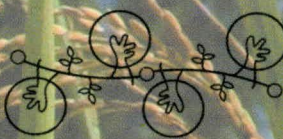
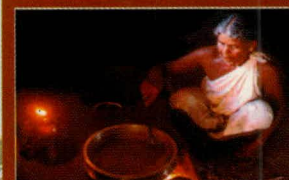
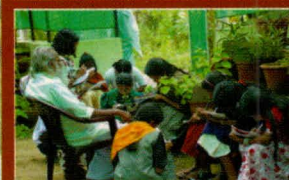


10 years of Community Agrobiodiversity Centre



**M. S. Swaminathan Research Foundation
Community Agrobiodiversity Centre**



**M. S. SWAMINATHAN RESEARCH FOUNDATION
Community Agrobiodiversity Centre**

10 years of *Community Agrobiodiversity Centre*

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M. S. Swaminathan Research Foundation

MSSRF/RR/07/15

November 2007

**10 years of Community Agrobiodiversity Centre
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Preface

It is with a profound sense of satisfaction that we bring out the *10 Years of Community Agrobiodiversity Centre*. By choosing Wayanad as one of the prime regional centres in 1997, M. S. Swaminathan Research Foundation has taken a significant step on the front of biodiversity conservation. Since then the Centre has been striving along with other partners for sustainable use of natural resources in a scientific manner specifically anchored on the strengths, beliefs and practices of local people, especially the tribal communities of Wayanad, a biologically rich region now ironically identified as a distress district.

The past one decade of CABc can be considered as a developing phase and we are now stepping into a stabilization phase. This document is a tour through the activities of CABc undertaken in the past ten years through fourteen projects supported by a multitude of funding agencies and other well wishers. In a brief manner, the document depicts the journey traversed by CABc so far and the path ahead. During these ten years of research and advocacy in the area of conservation, sustainable management of natural resources and livelihood improvement, the Centre has been successful in building confidence among the tribal and rural communities of the district. Through its timely and significant efforts, CABc is well recognized by the community as a facilitator in recognizing their contributions to the conservation of genetic resources and traditional knowledge.

We were guided all through by the Programme Advisory committee headed by Prof. M. K. Prasad and the Management Advisory Committee chaired by Sri. A. Ratnam. We are indebted to Dr N. Anil Kumar, my predecessor and the first Project Director who was instrumental in bringing up CABc to its present stature. I am grateful to all my colleagues and the editorial committee, especially Mr G. Girigan, Ms Smitha S. Nair, Dr C. Manjula and Ms V.P. Sreevidhya for their sincere and unrelenting efforts in bringing out this compilation on time.

It is my fervent hope that this document will guide the future researchers of CABc and help our well wishers to advise us in formulating and strengthening agrobiodiversity conservation efforts to alleviate poverty and hunger of the marginalized communities of Wayanad under the guidance and inspiration of our beloved Chairman Prof. M. S. Swaminathan.

K. U. K. Nampoothiri

20.11.2007

Acknowledgement

It is with great pleasure that we dedicate this *10 Years of Community Agrobiodiversity Centre* – a compilation of activities of the Centre during the period of 1997- 2007 to the people of Wayanad whose constant cooperation and consistent support helped us to accomplish the tasks during the decade. In this occasion, we express our sincere gratitude

Dr K. U. K. Nampoothiri, the Director, CABc who has been instrumental in conceiving the idea of developing this document and was the source of inspiration for this compilation.

We are obliged to Prof. M. S. Swaminathan, the Chairman; Dr M. Velayudham, former Executive Director and Ms Mina Swaminathan, MSSRF, Chennai for the warm encouragement and valuable guidance provided through out the implementation of the projects. We are also indebted to Dr N. Anil Kumar, the Director cum Barwale Chair of Biodiversity Programme, MSSRF, Chennai and the Founder Director of CABc for rendering valuable suggestions and for reposing confidence in us to produce this document. We would also like to sincerely acknowledge the invaluable and timely advice of the Management Advisory Committee and Programme Advisory Committee, headed respectively by Sri A Ratnam and Prof. M. K. Prasad.

We would like to record our sincere gratitude to Swiss Agency for Development and Cooperation, New Delhi; Department of Science and Technology and Department of Biotechnology, Govt. of India; National Medicinal Plant Board; UNDP/GEF; Japan Consulate, Chennai; Botanic Gardens Conservation International; National Botanical Research Institute, Lucknow; Sir Dorabji Tata Trust, Mumbai; International Development Research Centre, New Delhi; Malayala Manorama, Kottayam and Friends of MSSRF, Tokyo for their invaluable financial assistance. The annual Ford Endowment Grant which ensured the continuity of many important activities of CABc is also duly acknowledged.

This document is a revised and updated version of the Decadal Review Report prepared in 2006 for internal circulation at MSSRF. We are extremely grateful to all of our colleagues especially Mr M.K. Ratheesh Narayanan, Mr V. V. Sivan, Mr P. M. Nandakumar, Mr V. P. Sajeev, Ms C. S. Dhanya, Ms Alishiya Mathews and Mr P Prajeesh who are closely associated with this work and whose timely contribution in fact made this endeavour a success. We are grateful to Mr Sreekumar S. Menon and Ms Rency for proof reading the document; Ms K. N. Shyja and Ms V. P. Sreevidhya respectively for typing the document and setting the lay out. We are also thankful to M/s San Georgea, Sultan Bathery for the tidy completion of the printing work.

The authors accept the responsibility for errors and inaccuracies if any.

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Introduction



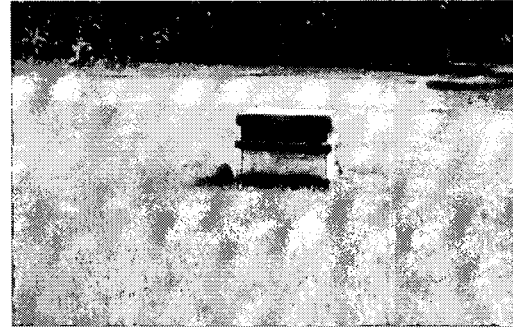
M. S. Swaminathan Research Foundation (MSSRF), one of India's leading Non-Governmental Organizations, was established in 1988 as a non-profit trust. The basic mandate of MSSRF is to impart a pro-nature, pro-poor, pro-women and pro-livelihood orientation to a job-led economic growth strategy in rural areas by harnessing science and technology for environmentally sustainable and socially equitable development.

MSSRF's one of the main goals is the conservation and enhancement of biodiversity, with emphasis on plants of current or potential economic value. This agrobiodiversity has been selected and conserved by the tribal and farming communities for many centuries. India's agro-biodiversity is now recognized as the Intellectual Property of farming communities, and protecting their rights is necessary so that they may continue their services in conservation and enhancement of the valuable plant and animal genetic resources.

In order to develop procedures for recognizing and protecting these rights, Prof. M. S. Swaminathan created a Technical Resource Centre (TRC) in 1996. The TRC's activity was focused on the following: chronicling the contributions of tribal and rural families; developing multimedia databases; maintaining a Community Gene Bank and Herbarium; and establishing a legal advisory unit. Field-level work commenced at three sites: The Kolli Hills (Tamil Nadu), Jeypore Tract (Orissa) and Wayanad (Kerala). Steady progress has been achieved in these field sites since their inception. MSSRF decided to expand these activities under a broader programme to provide the infrastructure necessary to empower communities in agrobiodiversity conservation and thereby enhancing rural livelihoods. As a result, the Community Agrobiodiversity Centre (CAbC) was established in 1997 in Wayanad district of Kerala.



Kurichiya Woman in rice field



Rice and rituals..... *Daivathara* in rice field

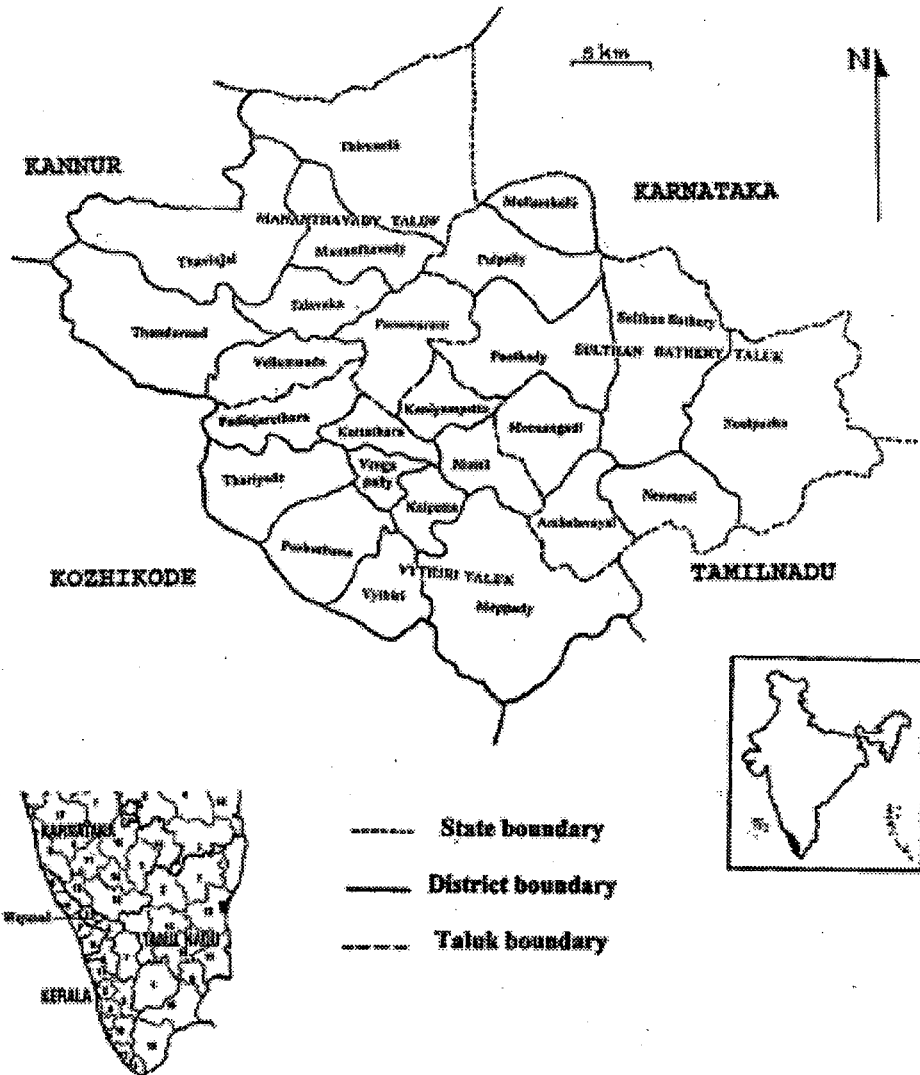


Paniya woman on wild food collection



Diversity in safe hands

MAP OF WAYANAD



Wayanad is one among the fourteen districts of Kerala, with an area of 2136 sq. km. and a population of 7,80,167 (Census Report 2001). The tribes constitute 17.1% of the total population of the district which is the highest in the State. The ethnic diversity is also equally impressive in the district, as evidenced by the presence of tribal communities like the *Kurichiya*, *Kuruma*, *Paniya*, *Adiya* and *Kattunaikka*.

A glimpse of ethnic diversity



Coming under Nilgiri Biosphere Reserve of Western Ghats - one of the biodiversity hotspots in the world – the district abounds a multitude of plants and animals in diverse kinds of vegetations. The main types of vegetation in Wayanad region are wet evergreen forests, moist deciduous forests, *sholas* and grasslands. The landscape diversity varies from forests, bushes, thickets, rocky grass lands, fallow fields, springs, streams, canals and wetlands- a fine example of a heterogeneous ecosystem in which a number of highly useful plants of medicinal and food value are reported. Out of an estimated 2000 species of flowering plants, 540 are endemic to southern Western Ghats and many species have been included in the Red Data Book of endangered plants. A number of once commonly available crop varieties also have become very rare or disappeared.

Wayanad accounts for 5.5% of the total area, 7.3% of the total forest area and 5.3% of the net sown area in the State. Total land area of the district is 2,12,560 ha out of which 37.1% is under forest cover and 54.6% area is used for agricultural purposes. It is one of the richest agrobiodiversity centres of the State with a long history of agriculture. The tribes practised shifting cultivation under which they raised multiple crops like Rice, Finger millet (*Muthari*), Foxtail millet (*Thina*), Little millet (*Chama*) etc. Settled agriculture started with the paddy cultivation. Pepper was the principal cash crop raised in this region. Tea and coffee plantations, introduced by the British gradually occupied the uplands. The large scale migration in the wake of World War II, population pressure, commercialization of agriculture etc. intensified land use pattern in Wayanad.

