

## Wild Edible Plants and NTFPs Used by the Tribes and Other Forest Dwellers: A Study of Tadoba Andhari Tiger Reserve, Maharashtra.

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**Abstract:** NTFPs has played a significant role in human history across the globe. Millions of rural especially forest dwellers in entire world uses a variety of non-timber forest products (NTFPs) as an integral part of their livelihood culture. In this research article an attempt has been made to understand the contribution of NTFPs in the tribals and other forest dweller's livelihood and also to acknowledge their traditional ecological knowledge (TEK) in the villages of Tadoba Tiger Reserve (TATR), Maharashtra. TATR has very rich biodiversity that supports several wild edible resources and other NTFPs. It is found out that there were 36 major NTFPs and wild edible plants used very frequently on the daily basis revealing that the tribals and other forest dweller's food culture was dominated by the NTFPs. The present article also articulates the idea of documentation and recognition of traditional ecological knowledge (TEK) which has been prevalent in these communities and passing through generation to generation.

**Key Words:** NTFPs, Wild Edible Plants, Tadoba Tiger Reserve, Tribals, Forest habitats, Food Security.

### 1. INTRODUCTION:

Since time immemorial human beings have been dependent on nature for food and shelter for their survival. Nature has always provided bountiful food resources in the form of leaves, roots, fruits and stems in the forested areas. Wherever and whenever in the history of the earth, forests and humans occupied the space beside each other, it is very much expected and cleared that NTFPs has had been of vital importance to the livelihoods of the human population of any region (Mclain and Emery, 2001). NTFPs includes the varieties of products that have been extracted from the jungles across the world for centuries. These includes fuel, fodder, rattans, fibre, flowers, fruits, edible leaves and roots, medicinal plants, gums, resins wild honey for their own consumption and to sell in their locality or to the nearby markets/haats etc., and variety of birds, wild animals, fish and insects used as food.

Non-timber forest products throughout the world have great importance in order to provide the food resources and sources of income with the help of forest products such as varieties of fruits, flowers, leaves, grass for the brooms, nuts and other medicinal and commercial NTFPs (Shackleton et al., 2011). It is estimated around 1.4-1.6 billion people across the globe, are somehow dependent on NTFPs (FAO, 2001). The NTFPs and NTFPs based work/occupation are of vital importance for the household of forested region, it is a fact that these NTFPs are a great source of their food security and a safety net for the rural poor people (Bryon and Arnold, 1999).

### 2. LITERATURE REVIEW:

According to a study flora has always occupy a very important place in the folk tradition of the Mediterranean region (Hadjichambis et al., 2008). It is inevitable to include the plants as a part of the food culture and livelihood culture across the globe. Approximately there are 30,000 edible plants are known by humankind. However, only a handful crops fulfil the 95% of man's food needs (Plotkin, 1988; Ten Kate & Laird, 1999). There are huge possibility and prospects in relation with the wild edible plants and food security at global level (FAO, 1988). NTFPs from the perspective of food security is very important; for instance, the people of Eritrea acknowledged that the NTFPs are consumed mostly for the household purpose and it is the most beneficial thing that has been provided by the ecosystem of riverine forests (Araiya, 2005). Tribals people and other forest dwellers are mostly getting nutrition in order to fulfil their intake of different vitamins and supplements from the wild foods (Grosskinsky,2000), it also has nothing to do with their purchasing capacity since it is widely available in their locality. In other studies, also it was found out that forest dwellers of Thailand get ten times more NTFPs from the collection of wild foods from the forested landscape as compare to their purchasing power (Delang, 2006). There are some major Wild foods which are

