kg dried Thakal= 3 medium-sized bags) (See table 6), women will be able to earn Rs 26,700 in 53 person days, which equals to Rs 500 per day income while the women are investing her leisure time and also claiming her care economy.

Table 6: Income from Thakal leaves

Dried weight of the leaves	Total bags prepared	Time invested (days)	Employment generated (days)	Price of each bag (Rs)	Total price of the bags (Rs)
8.9	26.7	2	53.4	1000	26,700
5089	15267	2	30534	1000	1,52,67,000

Hence, Namuna CFUG with the capacity to sustainably produce 5089.35 dry Thakal, can provide produce up to 15,268 bags, leveraging more than 30,000 person days of employment potential worth approximate income of Rs 1,52,67,000. However, thise huge potential of minor forest products has gone untapped in the country.

Similarly, for the Sal leaves, mature and healthy leaves are gathered from poles and saplings. The leaves are stitched together with bamboo pins to craft a flat surface called *Lapha* -that is ready to be pressed in the electric machine.

Different designs and sizes of Lapha are produced, of which 16 leaves and 4 Sal leaves were used for tapari and duna respectively. They are then left to dry in the sun for 3 days. Then, the Lapha are pressed by an electric machine to achieve an appropriate size and finish, but before final pressing the Lapha, a quality check on uniformity and thickness is performed. The final products are packed in airtight plastic bags and sent to the market. During this process, a number of people with different skills were required. Thus, calculations were made based on these requirements.

Conditions,

Hours to collect the 40 kg Sal leafs from the forest= 2.5 hour

40 kg- Leaf conversion time from leaves to lapha= 4 hour

Labor for drying in sun (40 kg) = 4 hours

Number of lapha from leaves (1 Kg) = 16 tapari

Number of lapha from leaves (1 Kg) = 49 Duna

Pressing on machine in 1 hour= 300 plates and 300 bowl

Half of the total AAC volume will be used to create Tapari, and the other half will be used to create duna.

Table 7: Potential green job creation from Sal leaves

CFUG (A)	Annual Allowable Collection (B)	No of Tapari lapha (C)	No of Duna lapha (c)	Labor for sun drying (D)	Time of convert leaf to Lapha (E)	Pressing Tapari lapha on machine (F)	Pressing Duna lapha on machine (f)	Total hours (G)= (D+E+F+f)	Potential job creation from Sal leaves in no of days (H)
Deurali	89760.0	718080.0	2199120.0	8976.0	1436160.0	1196.8	3665.2	1449998.0	181249.8
Amarjyoti	60243.2	481945.9	1475959.4	6024.3	963891.8	803.2	2459.9	973179.3	121647.4
Sankhadevi	57017.5	456140.1	1396929.0	5701.8	912280.2	760.2	2328.2	921070.4	115133.8
Total	207020.8	1656166.0	5072008.4	20702.1	3312332.0	2760.3	8453.3	3344247.7	418031.0

Thus, the CFUGs can generate 418031 person days of employment annually if the enterprise operates at the full scale (Table 7). As Deurali CFUG has the highest forest cover, the income that can potentially be generated is highest. In total, all CFUGs are expected offer daily income of NPR 4543 to entrepreneurs women as well as other marginalised users.

Table 8: Green Job creation through the *Duna Tapari* making in CFUGs

CFUG (A)	Purchase-Tapari (Rs)	Purchase-Duna	Total pressing hour	Total investment in pressing	SP of Tapari	SP of duna	Total income	Misc. cost	Daily individual income from the enterprise
Deurali	1220736	3141600	4862.0	729300	3590400	4398240	7988640	798864	1969.8
Amarjyoti	819308.1	2108513	3263.2	489476.3	2409730	2951919	5361648	536164.8	1888.6
Sankhadevi	775438.1	1995613	3088.4	463267.3	2280700	2793858	5074558	507455.8	1251.3
Total	2815482.2	7245726	11213.6	1682043.6	8280830	10144017	18424847	1842485	4543.1

The significance of these leaves in rural women's livelihoods were also reflected during focus group discussion and interview. One of Thakal entrepreneurs said,

> *"In the past, Thakal leaves were only used for mulching rice seedlings on farmlands and as roof covering materials. But now we utilise them as raw materials for handicrafts. I have earned NPR 20,000 within a 4-month"* (Field note 2023).

