SUMMARY AND CONCLUSION

The present ethnobotanical investigation has revealed that DDBR is a natural home of large number of medicinal plants and the traditional knowledge systems of the Adi and Memba tribe is very rich in relation to the use of medicinal plants of their surrounding for the treatment of various ailments. Majority of the herbal practitioners were professional famers, government employees and traders with a good amount of theoretical as well as practical knowledge on herbalism. Most ailments were treated at a household level. Significantly, higher numbers of medicinal plants were claimed by illiterate women (40%) compared to men (17%).

The present investigation recorded 209 species of ethnomedicinally important plants from the BR which comprises a good number of economically and pharmaceutically potential species like *Coptis teeta, Terminalia chebula, Rubia manjith, Paris polyphylla, Piper longum* etc. Involvement of the communities in the cultivation and management of these species may lead to the socioeconomic up liftment of the people of the fringe villages. Representation 162 genera under 80 families from both dicots and monocots indicate the rich floristic diversity of the medicinal plants. The medicinal flora dominated by the families *Urticaceae, Euphorbiaceae, Zingiberaceae, Solanaceae, Rubiaceae, Anacardiaceae, Poaceae, Araceae, Moraceae, Polygonaceae* and *Verbenaceae* signify the values of these taxa for medicinal uses as commonly observed in the region. However, the occupation of *Urticaceae* in the top position is very interesting and a unique report of the present investigation.

Collection and uses of the various species from the wild is found as a common practice rather than cultivation. Majority of the species are harvested from wild habitat (63%) while few species (12%) were collected from both in wild and cultivated state. Although the records of occurrence of RET species is only about 2 %, the species represented in this category are the threatened taxa like *Coptis teeta* and *Aconitum ferox* and the rare species like *Angiopteris evecta, Campylandra aurantiaca, Tectaria zeylanica* that need conservation initiative for sustainable uses. Except two almost all the species are found in tropical and subtropical climates of the BR and signify the possibilities of their management in the fringe villages which are situated in the similar climates. Most of the ethnomedicinal plants were gathered by traditional healers from the natural habitat.
indicates that there is very little practice of cultivation of medicinal plants in the field or home gardens.

On the basis of plant parts used aerial parts (73.30%) were used more frequently than the underground plant parts (20.81%) and whole plant (5.88%). Among the above ground plant parts used leaves were used predominantly (34.41%) while among the underground plant parts used roots were used frequently (11.00%) and least used is corm (0.96%) in the treatment of various ailments. Maximum number of species (53.11%) were reported to be used in the treatment of digestive system disorders which is followed by inflammation and wound healing (26.8%), ailments of reproductive system (13.4%), pain (11.50%), fever (8.62%), disorders of respiratory system (8.62%), circulatory system (5.75%) and nervous system (11) 5.27%, snake bite and scorpion sting (4.8%), dental problems (3.83%). Ailments related to general metabolism 3.83%, bone fracture (2.9%) while least in eye and ear ailments (2%).

The method of preparation of crude drug was mainly pounded powder and paste (124 species) in case of plants being administered topically or orally they are collected fresh just before use. The healers preferred fresh plant materials for herbal preparation to dry materials. Decoction, juice & extract, infusion and boiled vegetables are administered in case of oral administration. In case external or topical applications of plant materials mostly used in the form of pulverized and tie with poultice. Remedies were mostly administered twice or thrice a day for 2-3 days after or before meal depending upon ailments treated or until cure. In special cases such as dog bite it is about 30 days. There is hardly any side effects has been reported by the patients treated. In some cases strict dietary regimens were imposed during treatment of patients. In some cases some spiritual functions are also observed before or during treatment.

Present investigation reveals that maximum number of plant species used singly in the treatment of specific diseases or ailments, only few plant species are administered in association with different plant species as compound drugs. The remedies, which involved merely the use of single plant, could be of great interest for the development of novel drugs as the exploration of therapeutic activity bearing ingredients from a single plant, may be easier.

The informants’ consensus analysis reveals that there is a relatively high level of homogeneity among the information provided by the informants and thus the medicinal system is relatively well defined.
Unsustainable harvesting practices along with lack of awareness about the sustainable harvesting among the poor collector create pressure on natural habitat of the medicinal plants.

Among the various constraints observed in sustainable harvesting the remoteness and inaccessibility of the area have been found as a prime cause which completely restricted the region from any promotional and developmental activities to be initiated. Although the species like *Coptis teeta*, *Aconitum ferox*, *Campylandra aruntiaca*, *Paris polyphylla*, *Rubia manjith*, *Piper longum*, etc. are commonly found but due to the inaccessibility the communities are lagging behind the market linkage. The nearby commercial town Pasighat is well connected to Dibrugarh and Lakhimpur town of Assam located about 200 km away from the DDBR with continuous hilly terrain. It is very difficult to transport forest produces to Pasighat as the road communication is very poor. In comparison to the other BR of the Northeast region, the connectivity and communication to DDBR is very poor that hinder overall development.