At present, more than 80% of the people in Wayanad depend on agriculture for their livelihood. Coffee, pepper, tea, banana, paddy, cardamom, ginger, vegetables etc are the main crops presently cultivated in Wayanad.

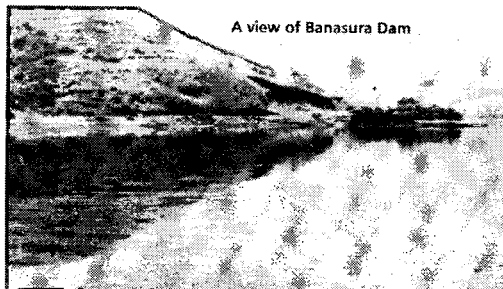
More than 70% of the total agricultural land is occupied by cash crops such as coffee, pepper, tea, cardamom etc. Wayanad is the primary producer of Banana (8935 ha), ginger (5244 ha) and coffee (67560 ha) and is second in the production of pepper (44908 ha), cardamom (4108 ha), jack (11320 ha), tea (6035 ha), lemon grass (229ha) and fodder grass (196 ha). Other major crops of the district are mango (5409 ha), plantain (2152 ha), areca nut (6033ha), tubers (1727 ha) and other fruit crops (817 ha).

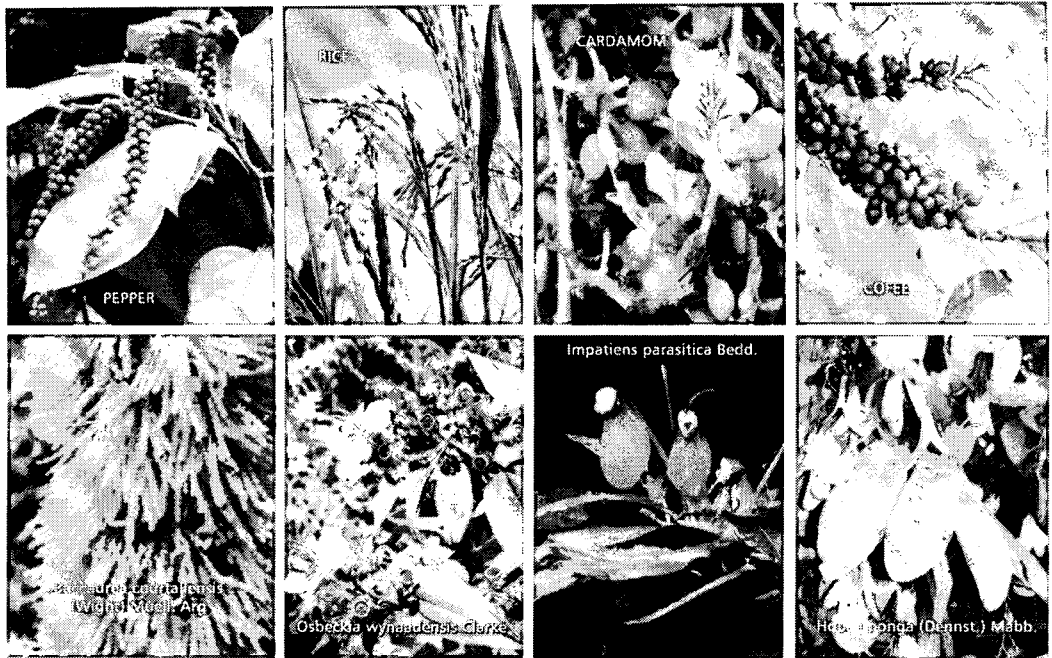


Shola-grassland ecosystem



A view of Banasura Dam





A notable feature of Wayanad is the coffee based farming system where other cash crops like pepper, ginger, cardamom, and vanilla are integrated. However, the recent price crash has created some setbacks in coffee cultivation. Increased incidences of pest and disease attack coupled with price crash have deteriorated not only the diversity but also the production of pepper in the district. The area under rice cultivation has come down drastically while banana cultivation occupied low land valleys, which has created many ecological and socio-economic problems in the district.

Community Agrobiodiversity Centre

Since its establishment, the Centre has adopted a three-pronged strategy to achieve its objectives.

- Generating public awareness and public participation through education
- Promoting revitalization of *in situ*, on-farm, conservation traditions of rural and tribal families by creating an economic stake in conservation
- Empowering primary conservers to access reward and recognition for their efforts in conservation; under the *Protection of Plant Varieties and Farmers' Rights Act*, and the *Biodiversity Act of India*

The Centre is unique in taking the district's tribal and rural communities' views in identifying priorities, defining objectives, and setting the direction of the organization's work. This grass root-community-level approach to sustainable improvement of livelihoods is the backbone of the Centre's mission.

The CABc's various activities fall under three broad programs:

Biodiversity Conservation

- Plant diversity and Traditional Knowledge (TK) baseline study
- *Ex situ* conservation of endangered and wild plant species
- Paddy field ecosystems research and paddy varieties husbandry
- The “Green Health” campaign to promote traditional health care practices
- Food basket diversification *via* wild plant foods and domesticated tuber crops

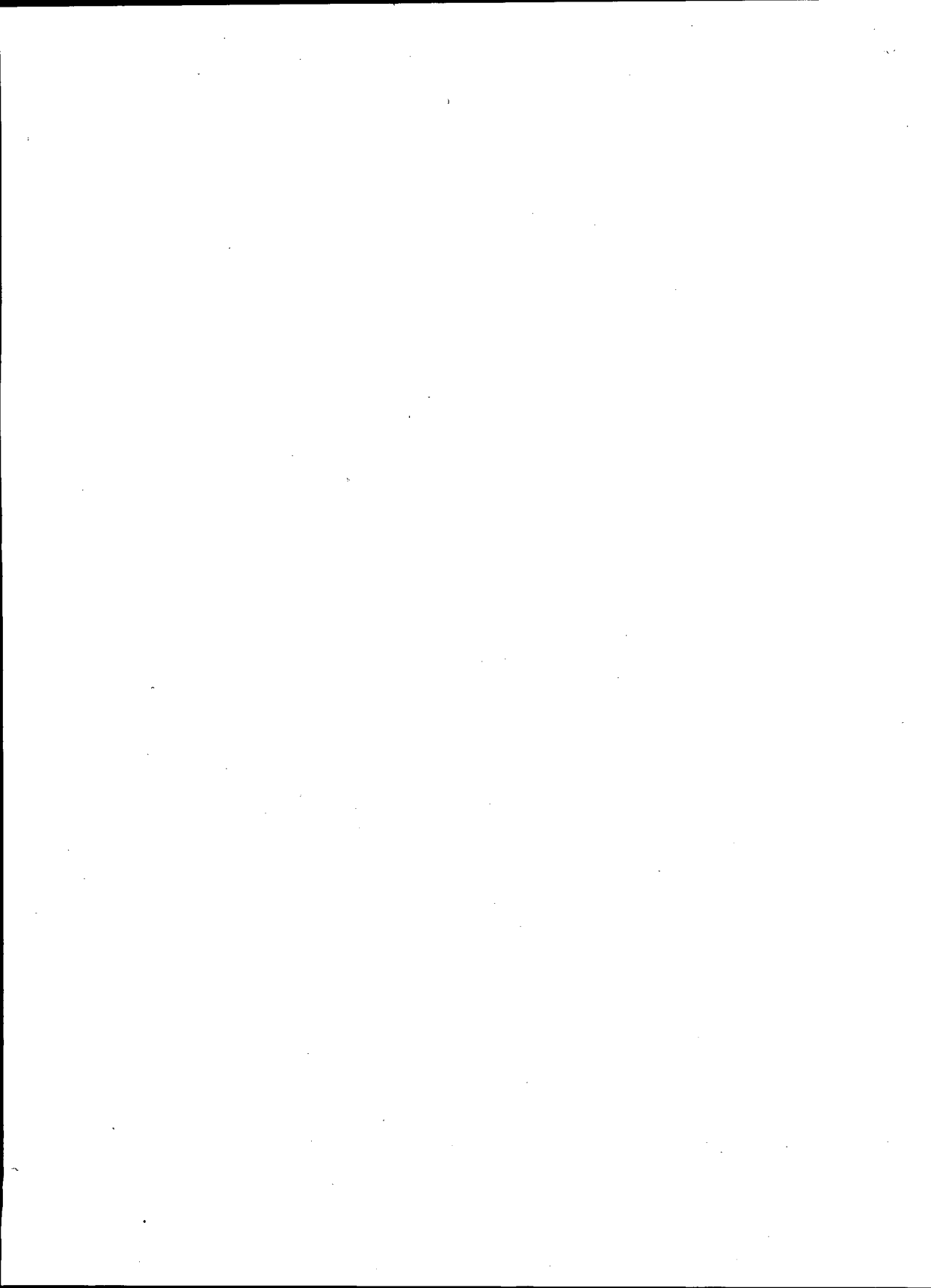
Education and Awareness

- Village Knowledge Centres and Village Resource Centre
- The “Every Child a Scientist” programme and “Knowledge Centre” for tribal and rural children

Eco-technology and Livelihood

- Promotion of income generating activities based on agrobiodiversity and natural resources
- Developing and demystifying of agro-eco-technologies for promoting organic farming

The Executive Director of MSSRE, based in Chennai, oversees the operation of the Centre. A Management Advisory Committee and a Programme Advisory Committee further facilitates the Centre's activities and ensures adherence to the organization's goals. Situated on sixteen hectares of fertile land, the CABC is composed of a main office building, a community training centre, a guesthouse, and a working farm with farmhouse and research facilities. Its additional resources include an arboretum, an orchidarium, and shade houses for collections of medicinal, endangered, and wild food plants.



Biodiversity Conservation
Programme

1.1. Medicinal Plants

Terminalia chebula Retz.



Wayanad is recognized for its biotic richness especially the medicinal plant wealth. Wayanad is also home to a number of indigenous communities who have a deep knowledge regarding the usage of plants. To a large extent, Wayanad still retains an organic method of cultivation; especially the women still grow a number of plants in their homestead garden in an organic way. Keeping these points in mind the Centre embarked on a Biohealth programme aimed at imparting knowledge to women regarding the healing nature of plants so as to reduce medical expenditure and inturn to conserve medicinal plants through education and cultivation. Promotion of conservation and sustainable use of medicinal plants for raising the economic status of women belonging to marginalized sections, is the major thrust area of the Biohealth Programme. This is targeted through awareness generation on conservation and promotion of medicinal plants and preparation of herbal formulations for primary health care needs, nutritive and cosmetic value. To a large extent women are the focus of the programme and the project operates through organizing them in Self Help Groups to catalyze the movement of conservation and sustainable utilization of medicinal plants forward.

Awareness programmes were conducted on indigenous healthcare systems, medicinal plant identification, propagation and harvesting among farmers, youths and students in Wayanad, Malappuram, and Kozhikode districts. Exposure visits are being organized to Arya Vaidya Sala,

Kottakal, a reputed Ayurvedic institution and educational materials are prepared in local language.

Women especially from economically and socially backward sections are given trainings to identify, conserve and sustainably use nearly seventy five species of medicinal plants and to prepare thirty six herbal formulations. A health care product 'Navadhanya mixture' marketed by the SHGs was found to be nutritionally richer than many similar products in the market as per the results of analysis by the Central Food Technological Research Institute (CFTRI), Mysore.

Keeping in mind the richness of the floral diversity, a study on the status and availability of medicinally important roots/tubers, orchids and macro fungi of Western Ghats was carried out and many of these plants are conserved *ex situ* at the Centre. A check list of 630 plants has been prepared, out of which three hundred are medicinally important and are conserved at the Centre. An ethnobotanical study has also been completed.

The growing demand for medicinal plants and the low availability or restricted access to it, necessitate the need for cultivation of such plants in the locality. Hence the Centre has established a mother nursery of medicinal plants to make available the seedlings that can either be cultivated commercially or be used for the primary health care needs. Community medicinal plant gardens contribute to the conservation of many locally rare but important plants.

A user friendly software package to store comprehensive database of medicinal plants of Kerala has been prepared to disseminate knowledge regarding effective conservation management practices and better utilization of resources.

Though the women were able to market some of the herbal formulations at local level and could earn anywhere between Rs.2000 to Rs.50, 000/- annually, the marketing could not be undertaken on a larger scale according to the Good Manufacturing Practice (GMP) standards for production and marketing of herbal products. A survey conducted with the help 'Fare Value Group' at Kozhikode to explore the market potential among the elite classes for six primary health care formulations revealed that an average of 15,000 packets of powdered products like 'Thali powder' (for bath) and herbal drink could be marketed quarterly. Technical consultation with the Women's Biotech Park, Chennai regarding marketing of nine selected products and samples suggested further value addition possibilities.

