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#### Ram Mayur L

PG Students, Department of Forest Products & Utilization, College of Forestry, ACHF, NAU, Navsari, Gujarat, India

#### Soufil Malek

PG Student, Department of Silviculture & Agroforestry, College of Forestry, ACHF, NAU, Navsari, Gujarat, India

#### Minal H Patel

PG Students, Department of Forest Products & Utilization, College of Forestry, ACHF, NAU, Navsari, Gujarat, India

#### BG Vashi

Retired Professor, Department of Forestry, College of Forestry, ACHF, NAU, Navsari, Gujarat, India

#### Vipul B Parekh

Assistant Professor, (Biotechnology), Department of Basic Sciences & Humanities, College of Forestry, ACHF, NAU, Navsari, Gujarat, India

#### Vijay M Prajapati

Assistant Professor, (Silviculture), Department of Silviculture & Agroforestry, College of Forestry, ACHF, NAU, Navsari, Gujarat, India

#### BS Desai

Assistant Professor, (Botany), Department of Basic Sciences & Humanities, College of Forestry, ACHF, NAU, Navsari, Gujarat, India

#### Suman Kumar Jha

Associate Professor, Department of Forest Biology, Forest Biology and tree improvement College of Forestry, ACHF, NAU, Navsari, Gujarat, India

#### Corresponding Author

##### Ram Mayur L

PG Students, Department of Forest Products & Utilization, College of Forestry, ACHF, NAU, Navsari, Gujarat, India

## Conservation of few threatened NTFP's (Trees) of south Gujarat

**Ram Mayur L, Soufil Malek, Minal H Patel, BG Vashi, Vipul B Parekh, Vijay M Prajapati, BS Desai and Suman Kumar Jha**

### Abstract

The region of South Gujarat is bestowed with rich ecosystem and floristic diversity equally supported by various tribes residing in the Eastern boundaries of Surat, Narmada, Valsad and Dangs district. Floristically, South Gujarat region harbours nearly 40% MAPs of Gujarat state, utilized by local inhabitants. Initiative has been taken up at Navsari Agricultural University to conserve rare and threatened MAP's which are also used as NTFP's. Biodiversity Conservation Centre has been set up, which has nearly 173 tree species that are conserved *ex-situ*. Few of the important NTFP's conserved at Biodiversity Conservation Centre are *Sterculia urens*, *Sterculia guttata*, *Bombax insigne*, *Terminalia arjuna*, *Mallotus philippensis*, *Bauhinia malabarica*, *Buchanania cochinchinensis* and *Semecarpus anacardium*. The present paper aims at providing the distribution patterns and conservation aspects of such rare and threatened tree species, which are also equally vital NTFP's on which tribal livelihood depends to fairly large extent.

**Keywords:** Biodiversity, conservation, NTFP's, south Gujarat, threatened

### 1. Introduction

Biodiversity is a comprehensive umbrella term for the extent of nature's variety or variation within the natural system; both in number and frequency. It is often understood in terms of the wide variety of plants, animals and microorganisms, the genes they contain and the ecosystem they form. The biodiversity we see today is the result of billions of years of evolution, shaped by natural processes and, increasingly, by the influence of humans. It forms the web of life of which we are an integral part and upon which we so fully depend. So far, about 2.1 million species have been identified, mostly small creatures such as insects. Scientists believe that there are actually about 13 million species, though as per UNEP estimates there are 9.0 to 52 million species exist on earth (Mora *et al.*, 2011) [4]. Biodiversity also includes genetic differences within each species - for example, between varieties of crops and breeds of livestock. Chromosomes, genes, and DNA-the building blocks of life-determine the uniqueness of each individual and each species. Yet another feature of biodiversity is the variety of ecosystems such as those that occur in deserts, forests, wetlands, mountains, lakes, rivers, and agricultural landscapes. In each ecosystem, living creatures including human form a community, interacting with one another and with the air, water, and soil around them. For much of the time man lived in a hunter-gather society and thus depended entirely on biodiversity for sustenance. But, with the increased dependence on agriculture and industrialization, the emphasis on biodiversity has decreased. Indeed, the biodiversity, in wild and domesticated forms, is the source for most of humanity, food, medicine, clothing and housing, much of the cultural diversity and most of the intellectual and spiritual inspiration. It is, without doubt, the very basis of life. Further that, a quarter of the earth's total biological diversity amounting to 1.7 million species, which might be useful to mankind in one way or other, would be in serious risk of extinction over the next 2-3 decades. On realization that the erosion of biodiversity may threaten the very existence of life has awakened man to take steps to conserve it. In this paper, the RET & medicinally important tree species conserved at NAU, Navsari is discussed.

