NON TIMBER FOREST PRODUCTS OF ARID & SEMI ARID REGIONS OF NORTH-WESTERN INDIA

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Rajasthan is the biggest state of India with a geographical area of 34.22 million ha, which constitutes about 10.41% of the total land area at the country. The state has a forest area of 3.26 million ha constituting 9.54% of the geographical area of the state. Per capita forest area (0.06 ha) in the state is very low (Rajasthan forest, 2007). The state is divided by Aravali hills, the oldest hill formations of India, running south-west to north-eastern direction. More than 50 % of the forest area of the state lies in Aravali range. As per the National Forest Policy 1988 of India, forest cover must be around 33% of the country's geographical area but the state has only 4.78 % of its area under forest cover (FSI, 2001). The state has about 5% of human population of the country but its cattle population is 11% and livestock population is 20.57% of the entire livestock population of the country (Rajasthan Govt, 2006). According to an estimate, more than 90 % of the energy demand in rural areas of Rajasthan is fulfilled by fuel wood (NSSO, 1995). This indicates tremendous pressure on the forests of the state as far as fodder for livestock/cattle population and fuel wood, small timber & various NTFPs for human population is concerned.

Non timber forest products (NTFPs), which refer to all biological materials other than timber extracted from natural forests for human and animal use, provide livelihood to millions of rural people who live in and around the forests. NTFPs include plant tissue used for fiber, medicine, edible and non-edible leaves, roots, flowers, fruit, seed nuts, honey, resin, glue, lac etc. and has both consumptive and exchange value. Besides the economic value, the non-economic value of NTFPs for the forest dwellers is more important since quite a good number of such products do not enter the market and are primarily consumed at local level with a little value addition. Various studies have shown that forest dwellers are highly dependent on NTFPs to sustain daily requirements of their family needs. In India, more than 41 millions of tribal and forest dwellers derive their earnings from these products after consuming about 60% of collected NTFPs for their personal use (Prasad, 1985).

Important NTFPs of North-western arid region of India include pods from *Prosopis cineraria* (Khejari), fruits from *Capparis decidua* (Ker), flower buds from *Calligonum* *polygonoides* (Phog), fruits and flowers from *Cordia dichotoma* (Lasora), fruits from *Salvadora oleoides* (Mitha jal), fruits and gum from *Acacia Senegal* (Kumbat), fruits from *Ziziphus mauritiana* and *Ziziphus nummularia* (Ber) etc. Table 1 gives more details about some of these species. Trikuta is the famous and delicious item/dish of generally all marriage and social gatherings of arid region of Rajasthan state. This dish includes dried pods of *Prosopis cineraria,* dried fruits of *Capparis deciduas* and dried fruits of *Acacia Senegal.*

If one has to pick out number one NTFP tree species of arid region of north western India, then undoubtedly it is *Prosopis cineraria* (Khejari). It is a medium sized and much branched tree with slender branches which are mostly with prickles. It is lopped twice a year to get leaves for fodder purpose and a healthy/mature tree provides about five to six kg of air dried pods during a normal rainfall year. Pods have a sweet pulp, are brown to chocolate colour on ripening. Unriped pods are used as a vegetable and after boiling, these can be stored for future use. Bark of this tree is powdered and mixed with flour during scarcity of food and famine periods.

Table 1: Edible Plants of Arid Region

Scientific name	Local name	Part used	Collection time
Acacia senegal	Kumbat	Seeds, Gum	May-June
Acacia tortilis	Israeli babul	Gum	May-June
Balanites aegyptiaca	Hingota	Fruits	March-July
Capparis decidua	Ker	Fruits	May-June
Cordia dichotoma	Lassora	Fruits	May-June
Cordia gharaf	Goondi	Fruits	May-June
Prosopis cineraria	Khejari	Pods	April-May
Prosopis juliflora	Vilayati babul	Gum, Seed powder	May-June
Salvadora oleides	Meethajal	Fruits	May-June
Salvadora persica	kharajal	Fruits	May-June
Zizphus mauritiana	Ber	Fruits	September-March

Zizphus nummularia	Jharber	Fruits	May-June
Calligonum polygonoides	Phog	Flowers	Feb-March

In the tropical dry deciduous forest areas of India, where there is scarcity of water and opportunities for farming are limited, NTFPs are, in many cases, the only means for survival for tribals. NTFPs are a part of the socio-cultural life of tribal people living in Aravali region of Rajasthan who maintain a symbiotic relationship with the forest and forest based products. The Aravali hills consisting of tropical dry deciduous forests of Rajasthan state are the store house of a variety of NTFP yielding species and potential economic value of NTFPs available in this region is immense.

