

Study of Agroforestry System and Socio Economic Status of Farmer in Leparada dist of Arunachal Pradesh

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Abstract—The present study was conducted in different villages of block Basar, Leparada district, Arunachal Pradesh. A total of 120 respondents were selected randomly. The data were collected by the researcher using pre-structured interview. The finding shows that the majority of respondent were practicing Agrisilviculture system and Agrosilvopastoral System (Home garden).

Keywords— *Agrisilviculture system, Agro silvopastoral System, Home Garden.*

I. INTRODUCTION

Agroforestry has a long tradition in Arunachal Pradesh, where trees are integrated in the crops and livestock production systems according to agro- climatic and other prevailing conditions. These systems are managed indigenously, with practices having been evolved by the farmers through trial and error over long periods of time Rai S N & Proctor J, (1986). Farmers usually plant trees in their traditional agroforestry systems in pursuit of their livelihood goals of income generation, risk management, household food security and optimal use of available land, labour and capital Arnold JEM & Dewees PAA, (1999). A great number of different traditional grain crops, rhizomatous crops, pineapple and vegetables are being grown with a number of fruits and other trees in their traditional systems, which are valuable for the farmers' everyday life.

Traditional cropping patterns also vary among the communities, since they have evolved in response to prevailing soil and climatic conditions and social and ethological preferences Ruthenberg H, (1976). The age, gender and socio- cultural status are the most frequently used proxies for household preferences Pattanayak SK, Mercer DE, Sills E & Yang J, (2003). The farmers of Arunachal Pradesh are not ready to adopt modern agroforestry as it is considerably more complex than traditional agriculture Arunachalam A, Khan ML & Arunachalam K, (2002). The tribesmen have also their own ways of identifying, classification and judicious uses of traditional ethnobotanical plants. Ethnobotanical uses of plants in Arunachal Pradesh have been reported Tewari KC, Majumdar R & Bhattacharjee S, (1978) and Sabat BC, (2003). Arunachal Pradesh harbours ca. 500 plant species of medicinal and pharmacological significance. A detail study of community wise survey is required as this may provide a meaningful way for the promotion of the traditional knowledge. The medicinal plants used by Nyishi community of Arunachal Pradesh has also been reported but the ethnobotanical plants in traditional agroforests and their indigenous uses has not yet been explored and categorized for any community of Arunachal Pradesh Tag H, Das AK & Loyi H, (2007) and Murtem G & Das AK, (2005).

Large number of studies on wild edible plants and related topic of various states of North eastern India had been carried out by many researchers (Arora, 1981; Singh and Singh, 1985; Singh et al., 1988; Maikhuri and Gangwar, 1993; Borthakur, 1996; Sundriyal et al., 1998; Sundriyal and Sundriyal, 2003; Kumar, 2003; Samati, 2004; Sundriyal et al., 2004; Kayang, 2007; Tiwari et al., 2010) however, such study on various tribes of Arunachal Pradesh in general (Haridasan et al., 1990; Murtem, 2000; Kohli, 2001; Kar, 2004, 2005; Angami et al., 2006) is meager and on Adi tribe is lacking. Due to various physical barriers they have been leading practically a life of seclusion thereby preserving their traditional knowledge intact. So, documentation of their traditional knowledge on cultivated crops, semi-domesticated and wild vegetable plants become a prerequisite. Keeping the gap in consideration, present study was carried out which provide valuable information on cultivated crops, semi-domesticated and wild plants of East Siang district, Arunachal Pradesh, Northeast India.

II. MATERIALS AND METHODS

The present study was purposively undertaken in Basar Block which is located at the Leparada district of Arunachal Pradesh which is about 258.2 km away from the Itanagar city. It lies between 27°05'N longitude and 94°40'E latitude at an elevation of 680 m above the mean sea. Total area covers 1650 sq.km. The regions in the lower belts of the state experience hot and humid climates, with a maximum temperature in the foothills reaching up to 40°C (during the summer). The average temperature in this region in winter ranges from 15°C to 21°C while that during the monsoon season remains between 22°C and 30°C. The state receives an average rainfall of 300 cm. 120 respondent were selected randomly as a sample of study.

