Chapter-II
REVIEW OF LITERATURE

Plants have been used since ancient times for the treatment of various ailments. The importance of medicinal plants in traditional healthcare practices, providing clues to new areas of research and in biodiversity conservation is now well recognized. However, information on the uses of plants for medicine is lacking from many areas of the country. Examples on usage of plants by human beings can be traced to the remote past in the ancient Sanskrit, Greek and Arabic literature. Healing properties of some herbs are mentioned in Rigveda (4500 B.C - 1000 B.C), one of the oldest treaties in the world, in the form of sonnets, which were often recited in religious rituals (Harrison, 2002).

Marcus and Flannery (1978), the well-known ethnobotanists remarked, "Botanical data in the 16th century documents are extremely rich; they are also frustrating because no Latin names are assigned to the plants involved". Ross (1862) and Brown (1868) initiated general studies on the uses of plants. In 1896, Harsberger stated that ethnobotany is the first science that originated with the evolution of existence of human beings in this planet. Schultes (1941) repeated this point of view, that the men of science agreeing rather commonly to regard the ethnobotany as "the study of the relations which exist between man and his ambient vegetation".

2.1. Medicinal Plant Studies around the world

Weiner (1970) reported about the use of 20 medicinal plants practiced by the local inhabitants in Namosi village, Fiji. Turner and Bell (1971) studied 39 plants belonging to 36 genera and 28 families used as medicine by the Coast Salish Indians of Vancouver Islands. Prance (1972) described the preparation of a contraceptive by name
Beku made from *Curarea tecunarum* by the tribe Denis of Amazonian Brazil. Turner and Bell (1973) documented 69 medicinal plants belonging to 61 genera and 30 families used to cure various ailments by the Southern Kwakiutl Indians of British Columbia. Uhe (1974) highlighted 154 medicinal plants used by the native people of 9 Samoan Islands. Singh *et al.* (1979) enumerated 75 medicinal plants used in Nepal. Wilson and Marian (1979) listed out 34 plant species used in native medicine to cure various diseases by the people living in Ethiopian Plateau.

Giron *et al.* (1991) recorded 119 medicinal plants used in the traditional medicine by the Carib population inhabiting Guatemala, a poly-ethnical country in the Herat of the Mesoamerican region. Abbas *et al.* (1992) discovered 52 medicinal plants belonging to 49 genera and 20 families, which are being employed in the traditional medicine in Bahrain. Bhattarai (1992) documented 62 plant species used in the traditional phytotherapy by the local inhabitants of Jumala, Muga and Kalikot districts of West Nepal. Gill and Nyawuame (1994) studied about 103 leguminous plants used in the ethnomedicinal practices of Nigeria. Dolores and Latorre (1997) highlighted 101 plants of both flowering and non-flowering plants used in native medicine by the Mexican Kickapoo Indians living in Mexico.

Balick *et al.* (2000) mentioned the use of some medicinal plants by the Latino healers for women’s healthcare in New York City. Ivancheva and Stantcheva (2000) enumerated 73 medicinal plants belonging to 30 families used by the local people of Bulgaria, South-East Europe. Guarrera (2003) recorded 126 plants used in the traditional medicine by the local inhabitants of Central Italy. Rodrigues (2003) highlighted 165 useful plants of which 150 had medicinal and/or aromatic use. Fassil (2005) studied the
use of medicinal plants and the related lay traditional health knowledge and practices among rural communities in the Bahir Dar Zuria Wereda (district) of Gojam located in the northwestern highlands of Ethiopia.

Hamayun et al. (2006) enumerated 70 medicinal herbs used by the local people inhabiting Burner district, Pakistan to cure various diseases. The most frequently used medicinal herbs of the area include Acorus calamus, Ajuga bracteosa, Trachyspermum ammni, Paeonia emodi, Skimmia laureola, Thymus serpyllum, Valeriana jatamansi and Viola biflora. Bussmann and Sharon (2006) recorded the traditional use of medicinal plants in Loja province, Southern Ecuador. Joshi and Joshi (2007) reported 116 plant species belonging to 66 families used by the local people inhabiting Likhu Sub-Watershed, Nuwkcot district, Nepal to treat various diseases. Ahmad et al. (2008) documented a total of 40 plant species belonging to 38 genera and 34 families used in herbal cosmetics by local women communities in district Attock of Northern Pakistan.

