BANGALORE BIO-PARK
BANGALORE UNIVERSITY
BANGALORE-560056.

DRAFT MANUAL

INTERNATIONAL YEAR OF PLANET EARTH-2008

BANGALORE UNIVERSITY
JNANA BHARATHI, BANGALORE-560 056

FEBRUARY 2008

INTERNATIONAL YEAR OF PLANET EARTH 2008

BANGALORE BIO-PARK

Published by Bangalore Bio-park advisory Committee

Editorial:

Parton : Dr.H.A.Ranganath,
Vice Chancellor

Publisher : Sanjay Vir Singh IPS
Registrar

Printed by : Dr. Sarvothama Kamath,
Director, Prasaranga

Advisor : Sri.A.N.Yellappa Reddy IFS (Retd.)
Chief Advisor, Bangalore Bio-Park

Conveners : S.Narayanaswamy
Convenor, Bangalore Bio-Park

Dr.T.J.Renuka Prasad
Convenor, Int. Year of Planet Earth-2008

Compilation : Dr. N.Nandini
Dr.S.R.Ambika
Dr.M.S.Reddy

Assistance **:**

Dr.Sunitha
Mr.B.N.Krishna Murthy
Mrs. Anupama
Mr.V.Anandaraju
Ms.Smitha
Mr. K.S.Yogananda
Mr.Durgesh
Mr.Keerthi Kumar
Mr.G.S.Chandan
Mr.V.Nandeesh

Dr. H.A.RANGANATH
Vice Chancellor

Bangalore University
Jnanabharathi,
Bangalore-560 056

Foreword

I am happy to know that Bangalore University is celebrating the "**International Year of Planet Earth-2008"** on 13 February 2008. The barren land located in this region was converted into bio-park during 2000-the new millennium. Over the years, efforts were made to plant thousands of seedlings in the campus. I am told that, more than 3 lakh tree saplings were planted in a 300 acre land drawn from 300 plant species - comprising trees, bushes, herbs, and shrubs, out of which 100 are arboreals. The prominent arboreals are Tabebuias, Cassias, Albizzias, Ficus, Millingtonias, Phyllathus, Terminalias, Palms, and Eucalyptus etc. Apart from tree wealth, the native natural vegetation comprising of shrubs, herbs have been rejuvenated and their numbers exceeds 200 sps. Which acts as a food reserve for large number of plants and animals. More so a wonderful lung space for human beings.

Within the campus efforts have been made to conserve water by constructing 5 check dams. Improvement in environment and ecology and the tree wealth are enhancing the biodiversity of the campus. About 60 types of more than 150 varieties of butterflies on the Campus Bio-park have been identified. Many insects and microbial fauna are being noticed in addition to birds, reptiles and mammals. In the biopark the Smriti vanas (Commemorative gardens) Charaka vana, Shrushrutha vana, sanjeevini vana, Madhuvana, Bonsai Garden, Panchavati, Ksheera Vana(Ficus garden) have already been developed. The Centre for Apiculture Studies with an Apiary has been established with a view to enhance the biodiversity conservation through pollination. It attracts large

number of insect fauna and avian fauna in search of pollen and nectar. Dr.H.Narasimhaiah, former Vice Chancellor and Dr.M.H.Marigowda, a doyen of horticulture, and a host of former Vice Chancellors have greatly contributed in making the Jnana bharathi campus as a permanent green patch and food reserve for plants and animals. During the latter part Sri A.N.Yellappa Reddy, the Chief Advisor of Bio-Park and S.Narayanaswamy, Senior Assistant Director of Horticulture, Government of Karnataka have also contributed for conservation of plants. They took keen interest in enriching greenery of the campus and also initiated series of activities during this period of UNESCO declared ***"International Year of Planet Earth- 2008".***

I wish the programme a grand success and I would be very happy if the students, research scholars, teachers and non – teaching staff of the university to be the torch bearers for retaining the biopark a permanent green space in Bangalore - the Garden City of India.

Sd/-

13th February 2008 H.A.RANGANATH

International Year of Planet Earth-2008

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INTERNATIONAL YEAR OF PLANET EARTH- 2008

Dr.T.J.Renukaprasad, Convener Bangalore Bio Park,
Jnana Bharathi, Bangalore University, Bangalore-560 056

INTRODUCTION:

United Nations proclaims 2008 'International Year of Planet Earth'

The United Nations General Assembly, meeting in New York, has proclaimed the year 2008 to be the United Nations International Year of Planet Earth. The Year's activities will span the three years 2007-2009.

The Year's purpose, encapsulated in it strapline **Earth sciences for society**, is to:

- *Reduce risks for society caused by natural and human-induced hazards*
- *Reduce health problems by improving understanding of the medical aspects of Earth science*
- *Discover new natural resources and make them available in a sustainable manner*
- *Build safer structures and expand urban areas, utilizing natural subsurface conditions*
- *Determine the non-human factor in climatic change*
- *Enhance understanding of the occurrence of natural resources so as to contribute to efforts to reduce political tension*
- *Detect deep and poorly accessible groundwater resources*
- *Improve understanding of the evolution of life*
- *Increase interest in the Earth sciences in society at large*
- *Encourage more young people to study Earth science in universities*

Apart from researchers, who are expected to benefit under the Science Programme, the principal target groups for the Year's broader messages are:

- *Decision makers and politicians who need to be better informed about the how Earth's scientific knowledge can be used for sustainable development*
- *The voting public, which needs to know how Earth's scientific knowledge can contribute to a better society*

- *Fellow geoscientists, who are very knowledgeable about various aspects of the Earth but who need help in using their knowledge for the benefit of the world's population.*

The Year is now open to expressions of interest from researchers within each of its 10 themes. The Outreach programme of the year is also now open to expressions of interest, and will work in a similar way by receiving and responding to bids for support from individuals and organisations worldwide.

"**The International Year of Planet Earth (2007-2009)** aims to contribute to the improvement of everyday life, especially in the less developed countries, by promoting the societal potential of the world's Earth scientists."

The UN press release reads: ***"By a draft on the International Year of Planet Earth- 2008, which the Committee approved without a vote on 11 November, the Assembly would declare 2008 the International Year of Planet Earth. It would also designate the United Nations Educational, Scientific and Cultural Organization (UNESCO) to organize activities to be undertaken during the Year, in collaboration with UNEP and other relevant United Nations bodies, the International Union of Geological Sciences and other Earth sciences societies and groups throughout the world. Also by that draft, the Assembly would encourage Member States, the United Nations system and other actors to use the Year to increase awareness of the importance of Earth sciences in achieving sustainable development and promoting local, national, regional and international action".***

OBJECTIVES:

- ✓ The International Year of Planet Earth -2008 as declared by UNESCO is intended to be a vigorous international program. The principal goal of which is to demonstrate the enormous potential of the Earth sciences to lay the foundations of a safer, healthier and wealthier society. This goal leads naturally to the Year's subtitle: **Earth sciences for society**. The Year will have two major lines of action–science and outreach.
- ✓ The Science programme, currently organized into eight broad themes, will endeavour to provide answers to specific scientific questions vital to addressing societal needs. These themes are:
  - *Groundwater – towars sustainable use*
  - *Hazards – minimizing risk, maximizing awareness*
  - *Earth & Health – building a safer environment*
  - *Climate*

- *Resources – sustainable power for sustainable development*
- *Deep Earth – from crust to core*
- *Ocean – the abyss of time*
- *Soil – Earth's living skin*
- *Earth & Life – the origins of diversity.*

✓ The Outreach programme will serve the general public. An Outreach Plan will demonstrate how the Year will help to promote activities such as:–

- *Communicating progress in and provisional results of the science topics*
- *Generating involvement of a non-scientific audience*
- *Involving the general public in the research*
- *Sponsoring excursions and tours to geoscientifically interesting places*
- *Commissioning educational tools on Earth science's significance for society*
- *Supporting production of Earth science TV documentary programmes*
- *Supporting exhibitions and events on geoscientific/societal topics)*
- *Generally promoting of the Earth sciences to a wider public.*

✓ It is planned that the Year, actually envisioned as a three-year event, will be proclaimed through the United Nations and will involve the active collaboration of the geosciences community worldwide.

As UNESCO is planning to continue "**Planet Earth**" programme for 3 years, it may be considered to continue the activities on the campus in the said period.

PLANET EARTH PROGRAMME IN BANGALORE UNIVERSITY

The Bangalore University is planning to host various programmes both Scientific and out reach activities to understand **MOTHER EARTH** as described in the objectives. It is a year long activity in the year 2008.

It is planned to bring out an information manual about various aspects of Jnanbharthi campus by giving importance to document interested topics like Origin of Life, Evolution aspects, Water, Natural Resources, Biodiversity, Soil, Agriculture, Microbiology, Trees as Lungs, Solar energy, Environmental pollution and etc. Documenting various activities on the campus, both in print and Digital formats. A GIS database of the University campus is made available.

A core group of trained personnel/activists were made available. Teachers and Research scholars from various departments are drawn for this purpose.

Inviting groups of students, administrators, politicians and house makers to understand the Earth. A day long activity in the field under the heading **JNANDRI TRECKING**, to get a feel of mother earth is the focus. A concept of Life, Health and Peace is being envisaged.

JNANADRI TREKKING

Dr.T.J.Renukaprasad, Convener Bangalore Bio Park,
Jnana Bharathi, Bangalore University, Bangalore-560 056

A trekking at Jnanabharathi Campus under the title **Jnanadri Trekking** to show the following:

- **NINE SECTORS**: The entire Jnanabharathi campus (JBC) has been divided into nine sectors based on the land use/land cover giving due importance to ecosystems. The Bangalore University Bio-park mainly aims at the conservation of native species. Apart from this it has lot of scope for research, which helps the students and scholars to carry out research in various aspects of biodiversity. The important components of this Biopark include:
  - *Lowlands and eroded lands as part of the catchments and reservoir surfaces*
  - *Dry-land floral species*
  - *Fruit trees, medicinal plants, aromatic plants, flowering plants, in harmony with micro fauna*
  - *Percolation ponds and tanks for aquatic fauna*
  - *Several germ plasm banks belonging to different forest, horticultural, agricultural, medicinal species under various departments of the University*
  - *Herbal garden*
  - *Harvesting of rain water by contour trenching, gully plugging, and check dams.*

The entire Biopark different species of plants numbering 3 lakhs have been planted in different sectors. The native species were planted in 6 sectors viz., sector 1, 2, 3, 4, 5, and 8. The study of biocapsules (biodiversity sectors) of Bangalore University Campus aims at spreading the awareness among the students and citizens that life, health, happiness and peace all are interconnected provided generously by nature. So let's become responsible citizens to protect Mother Earth and to protect future generations and ourselves**.**

- **Sector 1:** The first sector is called as **Evergreen Forest** sector and spreads across 100 acres of the park land.
- **Sector 2:** The second sector is called **Madhu vana** sector (Orchard Capsule) which contains fruit plantation.
- **Sector 3:** Sector three is **Charaka vana** and **Shushruti vana** sector and it contains Ayurvedic plants.
- **Sector 4:** Sector four contains Medicinal plants and is known as **Sanjeevini vana** or **Aroma Park.**
- **Sector 5, 6 and 9** also included in the Bio Park, suitable functional concepts has to be evolved.
- **Sector 7 & 8:** are bio fuel energy sectors.