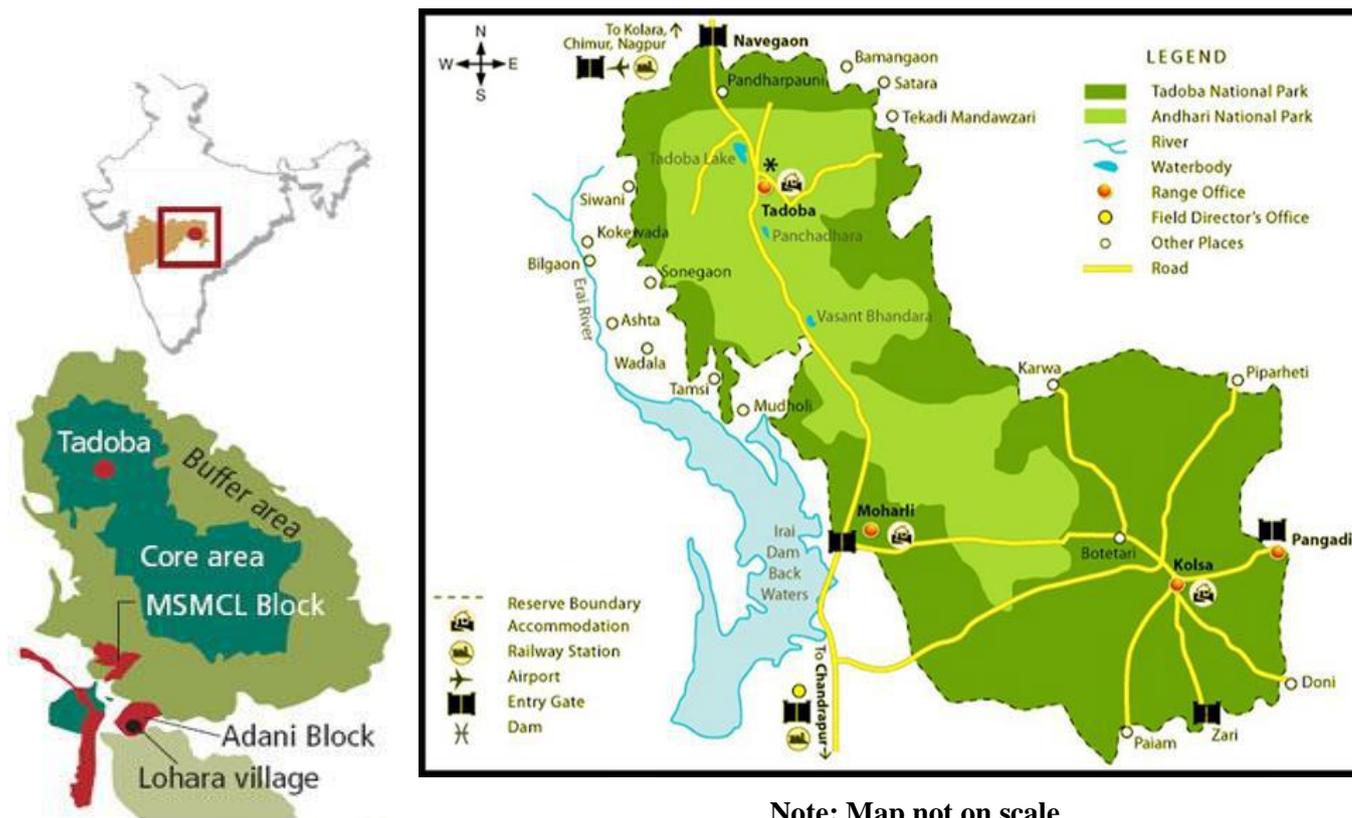
an integral part of the diet of tribals and other forest dwellers in normal time, but they used to consume some other species of flora also especially in distress time such as drought and post flood situation (Kaimowitz, 2003).

NTFPs and other wild edible plants become more important safety net for the food security wherever and whenever there is a dry region and when there is a crop failure then these NTFPs and wild edible plants plays the significant role to provide the food resources (Addis et al, 2005). For instance, Sahel region (The Sahel is the ecoclimatic and biogeographic realm of transition in Africa between the Sahara to the north and the Sudanian savanna to the south), where people use the drought resistant floral species of dry forest that may only use to consumed in the severe drought situation (Guinand and Lemessa, 2001). There are many species of wild flora which is being consumed as food (Haridasan et al., 1995). There are many studies on the wild edible plants and NTFPs in Maharashtra's parts such as Nasik, Amravari, Buldhana, Kolhapur, Jawhar were conducted by Vartak (1959); Vartak and Kulkarni (1987); Kulkarni and Kumbhoikar (1992), Patil and Patil (2000), Bhogaonkar et al., (2010), Kshirsagar et al., (2012), Mahadkar and Jadhav (2013), Joshi et al., (2013), Zode et al. (2016).