Recognizing and rewarding the traditional wisdom is important. It is well known that ethnic communities possess a deep knowledge regarding the local floral diversity. The indigenous





communities of Wayanad are not different as highlighted by a study on *Dioscorea* spp. used by the Kattunaikka community which revealed that they are familiar with the detoxification methods of some species of wild yams, necessary before consumption. Hence the Centre has made efforts to document similar knowledge with Prior Informed Consent and submitted such cases to National Innovation Foundation (NIF) for reward and recognition. Some of such submissions to NIF were 'Arresting fermentation of toddy' by Mr Achappan Pittan, Palookappil Colony, 'New variety of pepper' developed by Mr Balakrishnan, Kammana, 'Treatment for 'rat fever' (Leptospirosis)' by Mr V. J. Skariya, Pallikkunnu, Kottathara, 'Treatment for bone fracture' by Ms Shantha, Puthoorvayal, 'Rabies treatment' by Mr V. Siraj, Muttil, Wayanad and three innovations on conversion of vegetative waste into tincture alcohol by Mr Ravi Vakkom.

Farmers have formed a society 'JEEVANI' with technical guidance from MSSRF to promote medicinal plant cultivation, its conservation, sustainable utilization and to explore market avenues. With the progress of the Bio health programme, organic cultivation of medicinal plants by Women's Self Help Group has been initiated with a buy back arrangement dovetailed with Wayanad Vanamoolika Samrakshana Sangham- a grassroot level Community Based Organization (CBO) for a project supported by the Planning Board under the RSVY scheme for establishing a herbal production unit. Our long term goal is to encourage organic cultivation of medicinal herbs that will on one hand raise the economic level of the members and on the other contribute to the decrease of collection from wild. Federating the SHGs under a single umbrella will contribute to the strengthening of the groups and cause of medicinal plant conservation.



1.2. Wild Food Plants



1. *Diplazium esculentum* (Retz.) Sw. 2. *Achyranthes bidentata* Blume 3. *Embelia tsjeriam-cottam* (Roem. & Scheult.) DC. 4. *Zehneria maysorensis* Wight & Arn. 5. *Dioscorea oppositifolia* Prain & Burkill

The tribal population of Wayanad has been depending on the wild resources for long time. Unfortunately due to the changed land use patterns and to some extent change in societal values, the traditional knowledge regarding these resources is gradually declining and may disappear soon from their memory. This can have serious repercussions on the nutritional status of the tribal people and moreover in some cases lead to decline of some species as people will be disinterested to conserve it if they do not have a stake.

Under this circumstance, CABc has started a programme to enhance the livelihood of tribal groups through sustainable use of wild and traditional edible species. The research was undertaken in a participatory mode to access the traditional knowledge on wild edible resources, the gender dimensions of its management and present livelihood options. The overall goal was to understand through analysis and feedback as to how the livelihood of the tribal people can be improved through developmental interventions with the technical and financial support of different Govt. Institutes.

Documentation of the traditional knowledge on wild edibles and gender dimensions of its management was completed and as a result of this study a livelihood enhancement programme was undertaken in selected tribal hamlets and the wild food was conserved *ex situ*. The study followed a scientific format of evolving a methodology, extensive field survey and data collection for a year. The data were analyzed, validated and following the norms of ethical scientific research, the study findings were shared with key knowledge providers from the communities which was in turn found to be much helpful in paving the way for future action. A brochure and a CD were released highlighting the major findings of the study on Gender Dimensions of Wild food Management in Wayanad.

The study sought to focus attention on the wild food management practices to observe the difference in the approaches and pattern of wild food resources conservation and utilization. The in-depth research has revealed that the tribal groups have an extensive knowledge regarding

wild food using a wide array of plants and animal with some variations amongst the different groups. Some groups had found uses for alien species indicating that traditional knowledge is constantly evolving. Women play a greater role in conserving wild food that adds to the food basket of the family. The study highlighted that 372 wild edibles are accessed by tribal communities. Of these 102 leafy greens with 19 species of *Dioscorea*, 40 species of wild mushrooms, 5 species of crabs, 39 species of fishes and five types of honey find way into their diet.

A synthesis of the role of wild foods in the lives of the socio-cultural groups at times of emergencies and food famines as well as the diversity of wild foods that are used for the sustenance of the tribal communities revealed that the *Paniya* community is heavily dependent on the wild environment for their food needs. The *Kattunaikkas* are next in the knowledge ladder followed by the *Paniyas*. Interesting information was that the non-tribal communities like resource poor Muslim women also access the semi-wild environment for food, particularly the greens.

The decline in traditional knowledge related to wild food from one generation to the next is a stark reality indicated by the study. The changes in gender relations and its impact on food species management, the perception of both males and females of different age groups about the structure, function and dynamics of the agricultural landscapes *vis-à-vis* availability of food species also came under the purview of this study. The implications of land use changes, agrochemicals, restrictions of forest access, influence of development and impact of invasion of alien species on the availability of wild food were highlighted in the study.

The study also shows that many tribal and rural families still conserve a wide range of plants for their food needs. Women are more skilful in managing the surrounding landscape and are the main knowledge holders and conservationists. Moreover they are taking effective steps towards the sustainable management of landscapes and species that provide edible greens, but changing trends in gender relations inhibit these efforts. The decline of traditional knowledge, especially among youth, affects the sustainable use of many wild edibles. As a follow up, extensive awareness classes were conducted. Ninety eight species of wild edible plants are maintained and thirty-five species of edible mushrooms and thirty species of fish are preserved at CABc.

Realizing the importance of enhancing the nutritional supply, a 'food plants' package for home gardens was prepared with the help of Central Tuber Crops Research Institute (CTCRI), Thiruvananthapuram after conducting a socio-economic survey and livelihood analysis. The package consists of both wild and traditional edible species like tubers, greens, vegetables, fruit trees and fruit yielding climbers. It consisted of four species of fruit trees, three species of fruit

yielding climbers, seven species of traditional yam varieties, sweet potato, taro, elephant foot yam, *Asparagus* and seeds of nine traditional vegetable species.

As a result of the project, a germplasm plot with thirteen wild and fourteen traditional varieties of *Dioscorea*, four traditional varieties and three wild varieties of *Colocasia*, one species of *Amorphoballus*, three varieties of sweet potato, two varieties of *Canna*, two varieties of arrow root, twelve species/ varieties of legumes has been conserved *ex situ* at CABc.

Communities like the *Kattunaikkas* have traditionally depended on honey for their livelihood. The decline



Harvesting in an apiary Bottling of honey for marketing

in the availability of honey has serious repercussions on such people. Hence, a programme on apiculture with the help of Khadi Board was initiated in selected tribal colonies to enhance their livelihood options and it is encouraging that the people are able to earn an additional source of income through harvesting and marketing honey.



Collection of edible leafy greens from the wild

An integrated tribal development programme in Judgikkunnu tribal colony, based on the felt needs of the people, has been initiated with the financial support of Tribal and Forest Departments. A nutritional survey was conducted in selected tribal colonies to assess the existing nutritional status of people in selected hamlets to identify basic health and nutrition issues. As a result of this, an *anganvady* was opened at Ponkuzhy Kattunaikka colony.

Apart from the CD and brochure as a result of the gender dimension study in wild food management, four scientific papers, four booklets and three popular articles on various aspects of wild edible resources and its management, a database of wild edible leafy greens and mushrooms has been generated through this programme.

Some other outcomes of this programme have been the formation of a Tribal Cluster Development Society with democratic checks and means to ensure transparency in fund utilization at Kuttimoola and a tribal cluster in Mananthavady Grama Panchayath for comprehensive tribal development. A nursery has been started to raise seedlings of coffee, pepper, coconut, areca and medicinal plants in the plantation area as well as for wild plants for afforestation programme. Nursery raising and marketing of these seedlings by a trained tribal SHG group will become a model livelihood programme in tribal areas. A dairy project at Karuvanthodu *Kattunaikka* colony with the financial help of Pozhuthana Grama Panchayath and Veterinary Department, was implemented. An apiary programme in 10 tribal hamlets of the district with the technical and financial help of Vanamoolika and Khadi Board was implemented. In order to propagate and conserve knowledge regarding tubers, Tuber Crops Cultivation Groups have been formed in the tribal colonies at Judgikkunnu, Muthanga and Thachambath.

Restoration of 40 acres of paddy fields and income generation through organic cultivation and marketing of medicinal and scented rice varieties like *Navara* and *Ghandhakasala* and vegetables were done which benefited thirty *Kurichiya* families.

1.3. Conservation of RET species



Binding beliefs to conservation..... Poojari of koottakkavu temple is planting a tree seedling for restoring the sacred grove

Since the inception, CABc has been focusing on conservation of the Rare, Endemic and Threatened species of Western Ghats. The efforts in this regard started with the documentation of the floristic diversity of Wayanad region and till date, the programme has encompassed three consecutive phases each with a specific target.

A floristic study to unravel the angiosperm diversity of the area highlighted the biological significance of the region that provides habitat for about 25% of the Rare, Endemic and/or threatened flowering plant species of Western Ghats. A total of 1950 flowering plants were documented, with 32 Red Data Species and 550

endemics of Western Ghats. Besides, seven forest patches *viz.*, Banasuramala, Chembramala, Kurichiarmala, Vaduvanchal forest, Sugandhagiri, Thirunelly and Chanthanathodu of the district were prioritized for immediate conservation. Discerning the reality that poor natural regeneration is posing severe threat to a good number of RET species in Wayanad; attention was drawn towards adopting suitable *ex situ* conservation measures in the Centre. It led to the establishment of a conservation garden with 125 orchid species, 30 fern species, 156 endemic tree species and 60 accessions of wild tuber crops and a CABc herbarium with more than 8000 specimens of flowering plants of Wayanad.

As a follow up, the second phase was implemented in the year 2004 paying attention to the conservation of ten selected RET plant species of Wayanad by way of integrating conservation and livelihood security of the community. The species were selected giving thrust to the demand of the forest dwelling people for their food, health and livelihood. The target was achieved through the community-oriented multiplication of selected

species and by adopting both *in situ* and *ex situ* conservation measures towards ensuring their subsequent availability in the near vicinity of their dwelling places.

The third phase of the programme, initiated to mark the 80th birthday of Prof. M. S. Swaminathan, is envisaged to accelerate the Center's conservation efforts through an increased number of target species and an expanded outreach beyond the boundaries of Wayanad. For the purpose, a novel approach has been adopted by means of partnership building in conservation as well as research and by initiating fellowship schemes for providing ample opportunity to meritorious candidates to prove their worth in conservation. Targeting the conservation of 80 RET plant species, eight doctoral programmes have been integrated and collaboration has been established among five multidisciplinary institutions *viz.* CABIC, Kerala Forest Research Institute, Peechi, Centre for Medicinal Plant Research, Arya Vaidya Sala, Kottakkal, Sree Narayana Mangalam College, Maliankara and Centre for Research in Indigenous Knowledge, Science & Culture, Kozhikkode. Each research fellow is entrusted with the responsibility of collection and conservation of ten target species and the species are being thoroughly studied giving emphasis to their distribution, taxonomy, ecology and conservation biological aspects (The list of species targeted is appended as Annexure I).

Recognizing the role of traditional beliefs in promoting conservation measures, the Centre has also facilitated the establishment of zodiac forest and the restoration of sacred groves in the premises of CABIC and Koottakkavu temple, Pozhuthana. Further it needs to be specially mentioned that environmental education and awareness campaigns have been adopted in all the three phases of the programme as a major tool for enhancing and ensuring a concerted action towards RET Conservation. The centre has formed a forum - *for RET* - in 2007 for ensuring the open-ended participation of organizations and individuals working for the cause of conservation of RET species.



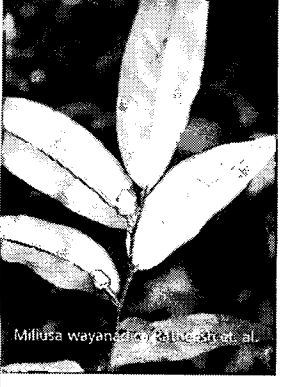
Asplenium Bourdillii (Hillebrand) Kuntze



Vateria macrocarpa Scott



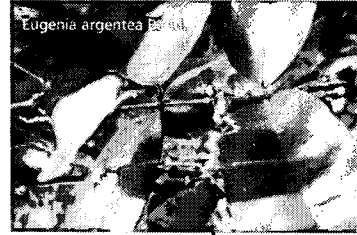
Medinilla malabarica (Lam.) Z



Millettia wayanadensis (Ravikumar) et al.



