

## **Biodiversity Education for Indigenous Communities**

**Ishwar C. Poojar\***

### **Abstract**

India's immense biological diversity encompasses ecosystems, populations, species and their genetic make up. India is one of the 12 mega-diversity centers in the world, with its plant and animal wealth representing 7 percent of the world's flora and about 6.4 percent of world's fauna.

The ethos of conservation is ingrained in India's cultural heritage. Over centuries, the people of India have had close linkages with nature. The subsistence lifestyles of different groups of people were shaped by their natural surroundings, in different ways for sustainable use of natural resources and have evolved appropriate conservation and management approaches, based on their culture and ethics. Even today, many indigenous communities are found distributed in a variety of ecosystems. With dwindling resources and depleting natural habitats, the very existences of these communities are now threatened. It is necessary for these communities to realize the importance of natural resources, for their livelihood even today and in the future.

In this context, in India various organizations are working at the grassroot level to conserve the resources and improve the life of such people. In Biligirirangan Hills (BR Hills, Mysore district, Karnataka), the Vivekananda Girijana Kalyana Kendra (VGKK), a local NGO group and The Energy Resources Institute's (TERI's) Biodiversity wing, are helping to create awareness among the Soliga tribals (indigenous community residing in this ecosystem) on various aspects of their life, including the upliftment of their socio-economic conditions. As a part of this activity VGKK runs a residential school, especially for soliga children.

A discussion was held between Dr. Sudarshan H., Director, VGKK# BR Hills and professionals from CEE\* Bangalore to decide the strategy for biodiversity education for Soliga children. The need of locale specific biodiversity education materials stressing the importance of biological resources was felt important for the Soliga community as their livelihood depends on the natural resources available in the surrounding forests. The strategy included a five day workshop for teachers working closely with the community – Soliga children in particular and preparation of biodiversity education materials for three levels ( primary, higher primary and secondary) and implementation of biodiversity education in BR Hills school for Soliga Children. It was also decided that materials developed should help students to understand the importance of natural resources, develop values, scientific skills such as inventorying and monitoring the bio-resources of the BR Hills region. The booklets developed during the programme cover a wide range of background and locale specific information on biological diversity.

---

\*Centre for Environment Education  
Bangalore, India  
[ceekarnataka@ceeindia.org](mailto:ceekarnataka@ceeindia.org)

They also include appropriate scientific activities to understand these concepts and monitor the biodiversity in the local environment. The teachers of BR Hills school can therefore introduce this subject in more meaningful and interesting way to the students.

Such biodiversity education materials developed for and by the local communities will equip youngsters to understand and monitor their immediate surroundings. In addition, this could go a long way in better management and conservation of their surrounding natural resources.

---

## **Introduction**

Environment is not only the sum of physical and biological things that constantly interact with each other. It is much more than this. It also includes the socio, cultural and economic patterns of human community and habits of people in different parts of the world. An accurate analysis of the environment must always consider the impact of human beings and their culture on all the surrounding elements and the ecological factors on every aspect of human life.

The necessity of environmental education is explained very well in the words of Sharma and Merle; environment education should develop new attitudes and behaviour patterns in people which enable them to make decisions concerning the necessity of preventing the deterioration of the environment, through respect for ecological equilibrium, greater solidarity and love for nature and increased involvement with the natural environment.

Environmental education encompasses all aspects of basic education that bring about improved natural resource management and reduce environmental damage. It can include a wide range of subjects such as social sciences, physical sciences and biological sciences.

For environmental education to be effective it must be linked closely to the environmental and social characteristics of the community itself. All education programmes, objectives, information, communication methods and audiences must be carefully identified if the programme is to realize its ultimate goal – improved environmental management. Arbitrarily designed efforts stand little chance of success.

## **Aims**

- Educating indigenous communities@ to improve their quality of life through education.
- Planning a five-day workshop for teachers of a residential school, to orient them with biodiversity education with a view to produce draft booklets.

*@ People who have inhabited a place /area/country for centuries, when persons from another culture or ethnic background arrived on the scene and dominated them through conquest.*

*settlement or other means and who today live more in conformity with their own social, economic and cultural customs and traditions than with those of the country of which they now form a part (Also: 'native people' or 'tribal people')*

## **Objectives**

- Assessing the need of biodiversity education for SOLIGA community.
- Preparation of strategy for biodiversity education for SOLIGA community to improve their quality of life through education.
- Planning a community specific-biodiversity education programme for teachers of a residential school.