There are plenty of edible plants and non-timber forest products that is being used by the tribal people across the Globe. Non-timber forest products have always played a crucial role to secure the food security to the people across the globe, from temperate region to tropical region. Though the Non-timber forest products and other wild edible vegetables in the form of leaves, roots, fruits and stems has always been used for the entire human race from the beginning of all the civilization on the earth and the nature of uses of non-timber forest products (NTFPs) have changed from pre-historic age to post-modern world like from raw consumption to processed one. However, there are some people who are dependent on the NTFPs from forests are tribals/indigenous people across the globe. Tribals peoples ("a human social group which mainly their habitat is in forested landscape and surviving by hunting, fishing, gathering NTFPs and shifting cultivation. They have developed their own faith and practices over a long period of time") are still directly dependent on the forest resources for their food security and livelihoods across the earth planet. Nature is an integral part of the tribals livelihood. They bring many NTFPs and edible plants from the forest to fulfil their daily consumption. The knowledge of edible and toxic plants they have transferred through generations to generations through oral narratives and this is known as "Traditional Ecological Knowledge (TEK)". Since the tribals possess the great TEKs and with the help of this it has become possible to explore the varieties of edible plants and NTFPs. On the basis of such trusted traditional ecological knowledge, some other food resources can be listed and documented for the purpose of food security for the entire world. Several attempts have been made to document the edible plants and NTFPs around the world. The present research paper is an attempt to understand and the documentation of edible plants and NTFPs in the vicinity of Tadoba Tiger Reserve, Maharashtra.

## 2.1. STUDY AREA:

Tadoba Andhari Tiger Reserve (TATR) is located in Chandrapur district of Maharashtra and is around 28 Kms. from the district headquarters of Chandrapur. It is one of the renowned Tiger Reserves in India. Chandrapur is one of the eastern most districts of Maharashtra. It is Maharashtra's oldest and largest National Park, the "Tadoba National Park", also known as the "Tadoba Andhari Tiger Reserve" is one of India's 47 project tiger reserves existing in India. is approximately 150 km from Nagpur city. The total area of the tiger reserve is 1,727 Sq.km, which includes the Tadoba National Park, created in the year 1955. The Andhari Wildlife Sanctuary was formed in the year 1986 and was amalgamated with the park in 1995 to establish the present Tadoba Andheri Tiger Reserve. The word 'Tadoba' is the name of the God "Tadoba" or "Taru", praised by the tribal people who live in the dense forests of the Tadoba and Andhari region, whereas "Andhari" is derived from name of Andhari River that flows in this area. Tadoba-Andhari Tiger Reserve was declared in 1995. The Tadoba Andhari Tiger Reserve (Forest Department of Maharashtra) is in the eastern part of the central Indian state of Maharashtra. Tadoba Andhari Tiger Reserve consists of the Core and Buffer area. The total area of the Core is 625.40 km<sup>2</sup> the area of the Buffer is 1101.77 km<sup>2</sup>. Out of which the Reserve Forest area is 577.96 km<sup>2</sup>, 32.51 km<sup>2</sup> Protected Forest and 14.93 km<sup>2</sup> other areas. The Reserve contains some of the best forest tracts and is endowed with rich biodiversity. There were six villages in the core area of TATR out of six 5 have been relocated outside the TATR and there are 79 villages in the buffer zone of TATR. The Tadoba Tiger Reserve area is dominated by the tribals. Gond is the major tribe of this area especially in core areas and they have distinct socio-cultural setting and lives in dense forested region of TATR. Gonds are primarily farmers, agricultural labourers and NTFPs gatherers from nearby forested region, cultivated and uncultivated lands. The tribals collects the various plants, roots, fruits and other NTFPs which was supplementing for the daily diets and also some NTFPs were the sources of their income.



