Getting Gender *Right* in NTFP Management

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What are NTFPs?

The term 'non-wood forest products' (NWFPs), and also 'minor', 'secondary', and 'non-timber' forest products, are used as umbrella expressions for the vast array of both animal and plant resources other than wood (or timber in the case of 'NTFPs') that are derived from forests or forest tree species (FAO 1997).

There appears to be no complete (or even near exhaustive) list of NTFPs whether for plants or for animal species. In fact there is no 'World' list for medicinal plants either. However, NTFPs are grouped often according to uses (foods, medicines, fibres, gums etc.).

Medicinal Plants form the largest sub-set of NTFPs: In India 8000 plant species have been recorded to be used for medicinal purposes. Of these 1000 species are traded commercially as raw drugs, (FRLHT Database). On the other hand there are single NTFP species like 'Chilgoza' (seed of *Pinus gerardiana*), that are almost wholly commercial now and make a considerable contribution to the local economy of Kinnaur district in HP[1]. For many households in Kinnaur the income from chilgoza forms 22% of their total cash income, (Rinki Sarkar, 2009). Forest honey and deer antlers collected from forests by Tribals form an important source of cash income for them.

Why are NTFPs important?

1. Most rural households (HHs) in India and around the world depend on NTFPs in varying degrees. Their survival is linked to the availability and access to NTFPs; for example on grass and grazing for cattle; on green tree fodder for stall fed livestock; on firewood and other biomass to meet HH energy needs; on forest litter for manure; on pasture for herding; on streams and springs for freshwater[2] and so forth.
2. In subsistence rain-fed economies and more so in Tribal tracts of the country, NTFPs in the form of wild vegetables, tubers, fruit, freshwater fish and bushmeat provide a safety net especially for the poor to tide over lean periods or during natural calamities like floods or droughts. This safety net function of NTFPs is critical for the over 84 million tribal population of India.
3. NTFPs are an irreplaceable source of productive work and cash income for rural HHs. In India, about 7.5 million people are engaged part-time as collectors of *tendu* (*Diospyros melanoxylon*) leaves, and another 3 million process the leaves

[1] Different production estimates exist for Chilgoza (Official: 30,000 kg/yr; HFRI: 80-100,000 kg/yr & Unofficial: >150,000 kg/yr; Current Delhi rate is Rs 1900 / kg (2013);

[2] Whether or not 'freshwater' is a NTFP is contentious; but considering that most rivers in India and the world originate in "Forests" (600 in Peninsular India alone), it is critical for conservation of forests that freshwater be accepted as an NTFP. The argument that freshwater is an 'ecosystem' service could be tenable if freshwater was free (like air or beauty), but this is no longer the case.

into *bidi* cheroots (Tewari 1982 cited in Arnold 1995). Estimated revenues from *tendu* leaves are US$200 million/yr (FAO 1994a). In Manipur State, India, 90 percent of the population depends on forest products as a major source of income, and some 250,000 women collect forest products (FAO 1992).

4. All Indian Systems of Medicine and folk traditions depend almost entirely on medicinal plants. Over 80% of rural populations depend on medicinal NTFPs for their primary health security, (WHO). In India, out of the 880 traded medicinal species studied, 61% are procured wholly from the wild, another 24% are either obtained from the wild or cultivated and only 10% purely cultivated, (FRLHT Database). In case of non availability of these species from the wild, all the plant based systems of medicine would collapse. And this includes many modern, allopathic medicines too.
5. Trade in NTFPs at the local, national, regional or global levels is difficult to estimate realistically but it is well over many billions of dollars annually. The global market for all categories of herbal products was estimated to be about 62 billion USD and for medicinal botanicals over a billion dollars in 1995. In India there are about 6000 herbal medicine manufacturing enterprises with an annual turnover of over Rs 4200 crores, (FRLHT). In India, it was estimated that over 50 percent of forest revenues and 70 percent of forestry-sector export income are derived from NTFPs, generating about half of the income for a quarter of India's rural people (Sekhar *et al.* 1993 cited in Lintu 1995).
6. Tropical forests harbour over half the known species on Earth. Thousands of these are used as NTFPs across societies. The conservation of this biodiversity is thus critically linked to the conservation of NTFPs and in turn to ecosystem diversity and health. Ecological associations of NTFPs with other species are little understood, and are clearly an area for more research.
7. For many NTFP species including medicinal plants, little is known and even less understood about their biology and inter-relationships with other species (both animal and plant) within the forest ecosystem. While research in these areas may take long, tools like Participatory Action Research (PAR) could be profitably used to determine safe harvest levels of a range of NTFPs. Over-exploitation of NTFPs for instance, as has been accelerating in recent times, could lead to irreversible decline of their populations with attendant ecological consequences.