Mesfin et al. (2009) documented 155 plant species of medicinal plants belonging to 39 families and 63 genera from the natural vegetation and homegardens in Wonago Woreda, Gedeo Zone, Southern Nations, Nationalities and Peoples Regional State (SNNPR). Flatie et al. (2009) reported 40 medicinal plant species belonging to 23 families used by Berta ethnic groups, Assosa Zone, mid-west Ethiopia. Samuel et al. (2010) documented 62 medicinal plant species belonging to 36 families which are used in Kampung Bawong of West Malaysia.

Ong et al. (2011) recorded a total of 52 species of medicinal plants during the folk botanical survey among the Malay villagers at Terengganu, Malaysia. Ong et al. (2012) surveyed 37 medicinal plant species belonging to 36 genera and 30 families used
as medicine by the Semai villagers of Tapah, Perak, Malaysia. Ahmad et al. (2013) recorded 100 having medicinal plants used in indigenous therapy by the people of Madyan valley in Swat district of Pakistan. Betti et al. (2013) described the popular use of medicinal plants by the Baka Pygmies settled in the periphery of the Ipassa Reserve. Hasan et al. (2013) documented 76 species of wild medicinal plants used traditionally by the Nepal people of Makawanpur district. Swertia chirayita, Astilbe rivularis, Bergenia ciliata, Acorus calamus, Nardostachys grandiflora, Valeriana jatamansii were most commonly used by the local people of this district. Mesfin et al. (2013) collected 31 species of medicinal plant used by the indigenous people of Gemad district, Northern Ethiopia helpful in treating 32 human ailments. Song et al. (2013) identified 171 medicinal plant species belonging to 141 genera and 68 families from the Jeju islands of Korea. Teklay et al. (2013) identified 114 medicinal plant species belonging to 100 genera and 53 families from the Awulaelo District, Tigray Region of Ethiopia. Enyew et al. (2014) highlighted the importance of 155 medicinal plants belonging to 128 genera and 65 families in and around Fiche district of Central Ethiopia. Maroyi and Mosina (2014) recorded 37 medicinal plant and traditional practices in peri-urban domestic gardens of the Limpopo province, South Africa. Olatunji et al. (2014) surveyed 53 medicinal plant species belonging to 36 families from Kogi state of Nigeria which were used by the herbal practitioners of this area. Limenih et al. (2015) recorded 54 plant species for their medicinal values from the Amhara region of North Ethiopia. In this study euphorbiaceae are the dominant family, followed by Solanaceae.

2.2. Medicinal Plant Studies in India

Indian subcontinent is one of the greatest emporia of ethnobotanical wealth (Jain, 1981). Most of the ethnobotanists explored the wealth of India. Among them first names
that come to our mind are E. K. Janaki Ammal, the pioneer of ethnobotany in India and S. K. Jain who initiated the ethnobotanical study on the food plants among the tribals, as an official programme of the Botanical Survey of India (BSI). S. K. Jain a leading researcher in ethnobotany published many books and papers in ethnobotany (Jain, 1987).

The history of medicine in India can be traced back to remote past (Guna, 2006). In the sixteenth century, some Portuguese and Dutch scientists came to India for the study of medicinal plants. Van Rheeds “Hortus Malabaricus” is the monumental work in 12 volumes on the study of Indian plants was published between 1678 and 1703. Jones in 1799 wrote a book on the “Observations on Selected Indian Plants” followed by Ainslies “Materia Medica of Hindoostan” (1813, 1826). Roxburgh (1920-1924), the father of Indian Botany worked a lot on Indian plants and his work was published as “Flora Indica”. Royle in 1837 wrote an essay on the “Antiquity of Hindu Medicine”. Shaughnessys (1841) “The Bengal Dispensatory” is the first book dealing exclusively with the properties and use of medicinal plants. In 1868, Waring’s Pharmacopoeia of India signaled a new epoch in establishing the value of medicinal plants. In 1869, Moodeen’s supplement to the Pharmacopoeia of India and Flueckiger and Hanbury’s Pharmacograpia (1879) added new information on the medicinal plants. Watt’s (1896) Dictionary of Economic Products of India was a landmark in modern ethnobotany. Wealth of India: A dictionary of Indian Raw Materials and Industrial Products (1948-76) published by the Council of Scientific and Industrial Research (CSIR) has also become a reference source for ethnobotanical research.
Kirtikar and Basu (1933) published a voluminous work on the *Indian Medicinal Plants*. Chopra (1933) published a treatise on the *Indigenous Drugs of India*. Other publications of this period are *Bharatiya Banushadi* by Biswas and Ghosh (1950-1952), *Monographs on Pharmacognosy of Root and Rhizome Drugs* and *Pharmacognosy of Leaf Drugs* by Datta and Mukerji (1950) and (1952), *A Review of Indian Medicinal Plants* by Chopra and Chopra (1955), and *Chopra's Indigenous Drugs of India* (Chopra et al., 1958). Chopra et al. (1965) prepared a monograph on *Poisonous Plants of India*.