Note: Map not on scale  
 Fig. 1: Study Area (Tadoba Andhari Tiger Reserve, Maharashtra)

### 3. MATERIALS AND METHODS :

The current study was conducted during the year of 2018-2019. The objective of the study is to explore the wild edible plants and NTFPs used by tribals as fuel, food and fodder in and around the TATR. Data collection was carried out by using semi-structured questionnaire, Focus Group Discussions (FGDs) and Key Informants Interviews (KIIs). Simple Random Sampling techniques was used to select the household respondents from the village. for the purpose of sampling Simple random sampling technique was used. The elderly people were given priority to impart their valuable traditional ecological knowledge (TEK) that helped to get the local name of the edible plants and other NTFPs. In addition to this, some of the edible plants were collected from field that has been confirmed and identified by the elderly people of the villages such as Botezhari, Kolsa, Jamni and Navegaon (Ramdegi) from the core areas and Wadala village from the buffer zone of TATR. Multiple-rounds of conversation have been done with the tribals of different villages of TATR landscape to know more about the different edible plants and NTFPs, the uses of different parts of edible plants and NTFPs and also about the food preparations.

### 4. RESULTS AND DISCUSSIONS:

Non-Timber Forest Products (NTFPs) contributes all the human race especially the tribals in many ways like it contributes to their livelihood, welfare of the human settlements living in and around the forested landscape, providing them food, medicines and other useful materials for their daily uses. It is also a fact that it provides employment and direct source of income to the tribes and other forest dwellers across the world especially to the third-world countries. The present study is based on the empirical data from the four selected villages of Tadoba-Andhari Tiger Reserve (TATR), Chandrapur, Maharashtra. The study reveals that there were 36 major NTFPs (see the Table 1) used very frequently by the forest dwellers of the vicinity of TATR, Chandrapur.

Table 1: Major NTFPs and Edible Plants Species in TATR landscape

	Botanical name	Family	Vernacular Name	Type	Availability	Part Used
1	Madhuca longifolia	Sapotaceous	Mahua	Tree	Jan-April	Flower (Fresh/Dried)

