



Role of Non Timber Forest Products in the Livelihood of Malayali tribe of Chitteri hills of Southern Eastern Ghats, Tamil Nadu, India

R. Prabakaran^{1*}, T. Senthil Kumar² and M.V. Rao³

¹R. Prabakaran, Department of Botany, Vivekanandha College of Arts & Sciences for Women, Tiruchengode-637 205, Tamil Nadu.

²T. Senthil Kumar, Department of Industry University Collaboration, Bharathidasan University, Tiruchirappalli-620 024, Tamil Nadu.

³M.V. Rao, Department of Plant Science, Bharathidasan University, Tiruchirappalli 620 024, Tamil Nadu.

ARTICLE INFO

Article history:

Received on: 01/04/2013

Revised on: 27/04/2013

Accepted on: 12/05/2013

Available online: 30/05/2013

Key words:

Chitteri hills, Malayali tribe, Eastern Ghats, NTFP, Livelihood.

ABSTRACT

The forest of Chitteri hills, Southern Eastern Ghats support rich diversity of timber as well as non timber yielding species. Malayali tribes living close to forest are depend on the forest products possesses imperative part of the traditional life style in Chitteri hills. Non-Timber Forest Products (NTFP) such as wild edible fruits, vegetables, fuel wood, fodder plants, house construction materials, household uses, agricultural implements and medicinal plants are mostly collected from natural habitats. Economically important 80 species and 216 medicinal species have been recorded by the Malayali tribes. The importance of NTFP collection by tribal community has shown decreasing trend due to exotic cultural invading in the study region.

INTRODUCTION

Non Timber Forest Products (NTFP) have been considered as minor forest products in many countries and it refer to all biological materials which are collected from the natural forests for human use.

Ethnobotanical researchers have so far brought on record over 500 plants significantly used by the tribal as food, dyes, tannins, drugs, narcotics, drinks, housing materials weapons, fibers and medicine (Cunningham, 2001). NTFPs play vital role among the tribal people and provide a source of income and subsistence living and are integral part of day-to-day livelihood activities of tribal people (Hedge *et al.*, 1996).

Tribals depend so much on forest for their economic livelihood. Traditional and ancient knowledge about utilization of natural resources still exists in many parts of India.

In this perspective present work, NTFP of Chitteri hills used by Malayali tribe was studied in detail.

METHODS

Study area

The study area, Chitteri hills, one of the segments of Southern Eastern Ghats, is situated in Pappireddipatti taluk, Dharmapuri District in Tamil Nadu. It is situated towards North East of Salem district within the geographical limit of 78°51'10" - 78°32'40" E, longitude and 11°55'14" - 12°4'48" N latitude and occupies an area of about 654Km².

The hills form a compact block consisting of several hill ranges and contain tangled ridges and ravines running in the North East and South West directions, enclosing many narrow valleys, rivers viz., Kallar, Varattar, Kambalai and Anaimaduvu (Harur Forest office Report, 2007).

The mean maximum and minimum temperatures are 39.5°C and 19°C, while in winter they are 31°C and 18°C respectively. The annual average rainfall ranges from 620 to 1400 mm both from the North East and South West monsoons. Topographically the area is undulating with an altitude varying from 240 to 1266 m.

* Corresponding Author

R. Prabakaran, Department of Botany, Vivekanandha College of Arts & Sciences for Women, Tiruchengode-637 205, Tamil Nadu, India.

Phone: +91-9443334893.

Tribes of Chitteri hills

Malayali tribes are the most significant and dominant tribal communities in Tamil Nadu, present in Chitteri hills. The dialect language of Malayali tribes is Tamil. There are sixty villages, out of these 6 villages located in plains and 54 villages are located in hill tops. According to 2011 census, (provisional) Malayali tribes population is 11,482. Malayali tribes in Chitteri hills are plain agriculture types and supplement their economy with activities like hunting and livestock. The agriculture is characterized by unproductive, uneconomic, lack of facilities and seasonal one. Malayali tribes are unique in folktales, songs, worship, mythology, taboos, religious and social ceremonies. (Thurston & Rangachari, 1909)

The study was carried out during the year 2009-2012 in the forest of Chitteri hills of Dharmapuri District in Tamil Nadu, India. The extensive field surveys were made different seasons of the year. Information on NTFP plant species and their utilization were collected through personal interview with the village headman, farmers and other knowledgeable tribal and traditional healers (Jain, 2010). The information were collected from different age groups and sex, again cross checked with other informants of same tribal community. Usually, NTFP collection season was spread over the whole year for different items.

