CHAPTER 4

Forest foods for tribals in selected regions of India and their sustainability

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4.1 Introduction

Almost 250 million people, a majority from indigenous and tribal regions rely on forest resources (FAO, 2015). Different from the urban or rural population, forest-dependent indigenous people forage forests to collect edible foods. In many hunting and gathering tribal communities, foraging wild forest food has been a traditional practice. This is true for tribal communities currently living in various countries, particularly in the global south. For the urban population, the foods for consumption are products that are purchased from the supermarkets. In contrast, tribal communities buy only a few food products and cultivate some of the food, while most of the food is obtained from foraging forests and natural resources (Bose, 2019).

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Many studies have highlighted the significance of a wide variety of wild foods from forest and other natural resources and its importance in the diets of local communities (Paumgarten and Shackleton, 2011; Anglesen et al., 2014; IFPRI, 2014). The challenge, however, is that little has been done to protect the rapidly changing food and nutritional security that is affected due to market demand, deforestation, land-use change, or lack of tenure, access, and control over forest food resources (Sayer et al., 2013; Vira et al., 2015). This chapter poses two questions: (1) How forest "wild" food demand in urban areas is affecting traditional food and nutrition security of tribals? (2) How is diet quality influenced by cultural mainstreaming and sustainability aspects? One of the main arguments is that with the increase in market demand for traditional forest wild food, the nutritional quality of diets for local forest-dwelling tribal communities is reduced.

The precise meaning of "forest food" is open to different interpretations. For the purpose of this chapter, the term wild refers to untamed objects that exist autonomously from the human impact that is derived mainly from wilderness areas. In other words, forest foods are not domesticated by humans but derived from wild species that occur in self-maintaining populations in natural or seminatural ecosystems. Censkowsky et al. (2007) refer to wild forest products to the practice as gathering a noncultivated native or naturalized resource from its natural habitat. The distinction is challenging given that some products that are collected from nature might have been subject to manipulation, or wild products in one country might be cultivated in another (Censkowsky, 2007; Wiersum, 2017). Pimentel et al. (1997) estimate that about US$ 90 billion in nontimber forest products (NTFPs) are harvested each year.

Lack of forest tenure and governance represents a risk to forest dwellers, and it is thus necessary to identify its impact on indigenous people with different food cultural acceptability and nutrition security (Bose, 2019). This chapter looks into the food and nutrition security aspect of traditional foods in tribal India. The chapter starts with a description of the study population and provides empirical evidence and then moves step by step toward a sustainable future of traditional food and nutrition.

4.2 Study population and methodology

The study specifically highlights the plights of a lesser-known indigenous hunting-gathering tribe, particularly vulnerable tribal groups (PVTGs). During the early 1970s, the Government of India created a separate category of so-called less developed tribal groups as primitive tribal groups and it was renamed to PVTGs due to debate about the word "primitive." Each of the 75 PVTGs is heterogenous, a few similar characteristics include physical isolation often living in remote forest areas, the absence of written language, and minimalistic lifestyle.

The four PVTGs case studies that have been identified for the study area represent a diversity of population and landscapes, each from Central, East, West, and South India. Detailed qualitative interviews were conducted during 2016 and 2017 by the

author, who was accompanied by a translator and a camera person. The investigators spent a minimum of 2 weeks with each tribe, including walking with them in their forest areas. Two complementary methods were used—semistructured interviews and maintenance of diaries for each community. This collection diary gave a rough estimate of the diversity of wild plants and animals including birds and aquatic habitats.

Participant observations helped in understanding the pattern of food consumption, type of food, and method of consumption (raw, preserved, cooked, other techniques). The narration about traditional food is recorded from men, women, the elderly, and youths of the tribal villages in their local languages. A qualitative manual data analysis was used, given that data collection was largely qualitative in content.

4.3 Findings

All the four tribal groups are traditional hunter-gatherers and have continued the tradition of foraging forest foods despite several restrictions from the Forest Department of Government of India. The findings are presented in a briefcase study format.

