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Underutilised Fruit Trees in Homegardens of Kerala: An Untapped Source of Food Security in India

AR Jisha Chand and K Azeez*

Research and Development Centre, Bharathiar University, Coimbatore- 641 046, Tamil Nadu, India
**Department of Botany, KAHM Unity Women's College, Manjeri, Malappuram- 676 122, Kerala, India*
e-mail: jishaachand@gmail.com

ABSTRACT

Homegardens are the sites of conservation of a large diversity of plants both wild and domesticated. The term underutilised fruit trees is applied, in the general sense, to a group of fruit trees presently growing in a scattered and unattended way on roadsides, homestead land, waste land etc. inspite of their potential for intensive exploitation. Homestead farming system is prevalent in Kerala with wide variety of plants grown for food, feed, fodder and fuel. In order to find out underutilised fruit trees random studies conducted in seventy five homegardens from three districts of Kerala state, India. Thirty six species of underutilised fruit trees falling under sixteen families were reported. Among thirty six species reported from seventy five homegardens, fifteen were indigenous and the rest were exotics. Most of these underutilised fruit trees establish through natural regeneration of seeds and they grow slowly without supply of any nutrition, start bearing fruits after a long period and produce fruits of inferior quality. Hence these species have remained neglected without any commercial importance. With the ever increasing population pressure and fast depletion of natural resources, it has now become necessary that required attention should be paid to explore the possibilities of exploiting new plant resources in order to meet the growing needs of the human society, which incidentally has depended only on a small fraction of plant wealth comprising less than thirty crops. As alternate crops, these underutilised fruit trees help in diversification besides meeting multifarious human needs.

Key words:

Diversity, Food security, Homegardens, Nutritional value, Underutilised fruits

INTRODUCTION

Homegardening is one of the world's most ancient food production practices and is commonly practiced throughout the world (Landauer and Brazil 1985). Homegardens, with their diversified agricultural crops and trees, are of vital importance to the subsistence economy of many areas in the tropics (High and Shackleton 2000). The predominance of fruit trees is an important characteristic feature of homegardens (Gajaseni and Gajaseni 1999). The homegardens are significant sources of minerals and nutrients (Asfaw and Woldu 1997). Based on a comprehensive literature review (Torquebiau 1992) concluded that dietary supplies from homegardens accounted for 3% to 44% of the

total calorie and 4% to 32% of the protein intake. Homegardens seldom meet the entire basic staple food needs of the family in any given area. As little or no chemical inputs are used in homegarden systems, the products from homegardens can be expected to be of superior quality. The diverse products available year round in the homegardens contribute to food security especially during 'lean' seasons (Christanty et al. 1986).

The Indian state of Kerala is one of the tropical regions, where homegardening has been a way of life for centuries and still critical for local subsistence economy and food security (Kumar and Nair 2004). The farmers of the state usually undertake intensive farming involving a variety of crops on the limited area available in order to obtain food, fuel, fodder, timber and cash from homesteads (Nair and Sreedharan 1986). While investigating the structure and function of agroforestry home gardens of Kerala, Nair and Sreedharan (1986) observed that the size of landholding ranged from 0.02 to 1 ha., with an average of 0.22 ha. A four-tier structure was found to be common in Kerala, and it was observed that the intensive land-use practices of homestead farming were increasingly becoming popular among a majority of the marginal farmers.

The interest in underutilised plants is derived from a variety of human concerns, themes and perspectives. Some of these are ethical or humanitarian; others relate to self sufficiency, economic gains, resource management, agricultural diversification, germplasm conservation or augmentation, nutrition and energy independence (Bates 1985). A large proportion of Kerala homegardens have been converted into small scale plantations of coconut and rubber (*Hevea brasiliensis*) or to cropping systems consisting of less number of crops (Ashokan and Kumar 1997). Species losses from homegardens are said to occur at an unprecedented rate. Although precise data are not available, it seems reasonable to surmise that floristic diversity of homegardens in most parts of the world has declined during the past four to five decades. Contrary to the general fear at the global level that homegardens are losing their traditional characteristics and are being transformed into species poor, cash crop production system, the present study aim to popularise some underutilised fruit tree species for enhancing the economic value of homegardens and ensuring food security include with tree improvement, domestication and sustainable cultivation of these species in order to conserve diversity.

MATERIAL AND METHODS

The field study was conducted in the Kerala state (8°18' and 12°48' N latitude and 74°52' and 77°22' E longitude) of Peninsular India, which has a total geographical area of 38,863 km^2 and a population 33,387,677. The state has a complex topography with mountains, valleys, ridges and scarps. The altitude varies from sea level to 2695 m asl. Based on the altitude, the land is divided into high ranges (above 750 m from sea level); highlands (between 75-750 m asl); midland (between 7.5- 75 m asl) and lowlands (below 7.5 m asl).

