SUMMARY

The major objective of this thesis were twofold: (a) the ecological distribution and socio economy of the common and less familiar wild leafy vegetables consumed by the ethnic people of the Sikkim Himalayas, and (b) the nutritional value of some common and less familiar wild leafy vegetables consumed by the ethnic people of the Sikkim. Out of 26 WLVs documented, 05 species were prioritized for detailed assessment. During the first phase a substantial documentation has been made on the ecological distribution and socio-economy of WLVs consumed by the ethnic people of Sikkim. Traditional knowledge of the ethnic people on the ethnic value, foraging, mode of consumption, culinary, trade and prospects of the selected common and less familiar WLVs were well documented. All these WLVs were recorded to have important bearing in the food habit and food security of ethnic people of the Sub-Himalayan region.

A major emphasis in this thesis has been the analysis of nutritional value of the selected common and less familiar WLVs. The investigations included the analysis of proximate composition, food value, mineral estimation, estimation of vitamin-C content, estimation of antioxidant activity, estimation of total phenolic content and examination on the microbial safety of five selected common and less familiar WLVs.

For the selected WLVs *Amaranthus viridis, Chenopodium album, Diplazium esculentum, Nasturtium officinale* and *Urtica dioica,* a wide range of adaptability with their specific ecological habitat from a cultivated field to a wasteland, home garden to a reserve forest, ditches to a stream and a furrow to the vertical margins of the field were recorded. In terms of altitudinal distribution, these WLVs were found luxuriantly growing from an elevation of 1000 ft to 12000 ft and were found to have distribution efficiency across the low hills to upper hills of the Himalaya. All the selected WLVs were recorded to have their specific ethnic value, socio-economic importance and were detected to be the vegetables generally available during the time of scarcity and emergency. All the selected species appeared to be multi-prospective plants and were found to be consumed by all the ethnic communities in large quantity. The market demand of *Amaranthus viridis* and *Chenopodium album* were found to be moderate while *Diplazium esculentum, Nasturtium officinale* and *Urtica dioica* were of high demand. Continuous rise in the market price, high demand and high supply equation with moderate or high edibility acceptance by the ethnic younger generation were observed to be the indicators of growing popularity and commercial viability of the selected five WLVs in the Himalayan region. Foraging and

trade of such WLVs in the hills were mostly done by the female members of the family.

With an aim towards ascertaining the nutritive value, different parameters were considered for investigation. All the five WLVs studied were found to have high protein content, high crude fiber content and high calorific value with comparatively low fat content. The findings indicated that the WLVs studied, could be identified as good quality greens for nutrient supplement and human health management. With an objective to examine the variability in mineral content the WLVs were subjected to different test parameters. The findings indicated that the WLVs studied could make significant contribution to the recommended dietary allowances for the nutrients.

Similarly with the objective to find out the phytonutrient content, the selected WLVs were investigated for antioxidant activity, total phenolic content and vitamin-c content. All the five WLVs were found to exhibit moderate antioxidant activity with variability in total phenolic content and vitamin-c content. Further, with an aim to ascertain the microbiological safety for human consumption, these wild leafy vegetables in raw state were examined for the occurrence of pathogenic bacteria *such as Listeria* sp., *Salmonella* sp., *Shigella* sp. *Staphylococcus aureus* and *Bacillus cereus*. The

results indicated that they were microbiologically safe for human consumption. Altogether it firmly establishes rich nutritional efficiency of all the five selected WLVs which can be recommended for human dietary supplement, nutritional management and medicinal alternatives.

Having established the benefit exponents of the selected WLVs, their traditional method of foraging from wild habitat however, has been observed to have some serious adverse effects on the environment and its biodiversity. It was well felt that, it is very difficult to answer how could the indiscriminative foraging level of WLVs be reduced, food security and income of local residents is increased and biodiversity conservation is ensured for such wild leafy vegetables.

Thus, with the benchmark of twofold objectives and observation on the adverse effects of foraging, an Ethnic Food, Health and Environment (EFHE) domestication model of WLV species, have been proposed in this thesis.