Fig 1: No. of family, Genus and Species of different plant groups

- Dicot: 317
- Monocot: 215
- Pteridophytes: 89

Fig 2: Total No. of Family, Genus & Species

- Total: 406
- Families: 273
- Genera: 114

Legend:
- Species (Yellow)
- Genera (Blue)
- Family (Pink)
Fig 3: Number of Family, Genus and Species of different categories of uses.
Fig 4: Categories of Habitat of Plants

- Tree: 63
- Herb: 154
- Shrub: 113
- Climber: 76

Fig 5: Purpose of Use

- Only one purpose: 166
- More than one purpose: 240
Fig 6: Uses of plants/plant parts for edible purposes with total number of species

- Leaves & Shoot: 138
- Fruits: 121
- Flower/Inflorescence: 24
- Underground parts: 18
- Seeds: 10
- Whole Plants: 5
- Total species: 259

Fig 7: Categories of edible plants with total No. of Species

- Fruit Plant: 84
- Leafy vegetable: 120
- Edible bamboo shoots: 43
- Vegetable fruits/seeds: 5
- Edible underground parts: 17
- Edible flower/inflorescence/bud: 24
- Leaves, shoots taken raw: 8
- Seasoning: 23
- Drinks: 23
Fig 10: No. of species of different plant parts used in prescriptions

- Leaf & Shoot: 83
- Root & tuber: 59
- Fruit: 21
- Stem: 16
- Bark: 12
- Seed: 10
- Juice or Latex: 9
- Whole plant: 5
- Flower: 4
- Total spp: 165

Fig 11: Method of application of prescriptions

- Orally administered: 64
- Topical or local application: 185
- Massage and fermentation: 6
- Smoking and inhaling: 4
- Others: 20
- Total prescriptions: 279
Fig 12: Different categories of uses of plants with No. of species in material culture
CHAPTER - VI
DISCUSSION
GENERAL DISCUSSION:

A total number of 406 species of plants belonging to 273 genera under 114 families have been recorded to be used by the Tea garden and ex-teagarden communities of Nagaon district of Assam. Of these 240 (59.1%) species are used only for one purpose, while the rest 166 (40.9%) species are used in more than one purpose. A breakdown of the number of the species, genera and families of different plant groups used by the Tea garden and ex-teagarden communities of Nagaon district is given in Fig. 1.

According to usage, the plants can be categorised into for broad categories (Fig 3). The total number of species together under these four categories makes total of 535 and the increase over the number 406 is due to the fact that those species used for more than one purpose have been included in more than one category.

It is seen that out of a total 406 species, the most commonly used species belong to herbaceous habit (154 spp.; 37.93%) followed by tree habit (113 spp.; 27.83%) and shrubs (76 spp.; 18.71%) and climbers (63 spp.; 15.51%).

Considering the number of species, the families viz., Cucurbitaceae (16 spp.), Solanaceae (12 spp.), Poaceae (8 spp.), Arecaceae (8 spp.), and Araceae (7 spp.) predominate in food and drinks, while Poaceae (7 spp.), Solanaceae (7 spp.), Asteraceae (6 spp.), Zingiberaceae (6 spp.) and Rutaceae (6 spp.) predominate in medicine, and Poaceae (9 spp.), Arecaceae (8 spp.), Lauraceae (5 spp.), Moraceae (5 spp.) and Euphorbiaceae (4 spp.) in material culture (Table 1).

Table 1: Dominant families for Medicinal use, Food & Drinks and Material culture.

<table>
<thead>
<tr>
<th>Food and Drinks</th>
<th>Medicine</th>
<th>Material Culture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family</td>
<td>Genera</td>
<td>Species</td>
</tr>
<tr>
<td>Cucurbitaceae</td>
<td>8</td>
<td>16</td>
</tr>
<tr>
<td>Solanaceae</td>
<td>4</td>
<td>12</td>
</tr>
<tr>
<td>Poaceae</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>Arecaceae</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>Araceae</td>
<td>5</td>
<td>7</td>
</tr>
</tbody>
</table>
In the following paragraphs certain important aspects of the uses and significance of plants in the life of the Tea garden and ex-teagarden communities of Nagaon district are discussed.

**FOOD AND DRINKS:**

Although rice constitutes the staple cereal of the Tea garden and ex-teagarden communities of Nagaon district, a large number of wild edible plants also supplement their diet. As a general rule, the gathering of food plants and their processing is considered a work only for women, men did help with major harvest and in the preparation of feasts.

