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Conservation Priorities of NTFP Species in Dry Deciduous Forests of Adilabad District, Telangana, India

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Abstract

Non-Timber Forest Products (NTFPs) have been used by ethnic and non-ethnic people for their food, shelter, medicine and commerce in Adilabad district of Northern Telangana. Over exploitation of the products has reduced the economic plant taxa and led to the loss of plant species which are essential for ecosystem diversity. The availability and distribution of the 16 NTFP species studied are not uniform in the district as per the phytosociological study. They are prioritized into three categories on the basis of score attained in the devised scale. Among these, *Firmiana simplex, Givotia mulaccana,* and *Aegle marmelos* shall receive the highest conservation priority, followed by *Madhuca longifolia* var. *latifolia, Dendrocalamus strictus* at moderate level while *Terminalia bellerica, Syzygium cumini* and *Tamarindus indica* are of low category which do not require much conservation attempt.

Key words: Non-Timber Forest Products, dry deciduous forest, conservation priority, Adilabad.

Introduction

People live near the forest depend on the forest for their survival. Tribal and non-tribal communities living inside and on the fringes of forest areas depend on NTFP species for their food, shelter, medicine and commerce. Non-Timber Forest Products (NTFPs) have been utilizing by the ethnic and non-ethnic people for their economic and healthcare measures. The significance of NTFPs to the State was perhaps realized first when the report of the Industrial Survey Committee appointed by the erstwhile Government of Central Provinces and Berar was published in 1939. As a consequence of this realization, trade in some NTFPs was nationalized. It is estimated that 275 million (27%) poor rural people in India depend on NTFPs for at least part of their subsistence and cash livelihoods (Bhattacharya and Hayat, 2004; Malhotra and Bhattacharya, 2010). This dependency is particularly intense for half of India's 89 million tribal people, the most disadvantaged section of the society.

Only in late 80's, there were some attempts made and highlighted the need to manage and study of the non-timber forest products. In general, tribal economy entirely depends on the health of forest and volume of the forest produce**.** The forest policies contain a specific provision for the integration of tribal interests with forests.

NTFPs valuing is increasing and estimated that currently, some US$90 billion worth of NTFPs are reportedly extracted worldwide annually and about one third of the same is consumed in the local economy without it in the market (Pimental *et al*., 1997). In India, a significant contribution of revenue comes from NTFPs, and 70-80% of forest exports are only NTFPs (Sinha and Bawa, 2002).

Studies conducted in some Indian states have shown that contribution of NTFPs to the total income of the households varied between 10 to 70% and majority of the forest dwellers depend on forests for 25 to 50% of their food requirements.

Study Area

Adilabad district lies in between latitudes $18^0$40' and $19^0$56'N and longitudes $77^0$47' and $80^0$00'E. It is bounded by Yeotmal and Chanda districts on the north, Chanda district in the east, Nanded district of Maharashtra in the west and Karimnagar and Nizamabad districts of Telangana in the south. The ethnic population constitutes 17.08% of the total population of the district, with prominent indigenous tribal groups such as Gonds, Koyas, Pardhans (Pradhans), Naikpods, Mannewars, Kolams (Kolavars), Andhs, Thotis, Bhils, Khatis, Wojaris, Yerukalas and Lambadis (Anonymous, 2011). Of these, Gonds stand for the dominant group (52.16%). Geographically, these people are responsible for the name Gondwanaland, the southern of the two super continents believed to have constituted super continent *'the Pangea'*. The study site enjoys typical tropical climate with four seasons, with an average rainfall of 742 mm and temperature varying from 28-41ºC in the hot season (Anonymous, 1975). In winter season, the temperature comes down to about 4ºC in Jannaram Division of the district (Suthari, 2013). The district occupies the second position with an area of 7066.47 sq km in the state in regard to the area under forest cover in Telangana state (Anonymous, 2013). It is one of the backward districts and occupies 30.36% of tropical dry deciduous forest cover (Fig. 1).

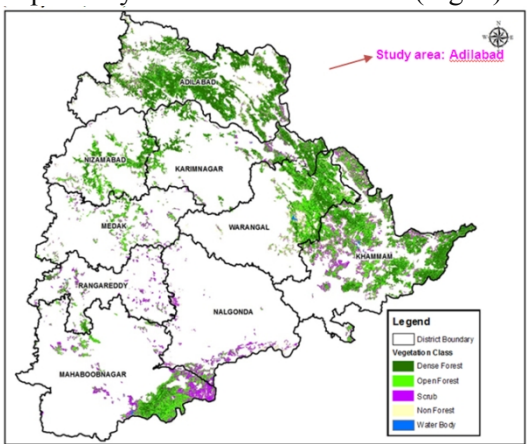

Figure 1. Forest cover map of Telangana and study area.

