Content list available at http://epubs.icar.org.in, www.kiran.nic.in; ISSN: 0970-6429

Indian Journal of Hill Farming

December 2023, Volume 36, Issue 2, Pages 20-30

Status, diversity and traditional uses of the homestead gardens under Salari Belt of Arunachal Pradesh

Juri Das[1] • Ajitabh Bora[2*] • Duyi Samyor[1] • Ranjeet Patel[2] • Baikunth Jyoti Gogoi[2]

[1]Research Associate, Defense Research Laboratory, DRDO, R&D Centre, Salari, West Kameng, Arunachal Pradesh
[2]Scientist, Defense Research Laboratory, DRDO, Tezpur, Assam

ARTICLE INFO

Article history:
Received: 12 July, 2023
Revision: 31 July, 2023
Accepted: 08 August, 2023

Key words: *Homestead gardens, agro-forestry, Salari-belt*

DOI: 10.56678/iahf-2023.36.02.4

ABSTRACT

Home stead gardens play an important role in fulfilling the basic needs and also conserving and maintaining the plant diversity in a sustainable and socially justifiable manner. Home stead gardens also have distinct horizontal structure which together help in the efficient utilization of water, light and space, and support diverse wildlife species besides meeting various social and basic needs of families. Homestead garden of Salari belt which comprise of three villages was observed in the following study. The Sartang tribe of Salari focus mainly on temperate horticultural crops like Mandarin (*Citrus reticulata*), Mango (*Mangifera indica*), Peach (*Prunus persica*), Pear (*Pyrus calleryana*), Guava (*Psidium guajava*) and aromatic plant (*Elettaria cardomum*). Most of their livelihood is earn by major fruit trees. In addition to that, the people of Salari village also depend on the seasonal vegetables. The inter-space between the fruit trees was not kept vacant round the year. Chilli (*Capsicum frutescens*), soybean (*Glycine max*), kidneybean (*Phaseolus vulgaris*) and colecrops (members of Crucifereae family) was grown round the year that the villagers preferred growing vegetables mostly. In Dekhiyan basti the women of the villagers were engaged in the agricultural practices, whereas the male population were busy in collecting firewood and timber species. Chilli (*Capsicum frutescens*), bitter brinjal (*Solanum incanum*) kidneybean (*Phaseolus vulgaris*) and colecrops (members of Crucifereae family) were practiced mostly. The villagers of the Khoitam basti practice agriculture under undulating elevation, first layer comprise of timber or firewood species. The second layer was pre-occupied by green cardamom (*Elettaria cardomum*) whereas the third layer were occupied mostly by the seasonal vegetables or crops from members of Cucurbitaceae family, respectively. The first layer act as the windbreak and provide shade to cardamom. On an average it was observed that most of the homestead gardens have wider species diversity.

1. Introduction

Homestead gardens are a time-tested local strategy that are widely adopted and practiced in various circumstances by local communities with limited resources in many developing countries and are widely used as a remedy to alleviate poverty and malnutrition. They play an important role in fulfilling the basic needs and also conserving and maintaining the plant diversity in a sustainable and socially justifiable manner. During the last 40–50 years, the relative importance has shifted from the traditional forestry to homestead forestry; in such a situation, homestead garden plays a vital role in providing firewood, fodder, medicine, fruit, and timber. It is estimated that about 70% of timber, 90% of firewood, 48% of sawn and veneer logs, and almost 90% of bamboo requirements were met from homestead forest (Uddin *et al.,* 2001).

Homestead garden are traditional agro forestry systems characterized by the complexity of their structure and multiple functions. Homestead gardens can be defined as 'land use system involving deliberate management of multipurpose trees and shrubs in intimate association with annual and perennial agricultural crops and invariably

*Corresponding author: ajitabh.drl@gov.in

livestock within the compounds of individual houses, the whole tree-crop animal unit being intensively managed by family labour (Fernandez & Nair 1986). Home stead gardens also have distinct horizontal structure which together help in the efficient utilization of water, light and space, and support diverse wildlife species besides meeting various social and basic needs of families. Homestead garden have attracted considerable research attention during the past three decades (Wojtkowski 1993) mainly due to the following reasons: (i) they contain characteristics which make them an interesting model for research and the design of sustainable agro ecosystems, including efficient nutrient cycling, high biodiversity, low use of external inputs and soil conservation potential (Torquebiau 1992; Jose & Shanmugaratnam 1993) and (ii) home stead gardens have been shown to provide a diverse and stable supply of socio-economic products and benefits to the families that maintain them (Christanty 1990).

The present study revolves around the Salari region which comprise of three villages namely, Salari, Khoitam and Dekhiyan basti. There homestead gardens represent a well-established traditional land-use system, which are maintained by at least 150 households. The women particulary maintained the homestead gardens. Akhter *et al.* (2010) also reported the role of women in homestead gardens management in the north-eastern Bangladesh. The management of the traditional homestead garden has evolved as a response to many factors such as cultural, economic and, environmental as well as personal preferences. Again, here the main driving force for the species selection is totally biased, mainly economic preference. Motiur *et al.* (2006) also reported the role of homestead gardens in rural economy. The domesticated crops are not even documented from the Salari belt, so we tried to record the different genetic diversit of the species present in the Salari belt.

2. Methodology

Site Characteristics

The study sites were located in the Salari village of West Kameng district of Arunachal Pradesh. Salari village is located in Dirang tehsil of West Kameng district (Figure 1). Salari village lies between 27° 31' N to 92° 41' E. Agriculture is the fundamental occupation of the people of Salari. It is occupied by very high mountains. The district experiences an annual rainfall of 1580 cm. The mean annual absolute maximum air temperature is 35.5°C and mean annual absolute minimum air temperature is 3.5°C. Topography includes medium slope.