A total of 259 species are used for food and drink by the Tea garden and ex-teagarden communities of Nagaon district (Fig 3). Of these, 88 (33.97%) species are also known to be used for medicine and 138 (53.28%) species for other purposes (including medicine). A comparison with the common literature on edible plants shows that 25 (6.65%) species seem to be either less known or unknown, while the rest 234 (90.35%) species, though not all widely known, are found mention in literature, out of 259 species, 76 species are cultivated, which account for 29.35 percent of the plants used for food and drinks.

Considering the number of usage, the edible plants Cucurbitaceae, Solanaceae, Poaceae, Arecaceae and Araceae are the first five families as shown in Table. 1

On the basis of actual usage, the edible plants can be classified into 9 broad categories as shown in Fig 7. The plants used in more than one way have been included in more than one category.

Analysis of data on the plants used for edible purpose shows that major share of edible plants of the Tea-garden and ex-teagarden communities of Nagaon district comprises vegetable. Of the plants used as vegetable, leaf and shoot (130 spp.; 50.19%) are the commonest parts used; followed by fruit and seed (56 spp.; 21.62%), leaf (22
spp.; 8.49%), flower and inflorescence (24 spp.; 9.27%), root, stem, rhizome, etc. (14 spp.; 5.41%) and whole plant (5 spp.; 1.93%). Except for the cultivation of a few fruit yielding plants, the Tea garden and ex-teagarden communities of Nagaon district largely consume fruits from wild species.

The liquor prepared from rice is the commonest alcoholic beverage consumed in varying quantities by the Tea garden and ex-teagarden communities of Nagaon district.

Candiments form a significant part in the food of the Tea garden and ex-teagarden communities of Nagaon district. The substitute of salt is an alkali solution prepared mainly from Pseudostem of *Musa balbisiana* and is an essential ingredient in their cooking. Leaves of *Ocimum basilicum* is the important and most popular flavouring agent, which is often grown in homestead.

On the basis of plant/plant parts used for edible purpose the species can be grouped into six categories in Fig 6. It is seen that leaves and shoots (138 spp.; 52.28%) are the commonest plant parts eaten by the Teagarden and ex-teagarden communities of Nagaon district which also constitute the bulk of the plants used as vegetable. Fruits of 121 species (46.72%) are eaten either raw or cooked as vegetable. Flowers and inflorescence of 24 (9.27%) species are used mostly as vegetable. Roots, tubers and bulks of 18 (9.95%) species are used and constitute largely as substitute of rice during scarcity. Seed (10 spp.; 3.86%) and whole plant (5 spp.; 1.93%) are put to fewer uses.

The degree of importance of these different kinds of edible plants varies from place to place and season to season. For example, shoots and leaves of *Clerodendrum colebrookianum*, which is an important vegetable is not consumed during flowering stage, when it develops a bitter taste.

The methods of edible plant collection are very simple. Flowers, leaves and shoots are plucked as such, white rhizomes and tubers are generally dug with instruments of various kinds. Mostly only hands are used. Except cereals they preserve a few plants
and normally gather the day's requirement in the morning hours. Fruits are generally collected and even consumed while working a wandering in forest and rarely brought home.

Plants which contain toxic principle such as certain yams and arums, must undergo the process of washing to get rid of toxic contents. But most of the wild food usually do not require such processing before consume.

A few plants are eaten raw, but mostly they are used after cooking. Some tubers or corms, such as Ipomoea batatas and Alocasia indica, are backed or roasted over open fire.

It can be commented that wild food plants contribute much to the bulk of the food consumed by Teagarden and ex-teagarden communities of Nagaon district. Vegetable constitute the significant part of the diet. Fruits do not form a significant part of the diet; they only supplement the diet. Beverage is consumed regularly by all sections of the their society.

MEDICINAL ASPECT:

Majority of the Teagarden and ex-teagarden people of Nagaon district depend on traditional medical practitioners of their primary healthcare. A total of 165 plant species (including 37 species belong to 23 genera and 29 families of ethnoveterinary) under 135 genera belonging to 78 families have been recorded to be used by the them (Fig. 3) of these, 102 (61.8%) species have been found to be used for various other purposes also.

A total 279 prescriptions (including 26 ethnoveterinary prescription) for man and animal health related problems have been recorded. Out of the total 279 prescriptions, 164 prescriptions (58.7%) involve single plant, while the rest 115 (40.3%) prescriptions involve more than one plant ingredients. As far as the use in particular ailment is concerned, 40 (14.33%) of the total 279 prescription seem to be either
little known or unknown on comparison with common literature on medicinal / ethnomedicinal plants, while the rest 239 (85.67%) prescriptions, though not all widely known, are found mention in literature. The less known prescription are marked with asterisk (*) sign in the text.