Telangana has 23,272.04 sq km of area under forest cover (very dense 616.41, moderate dense 9474.71, open forest 8659.76 sq km (excl. scrub 4521.16 and non-forest 2590.70 sq km) (Anonymous, 2013).

Materials and methods

NTFPs and Household survey

During the field exploration studies, the primary data about NTFP's was gathered from the ethnic and non-ethnic people of Adilabad district whether it is used for the purpose of self-use and/or commercial along with the seasonal availability (month / months and whole year). The months of January to May are considered as the peak season for NTFPs collection. The other important season was monsoon (June-September). So, the NTFPs collection was optimum during summer and monsoon

seasons. The collected NTFPs samples were deposited at Museum, Department of Botany, Kakatiya University and the processed plant voucher specimens were housed at Kakatiya University Herbarium, Warangal (KUW).

NTFP availability and dependence

The NTFPs are used as food, fodder, medicine, household articles, fencing and non-commercial as well as commercial purposes, as revealed from household survey. Totally 183 plant taxa were identified for general use category, most of these are available in quantities. The products from them are of high commercial value**.** The level of dependence on NTFPs was based on the availability of other resources. Where the availability of resources is high, there was less dependence on NTFPs. The poor people and forest fringe villagers mostly depend on the collection of NTFPs. The contribution of NTFPs to annual household income varies. Accordingly, the households are categorized into *three* categories: (i) *High dependent* - where NTFPs contributed more than 50% in annual household income; (ii) *Moderately dependent* - with 20-50% contribution; and (iii) *Low dependent* - with <20% contribution. The high dependence on NTFPs was observed in all the areas of the district. The major NTFPs are bamboo, tendu leaves, gum karaya, whereas the remaining provide moderate to low contribution of their income (Omkar, 2010).

Scale of Scoring and Conservation Prioritization

Twelve criteria with different values were assigned to scores (three to zero) based on, *viz*. distribution pattern, occurrence and harvesting, as per the Scale devised by Silori *et al*. (2005), with a slight modification. When the NTFP species is present in less than 40% of the sampled area (plots), the scale awards a score of three (3); when it is between 40-60, it accords one (1). Otherwise, it is not for conservation earning and no credits for care. If the NTFP species is in a regeneration stage, it is to be assigned the score of three; score two when trees are also found with saplings, and score one when there are establishments and regeneration only. There is no score for a NTFP taxon with all the above stages. The score is based on the harvested parts. When the roots are harvested, the NTFP species shall be given score of *three, two* when collected for sale and when aerial parts are collected other than leaves, the score will be *one* for a species whose produce is gathered for self- consumption as flowers, fruits and seeds (Tab. 1).

Results and discussion

NTFP species Priority list for Conservation

Based on the scale of scoring adopted the NTFP species of Adilabad district are screened to prepare the priority list for conservation (Tab. 2). In the descending order of the score the species attained (20 to 4), they occupy the ladder of conservation priority. The NTFP taxa assessed were obviously the tree species indigenous to tropical deciduous forest. The plant taxa are grouped into three categories on the basis of priority they must receive as *high* to *low*.

(i) High Priority: There are *four* NTFP species which are very important for the region. They are *Firmiana simplex* (tapsi for gum) with the score 20, *Givotia moluccana* (poniki used for Nirmal toy making) and *Aegle marmelos* (maredu for medicinal) species with the score 16, *Phyllanthus emblica* (usiri for fruits) with the score 15

Table 1. Parameters and Scoring for prioritization of NTFP species.

Parameter	Score
Distribution	
1. NTFP species in a sampled plot:<40%	3
2. NTFP species in a sampled plot:>40% and <60%	1
3. NTFP species in a sampled plot:>60%	0
Occurrence	
1. NTFP species recorded only in regeneration stage	3
2. NTFP species recorded in regeneration and sampling stage	2
3. NTFP species recorded in regeneration, establishment, tree form	1
4. NTFP species recorded no score in all above three stages	0
Parts Harvested	
1. Roots	3
2. Aerial parts - Stem/Bark or Gum (other than leaves)	2
3. Flowers, fruits and seeds	1
Utilization	
1. Collection for self-consumption	1
2. Collection for commercial sale	2

(after Silori *et al.,* 2005, present study)

Table 2. NTFP species and distributional status, mode of collection, conservation priority of the study area.