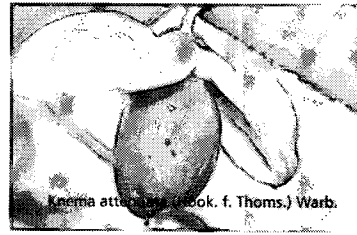
Spathoglottis phoenicea (Wight) A. D. C.



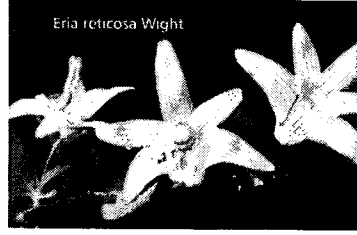
Eugenia argentea (Lam.)



Albizia leucodermis (Wight)



Knema attenuata (Hook. f. Thoms.) Warb.



Eria reticulosa Wight

1.4. People's Biodiversity Registers

Community Agrobiodiversity conservation movement started with People's Biodiversity Register preparation. *People's Biodiversity Register (PBR) is a document prepared by community on local biodiversity and associated knowledge, its status and their perception on the utilization of available bio-resources.*

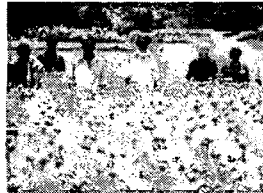


Through the stages of PBR preparation...

The main objectives of the programme are to empower local communities in chronicling and documenting bio-resources and associated knowledge in the form of biodiversity registers and to inspire Panchayat Raj Institutions and local community to implement conservation oriented programmes in their respective localities. Technical Programmes included training and capacity building, preparation of biodiversity registers, sensitization of the results of PBR and planning of developmental interventions for biodiversity conservation.



Extensive trainings were imparted to 400 selected people in four Grama Panchayaths for the preparation of biodiversity registers. The people, Panchayath members, Agrobiodiversity Conservation Corps and local NGOs were rallied with MSSRF in preparing biodiversity registers and forming Biodiversity management Committees in



Kottathara, Meppady, Thariodu and Pozhuthana Panchayaths.

The Centre could empower a local NGO named 'Yuvasabdam' to take care of biodiversity conservation activities and documentation of bio-resources available in their locality. For the purpose of creating awareness on biodiversity and to facilitate collective action in conservation, the Centre in support of 'Yuvasabdam', established a local resource centre named "Vayal Environmental Society" in Kottathara Panchayath. A local heritage site, consisting of important plant species, was identified at Palukkappu in Kottathara Panchayath and conservation efforts were encouraged. Two medicinal plant gardens were established for recognizing the key informants, who shared their knowledge to local people. Followed by the PBR preparation, a public function was

organized to felicitate ten key tribal farmers for generating public interest in the traditional conservation practices pursued by various tribal communities in the region.

In Meppadi Panchayath, the PBR preparation exercises led to the establishment of one medicinal plant garden in Thrikkaipatta School campus, *in situ* conservation of 12 native pepper varieties and the restoration of a sacred grove. Thrikkaipatta Village was selected as a heritage site for biodiversity conservation activities.

PBR exercise and explorations in Pozhuthana Panchayath resulted in the collection of 50 rare orchids and promoted *ex situ* conservation of the same in CABIC campus, restoration of Koottakkavu sacred grove, establishment of zodiac garden in Koottakkavu and revival of rice varieties like *Thekkan Cheera* and *Uruni Kaima*. In addition to that, Grama Panchayath initiated various programmes for the protection of streams and other natural water bodies.

The cultivation of traditional plantains, native vegetable crops and ginger was promoted in Thariodu Panchayath by bringing back the lost crops/ varieties.

Box 1. Biodiversity at a glance in four Grama Panchayaths

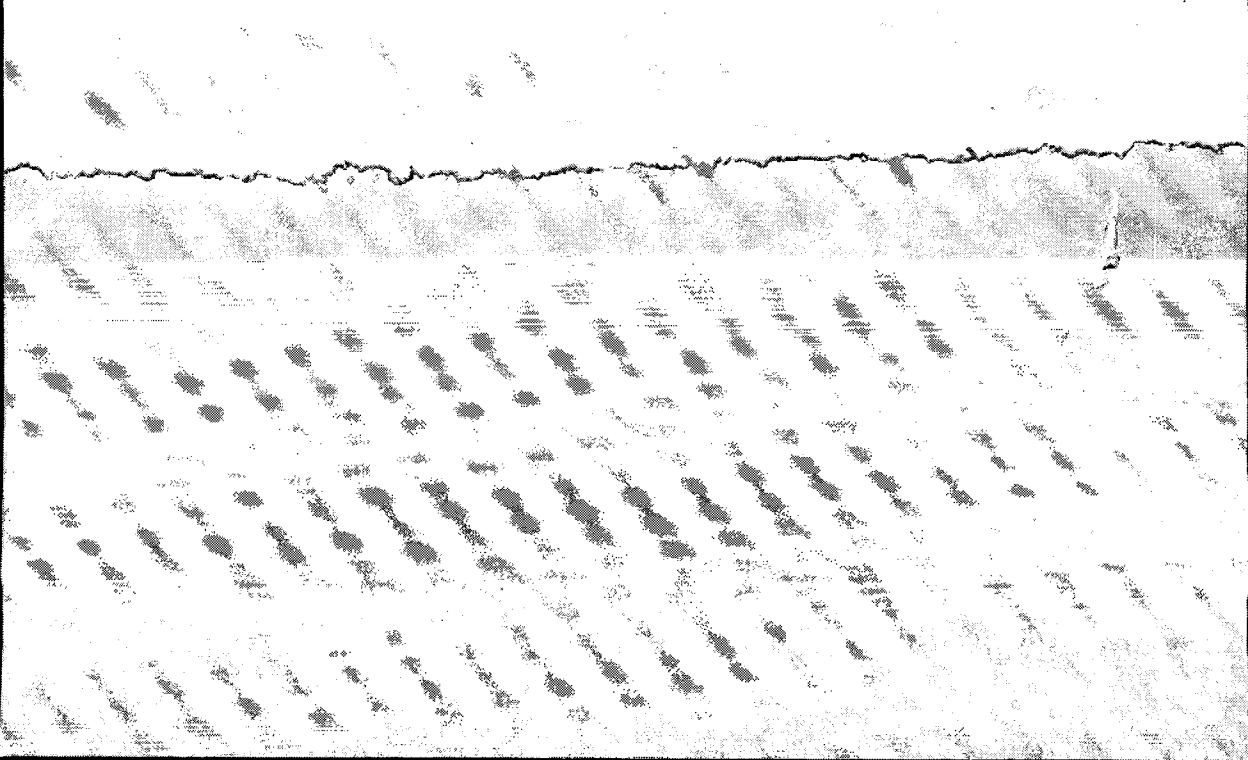
The comprehensive analysis of the PBRs of four Panchayaths gives the picture of the agrobiodiversity status from the people's point of view.

- a) Six crops and their distinct varieties are disappeared (not under cultivation at present) and two varieties of rare crops are critically endangered.
- b) The native crop diversity is under severe threat. Out of 102 traditional rice varieties reported in the PBR, 21 are under cultivation but others are extinct.
- c) The native landscape including ecologically important agriculture landscapes are under threat (grass land, forest, rice fields, coffee-based mixed cropping etc.).
- d) The crop biodiversity of the major food crops remain unchanged even though there is a reduction in area. They include yams, taros, tapioca, vegetables, green leafy vegetables, legumes and various fruit species.
- e) 271 species of plants are used for medicinal purpose by different communities.
- f) 103 species of climbers are reported in the panchayaths.
- g) 43 shrubs, 64 weeds and 61 grasses were reported in the PBR.
- h) There are 297 tree species known to public.
- i) More and more cash crops were introduced and encouraged throughout the Panchayaths.
- j) Among the cash crops, pepper faces more threat from the point of view of biodiversity, especially due to increased incidence of pest and disease attack.

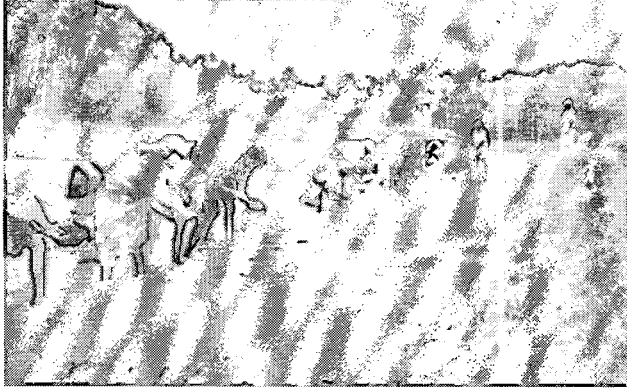
1.5. Conservation of Rice Fields & Native Rice Varieties

Recognizing the importance of rice fields and landraces of rice from the point of view of agrobiodiversity and the socio-economic background of Wayanad, the Centre launched rice conservation programmes in 1998. The specific programme for promoting economically important speciality rice varieties was launched in 2005, under which thrust was given to validate and commercialize medicinal and aromatic rice varieties of Wayanad. The key activities under the rice conservation programme included awareness generation, training and capacity building for farmers, production and distribution of quality seeds of rice varieties, introduction of advanced technologies for increasing the rice yield, promotion of economically important rice varieties, market linkage and value addition and promotion of organic rice farming.

Awareness was created among the public on conserving rice fields and rice varieties. The Centre has prepared 50 multi-colour posters, 5 write-ups, 10 popular articles, and preserved specimens of 100 traditional rice varieties. *Vayal*, a magazine for generating awareness on environmental issues was brought out. One video documentary was prepared and five radio broadcasts were also given highlighting the importance of paddy fields. Sixty two training programmes were organized on nine themes covering all aspects of rice production including organic rice cultivation and Systems of Rice Intensification (SRI) for 684 farmers.



The Centre initiated seed multiplication programmes and produced quality seeds of economically important traditional rice varieties. The seeds were distributed to the farmers interested in cultivation of the traditional varieties, on the condition that they are bound to return double the quantity of seeds which is distributed to farmers during the next season. This process helped to distribute seeds at a low cost among more number of farmers. More than 20 quintals of seeds of four varieties have been distributed to the farmers for cultivation through this process. Participatory mode of seed purification wherein scientists work to strengthen farmers' informal research and

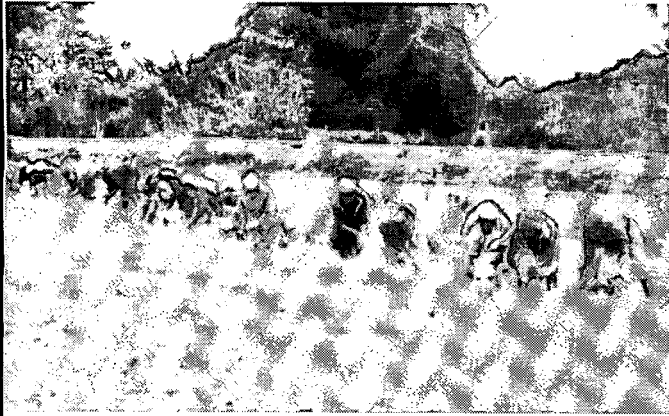


A scene from SRI trial plot

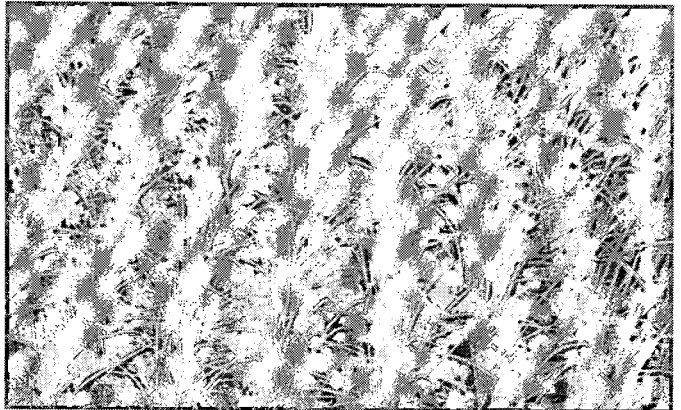
development system was adopted and it was found to be the best approach to conserve these varieties.

System of Rice Intensification (SRI) method of cultivation was introduced in the district in 2001 to boost rice yield. Traditional rice varieties like *Veliyan*, *Gandhakasala*, *Chennellu*, and *Navara* were used to experiment under this method of cultivation. This system was a success in the irrigated area, but not in the water logged areas. The results show that in ideal condition in irrigated areas, the yield goes up to two fold compared to conventional method.

