

## CHAPTER 6

# **MATERIALS & METHODS**

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The entire methodology for the present dissertation is primarily based on the interaction with the *Mech* people, pursuing them to share their traditional knowledge and analyzing the documented data scientifically. Traditional societies are, in general, very much conservative. There are strict social rules to control the leakage of their traditional knowledge (TK) outside the society and the punishment for doing so is quite stringent. Sometimes the collected TK needs proper verification as there is every possibility to get a fake data where the resource person tries to satisfy both, his own society and the outside receiver.

However, the entire methodology followed has been presented below in detail along with reference sources.

## 6.1. Ethnobotanical Studies

For the ethnobotanical survey the methods adopted by Schultes (1962); Jain (1981, 1987, 1991); Rai *et al* (1998); Rai & Bhujel (1999); Rai (2002) and some publications (Croom 1983; Alcorn 1984; and Rao & Hajra 1987) were followed. A questionnaire prepared on the model by Jain & Mudgal (1999) and Tag (2007). The extensive fieldwork spread over three years from 2004 to 2009 was carried out in different villages in the Duars of the Jalpaiguri district of West Bengal and Kokrajhar district of Assam.

The villages, which were vividly surveyed, are: Pashim Satali, Satali Nakadala, Mendabari, Dakshin Mendabari, Uttar Mendabari, Mantharam, Nimati, Chhekamari, Karjeepara, Baniapara, Mondalpara, Latabari, Dhalkar, Sibkata, Khoardanga, Ghoramara, Salkumar and Mahakalguri in West Bengal and Gossaigaon, Raimana, Kochugaon, Patgaon, Basugaon, Ranikhata, Amtika, Sidli, Amguri Bazar, Deosri, Saralpara and Haltugaon in Assam. The purpose of the study was the record of the traditional knowledge of the *Mech* people related to the use of plants. Enquiries were made on their daily life, food habit, occupation, health practices, medicines, trade, beliefs, rituals, ceremonies, traditions and customs using a pre-designed questionnaire.

**6.1.1. Preparation of Questionnaire:** The questionnaire has been provided in Annexure I & II.

**6.1.2. Development of Contact with *Mech* People:** The random demand of information from the people of traditional societies generally shows their antipathy and unwillingness to share their traditional knowledge (Train *et al* 1941) but with the sense of affection, sympathy and respect were extended to the informants to create the healthy atmosphere and better understanding. The *Mech* people in general, are all apparently seemed to be very friendly but maintained a deep secrecy about their traditional knowledge, especially concerning to herbal medicines. There is a belief, if too many people know about the medicines those will loose their efficacy. They also hesitate with a notion that their folk medicinal practices may be a matter of funny story for the outsiders. So, it is very important to establish a friendly relationship with these people. It is also helpful to participate in various ceremonies and festivals of their indigenous culture. However, they were ready to impart their indigenous knowledge, after visiting them for several times and convinced them that these information were collected only to record and preserve in written form for the future generation of the society and these will not be disclosed to the other medicinemen and also will not be used for personal benefit. Sometimes, the investigator had to take help from mediators mainly to resolve the language problem.

The communication with *Mech* people was not very difficult as because the author herself is an inhabitant of the Duars. Author personally knew few of them and had contacts with them. First of all author was to contact knowledgeable informants in the *Mech* villages or the medicine men called *Oja*. The *Mech* people apparently seemed to be very friendly. Almost all of them could speak and understand Bengali language and so direct conversation was possible without the help of interpreters in most of the cases. But sometimes interpreters were necessary, especially in Assam. The ladies also did not hesitate to speak to the author to express their own problems. Thus the author had all opportunity to know much about their family interactions; the visible behavior and traditions and the invisible thoughts of their mind.

During the field work some skills were adopted. First of all, proper contact was established with knowledgeable informants or medicine-men (*Oja*); they were then taken to the field mainly to recognize the plants they use. Another approach was to explain the purpose of the work to the Village Head or *Gaon-Burha* and educated persons of that area. Sometimes different

types of uses of plants were discussed with elderly persons and housewives. They provided different data using their local or vernacular plant names. Repeated queries were made to understand their knowledge, methods of diagnosis and treatment of diseases. Further information regarding the mode of intake and other conditions and combinations were also recorded. Data were collected on the specific part(s) of the plants, methods of processing and preparation of the drug and doses of administration of the prepared medicine. While in the field, a large number of information were enquired and recorded in pre-designed questionnaire, which was prepared following Jain & Mudgal (1999) and Tag (2007). Cross checking of collected knowledge in extremely important. This was done in the same or different village.

Staying with a family for some days and taking part in their regular domestic activities was also very much helpful not only to collect different TK in detail but also to understand the philosophy of uses of many plants in numerous instances.

