

**Experimenting with Socially Critical Environmental Education for Community-based Medicinal Plant Conservation: The Case Study of Rural Commune's Medicinal Plant Conservation Center (RCMPCC), Pune, India**

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**Abstract**

Recent studies on Education for Sustainable Development (ESD) reveal that most Environmental Education (EE) policies and programs tend to neglect local concerns and the significant life experiences that children bring to classrooms and suggest that in order to be successful, they should build upon this prior knowledge and experience. Socially critical EE seems to be partly aware of this disjuncture as it sees environment education as a collaborative effort among local communities, schools and other actors who reveal their interest in solving local environmental issues. This emerging paradigm, however, does not acknowledge the role of local knowledge systems explicitly and needs to be better understood in practice. This calls for innovating new ways of creating platforms, where multiple stakeholders critically collaborate to encourage synergistic interaction between formal EE and local knowledge systems. Two simple and innovative community-based interventions experimented with by an NGO from India, are discussed and their potential in realizing socially critical EE analyzed.

**Organization of the paper**

This paper is organized in four sections. The first section reviews the recent trends in EE and lays the foundation for socially critical EE as an emerging educational paradigm in ESD. The second section briefly reviews the literature on local knowledge systems such as Traditional Ecological Knowledge (TEK), which can interact with formal EE in order to encourage community-based conservation. The third section is the case study of Rural Commune's Medicinal Plant Conservation Center (RCMPCC) from Pune, India with particular reference to two participatory approaches that have been used to create a platform for socially critical EE in order to achieve the goals of community-based medicinal plant conservation. The final section analyzes these two approaches in fulfilling the criteria of socially critical EE. The paper concludes with suggestions for an effective operationalization of socially critical EE.

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## Educational paradigms and trends in EE

The recent debate about educational paradigms in EE is dominated by a socio-cultural focus (Sauvé, 1999; Palmer, 1998). Bertrand and Valois (1992), as quoted in Sauvé, (1999), have suggested three major typologies for EE: the rational paradigm, the humanistic paradigm, and the inventive paradigm. These paradigms, offer different educational visions and shape educational choices in the discourse and practices of EE. For instance, the rational paradigm views nature as dominated by humans/society and emphasizes the use of pre-structured and expert-driven learning as happens mostly in the case of transmission of formal knowledge in the classrooms. The humanistic paradigm puts weight on optimal personal accomplishment and learner-centered educational strategies. The inventive paradigm is an emerging and radical approach, which calls for the critical construction of knowledge and concrete action at the local level through co-operative learning. In the context of the differential educational visions offered by these three major educational paradigms, their features are compared in the following table.

**Table 1: Typology of educational paradigms in EE**

<b>Educational Paradigm</b>	<b>Associated socio-cultural paradigm</b>	<b>Main features</b>	<b>Examples of EE approaches</b>
Rational	Industrial: dominant nature, competition for growth and productivity	Transmission of formal scientific /technological knowledge, emphasize on rote learning and memorization	Formal presentation or demonstrations, modular training approach
Humanistic	Existential: respect for nature, harmony and self-accomplishment	Focus is on learning and the learner, developing a multi-faceted personality through freedom to learn	Nature education or value education
Inventive	Symbio-synergistic: symbiotic relationships among humans, society and nature	Critical construction of knowledge for social transformation, cooperative and collaborative problem solving	EE at the grassroots, socially critical EE

Source: Bertrand and Valois (1992), Sauvé (1996)

The inventive educational paradigm which seems to fit best with community-based conservation focuses on the symbiotic relationship between humans, society and nature and establishes its prevalence over the other two approaches. Firstly, it appreciates the value of different systems of knowledge including local knowledge systems in the critical construction of knowledge. Secondly, it focuses on collaborative learning, which offers a wide spectrum of choices for collective decision-making and problem solving for a given environmental issue. In fact, as Sauvé notices ‘many aspects of socially-critical

environmental education, as defined by Robbotom and Hart (1994) correspond to this vision' (1996). Based on the works of Walker (1997), Robbotom and Hart (1994) and Sauvé (1996) the following criteria may be suggested for socially critical EE:

*Box 1: Suggested criteria for socially critical EE*

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| <ol style="list-style-type: none"> <li>1.</li> <li>2.</li> <li>3.</li> <li>4.</li> </ol> | <p>Involvement of student, teachers and community agencies in collaborative investigations of the real environmental issues in their local area</p> <p>Schools working with communities to develop a new critical awareness of the roles that communities play in influencing the course of such issues</p> <p>Investigations that make explicit the values and interests of various groups and the <i>use of different knowledge systems including local knowledge (own emphasis)</i></p> <p>Investigations which are driven more by the nature of the unfolding of the issue than by prior commitment to teaching a body of knowledge/skills.</p> |
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Recent trends in EE also encourage collaborative and community-based informal learning to tackle local environmental issues. Palmer (1998) has reviewed these trends in EE (see table 2) and has concluded that the world's most successful programs in the 21<sup>st</sup> century are those in which formal and informal elements of education are supported alongside each other, with the involvement of major stakeholders.

**Table 2: Key trends in EE: A journey of four decades**

<b>Decade</b>	<b>Focus</b>	<b>Areas of interventions</b>
1960s	Nature study	Learning about plants and animals, and the physical systems that support them
	Fieldwork	Led by 'experts' with a particular academic focus—biology, geography, etc.
1970s	Outdoor/Adventure education	Increasing use of the natural environment for first-hand experiences
	Field studies centers	Growth of field and environmental/outdoor education centres for developing awareness through practical activity and investigation
	Conservation education	Teaching about conservation issues
	Urban studies	Study of the built environment, street work
1980s	Global education	A wider vision of environment issues

	Development education	The political dimension of EE
	Values education	The clarifying of values through personal experience
	Action research	Community problem-solving. Pupil-led problem-solving, involving field work
1990s	Empowerment	Communication, capacity-building, problem-solving and action, aimed at the resolution of socio-environmental problems
	Education for a sustainable future	Participatory action. Relevant approaches to changing behaviours and resolving ecological problems
2000s	Community of partners/ collaborative learning	Students, teachers, NGOs, and politicians working together to identify and resolve socio-ecological problems.

Source: Palmer, 1998:23

This vision of collaborative and cooperative learning is congruent with a socially critical approach to EE as discussed earlier. Palmer (1998) also reviewed the inadequate impact of formal school-based EE programs and concluded that other influences and experiences (local knowledge systems such as TEK) in people lives are more powerful and significant something that formal EE school programs tend to neglect. People often gain these formative experiences informally during their interaction with the environment and their societies. Local knowledge systems thus become a key vehicle in shaping this significant life experience particularly among rural and tribal communities. Palmer (1998) suggests that future EE programs, in order to be effective in conservation and the broader sustainability of natural resources need to: i) recognize and build upon prior knowledge and significant life experiences; and, ii) recognize the importance of knowledge gained through living and interacting in communities, in other words, socially acquired knowledge, as distinct from formal knowledge.

The importance of the local knowledge systems for natural resources conservation is very clear in Agenda 21, which is a road map for nations wanting to achieve Sustainable Development (SD) in the 21<sup>st</sup> century. UNESCO, in Chapter 36 of Agenda 21, emphasizes the need for incorporating local knowledge systems into formal, informal and non-formal modes of teaching/learning in schools (Reid et al, 2002). The need for integrating alternative knowledge or informal learning experiences in EE and science education has been further recognized recently due to its effectiveness in improving learning experiences (Chawla, 2001; Palmer, 1998; UNESCO, 1999). The role of informal learning, which mostly happens through local knowledge systems, becomes even more significant in developing countries, where more than 260 million children are still out of school. The local biodiversity-related knowledge systems or TEK thus can play a significant role as a source of an informal learning component in socially critical

EE for improving community-based conservation. Given the apparent pedagogical and conservation value of TEK, it is crucial to understand the concept of TEK as a component of local knowledge systems and promote its use in both EE and community-based conservation.

