One nature: Two Worlds

The Final Technical Report

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# TABLE OF CONTENTS

**EXECUTIVE SUMMARY**

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1.0: **UNDERSTANDING COMMUNITIES: LAYING THE FOUNDATION**

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2.0: **OBJECTIVE-WISE DESCRIPTION OF THE RESEARCH METHODS AND DATA SOURCES**

2.1: Data collection on Understand self-organization and cross-scale interactions

2.2: Data collection to describe and understand use of TEK as component of socially critical EE

2.3: Data collection to demonstrate pedagogical approaches promoting exchange between local knowledge and formal environmental education

3.0: **WHAT WAS INTERACTED-ADAPTED IN THE FIELD: NARRATIVE ON CHANGES, CHALLENGES AND ADAPTATIONS**

3.1: Changes in the research sub-questions

3.2: Changes in the research methods and sources

3.3: Changes in the time of research

3.4: Challenges, Struggles, and Lessons Learned

4.0: **PRELIMINARY RESULTS, DIRECTIONS FOR ANALYSIS, SHARING AND NEXT STEPS**

4.1: Preliminary analysis

4.1.1: Analysis of self-organization and cross-scale interaction

4.1.2: Understanding TEK as a component of socially critical EE

4.1.4: Policy recommendations

4.2: Sharing and verification

4.3: Sharing through publications

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**List of appendices**

Appendix 1: Month-wise Schedule of field activities from November’03 to February’05

Appendix 2: Brief proceedings of the project inception workshops held at a) Pune, b) Amboli and c) Baripada
Executive Summary

- This final technical report describes progress of the field research from November 2003 to February 2005. Included is a schedule of activities, description of field research, a discussion on challenges and successes and finally a summary of some preliminary results and indicative frameworks for further analysis.

- The field research took place in Amboli and Baripada in Western state of Maharashtra in India. The project inception workshops organized in the beginning, which helped in gathering the inputs of research participants, scheduling field activities, and securing active involvement and commitment of local communities. An interactive-adaptive research approach guided this field research. In-depth interviews (unstructured and semi-structured), focus, and small group discussions, interactive forest walks, workshops, were the common research methods were most commonly used. In addition, biodiversity and recipe contests were used with school children and rural women. These methods were either employed separately or in combinations, wherever required, after obtaining written or verbal consents of all research participants as per the ethics protocols mandated by University of Manitoba and IDRC, Canada.

- Major challenges encountered were changes in sub-questions pertaining to two objectives, delay and re-scheduling of community-based activities, non-availability of desirable primary data sources, local dialects, training of local research assistants, eliciting responses from local healers and balancing research priorities, while working in villages. These challenges were dealt with suitable adaptive responses evolved in field as explained in section 3.3 and 3.4.

- Most of the data analysis is yet to start except the objective on cross-scale interaction and self-organization (please, see, section 4.1), the preliminary results of which were published through a technical report. Both qualitative and quantitative analysis of the data will be conducted using Nvivo and SPSS computer software. Socially critical Environmental Education will be the main theoretical focus that will guide this analysis. The tentative schemes or frameworks for organizing the results into tabular forms with regard to local knowledge transmission and policy responses (Please see tables 8 to 12) are outlined.

- The sharing of preliminary findings, key issues, and concerns took place at both field sites in two rounds, during July-August 2004 and January-February 2005, through community-workshops, presentations and distribution of CDs, individual consultations, written reports (local language in Amboli as well as an English technical report for wider circulation) and international workshops/conferences. The next phase of thesis research (March 2005 to February 2006) will be devoted to data analysis, thesis writing and wider dissemination of findings through publications, website and conferences as indicated in Table 14.
Organization of the report:

This final technical report is divided into four sections. The first section details the progress of the field research in India from November 2003 to February 2005. The phase-wise schedule of field activities accomplished is provided, to give an idea of how this research unfolded in the field through various approaches and activities. The month-wise calendar of activities is appended in the end. The second section is a detailed account of the field research in relation to objectives. It also provides objective-wise description of data collection methods and sources. The third section is a narrative on successes, problems encountered (and resolved!) in the field and as such reveals the interactive adaptive learning that happened in the field. The fourth and final section highlights some of the preliminary findings and suggests broad directions towards which the preliminary analysis is directed. It concludes with an outline for the thesis work for next few months.

1.0: Understanding communities: laying the foundation

The research undertaken was titled ‘Revisioning community-based conservation and education: The role of traditional ecological knowledge’. Before the start of field activities, a series of consultations was held at the Center for Community-based Natural Resources Management (CCBNRM) at Natural Resources Institute (NRI), University of Manitoba (UM) between April 2003 to October 2003, in order to develop a sharper understanding of the key concepts such as community-based conservation, traditional ecological knowledge, environmental education etc. I was coordinating a weekly seminar series during this period, which involved four Masters students from NRI, mentored, and facilitated by various faculty members from UM. The purpose was to discuss and deliberate on conceptual issues and research methods relevant to each student’s research proposals. This was organized under the guidance of Dr Fikret Berkes and faculty members of NRI and under the team project jointly supported by International Development Research Center (IDRC) and Equator Initiative (EI) of United Nations Development program (UNDP), Washington. This series made a very valuable contribution in terms of selection of site/communities, field research methods to be used, as well as clarifying research objectives. Consequently, an EI case of RCMPCC (Rural Communes’ Medicinal Plant Conservation Center), Pune was selected. A second organization selected for study was SRISTI (Society for Research and Initiatives for Sustainable Technologies and Institutions), based in Ahmedabad, India. SRISTI was selected considering my past association, working relationship and their outstanding work in the field of traditional knowledge and green grassroots innovations.

I realized that the first step would be to finalize two sites according to set criteria (as listed in the proposal submitted to IDRC) by the way of meeting key people from both contact NGOs (Non-Governmental Organizations) viz. RCMPCC and SRISTI. Since RCMPCC was an obvious choice as a part of NRI’s team research project on EI, the meeting with SRISTI staff and Prof Anil Gupta was a necessary requirement before starting. The second field site as finalized during these consultations with SRISTI was a small village called Baripada in Maharashtra State, close to the border with southern Gujarat. The field research thus took place in two sites of

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1 Dr James Gardner and Dr John Sinclair provided very useful and constructive editorial comments. They have provided continuous guidance and friendly support throughout my PhD program at University of Manitoba. Funding support from SSHRC and IDRC, Canada is gratefully acknowledged. Dr Fikret Berkes kindly provided additional funding for field travel and useful guidance to enhance my understanding on relevant theories and concepts. Dr Jon Young has provided very useful suggestions to sharpen my understanding on critical pedagogy and its linkages with environmental education. RCMPCC, SRISTI, and village communities at Amboli and Baripada extended their excellent cooperation and warmth, while I was in field. Without these wonderful people and their exceptional support, this research would have remained a dream. Usual disclaimers apply.
Maharashtra: at Amboli village which is one of the thirteen medicinal plant conservation areas (MPCA) as suggested by RCMPCC, Pune and at Baripada village community in Dhule district of Maharashtra as suggested by SRISTI, Ahmedabad. Both these sites were visited three times from 2003 to 2005. I stayed in both villages for more than three months during my second phase of fieldwork and most of the field research methods were employed during this period from January 2004 to November 2004. In addition, visits to Pune, Sawantwadi, Kolhapur, Nagpur, Nandurbar towns in Maharashtra and Bangalore, Karnataka were made in order to meet key people from the Forest Department and NGOs.

In the following table, a phase-wise description of major research activities for the entire field research period from August 2003 to February 2005 is given.

Table 1: Phase-wise schedule of visits

<table>
<thead>
<tr>
<th>Description of major activities</th>
<th>Name of Phases</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Period</strong></td>
<td><strong>Phase I</strong></td>
</tr>
<tr>
<td><strong>Places visited</strong></td>
<td><strong>Phase I</strong></td>
</tr>
<tr>
<td>Univ of Manitoba, SRISTI (Ahmedabad and Virampur) in Gujarat, RCMPCC(Pune), Kolhapur (Maharashtra), Nagpur (Maharashtra), Bangalore (visit to FRLHT), Baripada (Dhule district of Maharashtra)</td>
<td>Penn State, Pennsylvania, USA, Pune. Amboli and Baripada (Maharashtra), SRISTI (Ahmedabad)</td>
</tr>
<tr>
<td><strong>Major research activities</strong></td>
<td><strong>Phase I</strong></td>
</tr>
<tr>
<td>Seminar Series and conceptual workshops at Univ. of Manitoba, Identification of sites and preliminary data collection</td>
<td>International conference on Indigenous knowledge, Workshop on EI projects at Univ. of Manitoba for Analysis, Technical report submitted to UNDP, Sharing workshop at Pune/Amboli, Local language report and workshops for Amboli, Data collection and policy/sharing workshops at Baripada</td>
</tr>
</tbody>
</table>

A detailed month-wise account of field activities is provided in an appendix-1.
2.0: **Objective-wise description of the research methods and data sources**

As planned in the proposal, this field research intended to use an interactive-adaptive research approach (Nelson, 1991), which provides flexibility in the research methods and is ideal for a novice researcher particularly in an unfamiliar community setting. The two major components of the research methods were: i) Literature as well as document review and, ii) Field research. The literature review involved obtaining a detailed understanding of main research concept viz. community-based conservation, traditional ecological knowledge (TEK), relevant to sustainable management of local natural resources and environmental education. The Impact assessment reports provided by RC (Rural Commune), Mumbai were also useful in generating some insights and refining the checklists.

The field research component used a mix of participatory methods, such as semi-structured interviews, daily routine mapping, focus groups, workshops, participant observation, and small group meetings. In addition and most importantly, two new methods of biodiversity and recipe contests were used in order to scout school children and women with outstanding local knowledge of medicinal plants. The use of different methods however, was varied according to the set objectives:

2.1: **Data collection on understanding self-organization and cross-scale interactions**

Most of the fieldwork for this objective was carried out from November 2003 to October 2004 in Maharashtra. The field research commenced with an inception workshop organized at RCMPCC office, Pune in November 2003, where the project design, objectives were shared with RCMPCC staff and their technical advisors. Based on the feedback obtained in this workshop, three field sites were finalized and visited in the month of December 2003. These sites are the project areas of RCMPCC typically known as MPCA (Medicinal Plant Conservation Areas) and included: i) Kharpud MPCA (Central Maharashtra), ii) Leghapani MPCA (Northern Maharashtra), and, iii) Amboli MPCA (Southern Maharashtra). During the visits to these MPCAs, local consultations and focus groups with the Local Management Committee (LMC) and Self-help Group (SHG) members and forest walks with local healers were organized. Some of the insights related to the self-organization aspects of the project were gained during these exercises.

The Amboli MPCA was finalized as the first field site for the community consultations based on pre-determined criteria, viz.

- Willingness of the community/project functionaries to participate (judged by researchers/contact NGOs on the basis of preliminary visits and interactions with villagers)
- Presence of a primary school in and around (within manageable distance) the village
- Evidence of self-organization/ adaptation on the basis of use of local knowledge TEK (For example, number of TEK experts known, documented knowledge in database etc)
- A track record of participatory management (presence of common-property institutions, national/ international recognition for community-based conservation/development)
- Overall spirit of cooperation in study (as determined by RCMPCC/SRISTI)

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2 The complete list of the references was provided in the proposal and is not appended in this report, to save space.
<table>
<thead>
<tr>
<th>Nature of research participants</th>
<th>Research Methods used</th>
<th>Place</th>
</tr>
</thead>
<tbody>
<tr>
<td>RCMPCC staff, consultants Forestry students /interns and advisors (12)</td>
<td>Workshop (1)</td>
<td>Pune</td>
</tr>
<tr>
<td>RCMPCC management and staff (4)</td>
<td>Semi-structured interviews (4)</td>
<td>Pune</td>
</tr>
<tr>
<td>State, district and Range Forest officials involved in genesis and growth of the project(6)</td>
<td>Semi-structured interviews (6)</td>
<td>Sawantwadi, Nagpur, Kolhapur, Pune, Panji (Goa)</td>
</tr>
<tr>
<td>FRLHT representatives (2)</td>
<td>Semi-structured interviews (2)</td>
<td>Amboli and Bangalore, (Karnataka State)</td>
</tr>
<tr>
<td>RCMPCC ‘s community organizers (3)</td>
<td>Guided focus group discussion (1)</td>
<td>Pune</td>
</tr>
<tr>
<td>Forest Department staff at village and range levels (3)</td>
<td>Semi-structured interviews</td>
<td>Amboli MPCA</td>
</tr>
<tr>
<td>Members of local management committee (LMC)</td>
<td>Semi-structured interviews (3) and Focus group discussion (1)</td>
<td>Amboli MPCA</td>
</tr>
<tr>
<td>Members of LMC/Self-help group (SHG) /Villagers/Community leaders/school teachers /village forest staff (11)</td>
<td>Workshop (1)</td>
<td>Amboli MPCA</td>
</tr>
<tr>
<td>Members from SHG (2)</td>
<td>Semi-structured interviews (2)</td>
<td>Amboli MPCA</td>
</tr>
<tr>
<td>Members of LMC/SHG (varied in numbers, range 8-12)</td>
<td>Focus group discussion (3)</td>
<td>Amboli, Honyakoli and Leghapani MPCAs</td>
</tr>
</tbody>
</table>

*Note:* The figures in the brackets in the first two columns indicate the number of participants/methods.