## **Target Groups**

Teachers of a residential school and Soliga Children.

## **Review of Literature**

According to Bernard A. Weintraub (1995), environmental education can enable a relevant and fulfilling education within a community-specific environment. In this educational programme we aim at fulfilling strategic needs of community specific environment through education. Here communities are helped to overcome difficulties to make their life sustainable. John Fallis (1991) describes a residential school environmental education programme that helps students take environmental action in their school to implement the environmental education programme and in turn help the communities. This educational programme also involves a residential school to implement the environmental education programme and in turn helps the communities to manage the natural resources more efficiently.

The model developed by Smith and McGinnis (1995) for urban African American students in specific contexts by selecting relevant local environmental issues; teaching strategies to investigate the issue; technique for initiating the environmental actions is very appropriate and resembles the educational programme which is carried out at the residential school in BR Hills, Mysore District, Karnataka, India.

## **Methodology**

### **a. Collection of Background Information**

#### **I. Study area**

The study area is located at Biligirirangan Hills (BR Hills) which are about 110 km. south east of Mysore, Karnataka, India. The BR Hills located 11.5 N and 77.78 E in the south east of Karnataka consist of discontinuous hill ranges running north to south. The hill ranges extend from the border between Chamarajnagar and Yelandur taluks in the west, Kollegal taluk in the north east, all found in Mysore and Chamarajnagar districts of Karnataka to the south in the Sathyamangala taluk of Coimbatore district of Tamilnadu. The total land area of BR Hills is

about 600 square kilometres and the total forest area is 550 square kilometres. The chain of hills are isolated from both the western and eastern ghats.

According to the faunal diversity survey conducted by the Merlin Nature Club, Bangalore – a local NGO, BR Hills forests support over 18 types of mammals, 145 types of birds, 10 types of reptiles, 7 types of amphibians and 87 types of butterflies. The plant wealth is also equally diverse and scientists have described over 233 species of plants in the region.

## **II. Organization – Working with Soliga Community**

Vivekananda Girijana Kalyana Kendra (VGKK), a local NGO, under the leadership of Dr. Sudarshan H., has undertaken several development projects to improve the socio-economic conditions of “Soligas”. The VGKK achieved its goals by opening a school, hospital and also providing various infrastructure facilities for Soligas.

## **III. The tribal Community – Soliga**

Soliga is a tribal community distributed mainly in three taluks of old Mysore district and has peculiar origin. The Soliga believe that their forefathers originated from Bamboo (Soliga means the one who has come from within the Bamboo). Today the soliga population accounts to nearly 12,711. The Soligas lead semi nomadic lives and eke an existence by food gathering and practicing shifting cultivation. They grow ragi (*Pennisetum typhoides*) and jowar (*Sorghum bicolor*).

## **IV. The Podu**

The Soligas live in a tribal settlement called “Podu”. It consists of a group of usually 10 to 50 huts. The huts have entrances as short as 3 feet to 4 feet. Usually bamboos along with some sticks and twigs from the forest are used for the construction of huts. Later these are plastered with mud to a height of about 2.5 feet to 3 feet. The roof is made with bamboo mesh, dried grass and tree barks. In winter a log is kept burning throughout the day and night to keep the hut warm and wild animals away .

## **VI. The community life and traditional education**

The community life of the Soliga is very interesting. The sharing system has been practiced down the ages. No Soliga has ever suffered from acute want of food, as a Soliga harvests grains and shares with the community. They also have strong family and filial bonds. For a soliga child, forest is the school and life itself an ongoing process of education. Children learn the art of honey collection and traditional cultivation during their childhood. The folklores, songs, dance and religious practices are also important sources of a child’s linguistic and cultural schooling.

A Soliga child’s knowledge of the flora and fauna is remarkable. A child aged 12 years could identify as many as 260 plants. Teenagers are adept at climbing trees, swimming and trekking in the forest, skills which are so essential for their survival and self reliance in these dense forests.

The Soliga ancestors were capable of teaching their children, skills such as harvesting of gooseberries (*Phyllanthus emblica*), honey gathering and traditional cultivation. This way the traditional education helped their children to use their surrounding resources sustainably. A majority of the non-timber forest products (NTFPs) worth billions of dollars are harvested from the tropical region of the world. But the impacts of extraction on the tropical forests are not properly quantified. The communities involved in the harvesting of such products do not know about the economic value of NTFPs in the market. Here the education stressing the details on NTFPs, its value, sustainable harvesting and conservation would definitely play a crucial role in building awareness among such communities.