Shah and Joshi (1971) mentioned 75 plants used as medicine by the Khasia Rajputs in the sub-montane and Bhotias in the montane of the Kumaon region of India. Drury (1973) published his monumental work on useful plants of India. Malhotra and Moorthy (1973) gave a list of about 126 medicinal plants used by the local inhabitants of Chandrapur district, Maharashtra. *Indian Materia Medica* was published by Nadkarni (1954). Works like *Medicinal Plants of India* was published by Satyavati et al. (1976), and *Cultivation and Utilization of Medicinal Plants* by Atal and Kapur (1982).

*Glimpses of Indian Ethnobotany* (Jain, 1981) is the first book that gave a comprehensive view of current studies in ethnobotany. India is well known for its ethnobotanic endeavours right from the time of Vedas and Samhitas. Thorugh the efforts of Ayurvedacharyas like Charaka, Susruta and Dhanwantari, ethnomedicine attracted serious attention in India even during centuries ago.

*Santal Disease and Santal Medicine* is the best ethnobotanical work done by Bodding (1925-27). *Glossary of Indian Medicinal Plants* (Chopra et al., 1956), *Bibliography of Ethnobotany* (Jain et al., 1984), *Dictionary of Indian Folk Medicine and
Ethnobotany (Jain, 1991) and Medicinal Plants of India (Jain and De Filipps, 1991) are some of the important ethnobotanical publications in India.

Yoganarasimhan et al. (1982) has recorded the use of 143 medicinal plant species by the local inhabitants in Tumkur district, Karnataka. The inhabitants of Sind Valley of Kashmir used 57 plant species belonging to 34 families as medicine (Dar et al., 1984). The uses of 26 plants are enumerated by the local inhabitants of Morni and Kalesar hills of Ambala district, Haryana Jain (1984). Thakur et al. (1992) mentioned about 32 medicinally important plants utilized by the local people inhabiting different villages of Madhubani district, Bihar for treating some common ailments like cold, cough, fever, diarrhoea, dysentery, vomiting, cholera, jaundice, malaria, snakebite, leprosy, genital disorders, etc. The tribe Korku inhabiting Melghat region of Maharashtra used 11 plant species as medicine (Badhe and Pandle, 1993). Shankar et al. (1993) gave a list of 35 plant species used as medicine by the tribals Idu Mishmis, Digora Mishmis and Padams inhabiting Dibang Valley, Arunachal Pradesh. Siddiqui and Husain (1993) drew attention to 36 plant species belonging to 31 genera and 27 families of angiosperms used in the treatment of gonorrhoea by the herbalists and villagers inhabiting the Central Uttar Pradesh.

All India Co-ordinated Research Project on Ethno-biology (AICRPE), a multi-institutional, multidisciplinary action oriented research programme extended over a period of 12 years generated a huge database on ethno-biology. The database revealed that over 10,000 wild plant species are being used by tribes for meeting various requirements: medicine (8,000 species), edible (3,500 species), fibre (550 species),
gums, resins and dyes (425 species), pesticides (325 species) and 1,000 species for other purposes (Pushpangadan, 1994).