In addition to these consultations, the researcher also took part in the training programs of Barefoot Botanists and Hirnyakeshi SHG organized by RCMPCC. Field visits to the farmers who undertook the cultivation of medicinal plants inspired by RCMPCC in and around Amboli MPCA were also made. The researcher was also invited as an observer to attend the three monthly review meetings of RCMPCC, which helped to understand the management of RCMPCC.

The checklist developed at CCBNRM at NRI, University of Manitoba was the major instrument used to meet the data requirement for this objective. The findings pertaining to this objective were verified with RCMPCC and the villagers of Amboli and brought out as a technical report for a wider circulation.
Table 3: Primary sources of data on self-organization and cross-scale interactions in Baripada

<table>
<thead>
<tr>
<th>Nature of research participants</th>
<th>Research Methods used</th>
<th>Place</th>
</tr>
</thead>
<tbody>
<tr>
<td>Representatives of SRISTI (3)</td>
<td>Semi-structured interviews</td>
<td>Ahmedabad</td>
</tr>
<tr>
<td>Representatives Janseva Foundation (Local NGO active in Baripada (3)</td>
<td>Semi-structured interviews</td>
<td>Pune, Aurangabad and Nawapur</td>
</tr>
<tr>
<td>Local Forest Department staff viz. DCF and Local forest guards (3)</td>
<td>Semi-structured interview</td>
<td>Pimpalner and Dhule</td>
</tr>
<tr>
<td>Members of Baripada Forest protection committee (8)</td>
<td>Focus group discussion (1)</td>
<td>Baripada</td>
</tr>
<tr>
<td>Selected key individuals identified through local consultations (3)</td>
<td>In-depth semi-structured interviews</td>
<td>Baripada</td>
</tr>
<tr>
<td>Women Members of SHG</td>
<td>Small group discussion (1)</td>
<td>Baripada</td>
</tr>
<tr>
<td>Local healers of Baripada (6)</td>
<td>Small group discussion (1)</td>
<td>Baripada</td>
</tr>
<tr>
<td>Members of village youth association (4)</td>
<td>Small group discussion (1)</td>
<td>Baripada</td>
</tr>
</tbody>
</table>

Additional data were obtained through a series of three interactive forest-walks organized during September to November 2004. Researcher observed communities closely through participant observation technique in the Amboli MPCA and Baripada villages spending for more than three months, at each site. This helped in observing communities closely and triangulating the data obtained from interviews and focus groups in the villages. This was particularly useful in understanding the transmission processes through practical demonstration of relevant skills by local healers, local knowledgeable women, and village youth.

2.2: Data collection to describe and understand use of TEK as component of EE

The socially critical EE – which has been originally proposed as a major theoretical framework, guided this objective. The sub-set of questions were targeted at understanding the patterns of local knowledge used in the village and then identifying critical skills and sources of knowledge transmission with special reference to conservation and sustainable use of medicinal plants. Most of the data related to this theme were collected through a detailed discussion and interviews conducted separately with male and female local healers at both the sites. Most of the healers were identified through three methods: a) List of names obtained from local NGOs/conservation committees, b) Names figured out in Biodiversity and recipe contests and iii) Snowball sampling. In addition, other sources such as NGO representatives and community members were also consulted for cross verification.

The skills sets data thus obtained from local healers were then triangulated with the village boys, and in some cases girls who were chosen as disciples by these healers in three ways. a) Ranking/Marking of specific skills by individuals, b) focus group discussion with village youth/‘budding healers’. Their responses were collected in three categories viz. i) Skills fully learnt, ii) skills partially learnt and iii) skills not at all learnt (Adapted from knowledge transmission model used by Ohmagari and Berkes (2001)).
<table>
<thead>
<tr>
<th>Sub-questions for objective</th>
<th>Amboli</th>
<th>Baripada</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Inventory of uses of local knowledge with regard to plants/forest</strong></td>
<td>Male healers (7), Female healers (6)</td>
<td>Male healers (10)</td>
</tr>
<tr>
<td>Methods used</td>
<td>Focus group (1)</td>
<td>Focus group (1)</td>
</tr>
<tr>
<td></td>
<td>Semi-structured interview with healers (13)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bare foot Botanist workshop (1)</td>
<td></td>
</tr>
<tr>
<td><strong>Learning with in local knowledge systems: Critical skills, Sources, transmission related</strong></td>
<td>Male healers (11), Female healers (10), Village boys (7) and village girls (5)</td>
<td>Male healers (10), Female healers (9), Village boys (6) and girls (6)</td>
</tr>
<tr>
<td>Methods used</td>
<td>Semi-structured interviews (21)</td>
<td>Semi-structured interviews (19)</td>
</tr>
<tr>
<td></td>
<td>Interactive forest walk with healers (3)</td>
<td>Interactive forest walks with healers (5)</td>
</tr>
<tr>
<td></td>
<td>Cross-validation of skills through in-depth interview (12)</td>
<td>Interactive forest walks with village youths (4)</td>
</tr>
<tr>
<td><strong>Use of local healers and their knowledge in organization of local conservation initiative</strong></td>
<td>Male healers (5), Female healers (5), Key village leaders (3)</td>
<td>Male healers (6)</td>
</tr>
<tr>
<td>Methods used</td>
<td>Focus group (2): separately with healers and leaders</td>
<td>Focus group (2): separately with healers and leaders</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The following checklist was used to collect data from the local healers:
1. From whom did they learn? At what age?
2. How did they learn?
3. Which parts of the plants are used most? Why?
4. Five medicinal plants used most? What are their methods of identification?
5. Rules for extraction of the plants?
6. Five rare medicinal plants and reasons for their population reduction?
7. Suggested measures to conserve/regenerate rare species?
8. Names of other vaidus known?
9. Which diseases are treated the most?
10. How many persons have been treated? Number of patients treated each year? How are their accounts have been maintained?
11. Rules suggested while curing the patients?
12. First experience and overall experience?
13. Difference between the methods of learning by you and your disciples?
14. Reasons for erosion of local knowledge of medicinal plants?
15. Accounts maintained for the patients? What form (written/oral/recall/assistance of others)

2.3: Data collection to demonstrate pedagogical approaches promoting exchange between local knowledge and formal environmental education

The two main research methods used to fulfill this objective were: biodiversity and recipe contests at both sites. I have used both of these methods before and therefore applying these methods was not so difficult. However, what was important was the outcome of both these methods in terms of participation of children, schoolteachers, school administration, and village communities. These methods also helped in scouting children and women with outstanding knowledge of local plants.

The Biodiversity contests organized at both sites indeed took a lot of preparation time. In both field sites, written pamphlets (in Marathi language) for announcements were made and distributed well in advance. This was followed by a visit to each classroom to explain the purpose and method of contests. Since there was no school in Baripada, the contest was organized at Bopkel village as suggested by Baripada village community in the inception workshop. A separate orientation with teachers and village youth volunteers were held at both the field sites to get them familiarized with the evaluation and seek their suggestions in adapting the evaluation process to suit their own schools. The winners were rewarded with prizes in the form of teaching learning materials.

Follow-up interviews with children and teachers of participating schools were conducted at both sites in order to ascertain their feedback on pedagogical value of biodiversity contests. In Amboli, a very interesting interaction in the form of interactive forest walk took place in which children, community members, local healers and school teachers not only exchanged their views but also drafted an agenda for boosting local efforts of medicinal plants conservation and its sustainable uses. In Baripada, the primary school children, teachers, community leaders, village youth and healers participated in a one-day forest visit. Useful interaction among healers and children took place with regard to strengthening on-going conservation activities. Three stone check dams were also constructed in the forest during this visit. Additional data on the academic performance of secondary school children (grades 5-9) were collected at Bopkel village (near Baripada). Other research participants including local healers, women and children were later followed-up for their inputs on generating policy recommendations. Additional data on the past academic performance of the winners of biodiversity contest, with respect to science/environment subject were made available by the school authorities in Amboli.
### Data sources and details biodiversity and recipe contests

#### Amboli

<table>
<thead>
<tr>
<th>Research participants</th>
<th>Biodiversity Contest</th>
<th>Follow-up data collection method (N)</th>
<th>Baripada/Bopkel village Biodiversity Contest</th>
<th>N</th>
<th>Follow-up data collection method(N)</th>
</tr>
</thead>
<tbody>
<tr>
<td>School going boys grades (5-9)</td>
<td>123</td>
<td>In-depth Interviews with high performing boys (11)</td>
<td>School going boys grades (5-9)</td>
<td>52</td>
<td>In-depth Interviews with high performing boys (10)</td>
</tr>
<tr>
<td>School going girls grades (5-9)</td>
<td>127</td>
<td>In-depth interviews with high performing girls (12)</td>
<td>School going girls grades (5-9)</td>
<td>72</td>
<td>In-depth interviews with high performing girls (12)</td>
</tr>
<tr>
<td>School going boys grades (1-4)</td>
<td>9</td>
<td>Not used.</td>
<td>School going boys grades (1-4)</td>
<td>4</td>
<td>In-depth interviews with high performing girls (1)</td>
</tr>
<tr>
<td>School going girls grades (1-4)</td>
<td>10</td>
<td>In-depth interviews with high performing girls (4)</td>
<td>School going girls grades (1-4)</td>
<td>9</td>
<td>In-depth interviews with high performing girls (1)</td>
</tr>
<tr>
<td>School teachers grades (5-9)</td>
<td>10</td>
<td>Semi-structured interviews (10)</td>
<td>School teachers grades (5-9)</td>
<td>6</td>
<td>Semi-structured interviews (10)</td>
</tr>
<tr>
<td>School teachers grades (1-4)</td>
<td>3</td>
<td>Semi-structured interviews (7). In addition, seven teachers from surrounding villages sent in their written responses.</td>
<td>School teachers grades (1-4)</td>
<td>2</td>
<td>Semi-structured interviews (7, teachers from surrounding villages sent in their written responses)</td>
</tr>
<tr>
<td>Local healers</td>
<td>4</td>
<td>Interactive forest walk and workshop along with selected children and teachers (1)</td>
<td>Local healers</td>
<td>2</td>
<td>Interactive forest visit with primary school children and teachers (1)</td>
</tr>
<tr>
<td>Village youth/community leaders and volunteers</td>
<td>9</td>
<td>Not used.</td>
<td>Village youth/community leaders and volunteers</td>
<td>4</td>
<td>Informal consultation (2)</td>
</tr>
</tbody>
</table>

**TOTAL** | 299 | 45 |

#### Recipe Contest

<table>
<thead>
<tr>
<th>Research participants</th>
<th>Recipe contest</th>
<th>N</th>
<th>Follow-up data collection method (N)</th>
<th>Research participant</th>
<th>N</th>
<th>Follow-up data collection method(N)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Village women/girls</td>
<td>45</td>
<td>Semi-structured interviews with winners (8)</td>
<td>Village women/girls</td>
<td>42</td>
<td>Semi-structured interviews with winners (15)</td>
<td></td>
</tr>
<tr>
<td>Local healers</td>
<td>6</td>
<td></td>
<td>Local healers</td>
<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Community leaders including members of local conservation committees</td>
<td>6</td>
<td></td>
<td>Community leaders including members of local conservation committees</td>
<td>7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>School teachers</td>
<td>3</td>
<td></td>
<td>School teachers</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Village youth</td>
<td>9</td>
<td></td>
<td>Village youth</td>
<td>10</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Figure in the bracket indicates numbers.
Recipe contests were organized at public places such as the forest demonstration garden in Amboli and primary school in Baripada. These contests ran through whole day and provided a useful way of scouting local women and girls with good knowledge of food related local uses of cultivated (lesser-known) and wild plants. Village healers and community leaders were also invited to experience and exchange their ideas with women participants and some of them had helped in the evaluation of the participants. Women with better performance in these contests were rewarded with prizes in the end and interviewed later to seek their views on the utility of such knowledge and methods such as recipe contest in building bridges with formal environmental education. In addition, data on causes of loss of this informal knowledge, its sources, transmission etc. were collected through interviews.