III. RESULTS AND DISCUSSION

3.1 Different agroforestry systems used by the native villagers

3.1.1 Agrisilvicultural System (crops and trees including shrubs/vines and trees)

This system involves the conscious and deliberate use of land for the concurrent production of agricultural crops including tree crops and forest crops.

This system was mainly comprised of agriculture crops along with forest trees (mainly on the bunds of the agriculture fields). The location of the trees was mostly on the bunds, but occasionally the trees were also found in-between and middle of the agricultural fields. They were mainly used for fodder, fuel and timber purpose. The major tree based agrisilviculture systems included the tree species like cajanus cajan, mesua ferrea, bambusa spp, Gmelina arborea, Along with agricultural crops.

3.1.2 Species found in a study area under Agrisilviculture system

Total 13 woody species viz. *Michelia obtusifolia*, *Pinus kesia*, *Terminalia myriocarpa*, *Anthocephalus cadamba*, *Gmelina arborea*, *Cuppressus torulosa*, *Bauhinia varigeta*, *Acacia mangium*, *Lyonia ovalifolia*, *Aesculus indica*, *Ficus semicordata*, *Quercus serrata* and *Prunus cerasoides* was recorded. Among which *Michelia obtusifolia*, *Ficus roxburghi*, *Ficus palmate*,

Gmelina arborea, *Cuppressus torulosa* were common to all villages. Whereas *Castonopsis indica*, *Acacia mangium*, *Lyonia ovalifolia*, *Aesculus indica*, *Pinus kesia* and *Quercus serrata* were found in Gori respectively. Bark and stem of *Michelia obtusifolia* were also used to make baskets. *Pinus kesia* was used for making agricultural implements. Herbaceous food crops species were documented in two prominent cropping seasons which were common to all villages. In kharif season cereals, pulses, oil crop, oilseed crop are cultivated. Among all the cultivated kharif season crops, *Eleusine coracana*, *Echinochloa frumentacea*, *Oryza sativa*, *Dolichos uniflorus*, *Glycine max*, *Glycine soja* and *Sesamum indicum* were main food crops which is cultivated in all the villages. In rabi season *Triticum aestivum*, *Hordeum vulgare* and *Lens culinaris* and *Brassica campestris* were prominent food crops observed. Total 5 shrub species viz. *Rhus parviflora*, *Zanthoxylum alatum*, *Desmodium elegans*, *Rubus ellipticus*, *Barberis eristata* and 5 herb species, *Cyndon dactylon*, *Euphorbia hirta*, *Oxalis acetosella*, *Eupatorium adenophorum* and *Solanum nigrum* were documented in agrisilviculture system.

Bijalwan et al. (2009) also supported the present study; their study indicated a total of 19 tree species in northern and southern aspects in agrisilvicultural system in mid-hill situation of Garhwal Himalaya between 1000 m to 2000 m a.s.l. The most dominant tree species were *Michelia obtusifolia*, *Gmelina arborea* and *Melia azedarach* and successively grown under traditional agrisilviculture system. The dominant agricultural crops *Eleusine coracana* in summer cereals, *Phaseolus vulgaris* in summer pulses-oilseeds and *Triticum aestivum* in the winter season.

Kala (2010) documented a total of 26 herbaceous food crop species and 21 woody species that were raised by farmers in the selected villages of Uttarakhand. A total of 37 plant species available in the agro-forestry system and used for curing various ailments by traditional healers were also documented during the survey. The major cereals produced by farmers were *Oryza sativa*, *Echinochloa frumentacea*, *Eleusine coracana* and *Triticum aestivum*. The indigenous system of cropping was locally called as Baranaja that revolved around the production of > 12 varieties of crops. Besides food, the species grown in the agro-forestry system were used for multiple purposes

3.1.3 Agrosilvopastoral System (trees + crops + pasture/animals)

3.1.3.1 Home Gardens:

This is one of the oldest agroforestry practices, found extensively in high rainfall areas in tropical south and south-east Asia. Many species of trees, bushes, vegetables and other herbaceous plants are grown in dense and apparently random arrangements, although some rational control over choice plants and their spatial and temporal arrangement may be

exercised. Most home gardens also support a variety of animals (cow, buffalo, bullock, goat, sheep) and birds (chicken, duck). In some places pigs are also raised. Fodder and legumes are widely grown to meet the daily fodder requirements of cattle. The waste materials from crops and homes are used as fodder/feed for animals/birds and barn wastes are used as manure for crops.