However, this amount is lower than the minimum wage rate in Nepal, which, according to the Labor Act of 2017, has a minimum monthly wage of NPR 17,300. On probing further, on the financial securities from the Thakal enterprises, another entrepreneur added,

> "*Yes, this is true. Because most of the women in this group are housewives who do not have any source of cash, jobs or income. Furthermore, this enterprise provides employment in the care economy. We do not have to sacrifice our 10-5-hour schedule. We can do handicraft jobs along with our other responsibilities, including cooking, house cleaning, caring for children and grandparents, gathering grass for cattle etc."* (Field note 2023).

Similar is the experience of the duna tapari entrepreneurs; one of the entrepreneurs states

> "*During the evening, I make Lapha while also helping my children with their studies. During this time, I can produce 300 Lapha in 3 hours, which sells for NPR 300. Similarly, I can earn NPR 9,000 in a month by working for 3 hours each day*" (Field note 2023).

The potential of the leaf based enterprises was even signified by the DFO during a policy dialogue workshop, where he said, *"I have never realised that the ordinary leaves could be converted into money"* (Field note 2023).

Broadening the Technical Knowledge to Avoid Knowledge Dominance

During the leaf inventory, 34 women were mobilised, including entrepreneur women and CF executive representatives, and only 3 of the CF executive representatives from the EC had previous engagement in the forest inventory process, while none of the entrepreneur women had been involved before. The CF leaders, who were men, had the opportunity to participate in the inventory process but only focused on timber. Women's inclusion in forest inventory was found to be poor, because forest inventory is normally considered to be an easy role for a man to play and women's role is largely ignored. When it comes to minor forest products, men members are not interested in it. Thus, for our leaf inventory, the group of women entrepreneurs was also part of the inventory crew. This is partly because women entrepreneurs play a prime role in resource extraction and it is important to empower them with technical knowledge.

> "*This is the first time we are involved in technical job, it's so astonishing to know the forest better*", said one of the women participating in the inventory process.

The project's goals extended beyond just conducting the inventory and assessing harvestable amounts. Another important objective was to empower women by enhancing their technical literacy. One of the Sal entrepreneurs stated during inventory process,

> "*Inventory work can be accomplished not only by educated/elite men but also by illiterate or semi-literate women like us"* (Field note 2023).

During the field, we observed that involving women in technical work supports women in increasing self-confidence and enhancing social capital. Thakal entrepreneur said,

> *"Now we know how much volume of Thakal can be extracted annually" (Field note 2023). "After participating in the inventory job and endorsing through the general assembly, the local elites appreciated our efforts,"* said another entrepreneur participating in the inventory job.

Further, the women shared how they were excluded from participating in the forest inventory despite the existence of such programs in the Community Forest Operation Plan (CFOP). They expressed feeling overlooked, as there was no inquiry into their capabilities or provision of suitable training. The entrepreneurs had to mentally prepare themselves before engaging in the inventory activities introduced by the project. This exclusion has led to a sense of marginalisation within their own Community Forest, accompanied by a lack of trust. They were also little hesitant in holding the measuring tape and readings during the training of Silviculture forest management.

Environmental Benefits of Sustainable Leaf Harvest

Incorporating the provision of minor forest products in CFOP commences the sustainable harvesting practice. One of the duna tapari entrepreneurs added,

> *"Now we know how, where, and when the leaves should be extracted without effecting forest condition so that leaf would regenerate every year. Previously, our main focus was to extract mature and healthy leaves from any area of the forest without considering the correct method."* (Field note 2023).