The set of sub-questions under this theme was informed by a review of relevant literature mostly on successful attempts on learning by formal environmental education from local knowledge systems and my earlier research experiences with the local communities in India. The original list of questions was pilot tested on a sample of two teachers, 3-4 healers and 3-4 children at both the sites and later on these were reduced and collated into four major sub-questions, as follows:

1. What are the reasons/causes for the erosion of knowledge or why intergenerational transmission of local knowledge is not taking place at a pace at which it should be?
2. What features of traditional knowledge and school based environmental education are considered important in teaching/learning of local plants/biodiversity? What are the ways in which exchange between TEK and formal EE can be promoted?
3. What roles do different stakeholders have to play to facilitate exchange between two of them?
4. What is a specific role that formal education will have to play in promoting such exchange? What kinds of policy/administrative changes are required to enable this exchange?

Both oral interviews and written responses of schoolteachers were collected on these four sub-questions, in two rounds. In the first round, through semi-structured interviews, teachers had indicated their general and specific views on the first three sub-questions related to the causes/reasons for lack of exchange between local knowledge and school based formal education. These responses were then triangulated through focus group discussions. In the second round, ten schoolteachers of both primary and secondary from Amboli and Baripada had sent in their detailed topic-wise comments on changes in the content and pedagogical methods for science and language. At Amboli, the primary school teachers from surrounding villages, who were attending their official school-cluster monthly meeting, had allotted a special slot for a group discussion on this topic. Later, out of 12 teachers who participated in this special group discussion, seven sent in their detailed written feedback on four sub-questions.

In addition to teachers, responses through interviews and focus groups were also collected from local healers and high-performing village women and school children as identified from biodiversity and recipe contests. In-depth interviews with three experts known for their work in India particularly with local knowledge systems on medicinal plants and/or biodiversity were also conducted with a broader set of questions, including four sub-questions pertaining to this objective. Insights were also derived from the barefoot botanist workshop organized by RCMPCC at Amboli and National workshop on strategies for medicinal plants organized by FRLHT at Bangalore. Finally, two major workshops, one each at both field sites with the participation of local healers/school teachers/Forest Department staff/development functionaries/community leaders/members of local conservation committees/high-performing students were organized to ascertain and understand the collective views of relevant stakeholders on these questions.

The various data sources and methods used to address this objective are described in the following table:
<table>
<thead>
<tr>
<th>Sub-questions for objective</th>
<th>Amboli</th>
<th>Baripada</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reasons for TEK erosion / lack of transmission</td>
<td>Secondary school teachers (12), Primary school teachers (12), Male healers (10), Female healers (8), High-performing boys (11) and girls (12) from Biodiversity contest, Women winners from recipe contest (8)</td>
<td>Secondary school teachers (8), Primary school teachers (2), National experts (3), Male healers (13), Female healers (11), High-performing boys (11) and girls (13) from Biodiversity contest, recipe contest winners (8)</td>
</tr>
<tr>
<td></td>
<td>Focus group with teachers (1), Semi-structured interview with secondary (12) &amp; primary teachers (7), male (10) &amp; female (10) healers (8), recipe contest winners (8), High-performing boys (11) and girls (12) from biodiversity contests, Bare foot Botanist workshop (1), Policy workshop (1)</td>
<td>Focus group (1) with secondary school teachers, Semi-structured interview with secondary (3) &amp; primary teachers (2), male (13) &amp; female (11) healers, recipe contest winners (8), High-performing boys (11) and girls (13) from biodiversity contests, Policy workshop (1), Interactive forest walks with healers and youth (2)</td>
</tr>
<tr>
<td>Features of local knowledge and environmental education &amp; ways of promoting exchange between friendly features</td>
<td>Secondary school teachers (12), Primary school teachers (12), Male healers (10), Female healers (8), High-performing boys (11) and girls (12) from Biodiversity contest, recipe contest winners (8)</td>
<td>Secondary school teachers (8), Primary school teachers (2), Male (13) &amp; Female healers (11), High-performing boys (11) and girls (13) from Biodiversity contest, recipe contest winners (8)</td>
</tr>
<tr>
<td></td>
<td>Semi-structured interview with secondary (12) &amp; primary teachers (7), male (10) &amp; female (10) healers (8), recipe contest winners (8), High-performing boys (11) and girls (12) from biodiversity contests, Bare foot Botanist workshop (1), Policy workshop (1)</td>
<td>Focus group (1) with secondary school teachers, Semi-structured interview with secondary (3) &amp; primary teachers (2), male (13) &amp; female (11) healers, recipe contest winners (8), High-performing boys (11) and girls (13) from biodiversity contests, Policy workshop (1), Interactive forest walks with healers and youth (2)</td>
</tr>
<tr>
<td>Roles of different stakeholders in promoting exchange between TEK and EE - incentives/disincentives</td>
<td>Secondary school teachers (12), Primary school teachers (12), Male healers (10), Female healers (8), High-performing boys (11) and girls (12) from Biodiversity contest, recipe contest winners (8)</td>
<td>Secondary school teachers (8), Primary school teachers (2), Male (13) &amp; Female healers (11), High-performing boys (11) and girls (13) from Biodiversity contest, recipe contest winners (8)</td>
</tr>
<tr>
<td></td>
<td>Focus group with primary (1) and Secondary (1) teachers, Semi-structured interview with secondary (12) &amp; primary teachers (7), male (10) &amp; female (10) healers (8), recipe contest winners (8), High-performing boys (11) and girls (12) from biodiversity contests Policy workshop (1)</td>
<td>Semi-structured interview with secondary (3) &amp; primary teachers (2), male (13) &amp; female (11) healers, recipe contest winners (8), High-performing boys (11) and girls (13) from biodiversity contests, Policy workshop (1), Interactive forest walks with healers and youth (2)</td>
</tr>
<tr>
<td>Review and reformulation of existing content and methods of formal EE to exchange with TEK</td>
<td>Secondary school teachers (02), Primary school teachers (08) National experts (2)</td>
<td>Written responses/checklists by primary (8) and secondary (2) school teachers, Review of on-going work on teaching-learning of EE concepts in Maharashtra State textbooks and in India, Informal consultations with national experts (2)</td>
</tr>
<tr>
<td></td>
<td>Written responses/checklists by primary (8) and secondary (2) school teachers, Review of on-going work on teaching-learning of EE concepts in Maharashtra State textbooks and in India, Informal consultations with national experts (2)</td>
<td>Written responses/checklists by primary (2) and secondary (3) school teachers, Review of on-going work on teaching-learning of EE concepts in Maharashtra State textbooks and in India, Informal consultations with national experts (2)</td>
</tr>
</tbody>
</table>
The data collection on sub-question on review of existing EE concepts into school curriculum was largely accomplished through informal interviews with two national experts viz. Dr E. Bharucha, Director of Bharati Vidyapith of Environmental Education research (BVIEER) and Dr. Lalit Pandey of Uttarakhand Environmental Education center (UEEC). BVIEER has just completed a textbook review of Maharashtra and other nine states of India with regard to teaching and learning of EE in schools. UEEC has demonstrated the one of its kind example of linking local communities and their knowledge systems with formal school based EE. Various reports available on these two initiatives were collected. In addition, in-depth interviews (relevant to this topic) with Dr Darshan Shankar and Dr Utkarsh Ghate from FRLHT, Bangalore were audio-recorded.

CEE (Center for Environment Education), in collaboration with several national and international agencies such as the Ministry of Environment and Forests, UNESCO, UNEP and IDRC, organized an international conference on Education for a Sustainable future at Ahmedabad in January 2005. My participation in this event proved very useful particularly in connecting with national and international experts working in this area and presenting some of preliminary research findings depicting socially critical EE.

The data collection processes, however did not progress at the same pace as planned. There were instances of delays in meeting with respondents and rescheduling of activities. This led to modification in the strategies of data collections, whenever required. The next section is a glance at how these changes and adaptations took place at various stages of the research.

3.0: What was interacted-adapted in the field: Narrative on changes, challenges and adaptations:

As the research progressed, there were changes in the sub-questions in two specific objectives, changes of research methods or data sources in some cases and finally changes in the time/phase of research, particularly in Baripada. These changes were driven by research participants and new field insights that had emerged either from my field interactions or new conceptual understanding from recent literature on socially critical environmental education, traditional ecological knowledge or/and community-based conservation.

3.1: Changes in the research sub-questions:

Throughout the field research, I tried to stick to the original plan of working on the same set of objectives and I am happy that it was mostly achieved, except changing sub-questions. The first objective on self-organization and cross-scale interactions had a list of sub-questions that evolved after deliberations in the seminar series and three workshops held on EI project at CCBNRM, NRI, UM. After spending some time in the field at RCMPCC, Pune, I realized that since the initiative has a short history and do not have any baseline data, it is indeed difficult to measure the institutional achievement in terms of biodiversity conservation and poverty alleviation. However, when I noted this limitation with others at UM, I found that other students working on EI projects had same concerns.

The indicators for measuring biodiversity conservation and poverty reduction were subsequently redefined in the field. In terms of biodiversity conservation for example, new sets of indicators were generated during interactions with local communities in Baripada, as described in the following table:
Table 7: Community-indicators for measuring success of conservation initiative

<table>
<thead>
<tr>
<th>Phenomena</th>
<th>Community-suggested Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improvement in local Biodiversity</td>
<td>Change in fuel wood status, change in ground water, change in birds/animals, change in rainfall, change in local cropping pattern,</td>
</tr>
<tr>
<td>Adaptive learning</td>
<td>Change in community-crafted rules, leadership, members/management structures, resources-use pattern, innovative ways of networking, building capacity for training other communities (e.g. new ways in methods/processes/packaging of herbal formulations)</td>
</tr>
<tr>
<td>Poverty reduction</td>
<td>Participation of women members in community-economic activities, Improvement in the balance of funds, Reduced number of diseased people, reduction in debt, Improvement in mobility, Increased number of self-help groups within village</td>
</tr>
</tbody>
</table>

Another change in research questions happened with regard to the second objective of understanding the role of TEK as a component of socially critically EE. It was hard for local communities to visualize the whole idea of TEK as a component of value within school or any formal structures and therefore an alternative idea of understanding the TEK relevant to medicinal plants and its sources, content and methods of learning was suggested in the inception workshops and other field interactions. The logic offered was that if marriage between TEK and formal EE is desired (as expected in this research), then understanding transmission within TEK systems is important. A better understanding of the pedagogical methods employed by local communities within TEK relevant to medicinal plants would facilitate the process of exchange between pedagogical methods applied in formal environmental education at school level. This emphasis on studying transmission was also reinforced by literature on TEK (Berkes, 1999). The sub-questions on transmission processes thus took the drivers seat for accomplishing the second objective. The study of TEK transmission is itself a big research area and therefore, the focus was narrowed to identifying critical skills and then checking on which skills were being lost during intergenerational transmission of TEK relevant to medicinal plants.

The research sub-questions posed in the last objective of policy recommendations if not changed significantly, were of course collated into four sub-questions, based on the feedback of the research participants received during pilot testing.