Plant species used by tribal were collected and identified by field visits covering on all seasons with the help of tribes and floras. The information gathered was entered in the investigation field notebook. Voucher specimens were preserved in the herbaria of the research and PG Department of Botany, Vivekanandha College of Arts and Sciences for Women, (Autonomous), Tiruchengode, Namakkal District, Tamil Nadu.

We have enroute 38 villages and interviewed experienced aged Malayali tribes with help of questionnaire /datasheet.

RESULTS AND DISCUSSION

The present study reveals the role of non timber forest products in the livelihood of Malayali tribes of Chitteri hills. The NTFP knowledge mostly is from wild natural resources than from the agriculture. NTFP utilized by Malayali tribes can be classified under various categories like wild edible forest products, house building materials, fuel wood, household uses and agricultural tools.

Wild edible forest products

Malayali tribes collect wild edible NTFPs that include wild fruits. Leafy vegetables, tubers, which are commonly used for self subsistence. Wild edible plants are important in the livelihood strategies of tribal wild food which are not dietary staples; generally they provide nutritionally valuable supplements in the form of ingredients, vegetables and fruits.

The wild fruits can be categorized based on utilization by human beings and animals. A total of 38 species used by the Malayali tribes for consumption in both fresh and dried forms and

fruit of 6 species have been consumed by various animals such as birds, monkeys, wild boar, deer and Indian gaur. Malayali tribes use 11 different leafy vegetables for cooking purpose from herbs, shrubs and trees. Among vegetables, *Allmania nodiflora* (L.) R. Br. ex. Wight., *Alternanthera sessilis* (L.) R. Br. ex. Dc., *Achyranthus aspera* L., *Cansjeera sheedi* J.Gmelin, *Cassia tora* L., *Cocculus hirsutus* (L.)Diels, *Colocasia esculenta* (L.)Schett., *Commelina benghalensis* L., *Pterolobium hexapetalum* (Roth) Santapau & Wagh. They also consume three species of *Dioscorea* tubers. Honey is generally collected for cash generation and also self subsistence.

Even among the different tribes of Tamil Nadu the diversity of wild edible plants are different from place to place and tribal communities. These results can verify with Nadankunjidam, (2003), Arinthan *et al.* (2003), John Kennedy (2006), Sasi & Rajendran (2011) and Shanmugam (2012).

Fire wood plants

Wood is the oldest fuel known to man. Since time immemorial it has been meeting energy needs for domestic activities such as cooking and heating. One of the most important Non Timber Forest Products for daily life is fuel wood, the only means of energy source of Malayali tribes. The fuel wood species are harvested from the forest close to the hamlets. The species preferred for fuel wood to their easy availability and combustibility. According to Malayali tribes trees which are not considered as a source of good timber treated as firewood. Malayali tribes recognize 20 trees as fuel wood species.

The fire wood utilized by Malayali tribes belong to 20 species, 18 genera and 16 families, they are *Bridelia crenulata* Roxb., *Canthium dicoccum* (Gaertn.) Teijsm. & Binn., *Cassia fistula* L., *Cassia siamea* Lam., *Cassine glauca* (Rottb.) Kuntze, *Diospyros ferrea* (Willd.) Bakh. var. *buxifolia* (Rottb.) Bakh., *Erythroxylum monogynum* Roxb., *Gmelina arborea* Roxb., *Ixora pavetta* Andr., *Madhuca latifolia* J.F. Gmel., *Mallotus philippensis* (Lam.) Muell.-Arg., *Memecylon edule* Roxb., *Naringi crenulata* (Roxb.)Nicolson, *Pleurostylia opposita* (Wall.) Alston, *Premna tomentosa* Willd., *Strychnos potatorum* L., *Tamarindus indica* L., *Vitex altissima* L.f., *Ziziphus rugosa* Lam. and *Ziziphus xylopyrus* (Retz.) Willd. The fire wood is mostly for their livelihood and to some extent earns money by collecting the firewood.