Sampling Protocol

The size of the homestead gardens sampled ranged from 0.01 to 0.11 ha. Since the land holding pattern of majority of the villagers falls in the category of either marginal or small holders and large farmer category represent only a small fraction of the village, therefore, in the present study, sampling was done mostly from the marginal and small farmers' category. Total 30 household was selected and surveyed by administering a semi structured questionnaire for socio-economic factors and information on homestead garden size, and management practices, species richness etc. Plant uses defined by villagers were documented and each plant was allotted a category according to its main use like vegetable, medicine, ornamental, timber, fruits etc. Plant specimens collected were identified with the help of literature of Santapau *et al.* 1998 and Kanjilal *et al.* 1934-1940 and matched at Assam.

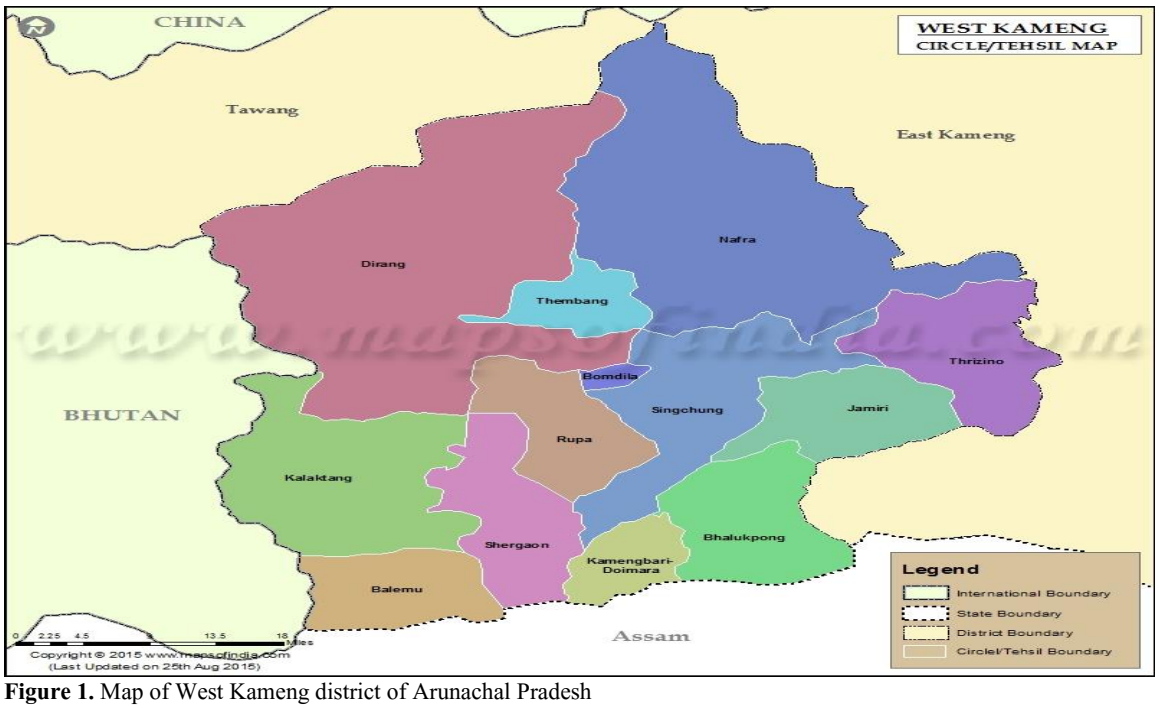


Figure 1. Map of West Kameng district of Arunachal Pradesh

Table 1. Major fruit plants diversity in the homestead garden with their parts used

Species	Family	Local name	Parts used
Artocarpus heterophylla Lamarck	Moraceae	*Kothal*	Fleshy sacs, seeds
Citrus aurantifolia (Christmann) Swingle	Rutaceae	*Nimbu*	Juicy sacs
Citrus reticulata	Rutaceae	*Suntala*	Pulp
Mangifera indica Linnaeus	Anacardiaceae	*Aam*	Mesocarp
Musa sapientum Linnaeus	Musaceae	*Cheni champa*	Fleshy part
Prunus persica Linnaeus	Rosaceae	*Peach*	Fleshy part
Pyrus calleryana Linnaeus	Rosaceae	*Pear*	Fleshy part
Psidium guajava Linnaeus	Myrtaceae	*Madhuriam*	Fleshy part
Punica granatum Linnaeus	Punicaceae	*Dalim*	Juicy aril
Prunus domestica	Rosaceae	*Plum*	Fleshy part

Table 2. Minor fruit plants diversity in the homestead garden with their parts used

Species	Family	Local name	Parts used
Anona reticulata Linnaeus	Annonaceae	Atlas	Pulp
Averrhoa carambola Linnaeus	Averrhoeaceae	Kordoi	Whole fruit
Citrus grandis (Linnaeus) Osbeck	Rutaceae	Robab tenga	Juicy sacs
Citrus jambhiri Lushington	Rutaceae	Gol nimbu	Juicy sacs
Dillenia indica Linnaeus	Dilleniaceae	Ou-tenga	Calyx
Diospyros lancaefolia Roxburgh	Ebenaceae	Kendu	Mesocarp
Elaeagnus latifolia Linnaeus	Elaeagnaceae	Mirika tenga	Fleshy part
Elaeocarpus floribundus Blume	Elaeocarpaceae	Jalpai	Fleshy part
Emblica officinalis Gaertner	Euphorbiaceae	Amla	Fleshy part
Flacourtia jangomas	Flacourtiaceae	Poniol	Fleshy part
Garcinia pedunculata Roxburgh	Clusiaceae	Nikli imli	Fleshy part
Prunus persica (Linnaeus) Batsch	Rosaceae	Bogori	Fleshy part
Syzygium cumini (Linnaeus) Skeels	Myrtaceae	Kala jamun	Fleshy part
Syzygium jambos (Linnaeus) Alston	Myrtaceae	Safed jamun	Fleshy part
Tamarindus indica Linnaeus	Fabaceae	Imli	Pulp
Terminalia bellerica	Myrtaceae	Bhomora	Kernel
Terminalia chebula Retzius	Myrtaceae	Hilika	Fleshy part

