SUMMARY AND CONCLUSION

Ethno-botany is the study of how people of a particular culture and region make use of indigenous plants for food, shelter, medicine, clothing, hunting and religious ceremonies. Ethno-botany has its roots in botany, the study of plants. Botany has been originated from an interest in finding plants to help and fight illness. In fact, medicine and botany have always had close ties. Many of today’s drugs have been derived from plant resources. India has major achievements in the field of ethno-botanical research because 427 tribal communities are residing all over the country. According to census 2001 of India, scheduled tribe population was 78.8 million which constituted about 8.5% of the total population of India. Medico botanical study is very important area of ethno-botany for bio-prospecting and value addition. Ethno-medico-botanical studies have prime importance in searching new medicines from the plants for human and livestock.

Considering the importance of ethno-medico-botanical research in India in general and Maharashtra state in particular, Bhor region from Pune district of Maharashtra state was selected for ethno-medico-botanical survey. This taluka is populated with Dhangar, Kunabi, Mahadeokoli, Katkari, Carpenters, Blacksmith, Goldsmith, Barbers and Bhoi communities which are residing in hilly parts and they have traditional knowledge of medicinal plants used for human and animal diseases. Bhor is situated in hilly and remote western ghat region which covers an area of 892.0 Sq. Km. It lies 54 km south of Pune and between 18° and 18°.45’N latitude and 73° 15’E. longitude. It has 185 villages and total population is 17,1,719 out of which 10,817 belong to Scheduled castes and scheduled tribes and remaining 1,60,902 others castes.

Present survey was carried out by random sampling method from 105 informants from different villages. These informants are of different age groups. Two old persons were of the age group between 90 to 95, maximum people belong to age group of 51-60 followed by 61-70, 41-50 and 31-40. Out of 105 people, five were educated. Anand Tukaram Bandal is the only educated young person who is matriculate. Forty informants were educated up to 4th standard, thirty up to 5th to 7th standard and ten were educated up to the 8th to 10th standard. Illiterate people were 25 who were not going to the school. I have observed that old people were having more knowledge than the younger ones.
Systematic documentation of ethno-medico-botanical information was undertaken. Validation of ethno-veterinary medicine was carried out which the major and important part of this research. Various developmental activities are initiated in Bhor region hence there is an urgent need to document traditional knowledge before it vanishes forever. Preparation of herbarium sheets and their deposition is a main objective of present study. Total 134 herbarium sheets were prepared and deposited at AHMA (Agharkar Herbarium of Maharashtra Association) recognized by Kew herbarium. It includes botanical name, family, local name, locality, parts used, ethnomedical-botanical notes and utility for ailments either human or cattle diseases.

Traditional knowledge from Vaidus, Bhagats, Herbalists, farmers and women was collected on human and animal diseases. Total 231 plant species were recorded for 22 human and 16 animal diseases. Two Pteridophytes are also used by local people. It was found that total 65 plants were used for skin diseases, 35 for fever, 28 for respiratory diseases, 27 for stomach ache, 26 for urinary disorders, 24 for wound healing, 23 for diarrhoea and dysentery, 21 for gynecological problems, 20 for piles, 20 for snake bite, 18 for Jaundice, 15 for acidity, 14 for body ache, 13 for tonic, 13 for toothache, 12 for rheumatism, 11 for scorpion bite, 11 for headache, 10 for eye diseases, 10 for diabetes, 5 for ear ache and 4 for cancer.

Most of the wild plants were collected from the forest areas. Some of the plants were weeds, cultivated plants, epiphytes and parasites. All these plants were used by tribal communities. Majority of plants which were used by the tribals are Calotropies procerea (Ait) R.Br., Vitex negundo L., Bauninia recemosa Lamk, Embilica officinalis Gaertn., Pogostemon benghalensis and Ricinus communis L., Achyranthes aspera L., Caesalpinia bonduce (L.) Roxb., Calotropis gigantea (L) Ait, Eleusine coracana (L.), Terminalia chebula Retz. and Woodfordia fruticosa (L.) Kurz., Aloea vera (L.) Burn., Careya abrorea Roxb., Cassia fistula L., Carissa congesta Wt, Ficus racemosa L., Tinospora cordifolia L. and Solanum anguivi Lam.