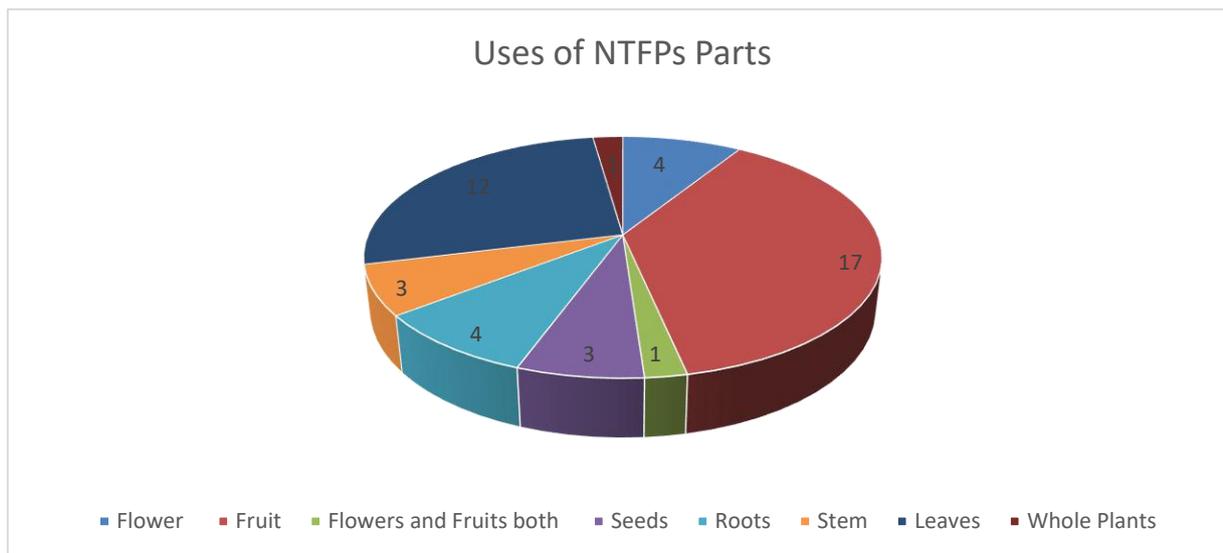
2	Diospyros melanoxylon	Ebenaceae	Temur	Tree	May-June	Ripen fruit (Fresh and dried)
3	Tamarindus indica	Fabaceae	Chinch	Tree	January-April	Young leaves/fruit/flowers
4	Bambusa vulgaris	Poaceae	Bamboo	Shrubs	TOY	stem
5	Limonia acidissima	Rutaceae	Kavat	Tree	August	Fruit, Leaves, stem Bark
6	Aegle marmelos	Rutaceae	Bel	Tree	March to June	Leaves, Fruit
7	Buchanania lanzan	Anacardiaceae	Charoli	Tree	Sept-Dec	Leaves, Seed, Stem bark, Fruit
8	Emblica officinalis	Euphorbiaceae	Amla	Tree	Oct-Feb	Fruits, Leaves
9	Butea monosperma	Fabaceae	Palash	Tree	Feb-April	Leaves, Flower
10	Anogeissus latifolia	Combretaceae	Dink/ edible gum	Tree	Dec- March	Dried eaten raw, in sweet preparations
11	Annona squamosa	Annonaceae	Sitafal	Tree	April-Aug	Ripe fruit, Leaves
12	Pithecellobium dulce	Mimosaceae	Jungle Jalebi/ Chichbilai	Tree	Jan-April	Fruit
13	Syzygium cumunii	Myrtaceae	Jamun	Tree	May-July	Fruit
14	Ficus racemosa	Moraceae	Umber	Tree	Sept-Oct	Fruit
15	Mangifera Indica	Anacardiaceae	Aam	Tree	Jan-May	Fruit
16	Ziziphus mauritiana	Rhamnaceae	Ber	Shrubs	Jan-March	Fruit
17	Sesbania grandiflora	Fabaceae	Heti ful	Shrubs	Nov-Jan	Flower
18	Basella alba	Basellaceae	Ceylone Spinach	Climber	TOY	Leaves
19	Amaranthus spinosus	Amaranthaceae	Math Bhaji	Herb	TOY	Leaves
20	Dentella repens	Rubiaceae	Kadu Sabji	Herb	June- Feb	Leaves
21	Dendrocalamus strictus	Grasses	Bambooshoot	Herb	TOY	Stem
22	Colocasia esculenta	Araceae	Dhopa	Herb	March-July	Corm, petiole, Roots
23	Ammannia baccifera	Lythraceae	Dhan Bhaji	Herb	Rainy Season	Young leaves
24	Andrographis paniculata	Acanthaceae	Bhuineem	Herb	TOY	Leaves, Root
25	Canavalia gladiata	Fabaceae	Chemmakaya	Climber	Oct-March	Green fruit

26	Ziziphus oenoplia	Rhamnaceae	Yeroni	Shrubs	Nov-Dec	Ripe Fruit
27	Seed	Trapaceae	Shingada	Shrubs	Jul-Aug	Seed
28	Amorphophallus campanulatus	Arums	Suran	Shrubs	Oct-Nov	Tuber/Root
29	Momordica dioica	Cucurbitaceae	Katwal	Climbers	July-Aug	Fruits
30	Coccinia grandis	Cucurbitaceae	Jungli Kundru	Climbers	TOY	Fruits
31	Ipomoea aquatica	Convolvulaceae	Pan Bhaji	Shrubs	TOY	Leaves
32	Oryza rufipogon	Poaceae	Dev Bhat	Wild cereals	July-Oct	Seed
33	Agaricus bisporus	Agaricaceae	Mushroom	Fungus	Sept-Oct	Whole plant
34	Terminalia chebula	Combretaceae	Hirda	Tree	Nov-March	Fruits
35	Terminalia bellirica	Combretaceae	Beheda	Tree	Nov-March	Fruits
36	Tacca leontopetaloides	Taccaceae	Dev Kanda	Shrubs	TOY	Root