3.2: Changes in the research methods and sources:

The changes in the research methods and sources were also the result of an adaptive response. The sources of data were much more widespread in addressing the first objective. This was realized after the inception workshops at both the sites, but more so at Amboli. The list of key people involved with the RCMPCC initiative grew and it took more time in local travel than expected. In the inception workshops organized at Pune with RCMPCC staff at Amboli, it was suggested to substitute plants brought variable with the list of plants in an evaluation of participants of biodiversity contest. This was suggested to avoid over-extraction of plants in general and rare plants in particular by children participating in the contest. In Baripada, the villagers suggested to organize a contest in a Bopkel village, since the village had no secondary school and teachers. However, at both sites, deriving inspiration from the successes of the contests organized in secondary schools, primary schools expressed interest to have similar contests for their students as well. Subsequently, biodiversity contests were organized in the primary schools, in simpler and enjoyable ways such as drawing contest (on interesting ecological features of local interest), or bringing leaves (Amboli), elaborated quiz on local uses (Baripada). The teachers from surrounding villages at Amboli also witnessed the contests while they got to gather for a study circle meeting at Amboli and decided to send their
suggestions on the checklists developed for the teachers for sub question 4. This was a welcome move and helped in understanding wider perspective by having more respondents on policy recommendations.

The focus group with the village youths or ‘budding healers and interactive forest walks with healers and school children and/or village youths were also newer methods, which were not originally proposed. During initial sharing of project design and purposes of research with local healers and school teachers, it was strongly suggested that organizing such interactive forest walks would be helpful in understanding and observing the transmission between veteran healers and school children/village youth, who are emerging as ‘budding healers’. Two such walks were organized at Baripada and one in Amboli depending upon the interest of research participants.

There have also been changes in the data collection methods with the teachers. In the first round, after semi-structured interviews and focus groups, school teachers at both field sites suggested that the question on policy changes should also reflect on the changes in classroom teaching practices and content of textbooks. Subsequently, a checklist with nine items/themes was generated (based on earlier field interactions) highlighting teachers’ views on changes in existing textbook content and method of teaching in the subjects of language and science.

3.3: *Changes in the time of research:*

Changes in the time of research activities, happened mostly in the start of field activities at Baripada. In Amboli, changes in organizing contests occurred but they were adjusted well within the total time allotted to fieldwork in village and hence did not affect the overall plan significantly. The field research activities in Baripada, were delayed due to following reasons:

- During the preliminary field visit to Baripada site in December 2003 it was realized that June-July are probably the busiest months for the villagers during paddy transplanting season. These are the months when villagers would be mostly engaged in the paddy farm and it is hard to get their commitments in research consultation.
- I had discussion with a local NGO called The Janseva Foundation, which has been working with the communities of Baripada and they suggested that September –October were the best months for the local communities’ availability and therefore for the fieldwork. However, entering into the village in the months of July-August would help in understanding the village and in rapport building.
- The schools in the Maharashtra state in this region reopen in late June or July. Since the research proposed some of the field activities like biodiversity contests with the local schools it was good idea to have these activities organized in late July-August.
- July-August are the heavy rainfall months for this region of Maharashtra. Notably, Baripada had received more than 80 percents of its annual rainfall in July last year. Given its isolated location on a hilly terrain, access to the village in these months became even more difficult. The only linking bridge with Baripada washed away due to heavy rain.

For the reasons mentioned above, the field activities could not be started as scheduled. Nevertheless, when the situation normalized, the field activities in Baripada picked up faster than Amboli. There had been some delays in organizing activities with and getting responses from schoolteachers at both sites due to their engagement in examination/school, administration and extension in the time needed to complete written responses.

Some of these delays are also discussed in the next section on challenges.
3.4: Challenges, Struggles, and Lessons Learned

Challenges were encountered throughout the fieldwork. Some were common at both the sites, such as dealing with healers, teachers and bureaucrats, local dialect, training and involvement of local research assistant, gregarious culture of local communities etc, while some were site-specific including delay in start of field activities (please, see previous section) and community dynamics in Amboli.

Dealing with local healers is always considered a tricky issue, because of secretive nature of traditional knowledge with regard to medicinal plants. However, organizing community-based activities in the village, staying within villages, adopting their ways of life, and taking part in village’s activities such as fairs, ‘bhajans’, and openness in communication (clearly spelt out objectives, research design, inception workshops etc) have proved very useful. The data collection with healers, was initially challenging and time consuming. This became easier once their trust built up and mutual expectations fully understood.

The second general challenge was the gregariousness of the local communities more particularly in Baripada. Once I familiarized with the local people, a number of visitors kept multiplying. The small village culture typical to India was quite evident in Baripada. I had frequent and unannounced visits by villagers, while I was trying to transcribe or translate data in my laptop. Most times, villagers wanted to see their photographs digitally transferred in laptop or just ‘a laptop’ per se. This caused interruptions and distractions but as time went on, I got used to such visitors. I shifted my daily routine to more nocturnal data entry activities, as an adjustment.

Another important challenge was with regard to the local dialects. In Amboli most people, speak Konkani-, which is a mix of Marathi influenced by Goan accents. While in Baripada, people speak a different kind of Kunkani- a classic mix of Marathi, Gujarati, and interestingly borrowing some words from English. Since both sites were located on inter-state borders, this was natural. However, it took some time to switch gears while dealing with two different dialects alternatively.

Male and female local research assistants from both the villages were hired based on their literacy levels, interest, and communication skills. The reason for hiring a female language assistant was for better interaction with women respondents. However, at both places, the research assistants were not formally trained to conduct field research of this sort. Consequently, more time went into their training than expected. Discussions of interview checklists also took considerable time before all field investigators reached at the same level of understanding on conceptual issues. The on-site training while dealing with school children and healers was accomplished through iterative rounds of guided interviews with a few respondents. The skills and knowledge of the local research assistants improved after their involvement in field research. The field exposure encouraged them to take up leadership roles in their villages either by starting a new self-help group of women or finding part-time employment opportunities.

There were some subtle and delicate phases of emotional and professional dilemma that have left deep-rooted imprints on my overall experiences. At both sites, there were times when I was requested by village communities to take part and represent their village to some higher-level Government bureaucracy to solve common village problems. In Amboli, for example, I was asked to represent a village case to the District Conservator of Forest on the issue of relaxing the village land acquired by Forest Department for reserved Forest. In Baripada, I was asked to meet practically all Government functionaries who had visited Baripada for their official work. Since I stayed at both places for more than three months, villagers counted me as one of the members of their villages. While this would be a welcome gesture to understand local communities better, it juxtaposed my role as an objective researcher vis-à-vis as an ‘insider’, at times. The ethical

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3 Popular folk songs used to worship Hindu gods and goddesses in western India.
guidelines mandated by University and IDRC have however, helped me to maintain a fine balance between such paradoxical positions and I managed to stick to my role as a research student with some participation in village development activities so long it did not affect my ethical obligations. There were some steep learning curves in this process!!

However, I should not delude my self that there was no direct benefit to the local communities during my research. For example, there were possibilities of strengthening community-based initiatives in the Baripada, which helped in mobilization of more resources and attracted attention of media and Government. I have also been involved in exploring an external funding opportunities by RCMPCC to sustain its community-based conservation activities. This was feasible and perhaps ethically more convincing. Some positive efforts inspired by my research and involvement in both villagers are highlighted in the following Box.

**Box: 1: Self-inspired initiatives driven by research: Potential areas of action research**

- In Amboli, interactive forest walks were organized in which more than 12 schoolchildren and local healers were participated. This activity provided a hands-on experience of identifying and using some of medicinal plants to school children and ensured collective contributions of village women, local healers, teachers, children and Forest Department staff to outline an action plan for conservation and sustainable use of medicinal plants. This was historic in Amboli, since all these stakeholders having different values and interests, got to geather to solve a common village issue. RCMPCC and local Forest Department staff are following upon some of these action points.
- The idea of community-based plant diversity register took shape in Baripada. When researcher shared the story on success of community-based biodiversity monitoring from southern India, Baripada villagers liked the idea and decided to experiment it. With the help of faculty members of Botany and Zoology department of colleges from Pimalner and Sakri towns, a team of six village youth and four healers were trained in vegetation mapping and recording of plant diversity. A simple plant diversity register detailing names, status, and uses of medicinal plants was prepared from 14 selected sites, representing the geographical and ecological variations of entire forest. The register was made public through a community workshop, attended by local healers, Forest Department staff and selected government functionaries. The rules for the sharing and upgrading the register data were decided collectively.
- Special forest walk with school children and healers was organized in Baripada. The purpose was to build stonewalls or check dams to prevent the run-off of monsoon water in forest. During this voluntary labour mobilization activity, a group of school children, teachers, and healers constructed three small check dams in the forest and enjoyed a lunch —popularly known as *vanbhojan*. Local healers had also organized a small session of most important medicinal plants and helped inculcate conservation spirit through such joyful activity. It was decided that organizing session on forest conservation should become a regular feature of this annual activity.
- Several school/village level activities triggered by field research. Some of these included, planting of medicinal plants in forest nurseries by school children, organizing local meetings among healers, initiating school herbal garden (Amboli), honoring the school children who performed outstandingly in biodiversity contests by block or district development authorities (Bopkel), involving local medicinal plant conservation as a regular agenda item in local community meetings (Baripada).

**4.0: Preliminary results, directions for analysis, sharing and next steps:**

What follows in this section is a brief account of some preliminary results. However, wherever possible, I have indicated my plan for further analysis and thus present the broader directions in which I will move. A
list of published materials during field research is also provided in the subsequent sub-section and a tentative schedule of future research activities is indicated at the end.

4.1: Preliminary analysis

To facilitate the readability and to compare data sources and gaps, the steps in the analysis are presented according to research objectives.

4.1.1: Analysis of self-organization and cross-scale interaction

This objective was targeted at looking at the community-based conservation case of RCMPCC. Though young, RCMPCC initiative has started demonstrating useful lessons as a community-based conservation. It has built on a strong vision and a firm foundation of few sympathetic and dedicated individuals and NGOs like FRLHT (Foundation for Revitalization of Local Health Traditions) and a supportive government institution like the Forest Department of Maharashtra. The platform for social learning was created on the synergistic and symbiotic sentiments and strengths of FRLHT, RC, and the Forest Department. RCMPCC has created and sustained local management structures such as Local Management Committee (LMC) and SHG and creatively engage them not only in enterprise-based conservation of medicinal plants but also developed a sense of ownership among the local communities and thereby generated a new opportunities of these structures to become partners with the Forest Department s in monitoring and sustainable management of local natural resources.

RCMPCC initially was organized through funding supports of local trusts like (Sir Dorabji Tata Trust (SDTT) and formal support, which has come as a push from international donors such as UNDP coupled with positive attitude and orientation of the senior forest officials in the form of state level conceptual workshops. All these happenings facilitated formal institutional support from the Forest Department and in-kind support from local NGOs, other government development departments such District Rural Development Agency (DRDA) and most importantly local communities. The empowerment of women achieved through their organization in SHG is proving its viability through the emergence of a strong social network at the local level. The recognition of women healers and herbal drugs productions and sale by socially and economically disadvantaged women through SHGs and LMCs are carving out new niches for the existing gender-sensitive development and conservation efforts by transforming the traditional vision of women in local conservation and livelihood improvement activities. RCMPCC has instituted and experimented new participatory methods like CAMP (Conservation Assessment and Management Plan)\(^4\), village botanists programs, local healers’ conventions. RCMPCC also demonstrated innovative ways of management such as routing of revolving funds to LMCs and SHGs, training and capacity building of LMCs and SHGs, reshuffling responsibilities at local level, empowering selected LMCs as trainers to build capacities of other local organizations to name a few. These lessons provide useful learning to understand and organize similar community-based initiatives in a better way. The successful implementation of a concept of MPCA by RCMPCC led to its legal recognition by the State Forest Department in Maharashtra. The national agencies like planning commission and international agencies like Global Environment Facility (GEF) also took note of MPCA as a viable idea and integrated it into their planning and policy documents relevant to conservation and management of medicinal plants.