Arshad et al. (1997) documented 51 plant species belonging to 29 families from the Cholistan desert lying in the south of Punjab used by the local inhabitants in their native medicine. Sen and Batra (1997) has dealt with the use of 65 medicinal plants belonging to 40 families in 46 household remedies by the Bramhabhattas and Hurjar communities in Rajasthan. Dagar and Dagar (1999) has recorded the medicinal use of four species of pteridophytes, one species of gymnosperm, 53 species of dicots and nine species of monocots, which have been used to treat gynaecological, urino-genital and other related problems by the aborigines of Andaman and Nicobar Islands. Uniyal et al. (2002) has documented 85 medicinal plants used by the local inhabitants in the upper catchment of river Bhagirathi, Garhwal Himalayas. Das and Sharma (2003) mentioned about 47 vascular plants used to cure diseases such as fever, jaundice, dysentery, diarrhoea, toothache, cancer, sore, wounds, skin diseases, etc., by the Manipuri and Barman communities inhabiting Cachar district, Assam.

Kala (2006) has recorded 335 medicinal plant species, of which 45 are rare and endangered. Verma et al. (2007) has presented the information on the traditional uses of seventy-two plant species collected from the campus of Banares Hindu University, Varanasi, Uttar Pradesh, and highlighted the uses of these plants by the local inhabitants. Bhattacharyya and Borah (2008) have dealt with 32 medicinally important weed species found in different crop fields along with some other plant species believed to have medicinal properties which are being used by the rural people, particularly the women of Nalbari district of Assam. These weeds although have eradicated from the crop field
during cultural operation may be fruitfully utilized to serve the medicinal purposes against various diseases.

Kalita and Phukan (2010) has studied about some of the ethnomedicines used by the Tai Ahom of Dibrugarh district, Assam for the treatment of 17 commonly occurring diseases like abdominal pain, abscess, cough, cut-injury, diarrhoea, dysentery, epilepsy, epitaxis, fracture, gastric, inflammation, loosening of teeth, loss of appetite, migraine, sleeplessness, sourin mouth, wooping cough, and worms. Rajkumar and Shivanna (2010) have surveyed 22 herbal practitioners and knowledgeable elder people residing in 10 randomly selected villages of Sagar taluk of Shimoga district, Karnataka using semi-structured questionnaire based interviews. Rahmatullah et al. (2010) has dealt with 50 plant species belonging to 49 genera and 33 families used by the Kavirajes of Chalna area, Khulna district of Bangladesh.

Dey and Nath (2011) have documented 24 species of medicinal plants in pediatric and maternal care practiced by the indigenous people of Purulia district of West Bengal, India. Barukial and Sarmah (2011) have recorded 232 plant species and their ethnmedicinal values used by the people of Golaghat district of Assam, India. Kumar and Bhagat (2012) have enumerated 139 species of medicinal plants belonging to 117 genera and 69 families from Kathua district of Jammu and Kashmir. Shivanna and Rajakumar (2013) have shown that 86 plant species for treating 47 human and 16 veterinary ailments are used by the local communities in Hosanagara Taluk of Shimoga district in Karnataka. A large number of healers of this taluk prefer wild plants over the cultivated ones for herbal drug formulation. Yabesh et al. (2014) has studied about 102 species of medicinal plants distributed in 95 genera belonging to 53 families commonly used ethno
medicinal plants by traditional healers in Silent valley for the treatment of 19 ailment categories based on the body systems treated.

Mistry (2015) has identified 52 species of medicinal plants belonging to 39 families, 51 genera for the treatment of various ailments. Medicinal plants used for the treatment of respiratory disorders were recorded from five villages from the North Eastern Himalayan Sub-region of India and a total of 14 species of ethno medicinal plants belonging to 11 families were identified by Bhuyan and Baruah (2015).

2.3. Recent medicinal Plant Studies in Tamilnadu

Muthu et al. (2006) has documented 85 plant species distributed in 76 genera belonging to 41 families to treat various diseases. Kumar and Kumar (2011) conducted studies on the herbal medicine used for the treatment of various ailments among Thenmudiyanur villagers of Thiruvannamalai district, Tamilnadu. Muralidharan and Narasimhan (2012) documented the medicinal plants used for gastrointestinal problem by villagers around Gingee hills of Villupuram District.

