CHAPTER- III

MATERIALS AND METHODS
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3.1 Chhattisgarh State: A Profile

3.1.1 Introduction –

Chhattisgarh is one of the youngest States of the Indian nation. Chhattisgarh, the 26th State of India, was carved out of Madhya Pradesh on November 1, 2000. Chhattisgarh is located in the heart of India, and shares its borders with six States of the country; Uttar Pradesh to the north, Jharkhand to the north-east, Orissa to the east, Madhya Pradesh to the west and north-west, Maharashtra to the south-west and Andhra Pradesh to the south-east. Chhattisgarh is located in the central part of India, between the latitudes of 17°46–24°8 N and the longitudes of 80°15–84°24 E. 12% of India's forests are in Chhattisgarh, and 44% of the State's land is under forests.

3.1.2 Geographical Area –

Total geographical area 136034.28 sq. Km. Jagdalpur is the largest district (17016.040 Sq. Km.) while Kawardha is the smallest district (3958.01 Sq. Km.) in area.

3.1.3 Administration –

In Chhattisgarh there are 5 divisional headquarters and 27 districts (Newly found 9 Districts Baloda Bazar, Gariyaband, Balod, Bemetara, Sukama, Kondagaon, Balrampur, Mungeli and Surajpur). 146 Tehsils and Blocks 86 Cities, 104 Towns, 20063 Villages, 10 Municipal Corporation and near about 10,000 Gram Panchyat.

3.1.4 Climate –

The climate of Chhattisgarh is mainly tropical, humid and sub-humid.
The average annual rainfall in Chhattisgarh is 1405.3 mm (maximum average annual rainfall up to 1885.1 mm in Jashpur district).

Maximum temperature is observed at Raigarh and part of Janjgir-Champa districts having more than 27°C temperature annually.

3.1.5 Soil –

Chhattisgarh has at least five different types of soil. In the districts of Bilaspur, Surguja, Durg, Raipur and Bastar red and yellow loamy soil is dominant. Both are low in nitrogen and humus content. A major part of paddy production comes from this region. In the hill ranges, the soil is sandy loam, which is also suitable for paddy. Laterite soil is good for cereal crops, while the black soil is best suited to cotton, wheat and gram.

3.1.6 Rivers –

Chhattisgarh has been broadly divided into three major drainage basins (a) Mahanadi (b) Godavari and (c) Son. Mahanadi is the main and the largest river of Chhattisgarh called the “Life line of State”.

3.1.7 Agro-Climatic Zones of Chhattisgarh –

Chhattisgarh may be divided into 3 distinct agro climate zones.

Northern Hills Zones – To the north lie dense forests, hills and water reservoirs. The districts that are part of this region are Surguja, Koriya, Jashpur nagar and Dharamjaigarh Tehsil of Raigarh District. Chhattisgarh Plain - The districts that fall in the central plains region are Raipur, Mahasamund, Dhamtari, Durg, Rajnandgaon, Kabirdham, Bilaspur, Korba, Janjgir and part of Kanker District (Narharpur & Kanker block) along with part of Raigarh District. Southern region (Bastar Plateau) - The southern region of Chhattisgarh is known for its varied and
rich forests, its diverse tribal population and unique culture. The districts in this region Jagdalpur, Dantewada, Bijapur and remaining part of Kanker District

3.1.8 Forests –

Chhattisgarh is rich in forest products. Forest products and mining are the main sources of income for the state. Chhattisgarh Forests cover nearly 43.15% of the total area of the state (State forest research institute). The northern and southern regions of Chhattisgarh are hilly, whereas the central region is a fertile plain.

3.1.9 Medicinal and Aromatic Plants of Chhattisgarh –

The total number of botanical names of medicinal and aromatic plants is 2021 enlisted in this Database for Chhattisgarh. Each one of these plant entities is tagged with one or more of the specific medical system recording its medicinal use. These medical systems include Ayurveda, Siddha, Unani, Homeopathy, Tibetan, Western and Folk. The master list of 2021 botanical names of medicinal plants of Chhattisgarh has been further processed to link the botanical synonyms and after such processing, the total number of plant species included in this exhaustive inventory of medicinal plants of Chhattisgarh state stands at 1525 (Appendix - 1). The plant entities enlisted in this inventory of medicinal plants of Chhattisgarh state belong to 911 genera and 196 families. These include 14 taxa at subspecies level. After incorporating the linkages of botanical synonyms, the total number of medicinal plant species (taxa) stand at 1525. (Source – FRLHT database, C.G.Medicinal plant board report, 2010)(Appendix -1).