4.3.1 Baigas from Chhattisgarh, Central India

The Baigas live inside the Tiger Reserve project in the Achanakmar Wildlife Sanctuary of Chhattisgarh in Central India. One of the important plants commonly accessed by Baigas is drumstick (*Moringa oleifera*). Due to lack of electricity and minimum kitchen equipment, the leaves, flowers, and fresh pods are sun dried and stored and customarily used for cooking. Drought resistant, hardy, and nutritious traditional coarse millets such as wild rice, finger millet (*Eleusine coracana*), and "*Kodo*" millet (*Paspalum scrobiculatum*) form the customary staple diet. They boil it with wild tubers and fruits and consume it. Due to an increase in demand for *kodo*, pearl (*Pennisatum glaucum*), and finger millet as superfoods in the market, Baigas are now trading organic coarse millets for cash or barter them for polished rice.

NTFPs such as *bholim* are used as medicine while weaver ants (*Oecophylla smaragdina*) are enjoyed as a snack food. During the monsoon, Baiga men collect a special type of mushroom, known as "*Pihiri*" (variety of *Phallus rubicundus*) from the forest, which is now recognized as a superfood. An NGO staff explained, "Baigas are selling these days rare and exotic wild food, *Pihiri*, to barter for soap and cooking oil, or even *enouwa* (alcohol). Outsiders are recognizing the forest food's value while Baigas lack the information that they are sacrificing their best nutritional diet for nothing." Moreover, Baigas are in the brink of facing displacement from the Tiger Reserve wherein they would not only lose their traditional land rights but access to traditional food and nutrition from the commons.

4.3.2 Kurumbas from Nilgiris, Tamil Nadu, South India

Traditionally hunting and gathering communities, the Kurumbas of this study are a resettled community after relocation from reserved to nonreserved forest areas. Two

households interviewed practice cash crops, including coffee, pepper, turmeric, and ginger. All the study households living in the forest area have claimed the individual tenure rights from the Forest Department. The respondents mentioned that they are dependent on the forest. Wild honey was one of the key NTFPs for livelihood. Women respondents observed that they are increasingly shifting toward rice as compared to their traditional staple diet of finger millet. The women explained, "This is different from our traditional activities of collecting forest foods. We are learning from the other non-*adivasis* (non-tribal) to prosper and eat properly cooked food. This adaptation is good to be recognized as one of the mainstream population."

The key issue in the focus group discussion was the change in lifestyle from hunting and gathering (a cash-free system) to a small farm with a focus on cash and land as property. Despite restrictions imposed by government officials, the Kurumbas occasionally hunt birds and other small wild animals from the forests for food. Often, they share wild foods among kinfolk, thereby distributing the responsibility collectively.

4.3.3 Paudi Bhuyan from Odisha, East India

An elderly Paudi Bhuyan woman, explained: "We do not have a fixed meal consumption concept such as breakfast, lunch, and dinner. Rather the clans ate collectively as and when foods were available. Nowadays, after we've been settled, we began learning the concept of individual households, mid-day meals for children and a slow transition towards a mainstream diet due to exposure as wage labourers." Many customary foods disappear, according to a youth, due to changes in work and lifestyle, and lack of access to forest resources.

According to Paudi Bhuyan men, wild meat and vegetables such as yam when prepared by simple techniques of steaming, boiling, fermenting, or roasting on open wood fires provide sufficient nutrition for people to remain healthy and satisfied with the taste. The respondents attributed health issues to lack of access to their customary diet of diverse seasonal wild foods, particularly medicinal herbs that previously were accessible from the forest. In a focus group discussion, they voiced: "Our young generation feels stigmatized because of our foraging culture, mainly for wild small animals such as rabbits and pigs. We no longer feel proud of our customary food habits, even though that suited our health much better than the urban-based carbohydrate-rich rice and wheat food we eat now."

4.3.4 Katkaris, dry deciduous forests of Maharashtra, West India

A majority of Katkaris depend on seasonal forest food, which according to them is not only delicious but also healthy due to medicinal properties (see Table 4.1). "We wake up in the morning and have millet porridge with some dried wild meat. It keeps us going for all day long." They have been traditionally drying the Moringa leaves and

Table 4.1 Nontimber forest produce used by Indian tribal population and associated challenges.