Boombilagan and his co-workers (2011) dealt with 27 traditionally useful medicinal plant species belonging to the Asclepiadacean members used by the rural people in Madurai district of Tamilnadu. Sivasankari et al. (2013) reported 52 species of valuable medicinal plants belonging to 36 families from Utapuram of Madurai district. Deepa and Saravanakumar (2013) studied 89 species of medicinal plants belonging to 51 families from Cuddalore district of Tamilnadu. The study has shown that about 33 medicinal plants were used for the treatment of several diseases either in single or in combination with some other ingredients.
2.4. Recent Medicinal Plant Studies in Kanyakumari District

Jeeva et al. (2005b) documented 92 weeds used as traditional medicine in Kanyakumari district of Southern Western Ghats. Majority of the weeds were used for healing wounds, kidney stones and skin diseases. *Aloe vera*, *Lippia nodiflora* and *Scoparia dulcis* are some of the widely distributed species of Kanyakumari district. Prakash et al. (2006) recorded 121 plant species covering 51 families of medicinal plants in the Scott Christian College Campus, Nagercoil. Banu et al. (2007) reported 17 plant species to be used by the rural people of Kattathurai of Kanyakumari district. Jeeva et al. (2007) dealt with 30 plant species belonging to 29 genera and 22 families of angiosperms used in the traditional treatment of skin diseases in South Travancore of Southern peninsular India. Britto et al. (2010) documented 50 medicinal plants species belonging to 32 families of the Manavalakuruchi in Kanyakumari District.

Jeeva and Femila (2012) studied the medicinal plants used by the Nadars of the Atoor village of Kanyakumari district. Sukumaran et al. (2014) compared the usage of medicinal plants used by two cultural communities of Kanyakumari of Tamilnadu. Lohidas et al. (2015) reported 85 medicinal plants from the AVM canal bank in Kanyakumari district. Uma and Parthipan (2015) reported 25 medicinal climbers belonging to 23 genera with 12 families from Pazhayaru river bank of Kanyakumari district.

Though a lot of has been works were done in ethnobotany, still there is scope particularly on integrated and interdisciplinary work. Currently, in Kanyakumari district the conservation of traditional knowledge is greatly faces a real threat due to many factors like modernized technologies and lack of interest among traditional healers in
transferring their knowledge and technology to next generation. So, there is an urgent need for a closer interaction between them to document the traditional knowledge before it is being lost.

2.5. Quantitative ethnobotanical studies

Before the mid-1950s, research into ethnobiology had primarily been descriptive, but by the mid-1980s, researchers incorporated a variety of quantitative methods for data collection and analysis into it (Phillips et al., 1994). The term ‘quantitative ethnobotany’ was used for the first time by Balee (1987) in an article published in a Brazilian journal. Since then, the term ‘quantitative ethnobotany’ has been increasingly used by other workers in the field.

Albuquerque (2006) evaluated two quantitative ethnobotanical techniques from the rural community in the semi-arid region of Pernambuco State, northeastern Brazil. Ong and Kim (2014) quantified the medicinal plants used by the Anti Negrito indigenous group in Guimaras Island, Philippines. Molares and Ladio (2009) reviewed the flora used by the Mapuche for medicinal purposes by using quantitative analysis. Guler et al. (2015a, b) studied the medicinal plants used by the traditional healers of Bozuyuk and the villagers of Turgutlu and confirmed their use values quantitatively. Shah et al. (2016) documented the indigenous knowledge on medicinal flora from the communities residing near Swat River (Suvastu) and in high mountainous areas of Swat-Pakistan. Shrestha et al. (2016) recorded the medicinal plant diversity and traditional healing practices in Eastern Nepal with respect to their quantitative indices.

It is very recent in the Indian context and hence only a very few works have been done in this research. Raghupathy et al. (2008) has done the quantitative ethnobotany of
‘Malasars’—an indigenous forest tribe residing at Vellangiri Hills, Tamilnadu, India and has estimated the consensus factor for determining the homogeneity in the informants knowledge. Raghupathy and Newmaster (2009) have studied the ethnobotany of Irulas in Kodiakkarai Reserve Forest, India using quantitative techniques and found that a high consensus existed among them with regard to medicinal plant use. Chellapandian et al. (2012) quantified the medicinal plants used by Siddha medical practitioners of Radhapuram Taluk of Tirunelveli district, Tamil Nadu. Frequency of citation and informant consensus factor (Fic) were analysed for the data regarding the ethnobotany of ‘Tharus’ of Dudhwa National park, India, by Kumar et al. (2013). Gazzaneo et al. (2005) documented the knowledge and use of the medicinal plants used by the local specialists from the Atlantic forest range of Northeastern Brazil quantitatively. Rana and co-workers (2015) quantitatively analyzed the traditional medicinal plants of Sikles, Nepal.