- **QUADRANTS**: Twenty one quadrants have been made in the Jnanabharathi campus. Each quadrant measures 10 sq mtrs. Sand paths have been created around each quadrant. A systematic observation of movement of different creatures through the sand paths is monitored.
- **BIODIVERSITY PARK**: Different species of plants numbering 3 lakhs have been planted in different sectors. Functional clusters of various plants are created to maintain the viable population.
- **WESTERN GHATS-RET (**Rare, Endangered and Threatened Species- clusters were established **)**
- **GROUNDWATER HARNESSING STRCUTRES**: Subsurface dykes have been constructed to harness Ground Water. The retaining walls errected for the purpose to enable impounding of surface water and in turn became Artificial Recharge Sites. Seven structures in different valleys have been completed. The Programme is sponsored by Central Ground Water Board. Two more projects are in the pipe line. Increase in Water Table in the Bore Wells near these structures is being monitored.
- **BIRD/BUTTERFLY WATCHING**: A variety of Birds and Butterflies are seen after the Biodiversity and Groundwater structures. Bird/Butterfly Watching facility may be made available.

Bangalore University is a major habitat, for bird nesting and roosting. The flora of the campus has created a successful local interwoven symbiotic relationship between the two life forms. Birds have also benefited from the availability of water reservoir created in the biopark of the campus. The resident birds of the campus include egrets, bee-eaters, patridges, larks, mynas, koels, sunbirds, and peckers. Others who come seasonally include rosy pastors, orioles, warblers, and sandpipers.

Chief wild fauna of the campus comprises birds, rodents, reptiles, insects, and toads. There are high populations of snakes and termites.

Bangalore University Jananbharathi campus possesses 300 plant species - comprising trees, bushes, herbs, and shrubs. Out of which 100 are arboreals. The prominent arboreals are Tabebuias, Cassias, Albizzias, Ficus, Millingtonias, Phyllathus, Terminalias, Palms, Eucalyptus etc. Apart from tree wealth in the region, the native natural vegetation comprising of shrubs, herbs have been rejuvenated and their numbers exeedes more than 200 sps.

About 60 different types, more than 150 varieties of butterflies have been identified in the Biopark. This include Lycanidae (Zebra blue; Common pierrot Common Silverline; Pea Blue; Green Blue, and Grass Jewel); Nymphalidae (Great eggfly; Yello Parsy; Peacok Parsy; Lemon Parsy; Blue Parsy, Chocolate

Parsy; Commander; Plain Tiger; Striped Tiger; Blue Tiger; Dark Blue Tiger; Baronet; Common Bushbrown; Tawny Coaster; and Common Castor); Pappilionidae (Common mormon; common rose; Crimson Rose; Blue Bottle; Common Jay; Tailed Jay; and Lime Butterfly); Pieridae (Common Gull; Wonderer; Jezebel; Hebomoea Glaucipe; Crimson Tip; Yellow Orange; Mottled Emigrant; and Grass Yellow Psyche); Hesperiidae (Indian Skipper; Tamil Grass; Chestnut Bob; Common Banded Awl; Restricted Demon, and Rice Swift.

- **CHARAKA VANA**: Medicinal plants are grown and Students of Ayurvedic Colleges are using to acqint themselves to identify the Herbal plants. It consists of clusters of ganas as grouped in **Charaka Samitha.**

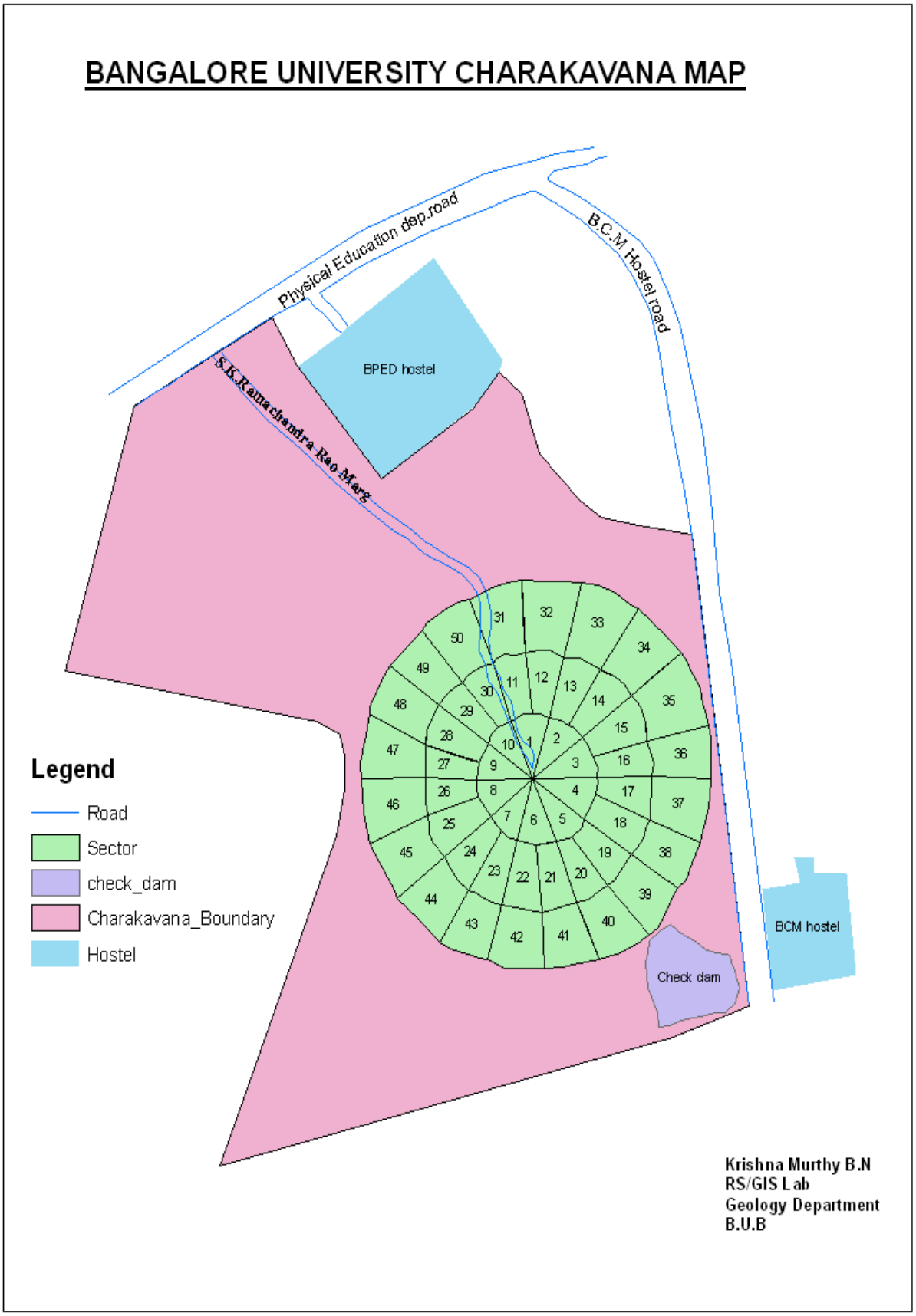
- **BONSAI GARDEN**: "Nature in miniature art of horticulture". Bonsai is an Japnese art where in trees are trained, twisted and dwarfed by manipulating its natural features. Trees in small size and shape would enthuse the plant lovers.

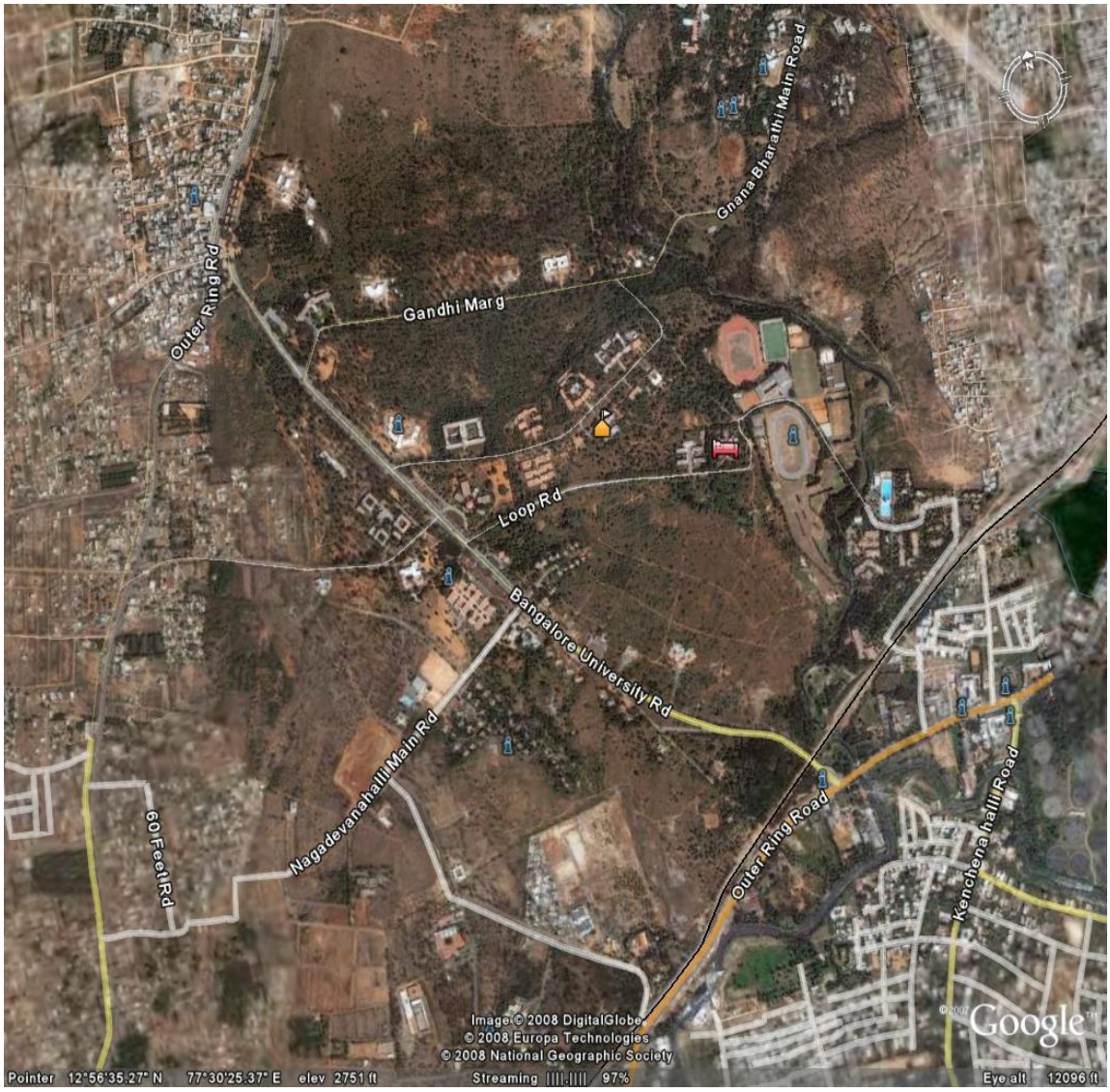
- **APICULTURE: T**he Centre for Apiculture Studies with Apiary has been established in the midst of Bio-park with a view to enhances the biodiversity conservation through pollination and attracts large number of insect fauna and avian fauna in search of pollen and nectar. The diversified plants both herbs, shrubs, trees provide copious amount of nectar and pollen all through the year. Through this centre is has also been planned to organize extension activities and this would promote eco-tourism of Jnana Bharathi campus.