### **TEK: Its relationship with formal EE and role in biodiversity conservation**

More than three-quarters of the world's population relies on local knowledge systems to meet their medicinal needs and at least half rely on local varieties and associated knowledge systems for food supplies (RAFI, 1995 as quoted in Walsh, 2003). This knowledge is popularly known as TEK and is a sub-set of indigenous knowledge. TEK may be defined as 'a cumulative body of knowledge, practice and belief, evolving by adaptive processes and handed down through generations by cultural transmission' (Berkes 1999: 8). TEK is conceptualized in many ways, from its role as a livelihood strategy in poor tribal communities (Gupta, 1990) to its management implications for contemporary natural resource management (Johannes, 1989; Ruddle, 1993; Grenier, 1998; Berkes, 1999). Berkes et al (2000) explore the role of TEK in managing processes and functions of complex social-ecological systems as parallel to adaptive management. He further suggested that TEK is largely dependent on social mechanisms. Social mechanisms embedding TEK are hierarchal as depicted in the following figure:

As depicted in the above figure, TEK can be operational at four inter-related strata. The first stratum starts at the village/local level, which includes the knowledge of local plants, animals—their identification, folk taxonomies, their uses (ethno botany) etc. This sort of knowledge is largely based on diachronic observations and therefore has been able to survive through the ages. At the second level, TEK exists in the form of land or resources management systems, which is inclusive of the first level and requires additional understanding of the functional relationships among various species and/or ecological processes. The third level of analysis requires TEK embedded in the social institutions or informal rules in use as practiced by communities or groups with a common stake in and interdependence on the resources, such as hunters, pastoralists or fishermen etc. The final stratum of TEK analysis includes the worldview, which shapes the belief systems and shapes our interpretation of our surrounding world.

These levels are not distinct and sometimes they intermingle so closely that they may appear to be the same. For example, it is indeed hard to draw a boundary between social institutions and management systems in the same village if the informal institutions are managing the same resources for sustainable use. These levels thus mutually pass on feedback and thereby generate learning, which helps them survive through adaptation in the event of change or crisis. In the field of natural resources management and EE, the complementary nature of TEK and formal knowledge have been debated in the works of Colorado and Collins (1987), Corsiglia and Snively (1995); Saloman (1996); Berkes (1999); Richards (1997) and UNEP (1998) as quoted in Kimmerer (2002).

Both these knowledge systems have their own advantages and limitations (Aggarwal, 1995), but they can enhance mutual capabilities if complemented. The important point is

to build bridges between these two and so create ‘knowledge in action’ (Brown, 2003), a core component of socially critical EE. This requires the creation of a platform through participatory ways so that holders and practitioners of both local knowledge systems and formal knowledge can inform, interact and transform each other. Rural Commune’s Medicinal Plant Conservation Center (RCMPCC), an NGO from India has demonstrated two such innovative ways of creating a platform for socially critical EE.

### **Village botanist and *Vaidus* workshops: Innovative ways of community-based medicinal plant conservation—Case study of RCMPCC**

*Rural Commune’s Medicinal Plant Conservation Center: Catalyst for participatory community-based medicinal plant conservation*

The RCMPCC is envisioned by a Mumbai-based NGO, called Rural Commune for the *in situ* conservation and sustainable utilization of the medicinal plant diversity of Maharashtra through developing partnerships among the forest department, local communities and NGOs. To this end, the RCMPCC, in collaboration with other stakeholders organized several activities such as the establishment of a network of 13 MPCAs (each ranging from 250-400 hectares) in Maharashtra and the documentation of some 50,000 plants, representing more than 150 different species in these MPCAs through participatory approaches like the barefoot botanist program, the Conservation Assessment and Management Program (CAMP), local healers conventions and scientific assessments by field botanists, the establishment of local management structures such as Local Management Committees (LMCs) and Self-Help Groups (SHGs) for marketing and local sale of herbal products (for details, please see <http://www.rcmpcc.org/>). RCMPCC was honored with the Equator initiative award by UNDP in February 2002 for a range of innovative activities that were undertaken to meet the larger goals of biodiversity conservation and poverty reduction (<http://www.equatorinitiative.org/>).