SN	Species name	Distribution in natural forest	Collection season	Form	Score	Conservation Priority	Dependent Community
1	*Firmiana simplex*	Rare	Whole year	Gum	20	High	Tribe
2	*Givotia moluccana*	Rare	Whole year	Wood	16	High	Non-tribe
3	*Aegle marmelos*	Rare	Oct- Dec	Fruit, wood	16	High	Tribe, Non-tribe
4	*Phyllanthus emblica*	Rare	Feb-May	Fruit, wood	15	High	Tribe, Non-tribe
5	*Dendrocalamus strictus*	Common	Whole year	Culm	14	Moderate	Tribe, Non-tribe
6	*Madhuca longifolia* var. *latifolia*	Common	April-June	Flower, Fruit	14	Moderate	Tribe, Non-tribe
7	*Buchanania cochinchinensis*	Rare	March-May	Fruit/Seed	14	Moderate	Tribe, Non-tribe
8	*Terminalia chebula*	Rare	March-May	Fruit/Wood	12	Moderate	Tribe, Non-tribe
9	*Strychnos potatorum*	Rare	Nov-March	Fruit	10	Moderate	Tribe
10	*Diospyros melanoxylon*	Abundant	March-June	Leaf, Fruit	10	Moderate	Tribe, Non-tribe
11	*Gardenia gummifera*	Abundant	Feb-March	Resin	09	Moderate	Tribe, Non-tribe
12	*Terminalia bellerica*	Common	April-May	Fruit, Wood	08	Low	Tribe, Non-tribe
13	*Soymida febrifuga*	Abundant	March-June	Fruit, Wood	08	Low	Tribe, Non-tribe
14	*Syzygium cumini*	Common	Sept-Nov	Fruit	06	Low	Tribe, Non-tribe
15	*Tamarindus indica*	Common	Feb-June	Fruit	06	Low	Tribe, Non-tribe
16	*Thysanolaena latifolia*	Abundant	Nov-March	Above ground	04	Low	Tribe, Non-tribe

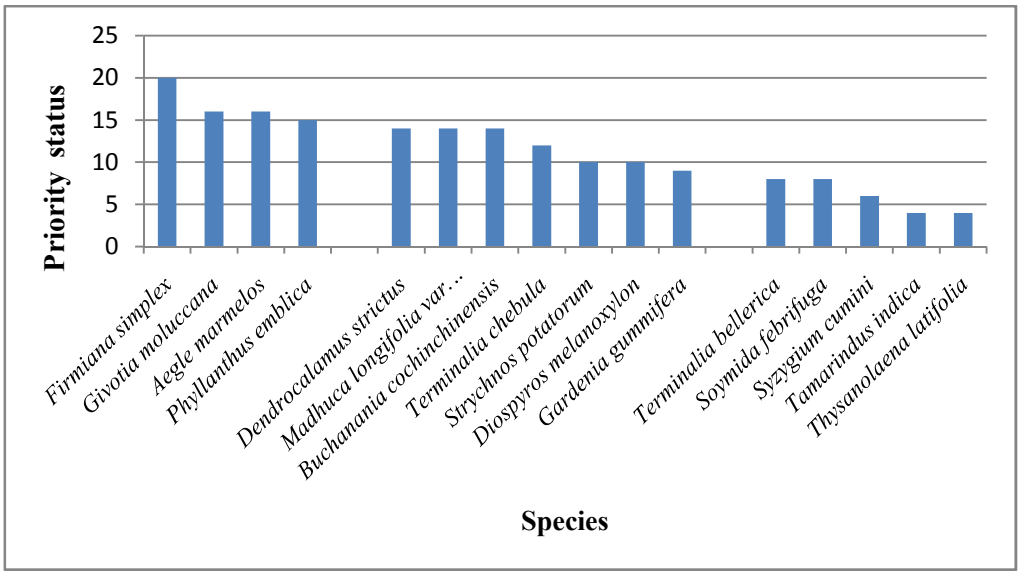

Figure 2. NTFP species priority status and conservation priority.

closely fallows them. In the priority list of Silori *et al*. (2005), *Phyllanthus emblica* was topped the list followed by *Strychnos potatorum, Firmiana simplex* and *Sygyzium cumini* (Fig. 2).