Bio-Cultural Significance:

NTFPs, particularly medicinal plants invariably have empirical knowledge and/ or belief systems associated with their use; what is known as ‘folk’ traditions, (also referred to as Indigenous Technical Knowledge, ITK). As populations of different NTFP species decline or they become rare or extinct in the wild, it directly impacts their use and with that over time, the knowledge / belief associated with that use. Thus in the world of NTFPs, the richness of species diversity is directly linked to the richness of cultural diversity. Conversely, the loss of one leads to the loss of the other. Therefore diverse knowledge systems associated with the use of thousands of plant and animal species across the world, are threatened as we continue to lose species to severe depletion or extinction. It is no co-incidence that indigenous people,

indigenous knowledge and indigenous cultures are found in great diversity in the species rich tropical world. Conversely, the loss of cultures and associated ITK can lead to severe decline and even extinction of a species that people no longer know how to use.

What is important to appreciate and understand is that the bio-cultural heritage of any society, painstakingly developed over millennia, can be abruptly threatened due to loss of NTFP species or with the loss of knowledge, a species can fall into terminal desuetude.

Management Issues around NTFPs:

Many of the issues that hold back NTFPs realize their economic potential and social relevance are similar or overlapping with those that hinder or block the development of forestry and sustainable natural resources management. In order to better appreciate the complex and inter-linked issues around management of NTFPs, they are discussed here under 3 Heads, Historical, Social and Economic. The background to this discussion is embedded in the colonial and post colonial experiences of forest management in India.

Historical

With the advent of the British Raj, the forests and other Common Property Resources including in the Princely states gradually ceded to the State. This change of ownership was complete after Independence. As the forests were taken over by the 'State' and demarcated and reserved under prevalent Forest Laws, there was a concomitant erosion and eventual breakdown of Community control and regulation. Forests gradually become Open Access areas with local communities unable to handle ingress and incursion by 'outside' people and interests including those of the State usually through the Forest departments.

The onset of "scientific" forest management heralded the primacy of timber (for colonial economic interests mainly) and this was institutionalized in the form of Working Plans (WPs). This basic tenet of Working Plans has remained unaltered till today. Although less revenue oriented now, the colonial legacy of forests to be managed for timber persists. The revenue earning itch spilled over to NTFPs as well and nearly all high value MFPs (as they were called earlier), were nationalized. While the British did allow and admit several "Rights" of local communities during the process of Forest Settlements, it was mainly done in British territories and the vast NTFP dependent forest dwelling and tribal populations of the country were left out. This 'historical injustice' actually formed the basis of the Forest Rights Act later.

While there were no active management prescriptions for NTFPs in the WPs, but because they earned some revenue for the state, NTFPs were brought under Regulation. So even where NTFPs could have brought in substantial incomes for forest dwellers, they were and still are unable to negotiate the complicated and bureaucratic regulatory red tape that eventually allows NTFPs to reach good markets. The NTFP collectors thus became

subservient to the traders in towns and their agents in villages and that is the route of NTFP trade that dominates this secretive business till today.

Meanwhile, the Tribal people and other forest dwellers gradually got alienated from "their" forests, which with growing interests of several 'new' stakeholders including the forest departments, became more and more Open Access areas from being community owned and managed earlier. With roads and the access to markets that followed, many NTFP species underwent rapid commercialization and the forests that were virtually Open Access now suffered the Tragedy of the Commons[3]. Despite more regulation, the forest departments were unable to contain over-exploitation or arrest the flow of NTFPs driven by market forces.

A sub-set of problems that have and continue to hinder comprehensive or species targeted interventions in NTFP management has to do with lack of authentic data. This could be to do with species lists for instance. It took FRLHT, Bangalore several years to reliably correlate the local names of medicinal plants or trade names of raw drugs with their botanical identities. Similarly, data related to trade in NTFPs at local, state, national or international levels is problematic and there are no mechanisms at present to check the authenticity of figures. Therefore, figures relating to quantities traded and their monetary value can be way off the mark and may lead to investment and returns problems.

Schemes that offer huge returns (and profits) through cultivation of medicinal plants need to be viewed cautiously. Often the returns projected and the time it takes for many species to mature (which can vary due to climatic and other factors) are misleading and many farmers have burnt their fingers trying to make a quick buck.

Social

It is well known that human societies have always been stratified by class or caste or both. In recent times while strict caste based exclusion has broken down considerably in urban areas, it persists more in varying degrees in rural areas. Social status as defined by caste has led to historical social and economic inequality. The Scheduled Castes and Tribes remain by and large the poorest groups in most districts of the country, especially in forested tracts.

This unequal social and economic status has denied or restricted both security of tenure or free access to Common Property Resources (CPRs) like forests and by extension to NTFPs. This is despite the fact that the poorer are more dependent on forest resources especially NTFPs than others. Further, because of persistent poverty, illiteracy and low self esteem, the poor especially as caste groups have been unable to organize themselves politically. The poor SC or ST NTFP collector has thus been at the mercy of Upper Caste traders or middlemen. (One could cite a long list of Hindi movies here as reference!).