Table 3. Diversity of vegetables in the homestead garden with their parts used

Species	Family	Local name	Parts used
Abelmoschus esculentus (Linnaeus) Moench	Malvaceae	*Bhendi*	Immature fruit
Alocasia indica (Roxburgh) Schott	Araceae	*Kochu*	Leaves
Alocasia cucullata (Loureiro) Schott	Araceae	*Kochu*	Tuber
Amaranthus gangeticus Linnaeus	Amaranthaceae	*Morisa sak*	Leaves
Brassica oleracea var. *italica* Linnaeus	Brassicaceae	*Broccoli*	Green curd (head) with stem
Brassica oleracea var. *capitata* Linnaeus	Brassicaceae	*Bondha kobi*	Leaves
Brassica oleracea var. *botrytis* Linnaeus	Brassicaceae	*Phul kobi*	Yellow curd (head) of aborted floral meristem

Brassica oleracea var. *gongylodes* Linnaeus	Brassicaceae	*Ol kobi*	Tuber
Brassica rugosa (Roxburgh) L.H.Bailey	Brassicaceae	*Lai*	Leaf
Benincasa hispida (Thunb.) Cogniaux	Cucurbitaceae	*Kumora*	Fruit
Beta vulgaris Linnaeus	Chenopodiaceae	*Beet*	Tuber
Centella asiatica (Linnaeus) Urban	Apiaceae	*Bara manimuni*	Leaves
Chenopodium album Linnaeus	Chenopodiaceae	*Buthua*	Leaves
Cissus quadrangularis Linnaeus	Vitaceae	*Har jora*	Stem
Clerodendrum colebrookianum Walpers	Verbenaceae	*Tita patta*	Tender shoot
Coccinia grandis (Linnaeus) Voigt	Cucurbitaceae	*Kundoli*	Fruit
Corchorus capsularis Linnaeus	Tiliaceae	*Mora pat*	Leaves
Cucumis sativus Linnaeus	Cucurbitaceae	*Cucumber*	Fruit
Cucurbita moschata Duchesne	Cucurbitaceae	*Ronga lau*	Fruit & twigs
Daucus carota Linnaeus var. *sativa*. DC.	Apiaceae	*Gajor*	Root
Dioscorea alata Linnaeus	Dioscoreaceae	*Kath alu*	Tuber
Dioscorea bulbifera Linnaeus	Dioscoreaceae	*Gothia alu*	Tuber
Dioscorea esculenta (Loureiro) Schott	Dioscoreaceae	*Moa alu*	Tuber
Dolichos lablab Linnaeus	Fabaceae	*Simi*	Fruit
Hibiscus cannabinus Linnaeus	Malvaceae	*Mesta tenga*	Leaf and calyx
Houttuynia cordata Thunberg	Saururaceae	*Khaji*	Leaves
Hydrocotyle sibthorpioides Lamarck	Apiaceae	*Chotu manimoni*	Whole plant
Lagenaria siceraria (Molina) Standley	Cucurbitaceae	*Lauki*	Fruit
Luffa cylindrica (Linnaeus) M.J. Roemer	Cucurbitaceae	*Bhol*	Fruit
Luffa acutangula Roxburgh	Cucurbitaceae	*Jika*	Fruit
Lycopersicon esculentum Linnaeus	Solanaceae	*Tamatar*	Fruit
Lycopersicon pimpinifolia Linnaeus	Solanaceae	*Chota Tamatar*	Fruit
Malva verticillata Linnaeus	Malvaceae	*Lofa*	Leaves
Manihot esculenta Crantz	Euphorbiaceae	*Simolu alu*	Tuber
Momordica charantia Linnaeus	Cucurbitaceae	*Kerela*	Fruit
Momordica dioica Roxburgh *ex* Willdenow	Cucurbitaceae	*Bhat kerela*	Fruit
Moringa oleifera Lamarck	Moringaceae	*Sajina*	Fruit & leaves
Musa paradisiaca Linnaeus	Musaceae	*Kach kol*	Flower
Myriactis nepalensis	Asteraceae	*Babori*	Leaves
Nasturtium officinale	Brassicaceae	*Simi*	Leaves
Paederia foetida	Rubiaceae	*Bhedoilota*	Leaves
Phaseolus vulgaris	Fabaceae	*French bean*	Fruit
Phlogacanthus thyrsiflorus (Roxburgh) Nees	Acanthaceae	*Ronga bahok*	Flower
Pisum sativum Linnaeus	Fabaceae	*Motor*	Seeds
Polygonum microcephallum D. Don	Polygonaceae	*Madhusuleng*	Leaves
Portulaca oleracea Linnaeus	Portulaceae	Malbhog sak	Twig
Solanum melongena Linnaeus	Solanaceae	*Bengon*	Fruit
Solanum betaceum Linnaeus	Solanaceae	*Tree tomato*	Fruit
Solanum torvum	Solanaceae	*Hati bhekuri*	Fruit
Solanum indicum	Solanaceae	*Tita bhekuri*	Fruit
Solanum incanum	Solanaceae	*Tita bengon*	Fruit
Spinacia oleracia Linnaeus	Chenopodiaceae	*Paleng*	Leaves
Trichosanthes dioica Roxburgh	Cucurbitaceae	*Potol*	Fruit
Trichosanthes cucumerina var. *anguina*	Cucurbitaceae	*Dhunduli*	Fruit
Trigonella foenum-graecum Linnaeus	Fabaceae	*Methi*	Leaves
Vigna unguiculata Linnaeus	Fabaceae	*Dangbodi*	Immature Fruit