On the basis of curative properties with which they are associated the prescriptions can be categories into: (1) Animal bites (snake bite, insect-sting, dog-bite scorpion-sting, etc.), (2) Antiferlity, (3) Anthelmintic, (4) Bone fracture and dislocation of bones, (5) CNS disorders (insanity, epilepsy, delirium, paralysis, etc.), (6) Cuts, wounds and swellings, (7) ENT disorders, (8) Gastrointestinal (GIT) disorders, (9) Pain, (10) Respiratory disorders, (11) Urinogenital (UGT) disorders, (12) Skin infections/diseases, (13) Fever and (14) Miscellaneous. The miscellaneous category includes jaundice, dropsy, piles, spleen enlargement, diabetes, caries, anaemia, toothache, goitre and lactagogue.

The total number of prescriptions along with the number of less known ones used for these 14 ailment/symptom categories are shown in Fig. 8.

The maximum numbers of prescriptions used for a particular ailment can possibly show the prevalence of the ailment among the Teagarden and ex-teagarden communities of Nagaon district and probably also in the area of present study. Analysis of data reveals that the maximum number of prescriptions have been reported for gastrointestinal disorders, followed by urinogenital and skin diseases for other ailments, relatively lesser number of prescriptions have been reported.

The study also revealed that at least five methods of application of medicine or usage are included in the prescriptions. The maximum number of prescriptions are orally administered (66.30%), which is followed by topical and local application (22.94%), massage and fomentation (2.15%), smoking and inhaling (1.43%) and others (7.17%). Fig. 11.
Table 2 : Method of application of ethnomedical prescriptions. (Total No. of prescriptions 279)

<table>
<thead>
<tr>
<th>Method</th>
<th>No. of Prescription</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Orally administered</td>
<td>185</td>
<td>66.30%</td>
</tr>
<tr>
<td>2. Topical or local application</td>
<td>64</td>
<td>22.94%</td>
</tr>
<tr>
<td>3. Massage &amp; formentatain</td>
<td>6</td>
<td>2.15%</td>
</tr>
<tr>
<td>4. Smoking or inhaling</td>
<td>4</td>
<td>1.43%</td>
</tr>
<tr>
<td>5. Others</td>
<td>20</td>
<td>7.17%</td>
</tr>
</tbody>
</table>

Medicines that were indicated to be administered orally included those claimed to be used mainly for treating intestinal parasites, diarrhoea, dysentery, other gastrointestinal diseases, bronchial troubles, urinary trouble, epilepsy, etc. Orally prescribed medicine include liquid preparation, non formulated medicines, pills and medicines mixed with foodstuffs.

Medicines recomended to be applied topically were included mainly for skin diseases, wounds, eye diseases, problems of ear, nose and throat, sprains, protruded rectum, swelling, eczema, external bleedings, bites etc. These medicines were liquid preparations, paste, ointments and powders.

Smoking was suggested be employed for ailments of respiratory tract, throat infection etc. In this case non-formulated or powdered medicine were used to produce smoke.

An interesting method was streaming/inhaling of vapours in which packets of medicinal plant/plant parts are boiled in water while the patient is allowed to sit under a blanket with the pot containing the boiled plant / plant parts and inhaling the vapours cures the patient.

The various methods employed in the preparation of prescriptions were:

1) Plant parts boiled or soaked in water to make an infusion or decoction.
2) Plant parts bruised and applied externally.
3) Plant parts chewed and sucked.
4) Plant parts pounded and the juice extracted.
5) Plant parts dried and powdered.
6) Plant parts pounded and made into a paste.
7) Plant parts pounded and made into pills.
8) Plant parts rubbed, boiled and inhaled.

The methods one and six are the commonest ones. As far as the techniques of preparation of medicine are concerned, there do not appear to resemble those specified in present day organised pharmaceutical practices. In some preparations, household utensils (e.g. cup, bowl, pot, knife, etc.) and naturally available materials (e.g. stickes, pieces of stones, etc.) were used. In all cases, medicines are prepared manually, while most preparations do not specify the quantities of ingredients to be included; those that indicate are only the use of rough measurements. In some cases, physical observations and use of cups and spoons are also indicated.

The study also revealed the frequency of different plants used in the prescriptions. It is seen that leaf and shoots (50.30%) are the commonest plant parts used, which are followed by roots and tuber (35.75%), fruit (12.72%), bark (9.67%), seed (7.27%), stem (6.06%), whole plant (5.45%), flower (3.03%) and juice or latex (2.42%) (Fig 10).

The study also provides the following information with particular reference to plants:

a) Some plant is often used for treating a number of different ailments.
b) Some part of the plant is used for treating different, even unrelated, ailments.
c) Different part of a plant are used for treating different ailments, and
d) Different parts of a plant are used for treating the same ailment.