[3] See The Tragedy of the Commons, Garrett Hardin, 1968

Perhaps the most socially debilitating feature and one which cuts across caste, clan or ethnic groups has been the institution of Patriarchy, with a few notable exceptions as in some Matrilineal tribes as in the NE and Kerala. Women all over the world have been relegated to a 'lesser' position than men. Gender roles have thus got defined and codified inviting social sanction or ostracism even when Constitutional guarantees allow otherwise. The more difficult and socially invisible jobs like working within the four walls of the house (24x7x365), or tending cattle or weeding and hoeing, typifies the world of most rural women even today. Besides of course having to bear and bring up children.

As part of the gendered division of rural labour, it is women who are mainly responsible to collection of firewood, fodder, grass, wild food, medicinal plants, (all NTFPs) and so forth and are also expected to have the knowledge and skills to use them.

"Gender refers to the economic, political and cultural attributes associated with being a man or a woman." Gender differences in knowledge systems; Huisinga et al. (1993) identify four areas of gender differences in knowledge systems related to forests:

• Women and men have knowledge about different things

• Men and women have different knowledge about the same things

• Women and men may organise their knowledge in different ways

• Men and women may receive and transmit their knowledge through different means.

Studies indicate that CFM groups with more women in the Executive Committee than men, resulted in greater improvement in forest condition. All women ECs in Nepal did even better despite lesser allocations, more degraded and smaller forest areas than other groups, (Agarwal, 2009).

Economic

The global surge of interest in natural food products, herbal medicines and cosmetics and alternative medicine has resulted in intense market driven over exploitation of NTFPs without production and management systems being able to cope with demand. More and more species are getting commercialized and many driven to the verge of extinction, (Rhinos, tigers, Saraca asoka, Red sanders and many others).

Apart from Market forces, the failure of policy and implementation in arresting over exploitation, illegal trade and effective conservation, seriously threatens the continued availability and even survival of many NTFP species. For instance, while JFMCs have been given full rights to harvest and sell NTFPs, the high value ones like bamboos, rattans, pine resin, sal seeds, tendu leaves etc., remain nationalized and therefore of little or no benefit to local communities and collectors. Government unwillingness to forego revenues from such NTFPs has resulted in failure of local communities having a real economic stake in NTFP

management and conservation. The on-going tussle over opposition to allow bamboo rights and harvesting to local communities is a case in point.

Unsure of supply side positions and reliability, many small NTFP based value addition enterprises fail to take off. For example, a small enterprise based on value addition to some Himalayan herb species may face sudden closure because the National Biodiversity Authority decides to ban extraction or use of those herbs.

In the case of medicinal plants and because they are explicitly in no department's mandate, several schemes and projects with various departments and agencies, each not knowing what the other is doing, have neither lifted India's medicinal plants exports nor made herbal medicines any cheaper.

Gender and NTFP Management:

NTFPs are to the Forest what women are to Society. Without either, the Spirit of the Forest, as of Humanity, would disappear. As various studies and the experience below clearly bring out, systematically addressing issues around gender inequity hold the key to sustainable forestry (and development) as of conservation and sustainable use of NTFPs.

NTFPs are an intrinsic part of forests. Their presence, abundance or otherwise is linked to the health of the forest. In fact the presence of key species of animals or birds which are often not reckoned as NTFPs, but which they actually are, indicate the state of health of a forest. Apex carnivore species like the Tiger or Leopard in forests are one example. Beginning with the Industrial Revolution, and perhaps prior to that with the spread of agriculture, forests all over the world have been in a state of accelerated decline.

More recently, the adverse direct impacts of 'Development' (forest fragmentation and degradation) and its long term irreversible consequences like desertification or disappearance of mangroves and the linked multiplier extinction of species, continues to batter the lives and livelihoods of forest dwelling communities and other marginalized forest dependent groups. The Poor among these have disproportionately been 'paying' the cost of Development *and* often of Conservation as well.

The first indicator of forest degradation is the drop in the number of species, both plant and animal, that once inhabited that forest. The species to go first are 'niche' species or rare ones or endemics and so on down the line. Animals and birds and possibly other smaller fauna, being more sensitive to habitat changes are more likely to disappear early in the forest degradation process. Most of these species are or yield NTFPs.

The economic impact of the loss of species diversity is on those most dependent on them, the poor and marginalized groups, and among these the worst affected are women. Why? Because, historically it is women who have collected, used and conserved a far greater

number of species for food, medicines and cultural and spiritual values. The consequences of species loss is more acutely felt by mountain women because of steep gradients and rough terrain and generally more inhospitable conditions, (Manohara Khadka and Ritu Verma, 2012).

The implications of species loss or of their becoming scarce are many, particularly for women. It is common knowledge that women are almost solely responsible for cooking and are the main gatherers and collectors of biomass or firewood for cooking. Women are also responsible for giving primary health care to the sick at home and are often most well versed with the use of medicinal plants, (Grandmother's remedies). In a study in the central Indian Himalayas, 52 per cent of women, compared to 26 per cent of men, were found to have knowledge of at least 30 indigenous health care practices (Samal and Dhyani 2006, quoted in Ibid, 2012). It is women who know, recognise and principally undertake the gathering of wild food plants and tubers and fruit from the forest. Nearly all of these various responsibilities are directly linked to the abundance and/or availability of NTFPs. Loss or scarcity of NTFPs therefore means more work and drudgery for women. This implication makes women see the forest and its NTFPs from a perspective different to that of men.