**6.1.3. Observing the Daily Life:** Direct observation on the daily life in *Mech* society including food and traditional liquor preparations, process of making of instruments etc. helped to record the related plants much easily. Attending different customary rituals including funerals and other similar occasions on the uses of plants helped to understand the philosophy of the uses of different plants in *Mech* society. Observation on different places of religious interest or on Sacred Groves and recognition of plant related folklores and myths also were possible through such observation. The daily or weekly markets (*hats*) were also visited to study the marketability of wild or cultivated plants, vegetables and other plants products collected and/or produced in this area. Various plant materials were observed and in some cases brought for the conservation.

With the advent of modernization and through the contact of newer cultures, the *Mech* people have now adapted many broadly practiced manners and customs and now they become very hospitable and friendly to outsiders. For this, it was possible to stay as guest in quite a few *Mech* families and to receive invitation to attend many of their social or family-oriented celebrations and ceremonies. During the field work through the *Mech* villages, personal observations were noted down in the field note book on the daily life, agricultural practices, subsistence food, plant resource management, conservational practices/ attitudes and so on.

Men folk are generally familiar with local area, local plants and other resources. The *Gaon-burha*, elders and leading local intellectuals are also well acquainted with such knowledge as well and were interviewed. The ladies have absolute control over the household affairs and play a vital role in agro-ecosystem. So, they were also consulted mainly for the matters related to social affairs.

**6.1.4. Edible Plants:** Since time immemorial plants have been used as source of food, shelter, clothing, medicines, fiber, gum, resin, oil, etc. Several species of wild plants are used for edible purposes by tribals and other local people inhabiting in forest and remote areas. It is true that wild plants have been the primary source of man's basic needs. Many such species are most popular and now cultivated widely. Numerous workers including Jain (1964), Sahu (1996), Shukla *et al* (2001), Kar *et al* (2008), Takatemjen *et al* (2009) and Majumdar & Datta (2009) worked on wild edible plants in different corner of this country.

Sustenance of the *Mech* people, by and large, depends upon wild edible plants, including famine foods, which are collected daily from the forests and also from different other type of vegetation. Various parts of plants are used in the form of fruits, vegetables, pickles or other preparations. Aquatic animals like crabs, water snails, tadpoles, common prawns, different types of small fishes (available in local streams) etc. also form integral part of their rural foodstuffs.

Though majority of the vegetables sold in the markets constitute cultivated products but about one third of the vegetables account for wild edible plants.

Generally women folk collect edible plants from the vegetation. Children also some time take part in this work. But, for the collection of fruits from upper branches of tall trees are generally done by men. However, mostly women were consulted for this and they were requested to spot the plant in the vegetation and the voucher specimens were procured through this type of interaction only. Also, many plants were recognized after analyzing the already collected plants and through observation at the time of collection.

#### **6.1.5. Preparing Food, Medicine and Traditional Liquor:**

**A. Food:** During the surveys, data on household composition based on the method of preparation of food, medicine and traditional liquor available for use was documented. Knowledge of indigenous food is part of traditional knowledge which is largely transmitted through involvement of persons of households. The survey was conducted using a schedule to evaluate the information, availability and consumption pattern of edible plants. Informal discussions with inhabitants were held to enhance understanding and gather information about different preparations of edible plants as well as traditional cousins also. Female member from the household, who is responsible for food preparation, was engaged with the additional informants like males and children; those who assist in collection and processing of wild vegetables. With the help of informants, collection

of plant specimens, their local names, processing, ingredients and their quantity and preparation method were noted down.

**B. Medicines:** The information about the ethnomedicinal plants and their method of preparation was collected through rigorous surveys. The *Mech* people are in fact very friendly but maintained a deep privacy about their traditional medicines. However, after visiting them for several times to develop confidence and with the help of contact persons, finally they agreed to share their knowledge. The traditional healers (*Oja*) were interviewed about the medicinal plants, preparation method of medicines, quantity, mode of administration, etc. The midwives were also consulted for this purpose.

**C. Veterinary Medicines:** Ancient people closely observed the behavior of their domestic animals and the surrounding environment. Over centuries, through trial and error and keen observation, they acquired knowledge on remedial properties of plants against various diseases of animals. This knowledge about diseases and their treatments was transmitted by one generation to the next only verbally. Due to modernization, the traditional knowledge is vanishing rapidly day-by-day. In the present study, an attempt has been made to investigate and document this oral tradition that has accumulated over the ages. Records on ethnoveterinary recipes and plants used for treating animals are available from various parts of India (Jain & Srivastava 1999, 2003; Jain 2003).

The study area is rich in herbal wealth. *Mech* people usually practice agriculture for their economic needs. Most of the inhabitant depends largely on plant resources growing in their surroundings to gather their requirements including ethno-herbal therapy for ailing animals. Ethnoveterinary information was collected by interviewing local healers and experienced people. Collection of data and fieldwork was done according to Jain (1999). The information was cross-checked with different informants.