#### **b. Discussion with Director, VGKK and formation of a strategy**

A discussion was held between Dr. Sudarshan H., Director, VGKK, BR Hills and professionals from CEE, Bangalore to decide the strategy for environmental education for Soliga children. The need of locale specific biodiversity education stressing the importance of biological resources was felt important for the Soliga community because they depend on the natural resources (especially the non-timber forest products namely gooseberries, honey, etc.) available in the surrounding forests. The strategy included a five-day workshop for teachers working closely with the community – Soliga children in particular: preparation of educational materials for three levels (primary, higher primary and secondary): and implementation of biodiversity education in the BR Hills school for Soliga children. It was also decided that materials developed should help students to understand the importance of natural resources, develop values, scientific skills such as making an inventory and monitoring the biological resources of the BR Hills region.

#### **c. The process involved**

##### **I. Training and material preparation**

A five-day workshop was organized to orient the teachers with innovative approaches in biodiversity education such as experiential learning methods (for example field methods to assess the biological diversity), to teach the concepts in biological diversity and to prepare the locale specific biodiversity education materials. Ten dedicated teachers from BR Hills residential school had been selected for the five-day workshop at CEE, Bangalore. The selected teachers had sufficient knowledge about the tribal students, their community and biological diversity of the area.

During the five-day programme, resource lectures were organized. The resource persons included scientists from The Energy Resources Institute – Biodiversity Wing, based at BR Hills region, professionals from Centre for Ecological Sciences (CES), Bangalore and professionals from CEE Bangalore.

The programme was organized for five days. On the first day, a brief introduction about the programme's aims and objectives was presented along with concepts in biodiversity, a lecture on traditional knowledge and introduction to the field methods to assess diversity (both flora and fauna). On the second day, the teachers were exposed to field methods to assess biodiversity, and later classroom sessions included the analysis of data collected in the field. The third day onward, teachers were grouped into groups of three based on their level of teaching (primary, higher primary and secondary). Each group was assigned the preparation of biodiversity education materials at various levels. The preparation of materials included planning an outline of the contents in the booklets, library work and scanning through existing database in environmental education and various books on scientific information, both published and unpublished materials available on the BR Hills ecosystem. Continuous presentations and discussion sessions were also arranged to overcome the difficulties during preparation of the biodiversity education materials.

### **Outcome of the workshop**

At the end of fifth day, the different teacher groups came out with drafts of biodiversity education materials suitable for different levels ( primary, higher primary and secondary) at BR Hills school. The following three locale specific biodiversity education booklets in Kannada (local language) were brought out after a round of editing by the professionals at CEE Bangalore.

#### *1. Biligiri Bettada Jeevighalu (Biodiversity of BR Hills) – Part I*

This booklet is meant for the teachers of primary school, designed to appreciate biological diversity in the surroundings. The contents of the booklet cover the scientific way of identification of fruits, flowers, birds and various animals, broad classification of animals, experiencing forests, study of the tree as an ecosystem, model making, study of honey bees and natural colour-yielding fruits and flowers. All these topics help children to identify fruits, flowers and birds. It contains 15 simple activities to impart some of the simple skills such as observation, identification, painting, model making and mask making.

#### *2. Biligiri Bettada Jeevighalu (Biodiversity of BR Hills) – Part II*

This part is meant for the teachers of higher primary school and concentrates on the biodiversity concepts. The booklet covers background information on biodiversity (both flora and fauna), biogeographical regions of India and BR Hills in particular. The booklet has 12 simple activities such as study of trees, medicinal plants, insects, food chain, pyramids, bird watching, symbiotic relationship (eg., parasitism, mutualism and commensalisms) adaptation of species (eg., Mimicry), study of BR Hills biogeography and activities to set up a biodiversity exhibition centre. All these activities will help students to learn concepts in biodiversity such as animal diversity, plant diversity and ecosystem diversity.