3.1.3.2 Species grown in homegarden

A homestead garden is stratified into different strata like under story, middle story and top story. In under story, all annuals like weed grass and vegetables are grown. Maximum species are common in all the villages' viz. tomato, lady finger, bitter gourd, pumpkin, cabbage, arabi, coriander, turmeric, potato, radish, garlic and onion etc. In middle story all the shrubs and trees were raised, mainly fruits plants were dominant. In home garden 11 species of temperate and sub-tropical fruits are identified i.e Prunus persica, Mesua ferrea, Citrus sinensis, Mangifera indica, Pyrus communis, Mesua ferrea etc. Only one shrub species Tinospora cordifolia was grown by the farmers of only one village Gori.

Similarly in two districts of Uttarakhand viz. Rudraprayag and Uttarkashi Rana et al., (2016) identified 35 species of trees (forest trees+ fruit trees), 18 species of agriculture crops, 13 species of vegetable crops, 9 species of grasses and 13 species of shrub.

Conformably to present study Sahoo (2009) documented a total of 231 species with 105 trees, 50 shrubs and 76 herbs species from 45 indigenous agroforestry homegardens. These tree, shrub and herb species were distributed in 84 and 49; 31 and 22 and 59 and 39 genera and families respectively. Overall, there were 88 families, out of which 24 tree species (23%) were common

3.1.4 Some important trees found in the study area

Top storey comprises of Hollock (*Terminalia myriocarpa*), Jutuli (*Altinga excels*), Hingori (*Castanopsis indica*), Bonsum (*Phoebe goalprensensis*), Sopa (*Magnolia Spp*), Dhuna (*Canarium resiniformis*), Poma (*Cedrela toona*), Mekahi (*Phoebe cooperiana*), Khokon (*Duabanga graaaandflora*),

Middle storey with Haldisopa (*Adina olgocephala*), Jamuk (*Syzygium cumini*), Pichola (*Kydia calycina*),

Lower storey with Gahori Sopa (*Magnolia griffitti*), Bon Am (*Mangfera sylvatic*), Ground Flora with Hati bhekuri (*solanum subtracatum*), Kolgoch (*Musa Spp*),

Bamboo types like Kako bans (*Dendrocalamus hamiltonii*), Bojal bans (*Pseudostachyumpolymorphum*) cane varieties Lejai bet- (*Calamus floribundus*), Raidang bet (*Calamus flagellum*) Palm species like Toko palm (*Livistonia jenkensii*), Jeng (*Calamus erectus*) anad Climber species like Ghila lata (*Bauhinia Vahlia*), Pani lata (*Vitis planicaulis*), Kuchai (*Accia pinnata*), Gowlia lata (*vitis latifolia*), Dimmorulata (*Ficus Scandens*), Hegumi lata (*Tinospora coordifolia*), Mermeri lata (*Gnetum scandens*) etc. are found in the district.

3.2 Phyto-sociological aspects of selected tree species in agroforestry systems in Arunachal Pradesh.

TABLE 1
SPECIES IN STUDY AREA UNDER IN BAM VILLAGE TREE COMMUNITIES FOUND.