House construction plants

In early human history wood had been of greater importance than the food plants, as a fuel and for weapons and tools. Malayali tribes have clear knowledge about the trees to be used for house construction materials. They are using nine species for house construction and five plant species have been used for thatching. The huts are made up of mud walls to maintain cool environment. Such kind of huts is mainly covered by the leaves and branches of *Phoenix loureirii* Kunth, *Themeda cymbaria* Hackel for roofing and thatching. Malayali tribes use *Chloroxylon swietenia* DC., *Erythroxylum monogynum* Roxb., *Ixora pavetta* Andr. as Nedunkal valai and *Tectona grandis* L.f., *Dalbergia*

latifolia Roxb., *Dendrocalamus strictus* (Roxb)Nees, *Albizia sp.* *Terminalia cernulata* Roth was used as Kuruku valai in construction of hut. Tribal use processed leaf fibers of *Agave angustifolia* Haw. and *Argyrea cuneata* (Willd) Ker Gawler plants for tie the thatching of leaves and woods.

Fodder plants

Forest grazing, a conventional resource, follows a centuries-old use of the forest land fodder is the basic demand of livestock. Domestic animal fodder requirement is fulfilled in the Chitteri hills because of its rich in fodder species. Primarily the members of the Malayali tribes are purely forest dependant; the livestock is the major economic source next to agriculture and an integral part of the traditional livelihood. The domestic livestock of Chitteri hills mainly feed on leaves, pods, usually cultivated and wild varieties of forest plants for fodder use.

Malayali tribes also use trees and shrubs as fodder for their livestock. They cut branches with leaves with the help of sickles. Malayali tribes are used to collect the leaves of wild forest plants. Some of these are *Ficus virens* Ait., *Pleurostyliya opposita* (Wall) Alston, *Schefflera stellata* (Gartner) Harms, *Zizyphus rugosa* Lam., a total of nine species have been utilize as fodder plants. Poaceae members are highly used for fodder in both fresh and dry forms throughout the year are used as fodder in their respective seasons. Malayali tribes people suggest that grazing is necessary for growth of the grasses as the faeces of animals provides very good manure and it prevents the soil from becoming nutrient-deficient. Cultivated crops that form a substantial portion of daily food requirement such as paddy followed by millets.

House hold use plants

Malayali tribes have fine knowledge to use natural resources particularly plants for their day-to-day life. Bark of *Premna tomentosa* Willd used for milk coagulation. Leaves of *Chloroxylon swietenia* DC., used for ripening of fruits. *Albizia amara* (Roxb.) is used as shampoo and *Ficus benghalensis* L. prop root tip used as hair grower. *Premna tomentosa* Willd leaves used for making pittu in order to have taste and flavour. *Agave americana* L. and *Theprosia purpura* leaves used to make liquid detergent. *Hiptage benghalensis* (L.) Kurz. leaves are used to make narcotics. Fruits of *Cappris zeylenica* L. and tuber of *Decalepis hamiltonii* Wight & Arn. used for making pickles. Grinding purposes they use tools made up of *Gmelina arborea* Roxb. wood. Malayali use *Cocccus nucifera* L., *Phoenix loureini* Kunth, *Phoenix* sp to make brooms. The exudates of *Semecarpus anacardium* L., rhizome of *Acorus calamus* L. is used as cosmetics for children and Malayali tribes believed that by marking their children have protect from bad evils. From different parts of plants such as leaves of *Tarrena asiatica* (L.)Kuntze ex Schumann and *Canthium dicoccum* (Gaertn.) Teijsm & Binn. is used to prepare marking and *Mallotus philippensis* (Lam.) Muell.Arg. bark is used to prepare sendhuram. Malayali tribes use *Canthium dicoccum* (Gaertn.) Teijsm & Binn to make combs because of soft nature wood.

Agricultural tools

Malayali tribes in Chitteri hills rely on traditional practice and provide valuable complement formal knowledge of their surroundings and their daily lives. Being traditional agricultural practice Malayali inhabitants of the Chitteri hills use different plants species in making agricultural implements, ploughs, tools handles, sticks, sickle, dagger, hoe, axe and knife handles. They are made from locally available hard and soft wood. *Dendrocalamus strictus* (Roxb)Nees., *Chloroxylon swietenia* DC., *Cassia fistula* L., *Ficus benghalensis* L., *Gmelina arborea* Roxb., *Grevillea robusta* A. Cunn. ex R. Br. and *Memecylon edule* Rezt.