Incorporating these provisions in CFOP contributes to the sustainable harvesting practice where there is a defined number of annually allowable cut. One of the CF Chairpersons explained,

> *"We had lots of difficulties controlling the unmanaged Sal leaf extraction, as the users even picked the leaf from seedlings. Now the leaf picking is guided properly for extraction method and the volume which led us to manage the forest in a sustainable manner"* (Field note 2023).

Further, we asked, *"how does the defined volume and extraction manual help to manage the forest sustainably?"* The chairperson replied,

> *"Not touching the seedlings implies promoting the growth of new trees in areas where old or unwanted trees are to be removed. This process helps regulate the continuous production of forest products" (*Field note 2022).

Furthermore, one of the executive members from the CF stated,

> *"The proper utilisation of Sal leaves has reduced the availability of burning materials, so we expect a reduction in forest fires".*

In addition, the women's presence in the forest for leaf collection has also supported forest conservation and protection..

During the 2022 policy dialogue workshop organised by WEE-FS, the District Forest Officer (DFO), , he stated,

> *"Thakal is a thick undergrowth suppressing Sal regeneration and we focused on its removal to promote Sal regeneration. But now, it has proven to be a raw material for women*

entrepreneurs in handicraft making. The inclusion of a Thakal in the Operational Plan marks a significant step towards achieving sustainable forest management."

Involving women in the inventory process aims to empower women forest users by enhancing their technical knowledge and their perception of their roles in forest management.

Socio-Cultural Benefits of Sustainable Raw Material Generation

Individuals are associated with a community in various ways: cognitively (knowledge), affectively (emotion) and behaviorally (action) (Axon 2020) and meaningfully, engaging the public with community-based sustainability projects as a method to facilitate sustainable lifestyles. Individuals engage with community projects in numerous ways: cognitively (knowledge. These dimensions encompass the way people think, feel, and act within a community. Within a Community Forestry User Group (CFUG), individuals engage with one another in one way or another. This study commenced to identify how the inventory process empower women in socio-cultural aspects. Through this inventory exercise, the women came closer to each other, even knowing the technical persons for inventory support, expanding their socio culturally defined communication approaches. The women entrepreneurs also defined their social values regarding the Sal and Thakal leaves inventory, such as, planning days for harvesting based on their culturally respected seasonal calendar. Moreover, the image of these women inventory makers has changed in society now, not only as women forest users but also as forest planners. Being capable of explaining inventory matters, the women entrepreneurs' increased confidence provided them courage to break the bias of lower status in decision making, as they took the lead in deciding the Thakal and Sal CFOP development.

Access to and Control Over the Resources

Including both Sal and Thakal leaves in the CFOP is found to be helpful in promoting gender equality in forest management as it provides access to and control over the resources. By recognising the importance of both timber and non-timber forest products, and by taking into account the needs and interests of both men and women, forest management can become more inclusive and equitable. This can help to ensure that both men and women have equal opportunities to benefit from forest resources and participate in forest management. One of the entrepreneurs said

"In the past, we faced restrictions from forest guards when collecting leaves, but this is no longer the situation. We now make the decision about where and when to extract the leaves, with coordinating with both the CF and DFO" (Field note 2023).

The provision of CFOP facilitated and ensured sustainable access and control over forest resources, which contributed to women's empowerment. When women have control over the resources that they rely on, they can become more self-reliant and execute their agency for wider opportunities and rights to gender equality.

Change in Attitude of the Women Entrepreneurs

Within Women Entrepreneurs: Being an entrepreneur comes with responsibilities. The primary source of income for most of the marginalised women used to be alcohol

production, a job often stigmatised in society. One of the entrepreneurs stated,

> *"After becoming a Thakal handicraft entrepreneur, I left the alcohol business, even though it generates comparatively less income. But I am satisfied and happy with it because it is a prestigious job"* (Field note 2023).