| SL.NO | SPECIES | TOI | TNI | D | BA | F% | RF | RD | RDO | IVI |
|-------|---------------------------|-----|-----|-----|-------|-----|--------|--------|--------|--------|
| 1 | <i>Albizzia stipulata</i> | 4 | 11 | 1.1 | 0.03 | 40 | 17.39 | 21.15 | 6.38 | 44.93 |
| 2 | <i>Callistemom sp.</i> | 1 | 2 | 0.2 | 0.03 | 10 | 4.35 | 3.85 | 6.38 | 14.58 |
| 3 | <i>Caryota urens</i> | 2 | 5 | 0.5 | 0.016 | 20 | 8.70 | 9.62 | 3.40 | 21.72 |
| 4 | <i>Cedrela toona</i> | 2 | 6 | 0.6 | 0.034 | 20 | 8.70 | 11.54 | 7.23 | 27.47 |
| 5 | <i>Citrus maxima</i> | 1 | 2 | 0.2 | 0.009 | 10 | 4.35 | 3.85 | 1.91 | 10.11 |
| 6 | <i>Delonix regia</i> | 2 | 4 | 0.4 | 0.042 | 20 | 8.70 | 7.69 | 8.94 | 25.32 |
| 7 | <i>Engenia praecox</i> | 1 | 2 | 0.2 | 0.04 | 10 | 4.35 | 3.85 | 8.51 | 16.70 |
| 8 | <i>Erythrina suberosa</i> | 1 | 2 | 0.2 | 0.007 | 10 | 4.35 | 3.85 | 1.49 | 9.68 |
| 9 | <i>Eucllytus sp.</i> | 6 | 12 | 1.2 | 0.035 | 60 | 26.09 | 23.08 | 7.45 | 56.61 |
| 10 | <i>Ficus benghalensis</i> | 3 | 6 | 0.6 | 0.228 | 30 | 13.04 | 11.54 | 48.51 | 73.09 |
| | Total | 23 | 52 | 5.2 | 0.47 | 230 | 100.00 | 100.00 | 100.21 | 300.21 |

BAM on analyzing the RDO of each species, it was found that *Ficus benghalensis* (48.51) was the most dominant tree species with the highest value of RDO *Delonix regia* (8.94) and *Engenia praecox* (8.51) had the second and third place, respectively, followed by other species viz. *Euclyptus sp.* (7.45), *Cedrela toona* (7.23), *Albizia stipulata* (6.38), *Callistemom sp.* (6.38) *caryota urens* (3.40), *citrus maxima* (1.91), and *erythrina suberosa* (1.49) while analyzing the importance value index of each species, it was found that *Ficus benghalensis* (73.09) was the most dominant tree species with the highest value of IVI *Euclyptus sp.* (56.61) *Albizia stipulata* (44.93) *Cedrela toona* (27.47) had the second and third place, respectively followed by *Delonix regia* (25.32), *Caryota urens* (21.72), *Engenia praecox* (16.70) *Callistemom sp.* (14.58), *Citrus maxima* (10.11), *Erythrina suberosa* (9.68)

TABLE 2
SPECIES IN STUDY AREA UNDER IN SAGO VILLAGE

| SL.NO | SPECIES | TOI | TNI | D | BA | F% | RF | RD | RDO | IVI |
|-------|--------------------------------|-----|-----|-----|--------|-----|--------|--------|--------|--------|
| 1 | <i>Azadirachta indica</i> | 1 | 2 | 0.2 | 0.023 | 10 | 6.67 | 7.14 | 6.19 | 20.00 |
| 2 | <i>Caryota urens</i> | 1 | 1 | 0.1 | 0.0008 | 10 | 6.67 | 3.57 | 0.22 | 10.45 |
| 3 | <i>Cedrela toona</i> | 2 | 2 | 0.2 | 0.0047 | 20 | 13.33 | 7.14 | 1.27 | 21.74 |
| 4 | <i>Celtis timorensis</i> | 4 | 9 | 0.9 | 0.0137 | 40 | 26.67 | 32.14 | 3.69 | 62.50 |
| 5 | <i>Citrus maxima</i> | 1 | 3 | 0.3 | 0.003 | 10 | 6.67 | 10.71 | 0.81 | 18.19 |
| 6 | <i>Couroupita guianensis</i> | 1 | 3 | 0.3 | 0.0396 | 10 | 6.67 | 10.71 | 10.66 | 28.04 |
| 7 | <i>Delonix regia</i> | 1 | 3 | 0.3 | 0.15 | 10 | 6.67 | 10.71 | 40.39 | 57.77 |
| 8 | <i>Elaeocarpus floribundus</i> | 2 | 2 | 0.2 | 0.007 | 20 | 13.33 | 7.14 | 1.88 | 22.36 |
| 9 | <i>Fagus sylvatica</i> | 1 | 2 | 0.2 | 0.1225 | 10 | 6.67 | 7.14 | 32.98 | 46.79 |
| 10 | <i>Ficus benghalensis</i> | 1 | 1 | 0.1 | 0.0071 | 10 | 6.67 | 3.57 | 1.91 | 12.15 |
| | Total | 15 | 28 | 2.8 | 0.3714 | 150 | 100.00 | 100.00 | 100.00 | 300.00 |