Table 4. Medicinal and aromatic plants diversity in the homestead garden and their uses

Species	Family	Local name	Parts used	Uses
Aquilaria agallocha	Thymelaeaceae	Sasi	Pods	Liver tonic
Acorus calamus Linnaeus	Araceae	*Boch*	Rhizome	Brain tonic
Aconitum ferox	Ranunculaceae	*Atish*	Roots	Anaemia
Andrographis paniculate	Acanthaceae	*Chiraita*	Whole plant	Liver tonic
Adhatoda zeylanica Nees	Acanthaceae	*Tita bahak*	Leaves	Bronchitis
Aloe barbadensis Miller	Liliaceae	*Aloevera*	Leaves	Dandruff
Asparagus racemosus Willdenow	Liliaceae	*Satmul*	Tuber	Appetizer
Azadirachta indica A. Jussieu	Meliaceae	*Maha neem*	Leaves	Skin disease
Bacopa monnieri (Linnaeus) Pennell	Scrophulariaceae	*Brahmmi*	Twig	Brain tonic
Bryophyllum pinnatum Salisbury	Crassulaceae	*Duportenga*	Leaves	Kidney stone
Cinnamomum tamala	Lauraceae	*Tejpat*	Leaf	Condiment
Curcuma domestica Valeton	Zingiberaceae	*Haldi*	Rhizome	Spice
Coptis teeta		*Mishmi teeta*	Root	Jaundice
Clerodendrum indicum (Linnaeus) O. Kuntze	Verbenaceae	*Akalbih*	Root	Jaundice
Dioscorea floribunda	Dioscoreaceae	*Kham alu*	Tuber	Tape worm
Elettaria cardamomum (L.) Maton	Zingiberaceae	*Eilaichi*	Small seed pods, seeds	Spice
Illicium griffithii	Schisandraceae	*Lissi*	Fruit	Fever
Oroxylum indicum	Bignoniaceae	*Jigat*	Bark	Fever
Gymnadaenia orchidis	Orchidaceae	*Panch hath*	Flower	Immunity booster
Rauvolfia serpentina	Apocynaceae	*Jadu root*	Root	Blood pressure
Kaempferia galanga Linnaeus	Zingiberaceae infection	*Bura ada*	Root	Skin
Mimusops elengi Linnaeus	Sapotaceae	*Bakul*	Twig	Toothache
Murraya koenigii (Linnaeus) Sprengel	Rutaceae	*Narasingho*	Leaves	Anemia
Panax sikkimensis	Araliaceae	*Ginseng*	Tubers	Vitality and vigour
Picrorrhiza kurroa	Plantaginaceae	*Kutki*	Rhizome	Immunity booster
Piper longum	Piperaceae	*Pipli*	Fruit	Spice
Rubia cordifolia	Rubiaceae	*Manjista*	Leaves	Immunity booster
Whithania somnifera	Solanaceae	*Aswagandha*	Roots	Vitality and vigour
Rauvolfia serpentinea	Apocynaceae	*Sarpagandha*	Roots	Blood pressure
Taxus baccata	Taxaceae	*Yew*	Leaves	Breast cancer
Tinospora cordifolia	Menispermaceae	*Giloy*	Leaves and stem	Immunity booster
Terminalia arjuna (Roxburgh *ex* DC.)	Myrtaceae	*Arjun*	Stem bark	Heart tonic
Vitex negundo Linnaeus	Verbenaceae	*Posotia*	Leaves	Skin disease

