Chapter 4: METHODOLOGY

4.1 Selection of Villages

The study was carried out in the twenty villages 10 villages in the interior (Core zone) of AABR which constituted Block I located within distance of 1-3 km radius and 10 villages in the exterior/ Periphery region (Transition zone) which constituted Block II located within distance of 4-7 km radius in Achanakmar-Amarkantak Biosphere Reserve.

Primary data was collected through Participatory Rural Appraisal (PRA), household survey, semi-structured interviews and focused group discussion. Semi structured or open ended interviews are those interviews in which some questions are pre-determined and others arise during the course of the conversation with key informants (Martin, 1995). Semi-structured interviews are guided conversation in which only the topics are predetermined and new questions or insights arise as a result of the discussion (Pretty et al., 1995). Secondary data were collected from the research books, research papers, reports of Forest Department, reports and publication of academic institutes and NGOs.

4.2 Sampling Design

Villages within each block were selected by random sampling. In each village 10 households were sampled also by random sampling i.e. one hundred (100) household from each block were sampled. Therefore, total number of households surveyed was two hundred (200).
The two blocks were chosen on the assumption that the households located in periphery i.e. block II are collecting more NTFP without any restriction and have more chances of having greater exposure to the outside market. While the households in the block I are restricted to collect NTFP due to closeness to the restricted areas like tiger reserve and core zone of the AABR and have less chances of having exposure to the outside market. The two blocks were also chosen on the assumption to determine the relative abundance of NTFPs in each block. Hence, a meaningful comparison can be made between these two blocks with regard to objectives of the research.

4.3 Data Collection

The field data was collected during July 2008 to December 2010. There were two main objectives in conducting interviews of sampled households from both blocks. Firstly, to assess the contribution and extraction pattern of NTFP in their day to day life and their perspective. Secondly, to record their indigenous knowledge in utilization, conservation and sustainability functions. Meanwhile, information about market channels and market trends of selected NTFPs were collected. The summary of NTFP harvesters from AABR is given in table 2. The local people are considered to have an in-depth knowledge of the surroundings where they have survived for a long time. Respondents were selected from 20 villages of two blocks. Participation in all surveys was voluntary, and respondents were interviewed by a local research assistant trained to conduct the surveys.
Table: 2 Characteristics Summary of interviewed harvesters.

<table>
<thead>
<tr>
<th>Character</th>
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<tbody>
<tr>
<td>Blocks</td>
<td>2</td>
</tr>
<tr>
<td>Villages</td>
<td>20</td>
</tr>
<tr>
<td>Harvesters</td>
<td>200</td>
</tr>
<tr>
<td>Gender</td>
<td>Male 89%</td>
</tr>
<tr>
<td></td>
<td>Female 11%</td>
</tr>
<tr>
<td>Age</td>
<td>28 to 76 years ($\bar{x} = 48$)</td>
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<tr>
<td>Harvesting Experience</td>
<td>10 to 30 years ($\bar{x} = 20$)</td>
</tr>
<tr>
<td>Primary occupation</td>
<td>Agriculture (62%), NTFP collection (21.5%), Labour (15.5%), Housewife (1%)</td>
</tr>
<tr>
<td>NTFP collection</td>
<td>(46%), no secondary occupation (34%), Daily wage Labour (11%), Agriculture (9%)</td>
</tr>
</tbody>
</table>

Interviews with those involved in the harvesting, processing and trade provided the primary source of information. All interviews contained qualitative and quantitative questions, and followed the methodology of Cavendish (2002). Interviews differed in their degree of formality and structure of questions. With the exception of one wholesaler, none of the respondents kept records. Many of the key variables measured, e.g. annual harvest, annual income, were based on respondents’ recall and estimations of figures, instead of the preferred but more costly method of direct measurement. Such data are inherently inaccurate, and depends on the honesty, cooperation and recall ability of the respondents (Martin, 2004). An attempt was made to minimize biases and inaccuracies by breaking questions into meaningful and easily recalled components. The trap of posing too many quantitative questions in a row was avoided. Cross-checks were installed in the flow, content and wording of questions, and also through follow-up questions and checks to clarify inconsistencies. Open discussions were often held upon completion of interviews, accompanied by extensive note-taking. Weekly and local markets were also
surveyed in order to record the current price and accuracy of NTFP sales. In cases in which the NTFPs were bartered rather than sold, the retail sale price of the exchanged commodity (oil, salt, and rice) was recorded as the cash income.

In addition, separate interviews were conducted with forest staff involved at the field level (forest guards and foresters), executive staff members (Range Forest Officers and Sub-Divisional Forest Officers), managerial officials (Assistant Conservator of Forest and Divisional Forest Officer), and a local NGO official. This was done in order to learn about institutional perceptions and problems at the administrative level. Upon completion of the research, a feedback meeting was conducted in order to share the research findings with the villagers and to obtain their suggestions and comments.