The Dehang Debang Biosphere Reserve still remains ethnobotanically under-explored. The topography and inaccessible geographical location led to isolation of the tribes to a large extent which resulted in high degree of variability of bio-culture observed among the tribes of DDBR. Most of the villages still remain isolated from urban culture. Their close association with wild plants helped to develop intimate knowledge about the plants and their uses. They still maintain their own traditional system of diagnosis of diseases and indigenous way of application of plants for curing the ailments and prefer herbal treatment than modern medicine. Most of the traditional knowledge on herbal medicine passes to next generation through oral communication.

In the traditional medicinal system it was common to see that different ritual procedures such as sacrificing pigs, hens, fowls, mithuns (*Bos frontalis*) etc. and offering eggs are practiced by healers alongside treating ailments with herbs to appease the evil spirits as remedy of ailments since they believe that diseases are caused by evil spirits. Lack of awareness on sanitation and hygiene coupled with climatic factors like high humidity, prolonged rainy season seems to be some of the factors that cause illness among the tribal communities of DDBR.

Notably most medicinal plants of the study area as well in the state are traded locally or regionally rather than internationally and the costs of domestication and cultivation are high. Moreover, cultivation is not necessarily the most beneficial production system in this region. Wild collection practice secure valuable income for
many tribal households which may provide incentives for conservation and sustainable use of forest and other important plant areas, and can be an important factor in the local economies.

The interesting observation emerged out from the present study that to improve palatability, additives are used many a times. The extract of *Mikania macrantha*, for instance, is administered with *Mentha piperita* to reduce bitterness. Some informants of Janbo village, which is dominated by Ashing subtribe, reported that some restrictions are imposed while taking certain types of medicines. For example, patients are not allowed to take country beer (*Apong*), *Capsicum annuum*, *Solanum melongena* and *Cucurbita pepo* during treatment for diarrhoea.

It was observed during ethnoobotanical investigation that besides medicinal uses *Helminthostachys zeylanica* is used as bioindicator of presence of availability of water and nutrients in soil for wet rice cultivation in abandoned land (*Jhum land*). Milangs traditionally believe that the abundant growing of the plant indicate the availability of water content in soil for wet rice cultivation. Besides, there were some ethnomedicinal practices that need closer monitoring and improvement for better service. Such practices may include hygienic handling of plant and their products and difficulty of measuring accurate and reproducible doses.

The result of the ethnomedicobotanical investigation yielded various useful information on medicinal plants and the healing practices used by the communities. The present research work serve as a first hand information on ethnomedicobotany that enumerates all the available medicinal plants with their taxonomic citation, key identifying characters distribution and details of the utilization pattern of each of the recorded species. As no comprehensive accounts on the occurrence and utilization pattern of medicinal plant is available for the DDBR, the present thesis work assume a greater significant in bridging the gap. By and large the present report may be helpful for

- Selection and cultivation of commercially potential medicinal plants for socioeconomic upliftment of the tribal communities.
- Detailed phytochemical screening of high value rare medicinal plants like *Campylandra aurantiaca*, *Liparis nervosa*, *Senecio scandens* etc.
- Baseline information for a pharmacological screening works against a variety of claimed activities.
- Ecological and population studies of RET species and formulation of
conservation strategy.

- Overall management of biosphere reserve.

Based on the present ethnomedicinal investigation of the DDBR particularly the Siang part the BR, the following suggestions and recommendations have been made that may be useful for manager of the BR for socioeconomic development-

1. Promotion of extensive survey and research for wild plant resources and their management.

2. Promotion of medicinal plant cultivation in the fringe villages particularly in Jengging, Janbo, Bomdo, Yinkiong, Tuting and Ramsing areas.

3. Establishment of marketing linkages to supply medicinal plant products. The authority of BR in collaboration with State Medicinal Plant Board and other related departments may take initiative for collection and disposal of produces harvested by the communities that assure the returns for the participants.

4. Proper utilization of the degraded lands adopting the modern land management practices. Introducing the medicinal and other horticultural crops in various agroforestry systems may improve the socioeconomic status of the poor tribes. Species for both monoculture and mixed cropping may be selected from the local available resources.

5. Training and awareness programs to the communities to improve local and regional utilization in sustainable management of resources.

6. Besides the medicinal value, many species of wild relatives of crop plant like *Coix lacryma-jobi*, *Mangifera sylvatica* can be managed for improvement of agricultural sectors.