Table 5. Ornamental plant diversity in the homestead garden and their uses

Species	Family	Local name	Parts used
Amaryllis belladonna	Amaryllidaceae	Safed lahsun patta	Leaf & flower
Aglaonema pictum	Araceae	Lal money plant	Leaves
Bauhinia variegata Linnaeus	Caesalpiniaceae	Kanchan	Flower
Bulbophyllum crassipes	Orchidaceae	Orchid	Flower
Catharanthus roseus	Apocynaceae	Sadabahar	Flower
Chlorophytum comosum	Asparagaceae	Spider plant	Leaves
Crassula ovate	Crassulaceae	Jade plant	Leaves
Crinum asiaticum Linnaeus	Amaryllidaceae	Lasun patta	Leaf & flower
Callistemon viminalis	Myrtaceae	Bottle brush	Flower
Callistephus chinensis	Asteraceae	Duplicate sunflower	Flower
Canna indica var. indica	Cannaceae	Parijat	Flower
Canna indica var. maculata	Cannaceae	Parijat	Flower
Cosmos bipinnatus	Asteraceae	Cosmos	Flower
Clitoria ternatea Linnaeus	Fabaceae	Aparajita	Flower
Cymbdium walu	Orchidaceae	Orchid	Flower
Dahlia pinnata Cavan	Asteraceae	Dalia	Flower
Datura metel Linnaeus	Solanaceae	Datura	Flower
Dendrobium thyrsiflorum	Orchidaceae	Orchid	Flower
Dendrobium ochreatu	Orchidaceae	Orchid	Flower
Dracaena trifasciata	Asparagaceae	Snake plant	Leaves
Epipremnum aureum	Araceae	Money plant	Leaves
Euphobia pulcherrima	Euphorbiaceae	Poinsettia	Flower
Gomphrena globosa	Amaranthaceae	Purple phul	Flower
Hydrangea macrophylla	Hydrangeaceae	Hydrangea	Flower
Hibiscus rosa sinensis	Malvaceae	Chinese rose	Flower
Helianthus annus L.	Asteraceae	Sunflower	Flower
Jasmium sambac (Linnaeus) Aiton	Oleaceae	Chandrika	Flower
Malvaviscus arboreus Cavan	Malvaceae	Pahimuja	Flower
Mirabilis jalapa Linnaeus	Nyctaginaceae	Gopal	Flower
Murraya paniculata	Rutaceae	Kamini	Flower
Nyctanthes arbortristis Linnaeus	Nyctaginaceae	Sewali	Flower
Plumeria acuminata Aiton	Apocynaceae	Shun champa	Flower
Paphiopedilum insigne	Orchidaceae	Orchid	Flower
Pilea peperomioides	Urticaceae	Chinese money plant	Leaves
Polianthes tuberosa Linnaeus	Amaryllidaceae	Rojonigondha	Flower
Polyalthia longifolia	Annonaceae	Debadaru	Leaves
Portulaca grandiflora Hooker	Portulacaceae	Office phul	Flower
Putranjiva roxburghii Wallich	Euphorbiaceae	Putranjiva	Leaves
Sedum morganianum	Crassulaceae	Donkey tail	Leaves
Senecio rowleyanus	Asteraceae	String of pearls	Leaves
Ipomoea quamoclit Linnaeus	Convolvulaceae	Tarulota	Leaves
Rhynchostylis retusa	Orchidaceae	Orchid	Flower
Rosa alba Linnaeus	Rosaceae	Gulab	Flower
Vanda coerulea	Orchidaceae	Orchid	Flower
Taraxacum platycarpum	Asteraceae	Yellow daisy	Flower
Tabernaemontana divaricate	Apocynaceae	Kothona	Flower
Tagetes erecta Linnaeus	Asteraceae	Narji phul	Flower
Zinnia elegans	Asteraceae	Zinnia	Flower

Table 6. Plants for miscellaneous uses in the homestead garden

Species	Family	Local name	Parts used	Uses
Acer oblongum	Sapindaceae	*Phenphenba shing*	Stem	Timber and fuelwood
Acer pectinatum	Sapindaceae	*Khubilam shing*	Stem	Firewood
Albizia lebbeck	Fabaceae	*Knorshing*	Stem	Building material
Alnus nepalensis	Betulaceae	*Gongjenang shing*	Stem	Building material
Allium cepa Linnaeus	Liliaceae	*Pyaj*	Tuber	Condiment
Allium sativum Linnaeus	Liliaceae	*Lahsun*	Tuber	Condiment
Bambusa balcooa Roxburgh	Poaceae	*Bhaluka bah*	Culm	Building material
Bambusa polymorpha Munro	Poaceae	*Betua bah*	Culm	Building material
Bambusa pallida Munro	Poaceae	*Bah*	Culm	Building material
Bixa orellana Linnaeus	Bixaceae	*Joroth*	Seed	Dye
Cassia fistula Linnaeus	Caesalpiniaceae	*Sunaru*	Stem	Timber
Clerodendrum serratum	Verbenaceae	*Nangal bhonga*	Leaf	Local liquor
Coriandrum sativum Linnaeus	Apiaceae	*Dhania*	Leaf	Condiment
Cupressus torulosa	Cupressaceae	*Chanang shing*	Branches	Fuelwood
Cytisus scoparius	Fabaceae	*Jharu*	Stem	Cleaning purpose
Dendrocalamus hamiltonii	Poaceae	*Kako bah*	Culm	Building material
Eryngium foetidum Linnaeus	Apiaceae	*Man dhania*	Leaf	Flavouring agent
Flemingia strobilifera (Linnaeus)	Fabaceae	*Makhioti*	Flowering twig	Cultural significance
Juglans regia	Juglandaceae	*Khae shing*	Stem and leaves	Timber and manure
Garuga pinnata Roxburgh	Burseraceae	*Jia*	Stem	Timber
Gmelina arborea Linnaeus	Verbenaceae	*Gomari*	Stem	Timber
Gossypium herbaceum Linnaeus	Malvaceae	*Kopah*	Cotton ball	Make threads
Grevillea robusta A. Cunningham	Proteaceae	*Silver oak*	Stem	Timber
Lawsonia inermis Linnaeus	Lythraceae	*Mehendi*	Leaf	Dye
Mentha arvensis Linnaeus	Lamiaceae	*Pudina*	Leaf	Flavouring agent
Mesua ferrea Linnaeus	Clusiaceae	*Nahor*	Leaf	Cultural significance
Morus alba Linnaeus	Moraceae	*Noni*	Leaf	Silk worm food
Michelia champaca	Magnoliaceae	*Tamba shing*	Stem	Timber
Oroxylum indicum	Bignoniaceae	*Bhatghila*	Twig	Cultural significance
Oryza sativa var.glutinosa	Poaceae	*Local chawal*	Endosperm Grain	crop
Pinus wallichiana	Pinaceae	*Lenchong shing*	Stem	Bukhari
Pinus roxburghii	Pinaceae	*Roenang*	Stem	Timber
Pongamia pinnata	Fabaceae	*Koroch*	Stem	Timber
Lyonia ovalfolia	Ericaceae	*Pang dukshing*	Stem	Fuelwood
Tsuga dumosa	Pinaceae	*Sugga*	Stem	Construction of house
Rhododendron arboretum	Ericaceae	*Fuelwood*	Stem	Cultural importance
Sesbania sesban (Linnaeus) Merrill	Fabaceae	Sesbania	Plant	Bio fertilizer
Shorea robusta Gaertner f.	Dipterocarpaceae	*Sal*	Stem	Timber
Sterculia urens Roxburgh	Sterculiaceae	*Udal*	Stem	Fiber
Streblus asper Loureiro	Moraceae	*shewra*	Stem	Timber