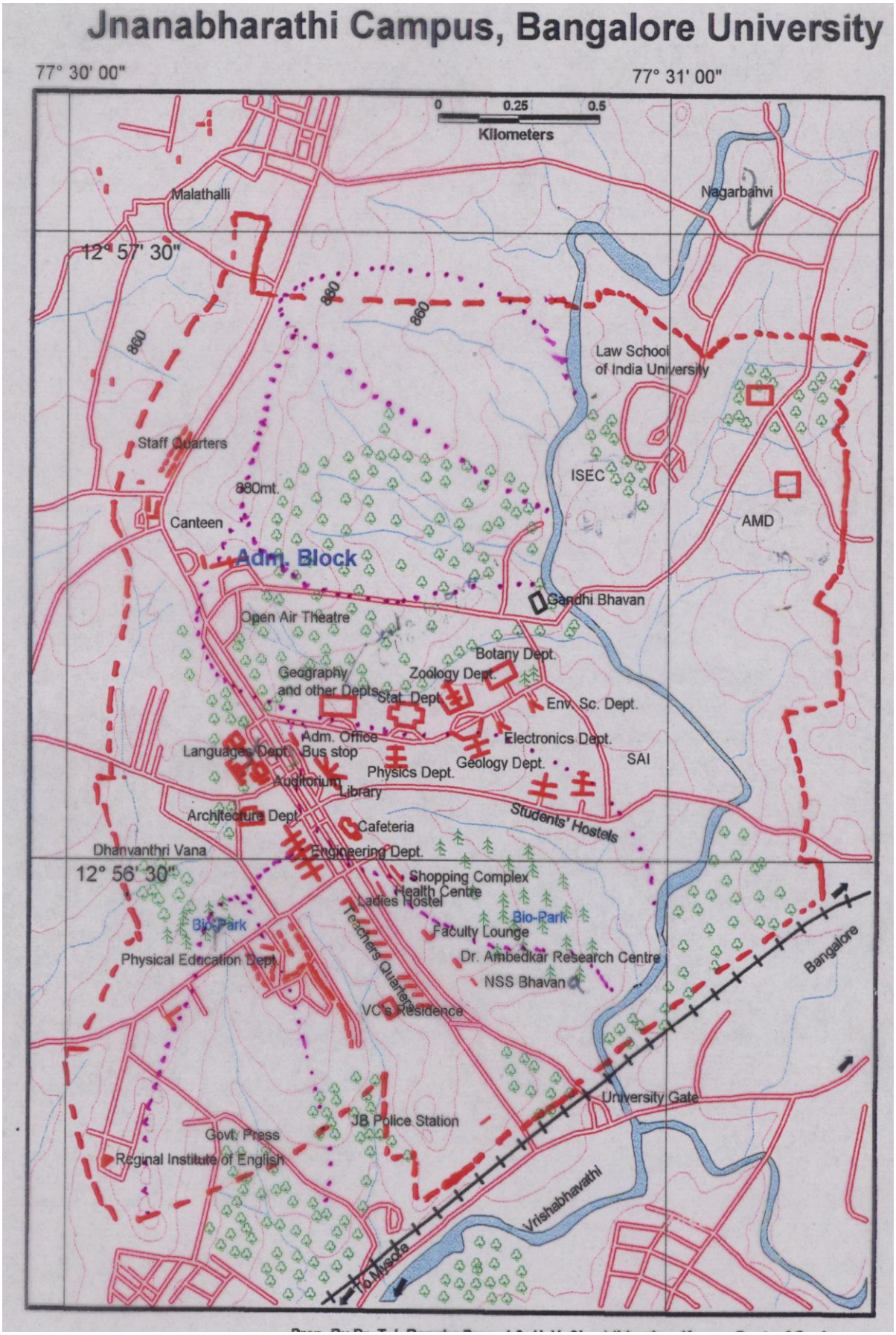
Jnana Bharathi, Bangalore
University

BANGALORE UNIVERSITY BIO-PARK MAP

Krishna Murthy B.N
RS/GIS Lab
Geology Department
B.U.B


BANGALORE UNIVERSITY CHARAKAVANA MAP
Physical Education dep.road
B.C.M Hostel road
BPED hostel
S.K.Ramachandra Rao Marg
BCM hostel
Check dam
Legend
Road
Sector
check_dam
Charakavana_Boundary
Hostel
Krishna Murthy B.N
RS/GIS Lab
Geology Department
B.U.B


Gnana Bharathi Main Road
Outer Ring Rd
Gandhi Marg
Loop Rd
Bangalore University Rd
Nagadevanahalli Main Rd
60 Feet Rd
Outer Ring Road
Kenchenahalli Road
Image © 2008 DigitalGlobe
© 2008 Europa Technologies
© 2008 National Geographic Society
Google
Pointer 12°56'35.27" N 77°30'25.37" E elev 2751 ft
Streaming 97%
Eye alt 12096 ft


Jnanabharathi Campus, Bangalore University
77° 30' 00"
77° 31' 00"
0
0.25
0.5
Kilometers
Malathalli
Nagarbhavi
12° 57' 30"
880
860
860
Law School
of India University
Staff Quarters
ISEC
880mt.
AMD
Canteen
Adm. Block
Gandhi Bhavan
Open Air Theatre
Botany Dept.
Geography
and other Depts.
Zoology Dept.
Stat. Dept.
Env. Sc. Dept.
Adm. Office
Languages Dept.
Bus stop
Electronics Dept.
SAI
Physics Dept.
Geology Dept.
Auditorium
Library
Architecture Dept.
Students' Hostels
Cafeteria
Dhanvanthri Vana
Engineering Dept.
12° 56' 30"
Shopping Complex
Health Centre
Ladies Hostel
Bio-Park
Bio-Park
Faculty Lounge
Physical Education Dept.
Dr. Ambedkar Research Centre
Teachers Quarters
NSS Bhavan
VC's Residence
Bangalore
University Gate
JB Police Station
Govt. Press
Reginal Institute of English
Vrishabhavathi
To Mysore

BANGALORE UNIVERSITY CAMPUS-DATA BASE

Dr.T.J.Renukaprasad, Convener Bangalore Bio Park.

The Bangalore University was established in the year 1963, The University started functioning from the old and historic campus of central college situated in central portion of Bangalore city. The central college which was started in the year 1856 possesses vast grounds of around 272 acres, it has a garden with flowering tress, shrubs and creepers. It was next only to the lalbagh and Cubbon Park in volume of green cover and serving as lung space in the much populated metropolis. In 1964 the university was given an area 1500 acres at southwestern side of Bangalore to locate the various Departments numbering around 25 and also to locate the Administrative offices. In the beginning attempts were made to enrich the wild terrain with greenery by planting avenue trees, ornamental trees, flowering and fruit bearing trees.

Bangalore University campus is spread over an area of about 4.5 sq.km (1100 acres) in the Arkavathi basin and falls in the village limit of Nayandahalli and Muddayanapalya (57 H/9). The population of the campus is about 8,000 including the floating population. The water requirement for the entire campus is supplied by borewell source and hence fully dependent on groundwater. The area receives about 900 mm of rainfall annually. As ground water contributes to the major part of the water requirement of the University and the adjoining SAI campus through borewells, there is enormous pressure on the aquifer system in the area because of continuous pumping. This condition has resulted in the lowering of water table, which is observed to be in the range of 4 to 6 m during 1994-2000. The situation will be alarming during the coming years unless some remedial measures are not taken up. The pumping borewells are closely spaced and there is a tendency of formation of cone of depression, which may result in the reversal of the water table gradient. Under such a situation, there is a possibility of ground water contamination by sewage water flowing in the Vrishbhavathi.

GEOLOGY:

The area essentially comprises of granite gneisses and schist's of Pre-Cambrian crystallines which are highly fractured. The strike of the formation trends in north - south direction with near vertical dip. Pegmatite veins are seen as intrusions in the area apart from sporadic exposures of basic rocks. The thickness of weathered zone varies from place to place and generally ranges from 8 to 18 m. Massive exposures of crystalline rocks are not visible in the area. However, highly weathered formations are exposed in the downstream side of the watershed and adjacent to the SAI campus.

Granitic gneiss, Schist's of Precambrian crystalline. Pegmatite veins are seen as intrusive in the area apart from sporadic exposures of basic rocks. Granite gneisses of peninsular gneissic complex of Archaean age traversed by intrusive such as pegmatite's and quartz veins & Amphibolites of Sargur group as lenticle intrusions.

- NW-SE lineament.