Biodiversity contributes to our material well-being. We obtained various productive materials from biodiversity e.g., agricultural materials or food, medicine, industrial raw materials etc.

- More than 60 wild species have been used to improve the world's 13 major crops by providing genes for pest resistance, improved yield, and enhanced nutrition (IUCN, 2012).
- Since agriculture began about 12,000 years ago, roughly 7,000 plant species have been used for human consumption.

The While most people depend mainly on domesticated species for their dietary needs, some 200 million depend on wild species for at least part of their food.

- Populations in South and East Asia are dependent on complex rice-fish agro-ecosystems, where fish and other aquatic animals serve as a source of nutrition to local communities, and provide essential services for rice productivity in the flooded fields.
- Fisheries alone account for at least 15% of animal protein directly consumed by humans. Fisheries indirectly support additional food production by providing inputs to the aqua-culture and livestock industries.
- Amphibians play a vital role in ecosystems, are indicators of environmental health, and are 'hopping pharmacies' being used in the search for new medicines. Yet 41% of amphibian species are threatened with extinction.
- In some countries, medicinal plants and animals provide most of the drugs people use, and even in technologically-advanced countries like the USA, half of the 100 most-prescribed drugs originate from wild species. According to world health Organization report nearly 80% of people live in Africa rely on traditional medicines as main source for their health care need.
- More than 70,000 different plant species are used in traditional and modern medicine. Microbes have given us nearly all of our antibiotics such as penicillin, as well as the cholesterol lowering strain.

## 2. Materials and method

The conservation of RET and medicinally important tree species at biodiversity conservation center, NAU, Navsari, Gujarat. Navsari Agricultural University, Navsari is located in the AES zone-III (Heavy rainfall zone) with a total area of over 4 ha. Geographically located at 20°57' North latitude and 72°54' East longitude at an altitude of about 11.83 meters above the mean sea level. It is about 13 km away from the historical place "The Dandi" on the Arabian seashore.

The IUCN Red List Categories (IUCN, 2001) for regional level has been followed for analyzing and categorizing the tree species of Gujarat. The brief explanations of which are as follows.

**Critically Endangered (CR)** - A taxon is Critically Endangered when it is facing extremely high risk of extinction in the wild in the immediate future.

**Endangered (EN)** - When a taxon is facing a high risk of extinction in the wild in the near future.

**Vulnerable (VU)** - When a taxon is facing high risk of extinction in medium-term future **Lower Risk (LR)**-When a taxon does not qualify for any of above-mentioned criteria, it can be divided further into two categories.

**Near Threatened (NT)** - A taxon which is close to qualify for Vulnerable.

**Least Concerned (LC)** - A taxon-which does not qualify near Threatened and possess no threat or if it is there it is negligible or curable in natural state.

**Data Deficient (DD)** - when there is lack of information regarding species such as its locality, area of distribution and population status etc. Majority of the 'Data Deficient' plants are rare with very few numbers and they are not mentioned in WP, documents and other records. This category may qualify for higher threat level after detail field studies.

The threat status of the species in Gujarat is followed as per Singh (2010) [12]. The uses of plants were defined as per local uses personally observed or reports in the literature.

A preliminary check list of conservation of RET and medicinally important **tree** species at biodiversity which are suitable in the AES Zone III climatic conditions was furnished initially in consultation with field experts., 173 tree species collected within and outside state. Some noteworthy medicinal tree floras are *Tecomella undulata*, *Terminalia arjuna*, *Annona squamosa*, *Annona reticulata*, *Sterculia urens*, *Semecarpus anacardium*, *Oroxylum indicum*, *Dillenia pentagyna*, *Bombax ceiba*, *Dalbergia sissoo*, *Madhuca latifolia*, *Garcinia indica*, *Catunaregam spinosa*, *Gmelina arborea*, *Phanera racemosa* (*Bauhinia racemosa*), *Acacia nilotica*, *Acacia catechu* and *Azadirachta indica*. Centre also has individuals of rare, endangered and threatened tree species viz.; *Sterculia guttata*, *Bombax insigne*, *Firmiana colorata*, *Kydia calycina*, *Adansonia digitata*, *Buchanania lanzan*, *Careya arborea* etc. All the above-mentioned tree species are presented in aid of botanical name, local name, family, important plant part, and also clinically proven medicinal uses.