RCMPCC has evolved cross-scale linkages at various levels among different stakeholders. The dynamic interplay among various stakeholders in varying degrees contributes to establishing the functional

\(^4\) CAMP is a process developed by IUCN for identifying endangered species of the plants – ‘red listed’ and work out programs for their recoveries and enrichment through participatory efforts at local level by the field botanists, local healers, villagers, forest staff and NGO representatives through forest walks and trails. The participants engage in dialogue and combined understanding of local medicinal plants and their status.
relationships among them and creatively engages them in a social learning. Both horizontal and vertical linkages among various actors are important to the successful implementation and sustenance of RCMPCC activities. The linkages are either directional specific (i.e. pointing which actor influence direct control over which actor at the other end) or magnitude specific (i.e. how strong/weak the link is) which help them characterized as one way /two ways and one strong/weak relationship bilaterally. These linkages are depicted in the following figure:

**Figure 1: Enabling cross-scale linkages helped in the achievements of project goals**

Vertically, the links between the Forest Department s and RCMPCC /FRLHT at the state, district and sub-district levels are the strongest ones in successful delivery of the project components. The links between RCMPCC and other NGOs at the state level was not so strong but found useful, where RCMPCC can build upon their strengths in organizing activities at the district/sub-district levels.
Horizontally, links between LMC and SHG are emerging as local institutional responses to avoid overlaps between tasks and to accommodate the emerging needs and concerns of LMC and SHGs.

Some of the links are weak but at the same time useful. For example, the links between RCMPCC and other state level NGOs such as Swayamsidhha, Shramjivi and Amachi Arogya and up to certain extent District Rural Development Agency (DRDA) are useful in mobilizing training support for LMCs in herbal product development their processing and marketing. In this case, DRDA provided funding support to conduct training for trainees (selected members from various SHGs) and Swayamsidhha, Amchi Arogya and Shramjivi organized technical sessions and provided field demonstrations to the trainees. These training activities were organized only once, but still helped in imparting hands-on skills on preparation, processing and marketing of selected herbal products and generating self-confidence in the trainees.

Certain links like the one between RCMPCC and LMC and RCMPCC/SHG and the state/district Forest Department s are strong enough making their outcomes more visible in meeting and sustaining the larger goals of revitalization of local health traditions and local conservation. The local level interventions have generated new expectations and hopes such as like home herbal gardens, school herbal gardens. These innovations need to be backed up by funding for their capacity building until they become self-supportive.

The other finding are reported in a detailed technical report, separately brought out, and presented to thesis advisory committee members, IDRC and UNDP in July 2004. These reports have also been web-published on CBNRM, NRI, University of Manitoba’s website.

The Baripada case was little different in terms of its community organization and the detailed analysis of self-organization and cross-scale interactions is yet to complete. It will also be interesting to make comparison of these two Community-based conservation cases, on the basis of socio-economic and ecological variations.

4.1.2: Understanding TEK as a component of socially critical EE:

The data for this objective were collected on three sub-questions as discussed in section 2.2. The reporting of findings may be grouped in two categories:

- **Inventory of local knowledge with regard to medicinal plants:**
  
  Data regarding the use of TEK by local healers (based on the responses on the checklists described in section 2.2) will be analyzed using SPSS software. Qualitative analysis of selected questions (numbers 5, 7, 11, 13, 14 of checklist) will be carried out by using Nvivo software. After obtaining general pattern of coding or categories, the reasons for such patterns/trends will be explored using insights generated through focus groups, workshops and relevant literature review including a book compilation called ‘Reading material on Local health traditions (FRLHT, Bangalore) and publications brought out by MAPAA initiative of IDRC.

- **Learning within TEK systems: Transmission of skills**
  
  Data pertaining to transmission of skills related to identification, medicinal uses and conservation of local plants were collected from healers and some of their disciples. These skills will be classified according to the their importance in three groups viz most important, important and least important. The relative preferences of local healers and their disciples will be revealed through the matching frequencies in each group. The differences on relative importance attached on critical skills by elder healers and young or budding healers will generate useful insights on why certain skills are not considered ‘critical’ by younger healers and therefore vulnerable to being lost during transmission. These findings will also reflect learning strategies within TEK, which may have implications for school-based EE.
### Table 8: Rank on critical skills sets indicated by local healers

<table>
<thead>
<tr>
<th>Skill set</th>
<th>Rank</th>
<th>Most Important</th>
<th>Important</th>
<th>Least Important</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interest towards plants</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>Identification of plants</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Extracting useful plant parts</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Processing medicine to final product</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Administering drugs</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Evaluating the initial and overall effect</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time of extraction</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Location of plants</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dialogue with patients for diagnosis</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Identifying rare plants and their regeneration</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any other skills listed by vaidus</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Further analysis on the transmission of particular skills will be carried out after a detailed review of the methods followed by Ohmagari and Berkes (2001).

- The third set of analyses will be undertaken to understand the existing and potential role of healers and their local knowledge of medicinal plants in current conservation initiatives. This will be an expansion of the previous table where the extent to which the given community initiatives have drawn on listed skills (as classified by local healers as most important, important and least important) will be determined. This will rely on the interpretation of the relevant qualitative data generated from local healers, schoolteachers, community leaders, and key individuals from local NGOs.
- The fourth and final set of analyses of skills will impart an understanding of the nature of knowledge transmission based on the interview responses from winners of recipe and biodiversity contests as well as local healers. These responses will be obtained from the data collected on three questions: i) what was/were the sources of their knowledge, ii) How they have learnt (methods), iii) to whom they teach about this knowledge, and, iv) How do they teach?, v) How they would rate their first experience of learning. These responses will be classified according to following table:

### Table 9: Indicative Framework for analyzing of Intergenerational transmission of skills

<table>
<thead>
<tr>
<th>Skill set</th>
<th>Sources of knowledge used by healers</th>
<th>Method of learning used by healers</th>
<th>Sources of knowledge suggested for ‘budding healers’</th>
<th>Method of learning suggested for ‘budding healers’</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interest towards plants</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Identification of plants</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
Table 9 continued ...

<table>
<thead>
<tr>
<th>Extracting useful plant parts</th>
<th></th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Processing medicine to final product</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Administering drugs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Evaluating the initial and overall effect</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time of extraction</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Location of plants</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dialogue with patients for diagnosis</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Identifying rare plants and their regeneration</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any other skills listed by healers</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

4.1.3: Demonstrating the value of biodiversity and recipe contests:

The data collected from the biodiversity and recipe contests will be summarized and analyzed using SPSS, using the following variables:

- Sex-wise/age-wise/grade-wise/caste-wise number of school children participated in the contest
- The extent of participation, as compared with school enrollment
- The reasons for non-participation vis-à-vis participation (based on the interviews with children and teachers)
- The socio-economic correlates of performance in the biodiversity contest (correlation matrix will be generated using sex, class (age), number of plants listed, rank in biodiversity contests and academic performance (based on average of last three years of data in various subjects. Insights on some these relationships will also emerge from the qualitative interpretations of the interviews conducted with the winners of biodiversity and recipe contests. Since the data on academic performance of all students who participated in the contest were only available from Bopkel village, this analysis will be limited to only one village.

In addition to the quantitative analysis described as above, the detailed qualitative analyses of the of the biodiversity and recipe contests as methods (guided by socially critical EE framework) based on semi-structured interviews organized with winners of biodiversity and recipe contests and school teachers.

4.1.4: Policy recommendations

A detailed review of secondary data sources relevant to policy such as the National Biodiversity Strategy and Action Plan (NBSAP), the Biodiversity Bill, Research reports on EE in Maharashtra/India etc. will be conducted to respond following four sub-questions:

- What are the reasons/cause of erosion of knowledge or why intergenerational transmission of local knowledge is not taking place at a pace at which it should be?
- What roles do stakeholders have to play to facilitate exchange between TEK and formal EE?
What are the major policy lessons learned from the past/existing efforts/initiatives that have tried to facilitate exchange between TEK and formal EE?

A qualitative analysis and categorization of the suggestions offered by primary school teachers, secondary school teachers, male and female healers, winners of biodiversity and recipe contests will be carried out. A comparative assessment of the different reasons offered by different stakeholders and possible drivers for their preferences will be made. Some of these interpretations will then be compared with those derived from available literature and insights obtained from the interviews of the national level experts.

What specific role will formal education have to play in promoting exchange with TEK? What kinds of policy/administrative changes are required to enable these changes?

In order to address these sub-questions data obtained from the mixed focus group discussions/workshops organized with local healers, government functionaries, Forest Department representatives, school children, community leaders organized at both sites will be analyzed. The resulting policy recommendations will be classified using following indicative classificatory framework.

Table 10: Analytical framework for policy recommendations

<table>
<thead>
<tr>
<th>Sector-wise policy response/ Level</th>
<th>Local (village and other institutions)</th>
<th>Local (School)</th>
<th>Sub-state (block and district level)</th>
<th>State</th>
<th>National</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health</td>
<td></td>
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<tr>
<td>Political</td>
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<tr>
<td>Education/Pedagogical</td>
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<tr>
<td>Legal</td>
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<tr>
<td>Ecological</td>
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<tr>
<td>General Administration</td>
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<td></td>
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<tr>
<td>Local development</td>
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</tbody>
</table>

In order to derive the pedagogical recommendations to encourage learning of the critical skills and TEK (relevant to identification and sustainable use of medicinal plants) in schools, a skill-wise detailed analysis will be carried out based on the in-depth interviews and interactive forest walks organized with local healers and village youth. This will be supplemented by insights derived from focus group reports and workshop reports relevant to topic. The following matrix will guide this analysis on policy change.
### Table 11: Analysis of critical skills of TEK (relevant to local plants/biodiversity) to be taught to primary and school children in formal education

<table>
<thead>
<tr>
<th>Name of Skills</th>
<th>Desired skill component</th>
<th>Method of teaching</th>
<th>Desired skill component</th>
<th>Methods of teaching</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identification of common medicinal plants using specific landmarks or special indicators</td>
<td></td>
<td></td>
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<tr>
<td>Identification of rare plants</td>
<td></td>
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<tr>
<td>Identification of Poisonous plants</td>
<td></td>
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<tr>
<td>Developing sensitivity towards local biodiversity</td>
<td></td>
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<tr>
<td>Distinguishing phenotypically similar plants</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use of medicinal plants (Which part to be used)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>What proportions to be used</td>
<td></td>
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<tr>
<td>Procedural knowledge (What is the process of making final product)</td>
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<tr>
<td>Doses to be administered?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interval of doses</td>
<td></td>
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<tr>
<td>Time of doses</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Length of treatment</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instructions for Repeat treatment</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Performing rituals (chanting of mantras etc) while practice</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Marking uncommon/rare plants in wild</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Extraction</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Which part to be removed</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>How much to be removed</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time of removal (Day / Nakshatra)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Special care to be taken (Which side, Shying away from shadows)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Religious rituals to be performed while extraction</td>
<td></td>
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<tr>
<td>Care for regeneration / Sustainable use</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Recording of treatments given</td>
<td></td>
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</tr>
</tbody>
</table>
A final set of analyses with regard to pedagogical changes, will be based mainly on teachers’ written responses collected during the second round of data collection of both sites. A list of topics on which local knowledge and school-based EE should interact was generated on the basis of field observations and interviews with local healers, national experts, as well as women and children who performed outstandingly in the contests. This list was further sharpened and finalized during the small group interactions with teachers and field observations. The final list of suggested topics is given in the first column of the following matrix, (Two matrices, each for subject of language and science/EE), which will be used to categorize the teachers’ written responses).

Table 12: Changes in the existing content and pedagogical methods as suggested by teachers

<table>
<thead>
<tr>
<th>Suggested topics for inclusion</th>
<th>Existing scheme of coverage in textbooks/content</th>
<th>Suggested Changes in the content of subject matter</th>
<th>Existing teaching method</th>
<th>Suggested changes in teaching method</th>
<th>Role of relevant stakeholder for facilitating changes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local natural resources</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Identification of medicinal plants</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Local uses of medicinal plants</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Local healers and their knowledge</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Historical significance of the village relevant to sustainability of natural resources</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sacred/religious dimension of villages’ common property resources</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conservation and sustainable use of local medicinal plants</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regeneration of local medicinal plants</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
This analysis will be further explored in the light of recent review of EE and science textbooks carried out in Maharashtra by BVIEER and successful experiences of policy changes in India.