**Note: TOY- Throughout Year**

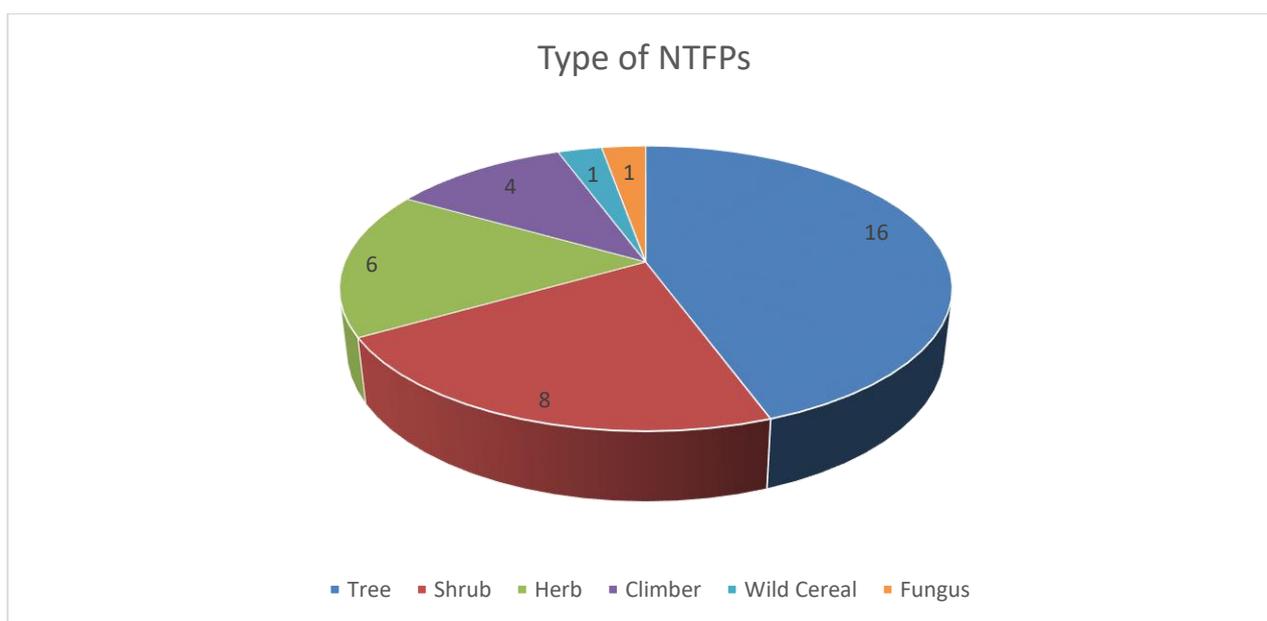
The tribals of Tadoba Andhari Tiger Reserve (TATR) especially from Botezhari, Kolsa, Jamni and Navegaon (Earlier Ramdegi) were almost dependent on the verities of NTFP from their surrounding forested landscape. It includes leafy plants, roots, stems, fruits and some of the shrubs that were used for medicinal purposes as well. Mainly 36 plants were found as NTFPs from the selected villages which were the most and frequently consumed in for their daily food requirements. The angiosperms play a major contribution as NTFPs collected and gathered by tribals of selected region.

The analysis of the data of NTFPs from the particular habitat shows that out of 36 species 16 are trees, 8 shrubs, 6 herbs, 4 climbers vegetable species, 1 Wild grain and 1 fungus. The Data reveals that the parts of trees are the most used than the others. The present research also throws some light on the rich biodiversity of mid forested landscape where there is a kind of biodiversity hot-spot. Three villages namely Botezhari, Kolsa and Jamni were located in middle of the TATR, where there were plenty of NTFPs be it useful trees, leaves or other species of flora. The data also shows the level of dependence of villages on the NTFPs like Botezhari, Kolsa and Jamni were more dependent on the forest resources whereas Ramdegi currently known as Navegaon was less dependent as compare to other three villages since it was on the fringe of core and buffer zone of TATR. According to some of the respondents it was also found out that the tribals and other forest dwellers used to get plenty of NTFPs in the form of roots, leaves, flowers and fruits for example Dhan bhaji, Math bhaji, Katwal, Colocasia esculenta, Ceylone Spinach, Sesbania grandiflora and suran (Amorphophallus campanulatus) are easily available in the vicinity of the villages for their daily consumption. Apart from this other NTFPs getting from trees such as Madhuca longifolia, Tamarindus indica, Emblica, Officinalis, Annona squamosa (Custard Apple) and Syzygium cumunii were collected from the forest and cultivated land. On the other hand, wild fruits such as Diospyros melanoxylon (Temur), Ziziphus oenoplia (Yeroni), Buchanania lanzan (Charoli) including Madhuca longifolia were collected consumed and sold in the village or in the local hat. The local tribals used to gather different plants from the different species of flora that too very sustainably, according to one of the respondents, trees were not used to break and cut in order to get the fruits, leaves or branch.