The majority of tribal or local people used leaves on priority basis followed by roots, bark, fruits, seeds, stem, flowers, latex, rhizome and whole plant. Petioles, bulbs and sap were rarely used. Barks of trees and shrubs were playing major role in medicines. For skin diseases, dysentery and diarrhoea maximum barks were used. Snake bite is major problem in tribal areas. Bark of different plant species was used for human and animal snakebite cases. For eye diseases, toothache and acidity bark is used in less quantity. Stem part of the plant material was useful in fever cases of human, bloat in livestock and dysentery and diarrhoea. Minimum quantity of bark is used for animal diseases like, Prolapse of uterus, conjunctivitis, yoke gall, liver disease and lactation.
Minimum stem part was used for scorpion bite, eye diseases and headache in human while maggots, prolapse of uterus, liver diseases, cough and cold and fever in livestock diseases. Roots are major part of the plant used in medicinal purpose. Maximum use of roots of herbaceous plants roots is 17.34%, shrubs 14.28%, Climbers 11.22% and 8.16% trees. It was observed that utilization of roots is maximum ultimately resulting into death of the plant. So it is very essential to conserve the plant resources by planting medicinal trees, shrubs and herbs.

Veterinary science was developed in India in Vedic period (Nakul Samhita, Aswayurveda and Hasthyurveda) which is an ancient Literature. Many ethno botanical plants have been used in Indian societies for curing animal diseases. In Bhor region, 16 animal diseases were recorded and for each disease different or same plant species and different plant parts were used. It was found that 16 plants were used for dysentery and diarrhoea, 15 for Wound healing, 13 for Maggoty wounds, 10 for snakebite, 9 for lactation, 8 for bloat 7 for insect repellent, 7 for ticks and 7 for deworming, 5 for cough and cold, fever, conjunctivitis and retention of placenta. Four plants were used for prolapse of uterus, liver diseases and yoke gall. Documentation of traditional knowledge and practice of EVM was major achievement in the present research. Validation of EVM was also conducted at farmers livestock.

Validation of EVM were carried out on 130 animals from Bhor region. *Pogostemon benghalensis* (Burm.f.) O. Ktze., *Colebrookea oppositifolia* J.E. Smith, *Gnidia glauca* (Fresen.) Gilg. *Woodfordia fruticosa* (L.) Kurz. *Azadirachta indica* A. Juss., *Agle marmelos* (L.) Coirr. *Tridax procumbens* L. and *Lavandula bipinnata* (Roth.) O. Ktze., *Annona squamosa* L., *Mentha spicata* L. and *Momordica charantia* L. leaf powders, flower powder and fruit powder were tested for wound healings, maggoty wounds, diarrhoea and dysentery. Some combinations of two plants and three plants tested for maggoty wounds and wound healing purpose. Single simple plant material used for dysentery and diarrhoea and two plants combination for few animals. All these validation practices have given positive response and only two cases of diarrhoea and dysentery were not successful.

There are varying positions and opinions of the issue of ‘validation’ and validating indigenous knowledge systems, particularly those related to healing practices. Some arguments made that the existence of this knowledge over thousands of years is proof of its validity and there is no need to analyse and validation. There are some scientists within the frame work of ‘Western Science and medicine’ who strongly argue for precise validation of these systems and practices using standard
pharmacological and clinical protocols that have been defined by ‘Western Science’ and that exist within it. Anthra’s experience had shown that both extremes were impractical. So Anthra team embarked upon an effort to evolve a new paradigm for validation of prioritizing the practices which then could be recommended confidently to farmers, who themselves were losing interest / faith in these traditional knowledge systems, which is subsequently termed as social validation.

Due to modernization and rapid developmental activities in rural areas, local people losing their own heritage of traditional knowledge and it need to be conserved by local people. It must be transformed / disseminated into local communities by preparing booklets in local language which will be future part of research work.

Ethno-medico-botanical research of Bhor region has made notable findings which are worth in botanical science.

**Notable findings:**

1. Data on 22 ailments were collected for human beings and recorded notable plants which are not reported elsewhere and new to ethno-medico-botanical science

   - Jaundice - *Argemone mexicana* L.– root bark is not reported in earlier workers.
   - *Caesalpinia bonduc* (L.) Roxb. - leaf juice.
   - *Solanum anguivi* Lam. – Root paste
   - Fever - *Clerodendrum serrratum* L. – root decoction in fever
   - Dysentery & diarrhoea – *Paracalyx scariosus* (Roxb.) Alit.- Root juice.
   - Stomach disorders - *Calycoperis floribunda* (Roxb.) Poir. – leaf juice
   - Urinary disorders - *Phoenix sylvestris* (L.) Roxb.– Stem sap.
   - Ear diseases - *Barleria prionitis* L.– leaf juice.
   - Gynaecological problem- *Tectona grandis* L.– seed used for Infertility
   - Piles - *Remusatia vivipara* (Roxb.) Schott. & Endl. - Bulb paste
   - Skin diseases- *Dolichos lablab* L. – Leaf juice - burn and boil
   - *Clerodendrum philipinum* Schuer. –leaf juice- scabies
   - *Cucumis callosus* (Rottl.) Cogn. – fruit pulp- alopecia
   - Respiratory disorders – *Aleuritopteris farinose* (Forsk.) Fee.– Whole plant decoction.
   - Diabetic – *Costus speciosus* (Koen.) J.E.Smith. – Rhizome powder
   - Acidity – *Smithia racemosa* (Heyne ex Wt.) Baker- whole plant
   - Toothache – *Cajanous lineatus* (Wt. &Arn.) Van der. Maesen.- Leaf juice
2. As per veterinary practices there are more than 70 diseases recorded in literature out of which 16 diseases treated by the local communities which are commonly occurring in the study area.