PVTGs	Forest food—sustainably collected by the tribals	Superfood demand	Risks related to superfood
Baigas	Wild rice, finger and kodo millet, honey, mahua (*Madhuca longiflora*), fowl, weaver ants, custard apple, *bholim*, and wild mushroom	Finger and kodo millet. *Bholim* and weaver ants are of rare medicinal value making it one of the most expensive forest foods	Baigas barter nutritious organic finger and kodo millet rich in mineral and vitamins for rice and maize
Paudi Bhuyans	Bamboo shoots, Chenhek (*Garcinia cowa*), wild pigs, insects, rabbit, dog, fish, crab, highland rice, fowl, lemons, wild edible leafy vegetables such as ai-du (*Amomum dealbatum*)	Bamboo shoots—are regarded as high in phytonutrients and help to get phenolic acids into the human body. It is good for weight loss due to high fiber and low energy content	Taking away of bamboo shoots by urban trades, thereby causing environmental degradation and depriving Paudi Bhuyans of their much-needed forest produce
Katkaris	Pearl millet, moringa, guava, cow pea, fowl, and other forest foods include *vilayati imli* (*Pithecellobium dulce*), and jamun fruit (*Syzygium cumini*)	Moringa and jamun are regarded as high medicinal value for diabetes, antifungal, antiviral, antidepressant, and antiinflammatory properties	Commercial exploitation of moringa leaves and jamun fruits. Katkaris are left without these nutritious leaves and fruits
Kurumbas	Honey, birds and small wild animals, banana flowers, jackfruit dried seeds	Honey—pure organic wild forest honey with medicinal value	Kurumbas are pushed to barter for nonnutritious food

use it as an herb in our food every day. With the increase in awareness among the urban population, the demand for Moringa leaves has increased in recent years making it a "marketable" product. Katkaris, when in need of money, sell the moringa flowers, drumstick, and leaves in the market.

Jamun fruits are collected by Katkaris, and they have various techniques for preserving using natural methods due to lack of electricity or piped gas for cooking. "Our children used to drink jamun juice that we have made it traditionally including raw mango juice, but these days aerated cold drinks are influencing our children's food habits," says a Katkari mother of two adolescent children.

4.4 Discussion

4.4.1 Traditional food and nutrition of particularly vulnerable tribal groups

The PVTGs for generations have developed techniques that preserve food and nutrition from forests. Forest "wild" food discussed in this chapter from the perspective of PVTGs shows that their so-called "primitive" food is becoming a modern culture (Bose, 2016).

4.4.1.1 Farming techniques and land use

All the PVTGs mentioned in this chapter are 80% dependent only on forest food different from rural communities. A few of them use subsidized food grains and cultivate small family farms less than half hectares of forestland. They use a traditional manual technique of throwing the seeds on the cleared field rather than sowing and without using any chemicals. Diversity of crops in farming helps them to cope with climate variability impact but also helps them to have diversity on their plates. Swidden cultivation or "*jhum*" as it is known locally is a way to manage the biodiversity, wherein they cut and burn a small patch of forest and farm for 5–7 years before leaving the land to regenerate. The vegetables and fruits grown in such farms demand no or fewer pesticides and fertilizers. Therefore the food safety and nutrition component due to organic products remain uncompromised. Edible insects, such as spiders and grasshoppers among others, are carefully roasted in the sand and/or dried in sun using rock salt to ensure the nutritive value is retained. Often, children are encouraged to eat these edible insects as snacks.

4.4.1.2 Eating habits

Different from modern-day western notions, many tribal communities in South Asia and elsewhere in the world have strong community sharing and cooking traditions. For all the PVTGs, the sense of food habits is closely interlinked to sharing foods with their neighbors and kinships. Studies have shown that many traditional diets were rich sources of micronutrients such as calcium, iron, vitamin A (as β-carotene), and folate (Ghosh-Jerath et al., 2015). Moreover, the PVTGs being gatherers consumed only when they were hungry, and community eating of hunting food, such as wild pig, for example, helped them to use the resources of cooking wise in addition to sharing the burden and risk of food insecurity. Different from rural settings of India, tribal men and women eat and drink equally without any gender-biased or taboo associated with eating habits.