The network of farmers' forums promoted by the Centre facilitated the conservation of traditional rice varieties. A survey on traditional rice varieties showed that 103 traditional rice varieties were cultivated in the past. However, only 16 varieties are remaining and most of which are also



Women engaged in transplanting of *Navara* seedlings



Experimental plot for seed purification

under threat. An exploration study helped to collect additional five varieties, which were distributed to farmers. At present 21 traditional rice varieties are being cultivated in different parts of Wayanad. A traditional short duration rice variety (*Arupathaam cheera*) with the duration of 60 days was also identified. An interesting awned landrace traditionally known as 'Kaliyan' was collected which is mixed and sown along with *Veliyan* to increase the yield of the latter.

The Centre in consultation with farmers, political leaders, Government officials, members of Panchayath Raj Institutions, NGO representatives, agricultural professionals and scientists prepared a policy document on the possibilities of promoting rice cultivation in the district. The report was widely circulated among all Panchayath Raj Institutions for taking measures to arrest the decline of area under rice cultivation.

Adding efforts to the preliminary interventions, speciality rice varieties like *Navara*, *Chennellu* (medicinal), *Gandhakasala*, *Mullanchanna* (aromatic) etc. with good market potential were selected for mass multiplication and market linkages were created for generating economic stake in conservation. Among the speciality rice category, the prime one is *Navara*, the gifted medicinal rice of Kerala. It has qualities of a drug and is used internally in many ailments and externally as an application to muscle wasting, burns and scalds. From 2005, CABIC executes a project which was conceived mainly around the medicinal property, validation and market expansion of *Navara* and other speciality rice varieties endemic to Kerala and in particular to the Wayanad region, in the Western Ghats. Since the variety is found to exist in 4 different types *viz.*, Black Awnless, Black Awned, Yellow Awnless and Yellow Awned in various locations of the state, and no key is



available to distinguish the one with more potential, the Centre has entered into various research plans and collaborations to overcome this.

Pure line panicle selection of *Navara* is being practised at the Centre as well as in community plots in order to develop pure seeds. Morphological characterization of *Navara* rice has been done following International Rice Research Institutes' descriptors. Biochemical prospecting to characterize the active principle in *Navara* rice shows a profile variation in the black type of *Navara*. Realizing the need of an agreement between chemical profiling and clinical experiments, a protocol for validating *Navara* rice through clinical trials has been prepared in collaboration with Central Research Institute (Ay.), Cheruthuruthy, where the trials will be taken up. In view of the increasing potential of value added products of speciality rices and in order to widen the market options, seven *Navara* based products were developed. A study to assess the nutritional quality of *Navadhanya* powder, one among the products is initiated in collaboration with CNS Ayurveda Chikistalayam and Research



Centre, Pattambi. Marketing tie ups for speciality rice were established with Kalady Rice Millers' Consortium Pvt Ltd (KRMC), Kalady, Kandamkulathy Ayurveda Pharmacy, Thrissur, and organic market outlet at Kalpetta. The efforts now made is expected to establish a direct market linkage between farmers and entrepreneurs especially mill owners and herbal healers, for the speciality rice varieties, validate the Ayurvedic property of medicinal rice *Navara* and delineate the special chemical components of this variety and pave the way for a projected area of cultivation of 200 hectares. The results of the biochemical as well as nutrient analyses of *Navara* are expected to be used as an effective back up for introducing the value added products in the market.



1.6. Conservation of Yam Diversity

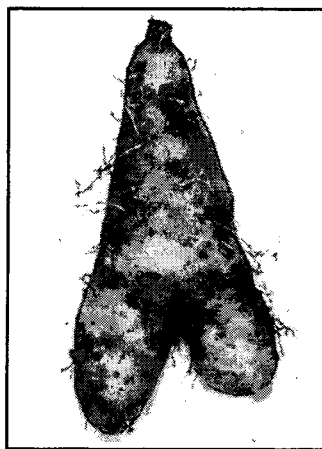
The importance of yam diversity in Malabar eco-region is well recognized by the native inhabitants to meet their food and other cultural and spiritual needs. However, many cultivars of the edible *Dioscorea* have now been discarded due to cultural erosion and advent of potatoes. In order to address this situation, CABIC intervened with an objective of establishing Community Seed Banks integrated with *in situ* conservation of cultivated yam varieties. Most yam varieties and species do

not produce seeds and therefore cannot be conserved in conventional gene banks. The morphological characters of this group are highly variable which brings in difficulty in characterizing the taxa.

Cultivation of all traditional varieties of *Dioscorea* from Malabar region was envisaged by forming farmers' groups. Seed banks at community level were initiated to ensure convenient and sustainable supply of seed materials of the most promising yam varieties. A wider awareness on the value and importance of yam as a nutrient rich tuber which is capable of increasing the diversity of food crops was created. With inputs from varied technical institutes, CABIC carried out a nutritional analysis on yams, trained people in value addition and processing of yams using local technologies and explored the market linkages.



Nanakizhangu



Inchikachil

Through germplasm survey in eight districts- Kasargod, Kannur, Malappuram, Kozhikode, Wayanad, Ernakulam, Kottayam and Alappuzha 23 cultivars were collected and community conservation plots were set up in Malabar eco-region. Yam Conservation Groups were formed after traditional farmers were identified with help from Agricultural Department and local micro level institutions and decentralized germplasm plots have been established. Taro,

turmeric, ginger, arrow- root, elephant foot yam were distributed to most deprived communities through SHGs, Farmers' groups and NGOs. To create awareness and generate farmers' interest in tuber crops, a central demonstration plot at CABc with traditional and improved varieties has been established.

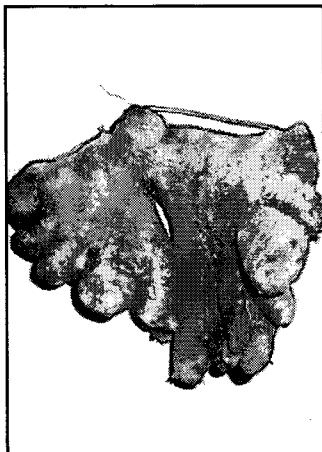
As this programme had many different components, for technical inputs it was necessary to collaborate with a number of institutions such as the Central

Tuber crops Research Institute (CTCRI), Thiruvananthapuram and the Central Food Technological Research Institute (CFTRI), Mysore. The CTCRI supported by conducting nutritional analysis and providing new varieties while CFTRI conducted a short course on value addition of fruits and vegetables which was a stepping-stone for further research and exploration of value addition of yams. Nutritional analysis of selected varieties was conducted with the help of Regional Research Laboratory (RRL) Thiruvananthapuram, and the most promising varieties were distributed to tribal people.

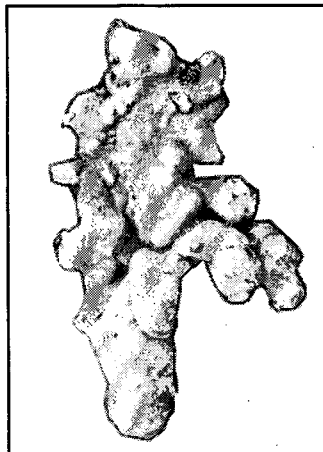
Realizing the importance of value addition, new interesting value added products like French fries, chicken-yam cutlet, tikki and payasam were tried out successfully. Yam chips preparation was tried out with the help of Technology Informatics Design Endeavour (TIDE), Bangalore and Central Plantation Crops Research Institute (CPCRI), Kasargod. There is good potential for marketing the chips if the taste and discolouration is rectified. The Yam Dextrose Agar medium was formulated and was illustrated as a successful nutrient medium for mushroom spawn production.

Field studies show that farmers are indifferent to cultivate *Dioscorea* due to poor profitability. Wild boars and porcupines driven by lack of food in the forest ravage the field and it was a major impediment as most of the tribal colonies encouraged to cultivate tubers were in the forest premises. Cultural erosion also has a significant role in relegating the *Dioscorea* cultivars from the homesteads. Inadequacy in study and promotional efforts resulted in the poor awareness among public on this crop.

Unlike Cassava, no institutions are engaged in serious research on *Dioscorea* especially its potential for value addition. Lack of awareness on the importance of yam and unavailability of adequate quantities of planting materials are serious impediments in popularizing the cultivation. Trainings, screening of films, orientation programmes for collection and identification, exhibition in trade fairs etc., were employed to generate interest amongst the people.



Kaduvakaiyyan



Chorakachil



1.7. Model Bio-village

Model village development programme was initiated in 2003 at Panthippoyil village in Padinjarethara Panchayath with the purpose of demonstrating viable development model built on the principles of integrated natural resource management and sustainable use of bio-resources that ultimately lead to poverty reduction. The objective was to establish a model biovillage by integrating ecological and economic security.

The technical programmes included awareness generation, formation of people's institution, training and capacity building, linkage and networking for organic cultivation and crop diversification, implementation of integrated soil and water conservation activities, promotion of home garden and *in situ* conservation of native crop diversity, promotion of income generating activities and establishment of Village Knowledge Centre.

The basic objective of Model Bio-Village is to develop a participatory model of rural development based on biodiversity conservation and natural resource management that can be easily replicable in any agrarian village economy having potential natural resource base. Basic thrusts are to conserve soil by enhancing soil fertility by integrating both traditional and modern practices of soil conservation, conserving water by protecting potential water bodies, adopting measures to conserve water in agriculture land itself, and to conserve and enhance the native crop diversity while adopting ecologically sound agricultural practices.

In order to strengthen the NRM based developmental activities and to ensure that the benefits of the intervention reach the most needed, Peoples' Institutions like SHG for women (25), farmers'



groups (5), nature conservation corps (1) etc. were formed. Ten vermicomposting units and five sericulture units were established and organic pepper cultivation was initiated in 500 hectares. As part of promoting crop diversity cardamom seedlings were supplied to farmers and vegetable seed exchange programme was initiated. Four head ponds located either in strategic points, or on common property were renovated. As a result of awareness generation, individuals supported by Panchayath Raj Institutions, started to renovate the ponds located in their property. One check dam was constructed using local technology. Later on with the support of CWRDM, the Centre constructed first ever Gabion Check dam in the district. Five loose-boulder check dams were built to reduce run off and to facilitate percolation of water. A water tank with a capacity of 18,000 litres was constructed in support of CWRDM in order to meet the drinking water shortage. The farmers were trained in mulching, contour bunding and trench making for conserving rainwater in the farm itself.

Apart from all these efforts, cover crops like Daincha, Sunhemp and *Sesbania rostrata* and fodder grass were distributed to farmers for increasing the availability of quality biomass. Training was imparted to empower farmers to produce organic inputs like vermicompost, leafy manures, bio-pesticides etc.

Traditional varieties of pepper such as *Valankotta*, *Uthiran*, *Karinkotta*, *Kalluvalli*, *Cheruvalli*, *Arkalamundi*, *Jeerakamundi* etc. were multiplied and distributed to the

villagers with the help of local nurseries promoted by the Centre. Conservation of the traditional varieties of *Dioscorea* like *Inchikkachil*, *Irachikkachil*, *Chorakkachil*, *Thoonankachil*, *Neendikkachil* and *Kuzhikkavathu* was also promoted. Two *in situ* conservation plots of ten native plantains and a medicinal garden with selected species of extensive use in health care practices were established in the village. The Centre facilitated an apiary in the Bappanamala tribal hamlet involving 20 tribal families. In the year 2005, one family on an average earned Rs. 1000/-per season. Besides, the Centre helped 'Ashwathy, a SHG at Panthippoyil for starting goat rearing units and poultry.

Out of the 25 SHGs formed, 14 are linked with PRIs for starting various programmes for income generation. They have started vegetable, rice, tuber and yam cultivation. The harvest was shared amongst them. Through the sale of surplus produce, each woman earned an average of 200 to 500 rupees. A Village Knowledge Centre was also established in Panthippoyil village to cater the demand driven knowledge of the local community to enhance their livelihood.



Renovating Headpond



Training on Vermicomposting

1.8. Policy Advocacy



Glimpses from policy makers workshop

Local level policy intervention was one of the thrust areas for facilitating collective action on agrobiodiversity conservation. Major objectives of this programme were to influence local policy makers in implementing effective policies that lead to sustainable use of biodiversity and to strengthen local initiatives by forming People's Institutions.

Four policy level discussions were organized mainly to address the field level implementation of 'Protection of Plant Varieties and Farmers' Rights Act' and 'Indian Biological Diversity Act'. Rights of the tribal communities who conserve the plant genetic resources were deliberated in the meetings. Attempts were also made to sketch out the conservation strategies of medicinal and aromatic rices of Kerala. As an outcome the Community Agrobiodiversity Centre facilitated the formation of different people's institutions to strengthen the community efforts in conservation and development.

District Tribal Leaders' Forum was formed to take measures to safeguard the rights of tribal communities and empower them to access reward and recognition for their contribution in conserving valuable genetic resources. The Centre, on behalf

of the tribal farming communities applied for the 'National Gene Saviour Award' for their contribution in conserving rice landraces of Kerala.