SAGO village on analyzing the RDO of each species, it was found that *Delonix regia* (40.39) was the most dominant tree species with the highest value of RDO *Fagus sylvatica* (32.98), *Couroupita guianensis* (10.66) and *Azadirachta indica* (6.19) had the second and third place, respectively, followed by *Celtis timorensis* (3.69), *Elaeocarpus floribundus* (1.88), *Cedrela toona* (1.27), *Citrus maxima* (0.81), *Ficus benghalensis* (1.91) *Caryota urens* (0.22) while the analyzing the important value index of each species, *Celtis timorensis* (62.50) was the most dominant tree species with the highest value of IVI *Delonix regia* (57.77) *Fagus sylvatica* (46.79), and *Couroupita guianensis* (28.04) had the second and third place, respectively, followed by other species viz. *Elaeocarpus floribundus* (22.36), *Cedrela toona* (21.74), *Azadirachta indica* (20.00), *Ficus benghalensis* (12.15) and *Caryota urens* (10.45).

TABLE 3
SPECIES IN A STUDY AREA UNDER IN GORI VILLAGE

| SLNO | SPEIES | TOI | TNI | D | BA | F(%) | RF | RD | RDO | IVI |
|------|------------------------------|-----|-----|------|------|------|--------|--------|--------|--------|
| 1 | <i>Albizia stipulata</i> | 6 | 18 | 1.8 | 0.05 | 60 | 31.58 | 40.91 | 1.54 | 74.03 |
| 2 | <i>Bischofia javanica</i> | 2 | 3 | 0.3 | 0.23 | 20 | 10.53 | 6.82 | 6.61 | 23.95 |
| 3 | <i>Cinnamomum zeylanicum</i> | 1 | 1 | 0.1 | 0.01 | 10 | 5.26 | 2.27 | 0.21 | 7.74 |
| 4 | <i>Docynia indica</i> | 1 | 1 | 0.1 | 0.02 | 10 | 5.26 | 2.27 | 0.47 | 8.01 |
| 5 | <i>Ficus benghalensis</i> | 1 | 1 | 0.1 | 2.87 | 10 | 5.26 | 2.27 | 83.93 | 91.46 |
| 6 | <i>Gmelina arborea</i> | 2 | 3 | 0.3 | 0.14 | 20 | 10.53 | 6.82 | 3.93 | 21.27 |
| 7 | <i>Pyrus pashia</i> | 5 | 16 | 1.6 | 0.06 | 50 | 26.32 | 36.36 | 1.83 | 64.51 |
| 8 | <i>Spondias mangifera</i> | 1 | 1 | 0.01 | 0.05 | 10 | 5.26 | 2.27 | 1.49 | 9.03 |
| | Total | 19 | 44 | 4.31 | 3.42 | 190 | 100.00 | 100.00 | 100.00 | 300.00 |

GORI village on analyzing the RDO of each species, it was found that *Ficus benghalensis* (83.93) was the most dominant tree species with the highest value of RDO *Bischofia javanica* (6.61), *Gmelina arborea* (3.93), had the second and third place, respectively, followed by otherspecies viz. *Pyrus pashia* (1.83), *Albizia stipulata* (1.54), *Spondias mangifera* (1.49), *Docynia indica* (0.47), *Cinnamomum zeylanicum* (0.21) while the analyzing the Importance Value Index of each species, it was found that *Ficus benghalensis* (91.46) was the most dominant tree species with the highest value of IVI *Albizia stipulata* (74.03), *Pyrus pashia* (64.51), had the second and third place, respectively, followed by *Bischofia javanica* (23.95), *Gmelina arborea* (21.27) *Spondias mangifera* (9.03), *Docynia indica* (8.01) and *Cinnamomum zeylanicum* (7.74)