4.2: **Sharing and verification**

The research design has an in-built component for sharing of preliminary research findings. This was achieved through three methods as described in the following table:

**Table 13: Schedule of sharing strategies**

<table>
<thead>
<tr>
<th>Field Site/Partners in Sharing</th>
<th>Time of Sharing/Verification</th>
<th>Method of sharing</th>
<th>Components of sharing</th>
</tr>
</thead>
<tbody>
<tr>
<td>RCMPCC, Pune</td>
<td>July 2004</td>
<td>E-mail, workshop, Individual consultations with key people</td>
<td>Draft technical report in self-organization and cross-scale interactions</td>
</tr>
<tr>
<td>Amboli</td>
<td>July -August 2004</td>
<td>Small group meetings with self-help groups of women, Written report with colour photos in Marathi given to all SHGs, all Forest Department staff up to district level and Additional Chief Conservator of Forest, Maharashtra, RCMPCC, Thesis advisor, IDRC, New Delhi and IDRC, Ottawa, Separate Workshops with LMC members, local healers</td>
<td>Main research highlights on TEK transmission, participation and performance of children in Biodiversity contest, RCMPCC’s work related to TEK, Individual profiled of selected winners from Biodiversity and recipe contest, Summary of key issues emerged in all field consultations</td>
</tr>
<tr>
<td>Baripada</td>
<td>January 2005</td>
<td>Small group meetings with self-help groups of women, Special workshop with local forest protection committee, Individual consultations/presentation of photos/main highlights with Conservator of Forest, Dhule division, Maharashtra and Forest Department staff, Small group meetings with local healers</td>
<td>Main research highlights on TEK transmission, participation and performance of children in Biodiversity contest, RCMPCC’s work related to TEK, Individual profiled of selected winners from Biodiversity and recipe contest, Summary of key issues emerged in all field consultations</td>
</tr>
<tr>
<td>RCMPCC, Pune, And field sites of Amboli, Bopkel, Baripada</td>
<td>January-February 2005</td>
<td>Two copies of Multimedia CD with photos and small videos left at each of four sites</td>
<td>All the photographs pertaining to all field consultations organized at both sites as well as slide show of research activities, in chronological order. Printed Photo albums were shared at Baripada.</td>
</tr>
</tbody>
</table>
The verification was achieved through sample checks with healers, schoolteachers, women, and school children. In addition, written verification at Amboli on local language report was also carried out with local healers, local community leaders, schoolteachers, RCMPCC staff, and forest functionaries. Additional verification at Baripada was accomplished through small group meeting with research activities as depicted in the printed photographs as well as through visual presentation on a laptop.

4.3: Sharing through publications

The result of research has been and will be widely shared in various national, international conferences and some of them have been published in the proceedings, newsletters, technical report, and book chapter. A list of publications in pipeline (papers accepted for future conference presentation/journal articles) is also indicated.

- Papers presented and published as proceedings/web-published


Shukla, Shaileshkumar. 2004. Revisioning learning in traditional ecological knowledge: Opportunities for innovations in school reform. Poster presented at the International Conference on Indigenous knowledges: Transforming the Academy held on May 27-28 at Penn State University, USA


- Articles in popular newsletters/local publications


- Publications/presentations in pipeline:

Shukla, Shailesh. 2005. Local knowledge and Institutions for Community-based conservation: Lessons from Medicinal Plant Conservation Center, India. Paper to be presented in a Panel on ‘can we localize Globalization: Case studies on Natural resources management from India. Panel organized by Canadian Asian Studies Association in conjunction with the Canadian Council of Area Studies Learned Societies on Conference ‘Furthering the Globalization Debate: Cross Regional Comparisons. To be held in Montreal in April-May 2005.

Shukla, Shailesh and James. S Gardner. 2005. Socially critical environmental education for community-based medicinal plant conservation in Maharashtra, India. Paper to be presented at a conference organized by Environmental Studies Association of Canada during up-coming Canadian Congress to be held at University of Western Ontario in May-June 2005.

Shukla, Shailesh and James. S. Gardner. 2005. Community-based approaches to Education for sustainable medicinal Plant conservation. Poster to be presented at World Environment Education Congress to be held in Torino, Italy in October 2005

4.4: Next steps

The schedule of academic activities and research for the next phase is outlined in the following Table:

*Table 14: Schedule of activities for the future*

<table>
<thead>
<tr>
<th>YEAR</th>
<th>2005</th>
<th>2006</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>A</td>
</tr>
<tr>
<td>Preparing for the Publications and presentations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Learning N-vivo</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Analysis and data review for data gaps, review of relevant literature</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Meeting with Thesis committee for review of analysis and inputs on thesis chapters</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drafting chapters for thesis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wrap-up / Prepare for thesis defense etc</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Appendix: 1

Schedule of field Activities carried out: November 2003 to February 2005

<table>
<thead>
<tr>
<th>TIME</th>
<th>FIELD ACTIVITY</th>
</tr>
</thead>
</table>
| November 2003 | - Arrived in Ahmedabad, Gujarat, met SRISTI staff and Prof Anil Gupta, shared research design and plan for field work, Three sites suggested by Prof Gupta, Baripada site finalized as a second case, contacts for Baripada obtained, Inputs on research questions related to TEK gathered from SRISTI staff, Review of literature in SRISTI library. Meeting with Prof V.S. Chand at Indian Institute of Management with regard to application of methods such as biodiversity and recipe contests.  
  - Secondary data on Baripada case gathered from key people in SRISTI  
  - Arrived in Pune. Organized conceptual workshop with RCMPCC staff (Please see, Appendix 2). Outline for fieldwork discussed and three potential field sites finalized  
  - List of Key people generated in consultations with RCMPCC project leaders and staff for understanding the processes of self-organization and cross-scale interaction by RCMPCC. Initial contacts with potential interviewee made.  
  - Met Dr Ashish Kothari of Kalpavriksha and collected literature related to policies such as National Biodiversity Strategy and Action Plan (NBSAP) of India, Community-based conservation in South East Asia etc.  
  - Began understanding issues on and framing ideas on organizing policy workshops in the two field sites, to be finalized. |
| December 2003 | - Met Dr E. Barucha from Bharti Vidyapith Pune to understand their work on review of existing school-based environmental education programs and policies in Maharashtra.  
  - Participated in the Barefoot Botanist workshop organized by RCMPCC and FRLHT at Amboli, which was also one of the three short-listed sites? Conducted interviews with Utkarsh Ghate, who was key person from FRLHT and major role player in sending nomination of RCMPCC for Equator initiative award. Also met some of the field consultants who have been working with RCMPCC and gathered relevant data on self-organization aspect of RCMPCC. Also met villagers and members of SHG (Self help groups) and LMC (Local Management Committee) and community leaders from Amboli.  
  - Pilot tested interview checklist with 4 respondents (community members from Amboli village) and finalized one in consultation with RCMPCC consultants and project staff.  
  - Completed two interviews with RCMPCC key people (audio recorded) on understanding self –organization and cross-scale interactions.  
  - Visited other two potential sites of Kharpud, near Pune and Leghapani of RCMPCC and met community members and RCMPCC project people from villages. Field visits (Medicinal Plant Conservation Areas) MPCAs and community meetings with the members of SHGs/LMCs at both sites.  
  - Visited Baripada (Second field site), its community-conserved forest, and meeting with community members. Also collected first hand information about Baripada, its socio-economic, cultural, and ecological features. Visited office of deputy conservator of forest, Dhule district and met local forest staff. |
| January 2004 | - Chose Amboli and Baripada as field sites, based on predetermined criteria. Got some preliminary data on Amboli from RCMPCC  
- Reviewed field documents, reports, and other books available in RCMPCC office to deepen understanding on medicinal plant conservation and documented associated traditional knowledge in Maharashtra/India.  
- Met a Dr Chitra Naik and two other agricultural experts from Indian Institute of Education, Pune. Got some literature from their library on educational issues among tribal children of Maharashtra.  
- Conducted in-depth interviews with senior advisor, Project coordinator, Assistant project coordinator, Field botanist, and community organizer from RCMPCC, Pune on the self-organization and cross-scale interactions aspects of RCMPCC.  
- Participated in a review workshop of RCMPCC staff and collected update on RCMPCC’s work in terms of biodiversity conservation.  
- Finalized interview schedules for LMC/SHG members and translated them into Marathi.  
- Draft pamphlets (in Marathi) for biodiversity and recipe contests were made.  
- Consent forms for local healers, school teachers/administrators, SHG/LMC/community members finalized, translated and photocopied in required numbers for use in Amboli.  
- Selected a male and a female from Amboli through interviews and a short work assignment to assist in research in local language and data collection. |
| February 2004 | - Arrived in Amboli for longer spell of fieldwork. Organized Inception workshops at Amboli with SHG/LMC members, forest staff, and small focus groups with schoolteachers from primary and secondary schools in Am. Dates for organizing biodiversity and recipe contests were finalized.  
- Distributed widely pamphlets of biodiversity and recipe contests in schools and around Amboli.  
- Conducted orientation sessions for school teachers/LMC/SHG members to evaluate performance of participants in biodiversity and recipe contests and ranking procedures.  
- Organized a recipe contest at Forest demo garden and Biodiversity contests at primary and secondary schools in Amboli. Collected entries from women and teachers about local medicinal plants. Evaluated entries in order to derive names local healers that children/women had cited as sources of knowledge. List of nine potential healers for a follow-up interview was generated.  
- Scouted 11 healers through recipe/biodiversity contests and conducted informal interviews with them. This was followed-up by a daylong field visits in a near by forest areas with 3-4 selected healers. Understood their practices in the field with regard to identification, use, processing, and extraction of medicinal plants in order to understand the important skill. Generated a list of skills used by them.  
- Identified nine women healers from Amboli, and conducted a semi-structured interview with them with regard to methods of learning, sources of knowledge, mode of transmission and ascertained their views on incorporating this knowledge into education/development planning at school levels. |
| February 2004 | Visited FRLHT, Bangalore. Conducted in-depth interviews with Dr Darshan Shankar and Dr Utkarsh Ghate on their views in RCMPCC’s case and use of local and Ayurvedic knowledge in medicinal plants sectors and policy issues. Also reviewed FRLHT library resources on medicinal plants.  
Participated in a National workshop on Building a National Strategy for Development of Medicinal plant sectors in India co-organized by FRLHT and Ministry of Environment and Forest, India at Bangalore.  
Returned to Amboli. Generated a list of questions to be asked to teachers and pilot tested the questions with three teachers from Amboli. Most of the secondary school teachers have sent in written responses after semi-structured interviews. |
| March 2004 | In-depth interviews with the members of SHG/LMC members and organized focus group discussion with the boys and girls who have demonstrated high performance in the biodiversity and recipe contests.  
Organized a follow-up focus group, separately with primary school and high school teachers about their feedback on the contests and clarifications on the issues/concerns on the questions for written responses.  
Organized research review meeting with members of LMC/SHG and generated a list of issues to be taken up in a policy workshop.  
Organized local healers/ school children/community members in a two days policy workshop. Field trip to the nearby forest area also conducted with selected local healers, teachers, and children to understand process of intergenerational exchange of knowledge.  
Finalized activity reports on biodiversity contests, recipe contests, local healers workshops, and focus groups with teachers.  
Keyed in data on biodiversity and recipe contests on their performance in the contests.  
Reviewed and organized data collected, compared the data with original objectives for data gaps and trained field researchers about filling up the data gaps. Tabulated the skill sets, which are considered critical for local healers and strategies for crosschecking this data set with of potential village youths/ disciples of healers outlined.  
Returned to RCMPCC, Pune. De-briefed RCMPCC about field research activities. Plan for sharing/verification outlined. Additional help for translator was taken from Mumbai to speed up analysis before verification.  
Returned to Winnipeg.  
Sent a paper abstract to International conference on Indigenous knowledge to be organized at Penn State University, Pennsylvania. |
| April 2004 | Participated in the workshop on Equator initiative. Brainstormed on the cross-scale and self-organizational issues of Equator initiative cases. List of issues to be included in the technical report to UNDP generated in consultation with other EI team members and representatives from IISD, Winnipeg, and IDRC.  
Discussed and learned strategies for qualitative analysis and coding of data with thesis advisors.  
In consultation with RCMPCC cleaned the qualitative data on self-organization and cross-scale interactions.  
Prepared a poster presentation for an abstract and a copy of poster titled as ‘Revisioning learning in traditional ecological knowledge: Opportunities for innovations in school reform’ for International conference on Indigenous knowledge held at Penn State University, Pennsylvania in May 2004. |
May 2004

- Scheduled individual appointment with all members of thesis advisory committee and updated them on progress of the first phase of field research. Obtained suggestions on further analysis.
- Participated in an International conference on Indigenous knowledge held at Penn State University, USA. Prepared and presented a research paper ‘Strengthening community-based conservation through traditional ecological knowledge: A proposal’ based on the first round of fieldwork. Also presented a poster on ‘Community-based conservation’.
- Prepared a workbook chapter ‘Linking Conservation and Development through gender sensitive methods: The case of medicinal plant conservation and women’s local ecological knowledge’ based on field experiences for the workbook on Gender and Development. Draft sent to editor for comments.
- Participated in a workshop on analysis of Equator initiative cases with the students and faculty members at NRI’s center for community-based Natural Resources management (CBNRM). Finalized the format and for the technical report to be submitted to UNDP.
- Established contact with Janseva foundation to initiate field research in Baripada. Reschedule of field activities due to the reasons of change in agricultural season due to late, heavy monsoon, and school vacations.
- Article on Baripada sent to Honeybee newsletter at SRISTI, Ahmedabad for publication.