So, how would village women manage forests, if they had a chance? In the case of firewood for instance, conventional forestry regards firewood as a 'minor' by-product of growing timber or pulpwood. This could be because men have traditionally not been concerned with firewood collection and especially with cooking. But it is men who plan, carry out and manage tree plantations. It is obvious that if women were in charge of forestry plantations, the approach, species mix, nursery practices and management would be radically different. The success of plantations would be measured by the quantity of firewood they produced and how quickly, for instance. By extension, energy efficient cooking devices would be a high rural development priority (if women had a say) and not left of half hearted male dominated initiatives largely driven through foreign funded projects, as is the case presently.

Interestingly, "Aumeeruddy-Thomas and Pei (2003) found that women were more likely to describe wood species based on specific fuelwood characteristics such as heat and light producing capacity and the time taken to burn, while men's knowledge of wood species tended to be structured around their suitability for furniture making, thatching, and making sheds and shelters. These differences demonstrate that women and men prefer to use rangeland and forest resources and agricultural crops for different purposes, and these purposes are often influenced by their gender roles", (Ibid, 2012). These gendered perspectives greatly influence the outcomes of JFM for example and possibly explain why JFM has become an extension of conventional forestry (controlled by men) rather than being a purveyor of NTFPs, things that people need (reflected in women's choices).

Studies across several country's of South Asia, (Nepal, India, Bangladesh, Bhutan cited in Manohara and Verma, 2012) reveal that because of the gendered division of labour, it is women, much more than men, who are concerned with the sustained availability of Biodiversity (NTFPs) and therefore have greater concern about their conservation. So, while

poorer women regularly collect a range of wild foods, fruit and tubers from the forest, know about their locations and seasons of harvest and so forth, they are never really consulted or participate actively in plantation planning or are able to choose NTFP species that benefit them and their households.

Despite women's knowledge about the environment and the potential they possess, their participation in decision-making has often been restricted by economic, social, and cultural structures. Young people are also key stakeholders in that they will experience the longer-term consequences of decisions made today concerning ecosystem services. Indigenous control of traditional homelands can sometimes have environmental benefits, although the primary justification continues to be based on human and cultural rights, (MEA, 2005). Similar sentiments are echoed in other assessments where gender inequities prevent or marginalise women's access to decision making forums that may sanction unsustainable resource use or exploitation, (Ashish Kothari, EPW, 27 July 2013).

Women are further, rarely aware of government policies or programmes regarding forestry, plantations or even JFM. A major reason for this is that women are rarely articulate about their interests which they are ever willing to sub-ordinate to that of their men folk. In Bodies like the JFMCs, almost wholly dominated by men, the expression of women's interests is tentative and made weakly to male dominated committees and fails to find acceptance with the male dominated forest departments. As a result, nursery practices and species grown have by and large remained unchanged for instance. While women are interested in annual or biennial NTFP species, the men (including the forest departments) have historically stuck to long rotation tree species and despite explicit policy guidelines that 'people's' choice will determine what grows in the nurseries, we find that invariably it is trees that men prefer or think will benefit them or what the FD is wont to grow.

"These gender-differentiated interests and knowledge have two major implications for the management of the environment. First, problems of deforestation, forest degradation, and loss of indigenous genetic resources can potentially be reversed when women engage in the conservation and management of biodiversity in various ecosystems, including agro-ecology. Second, the increased commercialization of agriculture and forests promoted by the interests of men often reduces access to biodiversity resources, especially indigenous plants, crops, animals, and other environmental resources (e.g., water and pastures) for women. This marginalizes women's conservation efforts, their indigenous knowledge, and the critical role of socio-cultural values associated with biodiversity management. Most critically, women's knowledge of biodiversity conservation is related to skewed gender divisions of labour and responsibilities in which women, in their roles as households managers, plant gatherers, home gardeners, seed custodians, food producers, forest managers, income generators, and plant breeders, engage more intensively in the protection, management, and use of agricultural and forests resources than men." (Ibid, 2012)

The key question that decision and policy makers will have to tackle is that despite numerous studies and research clearly indicating that while equitable, balanced, gender sensitive

approaches are imperative to sustainable management of natural resources, how quickly and how much can we change entrenched patriarchal positions?

Case Study 1: Women's Roles in Wild Yam Conservation, Management, and Use in Bhutan

Yeshey Dorji

The importance of wild plants as a food supplement and means of survival during times of drought and famine is generally underestimated. Consumption of wild food is common in biodiversity-rich rural areas of Bhutan – a country distinguished for its matrilineal society which grants women inheritance rights and privileges not found in most of South Asia. Rural people have significant indigenous knowledge concerning the conservation and sustainable use of wild plants. Women are the key sources, or reservoirs, of plant lore and knowledge.