SOIL TYPE:

Major part of the campus is covered by red soils. Mixed and gravelly soils are also seen in the area apart from a veneer of alluvial and silty / clayey soil along the stream course. The soil infiltration test results show that, the infiltration rate ranges between 5.10 to 10 cm/hr with an average value of 7.5 cm/hr. It can be inferred that the soil has good vertical transmission capacity and low run-off potential.

PRESENT LAND USE:

Bangalore University campus is partially inhabited. The built up area in the University campus is of about 1.21 sq.km (300 acres) and the balance area is covered by open landscape. The major part is un-inhabited. It is an undulating terrain and comprises of barren land with scrubs and thin vegetal cover. Presently, no surface water body exists in the area. Agriculture activity is absent in the area. The campus is devoid of any type of water impounding structure. The surface run-off available in the campus, which is non-committed, goes as waste without proper utilization during the monsoon period. This source of water is harnessed for artificially recharging the aquifer through suitable structures.

TOPOGRAPHIC FEATURES:

It is an undulating terrain and the elevation of the ground surface ranges from 800 to 830 mamsl. The topographic types are classified as a) highly dissected plateau - 10 %, b) pediment zone - 20 % c) valley slope - 70 % .The watershed is dissected by a north-south trending stream, which attains second order status before joining the Vrishabhavati. Presently under an afforestation and social forestry pragramme, the land is covered by vegetation by planting trees, scrubs and grass.

CLIMATE AND RAINFALL: Though Bangalore district comes under the eastern dry agro climatic zone, Bangalore university campus enjoys a climate typical of Bangalore City with an average annual rainfall of over 900 mm. The number of rainy days is about 58 days in the area. In the absence of any surface water impounding structures, the surface run-off being generated in the catchment areas drains into the Vrishbhavathi river without use and gets mixed with untreated sewage and other industrial effluents.

GROUND WATER CONDITIONS:

The area represents a typical hard rock terrain. Ground water occurs under water table conditions in weathered zones and under semi-confined conditions in jointed and fractured granite gneisses. The ground water body is recharged by direct infiltration of rainwater. Depth to water level is around 19 mbgl and show a modest seasonal fluctuation of 3m. At present nine bore wells exist in the area. These borewells are 35 to 120 metres deep and yield about 10 to 54 m3/day. The fractures are encountered at 47-49 m, 54-58 m, 78-81 m, 106 - 111m and 115 - 119.4 m depths in the exploratory borewell drilled by Central Ground Water Board. The ground water draft from these borewells is estimated to be 550 cu.m. per day. The hydrogeological tests carried out in the area reveals that, the transmissivity is ranging from 170 to 350 m2 /day and storage coefficient is computed to be 4.4 x 10-3. The details of exploratory borewells drilled by CGWB in the area are shown in table: 3 The quality of ground water in the area is potable and suitable for domestic use.

WATER REQUIREMENTS:

The water requirement for the University campus is estimated to be 600 m3 per day taking into account for 5000 populations with per capita consumption of 120 litres per day and an additional 20 percent for other purposes. As the University is planning to diversify its activities academically as well as socially, the demand on water will increase many fold in the coming years. The projected water requirements after 10 years and 20 years are likely to be 720 and 840 m3 per day respectively taking into account of increase in population at year 2010 and 2020.

Table: 3 Details of exploratory borewells drilled in Bangalore University Campus

Well type	Depth drilled (mbgl)	Casing (mbgl)	SWL (mbgl)	Drilling discharge (lpm)	PYT Results				
					DTW (mbgl)	Disch (lpm)	DD (m)	Sp.Cap (m3/d/m)	T (m2/d)
EW	119.45	8.30	16.34	900	16.34	468	4.90	138	350
OWI	119.45	14.00	15.85	706	15.85	504	3.59	140	170
OWII	60.00	12.70	14.42	767	14.42	450	2.92	222	215

PHYSICAL FEATURES OF THE CAMPUS:

The campus is engirdled by the rivulet "**Vrishabhavathy**" at its north eastern and south eastern side. The campus possesses wide range of vegetation ranging from Scrubby jungle wild trees to cultivated trees of shade, shelter,

flowering, fruit and aesthetic importance. The sylvan beauty of the campus is now the lung space of the thickly populated city. The campus has undulating terrain and elevation of the ground surface ranges from 800 to 830 ms. The topographic types are classified as (a) highly dissected plateau - 10% (b) Pediment zone - 20% (c) Valley slope - 70%.

The campus has diverse soil types. The main types being - Red soil. Gravelly soil and Sandy soil. Patches of alluvial and silt/clayey soil are found along the Vrishabhavathy stream course.

LAND, SOIL AND WATER CONSERVATION TECHNIQUES ADOPTED:

Surface run off water and subsurface water flow was conserved by contour furrows opened at regular intervals, staggered pits and saucers were prepared which trapped the rainwater which otherwise would flow as surface run off eroding the top soil.

In these contour trenches, staggered pits and saucers saplings brought from the Western ghats region \\crc planted in the first phase of the bio park. As planting was done during pre monsoon showers, saplings were quite well established and were fed with required water by making use of above mentioned conservation techniques. The water conservation by watershed management led to the soil conservation also. Thus the top soil was save the plants; which picked up very quickly by the end of the rainy season o year 2000. All the plants, about one lakh, in an area of 100 acres, have grown an height 3 to 4 feet.

LOCATION OF THE BIO-DIVERSITY PARK:

The Jnana Bharalhi Campus (J.B, Campus) of Bangalore University spread over an area of 1 100 acres and is situated on the elevated plateau at 900 m above sea level. The average rainfall of the campus is 900 mm. The Campus lies at the western side of Bangalore, the capital city of Karnataka State. It is aboi kilometers from Vidhana Soudha. the seat of the Government and Central of the cit

ARTIFICIAL RECHARGE OF GROUND WATER:

As one of the components, a scheme was launched to harness monsoon run off. Earlier rain water was going as waste. Now it has helped in as recharge of ground water through the check dams constructed under the scheme. It was also helped in maintaining the productivity of the existing water supply borewells. The check dams have infact become habitats for many kinds of birds and aquative fauna and flora.

ARTIFICIAL RECHARGE STUDIES IN JNANABHARATHI CAMPUS, BANGALORE UNIVERSITY

Dr. T.J.Renukaprasad, Department of Geology, Bangalore University,
Jnana Bharathi, Bangalore-560 056

Introduction:

Any man made scheme or facility that adds water to an aquifer may be considered as an artificial recharge system. It may be planned as in the case of a pit or pond or tank that has been constructed for the purpose of putting water into an aquifer or it may be unplanned or incidental resulting due to human intervention as in the case of surface water irrigation. Most artificial recharge projects are planned for the specific purpose of storing fresh water for subsequent use. Artificial recharge of ground water contributes to effective quantitative water resources management and continuity in water supply. In addition, generally it improves water quality and has environmental benefits.

Ground water conservation is more or less synonymous to artificial recharge. Here, augmentation to ground water recharge is incidental in nature. Structures like ground water dams, subsurface dykes or Bhandaras are quite prevalent to arrest sub-surface flows and help in conserving ground water. They are also effective to provide sustainability to ground water structures.

Impacts of ground water development:

Ground water irrigation has gained prominence during the last two decades through dug well, dug-cum-bore wells and bore wells. Ground water is an alternate source of water supply in areas where perennial surface water sources are absent. There are pockets where intensive and haphazard development has led to rather critical situations resulting in decline in ground water levels, shortage in water supply, drying-up of wells, dwindling of ground water based water supply, increase in pumping cost etc. Ground water is also extensively used to cater the domestic needs in urban areas, mostly through bore wells. Hence, there is a need to adopt an integrated and critical approach of development of ground water resources in over-exploited pockets and calling for urgent steps for augmentation of this natural precious resource.

Background information:

Large-scale urbanization and habitations leads to an aura of environmental and hydrogeological problems like deterioration in ground water quality, lowering of water table, less scope for natural recharge, incidence of flash flood and the associated problems. Such phenomenons are common in most of the rapidly growing cities. Bangalore City is not an exception from this. The Vrishbhavathi river flowing around the Bangalore University (BU) campus

(Fig.1) carries sewage water throughout the year because of urbanization along its course and on its catchments. Sewage water is let into the river without treatment from various points and the fresh water stream has turned into a sewerage drain.

Ground Water Exploration Studies by CGWB:

Central Ground Water Board (CGWB) had carried out ground water exploration studies in Sector I of the Jnanabharathi campus of Bangalore University during 1994. This catchment is located adjacent to the Sports Authority of India (SAI) campus. The detail of the exploration programme has been included in the subsequent chapter. The hydro geological condition in the area is promising for ground water extraction through borewells and potential aquifer zones were tapped through exploratory borewells drilled by CGWB. Subsequent to the exploration programme, the bore wells drilled by CGWB have been handed over to the University to meet their water requirement for the student hostel and other nearby establishments of the University. Apart from this, ground water is extensively pumped through bore wells in SAI campus in the same catchment. This situation has resulted into an enormous stress in the aquifer system in this catchment.

During the subsequent years, it was felt that recharge augmentation schemes are a must to protect the precious ground water aquifers in the area as a slow and steady decline in ground water levels were observed in the area and in the adjacent SAI campus. The University also had plans to implement artificial recharge schemes with technical expertise from Central Ground Water Board. Several meetings were convened to conceive and finalise the modalities to implement the scheme. The scheme was contemplated with an objective of implementing it as a demonstration scheme for the academic community in particular and for the public in general. As a result, the scheme on artificial recharge to ground water has been evolved under the Central Sector Scheme funded by Central Ground Water Board.

Source water availability for artificial recharge:

Rainfall is the only source of water available for recharge in the area. The surface run-off being generated during the monsoon period will be harnessed for recharge purpose by suitable structures. Apart from the surface run-off, rain water available from the roof tops of the various buildings can also be used for rainwater harvesting and artificial recharge schemes. However, roof top rainwater harvesting has not been contemplated under Phase I.

Geophysical studies carried out in the study area:

The objective of the geophysical investigations was to determine the thickness of the over burden comprising of soil thickness, highly weathered and weathered zones and to delineate fractures within the bedrock. Based on the prevailing hydrogeological conditions, Vertical Electrical Soundings (VES) were carried out in 5 alignments (fig.2) so as to finalize the locations for the construction of check dams.

The estimated over burden thickness is varying in the range of 6.5-35 m in the area based upon all the five VES alignments. By considering geophysical surveys and hydrogeological conditions, a total of 2 check dams and one combination structure (i.e. subsurface dyke and check dam) were recommended in the study area. The inferred hydrogeological sections for three recommended locations have been prepared based on geophysical surveys are shown in fig -3. The over burden thickness varies in the range of 16-35m. at check dam I. At check dam II, the average over burden thickness is estimated to be 14 m. where as it was in the range of 17-28 m at check dam site III.