Broadly three types of forests are found in the Aravali region namely, Teak forests, Anogeissus forests and mixed type of dry deciduous forests & grasslands. There is no clear demarcation among these forests and one type of forest often intermingle into other slowly at many places. Biotic interference is the main factor responsible for changes in natural vegetation in some areas. According to Champion and Seth classification of Indian forests, broadly forest areas of the region come under the category of Tropical Dry Deciduous Forests. *Tectona grandis* is the main species (30%) followed by *Anogeissus latifolia, Boswellia serrata, Butea monosperma, Diospyros melanoxylon, Holoptelia integrifolia, Lannea coromandelica, Miliusa tomentosa, Acacia catechu, Madhuca longifolia, Embelica officinalis, Terminalia bellirica, Wrightia tintoria* and *Azadirachta indica* etc. Important tree species known for their edible fruits near habitation areas include *Mangifera indica, Zizyphus* species, *Tamarindus indica* and *Phoenix sylvestris* etc. *Dendrocalamus strictus* is the main bamboo species of these forests whereas *Dichanthium annulatum, Aristida depressa, Heteropogon contortus, Schima nervosum* and *Themeda quadrivalvis* are the main fodder grass species. In addition to these species, *Acacia nilotica, Jatropha curcas, Butea monosperma* and teak trees are also found near agricultural fields. Some moisture loving trees species like *Syzygium cumini, Derris indica, Terminalia arjuna* etc. are found near river beds and water falls.

A study covering 1200 villages spread over 4000 sq kms of Aravali hills in Rajasthan state was undertaken by Arid Forest Research Institute, Jodhpur during 2006-08 to find out the economic role of NTFPs in supporting a rural family. It was found that on an average one third of a family’s annual income came from NTFPs from nearby forests. The annual estimated value of NTFPs realized per household were around Rs. 6000.00 in Udaipur district and Rs. 5000.00 in

Pratapgarh district, taking fuelwood and fodder grass collection in to account (Chaudhry *et al*, 2008). It is worth mentioning that on an average, each household in Aravali region collects about 2000-2600 kg of fuel wood per year from the nearby forests. Similarly, almost all the households collect grasses for use as fodder for their livestock/cattle ranging from 800-1200 kg/household/year. Villagers in Aravali ranges collect NTFPs round the year and their average income varies from Rs. 20 to Rs. 100 per day, depending on kind of NTFP collected and season. Table 2 presents commonly collected NTFPs in semi arid Aravali region.

Table 2. NTFP availability, collection season and status in the Aravali forest region

Scientific name	Local name	Part(s) used	Collection season	Status in local forest
Aegel marmelos	Bael	Fruit pulp, leaves	Oct-Nov	Common
Anogeiessus latifolia	Dhawda	Gum	Dec-Feb	Occasional
Annona squamosa	Sitaphal	Fruits	Nov-Dec	Abundant in some areas
Boswelia serrata	Salar	Leaves	All over year	Abundant
Butea monosperma	Khakhra	Leaves	Winter	Abundant
Cassia tora	Puwar	Leaves, seed	Mar-Apr.	Abundant
Carrisa carandus	Karonda	Fruit	May-Jun	Abundant in some areas
Diospyrus melanoxylon	Tendu	Leaves, Fruit	Apr-May	Common
Emblica officinalis	Aonla	Fruit	Oct-Dec	Common
Helicteres isora	Marodphali	Fruit	Oct-Feb	Occasional
Jatropha curcus	Ratanjot	Seed	Aug-Sep & Mar-Apr	Abundant
Madhuca indica	Mahua	Flower, Fruit	May & July	Occasional
Momordica dioica	Kikoda	Fruit	May	Occasional
Syzygium cumini	Jamun	Fruit	Jun-July	Abundant in some areas
Terminalia bellirica	Bahera	Fruit	Nov-Jan	Occasional

There is a serious depletion of some NTFP species in the Aravali region compared to twenty years ago. These species include *Acacia catechu* (Khair), *Boswellia serrata* (Salar), *Lannea coromandelica* (Godal), *Sapindus trifolatus* (Aritha), *Anogeissus latifolia* (Dhavara), *Madhuca latifolia* (Mahua), *Chlorophytum borivilianum* (Safed Musli), *Withania coagulans* (Paneer bandh), *Tylophora indica* (Damabel) and *Embelica officinalis* (Aonla). Forest department Rajasthan must undertake plantation of these NTFP and medicinal plant species in the state in order to maintain ecological balance of the region and to sustain rural livelihoods.

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Variety of NTFP available in Aravali region

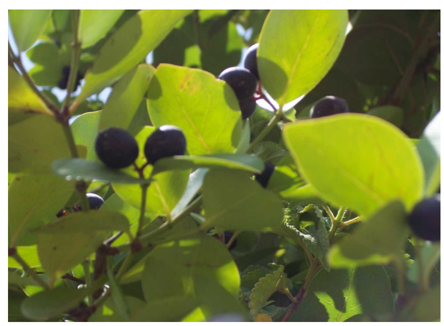
Neem seeds

Mahua seeds

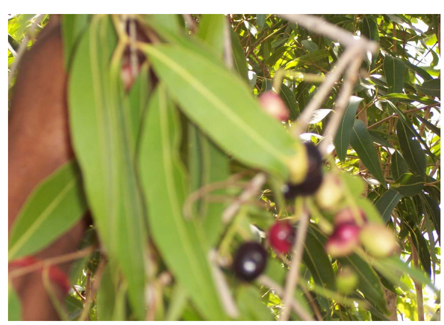
Mahua flowers

Tendu fruits

Gum



Karonda fruits



Jamun fruits

Fuel wood & green fodder collection in Aravali hills

Dry fodder collection in Aravali hills