Quercus semiserrata	Fagaceae	*Thongpa shing*	Stem	Wooden plough
Ricinus communis Linnaeus	Euphorbiaceae	*Era*	Leaf	Silk worm food
Saccharum officinarum Linnaeus	Poaceae	*Sugarcane*	Stem	Edible
Tectona grandis Linnaeus f.	Verbenaceae	*Shegun*	Stem	Timber
Thysanolaena maxima (Roxburgh)	Poaceae	*Phul jharu*	Inflorescence	Broom
Toona ciliata M.J. Roemer	Meliaceae	*Poma*	Stem	Timber
Trewia nudiflora Linnaeus	Euphorbiaceae	*Bhelkor*	Stem	Timber
Zea mays Linnaeus	Poaceae	*Makaa*	Seed	Edible
Zingiber officinale Roscoe	Zingiberaceae	*Ada*	Rhizome	Condiment

Figure 2. Population of Salari village involved in different cultivation

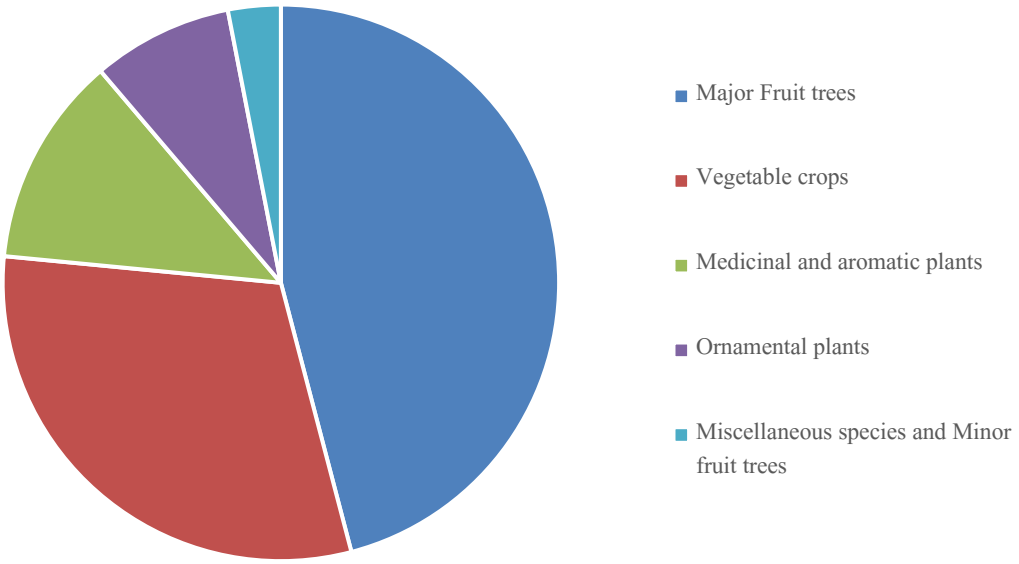


Figure 3. Population of Dekhiyan village involved in different cultivation

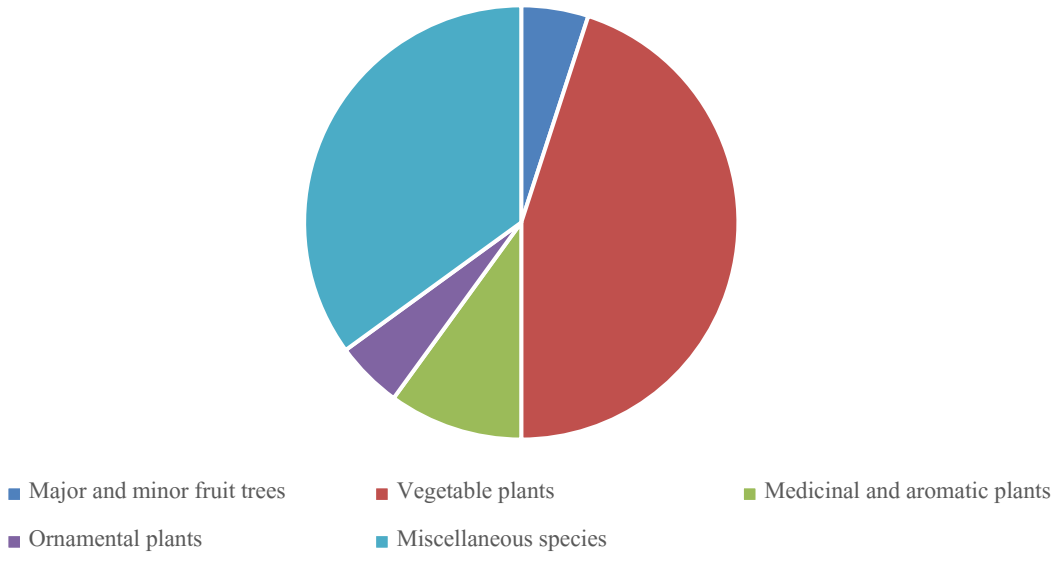
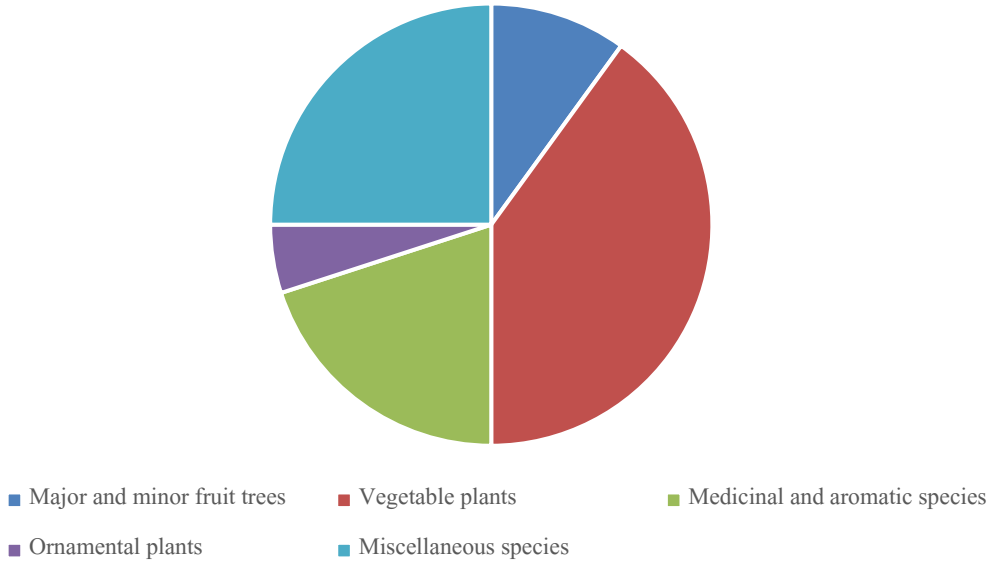


Figure 4. Population of Khoitam village involved in different cultivation



3. Results

The present study clearly indicates that the homestead gardens under Salari belt doesn't follow any specific arrangement. Among the three villages i.e, Salari, Khoitam and Dekhiyan, which are not even 10 kms apart, the homestead gardens varied both vertically and horizontally. The variation was influenced by the socio-economic conditions of the families, public demand and size of the land holdings.

A total of 212 plant species have been identified and recorded in the homestead gardens of the villages. Out of which, under major fruits comprise of 10 species (Table 1), 17 species were under minor fruits (Table 2), 56 species under vegetables (Table 3), 33 species under medicinal and aromatic plants (Table 4), 48 species under ornamental plants (Table 5) and 48 species under miscellaneous category (Table 6) respectively. The results revealed that in Salari village, majority of household were engaged in cultivation of major fruits (mostly *Citrus reticulata*) followed by vegetables (Figure 2). A very few groups of peoples earn their livelihood from ornamental plants (Table 5) and miscellaneous species (Table 6).

The inhabitants of Dekhiyan were farmers and earn mostly from vegetables and miscellaneous species *(Albizia lebbeck, Acer pectinatum, Alnus nepalensis, Bambusa balcooa, Bambusa polymorpha, Bambusa pallida, Cupressus torulosa, Pinus wallichiana, Pinus roxburghii, Lyonia ovalfolia*). Figure 3 was in corroboration with the following statement. The households of Khoitam