This case study explains gender differential roles and needs in the conservation and use of wild yam, *Dioscorea* spp., locally known as 'borang jogtang' (literally 'wild potato'). Women gather it, providing food security at times of food scarcity caused by drought and other hardships. The study was conducted in the Monpa community, in central Bhutan, and Martshalla village in eastern Bhutan. These communities are indigenous users of wild yams and live and rely on it as supplementary food for 4–5 months, from May–June to September–October, depending on availability. During May–September, people experience a shortage of maize, their staple food. Two reasons are identified for the shortage of maize during these months. First, more than 40 per cent of the total maize produced is used to brew 'ara' (local wine). Brewing ara is a social obligation and is needed for socio-cultural activities carried out in households and communities. Second, post harvest, a large quantity of the maize stored at home is destroyed by insects, while maize kept in storage in the fields is attacked by monkeys and other wild animals.

The collection of wild yam as a source of food is decreasing in Martshalla village, which is modernizing and has access to many imported food items. Only a few people continue with the tradition of collecting the yam tubers. This is in contrast to the Monpa community, where wild yams continue to play an important role in food security.

Securing Food Through Wild Yams

Women are the principal collectors and users of wild yams in the study areas. According to a 56-year-old woman in Martshalla village, who was responsible for collecting wild yams when she was young, there are socioeconomic, technological, and environmental reasons why Bhutanese women collect and use wild yams.

First, for rural women, wild yams constitute the main source of household food security. Ensuring food in the household is women's primary responsibility in rural Bhutan. Men often take part in off-farm activities such as working as wage labourers, mining stone quarries, and logging.

Women are not confident that this ensures the household's food security, and, therefore, they themselves search for food and conserve wild yams. Second, women's lack of income limits their potential to engage in small enterprise, such as

buying threads for weaving clothing in their leisure time. As their leisure time coincides with the period when they have no food, during mid-March to mid-June, women collect wild yams. Third, though other work may earn more income – for example, timber harvesting – collecting wild yams is less labour intensive. Finally, the easy access to wild yams and herbs from forests adjacent to their villages allows women with children to return home to care for them. Therefore, women want to protect forest plants and wild yam creepers in nearby forests for sustainable use.

Indigenous women in the study villages use five species of wild yams. Four of the five species are widely consumed: *D. oppositifolia* and *D. bulbifera* are the most widely used, followed by *D. Hamiltonii* and *D. Wallichi*. The least used species is *D. hispida* which has an intoxicating effect similar to alcohol. They often avoid consuming this tuber. If they do use it, it is usually soaked in running water for a week before cooking in order to remove the intoxicant. Some species of *Dioscorea* also possess medicinal properties and are used by local indigenous health care practitioners as stimulants, tonics, carminatives, and expectorants. Women use *D. bulbifera* as a medicinal plant. The availability of the various species of wild yam varies from one to three months. For example, *D. oppositifolia* is available pre-monsoon in May and June, while *D. hispida* is available at the end of the monsoon in September and October. In between, other species are available intermittently. Staggered collecting provides food over a considerable period of time. Yams are locally named according to their taste, shape, and texture and are identified on the basis of their colour, size, shape, fibre content, and cooking properties.

Women prepare yams as a main course, or include it while preparing curries or sour dishes, generally after boiling. Sometimes women barter wild yams for other commodities with neighbouring villages. One kilogram of yam tubers may be bartered for 500–700 grams of rice or finger millet. Women also give tubers to friends and neighbours as gifts if there is a surplus. Women ritually offer the cooked yam tubers to their deities before serving them to family members. Wild yams are also used for social and cultural events. For instance, women and children collect yam tubers to serve as one of the main dishes for the New Year gathering.

Collective Action in Gathering and Sharing Wild Yams

Most of the time, family members decide to collect wild yams together. Normally the collecting group consists of men and women of different ages, varying from 15 to 60 years old with the majority between 20 and 40 years old. The quantity of tubers collected per expedition varies from 3 to 8 kg. Tubers are collected and stored in bamboo baskets. If women are in a group without family members, they employ a collective approach to collect and distribute the wild yams. Unlike in the Monpa community, women and girls in Martshalla village often form a group of two or three, leaving the village in the morning and returning by early evening.

Since there are risks to collecting wild yams, women choose to work collectively. These risks include wild animals, leeches, insect bites, snakes, sinkholes, and falling tree limbs. Women enter the forest in a group and then divide into pairs, sharing roles. Sometimes, some pairs cannot find wild yams and return empty-handed. In such cases, those who found tubers share them.