(ii) Moderate Priority: There are *seven* taxa which fall under this category. With the score 14, *Buchanania cochinchinensis* (pedda morli- seed), *Dendrocalamus strictus* (bamboo) and *Madhuca longifolia* var. *latifolia* (ippa- seed, fresh corolla) shall receive the same attention. *Terminalia chebula* (karakkaya- fruit) with 12 and *Diospyros melanoxylon* (tuniki- leaf, fruit, wood) with the score of nine. As per the assessment of Silori *et al.* (2005), *Dendrocalamus strictus, Gardenia gummifera* and *Terminalia chebula* occupy the same status. However, the present study justify *Aegle marmelos* to High Priority while *Soymida febrifuga* goes down to Low Priority (Fig. 2).

(iii) Low Priority: There are *six* plant species fall under this category *Terminalia bellerica* (tani - fruits) and *Soymida febrifuga* (somi - timber, fruit) attained the score eight, *Syzygium cumini* (neredu - fruits) six, and *Tamarindus indica* (chinta - fruits), *Thysanolaena latifolia* (konda cheepuru - broom) and *Ziziphus xylopyrus* (gotte - fruits edible; leaves fodder to sheep and goats) with four. *Anogeissus latifolia* (tiruman - wood) was not assessed in the present study though it was in the list of Silori *et al.* (2005). Instead, the broom grass considered for economic significance in terms of harvest and income to the local people (Fig. 2).

Conservational Needs

The above assessment seems to be is realistic and perhaps truly reflects their ecological status and dynamics in dry deciduous forests of Adilabad district. The present study brings to focus the level of

attention to be paid to these plant species in the Forest Working Plans and in the workouts of VSS or Community Forestry people. It ultimately helps the Girijan Co-operative Corporation (GCC) and other self-help groups revitalize their inflows. There is immediate need to conserve the NTFP species for the sustainability and empowerment of tribes and non-tribes of the district (Omkar *et al*., 2008).

Conflict between forest products and forest conservation arises everywhere, but the studies have revealed both the conservation and socio-economic aspect are more important for any harvest (Rai and Uhl, 2004). The recent studies have suggested that the emphasis on NTFPs as a major income sources for the local communities and unscientific extraction might be a problem for conservation for future population of species (Redford and Padoch, 1992).

The regeneration of the over exploited species in the forest takes a long time and alarming reduction of economically important tree species may cause severe effect on the future generations (Bhattacharya *et al*., 2002). For example, the extraction of tapsi gum has gone from subsistence–collection to large-scale commercial extraction and unscientific exploitation.

The study area, there are 183 plant species of Magnoliophyta (Angiosperms) which provide minor forest products (MFPs). The NTFPs belong to 149 genera representing 64 families (Dicots / Magnoliopsida-164 and Monocots / Liliopsida -19) (Omkar *et al.,* 2012). The NTFPs are extracted throughout the year in case of gums/resins (*Anogeissus latifolia, Gardenia gummifera, Firmiana simplex*), fibre (*Hardwickia binata*), culms (*Dendrocalamus strictus*) and wood for toys (*Givotia moluccana*). As per the parts gathered, fruits are used more (nine), followed by seeds (six). Twin uses are found with *Aegle marmelos* (fruit, wood), *Diospyros melanoxylon* (leaf, fruit), *Madhuca longifolia* var. *latifolia* (flower, fruit), *Phyllanthus emblica* (fruit, wood), *Soymida febrifuga* (fruit, wood) and *Terminalia bellerica* (fruit, wood). NTFPs largely yield food (edible) and medicines. The NTFPs are collected by the rural people is for their self-use (8%), commercial (56%) or both (36%) (Tab. 2).

Conclusion

The natural vegetation predominates the forests with dry deciduous species like *Tectona grandis, Chloroxylon swietenia, Xylia xylocarpa, Terminalia arjuna, Adina cordifolia, Mitragyna parviflora, Anogeis-sus latifolia, Ziziphus oenopolia, Helicteres isora and Dendrocalamus strictus.* The rapid degradation occurred due to over exploitation, biotic pressure (grazing), large scale extension works in the form of mining, irrigation projects/dams, illegal felling, and conversion of forest land to agricultural land use (encroachments). The extraction of NTFPs without proper scientific training might be a problem for the conservation of NTFP species. The harvesting impacts on species survival and forest ecosystem of the particular area are directly related to the demand of the product and dependence of the community. There is an immediate need to take necessary steps to conserve the NTFP plant taxa for the sustainability and empowerment of ethnic and non-ethnic people of Adilabad district.

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