own larger homestead garden as compared to the rest two villages. The farmers of Khoitam village were mostly engaged in the vegetable cultivation specially tomato (*Lycopersicon esculentum*). In addition to that, some major fruit trees ***(Prunus persica, Pyrus calleryana and Prunus domestica)*** also pre-occupied their homestead but the citizenry was found to be very low. Even though the climatic condition was favorable for few orchids, but the villagers gave least importance to ornamental species (Figure 4).

4. Discussion

The Sartang tribe of Salari focus mainly on temperate horticultural crops (Figure 1). Mandarin (*Citrus reticulata*) is widely grown, since the villagers receive a handsome amount annually from its cultivation. Apart from the mandarin cultivation, a few groups of people also prefer other major fruit trees like Mango (*Mangifera indica*), Peach (*Prunus persica*), Pear (*Pyrus calleryana*), Guava (*Psidium guajava*) and aromatic plant (*Elettaria cardomum*). In addition to that, the people of Salari village also earn their livelihood from the seasonal vegetables. The inter-space between the fruit trees was not kept vacant round the year. Chili (*Capsicum frutescens*), soybean (*Glycine max*), kidney bean (*Phaseolus vulgaris*) and cole crops (members of Cruciferae family) was grown round the year. Another group of people of Salari village who comprise of large old orange trees and the soil wasn't suitable for other crops, practiced crops from members of Cucurbitaceae family. Among the grown vegetables, most of the people prefer to cultivate cole crops (members of Cruciferae family), since it's a part of contract farming. In the pie chart (Figure 2) the third largest share was occupied by the medicinal and aromatic plants followed by ornamental plants. Only three families were

involved in marketing of ornamental plants. Since Arunachal Pradesh is rich in orchids, every household had orchids in their front yard. The results revealed that the smallest share in Salari village was pre-occupied by miscellaneous plants (preferably *Oryza sativa var.glutinosa and Lagenaria siceraria*). A peculiar characteristic was observed in the homestead gardens of Salari village, that the Datura (*Datura metel*) was used as the fencing plants. The homestead gardens mostly lie in the backyard of the villagers. The front yards had ornamental and a bit of medicinal plants.