Before getting engaged in the enterprises, their income source was agricultural labour, tailoring and tough manual labour. One of the entrepreneurs showing the scars of the blisters on the hand said,

> *"See, these blisters are the evidence of how arduous work we had to do for our survival; we had to carry the heavier loads for wage labour. But now that we're part of this duna tapari enterprise, the process of making the products is way easier with the use of gender-friendly technology. Now, we are happy to see the effort getting monetised. We have not left completely to carry the heavier loads of sand and stone because we didn't have many alternatives"* (Field note 2023).

Family Support: Now, women are in the business after involving in the inventory process of NTFPs. The stakeholders, as well as the entrepreneurs themselves, believe that the resource can be sustainably extracted and used in enterprise as a provision by creating a legal platform for sustainable harvesting. Now, there are noticeable changes in family support. As the enterprise added an extra workload for the women, we asked them about their family support in household work sharing and their outward mobility and participation in enterprise development. One of the entrepreneurs mentioned,

> *"During my pregnancy, I was not able to go into the forest for 3-4 months. Therefore, my husband and mother in-law supported me by collecting the leaves from the forest. And I made Lapha during my leisure time to ensure that I could continue with the enterprise"* (field note 2023).

Community-entrepreneur Women: Entrepreneurial women belong to the marginalised groups, e.g., poor Dalit, indigenous, single, and economically disadvantaged women, whose livelihoods depend on forest products. The community has people from wide range of economic backgrounds. Unfortunately, marginalised women have experienced some form of suppression by the elite group within their community. During Key Informant Interviews (KII), one of the women mentioned,

> *"In the past, affluent individuals from our community used offensive language when speaking to us, but now they communicate with respect."*

Involving women in different activities, including inventory techniques, has gradually changed the societal perception towards women.

CFUG Internalisation: The CFUGs are guided by the operation plan for technical specifications and in our case study sites, the major objectives of forest management appeared to be timber based management. This is because, the forest comprises of precious hardwood species- Sal. However, the CFOP did not take into account the needs and interests of women, making it a gender-blind plan. By integrating the NTFP inventory into the CFOP, the CFUG is adopting gender-sensitive planning approach that reflect the

needs and interests of both men and women in the management of forest resources. This can help to ensure that both genders have equal access to forest resources, which can promote gender equality and contribute to the empowerment of women.

Power dynamics

The relationship between the marginalised women entrepreneurs and the Community Forestry Users Groups executive members was not healthy before. One of the entrepreneurs shared

> *"In the past, we used to visit the Community Forestry (CF) office only during the annual general assembly, which occurred once a year to inform about the decisions made by the CFUGs. After engaging in enterprise activities, including inventory making, we now meet almost on a daily basis because the primary source of raw materials for our enterprise is the community forestry."*

Furthermore, CF chairperson added,

> *"Now, our relation is not just a user, we are more than that. We are both forest managers".* (Field Note 2023).

DISCUSSION

The research revealed that the minor forest products inventory and its inclusion in the community forestry operational plan are found to have positive implications on overall women's empowerment. The women are aware about the number of green jobs that can be generated through the use of non-timber products in the area where people consider only timber as an economic product in the forest. Most importantly, the CFUGs have started realising the potential economic benefits of managing non-timber products such as undergrowth- Thakal and the leaves-Sal leaves. Further, the socio-economic benefits from Thakal and Sal leaves are found to be useful in creating spaces for women entrepreneurs as the managers of the minor forest products rather than the restricted users. This implies that women have the ability and legal basis to make choices for their enterprises.

The idea of women empowerment is that women hold power in terms of the ability to make their life choices, including economic decisions (Kabeer 1999). In coherence with our research are the findings from FAO (2016), gender mainstreaming at all levels of forestry sector has positive impact in forest management issues such as resource sustainability and economic benefits to the users. Reducing the gender gap in the forestry sector contributes to achieving broader social and economic benefits, including meeting the targets of the Sustainable Development Goals.