The data were collected with qualitative interviews semi-structured or unstructured interviews, informal conversations and structured questionnaires. Interviews were conducted in and around Achanakmar-Amarkantak Biosphere Reserve to study the indigenous knowledge in utilization, conservation and sustainability of NTFP in the indigenous communities of the Achanakmar-Amarkantak Biosphere Reserve. The study was carried out in the twenty villages (10 villages in the interior of AABR Block I) and (10 villages in the exterior/Periphery region Block II) of Achanakmar-Amarkantak Biosphere Reserve (AABR). Two to five respondents were selected from each hamlets depending upon the demographic composition and any recognized resource persons of hamlets. Interviews were selected based on being identified as established NTFPs harvesters. The main target of respondents were NTFPs harvesters irrespective of their gender, age and caste but some non harvesters were also interviewed as some of non harvesters may hold more indigenous knowledge in context of NTFPs extraction,
utilization, conservation and sustainability, storing, grading and chain value addition etc. The main aim was to maximize the amount and quality of Traditional Ecological Knowledge (TEK) obtained from respondents rather than the representative. The traditional knowledge provided by the local communities was documented, analyzed and cross-checked with local people in the PRA meetings. In order to gather more information in context of traditional knowledge, we interviewed the old mans in each village. We also assumed that the old men in each village has more knowledge than the young ones.

Regeneration status of tree species of both the Blocks was studied during February, 2009– November, 2010. Phytosociological studies were carried out using quadrat method. To study the impact on regeneration status of the present tree species and in particular four important NTFPs species namely Madhuca indica J.f.Gmel., Buchanania lanzan Spreng., Shorea robusta Gaertn. f. and Diospyrous melanoxylon by the extraction of NTFPs. Two hundred plots were laid out in the two blocks, hundred plots in each Blocks. The two plots were chosen on the assumption that the plots located in periphery Block II being close to the settlement area having more anthropogenic disturbances and heavy extraction is being done by collecting more NTFP without any restriction from authorities than the Block I. Therefore, comparative analysis on the regeneration status of the same can be determined and the factors responsible for the good regeneration and poor regeneration would be identified.
4.4 Key Information

Apart from the sampled 200 households, some key identified harvesters of AABR irrespective of gender, age and local traders of NTFP were taken as key informants for getting different kinds of information. They shared the information about the NTFPs species availability, harvesting season, local storage methods, problems and prospects associated with NTFP marketing. The information obtained from group discussion was further cross-checked. The distance traveled by the NTFP harvesters for the collection was directly observed and recorded. Group discussion also provided information about the knowledge of people to market or present trading chain, local rate and final price of NTFPs. They also provided information about the collection of NTFPs from forest, current level of marketing, trading chain, prices received and expected price of the major NTFPs.

To study the impact of NTFPs extraction on regeneration status of the selected four NTFPs species i.e. *Madhuca indica* J.f.Gmel. (mahua), *Shorea robusta* Gaertn. *f.*(sal) *Buchanania lanzan* Spreng. (chironja) and *Diospyros melanoxylon* Roxb. (tendupatta ) by the extraction of NTFPs. Two hundred plots were laid out in the two blocks, One hundred in each block. The two plots were chosen on the assumption that the plots located in periphery (block II) experiences having more anthropogenic disturbances due to heavy extraction of NTFPs without any restriction than block I which is located in the interior of the AABR. Therefore, comparative analysis on the regeneration status of the selected NTFPs can be determined and the factors responsible for the good regeneration and or poor regeneration can be identified. For studying the regeneration
status and survival of seedling 200 quadrats of 10m x 10m size were laid out in each of the selected plot.

4.5 Data Analysis

The quantitative data were analyzed by using appropriate statistical tools, i.e. percentage, means, standard deviation and summarized accordingly. The qualitative data were analyzed by descriptive measures and presented in the form of chart, figure and tables. The mathematical work was done with simple calculation. The descriptive language and tables were also used to analyze and interpret the obtained data.

On the basis of field data tree density, frequency, abundance, A/F ratio and IVI were calculated based on the standard formulae (Curtis and Macintosh, 1950). The index of general diversity was calculated by using Shannon-Wiener diversity index (1949) 

\[ H = \sum (ni/N) \log_2 (ni/N) \]

Where the importance value of each species and N is the total of importance values of all species. Index of dominane (C) was calculated by Simpson’s index (Simpson, 1949) 

\[ C = \sum (ni/N)^2 \]

Where, Ni is the number of individuals of each species and N is the total number of individuals in that location.