3.1.10 Land under Agriculture use –

51.57% of the geographical area of the State (48,23,863 hectares) is net sown area. Janjgir-Champa district has maximum percentage (71.17%) of net sown area
while Dantewada district has the lowest percentage (29.15%).

3.1.11 Population Statistics –

The total population of the State according to the 2001 Census, is 2.55 crore. Of this, 76.76 percent of the people live in rural areas and 23.24 percent live in urban areas. The State has a low density of population, 189 persons per square kilometer. Sex ratio is 991 according to census of 2011 which is higher than the all India sex ratio is 940 (Census-2011.co.in).

3.1.12 Literacy –

In Chhattisgarh the rate of literacy is 71.04% of the total population. Male literacy is 81.45% and female literacy is 60.59%. State ranks 27th among 35 states and union territories in term of literacy.

3.1.13 Health –

In Chhattisgarh the total number of District Hospital are 16 and Civil Hospital is 09 where as Community Health Centre (CHC) are 196 and Primary Health Centers (PHC) are 1000 in number.

3.2 Description of the study area

The study covers 97 villages (Appendix 2 and Table 3.1) under Bilha, Gaorela, Kota, Lorami, Marwahi, Masturi, Mungeli, Pathariya, Pendra and Takhatpur Block in Bilaspur District, Bagicha, Duldula, Farshabahar, Jashpur, Kansabel, Kunkuri, Manora and Patthalgaon Block in Jashpur District and Bhanupratappur, Durgkondal, Koyalibeda, Narharpur, Charama, Kanker and Antagarh Block under Kanker (Uttar Bastar) District of Chhattisgarh. The locale of the study area is showed in the (Figure 3.1).
Figure 3.1 Map showing location of the study area.
Table 3.1 Studied villages in Bilaspur, Jashpur and Kanker District of C.G.

<table>
<thead>
<tr>
<th>District</th>
<th>No. of Blocks</th>
<th>No. of Villages</th>
<th>No. of Traditional Healers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bilaspur</td>
<td>10</td>
<td>40</td>
<td>50</td>
</tr>
<tr>
<td>Jashpur</td>
<td>08</td>
<td>34</td>
<td>40</td>
</tr>
<tr>
<td>Kanker</td>
<td>07</td>
<td>23</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>97</strong></td>
<td><strong>125</strong></td>
</tr>
</tbody>
</table>

3.2.1 Study Area I: Bilaspur District –

Bilaspur district is situated between 21º 37 ' and 23º 7 ' N latitude and 81 º 12 ' and 83 º40 ' E longitude. Located in the central plains region of the State, Bilaspur is part of the agricultural heartland of Chhattisgarh. Area of the district is 8569 sq. km. The old Bilaspur district was divided into Bilaspur, Korba and Janjgir-Champa districts in May 1998 and Mungeli districts in Jan. 2012.

Climate –

The climate of Bilaspur district is sub-tropical, semi arid, continental and monsoon type. The average annual rainfall in district is about 58.cm. The climate is ideal for agriculture development, particularly for wheat, rice, sugarcane and cotton crops.

Natural resources –

The main rivers in the district are Sheonath, Arpa, Kharun, Aagar, Mand, Sonbhadra, Leelagar and Maniyari and these provide adequate water. Forty percent of the area of the district is forested. The forests are of Teak, Sal, Bamboo and other mixed varieties. Other than this, minor forest produce, especially medicinal herbs and plants, are collected from the forests. People want the management of forests to be
given to the people who live near the forests and feel that they should also be given permission to use the forest produce. In degraded forests, the plantation and protection of medicinal plants has been suggested. The encroachment of land must also stop and pasture lands must be saved. The empty land within the boundaries of the village can be used for plantation, sericulture, nurseries for lac trees, animal husbandry and the plantation of medicinal plants.