Community forestry has the potential of creating green jobs and generating economic benefits to the rural communities both by using timber and non-timber based products. However, recognition of minor forest product's contribution is often undermined, and most research on the green economy is tilted towards timber businesses. The study conducted by Subedi *et al.* (2014) estimates that the community forest user group invests approximately Rs 350 million each year in the production of forest products and services, and 31,000 full-time equivalent jobs are created. However, women's livelihoods and employment from the forest resources depend on their access to and ownership of forest resources. Mobilising women in forest inventory and forest based enterprises is in many instances, determined by socio-cultural norms and values. Consequently, including leaf inventory in the CFOPs is considered a milestone in women empowerment,

challenging the socio-cultural norms of doing a technical job. This process has also led the women to realise the significant economic benefits that can accrue from their CFUGs. Addressing the interplay of socio-cultural norms, community micro-politics, and unequal power relations leads to women's economic empowerment (Kabeer 1999). With these dimensions, we realise that women's economic empowerment starts challenging the gendered stereotyped roles in forest management.

Forest inventory facilitates the extraction of forest products in order to promote sustainable harvesting practices (Dhital *et al.* 2003). When technical knowledge dominates the context, forest users, most of whom do not master the technology, are rendered inactive, which increases the power of forest bureaucracy (Basnyat *et al.* 2018). In this context, leaf inventory is expected to sustain the leaf harvest and promote a sustainable supply of raw materials to the enterprises. For this purpose, the women entrepreneurs and the CF leaders formed the inventory crew so that their knowledge of management can be integrated into the CFOP planning process. The design and application of context-specific forest management practices with the participation of key stakeholders plays a significant role in sustainable forest management outcomes (Poudyal *et al.* 2020) key forestry stakeholders often hold different, and sometimes conflicting, expectations in relation to forest management policies and management objectives. Applying the triple-perspective typology of stakeholder theory, this paper assessed the evolution of \"Scientific Forest Management\" (SciFM. If these dimensions are ignored, the community forestry inventory risks to recentralising community forestry through strengthening bureaucratic authority than guiding the forest management decisions (Baral *et al.* 2018).

In addition, the leaf inventory not only addresses the operational issues it also establishes the legal platform for women entrepreneurs to sustainably assess the resources for their enterprises (Baral *et al.* 2023). Moreover, when the forest is sustainably managed, the environmental benefits that accrues from it are more (Pandit and Bevilacqua 2011). Besides the knowledge hegemony, the inventory was done to sustain the leaf extraction from the forest. unsystematic disturbances influence processes that can augment or erode the ecological functions of community forestry. As argued by Sagar *et al.* (2003), without a proper plan, the forest is haphazardly disturbed, which can alter the environmental functions of the forest; hence, incorporating the management prescriptions in the plan ensures the sustainability of the resource use. Similarly, Bocci and Mishra (2021) argue that the exclusive use rights of the forest resources allows the members to earn profit from sustainable use of the forest products. This motivates the women entrepreneurs to conserve and manage forest for long-term benefit. However, they are not growing well due to the ineffectiveness of enterprise promotion activities, gendered differences on forest-based enterprises and socio-cultural norms and values. Thus, there is an immense need to expand the financing to incentivise the rural women in forestry businesses to achieve synergies between conservation and livelihood outcomes.

CONCLUSION

Timber is considered as the primary forest product, but Non-Timber Forest Products (NTFPs) also hold significant income-generating potential, sometimes equal to that of timber. Conducting forest inventories specifically for NTFPs establishes a legal and sustainable harvesting framework. Involving

women in the inventory process contributes to their empowerment in various aspects, including economic, technical, environmental and socio-cultural dimensions. Therefore, it is necessary to incorporate the needs and interests of both women and men in CFOP through involving them in every process for optimum utilisation of forest resources to support the marginalise group.

In regions like the Terai and Chure belts of Nepal, where there are abundant resources of Sal and Thakal leaves, implementing NTFP provisions through inventory should be extended in CFOP to create forest as prosperity.

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