The Dekhiyan basti which is 3 km apart from the Salari village comprise of only 17 households. The agricultural practice also varied widely. The women of the villagers were engaged in the agricultural practices, whereas the male population were busy in collecting firewood and timber species. The pie chart (Figure 3) revealed that the villagers preferred growing vegetables mostly. Chili (*Capsicum frutescens*), bitter brinjal (*Solanum incanum*) kidney bean (*Phaseolus vulgaris*) and cole crops (members of Cruciferae family) were practiced mostly. Both the backyard and front yard were pre-occupied by the vegetables. Least preference was given to ornamental and major and minor fruit trees.

The villagers of the Khoitam basti were 100 per cent engaged in the agricultural activities. Instead, seasonally they hired peoples (from Assam) as a helping hand. The village lies 6 km away from the Salari village but the Sartang tribe followed different agricultural practices. The reason behind the differences was the undulating topography. Different layers were observed during the survey. First layer comprises of timber or firewood species. The second layer was pre-occupied by green cardamom (*Elettaria cardomum*) whereas the third layer were occupied mostly by the seasonal vegetables or crops from members of Cucurbitaceae family, respectively. The first layer act as the windbreak and provide shade to cardamom. The results (Figure 4) revealed that majority of the population were engaged in growing vegetable crops. Tomato (*Lycopersicon esculentum*) was the main crop. They prefer tomato over others since they received a handsome return from its cultivation. Moreover, due to dependence of other States (preferably Assam) for this particular crop, contract farming made the cultivation more financially sound. In addition to that, ornamental plants occupied the lowest share. The homestead garden of the villagers of Khoitam village lies in the front yard or roadside. A peculiar characteristic of the village is that, poinsettia (*Euphobia pulcherrima*) was used as the live fence.

A number of factors such as socio-economic status, market linkage, domestic demand, own consumption, land-holding area and pattern etc. normally affect the diversity in homestead gardens. On an average it was observed that most of the homestead gardens have wider species diversity.

5. Conclusion

The present study revealed that the homestead gardens do not follow any specific spatial arrangements. The Sartang tribe among the three villages practiced different agricultural techniques depending upon the spatial arrangement and scientific considerations. Moreover, the population gave priority to those crops of high economic return. The major drawbacks observed during the study were

i. The population gave importance to 2-3 crops which had high commercial use, adversely affecting the species diversity in the Sartang belt.

ii. The undulating topography provoking the nutrient loss from the soil. The population doesn't practice any soil conservation technique instead applying fertilizers, pesticides, weedicides etc.

iii. Cutting more firewood and timber trees and disturbing the gene-diversity and ecological balance.

iv. Since the climatic condition is favorable for few medicinal plants. The villagers don't even value them and corroboration them to extinct.

So, there is an urgent need to strengthen and document such traditional systems of natural resource management for economic viability, ecological sustainability and social acceptability (Eyzaquirre & Linares 2001).

6. Acknowledgement

For identification of certain plant species, their purpose and local name was provided by three ladies namely Nema Chanadok, Nani Chanadok and Pema Chanadok who are residents of Salari village. We highly acknowledge their selfless gesture.

7. References

Christanty, L. (1990). Home gardens in Tropical Asia with special reference to Indonesia. In *Tropical Home Gardens* (eds Landauer, K. and Brazil, M.), United Nations University Press, Tokyo, Japan. Pp. 9-20.

Eyzaquirre, P.B. & Linares, O.F. (2001). A new approach to the study and promotion of home gardens. In *People and Plants Handbook: Issue 7: Growing Diversity – People and Plant Genetic Resources*, WWF-UNESCO-RBG, Kew. Pp. 30-33.

Fernandez, E.C.M. and Nair, P.K.R. (1986). An evaluation of the structure and function of tropical home gardens. *Agric. Syst.* 21: 279-310.

Jose, D. & Shanmugaratnam, N. (1993). Traditional homegardens of Kerala: A sustainable human ecosystem. *Agrofor. Syst*. 24: 203-213.

Kanjilal, U.N.; Kanjilal, P.C.; Das, A. & Bor, N.L. (1934-1940). *Flora of Assam*. Vol. I – IV. Govt Press, Shillong, India.

Uddin, M.S.; Rahman, M. J. & Mannan, M. A. (2001). Plant biodiversity in the homesteads of saline area of Southern Bangladesh. *Proceedings of National Workshop on Agroforestry Research Development of Agroforestry Research in Bangladesh*, M. F. Haq, M. K. Hasan, S. M. Asaduzzaman, and M. Y. Ali, Eds., pp. 45-54, Gazipur, Bangladesh.

Motiur, R. M.; Furukawa, Y.; Kawata, I.; Rahman, M. M. & M. Alam. (2006). Role of homestead forests in household economy and factors affecting forest production: a case study in southwest Bangladesh. *Journal of Forest Research* 11 (2): 89-97.

Akhter, S.; Alamgir, M.; Sohel, M. S. I.; Rana, M. P.; Monjurul S. J. & Chowdhury, M. S. H. (2010). The role of women in traditional farming systems as practiced in homegardens: a case study in Sylhet Sadar Upazila, Bangladesh. *Tropical Conservation Science* 3 (1): 17-30.

Santapau, H. & Henry, A.N. (1998). *A dictionary of the flowering plants in India*. NISCARE, CSIR, New Delhi.

Torquebiau, E. (1992). Are tropical agroforestry homegardens sustainable. *Agric., Ecosyst. Environ.*41: 189-207.

Wojtkowski, P.A. (1993). Toward an understanding of tropical home gardens. *Agro fors. Syst*. 24: 215-222.