#### *3. Biligiri Bettada Jeevighalu (Biodiversity of BR Hills) – Part III*

It is meant for the teachers of higher secondary school and focuses on the inventory and monitoring of biological diversity. The booklet covers background information on the bio-

geographical regions of the world, India and BR Hills in particular. The topics include sampling methods and collection of statistical data, biodiversity (flora and fauna), socio-economic status of Soliga community, non-timber forest produce, biomass energy, documentation of indigenous knowledge in Soligas as well the rules and regulations of forest protection implemented by the Government of India. Preparation of maps of bio-geographical regions of BR Hills, study of vegetation diversity, such as trees, shrubs, herbs, medicinal plants, documentation of available NTFPs and their harvesting methods and herbarium preparation are some of the activities in this booklet. It also contains animal diversity study which includes small mammals, large mammals, birds, amphibians and reptiles. The socio-economic study involves finding out population and educational status, land holding, land use pattern and census of livestock in the Soliga community. An exercise on documentation of traditional knowledge in Soligas was also included to avoid loss of knowledge existing in the elders of Soliga community over a period of time. A topic on biomass energy usage is added to find out the dependency on the forest for fuel wood. It contains 17 simple activities to monitor the biodiversity of the region.

## **II. Implementation of biodiversity education in BR Hills school**

After preparation of the above locale specific biodiversity education materials, the teachers involved in the workshop became the key personnel to implement the biodiversity education in the BR Hills School. The teachers involved in teaching various subjects such as languages, science, social sciences and mathematics were part of this programme and they started using biodiversity education materials during the classroom sessions. The classroom sessions included the theoretical explanation of the concepts in biodiversity, the procedures for systematic documentation of biological resources and briefing on the field methods to assess the biological diversity. The field sessions were organized during the morning hours and on weekends. The systematic documentation of available resources and socio-economic conditions was carried out during the field visits. The information collected in the field was analyzed in the classrooms to draw attention of the students about the importance of biological resources. The analysis included, awareness of the state of biological resources, diversity in life forms of BR Hills and socio-economic condition of the Soliga community. CEE personnel along with VGKK organized a three-day programme for Soliga children and teachers to monitor the outcome of the workshop.. It was found that the teachers were very enthusiastic in teaching “activity oriented” new approaches and methods in biodiversity education to students. On the other hand students enjoyed learning about the environmental parameters of their surrounding. During the process of implementation, teachers pointed out several environmental parameters which are included in the biodiversity booklets and which they are trying to implement along with other government departments The following was one such initiative:

- Setting up of a permanent biodiversity exhibition centre at BR Hills school campus with technical and professional support from the Regional Museum of Natural History, Mysore.

Apart from this, teachers were advised to keep the biodiversity registers in the school to document the flora and fauna of the BR hills region. The documentation registers would be kept permanently in the school and students would fill in them their observations of the flora and fauna of the region. These registers would become a source of information on BR hills

biodiversity and this information would help to find out changes in the biological diversity over a period of time in the region and thereby facilitate proper action by the communities to conserve the biological diversity of the region.

### **Evaluation**

Monitoring and evaluation becomes the key step to assess the effectiveness of any environmental education programme. It also helps to improve educational programmes. The objective of our evaluation was to assess the academic knowledge base and skills developed in Soliga children leading to environmental action in the community. Because of time constraint and cost effectiveness, the questionnaire method was adopted to evaluate this programme. The total time span required for completing the evaluation was about a week. Questionnaires were designed carefully to evaluate the effectiveness of the programme. These were sent to the students and teachers separately after the monitoring programme held at BR Hills. The questionnaires were distributed to students through lottery method to avoid bias in selection of the students in filling up the questionnaires.

The contents of the questionnaires for both students and teachers were designed separately keeping the level of understanding the “questions” as a criteria. The contents of the questionnaires included the questions to evaluate interesting subjects, topics viz; plant and animal study, etc., and the number of biodiversity concepts learnt, for students. Skills developed during the field work viz; observation, data analysis etc, and short-answer questions were developed to evaluate the writing skills of the students. For teachers, questions were designed to evaluate the subject of specialization, experiences in teaching biodiversity education concepts, difference in the work load after implementation of the programme and academic capabilities developed during this programme.

### **Results of Evaluation**

A total of 19 students responded to the questionnaires the significant inferences are as follows:

- 18 students say the booklets helped in understanding the biological diversity of the BR Hills region.
- 16 students had developed self-confidence about the subject.
- 11 students confirm that the study helped them to learn about biological diversity scientifically and improved their writing ability.
- 11 students liked field study most and 12 students learnt one new concept and at least 8 students learnt two new concepts in biological diversity.

In general, about 95 percent students agree that, the study helped the Soliga community to understand biological diversity scientifically leading to conservation.