Women are aware that creepers younger than 3 years yield only about 3 to 4 kg of wild yams and don't find it worthwhile to dig out tubers. They therefore try to find creepers over 8 years old. After guessing the age of the creepers to be about 8 years, the process of digging and scooping soil begins, in which women, again, share roles. They clear vegetative ground cover about 0.3 m from the roots of the creepers. Using a 'chakku' (hoe), they dig a pit. A 'kheshow' (small bamboo basket) is used to scoop soil from the pit. Usually a pit measures 1.2 by 1.5 m on the surface. Pit digging is carried out turn by turn to ensure that no one tires quickly and to ensure that one person is on guard for wild animals. Pit digging continues till the last piece of the tuber is retrieved. In a spot that has a thick soil profile, the depth of a pit could go down to 1.5 m. When the tuber is about 12 to 15 cm long, it is snapped and handed over to the partner on the ground. Digging is continued till the tail end of the tuber is retrieved. While her partner is digging, the woman on the ground cleans soil off the tuber making sure that the skin is intact so that no air enters the cut ends. On average, the time required to dig a pit free of stones and tree roots is around one and a half hours. The collected wild yams are shared between the members of the group.

Indigenous Knowledge in Wild Yam Food Preparation

Women look after the entire process of yam preparation, both cooking them and distributing them among family members. After examining the quantity and palatability of the tuber, they decide which method of cooking to use. If the quantity is large and the taste is good, they boil the tubers for the main dish, to be eaten with finger-millet gruel. If the quantity is low and the taste is average, they prepare the yams as a curry to be eaten with cereals (maize, rice, or millet). On average, one family can consume about 2 kg of tubers in a meal. Preparing *Dioscorea bulbifera* tubers requires a longer, more complex process to make them edible. First the tuber is washed and boiled along with its skin. The skin is then peeled and the tuber is cut into slices and kept overnight in a basket in running water. The next day the tubers are boiled again and eaten.

Gender Indigenous Knowledge and Strategies for Wild Yam Conservation

The indigenous knowledge held by women and men helps in conserving the wild yam's genetic resources in their natural habitats and helps in selecting the preferred wild yams depending upon their availability, taste, size, shape, and medicinal value. Men and women, both young and old, know a lot about wild yams, but women, because of their experience in field collection and in preparation, have a greater practical knowledge. Women can identify a yam species by looking at the leaf sheath colour and the presence or absence of thorns. They decide the best time for collecting tubers based on leaf characteristics: they collect tubers either before the leaves are formed or after the leaves become dry. The tubers apparently do not boil properly after the leaves have grown.

Most adult women can recognize various creepers of wild yams. According to one woman from Martshalla village, there are two types of creepers. One type has a darker stem and a darker shorter leaf. The internodes of the young shoot of this creeper are short. The tuber of this creeper is soft and sweet. The other type of creeper has an elongated, lighter coloured leaf, and longer internodes on the shoot with long prickly thorns. The tuber is yellowish and has more fibres and long thick

hairs. This species is locally known as 'fhi-dang jogtang' and is collected only when there are no other species available for collection.

Although wild yam is a life-saving commodity, there are no real institutional or policy measures to protect or conserve it. Everyone is free to harvest tubers in the state forests. However, as they are responsible for collecting the tubers, women have adopted certain rules with regard to their collection on private land. As an example, women do not allow tubers to be harvested from their own land, and it would be a public issue if anyone dishonoured this agreement. While such a restriction ensures the availability of food at times of severe food shortage, it also avoids the digging of pits which are problematic when the land is brought under cultivation. Women restrict people from other villages from collecting the tubers in the forests that lie within the indigenous boundary of the village. Moreover, they restrict cattle grazing from other villages in the forests. To save the young vines, women inform cow herders to be careful not to cut them. Women collectively decide on fines for those who violate these customary rules.

Women avoid felling or wounding trees with yam vines. They consider it inhumane, and even dead trees with vines on them are not cut down. Men are also discouraged from cutting such trees for timber. Those vines in marginal areas that infest huge trees are left as 'mother vines', and most of the women in the village know that these vines are being nurtured as such. These conservation strategies, along with changes in people's lifestyle (e.g., access to more cereal crops and income), have contributed to regeneration and abundant populations of yam vines in the nearby forests. The proper management and harvesting of this resource offers women good potential for a sustainable source of cash income and food for subsistence needs.

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Case Study 2: Women's Leadership in Community Forestry in the Middle Hills of Nepal

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(Cited in "Gender and Biodiversity Management in the Greater Himalayas; Towards Equitable Mountain Development", Edited by Monohara Khadka and Ritu Verma, ICIMOD, 2012)

Rural women in Nepal have been participating in forest protection, development, and use for many years, as their agriculture- and livestock-based livelihoods rely on forests. Women's roles in community-based forest management practices have been widely documented. The ways in which they participate in forest decision making and their important strategies for the conservation of biodiversity and ecologically sensitive areas in the community-managed forest ecosystems are little known. This case study, conducted in Dolakha District, a mid-hills district of the Central Development Region of Nepal, explores the roles, strategies, and knowledge of rural women in biodiversity conservation and management in community forests. The case study surveyed three community forest user groups (CFUGs) in this district, namely, Charthali, Napke Yanmara, and Bhitteri, which have been managing their community forests for more than a decade. All of them are led by a woman chairperson.