The state receives both south-west and north-east monsoons. The number of rainy days varies from 45-172 in a year. The mean annual rainfall is 2693 mm. The mean annual temperature varies from 25.4°C to 31°C in the central parts of Kerala, while the temperature drops to 15°C in the hills. March-May are summer months and the temperature raises to 40°C in the central plains. The mean relative humidity varies between 85-95 per cent during June and 70 per cent during summer months. Kerala has diverse types of soils such as alluvial, sandy, laterite, red, black and peat soil. The state is administratively divided into 14 districts.

Seventy five homegardens were randomly selected from three districts of Kerala state, namely Thiruvananthapuram, Thrissur and Wayanad. Field research in these selected homegardens was restricted to underutilised fruit trees and consisted of an inventory, specimens were identified by reference to Gamble and Fischer (1957) and Sasidharan (2004).

RESULTS AND DISCUSSION

All the homegardens in the study followed a multilayered canopy arrangement. A

major portion of the upper canopy of home gardens, above 25 m in height, includes coconut, arecanut, fruit trees, and trees used for timber. This is followed by medium-sized fruit trees, spices, and timber or fuel trees, growing to a height of 10–20 m. The third layer of 3–10 m height comprises crops like pepper, tree spices, and fruit trees. The lowest layer, between 1–3 m in height, includes banana, cassava, and other tuber crops. At ground level, pineapple, vegetables, and other herbaceous crops are grown.

In the study area, cultivated species like coconut, arecanut, etc. were actively managed (eg. weeding, fertilizer application etc.), but for underutilised fruit tree species management was relatively passive (toleration and protection). The study has identified a number of underutilised fruit tree species freely growing in homegardens of the state. Some of them are indigenous and others are exotics which are well adapted to climate. A list is presented in Table 1.

Table 1: List of Underutilised fruit tree species in homegardens of Kerala

S. No.	Botanical name	Family	Vernacular/ Local names	Flowering & Fruiting
1	*Aegle marmelos* (L.) Correa.	Rutaceae	English: Bael tree, Bengal quince, Holy fruit tree, Indian Bael, Stone apple Malayalam: Koolakam, Koovalam, Mavilavu Vilvam	March-May
2	**Annona reticulata* L	Annonaceae	English: Bullock's heart, Custard apple Malayalam: Aatha, Aathachakka, Manilanilam, Parankichakka, Ramachakkamaram, Ramasita, Vlathi	May-August
3	**Annona squamosa* L.	Annonaceae	English: Sugar apple, Sweet sop Malayalam: Amruthakkai, Seethappazham	June-October
4	**Annona muricata* L.	Annonaceae	English: Soursop, Prickly custard apple Malayalam: Cancer chakka, Mullanjakka, Mulluathi	April - October
5	*Aporosa cardiosperma* (Gaertn.) Merr.	Euphorbiaceae	EnglishLindley's aporosa Malayalam: Aechil, Eachil, Kotili, Ponvetti, Vetti	December - June
6	*Artocarpus heterophyllus* Lam.	Moraceae	English: Jack fruit tree Malayalam: Chakka maram, Chakka, Kottachakka, Pilavu, Plavu	November - April
7	*Artocarpus hirsutus* Lam.	Moraceae	English: Wild jack Malayalam: Anjili, Ayani	December - March
8	**Artocarpus incisus* (Thunb.) L.f.	Moraceae	English: Bread fruit Malayalam: Kadachakka, Kadapilavu, Seemaplavu	January -June

9	*Averrhoa bilimbi* L.	Oxalidaceae	English: Bilimbi, Cucumber tree, Tree sorrel Malayalam: Irumbampuli, Pulinchi, Vilimbi	March-May
10	*Averrhoa carambola* L.	Oxalidaceae	English: Carambola apple, Coromandel gooseberry, Star fruit tree Malayalam: Anappulinchi, Chathurapuli, Karambola	May-August
11	*Baccaurea courtallensis* (Wight) Muell. -Arg	Euphorbiaceae	English: Moottyfruit Malayalam: Mootikaya, Mootilpazham, Mootippuli	January-June
12	*Borassus flabellifer* L.	Arecaceae	English: Palmyra palm Malayalam: Ampana, Karimbana	March-September
13	*Chrysophyllum cainito* L.	Sapotaceae	English: Caimito, Golden leaf tree, Star apple, West Indian star apple Malayalam: Swarnapathry	July-September
14	*Citrus maxima* (Burm. f.) Merr.	Rutaceae	English: Babloos, Bamblimoos, Pomelo Malayalam: Babloos, Kambilinaranga	April-November
15	*Ficus auriculata* Lour.	Moraceae	English: Elephant ear fig tree, Giant Indian fig Malayalam: Atthi, Seema atthi	November-February
16	*Flacourtia jangomas* (Lour.) Raeusch.	Flacourtiaceae	English: Coffee plum, Puneala plum, Spiked flacourtia Malayalam: Lavalolikka, Loika, Luikka	November-April
17	*Flacourtia montana* Graham.	Flacourtiaceae	English: Governor's plum, Indian plum Malayalam: Chalirpazham, Charalmaram, Charalpazham, Kattuloika	April-June
18	*Garcinia gummi-gutta* (L.) Robs.	Clusiaceae	English: Malabar gamboge Malayalam: Kodampuli, Korakkapuli, Kudapuli, Meenpuli, Pinampuli	January-September
19	*Garcinea indica* (Thouars) Choisy	Clusiaceae	English: Indian gamboge, Indian tallow tree, Kokam butter tree, Kokum, Wild mangosteen Malayalam: Punampuli	November-August
20	*Garcinia mangostana* L.	Clusiaceae	English: Mangosteen Malayalam: Mangosta, Mangustan	Throughout the year