TABLE 4
SPECIES IN STUDY AREA UNDER IN KADI VILLAGE

| SLNO | SPECIES | TOI | TNI | D | BA | F(%) | RF | RD | RDO | IVI |
|------|---------------------------|-----|-----|-----|--------|------|--------|--------|-------|--------|
| 1 | <i>Albizia stipulata</i> | 3 | 5 | 0.5 | 0.035 | 30 | 16.67 | 15.63 | 1.29 | 33.58 |
| 2 | <i>Areca catechu</i> | 1 | 2 | 0.2 | 0.009 | 10 | 5.56 | 6.25 | 0.33 | 12.14 |
| 3 | <i>Bambox ceiba</i> | 1 | 1 | 0.1 | 0.039 | 10 | 5.56 | 3.13 | 1.44 | 10.12 |
| 4 | <i>Callistemon sp.</i> | 1 | 1 | 0.1 | 0.005 | 10 | 5.56 | 3.13 | 0.18 | 8.86 |
| 5 | <i>Caryota toona</i> | 6 | 11 | 1.1 | 0.029 | 60 | 33.33 | 34.38 | 1.07 | 68.78 |
| 6 | <i>Citrus maxima</i> | 3 | 6 | 0.6 | 0.022 | 40 | 22.22 | 18.75 | 0.81 | 41.78 |
| 7 | <i>Tectona grandis</i> | 1 | 4 | 0.4 | 2.529 | 10 | 5.56 | 12.50 | 1.66 | 13.46 |
| 8 | <i>Ficus benghalensis</i> | 1 | 2 | 0.2 | 0.045 | 10 | 5.56 | 6.25 | 93.21 | 111.27 |
| | TOTAL | 17 | 32 | 3.2 | 2.7132 | 180 | 100.00 | 100.00 | 99.99 | 299.99 |

Kadi village on analyzing the RDO of each species, it was found that *Ficus benghalensis* (93.21) was the most dominant tree species with the highest value of RDO *Tectona grandis* (1.66), *Bambox ceiba* (1.44), had the second and third place, respectively, followed by other species viz. *Albizia stipulata* (1.29), *Caryota toona* (1.07), *Citrus maxima* (0.81), *Areca catechu* (0.33), *Callistemon sp.* (0.18) while the analyzing the Importance Value Index of each species, it was found that *Ficus benghalensis* (111.27) was the most dominant tree species with the highest value of IVI *Caryota toona* (68.78), *Citrus maxima* (41.78), had the second and third place, respectively, followed by *Albizia stipulata* (33.58), *Tectona grandis* (13.46) *Areca catechu* (12.14), *Bambox ceiba* (10.12) and *Callistemon sp* (8.86)