Various tribes in different regions in and around Tamil Nadu state use many species to make agricultural implements. For example Paliyar tribe of Theni district use *Dalbergia latifolia* Roxb., and *Diospyros ebenum* Koen to make plough instrument. Purna tribal of Gujarat make plough parts are made of *Tectona grandis* L.f., *Adina cordifolia*, *Anogeissus latifolia* (Roxb. ex DC.) Wall. ex Guill. & Perr., *Bombax ceiba* L, *Dalbergia sissoo* Roxb trunks and other 12 species for their agricultural implements. Tharu tribal of Nepal use *Acacia catechu* L. and *Dalbergia latifolia* Roxb. The present findings reveal the significance of plant species used by Malayali tribes of Chitteri hills and understand composition and utilization of various wild plants.

Ethnomedicinal plants

Most of the plants recorded in this study area are used as medicinal plants by tribes. Among these bark of 53 species, leaves of 110 species, underground parts 39 species and entire plants of 14 species have been used in curing various ailments.

The plants belong to 45 families of angiosperms and 2 families of Pteridophytes. Among the angiospermic families Euphorbiaceae, Asclepiadaceae and Apocynaceae were widely used by the tribals represented by 17 species each.

The medicinal plants used by tribes belong to 72 tree species (36.7%), followed by herb 45 herbs (22.9%), 38 shrub (14.2%), 28 Climber (14.2%), 21 Straggler (8.6%), 9 prostrate herb (2.7%) and 3liana species (0.6%).

Among the medicinal plants parts used by tribes include fresh young and mature leaves about 110 species (48.5%) and stem bark of 53 species (23.3%) have been used widely. This is followed by 14 species of entire plants (6.1%), root of 39 species (17.1%), rhizome of 23 species (10.1%), fruits 5 species (2%), seeds with 3 species (1.5%), stem latex with two species (1%), root latex tuber and endosperm with one species each (0.5%).

Malayali tribes are used the 16 different types of mode of preparation for curing various ailments. By using various plants parts from different plants, they prepare the crude drug in the form of paste (30.6%), decoction (14.5%). Dry powder (14.7%) and pills (8.7%) finds third place. Fresh entire leaves, fresh leaf juice (0.4%) and rhizome are eaten raw (0.3%), drop (0.15%), stem latex, root latex and fermented products (0.2% each). Mostly fresh plant parts were solely or in combination used either from single species or combinations with other species. These results moreover correlate with following studies (Udayan *et al.*, 2006;

Murugesan *et al.*, 2011 and Suresh *et al.*, 2011). About 52 health ailments are prevailed in Chitteri hills. The Gastro-intestinal problems such as stomach pain, oral ulcer, sprain, respiratory problems such as cold, cough, eosinophil, Tuberculosis and skin diseases such as itch, psoriasis. Rheumatism, inflammation, bone fracture, poison bites such as snake bite, Scorpion bite, centipede

bite, insect bite was also cured. Jaundice, paralysis, piles, mensus bleeding and chest pain were cured. Male impotency, Female impotency, diabetics, birth control, increase in lactation were also treated. Other than human beings, domestic animals ailments were cured diseases like vertigo, increase in lactation, fracture and body strength by remedies from decoction, paste & latex of wild plants.

Table. 1: List of NTFPs plants of Chitteri hills used by Malayali tribes.