June 2004

- Drafted a technical report and sent to thesis advisory committee members for comments. Draft also sent to RCMPCC for their comments/modifications.
- Submitted an English draft (based on my preliminary analysis) to RCMPCC for local language version to be shared with the research participants at Amboli.
- Finalized a paper for the proceedings of the International conference for Indigenous knowledge.
- Presented a paper on Gender sensitive methods in a workshop organized by CIDA and ESAC during the Canadian congress at Natural Resources Institute, University of Manitoba. Finalized and published a chapter in a workbook later published by CIDA.
- Formal Annual review meeting with Advisory committee members at University of Manitoba. Schedule for the visit of second field site and outline for sharing and verification.
- Discussed with RCMPCC (phone and e-mails) about possible dates for organizing sharing / verification workshops at Pune and Amboli.

July 2004

- Finalized and submitted the EI technical report to UNDP and CBNRM at University of Manitoba.
- Prepared a draft paper titled The Role of Traditional Ecological Knowledge in Education for Community-Based Resource Management for presentation in International conference on Common property resources at Mexico in August 2004.
- Left for India, to organize a sharing/verification of Amboli field site and conduct fieldwork in Baripada.
- Arrived in Ahmedabad. Obtained additional information on Baripada case from SRISTI staff.
- Reached at RCMPCC, Pune. Organized a sharing workshop on RCMPCC related finings with staff. Plan for Amboli sharing workshop chalked out.
### August 2004
- Prepared draft reports in Marathi with the help of RCMPCC for sharing in Amboli. Also prepared activity-wise photo albums to hand over to relevant research participants in Amboli.
- Shared booklets and main findings in three SHGs and LMC through small half-day workshops. Immediate reactions on the report recorded for further follow-up and revisions.
- Sample verification of translated interviews/focus group and workshop reports performed in schools, with teachers and selected students.
- Sharing cum Verification workshop organized among five male healers and five recipe contest winners. Charts on skill sets finalized and additional data on local knowledge skills transmission related to medicinal plants obtained in small groups, separately for male and female healers.
- Finalized paper for the Mexico conference.

### September 2004
- Returned to Ahmedabad. Meeting with SRISTI staff and collected additional information about Baripada village. Plan for field research outlined and modified as suggested by informants.
- Visit to Aurangabad. Met Dr Phatak of Janseva foundation and conducted in-depth interview for understanding self-organization and cross-scale interactions of Baripada case.
- Arrived in Baripada. Organized project inception workshop with villagers. Finalized schedule for the field activities.
- Selected male and female research assistants and conducted a training session on organizing contests, interview techniques, and recording of data through observations.
- Organized a recipe contest among women of Baripada in which more than 40 women participated and brought more than 90 recipes. A few outstanding women participants based on their performance in contest were identified for further follow-up and interview.
- Conducted a forest walk with a selected youth and local healers for understanding the transmission process in identification and use of plants. Also collected ethno botanical information on some plants, in order to understand local usages of biodiversity. Also recorded insights on transmission of medicinal plants related knowledge through observation and informal discussions with local healers and village youths.
- Made a visit to Bopkel village, where biodiversity contest was to be organized (as decided in the inception workshop). Met teachers, students, and organized orientation sessions with teachers and in each class (classes 5 to 9) with the students.
- Organized a biodiversity contest in Bopkel residential higher secondary school, in which more than 12 teachers and 124 students from grades 5 to 9 participated. Participants were evaluated based on fixed criteria and recognized by the way of prizes in the form of teaching-learning materials.
- Conducted in-depth interviews with 2 school teachers and a principal and identified potential school children for a detailed interview for seeking their views on promoting exchange between local ecological knowledge and formal school-based environmental education.
| September 2004 | - Visited colleges of Pimpalner taluka (20 Km from Baripada) and Sakri (40 Km from Baripada) and gave a talk on community-based Natural resources management to the bachelor degree students of life sciences. Also discussed a possibility of collaborative action research and training for Baripada village community to monitor the status of plant diversity in their community-conserved forests.  
- Organized a small meeting with members of Baripada village forest protection committee and 6-7 village youth interested in monitoring of their community-conserved forest. With the help of faculty members from colleges of Sakri and Pimpalner, organized a training-cum forest walk in Baripada. |
| October 2004 | - Visited three home herbal gardens and a farm herbal garden (medicinal plants grown on the boundaries of agricultural farm) in Baripada and had informal interviews with local healers. Also, pilot tested and adapted a semi-structured interview checklist for local healers.  
- Accomplished interview with school children winners of biodiversity contests. Also carried out focus group, separately with boys and girls on the issue of local ecological knowledge and ways of combining it with formal education in Bopkel village.  
- Completed interviews with 9 male healers (identified through snow balling) and 9 female local knowledge experts (identified through recipe contest).  
- Prepared a skill charts for male and female healers and tried to understand the transmission of specific skills with selected disciples in Baripada village.  
- Met Dr P. Katariya, an Ayurvedic practitioner from the Nawapur town (approximately 60 Km away from Baripada) and discussed issues related to exchange between local and Ayurvedic knowledge. Issues for the local healers workshop also short-listed.  
- Visited Range Forest Office at Pimpalner and met the Conservator of forest for Dhule forest division. Shared photographs from the field and updated Forest Department officials on the progress of fieldwork in Baripada.  
- Organized local healers workshop at Amboli. In this workshop formed a small focus group of mixed participants to elicit responses on the policy recommendations.  
- Met Agricultural officer and revenue secretary (talati) and gathered data on decadal change in agricultural development, monsoon and water table in Baripada. |
| November 2004 | - Returned to Ahmedabad. Participated in the preparatory meeting for traditional food festival at SRISTI.  
- Drafted an article on Mr Raman Bhoye for loksarwani- the Gujarat version of Honeybee newsletter.  
- Returned to Winnipeg  
- Workshop on EI cases at CBNRM, University of Manitoba for finalization and synthesis report on EI with NRI research team. Provided inputs and exchange field experiences with NRI EI team and faculty members. |
| December 2004 | - Reviewed my data, identified gaps, and discussed plan of next phase of fieldwork with my advisors at UM.  
- Consulted my advisor Dr John Sinclair on possible methods, tools, and strategies for analysis. |
| January 2005 | Submitted two paper abstracts for International conference on Education for Sustainable Future to be organized at Ahmedabad. Made a special presentation on Community-based approaches to Education for sustainable Development for presentation.  
| | Prepared Multimedia slideshow CDs for with all the photographs, slide effects and popular songs for wider distribution with schools and village communities at both the sites.  
| | Tabulated information from Baripada field site for sharing/verification.  
| | Arrived at Ahmedabad. Participated in the conference. Collected books, journal articles, and other publications (such as NBSAP) from the Book fair at Ahmedabad workshop.  
| | Visited RCMPCC, Pune, and obtained additional information on Amboli. Distributed to a set of two CDs to Amboli.  
| | Meeting with Dr Bharucha at Bharati Vidyapith, Pune to get update on their work on review of environmental education textbooks in Maharashtra.  
| | Arrived in Baripada. Organized sample verification with five students, three local healers (male) and four female local healers.  
| February 2005 | Organized small group meeting, separately with village youth, female villagers and male villagers for sharing some preliminary results on intergenerational transmission, useful plants. Also shared copy of Honeybee and Loksarwani newsletters covering features on Baripada community-based conservation work and a story on a local healer Mr Raman Bhoje.  
| | Presented a slide show containing all the photographs capturing chronological field research activities in Baripada. Also collected clarifications on some slides. Modified information based on inputs from local villagers.  
| | Visited Bopkel village and shared CD and photographs with schoolteachers and a group of students. Installed CD in school computer. Collected additional feedback from the secondary school teachers on exchange of local knowledge and school based environmental education. |
Appendix 2: Project Inception Workshop

A: The First project inception workshop with RCMPCC staff: 24 November, RCMPCC, Pune office:

A half-day workshop was organized at RCMPCC, Pune to share the research proposal to RCMPCC community and seek their inputs into project design and implementation. The participants include mainly technical and field staff of RCMPCC. Some of the major comments/concerns raised during the workshops are summarized as follows:

- The Biodiversity and recipe contests seem to be good tools but some of the criteria for evaluation need to be modified. The number of plants collected criteria may result in excessive collection of single plant species and sometime we may loose some rare or endangered species in a process. The number of plants listed criteria therefore will have to be employed and the rankings will have to be adjusted accordingly. Similarly the village like Kharpud is perceived to be educationally-weak both in terms of students enrollment and academic performance and therefore there may be substantial amount of children are out of school systems (both drop outs and never-enrolled) who also possess comparable and in some cases greater amount of local knowledge relevant to local biodiversity than their school going counterparts. These children should also be encouraged to participate in school-based activities like biodiversity contests through special contacts.

- RCMPCC works in thirteen project sites. The proposed work should also set up a stage for continuation of RC/RCMPCC’s activities and wherever possible provide opportunities for initiating and strengthening community-based conservation models. One such model that RCMPCC has been thinking of is creation of study group for biodiversity conservation. These study groups are informal and can function as village level decentralized committees. RCMPCC through consultations with other stakeholders like Forest and other development Departments, local communities have also realized the need for informal decision support systems at village level through local participation, and the research may provide an entry point to test out this idea on experimental basis. This may be an offshoot of the current research and provide a demonstration model of non-monetary incentive for local biodiversity conservation and associated knowledge systems at village level.

- Few possible sites have been thought out. Three sites have been short-listed based on the criteria set out in the proposal. These are :i) Amboli, ii) Kharpud, and, iii) Toranmaal. Three Suitable persons (Vaishali form Amboli, Poojali for Kharpud and Suresh/Vijay for Toranmaal) from RCMPCC who are familiar with these areas and hands-on experiences of working with local communities have been identified. Plans for preliminary field visits will be made in consultation with identified RCMPCC resource persons.

- Key peoples of the organizations who have been involved in the project from the beginning and are major contributors towards the growth of RCMPCC have been named. They are: Mr. Muneer (Mumbai), Ms. Rajashri (RCMPCC, Pune), Mr. Gogte (PCCF, Wildlife, Forest Department, Nagpur), Mr. Satish Eklunchwar (Forest Development Corporations of Maharashtra, Nagpur), Ms. Vaishali, Mr Vijay, Mr Vivek. Dr Brigadier Kaul, Advisor, RCMPCC (New Delhi) Dr. Haque, Ministry of Environment and Forests, New Delhi and Mr Sudarshan Rodriguez, Advisor, RCMPCC, Mumbai.