Mode of survey: Area covered by VES profiling in 5 alignments

Survey results: Indicated over burden thickness consisting of soil, highly weathered and weathered formation is varying in the range of 6.5-35 m.

Execution of check dams: 3 check dams constructed

- Check dam I indicated over burden in the range of 16-35m.
- Check dam II-14m.
- Check dam III- 17-28m.

SUMMARY:

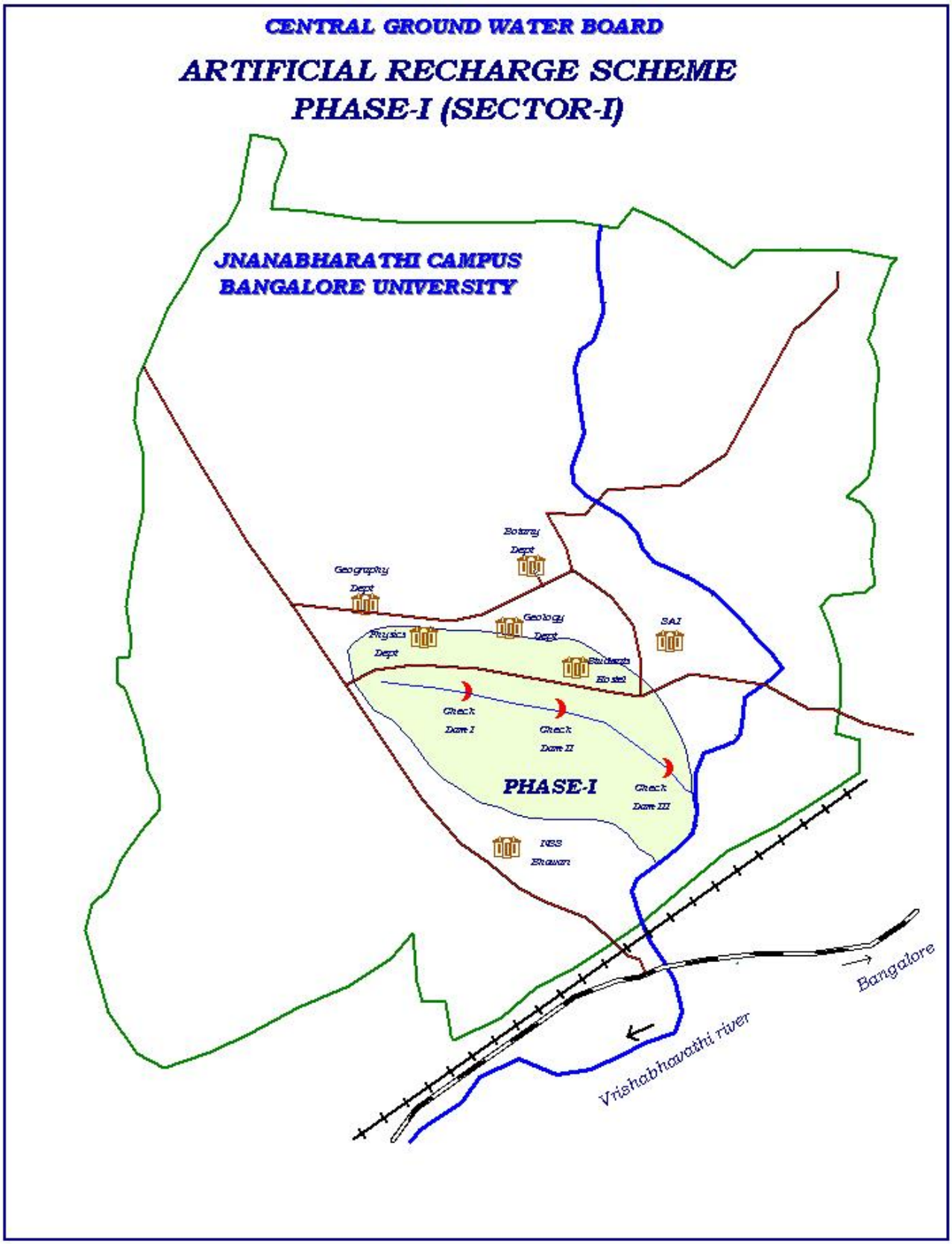
Under Central Sector Scheme, a scheme on artificial recharge to ground water is being executed in Jnanabharathi campus, Bangalore University which covers an area of about one sq.km. The scheme on completion would harness 0.043 MCM (43,000 m3) monsoon run-off going as waste and can improve ground water levels and sustainability of abstraction structures in the area through artificial recharge structures such as Check dams and subsurface dyke. This scheme is only a beginning in the University campus and all the plans are on the advanced stage to launch a model environmental eco-park in association with the University. The salient features of the scheme are:

Catchments details	Check Dam 1	Check Dam 2	Check Dam 3
Area (sq.m)	260000	340000	410000
Yield (cu.m)	14860	19430	23430
Water Available for recharge 75 % of yield (cu.m)	11150	14570	17570

Total water available for recharge: 43290 cu.m

The benefits include direct and indirect in any concerned artificial recharge schemes. An attempt is made to harness the natural surface water run-off (43290 cu.m) to recharge the aquifer system instead letting it into a drainage course. This will help to maintain the productivity of the existing water supply bore wells which supplies water to the University and Sports Authority of India campus. The scheme after completion is likely to recharge about 21645 cu.m (50 percent of 43290 cu.m) of potable water into the depleting aquifer system in the area. Considering 20 years span of life for the structures, the annual investment with 10 percent rate of interest works out to rupees 80740. The cost per thousand liters of water harvesting works out to about two rupees. In addition to above, the possible intrusion of polluted Vrishabhavati water to the aquifer in the area will be prevented.

An amount of Rs.13.75 lakhs was sanctioned for the scheme. Executions of the recharge structures were completed.


CENTRAL GROUND WATER BOARD
ARTIFICIAL RECHARGE SCHEME
PHASE-I (SECTOR-I)
JNANABHARATHI CAMPUS
BANGALORE UNIVERSITY
Botany Dept
Geography Dept
Physics Dept
Geology Dept
SAI
Check Dam I
Check Dam II
Check Dam III
PHASE-I
IISS Bhawan
Bangalore
Vrishabhavathi river

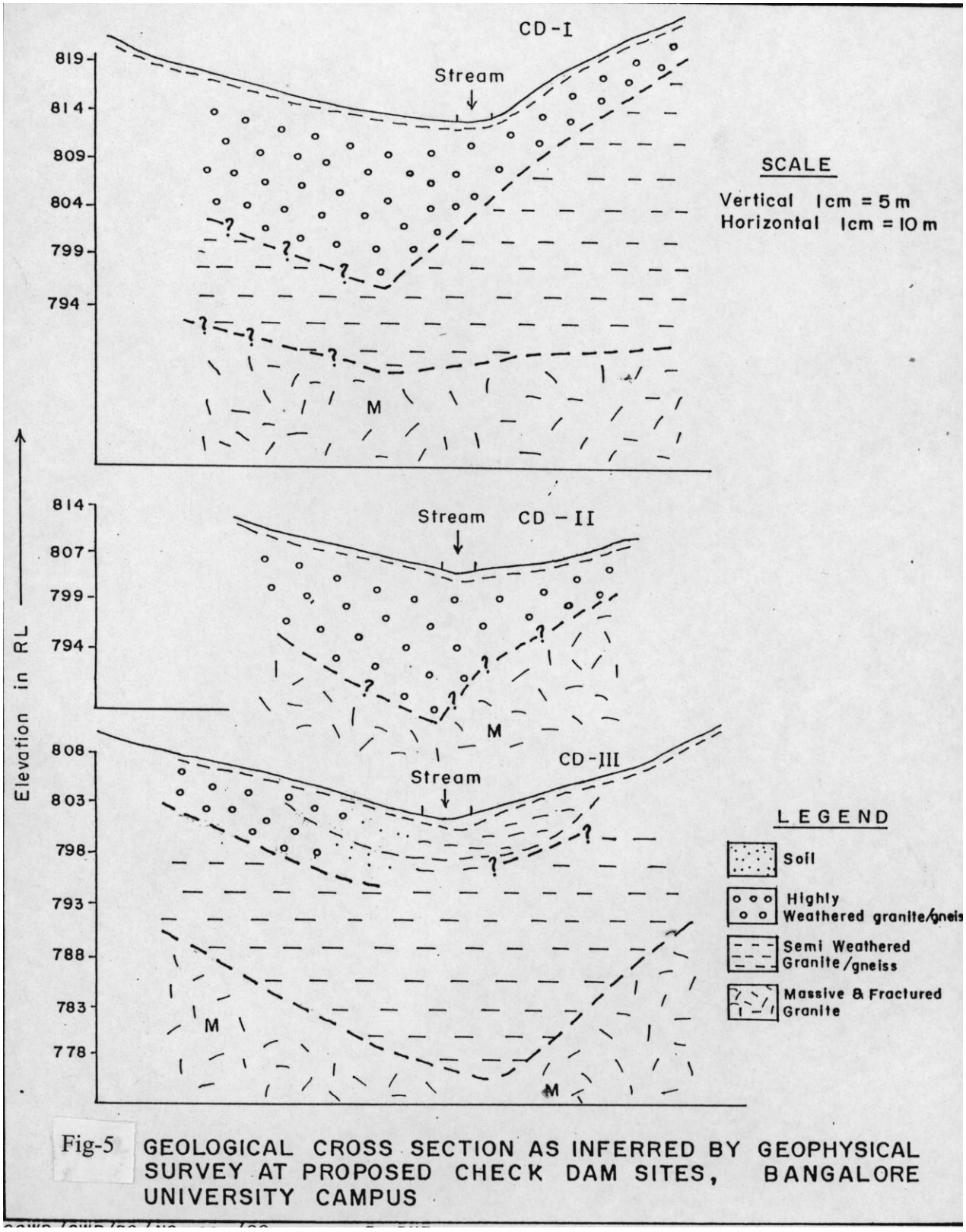


Fig-5 GEOLOGICAL CROSS SECTION AS INFERRED BY GEOPHYSICAL SURVEY AT PROPOSED CHECK DAM SITES, BANGALORE UNIVERSITY CAMPUS

Te geological cross section as inferred by geophysical surveys at the check dams sites are shown in fig.4

Structures feasible for artificial recharge in JB campus:

Both surface and subsurface recharge structures are feasible in the area. The total area is divided into nine sub catchments and about 29 check dams are proposed by the University authorities to make use of the yield from these areas for augmenting ground water recharge. The topography of the university is having unique morphological characters of hills and ridges, encompassing vast area with diverse soil and geological features. The Civil Engineering Department in association with Central ground Water Board have identified the locations, to harvest rainwater (storm run-off). These will serve as demonstration sites for water shed management studies. University is also planning to involve fully with CGWB in establishing a center to educate cost-effective technology for rain water harvesting schemes.