Increasing Women's Leadership in Community Forestry Decision-Making

Bishnu Dhakal, District Forest Officer of Dolakha, stated that women make up 35 per cent of the total membership in the executive committees of community forest user groups in Dolakha District, and that the trend has been increasing over the past 5 years. According to Dhakal, more than 50 per cent of total forest users in Dolakha district are women, and they are contributing to conserving 47 per cent of the total forest area in the district through community forestry. This is the second highest out of 74 districts of Nepal which implement community forestry programmes. According to Ratna Sharma, Forest Development Officer of the Nepal Swiss Community Forestry Project (NSCFP), women are taking more leadership roles in community forest user groups these days, and more than 20 per cent of chairpersons are women in groups facilitated directly by the project. He also mentioned that NSCFP has been encouraging the meaningful participation of women in various project activities, including community forest user group governance, pro-poor livelihoods, sustainable forest management, policy influence, and commercialization of forest products.

The Napke Yanmara Community Forest User Group in Dolakha District has an executive committee composed of only women and comprises 166 households, with 341 people managing 152 ha of forest as common property. The group has been an exemplary model for resolving conflicts and contributing to sustainable forest management and biodiversity conservation. According to Suntali Thapa, the chairperson of the group, there were numerous internal conflicts when she was appointed as the chairperson five years ago. She was selected as an alternative in an effort to resolve a conflict that emerged among forest users in the Napke Yanmara village in which two elites competed to make their daughters chairperson. The women's executive committee, with the support of the Dolakha District Federation of Community Forestry Users Nepal, negotiated with all members of the

groups to resolve the conflict. When the elites did not see the situation resolving in their favour, they supported Suntali Thapa.
Kalpana Thami, chairperson of Charthali Community Forest User Group, Bhimeshwor municipality, Ward 4 of Dolakha District, explained women's contributions to biodiversity conservation:

Most of the community forests we have been managing were barren at the time of handing over 10 years ago. We women members of our community forest user group selected mother trees to protect for regenration and prohibited men to cut big trees in our forest. As per our group's rules, each household is responsible to guard the forest at least three times in a month on a rotational basis. We have been suceessful in conserving wild edibles called kafal, guheli, kurilo, ban tarul,siltimur, and lapsi, which were rarely found in the forest 10 years ago. We also have seen a number of wildlife species, particularly rabbit, deer, tiger, wild chicken, and different birds, in our community forest.

For women, working as the chairperson of a community forest user group within the context of Nepal's highly patriarchial and socially unequal culture is not an easy task. However, women's success in taking on responsibility for forest conservation and management in the Dolakha district provides an example of the significant benefits realized from their participation. Women play essential roles that allow them to use their knowledge and experience to develop effective strategies to conserve, manage, and use community forests. As a result of these examples, women are increasingly being recognized as important actors engaged in biodiversity conservation in the Middle Hills of Nepal.

Struggles with and Strategies for Forest Management

As a woman chairperson, Suntali Thapa faced many problems in the early days of her leadership. Two of the most difficult problems were controlling illegal harvesting of forest products by outsiders and reducing uncontrolled harvesting of forest products by members of her community forest user group. For this, she had to work very hard to organize all users to resolve the problems collectively. Among the first things the group did was implement the formation of a small group that patrols the forest regularly. The collective patrolling approach proved to be successful, catching in the first six months 22 people who had entered the forest for illegal harvesting.

According to Thapa, protecting forests against illegal and uncontrolled harvesting was the most difficult task to address in the beginning, but the group succeeded because of the sincere and collective efforts made by all the women involved. Technical and moral support provided by the Federation of Community Forestry Users Nepal and the District Forest Office encouraged the women in the group to actively engage in forest conservation.

Once the members of the group succeeded in controlling illegal harvesting, this women-only community forest user group started to work on forest management measures. They initiated new plantations in degraded forest lands. With technical support from the forest officials, the group divided the forest area into five different sectors in which harvesting of fuelwood and fodder takes place on a rotational basis annually. This practice allowed for the regeneration of plants and reduced harvesting pressure in the forest.

Women members of community forest user groups encourage forest users to plant trees on farms, and promote agroforestry approaches so that fuelwood and fodder can also be obtained from private lands. Because women are the primary users of these forests, women-led groups are more sensitive to the ecological fragility of the state of the forest, allowing them to identify and conserve ecologically sensitive areas. They have identified conservation areas within the community forests, such as springs, areas prone to landslides and soil erosion, wildlife habitats, and religious places, and have declared them community-protected areas. an area of 50 m radius around all water sources has been designated as a conservation zone. As a result, users are strictly prohibited from collecting even dead wood or fallen trees from these protected areas.

Guidelines have been issued that users must take care of seedlings and non-timber forest products while collecting fodder and grasses from the forest. Once a year, the forest is opened for thinning and pruning activities. Forest products produced from these activities are then distributed among members of the community forest user group.

The group distributes fuelwood on the basis of users' demands or by equal shares. The group has adopted a 'social equity' approach, providing fuelwood free of cost for poor households and the victims of natural disasters. All user households are free to collect dead wood, fallen branches, and fodder on certain days of the year as decided by the executive committee.