Two approaches viz. local healers workshops and village botanist programs have been studied through participant observation and semi-structured interviews conducted with the participants of these consultations organized between November 2003 to December 2004.<sup>1</sup> Secondary data sources such as RCMPCC’s internal reports and concept notes pertaining to these two programs were also examined.

#### *Methods for working with local experts*

RCMPCC realized that a group of individuals who exist at the village level (often called *vaidus*<sup>2</sup>) are recognized by the village communities as local knowledgeable experts or healers or ecological experts. These *vaidus* exhibit extraordinary knowledge and interest in the local plants, fauna and ecosystems. Many of these local *vaidus* also practice herbal

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<sup>2</sup> The term *vaidus* is a generic folk term most commonly used in the Marathi and Hindi languages to describe local healers and traditional herbal practitioners, used most commonly for but not limited to male healers. Barefoot botanist or village botanist are used interchangeably throughout this paper.

treatments of diseased people, cattle or crops and have developed skills in identification and use of locally grown plants. RCMPCC has tapped the creative potential of these barefoot botanists<sup>3</sup> or village botanists in conservation and management of medicinal plant diversity through their sustainable uses (RCMPCC, 2003).

The village botanist on the other hand is a broader category. Village botanists were identified among all 13 sites of RCMPCC. Three to four village botanists for each MPCA were identified on the basis of the following guidelines:

- Knowledge of local plants and their uses including their cultural significance (as judged from the community's consultation)
- Interest in local plants, environment and their conservation (as demonstrated in their earlier efforts)
- The ability to read and write (desirable but not essential)

Most of the village botanists thus identified, were local healers (male and female), local forest guards and local knowledgeable elders. The first two village botanists' workshops were organized in December 2000 and November 2001 by RCMPCC. The third workshop was organized from the 16<sup>th</sup> to 18<sup>th</sup> December 2003 at Amboli MPCA in northern Maharashtra.

To involve these two types of local experts viz. *vaidus* and village botanists in the program, RCMPCC has been organizing two main set of programs: i) *Vaidu sammelans* or local healer conventions, and, ii) village botanist training programs by which the capacities of formal field botanists (some of whom are the staff of RCMPCC), local healers and communities have been strengthened through mutual exchange and hands-on learning experiences.

The village botanists were also involved in the creation of botanical inventories and participatory rapid assessment through specifically designed and implemented CAMP workshops. The key outcomes and learning that have emerged from these consultations have been summarized in the following table, drawing on the ways through which different knowledge systems such as TEK of medicinal plants and formal scientific knowledge (in this case botany) can be combined to generate socially critical EE in order to achieve the common goal of medicinal plant conservation.

As indicated in Box 1, the outcomes of these two activities are classified based on how they satisfy the following four criteria for socially critical EE:

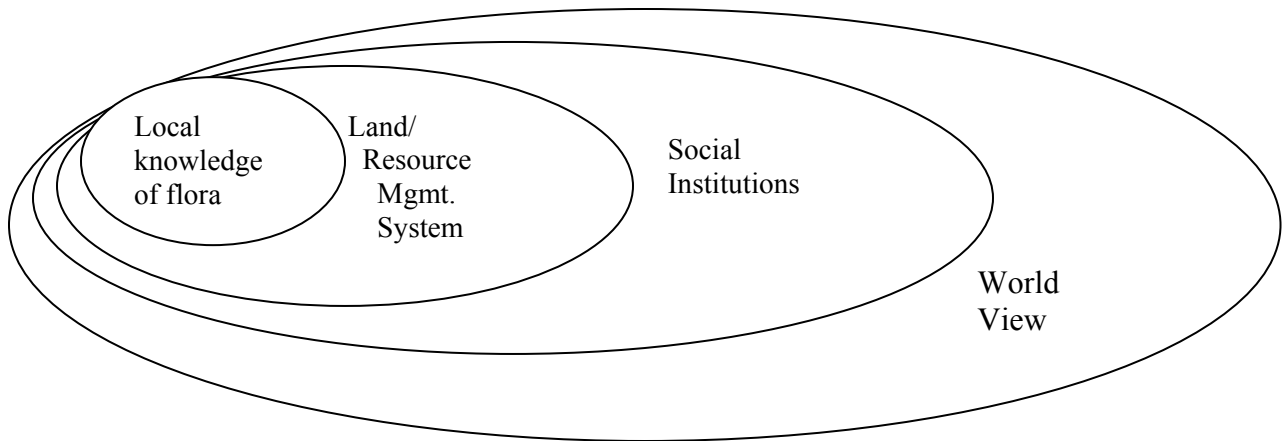
- Collaborative learning by multiple stakeholders: In this case, for medicinal plant conservation, the forest department, local healers and village botanists, school children and teachers engage creatively in discussion/deliberation on issues related to the conservation of medicinal plants.
- Revealing the different interests/values/knowledge of stakeholders: Local healers have TEK and field trained botanists/forest staff have formally acquired knowledge of botany/forestry and often, different priorities and interests in conservation.

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<sup>3</sup> A Bangalore-based NGO called Foundation for Revitalization of Local Health Traditions (FRLHT) initiated the Barefoot Botanist (BFB) program in 1995 with the original aim of enriching the traditional skills with relevant modern botanical skills, for both local use and even modern practical applications like guiding eco tourists, health students or researchers etc.

- Schools helped local communities develop critical awareness which leads to empowerment: Schools try to initiate and facilitate dialogue and help formulate a plan of action for the conservation of medicinal plants with local experts, forest staff and local village leaders.
- Problem solving/action for local environmental issues: The forest department, local communities and collaborating NGOs engage in and demonstrate practical action to resolve local environmental issues/problems.

**Figure 1: Levels of analysis in TEK**



Source Berkes, 1999

**Table 3: Examples of socially critical EE in RCMPCC's programs**

Evidence/Pointers from healers' workshops and the village botanist programs of RCMPCC	Criteria of socially critical environment education			
	1	2	3	4
The ten <i>vaidu sammelans</i> helped document the total uses of 326 plants. 415 plant-based formulations on 187 symptoms/illnesses have also been documented. In the village botanist workshop organized at Amboli, two village botanists who eventually also became forest staff demonstrated the techniques used to prepare a herbarium of 670 species in the last 2 years. They have also documented 805 medicinal uses of 420 of these species. Local forest staff prepared an inventory of locally available plants along with uses, local names and botanical names. The idea of converting MPCA into a community health resource center was inspired from such initiatives.	**	*		*
Most of the village botanists could list more than 100 plants along with their uses, growing habits and safe methods of extraction, which was exchanged and jointly verified with field botanists.	*	**		
School children, teachers, local healers, village botanists, village panchayat members and local forest staff outlined a plan for the conservation of medicinal plants for village Amboli.	*		**	*
The participation of women in these deliberations was notable. In general, there are not many women healers and their skills are considered limited to natal care and cattle. In this case, these women healers have transcended this perceived boundary of knowledge and helped shape local conservation agenda.	*	**		*
Useful learning took place about developing indigenous ways of understanding the functions of ecosystems such as the presence of plants/animals as eco-indicators or community-believed warning signals for conservation of biodiversity. For example, the presence of a particular black spider indicates that the quality of forest is good or the presence of particular plant species such as the <i>Umbad</i> tree indicates the presence of groundwater etc. This helped the forest department and the RCMPCC in determining the sites for nurseries, and the kind of plant diversity etc.	*	**		*