Activities taken up under the present study:

As mentioned above, three check dams have been finalized and were constructed in Sector-I of the Jnanabharathi campus under Phase-I of the central Sector Scheme. The decisions to implement the same have been taken after detailed field studies and discussions during the TCC meetings.

A small watershed is located (refer fig.3 above) in the south central part of the campus, covering an area of about 1.01 sq.km. It lies in between latitudes 12° 56' 20" - 12° 56' 50" and longitudes 77° 30' 20" - 77° 30 ' 55". There are two high yielding borewells in this area which were drilled by CGWB under exploration programme. The discharge of these borewells ranged from 706 to 900 lpm during drilling. Apart from this, other pumping borewells are also located in the same catchment covering SAI campus.

As mentioned above, surface run-off is the only source of water available for recharge in the area. The rainfall figures from June to September (monsoon) for the period 1968-1997 have been considered to arrive at the rainfall figure for 50% probability, which comes to 510 mm for the area/catchment. The catchment yield has been estimated accordingly as Q = A* Stranges's co-efficient where Q is the catchment yield from an area of A. The maximum flood discharge is estimated as per Dicken's formula. The summarized calculations are tabulated in Table.4.The capacity of the check dams have been finalized for the quantum of source water available as run-off from the catchment

Table.4. Details of catchment yield and run-off available for recharge

Catchment	CD-I	CD-II	CD-III
Catchment area (sq.km)	0.26	0.34	0.41
Catchment yield (MCM)	0.01486	0.01943	0.02343
Source water available for recharge (75% of yield) (MCM)	0.01115	0.01457	0.01757
Maximum flood discharge (cu.m/sec)	5.462	6.675	7.686

The annual run-off computed in this watershed is about 0.05772 MCM. Of this, about 0.04329 MCM (75 % of 0.05772, which is assumed as non-committed) flows into the Vrishabhavati and goes as waste without proper utilization because of the absence of suitable surface / subsurface water impounding structures in this catchment.

The capacity of the check dams and the water spread area details on these check dams are given in table.5. The check dam-III is a combination structure with a surface dam and a subsurface dyke with impermeable core wall constructed beneath the dam. The details of the subsurface dyke constructed are given below.

Table: 5 Capacity of Check dams and details water spread area

	Check dam I		Check dam II		Check dam III	
Storage capacity	Height (m)	Capacity (cu.m)	Height (m)	Capacity (cu.m)	Height (m)	Capacity (cu.m)
	0.5	33	0.5	9	0.5	27
	1.0	244	1.0	118	1.0	172
	1.5	603	1.5	623	1.5	707
	1.75	2026	2.0	1604	2.0	1168
			2.3	2634	2.5	2725
					2.9	3948
	Check dam I		Check dam II		Check dam III	
Water spread area	Height (m)	Area (sq.m)	Height (m)	Area (sq.m)	Height (m)	Area (sq.m)
	0.5	110	0.5	37	0.5	90
	1.0	406	1.0	283	1.0	539
	1.5	670	1.5	1084	1.5	977
	1.75	905	2.0	1546	2.0	1845
			2.3	2122	2.5	2360
					2.9	3124

Design of the check dams:

As mentioned above, three check dams were constructed in the study area. The designs have been arrived based upon the run-off being generated in the catchment, availability of non-committed run-off and five number of filling in a year. The designs of the dams constructed.

BANGALORE BIO-PARK

S.Narayanaswamy Convenor, Bangalore Bio-Park

GENESIS AND HISTORY:

At the turn of the century -2000 there were some statements in the press which were very appalling Bangalore is no longer a garden city, it has lost its epithets – city of salubrious climate , city of pensioners of paradise Bangalore city is engulfed by invasive plant species such as – Parthenium , eupatorium and lantana.

The credit of turning the barren, rugged campus in to green area goes to then vice–chancellor Late Dr.H.Narasimhaiah, and Late Dr.M.H.Marigowda retired director of horticulture, who was specially appointed by the university as Horticulture Advisor from 1973-1978.

All most three decades have elapsed since then, the campus grew to be a beautiful campus by the turn of the 20th century but, much of the interior land remained vacant expect for scrubby jungle. By this time the campus has become part of Bangalore city, as the outer ring road encircling the whole Bangalore is passing out side the campus.

The authorities of the university felt the necessity of developing a Biodiversity Park In the vast vacant lands of the campus with main objective of enriching. The environment and ecology of the campus, and to increase the infiltration of rain water, which other wise would flow in to the Vrishabavathy river let passing in the campus.

It was in January 2000, Honorable minister for forests visited the campus and assured that the Department would take up planting of indigenous tree species which will add to the Environment Planting operation started during the monsoon season of the year 2000 as "model -4" under the scheme –Japanese Bank for (JBIC) international co-operation implemented by the state Forest Department -50 Ha (100 Acres) of area was covered by planting 50,000 saplings from one hundred species in the / valley area sloping towards vrishabavathy behind the university guest house the plant species yielding Medicines, Aromatic, Timber, Cosmetics , Fodder , Fuel ,Bamboo, Flowers and of course fruits were planted .As model 7, another patch of 20 Ha (50 Acres) was covered by planting medicinal plants, Ficus plants and timber yielding plants along and on the boundaries of the campus towards west. As many as 40,000 plants classified under 25 species were planted. During the same season commemorative gardens(smrithivanas) were developed in area 10 Ha (25 Acres). This area in a valley portion towards Mysore Road behind and Vice-Chancellor Bungalow. Ten smrithivanas and one Mahapanchavati have been

developed. They are dedicated in the memory of philanthrapists who donated towards cost of planting these vanas.

The prominent vanas are Mahapanchavati, Kadamba Vana, Ashoka Vana, BokulaVana, Vatavrikjshavana, AswathaVana, DevaKanigaluVana, BiluvaVana,
Madhuvana, Hongevana, Bevuvana.A nearly 170 acres of area was covered during 2000-01, now these plants have grown to height of 3-5 feet. They have stood three summer seasons and would remain as drought resistant trees, as they have already faced severe dry and drought conditions of during 2001 and 2002.

Phase II

During the year 2001-02, the second phase of the project was taken up under the scheme compensatory plantation n 35 Ha (805) of area was covered by planting the different plant species, as many as 40,000 plants were planted. In the same year, as model –II of JBIC (Japanese Bank aided) of Forest Department 5 Ha (12) acres was covered planting 2000 plants totally 42000 plants were planted during the year.

Genesis:

I Initial stages

- 9 sectors
- 5 Phases
- 16 Functional Garden

II Present Status

- Bio Park
- Ornamental gardens
- Check dams

III Public utility

- Arboriculture
- Tree and Management
- Conservation of Nallur Tamarind grove
- Research project funded by DBT.

Micro prorogation – (1) Department of Botany
(2) Department of Environmental science

- Field trials hardening study of phenotypes genotypes.

AGENCIES INVOLVED IN THE BIOPARK

1. Forest Department, Government GOK
2. Ministry of central water resources board Government of India
3. Karnataka Vanasamvandana Bangalore trust.
4. National social service unit Bangalore
5. Garden Department , Bangalore University
6. Civil Engineering Department Bangalore University.
7. Department of Geology, Bangalore University.
8. Department of Envoronmental Science, Bangalore University
9. Department of Zoology, Bangalore University

New concept:

1) Production Horticulture
2) Environment Horticulture
3) Social Horticulture

For the benefit of handicapped and urban dweller horticulture world is at the edge of new concepts

1) Nature in Miniature Bonsai, topiary.
2) Desk top gardening.
3) Horticulture Therapy.

FUNCTIONS OF BIODIVERSITY

There are two main important functions of Biodiversity; firstly - the stability of the biosphere, which in turn leads to the stability of the climate, water regime, soil fertility, quality of air and overall health of the life supporting systems on earth. Secondly, biodiversity is the source from which the human race derives food, fodder, Fuel, fiber, shelter, medicine and raw materials for industrial goods required for ever increasing needs and aspirations.

Biodiversity is thus the biological capacity of our planet and the foundation upon which human civilization is built .The history of human civilization and development of economic systems and thoughts are all inherently and intricately interwoven with biological resources. All economic activities of human kind directly or indirectly derive its sustenance from the biological resources. Beside generating economic wealth and quality of life and well being of people, biodiversity and associated natural endowment assume great importance in human resource development and capacity in both traditional and modern technologies bioprospecting, bio-industry and related sectors here.

Most pertinently India has recently enacted a Biological diversity act which aims at promoting conservation, including conservation of habitats, cultivars, domesticated Stocks and breeds of animals and Micro organisms, as well as the associated Knowledge, sustainable use and equitable sharing of benefits of India's biodiversity resources, knowledge and related matters.

Realizing the importance of earth's biological resources for humanity and economic and social development of people in general, Bangalore University launched a unique project to save, to conserve, and to propagate the endangered, threatened, and extinct plant species of western ghats and other places of the planet. This is known as ex-situ conservation and involved collection of plants from their original habitats, identification of collected plants, planting and maintaining them in the new locals; documenting their change in character, adaptation, survival strength, and other ecological data. Thus Bangalore University became the new locale for ex-situ conservation threatened and endangered species.

BIO-DIVERSITY
Integrated Conservation Strategy in the Bangalore University Campus

A.N. Yellappa Reddy, Project Coordinator of Biodiversity Park and
S. Narayanaswamy Garden Department, Bangalore University

INTRODUCTION:

The term Bio-diversity is defined as variability among living organisms from all sources; terrestrial, aquatic, marine and aerial systems and ecological complexes of which they are part constitute what is known as biodiversity. In simple words biodiversity is nothing but flora and fauna of a given areas. Diversity is the spice of life. Biological diversity has been the back bone of a living network of higher animals. More so with human beings, as their food, shelter, health and fuel have to be ensured by the biodiversity. Hence the Bio diversity is required to be conserved; the conservation effort should have an integrated approach or integrated strategy,

The loss of biodiversity is a serious matter in a developing country like India as there is a greater need to produce food and other products. The loss of every species and gene is a matter of serious concern.