3.3 Diversity indices (Shannon wiener's diversity and Simpson's dominance index) for tree.

TABLE 5
SHANNON WIENER'S DIVERSITY INDEX

| SITES | KADI | GORI | SAGO | BAM |
|-------|------|------|------|------|
| H' | 1.8 | 1.45 | 2.08 | 2.09 |

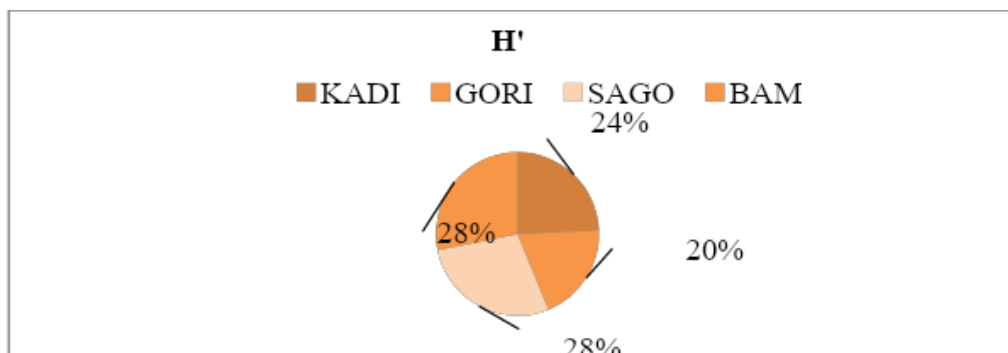


FIGURE 1: shannon wiener's diversity index

TABLE 6
SIMPSON'S DOMINANCE INDEX

| SITES | KADI | GORI | SAGO | BAM |
|-------|------|------|------|------|
| cd | 0.18 | 0.36 | 0.05 | 0.21 |

SIMPSON'S DOMINANCE INDEX

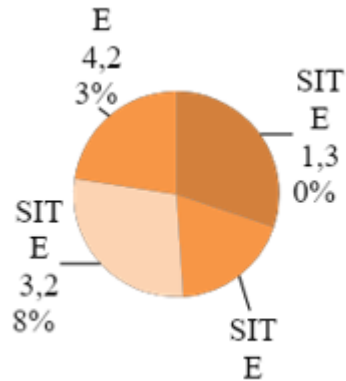


FIGURE 2: Simpson's dominance index

IV. SOCIO-ECONOMIC CHARACTERISTICS OF RESPONDENTS OF VILLAGES IN THE STUDY AREA

Based on information from interview, questionnaires were designed to collect the data from different villages.

4.1 Age

Age distribution of respondents is given in the Table 3.1. The age of respondents was categorized as young, middle and old. Majority of the respondents i.e. 73 (60.83%) were old in age followed by 37 (30.83%) of middle aged and 10 (8.34%) were young.

TABLE 7
DISTRIBUTION OF RESPONDENTS ON THE BASIS OF AGE

| S. No. | Category | Number of respondents | Percentage |
|--------|----------------------|-----------------------|------------|
| 1 | Young (21-35) | 10 | 8.34 |
| 2 | Middle (35-45 years) | 37 | 30.83 |
| 3 | Old (>45 years) | 73 | 60.83 |
| | Total | 120 | |

4.2 Education

The data in the Table 3.2 gives information about education level of the respondents. It was revealed from the interview that maximum number of respondents i.e. 67 (55.83%) had education up to 12th, followed by primary and above 12th i.e. 27 (22.50%) and 15 (12.50 %), respectively whereas 11 (9.17%) was illiterate.

TABLE 8
DISTRIBUTION OF RESPONDENTS ON THE BASIS OF EDUCATION

| S. No. | Category | Number of respondents | Percentage |
|--------|--------------------------|-----------------------|------------|
| 1 | Illiterate | 11 | 9.17 |
| 2 | Primary (1 to 8th) | 27 | 22.50 |
| 3 | Intermediate (9 to 12th) | 67 | 55.83 |
| 4 | Above (12th) | 15 | 12.50 |
| | Total | 120 | |

During informal discussion it was found that education facility was well in the village & nearby area. But the education level of women till the day was less than the man because the women were fully involved in the agriculture as well as household activities. In the studied villages it was observed that majority of the respondents were aware of the economic and environmental benefits of agroforestry practices and had favorable attitude towards those practices. It may be due to the fact that significant portions of household members are literate in the study area.

High educational level in family can improve acceptance of agroforestry practices, Infected educated members of family can improve awareness of farmers about benefits and advantages of agroforestry systems and results in high acceptance level for this land use option. According to census 2011-2012, the percentage of literacy rate was 72.42%. Out of this the male literacy rate was found to be 69.73% and female literacy rate 62.19%

4.3 Type of house

Data regarding type of house of respondents has been presented in Table 3.4. It was observed that majority of the respondent 101 (84.17%) resided in kutcha houses, followed by 13 (10.83%) respondents who were residing in mixed (pucca+kutcha) house. Only 6 (5%) respondents had pucca house.

TABLE 9
DISTRIBUTION OF RESPONDENTS ON THE BASIS OF TYPE OF HOUSE

| S. No. | Category | Number of respondents | Percentage |
|--------|----------|-----------------------|------------|
| 1 | Pucca | 6 | 5.00 |
| 2 | Mixed | 13 | 10.83 |
| 3 | Kutcha | 101 | 84.17 |
| | Total | 120 | |

4.4 Occupation

Data regarding main source of income for the households has been presented in Table 3.5. It was observed that maximum number of household family about 55 (45.83%) belongs to the farming which was the primary source of income whereas 31 (25.83%) belongs to service class followed by 19 (15.83%) families that were dependent in the business for their livelihood, followed by wage labors 15 (12.5%) families.