- RCMPCC is organizing a workshop of local traditional experts at Amboli from 13-15 December 2003. About 40-45 people local herbalists (hereafter referred to as vaidus) are expected to participate. Workshop will provide good orientation to the project site and opportunity to pilot test some of the questions with regards to policy recommendations for the study.

- Some of the activities proposed in the research can be taken up along with RCMPCC activities. However, there are certain specific activities like biodiversity contests, which require an additional time and money commitment on RCMPCC side. RCMPCC may help identify suitable local level field staff, which can be hired for 2-3 months that will assist in organizing field level activities and facilitate local language communication.
List of workshop participants:

1. Rajashree Joshi Asst. Director, RCMPCC, Pune
2. Suresh Jagtap, Field botanist, RCMPCC,
3. Varsha Gaikwad , Field botanist, RCMPCC
4. Sujoy Choaudhari, Botany and GIS specialist, RCMPCC
5. Kaustubh Moghe, Botany, PBR and special study, RCMPCC
6. Dr. Vaishali Gawandi, Community organization and mobilization, RCMPCC
7. Vijay Ajanikar, Community organization, RCMPCC
8. Pujali Deokar, Community organization, RCMPCC
9. Rahul Saraf, Enterprise development and research, RCMPCC
10. Bhagwan Deshmukh, Enterprise development and research, RCMPCC
11. Vandan Ghule, Field botanist, RCMPCC
12. Shailesh Shukla, Natural Resources Institute, University of Manitoba

B: Project Inception workshops: Amboli

Two small project inception workshops were organized at Amboli on 6th and 8th of January 2004. The major purpose of the workshop was to share the project design, objectives, and activities with local communities, Forest Department, and school authorities. Also to seek their suggestions and feedback on the project activities in Amboli. The first workshop was mainly attended by the members of community as represented in the local management committee set up by Medicinal Plant Conservation Center, Pune, women members of self-help group, local staff of Forest Department and local knowledge experts. The key issues that have been emerged during the meeting are as follows:

1. The community had expressed their willingness to participate in the study and enthusiastically and suggested that since most of the research participants group barring schoolteachers was present it would be good idea to obtain the verbal consent of communities for various deliberations to be organized as part of the research. The verbal consent for focus group discussions as well as interviews was thus obtained during the meeting.
2. Both biodiversity and recipe contests were thought as useful tools for documenting and disseminating TEK of medicinal plants. However, biodiversity-contest was primarily designed for school children and it was thought that secondary school children should be involved for the listing of plants. The primary school children (grades 1 to 4) may also be involved through their involvement in drawing contests. The subjects for the drawing contests may be decided in consultations with schoolteachers.
3. LMC and SHGs members have voluntarily agreed to contact the women members of their areas and to conduct the recipe contests. It has been realized that ten percents of the total participants of the recipe contests may be rewarded with small household items. However, this may be considered as recognition to their local knowledge about plants merely and should not be treated as a part of informed consent or research study. Similarly, suitable prizes may also be thought of for the school children that perform outstandingly in the biodiversity contests. For biodiversity contests, this issue may be taken up with the school authorities and teachers.
4. Amboli village has 12 hamlets, which are locally known as padas. It is not possible to cover all the padas in the stipulated time. Therefore, members of SHG and LMC have voluntarily allocated the responsibilities for spreading the message of contests and mobilizing local contacts in respective padas. LMC members meet once in a month. The progress of the study will be thus be constantly reviewed during this meeting until such time the field research activities are completed. The problems and issues will during field interactions will also be dealt with during these meetings.
5. The recipe contests should be re-designed and provide scope for the inclusion of non-vegetarian dishes with at least one ingredient from wild vegetable. In a sense, this will be a fusion of both wild vegetables and/or wild non-vegetarian dishes. There was considerable discussion on this issue and it
was decided finally that the central focus however should be on purely vegetarian dishes, contest
should not shut the doors for the some part of local communities who regularly use non-vegetarian
dishes along with or by mixing of vegetarian dishes.
6. The criteria for recipe contests should be designed considering three main issues: i) Use of new
vegetable/wild plant species which is uncommon and lesser known , ii) New use of known
vegetable/wild plant species and iii) new methods of preparation or new recipes of both known and
vegetables lesser known wild vegetables.
7. The date for the contest should be either in the second or third week of February.
8. Many of LMC and SHG members know the names of local healers who may be involved in the
study. Their help in mobilizing contacts will be sought as and when needed.
9. Three names have been short-listed for local language field assistance. They will be interviewed in a
due course through researcher and a RCMPCC staff. It is also good idea to have a local female staff
to facilitate interaction with women folks in local language. She should be familiar with written and
spoken Hindi. Few names have been suggested, which may be followed up through interviews. She
will also be useful in scouting and interviewing women healers, who have not been so well known
both by local communities and outside NGOs.

The second half-day workshop was organized on 8th November 2003 at Amboli Secondary School. All
eighteen secondary school teachers and a head teacher, Ms, were present. Some of the key issues emerged
during the workshop is described as follows:

1. The Biodiversity contests seem to be good idea for secondary school students. However, this may be
difficult concept for primary school children in the current form. A separate drawing competition
may be organized among primary school children.
2. The contest should be held primarily between two groups of students, the first group would consist of
all classes 5 to 7 Students. The second group comprises of students of grade 8-9 students. The
winners should be decided separately in both groups. Six winners (three best from boys and girls)
from each group should be recognized based on the following four criteria. i) Number of plants
listed, ii) number of plants for which uses are described, iii) knowledge of local plants (habitat, other
uses, ecological significance etc) and iv) style of writing.
3. The local language pamphlet should be prepared and distributed among students. The pamphlet
should clearly spell out the importance of contest and method of participation. The prizes are meant
for recognizing the local knowledge of outstanding school children and therefore should be
highlighted in the pamphlet to encourage participation. Similarly pamphlet should also be used as a
means to obtain children’ consent for voluntary participation in the activity.
4. Grade 10 students have School board exams in the following week and therefore should be excluded
from the contest.
5. The best time to organize contest should be in the third week of January. The dates may be finalized
as per mutual convenience. School has a regular prize distribution ceremony on 26 January each year
on Lord Ganesha's birthday, in which children who excel in sports and extra-curricular activities are
awarded. Same function may be used to give away prizes to the winners of the biodiversity contests
as well.
6. Some of the local healers like Juga Dhangar may be invited to distribute the prizes along with some
senior forest official.
7. It is a good idea to take up some follow-up activities after the contest. A few potential activities have
been decided to experiment with. The first activity is to organize a small forest walk among the
winners of the contest in nearby area under the guidance of local forest staff and a local healer. They
should be shown the plants ‘in-situ’ along with their uses as well as their relation with other partners
of ecosystem. This kind of activity was organized in a larger group by RCMPCC before and this
activity will be limited to the winners of the biodiversity contests with a clear focus on a
demonstrating a way to promote knowledge exchange between formal environment education and
local knowledge relevant to plants. The second activity is to prepare a herbarium sheets according to
therapeutic uses of the plants. For example, children under the guidance of local healer, teacher and a forest staff can prepare charts of the various plants that may be used for different diseases or has different ecological functions. These may be taken up as a work-experience subject and showcase in a sub-district or district level school science competitions. Another activity will be to organize a hand-on training for school children on how to prepare a low-cost and simple herbarium. This may be organized either through RCMPCC or local forest staff.

8. The evaluation for the contest should be carried out in the classroom with the help of local healers, Forest staff, and schoolteachers. The class teachers may be shuffled randomly. Children should be given a week’s time to make final preparation for the contest.

9. The criteria for evaluation and the sheet for listing plants may be provided to schoolchildren. One foolscap sheet for writing down the list may be provided. The second part of the contest is to describe uses (medicinal and others), habitat, and source of inspiration about the plants from the list. This may be prepared through a simple table form, which students can get from schoolteachers. Respective class teacher will explain this description in each classroom on 9 January during the school time. Researcher will make follow-up visit to each classroom to address any clarifications or queries that students may have with regard to preparation and participation in the contest.

Participants of the workshop:

a) First workshop:

1. Mr. Dilip Sawant, President, LMC, Amboli
2. Ms. Merry D’souza, Vice-president, LMC, Amboli and President, Arneshwari SHG
3. Ms. Aneeta Sawant, Member, LMC and President, Mawalidewi SHG
4. Ms. Dixita Guruv, Member, LMC and Secretary, Mawalidevi SHG
5. Mr. Radhakrishna Bandekar, Member, LMC and SHG
6. Ms. Bharti Awte, Ekta SHG member
7. Ms. Renuka Rawat, primary school teacher and member of Ekta SHG
8. Ms. Chhaya Gawde, village women, Bazarwadi
9. Mr. Arvind Gawde, Member, LMC
10. Mr. K.B. Konduskar, Forester, Forest Department
11. Mr. Arun Chauhan, LMC member and Joint-secretary
12. Mr. Bhavsheb, Karpe, Retired village level worker and advisor, LMC
13. Mr. Kashi Nath Gawde, Barefoot Botanist and watchman, Forest Department
14. Mr. Shivram Gawde, Barefoot botanist and watchman, Forest Department
15. Dr. Vaishali gawandi, RCMPCC, Pune
16. Mr. Shailesh Shukla, Student, University of Manitoba

b) Second workshop:

1. All teachers of the workshop
2. Mr. Mahadev Bhnise, Local research assistant
3. Head teacher of the secondary school

C: Project inception Workshop: Baripada

The workshop with the villagers of Baripada was held on 2 September 2004 in the open space near Chaitram pawar’s house. Besides the members from all three Self-help groups of Baripada, members of forest protection committee, panchayat were also present. The main issues discussed and decided in the meeting were as follows:
1. Two un-employed college going youths should help Mr Shukla in conducting the interviews with local healers and organizing village level activities. These village youth should also know Hindi and local Ayrani dialect. Two people decided to work for the research were Mr Chhagan Chorya and Ms Samrata Chorya. The members of youth association would also stay in touch with Mr Shukla on regular basis and review the progress of studies. Ms. Suhas from Janseva foundation will also periodically visit Baripada and provide guidance with regard to smooth implementation of field activities.

2. In view of the late monsoon, the transplanting of paddy is delayed and hence some of the villagers will be busy even in beginning of September. This might cause a delay of more the three weeks in the planned schedule. In view of the feedback received from the recipe contest organized in Amboli village ad upcoming pola and Ganapati festival, the recipe contest should be planned in two phases: The first phase should be devoted to actual conduct of the contest, when the taste and knowledge criteria should be tested. Since most of the village women are literally challenged in Baripada, it was decided that the medicinal values/nutritional values of the recipes may be decided through individual follow-up meetings with the participants. It was expected that more than 40 women might participate in the event. In which case, 4-5 evaluation committees may be formed. Each committee will have two members: One will be from the village who have some knowledge and recognized by the local forest protection committee as These committees will be oriented on the process and evaluation criteria before the actual contest. Some women members from the self-help groups of Baripada will also participate in the jury for recipe contests.

3. The prizes in the form of kitchen utensils should be awarded to the high-performing women after the contest. It was decided that the day of Pola would be the most appropriate day for prize distribution, since most of the villagers would be at home and could participate in the event. The women members from all three self-help groups of Baripada will decide the type of prizes.

4. The village has a primary school with classes 1-4. Most of the students after fourth standard move to upper primary classes/secondary school in Bopkel, Varsa and Kudasi. The general preference is for the residential schools. In the current year the members of forest protection committee estimate that most of the students would be in Bopkel and hence it is a good idea to organize the contest in Bopkel. In view of the exams of S.Sc., the competition may be organized among the students from classes 5-9. The dates and venue would be decided in the meeting of teachers to be held next week. A local youth may be hired from Bopkel for language assistance and follow-up of field activities.

5. The vaidus should primarily be selected from Baripada. However, one or two vaidus from Bopkel village, who have been recognized as outstanding, may be included in the study. These vaidus should also be involved as experts in biodiversity contests.

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Pola is local festival celebrated in Baripada and many other tribal villages of Dhule district of Maharashtra. This is the day when bullocks are worshipped and painted and decorated with colours vegetable dyes to honor their contribution in agriculture. They are fed with treats and allowed to rest on that day.