The state of Karnataka is uniquely endowed with a very rich store of flora and fauna, The State has a stretch of hilly range at western side popularly called Western Ghats, which is one of the two mega diversity, enters of India. It is considered as HOT SPOT of Biodiversity. It is 12th in ranking of the 18th global

Biodiversity HOT SPOT:

The Western Ghats range possesses 1500 endemic plant species. One of the main and easily identifiable components of biodiversity is endemism, while biodiversity is biological capital of earth; endemic fauna and flora of a region or nation are exclusive biological capital of that particular region or nation. Hence it is imperative upon nations to protect their own endemic flora and fauna.

CONCEPTUALIZATION OF BIO-DIVERSITY PARK IN BANGALORE UNIVERSITY:

Realizing the importance of Earth's biological resources for humanity, economic and social development of people in general and considering the importance of biodiversity of Western Ghats in particular, the Bangalore University in the year 2000. has launched a unique project to conserve and to propagate the endangered, threatened and extinct plant species of Western Ghats at the Jnanabharathi Campus by adopting appropriate conservation strategy i.e. Integrated conservation : Ex- Situ conservation and In-situ conservation.

HUMAN INVOLVEMENT:

Adopting Ancient Arts of Aytirveda Water conservation Social improvement Biomass production protecting the existing fauna Creation of habitats for fauna & flora

COMPONENTS OF THE BIO-DIVERSITY PARK:

- Soil and Water conservation
- Rainwater harvesting
- Planting of endangered plant species
- Planting Medicinal and Aromatic plants
- Improvement of Environment and Ecology of the Campus
- Building up and conservation of Fauna such as birds, insects, rodents reptiles etc.
- Research on Eco-utility projects
- Development of ancient sinrithivanas such as Panchavati, Ashoka, Bokula vana, Vatavriksha Vana, Arali vana, Charaka and Madhu vana.

For implementation of the project the campus was surveyed and divided in to sectors depending on the proximity to road, vegetation, topography. \ Status etc. The whole campus is fenced with dug trench and biofence by planting Bamboo hedge and other timber plants,

OBJECTIVES OF THE BIO-DIVERSITY PARK PROJECT:

1. *Safeguarding, maintaining, multiplication and conservation of existing fauna and flora of the Jnanabharathi Campus.*
2. *Introduction, acclimatization of indigenous and endemic plant species species.*
3. *Creation of habitats for the existing and to be introduced plant species.*
4. *To enrich land of the University Campus with biomass production.*
5. *To conserve the rainwater of the campus.*
6. *To build up green belt, lung space and carbon sink by way of developing thick, sustainable green mass in the campus.*
7. *Development of infrastructure for conducting research in biosciences.*
8. *To augment ecology and environment of the Bangalore University Campus in particular and Bangalore city in general.*
9. *9. Conservation of threatened, endangered and extinct plant species of medicinal importance of Western Ghats.*
10. *Establishment of germ plasm bank of plants.*

PHASING OF THE PROJECT:

In the first phase, during the year 2000. an area of 100 acres of land at JB campus has been planted with the threatened and endangered species of economic and medicinal importance from Western Ghats. In the second phase, during the year 2001 another 200 acres area has been covered. In all about 300 plant species, numbering about two lakh wild and semi domestic, were collected from Western Ghats area and planted at the J.B. Campus. The strategy of involving students Volunteers for conserving the flora and fauna the campus is very sound and an integrated approach.

EXISTING FAUNA AND FLORA OF THE CAMPUS:

FLORA:

Bangalore university campus floral species plays a major role in carbon sink in terms of plant biomass (density or area). There are various kinds of trees with more than 5-6 feet height and of more than 15-20 years old. Like this, thousands of elegant trees are distributed in the campus. Some precious plants are being cut by some miscreants hence; Bangalore University campus has lush green vegetation cover with huge varieties of trees, bushes

and grass. It is reported that the campus possesses more than 300 species comprising of trees, bushes, and shrubs. The tree wealth enumeration conducted by S. Narayaswamy superintendent, Garden Department, Bangalore University, shows that the campus has 100 tree species numbering around 1,00,000 plants. Eucalyptus trees alone are 10,000 in number. The prominent tree sop include Tabebuias, Cassias, Peltophorums, Dalbergias, Spathodias, Buteas, Phyllanthus, Cordias, Albizzias, Ficus, Millintonias, Polialthias, Pumerias, Terminalias, Plams, Fuliciums, Gulmohrs, Coconuts, Guavas, Eucalyptus, Casuarinas, Arancarias, Pilanthus, Saracas, Bahunias, Mulberries, Acacias, Eligenias, Mangoes, Sterenlias, Thusperias, Jacks, Tamarinds, Sandal wood, Bamboos, Alstonias, Champakas, Thujan, Cypress, etc.Shrubs and bushes constitute about 200 spp.

FAUNA:

The chief wild fauna of Bangalore University comprises of birds, rodents, reptiles, insects, frogs, and toads. There is a high population of snakes and termites in the campus.

PATTERN OF PLANTING:

Another factor considered while planting in Bio-Park, is mixing of speci climax and pioneering to provide shade competitions. Also wide varie species were mixed to create vertical and lateral competition as well as competition. Hierarchy of species was considered for creating the ecosy; This setting of eco-system will provide a unique opportunity for optii utilization of vertical, lateral and root competition to harness solar ener^ well as nutrients from the soil profiles. This provides a three tier or fourbio-system to increase phytomass production. The above mixing of pionei and climax species also help to measure the degree of selfing in individual and to assess the extent of variations in selfing rates as well as degrt infreeding etc.,

PLANTING METHODOLOGY:

While designing the planting in the campus, adequate care has been takt incorporate the understorey specialist trees which need greater attention care because they may not set fruit in open areas when raised as mono-cu plantation. To evolve species combination, information about tree archite and canopy pattern are taken in to account, Indigenous understorey specie essential to space trees for harvesting solar energy.

DIVERSITY OF SPECIES:

Based on the information collected on the diversity of plant speck economic, ecological and medicinal importance the saplings from wilderness were collected by the local community They were transported care to the campus and planted them in the simulated conditions of their ori

Apart from saplings those which are difficult to raise were collected by gathering vegetative culttings. buds, sucker, layers, tubers and scions. They are given-required care and attention. They have been planted in the intermediary nursery. After attaining surviving are they were planted in the park. Tree species yielding timber, fuel, lac, gum, scent, fodder, fruit, flowers fibre, machines have been planted in multiples.

Herbs, particularly those which arc yield essential medicines and bewaragcs are collected and acclimatised in the intermediary nursery and planted on the whole over 3 lakh plants of 300 species have been planted during the years 2000, 200 land 2002.

As regarding the fauna - A study was conducted on the bird population it was found that the bird species strength has gone up. Similarly the population of insects, rodents, and reptiles has gone up in the park.

SPECIES SELECTION & SAPLINGS SELECTIONS:

Phenological patterns, breeding systems, pollination methods, seed dispersal mechanisms, seed dormancy, seed storage and handling and seed germination-were some of aspects of plants were considered while selecting the species, for the Biodiversity Park. Only indigenous, plants species were selected and planted.

Consciously, assorted tree species were given prime importance. Studies with regard to their interpopulation combination of alleles and frequencies in different population have been taken up by the research students. The economically important and ecologically as well endemically suited trees such as teak, rose, terminalia, sandalwood, pterocarpus, dalbergia, hopea, bamboos, rattans, maduca, tamarind, banyan, neem amla. Soapnut, peepal, artocarpus, mesua and many more similar saplings are planted in multiples.

ORCHIDS:

There are 175 species of orchids in the Karnataka state, where as the ran; Western Ghats is an hot spot habitat for 23 species of wild orchids. Most of are known for their mimicry or rather camouflage instincts. That is to say they have physical expression to resemble insects and birds. It is mechanism they have developed to defend them selves against enei otherwise is a self defensive mechanism. The Biodiversity Park has been so enriched by introduction of the wild orch

BIOLOGICAL AGENTS IN THE BIODIVERSITY PARK:

Mammals such as hares, rabbits, rats, cats, mongoose, fox: reptiles sut snakes, lizards, chameleons; birds such as peacock, cuckoo, sparrows, drc insect such as honey-bees, wasps, termites, ants, beetles, lepidopteran. dep hymenopteran insects - are the common agents of animal kingdom chit found in the biodiversity park. Apart from this aquatic and amphibian men arc increasing their strength with growth and development of the ecosy and habitat in the park area. Perhaps, in a few years time there will sustainable food web getting full growth, rather uninterrupted and undisturbed chain could be reality.

The mission of creating this biodiversitv park would go Long wav in further the growth and conservation of the Biodiversity in and around Bangalore would restore ecology, land and water for the proper growth of people society

HUMAN (YOUTH) INVOLVEMENT:

For accomplishing this task, around 3000 National Social Service (NSS) volunteers drawn from the affiliated colleges of Bangalore University, were involved, NSS Volunteers numbering about 200 at a time camped for a period of 10 days at the Jnanabharathi campus and participated in the development of the park. They were also given theoretical and practical training in nurturing the plants and were imparted knowledge about these plants as well as their utility,

ECO-UTILITY CHARTER
FOR JNANABIIAITHI CAMPUS BIO-PARK

Dr.K. Siddappa, former Vice-Chancellor, Bangalore University.
A.N. Yellappareddy Reddy Advisor, Bio-Diversity park/ Bangalore University.
S.Narayanswamy, Superintendent, Garden Dept. And Co-Ordinator, Biodiversity Park, Bangalore University.

INTRODUCTION:

Pre and post independence era has witnessed an unchecked transformation and devastation of most sensitive and productive landscapes in the Karnataka State. With the result the bio and hydro system's were drastically altered and fragmented. The ecosystem has lost the. Organic structure due to degradation and depletion of renewable biological resources and the very fabric of sensitive biological diversity itself,, which has a unique value.

It needs well Co-ordinated management of existing eco systems and their expansion the future harvest of forest products play an important role in preventing further degradation of pristine patches of ancient vegetation It could be accomplished by following remedial measures.