The chairperson of the Charthali Community Forest User Group feels proud of doing something for the poorest of the poor members of her group. She reported that 16 out of 27 households are identified as economically poor, and they have been allocated two *ropanis* (0.1 ha) of forest land for undertaking income-generating activities like the cultivation of cash crops and fodder trees. These poor households have been trained in the cultivation of such cash crops as broom grass, napier, argeli, lapsi, and bamboo. The poorest user households have also produced raw materials, such as leaf litter and various weeds in their allocated forest lands to sell to a nearby briquette factory. They are able to earn about NPR 700–2,500 (USD 9–32) in one year from this activity.

Gender Differential Interests, Knowledge, and Responsibilities

While women are more knowledgeable about fuelwood, fodder, and wild edibles, men have more knowledge of the production and marketing of timber. Women forest users are interested in managing forests for firewood, fodder, and the conservation of water springs. In contrast, men are more interested in timber production and high-value products (e.g., essential oil) because of the economic value associated with them and the mobility needed for trading timber and essential oil.

Although men also are involved in forest resource management, women have the primary responsibility for the promotion and maintenance of forest resources that are critical to their livelihoods and subsistence needs. While women have managed forests for meeting their immediate requirements such as obtaining fuelwood, fodder,

cut grass, leaf litter, medicinal plants, herbs, and wild edibles, they also recognize the importance of this role for gaining political benefits, such as participation in the executive committee of community forest user groups.

Fuelwood, a primary resource extracted from the forest upon which communities are dependent, is used for both cooking and heating purposes. In some cases, fuelwood is also used as a source of income. Women know about the species that are fast growing and that produce less smoke while burning. Women's direct experience in the forest and home make them more sensitive to decisions regarding the time and duration that the forest is open for collecting. They open community forests from October to December each year for fuelwood collection.

Fodder and grasses are important forest resources for rural communities, as their livelihoods also heavily depend on livestock. This is even more so in highland areas where livestock are the major component of local livelihoods. Traditionally, fodder plantation and protection, collection, and harvesting are the responsibilities of women. Women community forest user group members encourage forest users to plant trees on farms for fuelwood and fodder, to conserve the forest.

After the introduction of the community forestry programme, grazing practices in community forests have been reduced. Collecting forage and fodder is now an even more difficult task for women because of the prohibition of grazing in community forests. This situation led them to adopt community forest management measures that produce more fodder and forage and has led them to become more involved with forest-related decision making than men.

Both men and women users in all the three community forest user groups are trained in fodder harvesting techniques to promote regeneration. They protect fodder seedlings and saplings while harvesting tree fodder and grasses. This practice helps to conserve and maintain biodiversity.

Women know when to collect forage and fodder and which tree species are good for fodder. They are aware of fodder species that are more nutritious for lactating animals, such as 'dudhilo'. They also know more than men about the fodder species available in community forests and the surrounding area. Some of the fodder species available in their forests are called khasru, silinge, lise, jhigani, chilaune, phalat, katus, painyu, dudhilo, and kaulo. The production, collection and utilization of fodder and grasses have two interlinked purposes: improving the livelihoods of rural households by increasing their access to forest products, and regulating ecosystem services by improving soil fertility. Sustainable management of fodder and grasses also helps improve livestock productivity, which eventually contributes to improved nutrition and income for rural farmers.

Gender-Specific Knowledge of Non-Timber Forest Products and Strategies for Biodiversity Conservation

After controlling the illegal harvesting of forest products and their continuous efforts to protect the forest against fire and overharvesting, women are now very happy not only to have access to fuelwood, fodder, and forage but now also have abundant non-timber forest products (chiraita, argeli, wintergreen, orchid, nagbeli, and wild edibles) in their community forests. Women are more familiar with the importance

and use of wild edibles such as fruits, yams, and leaves than their male counterparts. Women have practical knowledge about the appropriate location, season, and time for harvesting. They know which fruits and vegetables are available in which part of the community forests. They also know the best time to harvest the various plants, for example, early in the morning, after sunset in the evening, after rain, and so on. Women's involvement in the collection and use of these wild edibles has provided them with a detailed knowledge about the various non-timber forest products. Women conserve wild edibles through applying local techniques for multiplication such as leaving a certain number of plants to protect mother plants, rhizomes, and stems. Women are stricter in applying protection rules because they prefer and generally work in groups and with more transparency.

More Contributions but Limited Access to Information: A Gender Issue

As a result of their implementation and contribution to sustainable forest management, women are now able to see significant changes in forest cover, including species abundance and introduction of new species, which allow for sufficient access of all forest user households to fuelwood, grass, and fodder. Suntali Thapa expressed confidently that "women are equally as good in managing forest resources and biodiversity conservation as our men fellows". However, women's lack of awareness on forest policies is apparent. Women were generally less aware of the legal provisions associated with community forestry and such provisions are usually explained to them by men. Consequently, there is still a need for a focus on the quality of women's participation in the people-centred forestry process, and whether the greater roles played by women in forest management without being familiar with the policy framework, is a solution to the challenge of improving women's social and economic opportunities in forestry.