S.No	Binomial	Family	Vernacular name	NTFP use
1	<i>Achyranthus aspera</i> L.	Amaranthaceae	Naayuruvi	Leafy vegetable
2	<i>Agave angustifolia</i> Haw.	Agavaceae	Katralai	Fodder plant, Detergent
3	<i>Alangium salvifolium</i> L.	Alangiaceae	Alangi	Wild edible fruit-H
4	<i>Albizia amara</i> (Roxb.)Boivin	Mimosaceae	Arapu	Shampoo plant
5	<i>Allmania nudiflora</i> (L.) R.Br.ex.Wight.	Amaranthaceae	Thoyyakeerai	Leafy vegetable
6	<i>Altermanthera sessillis</i> (L.) R.Br.ex.Dc	Amaranthaceae	Ponnangenni	Leafy vegetable
7	<i>Amaranthus triflorum</i> L.	Amaranthaceae	Mullukeerai	Leafy vegetable
8	<i>Anacardium occidentale</i> L.	Anacardiaceae	Mundhiri	Wild edible fruit-H
9	<i>Artocarpus heterophyllus</i> Lam.	Moraceae	Palamaram	Wild edible fruit-H
10	<i>Atalantia monophylla</i> (L.) Corrêa	Rutaceae	Kaattu Elumichai	Wild edible fruit-H
11	<i>Bombax ceiba</i> L.	Bombacaceae	Ilavu	Fodder plant
12	<i>Borassus flabellifer</i> L.	Arecaceae	Panaimaram	Wild edible fruit-H
13	<i>Bridelia crenulata</i> Roxb.	Euphorbiaceae	Marivaengai	Fire wood
14	<i>Buchanania axillaris</i> (Desr.) Ramamoorthy	Anacardiaceae	Sulluki/Saraparuppu maram	Wild edible fruit -A
15	<i>Cansjeera sheedi</i> J.Gmelin	Opiliaceae	Vandu theemili	Leafy vegetable Wild edible fruit-H , Wild edible fruit-A ,
16	<i>Canthium dicoccum</i> (Gaertn.) Teijsm. & Binn.	Rubiaceae	Nekkini	Wood carving, Fire wood
17	<i>Carissa carandas</i> L.	Apocynaceae	Kilakai	Wild edible fruit-H
18	<i>Cassia fistula</i> L.	Caesalpinioideae	Konnai/Sarakonnai	Agricultural tools Fire wood
19	<i>Cassia siamea</i> Lam.	Caesalpinioideae	Thagarai maram	Fire wood
20	<i>Cassia tora</i> L.	Caesalpinaceae	Thagara	Leafy vegetable
21	<i>Cassine glauca</i> (Rottb.) Kuntze	Celastraceae	Eeli maram/ perumundi	Fire wood
22	<i>Chloroxylon swietenia</i> DC.	Rutaceae	Purasa maram	Coagulation plant Agricultural tools
23	<i>Cleistanthus collinus</i> (Roxb.)Benth.ex.Hook.f.	Euphorbiaceae	oduvan	Fertilizer
24	<i>Cocculus hirsutus</i> (L.)Diels	Menispermaceae	Kattukodi	Leafy vegetable
25	<i>Coccus nucifer</i> L.	Areaceae	Thenai	Brooms
26	<i>Colacasia esculenta</i> (L.)Schott	Araceae	Sema keerai	Leafy vegetable
27	<i>Commelina benghalensis</i> L.	Commelinaceae	Kayyankenakeerai	Leafy vegetable
28	<i>Cordia obliqua</i> Willd.	Boraginaceae	Valluku maram	Wild edible fruit-H
29	<i>Dendrocalamatus strictus</i> L.	Bombaceae	Siruvurai	Agricultural tools Thatching
30	<i>Digera muricata</i> (L.) C. Martius	Amaranthaceae	Pannakeerai	Leafy vegetable
31	<i>Diospyros ebenum</i> Koen.	Ebenaceae	Karungali	Wild edible fruit-H
32	<i>Diospyros ferrea</i> (Willd.) Bakh.	Ebenaceae	Irumbuli	Wild edible fruit-H
33	<i>Diospyros ferrea</i> (Willd.) Bakh. var. <i>buxifolia</i> (Rottb.) Bakh.	Ebenaceae	Irumbuli	Fire wood
34	<i>Erythroxylum monogynum</i> Roxb.	Erythroxylaceae	Sembulichaan/Devadhaaru	Wild edible fruit-H Thatching Fire wood
35	<i>Ficus benghalensis</i> L.	Moraceae	Aala maram	Agricultural tools
36	<i>Ficus racemosa</i> L.	Moraceae	Atthi	Wild edible fruit-H
37	<i>Ficus virens</i> Ait.	Moraceae	Irali/ Maraichi	Fodder plant
38	<i>Flacourtia indica</i> (Burm.f.)Merr.	Flucourtiaceae	-	Wild edible fruit-H
39	<i>Gmelina arborea</i> Roxb.	Lamiaceae	Kumizha maram	Wild edible fruit -A Agricultural tools Fire wood
40	<i>Grevillea robusta</i> A. Cunn. ex R. Br.	Proteaceae	Silver oak	Agricultural tools
41	<i>Grewia tilifolia</i> Vahl.	Sterculiaceae	-	Fodder plant
42	<i>Hiptage benghalensis</i> (L.) Kurz.	Malpighiaceae	Suthala kodi	Narcotics
43	<i>Ixora pavetta</i> Andr.	Rubiaceae	Koraa maram	Thatching Fire wood
45	<i>Limonia acidissima</i> L.	Rutaceae	Vila	Wild edible fruit-H
46	<i>Madhuca latifolia</i> J.F. Gmel.	Sapotaceae	Kaatu illuppai	Wild edible fruit -A Fire wood
47	<i>Mallotus philippensis</i> (Lam.) Muell.-Arg.	Euphorbiaceae	Thirichichilai maram	Fire wood
48	<i>Mangifera indica</i> L.	Anacardiaceae	Maa maram	Wild edible fruit-H
49	<i>Melia azedarach</i> L.	Meliaceae	Malai vaembu	Fertilizer
50	<i>Memecylon edule</i> Retz.	Melastomataceae	Allan maram	Wild edible fruit-H Agricultural tools Fire wood
51	<i>Mimosa intisia</i> L.	Mimosaceae	Sengai	Wild edible fruit-H
52	<i>Mimusops elengi</i> L.	Sapotaceae	Molluva/Magizha maram	Wild edible fruit-H Fire wood
53	<i>Naringi crenulata</i> (Roxb.) Nicolson	Rutaceae	Nai vila/Porivilanga maram	Wild edible fruit -A Fire wood
54	<i>Phoenix loureirii</i> Kunth.	Areaceae	Echam	Brooms Thatching
55	<i>Phonex</i> sp.	Areaceae	-	Brooms
56	<i>Phyllanthus emblica</i> L.	Euphorbiaceae	Periya nelli	Wild edible fruit-H
57	<i>Pithecellobium dulce</i> (Roxb.) Benth.	Mimosoioideae	Konakai/Kodukkaai puli	Wild edible fruit-H
58	<i>Pleurostylia opposita</i> (Wall.) Alston	Celastraceae	Sutholingi	Fodder plant, Fire wood