**Figure 2: Uses of different parts of trees and plants for the consumption**

According to **figure 2**, the tribals and forest dwellers of the TATR used to collect more fruits which was a daily part of their dietary depend upon the seasonal fruits followed by leaves and then roots. The tribals and other forest dwellers were well acquainted with the traditional ecological knowledge (TEK) that used to help them in terms of food security for instance, *Oryza rufipogon* locally known as Dev Bhat is kind of wild rice that is very heavy with the nutritional value, tribals and other forest dwellers used to collect nearly 20-30 kg/ family from the nearby wetlands and fallow lands in the month of November- December that can be considered as a food security in extreme situation. The fruits such as Mahua (*Madhuca longifolia*), Charoli (*Buchanania lanzan*), Chinch (*Tamarind Indica*), Jamun (*Syzygium Cumunii*), Sitafal/Sharifa (*Annona Squamosa*) etc. were used for the household consumption and for the income generation as well. Leaves, roots and flowers such as dhopa leaves (*Colocasia esculenta*), dhopa roots (*Colocasia esculenta*), Pan Bhaji (*Ipomoea aquatica*), Dhan Bhaji (*Ammannia baccifera*), Ceylon spinach (*Basella alba*), Heti flowers (*Sesbania grandiflora*), Kadu Bhaji (*Dentella repens*) were mainly used for the household consumption however Dhopa leaves (*Colocasia esculenta*) used to sell in the local haat/ village in distress situation since it grows abundantly in the wetlands and fallow land in forested landscape throughout the year.



**Figure 3: Types of Major NTFPs used by the forest dwellers**

**Fig 3** shows the types of NTFPs which are majorly used by the forest dwellers in TATR. The trees were more used in the TATR region followed by shrubs, herbs and climbers whereas the variety wild grains especially wild rice (*Oryza rufipogon*) and the fungus NTFPs (Mushrooms) consists one for each of both. The forest dwellers of the particular habitat also used to get so many herbs which were used for the medicinal purpose such as different leaves were being used for the cut and wounds, Bhui Neem (*Andrographis paniculata*), Hirda (*Terminalia chebula*) and Baheda (*Terminalia bellirica*). Climbers (are plants with long, flexible, climbing stems that are rooted in the ground, and usually have long dangling branches) such as Katwal (*Momordica*), Jungli Kundru (*Coccinia grandis*), Ceylone Spinach (*Basella alba*) and Chemmakaya (*Canavalia gladiata*) were consumed widely in that particular habitat.

## 5. CONCLUSION:

The present chapter demonstrates that NTFPs contributes to the wellbeing and livelihood of the household of forest dwellers across the globe. There is symbiotic relationship between Tribal people and forest dwellers since time immemorial. The empirical data revealed the considerable dependence on the wild edible plants and NTFPs of the tribals and forest dwellers of the Tadoba Andhari Tiger Reserve. There were 36 majorly NTFPs which were being used by tribals and other forest dwellers of TATR region. It was also found out that the wild edible plants and NTFPs worked as a food safety net for the tribals and forest dwellers of TATR. This research study also shows that the sustainable harvesting of NTFPs can play a vital role in securing the livelihoods, alleviating the poverty and reducing the vulnerability and for this further more research is required to throw lights on these issues (FAO, 2003; Angelsen and Wunder 2003). The study also shed some light on the Traditional Ecological Knowledge (TEK) of the tribals and other forest dwellers that has been passing through oral narratives through their generations to generations. This is high time to recognize and document their traditional ecological knowledge and their contribution should be recognized and acknowledged because it is said that tribals are the real ecological intellectuals.

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