**Health and well-being**

While there are health centers in the villages, they are usually short staffed and do not have adequate supply of medicines. In tribal areas, plants are still used for the treatment of ailments. In other areas, allopathic medicines are now being used. The people want to move away from faith healers, yet they continue to use these systems in the absence of suitable alternatives. They have also voiced a demand to prohibit the sale of addictive substances. The people feel that they were healthier earlier due to better food and clean water and air. The prevalence of malaria, tuberculosis, leprosy and chicken pox is reported from some areas.

3.2.2 Study Area II: Jashpur District –

Jashpur is situated in the north-eastern part of the State between 22° 23° 0° latitude and 83° 84° 0° longitude. Area of the district is 6088 sq Km. This district was part of Raigarh district till 25th of May 1998. North region of the district is hilly and rocky containing balua soil on the small plains. It is rich in forest resources and the majority of its Population belongs to the Scheduled Tribes. The district incorporates rich tribe such as; Oroan, Nagwanshi, Gond & Kanwar as well as most backward tribes like; Pahadi Korwa and Birhor. Oroan dialect “Kudukh” is spoken in Oroan population area where as sadari dialect is widely spoken in Jashpur.
Climate –

The climate of the district is very peculiar with upper ghat much colder while lower region is warm. The climate here is moist as heavy rainfall occurs here. The average rainfall of the district is 1512.8 MM.

Natural resources –

People want to conserve surface water (rivers and rivulets) and rain water. People in the rural areas have been utilising the natural resources (including water) for agricultural and domestic use and other purposes related to livelihood. Now they want to use modern techniques to optimise the use of these resources and they require training to be able to do this. The forests in Jashpur are essentially sal forests, interspersed with a few other varieties. The people are active in the forest protection committees, and have prevented the illegal falling of trees. An area that needs exploration is the extraction of medicinal plants from the forests. This can provide local livelihood opportunities. The district has some deposits of bauxite but these are not being adequately exploited. A strategic plan is required for the extraction of this metal.

Health and well-being

With regard to health, superstitions and local medical practices are widely prevalent. Even though people find traditional knowledge useful, they also consider modern medicine beneficial. From May through August, malaria, diarrhea, vomiting and fever are rampant in the villages of Jashpur. People express the need for medicines and personnel to be adequately available in the PHCs. They voice a demand for primary health care at the village level, and say that at least one health
worker should live in each village. Another aspect that is highlighted is the poor infrastructure. Roads should be functional all year round. Travel becomes a problem during the monsoon and it is impossible to go to the health centre with a patient. The people are willing and eager to participate in Government's efforts to promote better health practices. They want to initiate a campaign for health education and suggest the holding of health camps to tackle specific diseases, and to increase awareness regarding prevention and cure.

3.2.3 Study Area III: Kanker District –

The Kanker District is situated in the southern region of the state Chhattisgarh. Previously Kanker was a part of old Bastar district. But in 1999 Kanker got its identity as an independent district. Now it is surrounded by four districts of Chhattisgarh state, named Bastar, Dhamtari, Durg and Rajnandgaon. Kanker is situated within the longitudes 20.6°-20.24° and latitudes 80.48°-81.48°. The total area of the district is 5285.01 sq. km. Mainly the five rivers flow in the district named - Doodhawa river, Mahanadi, Hatkul river, sindur river and Turu river.

Climate –

The climate of the district is of Monsoon type. The May month is the hottest month and the December month is the coolest month. Average rain of the district is 1492 mm.

Natural resources –

About 57 percent of the total area in the district is forested. While most of the forest is of sal and teak, the district also has its share of mixed forests. People observe that the destruction of the forest results in floods and droughts. They want to be involved in the conservation and plantation of forests. More than two-thirds of the
villages in the district suffer from a water problem. The villagers feel that the main reason for this is the destruction of forests. Water conservation is a necessity and 97 percent of the villages are willing to contribute to this process. Since 68 percent of the district relies on rain-fed agriculture, there is a demand for irrigation facilities and modern techniques of cultivation. The land in the hill regions can also be used productively, by leveling it. The District Report points out that the encroachment on land needs to stop, so that common property resources can be used optimally.