**D. Liquor Preparation:** Traditional liquor consumed by almost all the *Mech* people in the area and prepared in good quantity by some families in Duars. However, only a few people produce it for sale. The basic information were collected from expert producers of traditional country liquor i.e. *Rice Beer*. The entire process of the survey was divided into four parts (Jain 1991, 1995; Ghosh & Das 2004; Baruah *et al* 2010; Nath *et al* 2010): (i) Establishment of effective contacts, (ii) Recognition of basic ingredients and (iii) Observing the method of preparation starter mixture and (iv) Brewing the beer.

After developing confidence their TK related to the production of rice beer were observed, enquired and recorded. The useful plants were recognized and/or spotted by the practitioners and specimens were collected from the wild or planted sources and recorded the vernacular name of the plants, useful parts, purpose of use and amount used. The method of preparation of starter mixture, brewing and final fermentation process was also recorded. People from the *Mech* community engaged in the marketing of starter and beer were interviewed quite informally.

**6.1.6. Documentation of Methods of Collecting Fodder Plants:** In recent years, extensive concentration has been given to sustainable use and integrated management of fodder plants due to their nutritional value and importance for the conservation of land and water resources (Joshi 1991). The *Mech* people collect fodder from various habitats and bundles are carried back to their villages to feed the stock. The domestic stock animals obtain their food in two ways. For a part of the time, they are released or led out to graze in meadow and forest areas around the village, and in the afternoon or evening, while returned back and sheltered in stalls, they receive tree leaves/twigs and grasses, which has been collected for them during the day. Stall-feeding has the added significance that it provides a supply of manure, which can be used as a fertilizer for the crop field. The domestic animals, which are reared by the *Mech* people, are cows, goats and pigs.

Ethnobotanical information on fodder plants was gathered using various techniques, such as open interview and discussion with local informants. Information about the choice of fodder species and grading of the value of fodder species was obtained mainly from detailed examination of fodder bundles, which are poisonous or in some way unsuitable as fodder. The village people, especially the women folk have excellent knowledge about fodder species and their food value. They are able to identify them accurately in the field and have developed indigenous selection practices of fodder quality.

**6.1.7. Collection of Plant Related Folklores and Myths:** Several folklore especially songs, proverbs and tales which have been passed from one generation to the other have references to certain interesting properties or aspects of plants. These uses though not experienced in modern laboratories have proved to be correct because of long years of trial and error method (Rao 1989). The data of myth and folklore related plants have been obtained from the *Oja* (Priest), *Gaon Burha* (Village Heads), elderly people and leading local intellectuals through interactions.

## 6.2. Voucher Specimens

For all the plants used by the people of *Mech* tribe voucher specimens were collected. Plants were basically spotted by them either from their collected materials on in the field.

**6.2.1. Herbarium Methodology:** The voucher specimens were processed according to the method as suggested by Jain & Rao (1977). On the basis of information the plant specimens were collected from the wild or planted sources. Their common-names, uses, parts used, habitat, distribution pattern, habit and a brief but significant botanical description, flowering and fruiting, etc. were recorded in the field note book. Collected specimens were tagged, packed in airtight polythene bags and brought to the laboratory for further processing.

In the laboratory, the specimens were treated with formalin and pressed in blotting papers with heavy wooden press. Specimens were given changes every 24 hours for first three days and then in regular intervals till the plants were properly dried. Then specimens were poisoned by soaking those in the saturated solution of Mercuric Chloride in Rectified Spirit and then again dried under the blotters. After poisoning, specimens were mounted on herbarium sheets by pressing them with glue and then properly stitched with thread, whenever that was necessary. All the herbarium sheets were labeled properly and stored temporarily in a Herbarium Cabinet.

**6.2.2. Identification of Specimens:** Identification of collected specimens was done with the help of different literature including *Flora of Bhutan* (Grierson & Long 1983, 1987, 1991, 1994, 1999, 2001; Noltie 1994, 2000), *Flora of India* (Hajra *et al* 1995, 1997), *Flora of Eastern Himalaya* (Hara 1966, 1971), *An Enumeration of Flowering Plants of Nepal* (Hara *et al* 1978, 1979, 1982), *Ferns and Fern-Allies of Arunachal Pradesh* (Singh & Panigrahi 2005), *The Orchids of Bhutan* (Pearce & Cribb 2002), *Diversity and Distribution of Bamboos in Assam* (Barooah & Borthakur 2003) etc. Identification was also confirmed by matching specimens with the pre-identified and authenticated specimens available in NBU-Herbarium and at CAL.

**6.2.3. Storing of Voucher Specimens:** Specimens are primarily stored in steel cabinets in the Taxonomy & Environmental Biology Laboratory in the Department of Botany, North Bengal University. After finishing of the project work, the main set of the voucher specimens will be deposited in NBU-Herbarium and the duplicates will be deposited in CAL.