3. In above ethno-veterinary practices for
Wound - *Pogostemon benghalensis* (Burn. f.) O. Ktze.- leaf powder
*Colebrookea oppositifolia* J.E. Smith – Leaf powder.
Wound maggots - *Gnidia glauca* (Fresen.) Gilg.- leaf powder
*Lavandula bipinnata* (Roth.) O. Ktze.- leaf powder
Dysentery and diarrhoea –*Careya arborea* Roxb.- Bark powder.
Bloat- *Jatropha curcas* L and *J. gossypifolia* L. – Stem part.
Prolapse of uterus – *Gloriosa superba* L. - tuber paste
*Grewia tilifolia* Vahl. – Bark juice.
Snake bite – *Leucas stelligera* Wall.ex Benth. – Leaf juice
Yoke gall – *Wattakaka volubilis* (L.f) Stapf.- Leaf paste.
Retained placenta – *Pandanus furcatus* Roxb.- Flower.

4. Validation has been carried out in farmer’s field with the supervision of herbalists. In this validation total 130 animals were used for wound healing, wound maggots and dysentery diarrhoea. Plant parts used in the study are

5. Maggots are caused due to blue bottle fly - *Calliphora vomitoria*. *Gnidia glauca* (Fresen.) Gilg leaf powder used on two animals, wound maggots were controlled with in 3 days. *Lavandula bipinnata* (Roth.) O. Ktze – leaf powder was tested on 11 animals. Wound maggots was control within 3-4 days. *Annona squamosa* L leaf powder was applied on 15 animals, controlled maggots with in 3-4 days. Leaf power of *Momordica charantia* L. tested on 10 animals, Control of maggots takes place with in 3 days.
6. *Lavandula bipinnata* (Roth) O. Ktze. and *Gnidia glauca* (Fresen.) Gilg are newly reported wild plants for wound maggots and wound healing having positive results on 15 animals.


8. For Dysentery and diarrhoea, total 45 animals were treated with powder of *Woodfordia fruticosa* (L.) Kurz., *Mentha spicata* L. and *Aegle marmelos* (L.) Corr. and combination of *Woodfordia fruticosa* (L.) Kurz. and *Mentha spicata* L. These plants have shown very good results.

While concluding the ethno-medico-botanical research following points were considered:

1. Utilization of flora of Bhor region, it involves the collection of information about the plant resources, identification, uses for human and animal diseases and management of different plants by herbalists or Vaidus in their small kitchen garden which are of prime importance in disease curing and conservation.

2. Bio-prospecting of ethno-botanical plants–In recent years, bio-prospecting program would create economic and social benefits by adding value to indigenous knowledge of ethnobotanically important plants through scientific innovations. Indian plant taxonomist may convert the traditionally important bio-resources of the county to economic wealth. In this connection, training to local people, cultivation and marketing of medicinal plants in the region will be major task for ethnobotanists. The ethno-medicinally important plants may provide the raw material to the pharmaceutical industries and some new sources to fight against diseases. Some of the most economically important herbal drugs have been discovered through ethnobotanical leads.

3. Traditional medicine and need for verification of claims - In India 75 to 80 per cent of population depends on traditional medicinal practitioners for their primary health cares. However in some of the cases there are controversies regarding the proper authenticity of the ethno-medicinal plants and there is need to verify the reports on their ethno-medicinal uses. Hence, there is need for correct scientific identification of the traditionally used plants in collaboration with ethnic groups and plant taxonomists.

4. Many ethno-botanical plants have been used in Indian societies in curing animal diseases. Proper attention has been paid towards ethno veterinary plants. The encouragement of this aspect would be definitely beneficial and economical for the farmers residing in villages who can get first aid treatment for animals from the local medicinal plants.

5. Ethno-botany in formulation of bio-insecticide–Plant insecticides are eco-friendly and biodegradable over synthetic insecticide. Many of the Indian plants have been traditionally used in different forms in the control of insect. The insecticide plants such as Azadiracta indica A.Juss and Aristolochia bracteata etz., Pogostemon benghalensis (Burm.f.) O.Ktze, Lavandula bipinnata (Roth.) O.Ktze and Colebrookea oppositifolia J.E.Smith and Annona squamosa L these are plant originated and properly documented. The ethno-insecticidal plants may be recommended as eco-friendly in EVM programme.