**Health and well-being**

While both allopathic and homoeopathic medicines are reasonably developed in the State, in the tribal areas traditional forms of treatment are practiced. With the spread of education, people have started paying more attention to treatment methods. During the summer months, 12 percent of the villages are affected by malaria and gastroenteritis. During the monsoon the figure goes up to 31 percent. The main reason for this is unhygienic water sources and the non-availability of clean drinking water. Only 27 percent of the villages in the district have a Sub-Health Centre and 14.4 percent have a health worker. People advocate the introduction of health related training and information dissemination. Some people demand the prohibition of liquor. People are aware about the health needs of their livestock and express the need for better facilities for the animals. They are willing to help in this task.

**3.3 Study Population**

Different communities were selected in Bilaspur, Jashpur and Kanker district. The study was carried out in the district of Bilaspur, Jashpur and Kanker of Chhattisgarh state of India. The survey was conducted to collect the information regarding remote villages of Bilaspur, Jashpur and Kanker district from Block Office
and Divisional Forest Office. 3-5 tribal villages or 3-5 traditional Healers in each Block were visited through periodical tour. Special attention was paid to record information from local traditional herbal healer (Vaidya). (Figure 3.1). The information on home remedies using the preventive and curative values of different plant species documented involving the ethical guidelines adopted by the International Society of Ethno-biology. The considered localities were expected to include a broad variety of ecological and socio-economic environments. Interviews were conducted during the January, 2009 to October, 2011, with approximately 1-2 informants in each Villages (total number of informants 125; 104 (83.2%) Man, 21(16.8%) Woman) (Figure 3.2 and Figure 3.3).

3.4 Time and procedure of data collection

Data for this study were collected through personal interview by the researcher himself during January, 2009 to October, 2011 using questionnaires prepared earlier (Appendix 3). Questions addressed to the informants were therefore, mainly focused on the purpose of plant application, parts used, the manner of their preparation and administration, forms of use, procurement method, place of collection, date/season of collection, method of storage, and period of storage confirmation. All possible efforts were made to explain the purpose of the study to the respondents in order to get the actual and valid information from them. The respondents were assured that the study was purely an academic one which is not likely to have any adverse effect on them.

The interviews were conducted with the respondents in their houses. Proper rapport was established with respondents so that they did not feel hesitation to furnish answers to the question and statements in the schedule (Figure 3.4 and Figure 3.5). The questions were explained and clarified whenever any respondent felt difficulty to
understand them. Excellent cooperation was obtained from all the respondents during data collection.

3.5 Identification and classification

Voucher specimens of species mentioned by informants were collected. Where necessary, the informants were invited to go to the field with the researcher to collect the plants or were shown the plants later to confirm if the species were actually the right plants. Plant species identification was carried out with the aid of available floras, and field guides. Species identification was further confirmed by comparing voucher specimens with herbarium specimens preserved at the DRTSD Herbarium, Department of Rural Technology & Social Development, G.G.V. Bilaspur (C.G.).

3.6 Study of Soil profile

The soil sample of different block of Bilaspur, Jashpur and Kanker districts were collected by digging about 6 inch deep. These soil samples where coded and send to Biotech lab demonstration & training centre, Ambikapur, district Surguja (C.G.) for complete soil analysis wiz (Appendix 4).

3.7 Secondary data collection

Secondary data were collected from different sources according to needs. Data and information were collected from Chhattisgarh Medicinal Plant Board, Raipur C.G., National Medicinal Plant Board, FRLHT, IUCN India Library, Tropical Forest Research Institute, Jabalpur search from Internet, CD-Rom and previous research and survey reports.

3.8 Data analysis

MS-Excel and SPSS programs were used to process all collected information by microcomputer. Responses of the completed questionnaires were numerically
coded and analyzed. Descriptive statistics such as frequency and percentage distribution were used to analyze data. In addition, graphs and tables were used to interpret the findings.
Figure 3.2 Distribution of study population by sex.

- **Gender**
  - Man: 83.2%
  - Woman: 16.8%

- **Class**
  - GEN: 10.4%
  - OBC: 21.6%
  - ST: 62.4%
  - SC: 5.6%
Figure 3.3 Distribution of study population by Class.

Figure 3.4 Photograph shows interview with informants.

Figure 3.5 Discuss in the Local Baigas.