Wayanad Agriculture and Rural Development Agency (WARDA) was established to address the issues related to agriculture and rural development and to pressurize the government for implementing eco-friendly agricultural and rural development programmes exclusively for the district. It is a coalition comprising NGOs, agricultural professionals, scientists, farmers, political and social leaders, women, tribes and representatives from financial sector. Under the leadership of WARDA, a team of experts discussed and chronicled the problems and prospects of agriculture in Wayanad district and developed a policy draft on the structural reforms required for enhancing productivity of major crops, value addition and infrastructure development. WARDA joined in hand with CABc to explore the potential of Wayanad district to form an exclusive export zone for major agricultural products. This effort helped to bring out a detailed study report on the possibilities of Wayanad district to declare it as an Export Zone for medicinal and aromatic plants, coffee, spices and horticultural crops. On the basis of this report, State Government declared Wayanad as an export zone for medicinal plants.

Livelihood Enhancement Programme



A scene from farmers' exposure visit- Mr T.V. Thomas Karshaka Sree award winner is explaining his cultivation practices

Soon after the establishment of CABc, a programme was initiated to enhance the livelihood options of marginalized communities especially the Scheduled Caste/ Scheduled Tribe. Since Wayanad is being supported by an agrarian economy, revitalization of the agricultural sector was targeted as the effective tool for its successful implementation. Due to the escalating propensity towards intensive farming with profit motive, it was the need of the hour

to advocate for the promotion of organic farming. Therefore, with the objective of indoctrinating the principles and importance of organic farming, the Centre introduced programmes on technological interventions emphasizing stability and sustainability along with productivity of small-farm production system.

As the first initiative, effective measures were taken up for the capacity building of individual farmers and their groups through knowledge dissemination. Various training programmes were conducted to impart organic farming know-how and thereby to popularize sustainable agriculture. The trainees were given exposure to various composting techniques, new cultivation practices, collection and application of bio manure and screening of bio pesticidal plants and preparation of bio pesticides. Such trainings provided a platform for the participants to share their experience and to interact with the resource team. The income generating activities like *Azolla* production, spawn production and cultivation of mushrooms, production of vermicompost etc. are also being promoted among women and marginalized farming communities.

The farmers were also trained to prepare and use '*Panchagavya*'- a traditional plant tonic for organic farming, *Trichoderma* – a bio-control agent and vermicompost along with a demonstration of trial marketing. Trainings were held to generate awareness on the importance of conservation and sustainable use of soil and water, microbial inoculants and recycling of agro-wastes. As part of imparting knowledge on soil management practices, orientation classes were conducted in the application of soil analysis kit for testing soil pH and NPK value. In addition to that, use and

efficacy of bio control traps, advantages of bio gas plants and its importance, organic pepper production, relevance of Effective Micro organisms (EM) technology, importance and scope of agricultural marketing, role of medicinal plants in income generation and use in primary healthcare practices, marketing and efficiency of organic manures, plant protection, apiary and animal husbandry were also addressed by such training programmes. A booklet on organic farming and brochures on

1. Vermi tank
2. Vermicompost ready for marketing
3. Separating Vermi from compost



vermicompost and *Trichoderma* were brought out in Malayalam as further measures for knowledge dissemination.

As a second step, targeting a diminution to the drudgery of tribal/rural farmers and women with enhanced efficiency and elevated income generation, CABc facilitated the implementation of appropriate agro-techniques for on-farm value addition to agricultural products, by-products and wastes for greater economic returns. In view of this, harnessing the rural technologies for vermicomposting and *Trichoderma* production, village level micro enterprises activities were launched and were supported and strengthened further by the research activities of the Centre.

Isolating suitable strains of both *T. barzianum* and *T. viride* from different parts of Wayanad, a *Trichoderma* stock culture centre and a field unit were established at CABc. From the experiments carried

out in the Centre, *Trichoderma* was found to be very effective as a bio-control agent against the pathogenicity of *Pythium* and *Fusarium* on cardamom as well as ginger, *Phytophthora* on pepper, *Collectotrichum* on ginger and *Rhizoctonia* on both pepper and cardamom. Based on the trials conducted for the successful preparation of inoculum, coir pith was identified as the most efficient and economical carrier material for the mass multiplication of *Trichoderma*.

Another initiative of the Centre was based on the cultivation enhancement and product development of mushroom. Unemployed youth were trained in spawn production, mushroom cultivation and value added products. Mushroom production units in villages were established and a 'Mushroom Society of Wayanad' (MSW) was formed with eighty members. The Centre also embarked campaigns to create awareness on nutritive, medicinal and diversity aspects of mushroom and a booklet on mushroom cultivation was brought out. The Centre has started a well equipped spawn production unit to supply good quality high yielding spawns of *Pleurotus*.

To ensure the participation of women in agrobio diversity conservation movement, SHGs are formed in various villages with the objectives of training them in various on-farm and off-farm income generating activities, linking them to various Institutions for accessing credit and knowledge and promoting livelihood of women based on biodiversity. Out of the total 99 groups formed 72 SHGs are functional at present with 951 members. There are 215 women members representing the most deprived communities belonging to ST/SC categories. Table 1 shows the year wise mobilization of savings and internal loan circulated in groups promoted by the Community Agrobiodiversity Centre. For ensuring sustainable income to the farmers, their organically grown vegetables, fruits, spices and value added food items are being channellized through a market outlet opened at the district headquarters which also serves as an information dissemination window. Bio inputs like *Trichoderma*, *Trichogramma*, and vermicompost and handicrafts made of local bio resources are also being promoted through the outlet. Within a short span of time this attempt has succeeded in evoking a wide interest among the public for organic farming and organic produce.

Moreover, with the view that demonstration of efficacy and economics of good agricultural practices can pave the way for renewed interest in sustainable agriculture, CABc has set apart 14ha of land for demonstrating various farm activities. Two hectare is earmarked for buildings and allied infrastructure and one hectare is utilized to lay a demonstration plot on farming systems. The Centre has practical models of some of the methods which can be easily replicated by farmers. CABc farm serves as a model for integrated farming based on the concept of Low External Input Sustainable Agriculture (LEISA). The LEISA farm has been strengthened by a



A scene from spawn production unit

dairy unit and a cow dung-based biogas plant. The slurry generated from the plant is fed to vermicomposting unit or directly to plants as manure and the biogas is supplied to the farmhouse. This model demonstrates successful energy management and biomass recycling at farm level and has encouraged a number of farmers to initiate such units. The efficacy of various water conservation measures is also displayed. A rainwater-harvesting unit with the capacity of 10,000 litre was constructed and trenches were dug in the farm-land. On the slopes *Vetiver* grass was

Table 1.

Year wise information on SHG formation and savings mobilized

Year	SHG Formed	Existing group	Savings in Rupee.	Internal loan circulated
1999	11 (151)	08 (104)	24,960	-
2000	22 (291)	14 (176)	1,06,240	5,43,000
2001	21 (283)	15 (192)	1,88,160	17,21,000
2002	09 (131)	07 (107)	2,56,520	26,93,500
2003	20 (263)	14 (183)	3,21,840	39,17,400
2004	12 (171)	10 (138)	4,04,400	60,61,000
2005	04 (51)	04 (51)	4,44,240	43,12,500
Total	99 (1341)	72 (951)	17,46,360	1,92,48,400

(figures in the bracket show the number of members in the groups)

planted in contour lines to prevent run-off of water and soil erosion. A few low cost, eco-friendly check dams were also constructed in the small streams and water channels in the LEISA

Box 2.

Details of training programmes imparted to women SHGs

- * Awareness Generation
- * Biodiversity conservation
- * Health and hygiene
- * Food habits
- * Saving habits
- * Training and capacity building
- * Leadership and Managerial skill development
- * Various income generating activities and skill development
- * Sustainable utilization of bio-resources
- * Sustainable farming practices

block. A garden has also been established at CA&C for the conservation and popularization of plants which can be used to prepare biopesticides or bio-manure.

Box 3 Major training and capacity building programs extended to SHGs .

- * Herbal medicine preparation
- * Bamboo based handicraft production
- * Mushroom cultivation
- * Food processing and value addition
- * Book binding
- * Apiculture
- * Nursery techniques
- * Dairy farming

3
Information Dissemination
Programme

3.1. Education of Tribal & Rural Youth in Bioresources Conservation

Since 2002 MSSRF has been engaged in an educational programme, named *Every Child A Scientist* (ECAS), for tribal and rural children on the thematic area of Biodiversity Conservation. The programme provides the children opportunities for interactive learning in areas relating to agro biodiversity and human well-being.

The objective of the programme is to familiarize the tribal children as well as the youth with local biodiversity, recent trends in genomics and information and communication technologies. With that intention the programme is running with a tested and well developed curriculum aided by simple databases and booklets of resource materials. For promoting knowledge on biodiversity heritage and creating awareness among tribal and rural youth, emphasis is given to address the diversity of ecosystems, habitats, and landscapes and their importance in the day-to-day human life.

As part of enabling the exploration and documentation of bio-resources and their value to the community, children are given exposure to some basic skills in botanical illustrations, plant collection as well as identification, herbarium preparation techniques and traditional knowledge documentation. Mushrooms being an inevitable part of the food and medicine of many tribes, the collection and identification of wild mushrooms and the technique of spore-print preparation are also included in the curriculum. In order to mould and enhance the creativity of children, training is provided in craft work using waste materials and clay. The knowledge Centre at CABIC, equipped with twenty computers and their accessories, facilitates the basic learning of computer applications and there by trying to empower the underprivileged children in Information and Communication Technology (ICT).

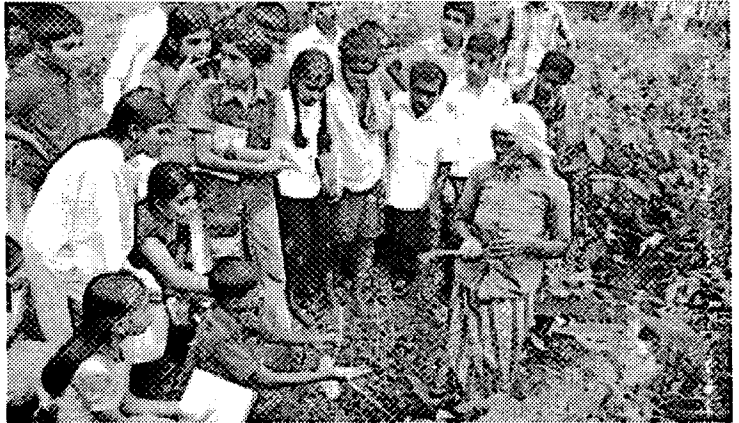
Biodiversity Education through ICT





Students of ECAS programme engaged in herbarium preparation

Conducting nature camps, Yoga classes and leadership training courses, facilitating projects and experiments on biodiversity-related topics, establishment of butterfly garden and aquaria are also included in the technical activities of the programme. The effective networking established with the local NGOs, Tribal Welfare Department, Sarva Siksha Abhiyan (SSA), Zoological Survey of India and Salim Ali Centre for Ornithology is envisaged to strengthen the awareness programmes towards generating a scientific temper and fostering a “Youth for Bio-resources Conservation and Development Movement”.



Learning from the custodian of traditional knowledge

With the increasing demand from various parts of the district, the programme has been extended to ten SSA Schools and three villages in the tribal hamlets at Thachambath, Vzhakandy and Kuttimoola. A key achievement of the programme is that it could motivate all the dropout children to rejoin school and now some of them have got specialized in subjects like butterflies, fruit trees, computers etc. Another noteworthy impact is that an ECAS student could identify two new host plants which was published in a scientific journal.

3.2. Village Knowledge Centres and Village Resource Centre



SHG meeting at VKC

Recognizing the fact that Information and Communication Technology (ICT) can be a positive tool in poverty reduction and knowledge empowerment is essential one of the important pre-conditions for progress, the Centre has initiated Village Resource Centre (VRC) and Village Knowledge Centre (VKC) Programmes in partnership with local community, strategic partners and Panchayath Raj Institutions. The activities include training and capacity building, content creation and linkage and networking. Through VKC, the Centre addresses the demand driven information of the community that are specific to the local area in relation to improvements in life, education and employment.

One Village Knowledge Centre has been established in Thachampath tribal hamlet. The rent free public building, furniture etc. were provided by Meenangadi Grama Panchayath. The inhabitants of the Thachampath hamlets belong to Paniya, Kattunaikka and Kuruma tribes. Need assessment survey has been conducted; in response to it the Centre is extending training and capacity building programme for tribes to improve health and livelihoods. Started to create content in multiple formats including video, audio, leaflets and booklets. Two more VKCs are to be established this year.