Teachers involved in teaching languages, science, mathematics and social sciences were part of this programme. As the biodiversity materials developed during the programme were locale specific, it was more interesting and easier to use in the class. A total of seven teachers responded to the questionnaires. Some of the significant points derived from the questionnaires were:

- Four teachers had no earlier experience in using similar methods to teach the biodiversity concepts and all the teachers agreed that they had benefited from the programme.
- Five teachers said that they would introduce similar methods on their own even if they left that school.
- The main constraint faced by many of the teachers was the time and work load due to introduction of the biodiversity booklets. To overcome this problem they suggested an infusion(multidisciplinary approach) of such type of lessons in the curriculum.
- Five teachers felt that the programme helped them to make the students understand biodiversity concepts and three teachers confirmed that it helped students to know the importance of biodiversity to the community.
- Five teachers felt that the students had benefited academically and they evaluated it as either good or fair.
- Four teachers felt that there was an increase in workload for students and a similar number of teachers said that participating in this kind of field-oriented studies helped them in developing their communicating skills and self confidence, which they rated either good or fair.

### **Discussion – an account of personal reflections / learning through this educational project**

Although, the materials are prepared for specific communities, they can be modified and used by other schools to help spread conservation efforts in various regions of India. Significant features derived at during this programme include:

- The work load for children and teachers increased considerably and this was not considered a constraint here, as the school was residential.
- The teachers involved in the programme felt that the biodiversity concepts could be infused into the regular curriculum in all the subjects (multidisciplinary approach) in order to reduce the burden on teachers as well as students. This was taken care of and topics in subjects such as social science, science and mathematics were selected to infuse the concepts in the existing curriculum.
- It was also found that the teachers and students involved in the programme were benefited. They could learn many new concepts and approaches in environmental education and they would like to continue with the programme in future. The students were enthusiastic to learn about their surrounding environment which had lead them to take proper environmental action in the communities to conserve the natural resources.
- During the process of programme implementation, various aspects about the culture of the Soliga community, their lifestyle, traditional knowledge base existing in the elders of Soliga community were learnt, based on which an educational strategy for the community could be developed..
- As biodiversity monitoring ( data collection on biological diversity and analysis) and documentation of traditional knowledge exercises were included in the biodiversity education programme, the students could realize the number and density of various life forms in the BR hills region. These exercises also helped them to know many important herbs, their uses and traditional practices of harvesting. Further, these studies helped students to initiate a strategy for conservation of natural resources which are dwindling in the BR hills forest region due to over exploitation.

The education for indigenous community is very important in today's world, because with dwindling resources and exploitation of skills of indigenous communities in collection of non-timber forest produce has affected the lifestyle of such communities. The biodiversity education materials developed for and by the local communities will equip youngsters to understand and monitor their immediate surroundings. In addition, this could go a long way in better management and conservation of natural resources and biodiversity of Biligirirangan hills region.

### References:

1. Bernard A Weintraub (1995) Defining a fulfilling and Relevant Environmental Education, *Urban Education*, Vol.14, PP 337-66.
2. Cecil Saldanha (1985-86) *Karnataka – State of Environment Report*, PP 144-154.
3. Dennison W F and Kirk, R (1990) Do, review, learn, apply: A Guide to Experiential Learning. PP 11.
4. Gopal Rao H.S and Srijay Dev Raj Urs D (1992) *Soliga's : A socio-economic Profile and Development Alternatives: a report submitted to Food and Agricultural Marketing Research Academy, Mysore*, PP 11-12.
5. John Fallis (1991) Moving Beyond to Environmental Action, *Journal of Experiential Learning*, Vol 14, PP 27-30.
6. Jennifer G. Smith and Randy J McGinnis (1995) *Experiential Learning for Urban African Americans*, *Journal of Experiential Education*, Vol.18 N3, PP 153-57.
7. Ravi Hegde et.al (1996) *Extraction of Non-Timber Forest Products in the Forests of Biligiri Rangan Hills, India*, *Economic Botany* 50 (3) The New York Botanical Garden, Bronx, NY 10458 USA, PP 243-251.
8. Sharma R.C. and Merle C. Tan (1990) *Source Book in Environmental Education for Secondary School Teachers*. UNESCO Principal Regional Office for Asia and Pacific, Bangkok PP 7-8.
9. Somasundaram H.N. and Kibe R.V. (1990) *Soliga – The Tribe and Its Stride*, *Vivekananda Girijana Kalyana Kendra, BR Hills, Mysore, Karnataka, India* PP 1-7.
10. Heywood H (Editor, 1995) *Global Biodiversity Assessment*, United Nations Environment Programme, University of Cambridge, PP 1111.