Upadhya et al. (2012) documented and analyzed quantitatively the traditional knowledge used to treat bone fractures from the Northwestern Ghats of India. Khan et al. (2015) compiled the medicinal plant usage among various communities residing in Garo hills of Durgapur, Bangladesh. In Kerala Yabesh et al. (2014) quantitatively documented the medicinal plants used by the traditional healers and Xavier et al. (2014) quantified and documented the indigenous knowledge on the utilization of most common medicinal plants used by the Kani tribes in Thoduhills, Kerala. In Tamilnadu, quantitative ethnobotanical studies were done by Ayyanar and Ignacimuthu (2011), who quantified the common medicinal plants used by the Kani tribals in Tirunelveli hills of Western Ghats, Pandikumar et al. (2011) documented the local knowledge on medicinal plants among the traditional healers in Mayiladumpara block of Theni district, Murtheeswaran et al. (2011) documented and quantitatively analyzed the local knowledge on medicinal plants used by the Kani tribes in Tirunelveli hills of Western Ghats, Pandikumar et al. (2011) documented the local knowledge on medicinal plants among the traditional healers in Mayiladumpara block of Theni district, Murtheeswaran et al. (2011) documented and quantitatively analyzed the local knowledge on medicinal plants used by the Kani tribes in Tirunelveli hills of Western Ghats, Pandikumar et al. (2011) documented the local knowledge on medicinal plants among the traditional healers in Mayiladumpara block of Theni district, Murtheeswaran et al. (2011) documented and quantitatively analyzed the local knowledge on medicinal plants used by the Kani tribes in Tirunelveli hills of Western Ghats, Pandikumar et al. (2011) documented the local knowledge on medicinal plants among the traditional healers in Mayiladumpara block of Theni district, Murtheeswaran et al. (2011) documented and quantitatively analyzed the local knowledge on medicinal plants used by the Kani tribes in Tirunelveli hills of Western Ghats, Pandikumar et al. (2011) documented the local knowledge on medicinal plants among the traditional healers in Mayiladumpara block of Theni district, Murtheeswaran et al. (2011) documented and quantitatively analyzed the local knowledge on medicinal plants used by the Kani tribes in Tirunelveli hills of Western Ghats, Pandikumar et al. (2011) documented the local knowledge on medicinal plants among the traditional healers in Mayiladumpara block of Theni district, Murtheeswaran et al. (2011) documented and quantitatively analyzed the local knowledge on medicinal plants used by the Kani tribes in Tirunelveli hills of Western Ghats, Pandikumar et al. (2011) documented the local knowledge on medicinal plants among the traditional healers in Mayiladumpara block of Theni district, Murtheeswaran et al. (2011) documented and quantitatively analyzed the local knowledge on medicinal
plants among Siddha healers in Virudhunagar district of Tamilnadu and Esakkimuthu et al. (2016) surveyed the medicinal plants used by the non-institutionally trained Siddha practitioners which were given for cardiometabolic diseases.

Although the use of quantitative methods is becoming common in ethnobiology, we still lack studies assessing the reliability of data collected from different methods. Quantitative indices such as Informant Consensus, Use Value, Family Use Value etc. have never been attempted earlier in the study area. So, the present study is an attempt to record the quantitative data regarding medicinal plant used in the traditional system of medicine in Kanyakumari district. Quantitative indices such as Informant Consensus, Use Value, Family Use Value, etc. were used to understand the preferences and consensus existing among the informants regarding medicinal plant use. Kanyakumari district is rich in its traditional knowledge on the native systems of treatment. This valuable knowledge is facing a big threat to be lost in the near future. Therefore, an immediate compulsion is felt to take sincere efforts to prepare this precious knowledge which may lead to the invention of new drugs for several ailments in future years.