Village Resource Centre (VRC) based in the Community Agrobiodiversity Centre, Puthoorvayal, Kalpetta, just commenced its activities.



Interaction with tribal children at VKC

Conclusion

The Community Agrobiodiversity Centre (CAbC) has completed 10 years of its service in the area of agrobiodiversity conservation. During the tenure, a steady progress has been achieved by broadening the activities and adding further infrastructure. Started as a three-man venture in a rented house, the Centre has now grown up with thirty two staff members and 41 acres of land with the entire necessary infrastructure spread in half a hectare area.

Being a sub-centre of MSSRF, imbued with the 'pro-poor, pro-woman and pro-nature' motto, the Centre has designed its activities confining to three major programme areas: Biodiversity Conservation, Livelihood Enhancement and Knowledge Dissemination. Integrating these three programme areas together, but passing through three distinct but consecutive phases of growth, the Centre has succeeded in creating an imprint in the vast arena of agrobiodiversity conservation.

Focusing mainly on education and awareness generation on agrobiodiversity conservation, the Centre had started its efforts in the year 1997 by launching the Agrobiodiversity Conservation Corps programme, intended to empower the rural youths to serve as the messengers of conservation in villages. The programme could generate public interest in conservation and could enhance the capacity of local people in bio-resource documentation through education and training. The concerted action in biodiversity conservation started with mobilizing people to prepare biodiversity registers and was much helpful in sensitizing the local community and the local self government to get involved in conservation efforts. These had further aided the Centre to identify key areas for its intervention to strengthen the community conservation movement towards ensuring the livelihood security of the marginal communities. Eventually the Centre decided to step into research and documentation of biodiversity for fortifying its various activities in the three programme areas.

Initially, due to the limited resources though CAbC had to restrict its activities only to Wayanad district, through the last ten years the Centre has made a big leap in expanding its sphere of action. Begun with PBR activities, conservation of medicinal plants and wild food plants in a few villages of Wayanad, it has widened its domain to Malabar eco-region through its conservation efforts in rice varieties and yam diversity and

finally to the entire Kerala through the programme for the conservation of Rare, Endemic and/or Threatened species.

Currently, the Centre is going through a very significant phase of its intervention by commencing activities such as establishment of women bio-resource complex that support rural women to produce and market branded herbal nutraceuticals, establishment of Village Resource Centre and Village Knowledge Centres to cater the demand driven knowledge of the rural community that are specific to the local area in relation to improvements in health, education and livelihood, conservation of critically endangered 80 species of flowering plants, promotion of organic farming, and empowering and facilitating rural communities in accessing reward and recognition for their contribution in biodiversity conservation. The Centre is also envisaged to function as a resource centre to protect and claim the intellectual property rights of the people.

This review on the activities of CABc for the past one decade thus depicts a clear picture of the gradual shift from an education oriented approach to an action oriented approach by means of addressing different strata of people and advocating for reinforcing and broadening the span of organic farming. Envisaging a coalition of research, training, communication, extension and networking programmes, in the fields of agriculture and rural development, the Centre is looking forward to link ecological security to livelihood security in a mutually reinforcing manner.

Annexure I

The list of 80 RET species selected for the project

Scientific name	Family	Status	Habit
1. <i>Aglaia malabarica</i> Sasidh.	Meliaceae	CR	T
2. <i>Anaphyllum wightii</i> Schott.	Araceae		H
3. <i>Arenga wightii</i> Griff.*	Arecaceae		P
4. <i>Aspidopteris canarensis</i> Dalz.	Malpighiaceae	VU	WC
5. <i>Atuna travancorica</i> (Bedd.) Kosterm.	Chrysobalanaceae	E	T
6. <i>Bauhinia phoenicea</i> Wight & Arn.*	Caesalpiniaceae		WC
7. <i>Beaumontia jerdoniana</i> Wight	Apocynaceae		WC
8. <i>Blepharistemma serratum</i> (Dennst.) Suresh	Rhizophoraceae		T
9. <i>Caesalpinia spicata</i> Dalz.	Caesalpiniaceae		WC
10. <i>Calamus hookerianus</i> Becc.	Arecaceae		CP
11. <i>Calamus travancoricus</i> Bedd.ex Becc.&Hook.f.	Arecaceae		CP
12. <i>Calamus vattayila</i> Renuka	Arecaceae		CP
13. <i>Calophyllum calaba</i> L.	Clusiaceae		T
14. <i>Capparis rheedii</i> DC	Capparaceae		WC
15. <i>Casearia wynaadensis</i> Bedd.	Celastraceae	E	T
16. <i>Cinnamomum malabratum</i> (Burm.f.) Bl.	Lauraceae		T
17. <i>Cinnamomum riparium</i> Gamble	Lauraceae	VU	T
18. <i>Colubrina travancorica</i> Bedd.	Rhamnaceae		SS
19. <i>Curcuma vamana</i> Sabu & Mangaly*	Zingiberaceae		H
20. <i>Cynometra beddomei</i> Prain*	Caesalpiniaceae	E	T
21. <i>Cynometra travancorica</i> Beddome*	Caesalpiniaceae	E	T
22. <i>Decalepis hamiltonii</i> Wight & Arn.	Periplocaceae		H
23. <i>Derris brevipes</i> (Benth.) Baker*	Fabaceae		WC
24. <i>Dysoxylum beddomei</i> Hiern	Meliaceae		T
25. <i>Dysoxylum malabaricum</i> Bedd.ex Hook.f.	Meliaceae	E	T
26. <i>Eugenia argentea</i> Bedd.*	Myrtaceae	CR	T
27. <i>Goniothalamus wynaadensis</i> Bedd.*	Annonaceae		T
28. <i>Gynema kbandalense</i> Sant.	Asclepiadaceae		SC
29. <i>Hedyotis wynaadensis</i> (Gamble) Rao & Hemadri	Rubiaceae		Sh
30. <i>Hopea ponga</i> (Dennst.) Mabb.	Dipterocarpaceae	E	T
31. <i>Humboldtia brunonis</i> Wall.	Caesalpiniaceae		Sh
32. <i>Hydnocarpus macrocarpa</i> (Bedd.) Warb.	Flacourtiaceae		T
33. <i>Ixora sivarajiana</i> Pradeep	Rubiaceae		T
34. <i>Jerdonia indica</i> Wight*	Gesneriaceae		H
35. <i>Kingiodendron pinnatum</i> (Roxb. ex DC.) Harms.*	Caesalpiniaceae	E	T
36. <i>Knema attenuata</i> (Hook.f.&Thoms) Warb.*	Myristicaceae		T
37. <i>Kunstleria keralensis</i> Mohanan & Nair	Fabaceae		WC
38. <i>Litsea coriacea</i> (Heyene ex Meisner) Hook.f.*	Lauraceae		T
39. <i>Loesneriella bourdillonii</i> (Gamble) Ramam	Hippocrateaceae		WC
40. <i>Madhuca bourdillonii</i> (Gamble) H. J. Lam	Sapotaceae	E	T

41. <i>Medinilla malabarica</i> Bedd.	Melastomataceae		Sh
42. <i>Memecylon randerianum</i> SM & MR Almeida	Melastomataceae		T
43. <i>Meteoromyrtus wynaadensis</i> (Bedd.) Gamble.	Myrtaceae	CR	Sh
44. <i>Myristica beddomei</i> King*	Myristicaceae		T
45. <i>Myristica fatua</i> Houtt.	Myristicaceae	E	T
46. <i>Myristica malabarica</i> Lam.*	Myristicaceae	VU	T
47. <i>Ocblandra beddomei</i> Gamble	Poaceae		Re
48. <i>Ochna gamblei</i> King ex Brandis	Ochnaceae		Sh
49. <i>Osbeckia wynaadensis</i> Clarke	Melastomataceae		Sh
50. <i>Oxytenanthera bourdillonii</i> Gamble	Poaceae	R	Re
51. <i>Oxytenanthera ritchiei</i> (Munro) Blatter & McCann*	Poaceae		Re
52. <i>Palaquium ellipticum</i> Engl.*	Sapotaceae		T
53. <i>Phaeanthus malabaricus</i> Bedd	Annonaceae	LRNT	T
54. <i>Phyllanthus indofischeri</i> Bennet.	Euphorbiaceae		T
55. <i>Pinanga dicksonii</i> (Roxb.) Blume.f.	Arecaceae		T
56. <i>Poeciloneuron indicum</i> Bedd.*	Bonnetiaceae		T
57. <i>Pterospermum reticulatum</i> Wight & Arn.	Sterculiaceae	VU	T
58. <i>Quisqualis malabarica</i> Bedd.	Combretaceae		WC
59. <i>Sageraea grandiflora</i> Dunn.	Annonaceae	E	T
60. <i>Salacia beddomei</i> Gamble	Hippocrateaceae		WC
61. <i>Salacia macrosperma</i> Wight	Hippocrateaceae		WC
62. <i>Semecarpus auriculata</i> Bedd.	Anacardiaceae	LRNT	T
63. <i>Solenocarpus indicus</i> Wight & Arn.	Anacardiaceae	R	T
64. <i>Spatholobus purpureus</i> Benth. ex. Baker*	Fabaceae		WC
65. <i>Strophanthus wightianus</i> Wall. ex Wight	Apocynaceae		SC
66. <i>Symplocos wynadense</i> (O. Ktze.) Nooteb.	Symplocaceae	E	Sh
67. <i>Syzygium chavaran</i> (Bourd.) Gamble	Myrtaceae	E	T
68. <i>Syzygium densiflorum</i> Wall. ex Wight & Arn.	Myrtaceae	VU	T
69. <i>Syzygium heyneanum</i> (Duthie) Wall. Ex Gamble	Myrtaceae		T
70. <i>Syzygium laetum</i> (Buch.-Ham.) Gandhi	Myrtaceae		T
71. <i>Syzygium malabaricum</i> (Bedd.) Gamble	Myrtaceae		T
72. <i>Syzygium mundagam</i> (Bourd.) Chithra*	Myrtaceae		T
73. <i>Syzygium munronii</i> (Wight) Chandrab.	Myrtaceae		T
74. <i>Syzygium occidentale</i> (Bourd.) Gandhi	Myrtaceae	VU	T
75. <i>Syzygium stocksii</i> (Duthie) Gamble	Myrtaceae	E	T
76. <i>Syzygium tamilnadensis</i> Rathkr. & Chithra	Myrtaceae		T
77. <i>Syzygium travancoricum</i> Gamble	Myrtaceae		T
78. <i>Utleria salicifolia</i> Bedd. ex Hook. f.	Asclepiadaceae	E	Sh
79. <i>Vateria indica</i> L.*	Dipterocarpaceae		T
80. <i>Vateria macrocarpa</i> Gupta	Dipterocarpaceae	CR	T

E-Endangered; CR-Critically endangered; VU-Vulnerable; R-Rare; LRNT-Lower Risk Near Threatened; H-Herb; Sh-Shrub; SC-Shrubby Climber; T-Tree; WC-Woody Climber; CP-Climbing palm; Re-Reed; P-Palm ; SS-Scandent Shrub.