59	<i>Polyalthia cerasoidea</i> (Roxb.)Beddome	Annonaceae	Senthalamaram	Wild edible fruit-H
60	<i>Premna tomentosa</i> Willd.	Lamiaceae	Ponnari	Wild edible fruit-H , Food making. Fire wood
61	<i>Pterlobium hexapetalum</i> (Roth)Santapu&Wagh	Caesalpinaceae	Karuinadu	Leafy vegetable
62	<i>Pterocarpus marsupium</i> Roxb.	Fabaceae	Vengai	Fodder plant
63	<i>Schefflera stellata</i> (Gaertner)Harms	Araliaceae	-	Fodder plant
64	<i>Schleichera oleosa</i> (Lour.) Oken.	Sapindaceae	Chakkattai/ Araku maram	Wild edible fruit-H
65	<i>Scutia myrtina</i> (Burm.f.)Kurz	Rhamnaceae	-	Wild edible fruit-H
66	<i>Semecarpus anacardium</i> L.	Anacardiaceae	Serra maram	Wild edible fruit-H Fertilizer
67	<i>Shorea roxburghii</i> G. Don	Dipterocarpaceae	Silari/Kungiliyam	Thatching
68	<i>Strychnos potatorum</i> L.	Loganiaceae	Thetha maram	Wild edible fruit -A Fire wood
69	<i>Syzygium cumini</i> (L.) Skeels	Myrtaceae	Navaal	Wild edible fruit-H
70	<i>Tamarindus indica</i> L.	Caesalpinioideae	Puliya maram	Wild edible fruit-H, Fire wood
71	<i>Tarenna asiatica</i> (L.)kunize ex Schumann	Rubiaceae	Tarennae	Wild edible fruit-H Thatching
72	<i>Terminalia bellirica</i> (Gaertn.) Roxb.	Combretaceae	Thandri	Wild edible fruit-H
73	<i>Themeda cymbaria</i> Hackel	Poaceae	-	Thatching
74	<i>Theobroma cacao</i> L.	Sterculiaceae	Cocoa	Wild edible fruit-H
75	<i>Thespesia populena</i> (L.) Soland ex.Correa.	Malvaceae	Pouarasu	Detergent
77	<i>Vitex altissima</i> L.f.	Lamiaceae	Mayilaadi	Fodder plant. Fire wood
78	<i>Ziziphus rugosa</i> Lam. / <i>Ziziphus xylopyrus</i> (Retz.) Willd.	Rhamnaceae	Attan kottai/Kottai maram	Fire wood, Fodder plant
79	<i>Zizyphus mauritina</i> Lam.	Rhamnaceae	-	Wild edible fruit-H
80	<i>Zizyphus oenoplia</i> (L.)Miller	Rhamnaceae	-	Wild edible fruit-H