Use of different parts of a plant for treating the same ailment indicated the possibility of having some active principle useful for treating ailment.

Many of the medicinal plants used in the ethnomedicine of the Teagarden and extra-teagarden communities of Nagaon district known for their medicinal value. Of the
165 plants recorded in the present study, 46 (27.88%) plants are known in British and/or Indian pharmacopoeia. There are also 85 (51.52%) species known for their use in Ayurveda, Unani and Siddha systems of medicine.

It is interesting to note that the Teagarden and ex-teagarden communities of Nagaon district also treated their domestic animals like cattle, goat, pigs, fowls, etc. with herbal remedies. A total of 37 species belonging to 23 genera under 29 families have been recorded to be used in their ethnoveterinary medicine by them. A total of 26 ethnoveterinary prescriptions involving these 37 species have also been recorded in the present study.

The ethnomedicine of the Teagarden and ex-teagarden communities of Nagaon district is an art adopted by years of experience. However, there is no organised school or system of transmitting this indigenous knowledge from one generation to the next. For this reason, some of this valuable indigenous knowledge on medicinal use of plants may be lost in the course of time.

**MATERIAL CULTURE:**

A total of 87 plants belonging to 69 genera under 38 families are associated with material use of the Teagarden and ex-teagarden communities of Nagaon district (Fig. 3). Of the total 87 species, 32 (36.78%) species are also used in medicine and 57 (65.51%) species are used for other purposes (including medicine).

Considering the number of species involved in material culture, Poaceae, Arecaceae, Lauraceae, Moraceae and Euphorbiaceae are the first five families as shown in Table 1.

On the basis of actual usage, the plants associated with material culture of the Teagarden and ex-teagarden communities of Nagaon district can be classified into 8 broad categories as shown in Fig. 3. The plants used more than one way have been included in more than one category.
In the absence of adequate literature on the material uses of plants of other ethnic groups in India, no attempt has been made to make comparisons about known or unknown uses of plants in this category. Nevertheless, certain uses of plants such as herbal fish poisons, indigenous seed preservation techniques, etc. included in this category seem to be quite significant.

There is some evidence of division of labour in the Teagarden and ex-teagarden communities of Nagaon district. Women are engaged in all works connected with collection and preparation of foods. Men make all the wooden articles, houses, tools and implements. Knitting of baskets, mats etc. are usually done by men and only occasionally the women do help.

**Socio-religious Aspects:**

In the preceding paras plants used by the Teagarden and ex-teagarden communities of Nagaon district to provide basic necessities and certain amenities of life have been discussed. There are certain plants associated with their religious and social customs and beliefs, and thus help in maintaining the cultural aspect of the society. In the present category all plants involved directly or indirectly in religious rituals and beliefs, social customs and festivals have been included.

A total of 24 species associated with the culture of the Teagarden and ex-teagarden communities of Nagaon district have been recorded (Fig. 3) and of these, 14 (58.34%) species are used for medicine and 20 (83.34%) species for other uses also (including medicine).

Perhaps as a consequence of living in a natural habitat and their dependence on plants, the Teagarden and ex-teagarden communities of Nagaon district have incorporated many plants into their culture, which depict through their language, social and religious beliefs and customs. The most significant in this connection that certain plant viz. *ocimum sanctum*, *Areca catechu*, *Phrynium pubinerve* and *Piper betel* are indispensable in all most all the religious and social functions.
CONSERVATIONAL ASPECT:

All though the human history, man has not used and exploited plants to his benefit, but also tried to improved the kinds and qualities of plants. In ancient days, by foresight or intuition, man maintained a healthy balance with nature and did not damage the green environment to such an extent as to reduce its quality or content.

The intimate relationship forests and their denizens—particularly the people living in and around them—is well known. Early inhabitants of forests regarded the forests as a valuable resource and used them for their livelihood to their best understanding, and without detriment to that resource. They also protected the forests through several beliefs and taboos.

Preservation of sizeable diversity of plants in association with a deity is quite a distinct phenomenon observed among the Tea garden and ex-teagarden communities of Nagaon district. From the point of view of conservation, these areas are important not only for the rare and endangered species of plants, but also for the ecosystem and for the conservation of plant diversity of the area.

Inspite of the protection extended through religious beliefs and practices, the forest in many parts of the area inhabited by the Tea garden and ex-teagarden communities of Nagaon district suffer considerable interference and dame due to obvious reasons.

Considering the present position it can be inferred that the beliefs about plants and most probably the basic idea of religious might have had a significant influence on managements of vegetable resources by the Tea garden and ex-teagarden communities. They have maintained a reasonable understanding of the potential uses of their resources, a factor which must have contributed to this group of people to survive on the vegetal resources till today.