*Species whose natural population has been located from Wayanad, Kannur and Kozhikode districts of Kerala

Annexure II

Publications

List of Extension Publications from CABc since 1997

- ♦ N. Anil Kumar & C. Anil Kumar 1997. *Jaiva Vaidhya samrakshanam: Pariseelakarkkulla Kaipusthakam, Bhagam-1*
- ♦ N. Anil Kumar 1998. *Jaiva Vaidhya samrakshanam: Pariseelakarkkulla Kaipusthakam, Bhagam-2*
- ♦ N. Anil Kumar & Salim. P. M, 1999. *Wayanattile Oushadha Sasyangal*
- ♦ N. Anil Kumar 2000. *Medicinal Plants Known from Wayanad- A Checklist*
- ♦ N. Anil Kumar & Elsy Mathew 2000. *Wayanattile Karshika Vilakal*
- ♦ N. Anil Kumar et. al. 2000. *Koon: Aaharathinum Arogya rakshayekum*
- ♦ N. Anil Kumar 2000. *Janakeeya Jaiva Vaidhya Register: Enthu? Enthinu? (Booklet)*
- ♦ N. Anil Kumar et. al., 2001. *Oushadbagunamulla Nehvithanangal*
- ♦ N. Anil Kumar & T. Raveendran 2001. *Wayanattile Paramparya Nelkrischi: ru Avalokanam.*
- ♦ N. Anil Kumar & V. Balakrishnan 2001. *Greenhealth Pariseelana Padbathi*
- ♦ N. Anil Kumar et. al., 2002. *Chithrasalabhngal*—Hand Book (1)
- ♦ N. Anil Kumar et. al., 2002. *Oushadhasasyangal*—Hand Book (2)
- ♦ N. Anil Kumar et. al., 2002. *Oushadha sayasingalum prathamikarogyu Ulpannangalum.*
- ♦ Anil Kumar, N., Balakrishnan, V., and Sasankan, I.V. 2002. *Utilization of Medicinal Plants for the economic and health security of farm families*; Proceedings of MSSRF- Ayurniketh Consultation on Sustainable Use of Medicinal Plants.
- ♦ Madhusudhanan, K., Anil Kumar, N., Balakrishnan, V., and Elsy Mathew. 2003. *Koon Krishi- Vithu Muthal Vipani Vare.*
- ♦ N. Anil Kumar & K. Madhusudhanan 2003. XIII Swadeshi Science Congress- *Crop Diversity & Tribal Empowerment (Proceedings)*
- ♦ N. Anil Kumar & K. Madhusudhanan 2003. *Bhakshya Surakshayekku Susthira Krishi (A farm radio talk compiled by a group of authors)*
- ♦ Ratheesh Narayana, M.K., Swapna, M.P., & Anil Kumar, N. 2003. Gender dimensions of wild food management in Wayanad District. MSSRF/RR/04/12.
- ♦ Anil Kumar, N., Ratheesh Narayanan, M.K., & Chackochan. 2003. Medicinal plants for primary health care (Malayanam).
- ♦ Sajeev, V.P., et. al., 2004. ECAS- Hand book (3) - *Punnya vrikshangal (Booklet)*
- ♦ Salim, P.M., and Anil Kumar, N. 2005. *Oushadhakoonukal (Booklet)*
- ♦ Salim, P.M., and Anil Kumar, N. 2005. *Veetuvallappile Nadan Vazhainagal. (Booklet)*
- ♦ Salim, P.M., Anil Kumar, N., and Asiya, P. 2005. *Bio Pesticide Plants. (Booklet)*
- ♦ Salim, P.M., and Anil Kumar, N. 2005. *Bio Manure Plants. (Booklet)*
- ♦ Joseph John and Nampoothiri, K. U. K. 2007. *Organic Farming: A Guide line. (Booklet)*
- ♦ Anil Kumar, N., Balaravi, S and Raveendran, T. 2006. *Karshakarude Avakashangal (Sasya Janithaka Samrakshana Niyamavum Karshakarude Avakashangal Act 2001-ne Adisthanamaki Thayarakijyathu*
- ♦ N. Anil Kumar, M. K. Ratheesh Narayanan, K. Satheesh & M.P. Swapna 2006. *Wayanattil kanappedunna bakshyayogyamaya koonugal. Handbook 11.*

- ♦ M. K. Ratheesh Narayanan, M.P. Swapna, K. Satheesh & N. Anil Kumar. 2006. *Wayanattile baksbyayogyamaya vannya ila varga sasyangal*. Handbook 12.

Popular Articles

- ♦ Anil Kumar, N and Balakrishnan, V. October 1999, *Prakrithiyile Malaghamar*, on Medicinal Mushrooms, Mathrubhoomi Arogyamasika (Malayalam), pp.43 and 60.
- ♦ Anil Kumar, N and Balakrishnan, V. 2001. Biotechnology for income generation, "Kudumbashree" (Malayalam) A Kerala Govt. Publication.
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- ♦ Balakrishnan, V. Ratheesh Narayanan M.K., & Chackochan, P.J. 2002. *Medicinal plant cultivation for income generation*, Kudumbasree, (Malayam), A Kerala Govt. Publication.
- ♦ Madhusoodhanan, K. 2002. *Gunamenmayodae Chippikoon. Karshakasree*, July 2002. (Malayalam)
- ♦ Anil Kumar, N. 2002. *Jaiva Vaividya Niyamam- Sadhyadbakal Parimithikal*. Janayugam, September (Malayalam).
- ♦ Balakrishnan, V. 2002. *Kaivittupokunnu Chovvyanum*. Karshakasree, July 2002. (Malayalam).
- ♦ Balarishnan, V., Ratheesh Narayanan, M.K., & Anil Kumar, N., 2003 *Kattarivukal Baksbya Surakshyaku* (Malayalam). Kattarivukal.
- ♦ Girigan, G., N. Anil Kumar & K. Madhusoodhanan. 2003. *Sasyainagaludae Samrakshanavum Karshakarudae Avakasangalum. Karshakan Dasavathsarapathippu*, April (Malayalam).
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- ♦ Anil Kumar, N., G. Girigan & V. Balakrishnan. 2003. Medicinal Rice of Kerala. Amruth, Jan-Feb (English).
- ♦ Girigan, G., N. Anil Kumar & V. Arivudai Nambi. 2004. *Vayals: a Traditional Classification of Agricultural landscapes*. LEISA India, December 2004.
- ♦ Balakrishnan, V., M. K. Ratheesh Narayanan & N. Anil Kumar. 2004. *Kattarivukkal Baksbya Surakshyaku*. Kattarivukkal, 2004. (Malayalam).
- ♦ Anil Kumar N., & M.K. Ratheesh Narayanan. 2005. Nutritious weeds. Down to Earth, September 15, 2005.
- ♦ 'Vayalum Vithum' a monthly publication in Malayalam

Digital Publications (CDs)

- ♦ Gender Dimensions of wild food management in Wayanad, Kerala, M. K. Ratheesh Narayanan, M. P. Swapna & N. Anil Kumar 2004.
- ♦ Vayal Nadinte Vayalukal, N. Anil Kumar, G. Girigan, Abdul Salam & T. Raveendran 2004.
- ♦ On-farm conservation of *Dioscorea* in Malabar eco- region, N. Anil Kumar, M. K. Ratheeshnarayanan, M. P. Muhammed Rafeek, P.M. Nanda Kumar, P. T. Shajahan & M. P. Swapna
- ♦ Pradhamikarogya rakshakku haritharogya paddhady, N. Anil Kumar & V. Balakrishnan
- ♦ Mushroom cultivation from spawn to harvesting, K. Madhusudhanan, N. Anil Kumar, V. Balakrishnan & Elsy Mathew
- ♦ CABc- A Centre for Community Agrobiodiversity Development MSSRF, 2000.

Scientific Publications

- Vedavally L. & Anil Kumar N. 1998. Gender Dimensions in Biodiversity Management Case Study Wayanad, Kerala. In Gender Dimensions in Biodiversity Management Swaminathan M. S. (Ed.). pp. 96-106. Konark Publishers.
- Anil Kumar, N., M. Sivadasan & M.K. Ratheesh Narayanan. 2001. *A new species of Dysosxylum Blume (Meliaceae) from India*. Rheedia 11 (2).
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- Anil Kumar, N. & V. Balakrishnan. 2003. People's Biodiversity Registers: A Case from India. CIP-UPWARD. Conservation and Sustainable Use of Agricultural Biodiversity; A Source Book, Philippines, 3 Volumes.
- Balakrishnan, V., M., K. Ratheesh Narayanan & N. Anil Kumar. 2003. Ethnotaxonomy of Dioscorea among the Kattunaikka People of Wayanad District, Kerala, India. Plant Genetic Resources Newsletter, 135, 2003.
- Chandrasekharan, V. M. & M. Geetha Rani 2003. Conservation and Characterisation of Traditional Varieties of Legumes and Cucurbites in Wayanad. Proceedings, 13th Swadeshi Science Congress, November.
- Ratheesh Narayanan, M.K., Meera Devi & N. Anil Kumar. 2003. Gendered Knowledge and Changing Trends in Utilisation of Wild Edible Greens- A study from Western Ghats, India. Proceedings, 13th Swadeshi Science Congress, November.
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- Ratheesh Narayanan, M.K. & N. Anil Kumar. 2003. *Gender dimensions and changing trends in utilization of wild edibles in Wayanad*. Proceedings, 13th Swadeshi Science Congress, November, 2003.

- ♦ Balakrishnan V., Ratheesh Narayanan M.K., & Anil Kumar, N. 2003. *Ethnotaxonomy of Dioscorea among the Kattunaikka people of Wayanad District, Kerala*. International Plant Genetic Newsletter, Rome, 135.
- ♦ Ratheesh Narayanan, M. K., M.P. Swapna & N. Anil Kumar. 2004. Gender Dimensions of Wild Food Management in Wayanad, Kerala. M. S. Swaminathan Research Foundation, MSSRF/RR/04/12.
- ♦ Anil Kumar, N. 2005. GIFTS: The Requirements to Protect Traditional Knowledge and Farmers' Rights. Proceedings of National Seminar on Evidence Based and Integrated Medicine for *Lymphatic Filariasis*, other Chronic Dermatoses and HIV/AIDS, February 8-10.
- ♦ Anil Kumar, N., Girigan, G., & Sivan, V.V. 2005. *Framework for establishing a herbal Bio-valley in Kerala*. A Compendium of 17th Kerala Science Congress, Kerala State Council for Science, Technology and Environment. 42-48.
- ♦ Anil Kumar & Ratheesh Narayanan M.K, 2005. Nutritious weeds in Wayanad, Down to Earth 14.
- ♦ Scope of Navara Cultivation (Yasmin S.H, Gipson Makil, Nandakumar P.M & N. Anil Kumar) Proceedings of the Gene Seminar July, 2006

Annexure III

Details of Projects and other Programmes

No	Title	Duration	Personnel	Financial Support
1.	Conservation, enhancement, sustainable and equitable use of biodiversity	1998-2001	N.Anil Kumar Girigan G. Ms. Prathibha Joy	Swiss Agency for Development and Co-operation, New Delhi
2.	Conservation of Biodiversity, Integrated Natural Resource Management and Poverty Reduction	2001-2006	N.Anil Kumar Girigan G. Manoj Kumar T. Raveendran P.A. Rasheed	Swiss Agency for Development and Co-operation, New Delhi
3.	Integrated management of biodiversity resources in partnership with communities	2006-2008	Girigan. G T.Raveendran P.A. Rasheed	Swiss Agency for Development and Co-operation, New Delhi
4.	Bio-health programme for conservation and sustainable use of medicinal plants	2000-2005	Rajesh Jacob V Balakrishnan V.V Sivan	IDRC Ford Foundation DBT. Govt. of India
5.	Livelihood enhancement Programme for the Most Marginalised Tribal Groups of Wayanad District through the Sustainable Use of Wild and Traditional Edible Species	2001-2006	Ratheesh Narayanan M.K. Swapna M.P	Utara Devi Resource Centre for Gender and Development, Ford Endowment Grant, MSSRF
6.	On-Farm Conservation of Yam (Dioscorea) Diversity in Malabar Eco-Region	2004-2007	Mohammed Refeek Shajahan P.T	UNDP/ GEF/ Small Grant Programme
7.	Medicinal and Speciality Rices of Kerala: Validation, Value addition, Organic Cultivation and Market Development	2005-2008	N. Anil Kumar K.U.K. Nampoothiri P.M. Nandakumar Prajeesh Yasmin S.H Gipson Makil Lidith. N.M Kavitha B.K	National Medicinal Plant Board
8.	Conserving 10 Rare, Endangered and threatened Plant Species for the	2004-2006	N. Anil Kumar V.V. Sivan C.S. Dhanya	Invest in Nature (IIN) - India Small Grant Scheme of the Botanic Garden

	Livelihood Security of the Tribal and Rural Communities of Wayanad District, Kerala			Conservation Network (BGCN) through NBRI, Lucknow
9.	Conserving 80 Threatened Species by Creating 8 Research Fellowships in Systematic Botany	2006-2009	N. Anil Kumar V.B. Sajeev Biju K.J Dhanya C.S Smitha S. Nair Sujana K.A Ramesh M Sujanapal P Satheesh K Surabhi K.S	Sir Dorabji Tata Trust, Mumbai
10.	Education of Tribal & Rural Youth in Bioresources Conservation, Inventorisation And Sustainable Utilization	2002-2005	VP Sajeev Archana Sreevidhya.V.P.	DBT, Govt. of India Malayala Manorama
11	Developing Biological Software and Capacity Building to Use the Rural Technologies for Sustainable Agriculture	Long term	K. Madhusoodanan P.M.Salim	Ford
12.	Livelihood Improvement of Marginalized Men and Women with Focus on Scheduled Tribe through NRM Intensified Micro Enterprises Activities	2005-2008	K.U.K. Nampoothiri Alishiya Mathews Asiya P Joseph John	Department of Science and Technology, New Delhi
13.	Mushroom Cultivation for the Economic Benefit of Tribal and SC Families in Wayanad District, Kerala	1998-2000	N. Anil Kumar V. Balakrishnan Elsy Mathew T. Manoj Kumar	Department of Biotechnology



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