4.4.1.3 Cooking techniques

Paudi Bhuyan tribe, for example, among other PVTGs commonly use fermentation technique. They believe that bamboo shoots, which are collected from the forest,

when fermented produce a sour bitter taste making it rich in probiotic properties good for the human body (Jeyaram et al., 2010). Similarly, Kurumbas ferment millets and wild rice to prepare various steamed items without any use of fat or oil. The use of traditional stone to grind and store the fermented millets produces a rich bacterial population beneficial for digestion and maintenance of body temperature. Given that most tribal communities lack basic kitchen utensils and depend on wood fuel for cooking, the utility of resources is maximized. Baiga tribe uses smoking to cook a particular type of wild small animal that is hunted once a year and shared as a community meal with high protein content.

4.4.1.4 Preservation techniques

Food preservation techniques in the PVTGs though may differ based on the cultural and ethnic diversity of the tribe, but more or less they all use traditional techniques such as drying, fermenting, water-covering, cooling, freezing, and salting. Sweet is rarely or never used except those who have access to honey or other forms of the traditional wild sweetening agent. Mahua flowers are brewed to make alcohol using a fermenting traditional herb while the seeds are processed manually to extract oil for cooking purposes. The traditional knowledge of preservation techniques has dual emphasis, as this study finds out, one that of food safety to ensure food is hygienic and secondly to maintain the nutritional components without compromising on taste.

4.4.1.5 Game meat and fish

The rest of India has a different food culture compared to the traditional food culture of the PVTGs. It is well known that fish plays a big role in providing ω-3 fatty acids that help in improving human health, particularly because of high protein and fat content. The PVTGs with free access to natural resources and those who have not yet been displaced (different from Baiga PVTGs mentioned in this chapter) also have better access to eat game meat. This food culture makes them different from the rest of India. The food security provisions of subsidized grains (Reji, 2013) fail to understand that a higher protein intake diet of PVTGs is not suitable for only grain, often genetically modified, imported food provided by the government under the provisions of the Right to Food Act (Bose and van der Meulen, 2014).

4.4.2 Modern transition in food and culture

A modern diet such as rice, wheat, lentils, and sugar that are provided as subsidized food reduces forest food diversity. This transition has not only the direct impact on indigenous food system knowledge but also on the health of the next generation that mainly lives on carbohydrate-rich supplies from government shops. For PVTGs, unlike mainland India, forest and food have been an integral part of their livelihood and food security. The risk of modern transition in food and culture relates to

pesticides, chemicals, and salt and sugar, and it leads to a high risk of diabetes, which these communities have never been exposed earlier.

4.4.3 Future of traditional food for tribal communities

There is a need that the traditional food system is documented to understand the rapid decline in biodiversity and nutrient-based diet. Gathering, storing, preserving, and cooking food without losing its nutrients are part and parcel of indigenous food systems. The future is in understanding that eating a healthy diet can be done sustainably without compromising on local ecosystems as shown by this study's indigenous hunting-gathering communities. One of the important aspects that we see in the PVTGs is the wisdom of eating high protein and mineral and micronutrient-rich forest food such as millets to reduce cholesterol.

4.5 Conclusion

This empirical research on rarely studied PVTGs highlighted three categories that impact forest food, particularly women and children: (1) commercialization of forest foods as "superfood" due to its high nutrition value, (2) cultural acceptability wherein tribal people lose out their traditional food due to mainstreaming; and (3) challenges sustainability due to loss of the forest resources. The author argues that food security studies in vulnerable areas with marginal populations demanding a shift in outlook from a primary preoccupation with staple food grains such as rice and wheat (Pingali, 2015; Bose, 2019) toward more food and nutrition value-based traditional food rich in micronutrients and vitamins are needed in tribal India.

The institutions and policies impacting forest food systems in India, such as forest, land, agriculture, food security, social policies, and market among others, have developed rather in an ad hoc way over the past 70 years. As a result, institutional pluralism and proliferation of policies have multiplied in inefficient ways, creating contradictions, gaps, and inconsistencies within and between them. To better understand how local indigenous and tribal communities manage their forest landscapes for sustaining their traditional healthy diet, the author recommends more in-depth research on "traditional food of indigenous peoples and its nutritional benefits."

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