TABLE 10
DISTRIBUTION OF RESPONDENTS ON THE BASIS OF PRIMARY OCCUPATION

| S. No. | Category | Number of respondents | Percentage |
|--------|------------|-----------------------|------------|
| 1 | Service | 31 | 25.83 |
| 2 | Business | 19 | 15.83 |
| 3 | Farming | 55 | 45.84 |
| 4 | Wage labor | 15 | 12.50 |
| | Total | 120 | |

4.5 Annual income

Data regarding main source of income for the household has been presented in Table 3.6. It was observed that majority of the household i.e. 94 (78.33%) belonged to the Above Poverty Line followed by 26 (21.67%) respondents who were found Below Poverty Line.

TABLE 11
DISTRIBUTION OF RESPONDENT ON THE BASIS OF ANNUAL INCOME

| S. No. | Category | Number of respondents | Percentage |
|--------|--------------------------|-----------------------|------------|
| 1 | Above Poverty Line (APL) | 94 | 78.33 |
| 2 | Below Poverty Line (BPL) | 26 | 21.67 |
| | Total | 120 | |

4.6 Land holding

Data regarding land holding pattern in the study area has been represented in the Table 3.7 and Fig.7. The farmers of the four villages of the study sites were categorized on the basis of availability of land, the categorization was large (>10nali), marginal (6-10nali) and small (<5nali). The present study reveals that majority of respondent i.e. 76 (63.33%) had maximum land, whereas 25 (20.83%) and 19 (15.83) of them had marginal and small land. Household size is a parameter that determines the quantity of products required from neighboring natural resources. In the studied villages maximum of the respondent i.e. 56.67, had small sized family.

TABLE 12
DISTRIBUTION OF RESPONDENTS ON THE BASIS OF LAND HOLDING PATTERN

| S. No. | Category | Number of respondents | Percentage |
|--------|---------------------|-----------------------|------------|
| 1 | Large (>10nali) | 76 | 63.33 |
| 2 | Marginal (6-10nali) | 25 | 20.83 |
| 3 | Small (<5nali) | 19 | 15.83 |
| | Total | 120 | |

A similar study was conducted by Roy et al., (2009) in Bhagar, Tola and Maniagar villages of Dhauladevi block in Almora district of Arunachal Pradesh during 2011-12. Sixty farmers were selected randomly. Ten variables viz. category, age, education, occupation, social participation, landholding, herd size, farming experience, annual income and material possession were selected to assess the socioeconomic status. Agriculture was the sole occupation of 25 percent farmers whereas others had subsidiary occupations like labour, shop keeping, driving etc. Majority of the farmers were in middle-age category (70%). The average age of the respondents was obtained 42 years. Most of the farmers had medium level of education (63.33%).

V. CONCLUSION

The Study of agroforestry system and socio-economic status of the farmer in Leparada district of Arunachal Pradesh through survey about the prevailing agroforestry system practiced by the farmers in the district, their phyto-sociological aspects of some selected tree species and their socio-economic status of the farmers leads to the conclusion that,

The practice of Agrisilviculture is the most prominent practice of agroforestry system in the surveyed area followed by agrosilvopastoral and Agro-horticulture. It also reveals that the four villages Bam, Sago, Kadi and Gori have excellent practices of Agri silviculture upon all Agroforestry systems predominantly with trees of *Cajanus cajan*, *Mesua ferrea* and *bambusa*. and crop plant of pulses, oil crops, oilseeds, *Oryza sativa*, *Brassica campestris*. Agrisilviculture with the combination of Agro-horticulture tree species like *Prunus persica* *Prunus domestica*, *Citrus limon* recorded. In Phyto sociological aspects it was found that *Ficus benhalensis* was most dominant tree in three out of four sites, followed by *Delonix regia* in one of the selected village. Agroforestry systems and practices associated with them plays an important role in securing the sustainable livelihood of the rural people in Arunachal Pradesh.

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