Evidence/Pointers from healers workshops and village botanist programs of RCMPPCC	Criteria of socially critical environment education			
	1	2	3	4
Some village botanists and Folk healers were also engaged in the micro credit SHGs and some were members of micro-enterprises of medicinal products in their respective villages	*			**
Knowledge exchanged among the local healers/ <i>vaidus</i> so far as conservation of the rare plant species is concerned. If less than fewer plants are left with in the village, the information is always passed on to the other healers of the same village and surrounding areas to keep vigil on that particular plants. This has led to the collective exploration by a group of concerned local healers for the alternative plants with similar properties and prompted them to initiate collective efforts for regeneration of the vanishing plants. Useful sharing also happened with regard to nomenclature (botanical and local names of plants), comparing known uses in the classified and codified texts versus uses reported by the local healers and in identifying priority species/areas for conservation through simple resource mapping and hands-on skills on making herbarium etc.	*	**		*
The village botanists and local healers were recognized publicly through certificate of honor.. Such programs thus helped envision and build capacities of these local experts as 'local research anchors ' and 'custodians of conservation'.	*	*		
In the district of Sindhudurga, the forest department and RCMPPCC published a Marathi language booklet with the list and uses of 100 Medicinal Plants. The botanical names and family as well as English names were also provided along with vernacular names. A separate list of 49 wild vegetables with local, botanical and English names was also appended in the book. In addition, the list of 113 local practicing healers or <i>vaidus</i> with their areas of specialization and addresses are described in the book. The book had been widely circulated among forest officials across state, other Government departments, Universities and scientific and NGOs. Many of the <i>vaidus</i> listed in these books were later invited by Forest Departments and local NGOs.	**	*		**
Two barefoot botanists from Amboli MPCA had recently guided researchers from International Tropical Timber Organisation (ITTO) from Japan and helped them organize transects by identifying suitable pockets.	*	*		**
Local healers and formally trained field botanists of the RCMPPCC had interacted face to face on status, uses and conservation issues of medicinal plants. These exercises were mutually enriching and helped validate knowledge of <i>vaidus</i> and generated some new insights, which formally trained field botanists could further explore.	*	**		

Self-compiled

Keys : \*\* = Strongly evident \* = Evident but not so strong

Criteria 1 = Collaborative learning by multi-stakeholders

Criteria 2 = Revealing different interest/values/knowledge by stakeholders

Criteria 3 = Schools helped local communities develop critical awareness, which leads to empowerment

Criteria 4 = Problem solving/action for local environmental issues

## Conclusion

The evidence or pointers set out in Table 3 indicate that through village botanists and local healers workshop programs RCMPPCC has translated the vision of socially critical EE into practice. The socially critical EE in this case is stronger in demonstrating collaborative learning by multiple stakeholders (by establishing cross-scale interactions at different levels of village, district and state), revealing and making use of different knowledge systems (TEK of local experts and formally acquired knowledge of field botanists/taxonomists and forest staff) and efforts for generating action at village level to improve the conservation status of medicinal plants in their project areas or MPCAs. The most successful form of socially critical EE achieved by these two methods of RCMPPCC is the synergistic and symbiotic partnerships between two seemingly conflicting knowledge systems and its holders i.e. the TEK of local healers and village botanists and the formal knowledge of field botanists, scientists and foresters. However, the results of school initiated efforts for community-based conservation, are not so strong. The school-related structures in general, and discipline-oriented school-based formal EE in particular, need to be reoriented. Innovative ways of combining local knowledge systems and local initiatives can be good starting points for implementing socially critical EE.

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