21	Garcinia xanthochymus Hook.f. ex Anders.	Clusiaceae	English: Sour mangosteen, Yellow mangosteen Malayalam: Monthanpuli, Pinar, Vayirapuli	Throughout the year
22	Grewia tilifoliaVahl.	Tiliaceae	English: Dhaman Malayalam: Chadachi, Unnam	February - June
23	Limonia acidissima L.	Rutaceae	English: Curd fruit, Elephant apple, Wood apple, Monkey fruit Malayalam: Vilankai, Vilarmaram, Vilavu	December-June
24	Mimusops elengi L.	Sapotaceae	English: Asian bullet wood, Bullet wood, Spanish cherry Malayalam: Bakulam, Elanchi, Elangi, Mukura	December- August
25	*Nephelium lappaceum L.	Sapindaceae	English: Rambutan Malayalam: Rambutan	March - July
26	*Persea americana Mill.	Lauraceae	English: Alligator pear, Avocado, Butter fruit Malayalam: Vennapazham	March-September
27	*Phyllanthus acidus (L.) Skeels.	Euphorbiaceae	English: Star Gooseberry Malayal am: Arinelli, Nakshatranelli, Nellipuli, Pulinelli, Seemanelli	December - August
28	Phyllanthus emblica L.	Euphorbiaceae	English: Indian gooseberry Malayalam: Nelli, Nellikkamaram	July-February
29	*Pouteria campechiana (Kunth.) Baehni.	Sapotaceae	English: Egg fruit, Yellow sapota Malayalam: Muttappazham	January - June
30	Spondias pinnata (L.f.) kurz	Anacardiaceae	English: Hog plum, Indian hog plum, Wild mango Malayalam: Ambazham, Kattambazham, Mampuli	March - December
31	*Syzygium aqueum (Burm.f.) Alston	Myrtaceae	English: Bell fruit, Water apple, Water cherry, Watery rose -apple, Malayalam: Chamba, Panineer jamba, Jamba, Jambakka	December-June
32	Syzygium cumini (L.) Skeels	Myrtaceae	English: Black plum, Jaman, Java plum Malayalam: Njara, Njaval	December-April

33	*Syzygium jambos* (L.) Alston	Myrtaceae	English: Malabar plum, Rose apple Malayalam: Champa, Malaykachampa, Seemajamba	October-January
34	*Syzygium malaccense* (L) Merr. & Perry	Myrtaceae	English: Malay Apple, Pomarosa Malayalam: Chuvannachamba	February-June
35	*Tamarindus indica* L.	Fabaceae	English: Tamarind tree, Indian date, Sampalok Malayalam: Kolpuli, Puli, Valampuli	September-April
36	*Ziziphus mauritiana* Lam.	Rhamnaceae	English: Common jujube, Indian jujube, Jujube tree Malayalam: Elentha, Jujuba, Ilantha, Lanthapazham, Perimthudali	February-April

*Exotics

These underutilised fruit trees growing in homegardens provide food, nutrition and some income for rural people. However, sustainable increase in production of underutilised fruits from homegardens are essential. At present, these fruits are not used very efficiently because of lack of good quality planting material, poor management, and constraints on product development and marketing. Moreover, farmers lack access to the information they need to improve the situation. Since most of these fruits have not yet been subjected to evaluation for various kinds of value added products, they cannot be subjected to mass production. An appropriate technology needs to be developed to popularise these fruits.

CONCLUSION

Most of the tropical underutilised fruits are often available only in the local markets and are rarely known in other parts of the country. Some of these fruits have excellent flavour, juiciness and have very attractive appearance. Underutilised fruits rich in vitamins, minerals, anti-oxidants and with other medicinal properties have bright market future. There is always a good market demand all over the world for new food products especially which are highly nutritious and delicately flavoured. Demand for natural, herbal and non-synthetic food products is increasing among urban, middle and upper middle class of developing and developed countries. In this context, underutilised fruit trees appear to be the crop of future and need focused attention as it can meet nutritional needs as well as other human requirements throughout the different parts of the world. The planned cultivation of these plants also helps sustain the effect of climate change. Popularising underutilised fruit tree species among farmers with due market support for fruits and other value added products will definitely ensure the commercial cultivation of these fruit tree species to bring them in mainstream of Indian horticulture.

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