## 3. Result

The Biodiversity Conservation Centre at ACHF, NAU, Navsari was initiated under the auspices of Dr. B. G. Vashi with an intent to conserve the rare, endangered and threatened tree species of Gujarat state. Later on, the conservation center flourished with more species added even from other states of India. Currently, the center is one of its kind holding more than 173 tree species of commercial and medicinal importance. The center is an ongoing mission to propagate, conserve and also distribute the species amongst other schools, colleges and institutes to enrich the students regarding the value and magnitude of biodiversity existing. This in turn has also proved to be one of the Centre for the identification of tree species for common man, students and also forest officials. Center harbors 67 medicinally important tree species along with the 28 RET species that is surviving as a means of ex situ conservation.

Biodiversity conservation center NAU, Navsari has presently total of 173 important tree species that need attention for conservation. Out of these, 67 important tree species and 28 species are categorized into rare, threatened and critically endangered in Gujarat (Singh, 2010) [12]. List of RETs tree species – biodiversity conservation center, ACHF, NAU in are alphabetically arranged as per their botanical names followed by the common name, family, parts used, Threat status and NTFP's uses (Table 1).

**Table 1:** List of RET's tree species in Biodiversity Conservation Centre, ACHF, NAU

No.	Scientific Name/ Botanical Name	Common Name	Family	Part used	Threat status	NTFP's/ local uses
1	<i>Adansonia digitata</i> L.	Choramli, Gorakhhamli	Bombacaceae	seeds, leaves, roots, flowers, fruit pulp and bark	NT	The Baobab or Monkey Bread tree's fruit is used medicinally by the natives as a coolant. The leaves are eaten with their food, and are supposed to restrain excessive perspiration. The bark gives fiber. The leaves are used as febrifuge. In Africa, it is reported to have the property of preserving human corpses.