CONCLUSION

The study has revealed significant role of NTFPs used by Malayali tribes of Chitteri hills. It is clear that these products are extremely important and significant component of the household livelihood of Malayali tribes. The diversity of NTFPs used by Malayali tribes is incredible and possesses a sound knowledge on plants.

ACKNOWLEDGEMENT

The heartfelt thanks to the Chairman, Vivekanandha Educational Institutions and Department of Plant Science, Bharathidasan University, for pursuing the work. They thankful to all people of Malayali tribes, farmers and traditional healers living in Chitteri hills for sharing their knowledge. Heartfelt thanks to tribal informant Mr. Murugesan guided us to visit all the tribal villages of Chitteri hills. The authors also thankful Mr.P.Manikanadan SRF, SACON, Coimbatore and Mr M .Kannan lecturer, Vinkaya Mission University, Salem for their help in field visits.

REFERENCES

- Arinathan V., Mohan VR., John De Britto A., Chelladurai V. Studies of food and medicinal plants of Western Ghats. J. Econ. Taxon. Bot. 2003; 27: 750-753.
- Census. 2011. www.censusindia.gov.in.
- Cunningham AB. Applied ethnobotany, people wild plant use and conservation. Earth Sean publishing Ltd. London and Sterling (2001).
- Harur Forest office Report. 2007. Tamil Nadu Forest Department, Harur range, Harur.
- Hegde RS ., Surya prakash S., Achoth L., Bawa KS .Extraction non timber forest products in the forest of Biligiri Rangan hill, India –I Contribution to rural income. 1996; 50: 243-251.

Jain SK. 2010. A manual of ethnobotany. Scientific publishers, Jodhpur, India.

John Kennedy SM. Commercial non timber forest products collected by the tribals in the Palani hills. Indian Journal of Traditional Knowledge. 2006; 5920: 212 – 216.

Murugesan M., Balasubramaniam V., Arumugasamy K. Ethnomedicinal diversity of Malasars in Velliangiri hills, Western Ghats, Tamil Nadu. Ethnobotany. 2011; 23:88-99.

Nadanakunjan. Some less known wild food plants of Attapadi hills, Western Ghats. J. Econ. Taxon. Bot. 2003; 27(3): 741 – 745.

Sasi R., Rajendran A. Diversity of wild Fruits in Nilgiri hills of the Southern Western Ghats Ethnobotanical aspects. International Journal of Applied Biology and Pharmaceutical Technology, 2012; 3(1): 82 – 87.

Shanmugam S., Muthuraja G., Dhanadekaran M., Annadurai M., Gobinathan S. Ethnobotanical study on the plants used as leafy vegetables by the paliyar tribes of pachalur in Dindigul district of Tamil Nadu, India. Lifesciences leaflets. 2012; 4:44-47.

Suresh K., Kottaimuthu R., Selvin Jebaraj Norman T., Kumuthakalavalli R., Simon M. Ethnobotanical study of medicinal plants used by Malayali tribals in Kolli hills of Tamil Nadu, India. International Journal of Research in Ayurveda and Pharmacy, 2011; 2(2): 502- 508.

Thurston E., Rangachari K. 1909. Castes and Tribes of Southern India, Government Press (Reprinted 1975) Cosmo publication, New Delhi. 406 – 436.

Udayan PS., Sathesh George KV., Tushar., Indira Balachandran. Medicinal plants used by the Malayali tribes of Servarayan hills, Yercaud, Salem district, Tamil Nadu, India. Zoos print Journal. 2006; 21 (4) 2223-2224.

How to cite this article:

R. Prabakaran, T. Senthil Kumar and M.V. Rao. Role of Non Timber Forest Products in the Livelihood of Malayali tribe of Chitteri hills of Southern Eastern Ghats Tamil Nadu, India. J App Pharm Sci, 2013; 3 (05): 056-060.