						All parts of the tree are useful, providing timber and fibers. The leaves are used as vegetable and acidic seed as a source of vitamin C.
2	<i>Buchanania cochinchinensis</i> preng.	Charoli, Chirongi	Anacardiaceae	Fruit	NT	The seed, Charoli is eaten and an oil is extracted from the kernels. The bark is used for tanning. The stem juice is used to cure diarrhea, leaves are used as fodder, and the wood is used in frame work.
3	<i>Careya arborea</i> Roxb.	Kumbhi	Lecythidaceae	Bark, Leaves, Dried calyx	NT	The timber is useful, - stands water well, and the - heart wood takes a fine polish. From the inner bark fuses for matchlocks are made and the bark is also used in - native medicine. The dried calyces under the name "Vakumbha" are sold in the market and used as a demulcent in coughs and colds. The wood is used in agricultural implements, rudders etc.
4	<i>Hymenodictyon excelsum/H. orixense</i> (Roxb.) Mabb.	Kadvai, Bhammarchhal	Rubiaceae	Bark, Leaves	NT	The inner coat of the bark is bitter and used as a febrifuge. The wood is fine and closed grained and is employed for making agricultural implements, scabbards, palanquins, toys etc.
5	<i>Kydia calycina</i> Roxb.	Waring, varing	Malvaceae	Leaves, Root	NT	The bark gives a fiber. The wood is used only as fuel
6	<i>Oroxylum indicum</i> (L.) Vent.	Tetu	Bignoniaceae	Leaf, stem bark and root	VU	The root bark is much used in medicine by the natives as a tonic and astringent in' diarrhea and dysentery. Ground to powder and mixed with turmeric it is used in Bombay as an application to sore backs of horses and bullocks. The tender fruit is used as stomachic.
7	<i>Sterculia urens</i> Roxb.	Kadayo, Gum Kadaya	Malvaceae	Seed, Bark, Gum	NT	Cloth is made from the bark in Malabar. The seeds are roasted and eaten by poor natives, in some parts of India (Gonds in Madhya Pradesh), they are ground and used as coffee. The gum known as Gum Kadhaya or Katira is used in textile and many other industries. The bark gives a fiber. The wood makes a poor fuel. Used for toys, musical instruments and canoes. The bark exudes the white gum Karaya which is used in cosmetics and for thickening ice-cream. A useful fiber for making ropes and coarse cloth is obtained from bark, which was used as garments in the past in north India. Seeds are roasted and eaten. Gujarat State Forest Department has started planting this species due to its beauty.
8	<i>Bombax insigne</i> Wall.	Simul	Meliaceae	Wood	CR	The wood is more durable than <i>B. ceiba</i> . It is particularly valued for making matches
9	<i>Cedrela toona / Toona ciliate</i> M. Roemer	Toon	Meliaceae	Bark	CR	The wood is valuable for furniture, the flowers yield a dye and the bark has some repute in native medicine
10	<i>Radermachera xylocarpa</i> (Roxb.) K. Schum.	Khad sing, Khadsingi	Bignoniaceae	Wood	CR	The wood is good and handsome, tough and elastic, taking a good polish. It deserves to be better known and to be in more general use for cabinet-work (Gamble). Yellow resinous substance (that often fills up the pores of the heart wood) yields oily extract which is employed in cutaneous diseases (Dalzell & Gibson). Roxburgh says that one of the capsules would make a dangerous bludgeon.
11	<i>Sterculia guttata</i> Roxb.	Kukar, Goldar	Malvaceae	Seed	CR	The bark of younger part of the tree yields a white flaxen fiber and used for making rough cloth. The seeds are either eaten raw or after roasting.
12	<i>Mallotus philippensis</i> (Lam.) Muell-Arg.	Kapilo, Kamala	Euphorbiaceae	Bark, Leaves	EN	The red powder which covers the seeds furnishes a valuable dye which is employed in dyeing silk a bright flame-colour. The powder is also used in medicine and is considered to be efficacious in the expulsion of Taenia or Tape-worm.
13	<i>Semecarpus anacardium</i> L. var. <i>anacardium</i>	Bhilamo	Anacardiaceae	Fruits, Pericarp.	EN	The juice of fruit is used in making linen. The black resin from fruit is used by Indian washer men as marking-ink for clothes. The orange-colored receptacle is eaten either dry or roasted. Hypo carp of fruit is eaten when ripe. The extract obtained by boiling the nuts is useful in treatment of sciatica.
14	<i>Firmiana colorata</i> (Roxb.) R. Br.	Scarlet sterculia, kodaro	Sterculiaceae	seeds, root, stem, flower, fruit and leaves and modified plant organs	VU	The bark gives a fiber.
15	<i>Pterocarpus marsupium</i> Roxb. var. <i>acuminatus</i> Prain.	Biyo	Papilionaceae	Leaves, stem, bark, heart wood, gum	NT	It supplies the gum Kino for European pharmacy and wines and the timber is hard and durable. It is used for making excellent sleepers for railways. It is also used in buildings, agricultural implements, carts, boats etc. The gum Kino of commercial importance contains tannin. The leaves are eaten by cattle.

16	<i>Stereospermum personatum</i> (var. colais)	Patla	Bignoniaceae	Roots, leaves, bark and flowers.	EN	The leaves, roots and flowers have some repute in native medicine. The wood is used in furniture and buildings.
17	<i>Bauhinia malabarica</i> Roxb.	Khatichamol, Khatambdi	Caesalpiniaceae	Leaves Bark, flowers.	VU	The wood is used as fuel. The young leaves have a sour flavor. They are used as a lime-flavored condiment for soups etc. Young shoots - cooked and eaten as a vegetable.
18	<i>Terminalia arjuna</i> Wt. and Arn.	Arjun	Combretaceae	Bark	LC	The wood is used for cart and agricultural implement making. The bark is used for tanning and dyeing. It is also used in Ayurveda medicine. Leaves are fed to silkworms; wood is used in buildings and in boats. Bark—used as a cardioprotective and cardiostimulant

#### 4. Conclusions

The present study on tree diversity in Biodiversity conservation center at Navsari Agricultural University campus reveals that Agricultural University could play a significant role in the conservation of biodiversity. Agriculture universities can conserve biodiversity with minimal effort which may be useful for other Government institute like Forest Department. Association between University and forest department can play a significant role in rehabilitation of these selected important plants. Prioritization of the species based on their status such as endangered, rare is required for effective management of biodiversity center as common species sometime occupy the necessary space of the rare species. Thus, Biodiversity conservation center contribute significantly towards saving our valuable plant biodiversity hence it should be popularized in all the institutes which can contribute a small piece of land for conservation of biodiversity.

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