I) *by maintaining Games sanctuaries and National Parks as well as buffer*

II) *ex-situ approaches focus on strengthening gene banks and maintains of Biological reserves and Botanical gardens Forest tree species of our Western Ghats exceeds over SCO tree species, which occupy in three canopy layers trapping solar energy efficiently. But the advent of modern forestry has focused on less than 20 tree species which have economic value-neglecting all other tree species which performs greater ecological and environmental services and their economic values have yet to be defined. Therefore, there is an urgent need to understand the status of western ghat forest and the genetic resources at the eco systems.*

These undisturbed eco system keeps more than 90% of the green energy, renewable food factories to variety of animals In their vegetation. Therefore, understanding and replicating. The eco systems are important management strategies to be evolved. Thus, the following eco charter is essential to understand the potential economic and ecological values of the natural endowments in view of pressing economic short sighted policies and populated related problems, habitat loss and over exploitation Etc. ,

Several studies Indicate tropical ever-green and semi evergreen trees are robust and large canopy trees which are pollinated by birds and bats Eg.,Croxylone indium . This endangered species planted at Jnanbharathi Campus in the year 1991, The above species started flowering and fruited In the campus This clearly indicates the natural pollinators and vectors for many of the species are found in Bangalore eco systems, Similarly, sun birds, flower peckers which are becoming rare will multiply and play an important role as pollinators for many of the species in the Jnanbharathi Campus, While designing the planting in the Campus adequate care has been taken to incorporate, under story specialist trees ' need' greater attention and care because they may not set; fruit in open areas when raised as mono-culture plantation. To evolve species combination, information about tree architecture, canopy pattern for indigenous under story species is essential to space to harvest Solar energy.

The other important factor needs integrated studies are the olfactory lures which are prevailing among Annonaceae. Ex Myr'sticaca fam. While planting in Bio-Park , consciously, species of climax and pioneering species were inter mixed to provide shade competitions etc And also wide variety of assorted species 'were mixed to create verticle and lateral competition as well as root competition so that a biological competition and hierarchy of species will set In the eco system. This setting of eco-system will provide a unique opportunity to understand the optimum verticle, lateral and .root competition to harness Solar energy as well as nutrients from the soil profiles. The above studies will give us an idea to create three tier or four tier Bi.o-systerns to increase phytomass production, The above mixing of, pioneering and climax species also help to measure the degree of selfing in individual trees and to assess the extent of variations in selfing rates as well as degree of .inbree-ding etc., With the help of electro-Phoretic analysis or enzymes and other procedures would help to identify genetic markers and to measure degree of out-crossing.

Genefow-effeective population size:

Though*, geneflow and effective population size is vital for breeding and conservations the knowledge is very inadequate. To fulfil this, various designs of planting were adopted and a series of clusters have been established in the Bio-Park. The patterns adopted are random and number also adopted basing on the availability of the space and species.

Seed Biology:

Basic information about seed biology of tropical tree species is grossly inadequate. While establishing herbal garden at Jnana Bharathi Campus the inadequacy felt during propogation of sensitive specieso It is important to know seeds viability. Seed dormency Seed germination, storage technology handling etc., especially for viviparous species like Miteria, Artccarpus, Hopea etco, crude nursery techniques were evolved. Knowledge about seed disper al agents also is almost nil thus, the role of forest dynamics and their interactions studies are vital in forest regeneration.

Reproduction and Population Genetic Structure:

Phenological patterns, breeding systems, pollination, seed dispersal mechanisms even for most economically important tree species also has not been studied. Therefore, there is a need to initiate studies of reproductive episodes of tropical forest tree species. And also there is need to integrate ecological and genetic study to understand the dynamics of regeneration. So far, forest managers have paid little attention to understand this important function of natural regeneration and role of Mother trees and they extracted all mother trees and freak elites in the name of selection telling prescriptions practised in the and forest management.

Allele frequencies:

Consciously assorted tree species were introduced in the Jnanabharathi campus to study inter populational combination of alleles and their frequencies in different population. It is a well known fact, that in ever-green forests, the structure of genetic variation within and amc ng species is an inherent feature. Therefore, systematic studies will open new vistas of conservation, propagation and production strategies

Intervention to restore hydrolocfical Impoverishment:

The gee-morphological features of Jnana Bharathi Campus is highly dissected with many valleys and ridges comprising a total catchment of over 5 to 6 thousand hectares of Vrushabhavathi water shed traverses through Jnanabharathi Campus.

Due to severe land degradation the landscape of the campus experiences accelerated erosion and more or less the entire catchment has become impervious land surface due to crustation and comentation. The entire rainfall water falls in the catchment enters V-Valley within 30 to 60 minutes after heavy down pour.

The flash floods are very common in the campus premises. Over 40% to 60% of the total rainfall occurs in the form of flash floods and reaches a V-Valley

within 30 to 60 minutes carrying huge quantity of top soil. The land mass of the Campus is filled with rills and deep to moderate gullies. The urban landscape surrounding J.B.Campus is totally impervious from buildings and aspalted roads.

To evolve Stgategfies to adbust. cultural backlash of globaligation on slaught. The Bio-Park will become a centre to combine traditional knowledge with modern science. Karnataka State has wide range of diversity of soil, climate, fauna and flora and rich in traditional knowledge and technologies. Technology is an expression of human creativity, we should feel proud that we have abundant creative innovation at grass root level which has not been registered in the past and the same trend is continued even today. Hence, there is a need to upgrade and address their knowledge systems developed in the past and as well as recently. The rich diversity of soil, wide range of climate, rainfall pattern and bio-diversity utilisation culture demand a array of technologies to promote human development sustainable and issue like "farmers rights" and " intellectual property rights" related to Environmental degradation, economic growth, unprecedented growth of bio-tech production of biological software etc., are entering in a big way to our country. Here, the role of scientists in the university have moral and ethical duty to build adequate scientific safety net to protect the "Peoples interest " and etc.,

The Universities should become leaders in promoting rural job lead growth,Unfortunately, the farmers today confronting varieties of challenges in the field of costs quality, technology etc, because of varieties of reasons beyond the control of the farmers.

Without bio-diversity lasting human growth and peace will not be possible mainly because non-monetary contribution of biodiversity especially the role of key stone plants trees, creepers, climbers and animals are immeasurable.

All faculties of University should try to develop socially relevant technology delivery systems. Today, not only "know-how" but also they need to know " how to do "know. The University can play a very important role to reach the unreached communities.
in providing technical 'know-how to do now systems.

University should evolve technologiesi influence public to preserve health of our environment, soil, water bodies, mountains, eco systems, marine eco systems, aquatic eco system as well as to develop protocol for live stock management and animal husbandry by growing broder treesand other animal's and liama's.

BIODIVERSITY EX-SITU CONSERVATION STRATEGY IN BANGALORE UNIVERSITY: A CASE STUDY

A.N. Yellappa Reddy Advisor, Bio-Diversity park/ Bangalore University

With an objective of conserving the plant species and to improve the ecology and environment of Jnana Bharathi Campus of 1200 acres of area, a strategy has been conceived by the Bangalore University, where in the plant species of western ghats, irrespective of their status, are planted in the campus of Bangalore University .

In the first phase an area of 100 acres of land at JB Campus has planted during the year 2000. with the threatened and endangered: species of economic, importance, of medicinal importance from Western Ghats. During 2001 another l00 acres land area has been covered by planting. The approach adopted for conservation is Ex-situ conservation. In all about 300 plant species numbering to two lakhs were collected from wild and semi domestic habitats of western ghats area.

A system has been evolved to decrease the mortality of the newly planted saplings by feeding them with rain water harvested through contour trenches, basins and bunds and check dams. It is not exaggerating to mention that more than ninety five percent of the plants planted have survived the severe summer seasons. Subsequently action has been initiated to recharge the underground water of the campus, by construction of minor checkdams and gullyplugs. To maintain the fauna population, the existing bushes. trees and plants are not disturbed. Moreover, they are given proper care by preventing wild fire, which otherwise would have raged them to ground Now they could offer shelter to rodents, birds, reptiles, insects etc for accomplishing this task, around 1725 N.S.S.Volunteers , drawn primarily from he affiliated colleges, of Bangalore ,including the districts of kolarand Tumkur. The N.S.S.Volunteers numbenng to 100 to 300 at a time, had ^amped for a period of 10 days in Jnana Bharathi campus. While attending to the care of the plants. they have undergone educative training , physical labour, Qshramadanjto bring up the Bio-diversity park. They were given theoretical and practical training in nurturing the plants and imparted knowledge about these plants a.s well as then utility.

The strategy adopted by the Bangalore University is unique, for the Bio-diversity park is a demonstration centre for students, researchers, scientists and agriculturists

WHETHER VRISHABAVATHY IS BENEFECIAL OR HARMFUL TO THE JNANBHARATHI CAMPUS

S.Narayanswamy, Garden Superintendent, Bangalore University.

Water, of late, has become a favoured subject for seminars mod conferences all over the world. X feel our present generation has very lately realized the importance of water. Now, a time has coma that water is not a cheap resource. There are speculations that future wars will be fought over water rather than oil for which was wars have been fought already.Though 3/4th of earth surface are covered by water, yet tike remaining 1/4th surface are of earth faces accute water shortage or water deficit. In majority eases waster shortage or water deficit is artificial and man made. Either there is a social inequity in distribution or other problems such as salinity; alkalinity or pepp pollution of water makes itself unusable. There is an old saying I quote "water water every but not a drop to drink" • Perhaps it was a popular saying of sailors and navigators. But this saying hold good even now, that too it holds good here in the very Bangalore University campus popularity called Jnanabharathi.

Bangalore University Jnanabharathi campus is having 11OO acres of vast are engirdled by a rivulet popularily called Vrishabavathy.The rivulet Vrishabavathy is a tributary of Arkavathy river. It flows in the campus, Vrishabavathy was once, not long ago, and about a decade back was flowing with pristive potable water, now it is most dreaded rivulet. Only dirty, obnoxious, highly infectious and contaminated water flows once it was beneficial to Janabharathi now the stream turned out to be harmful stream.

The stream also emits awaful 'odour, it contains harmful microorganisms such as protozoa, bacteria, fungi and what not. Once it was gurgling stream, sow it flows slowly and has become heavy due to industrial pollutants poured into it along its course, white lather shines in the fringes all along its course. Its course covers nearly 2 KMs distance within the campus area, but not a drop of it could be used - whether for tho vegetation or for the population of the campus. The campus has more than one lakh cultivated, mended trees, and plethora of fauna such as rabbits, snakes 9 rodents, jackals, and of course cattle and human beings, But the stream has proved to be detrimental to both fauna and flora of the campus. Even the aquifer system of the campus getting imbalanced as 5 to 6 borewells are running round the clock to feed the population and plants of the campus. There by water table 1ms gone down by 5 to 6 meters during last 5 years. This trend continues in the coming years. Further more, there is every possibility that the contaminated water of Vrishabavathy seep into the aquifer system. Then the whole ground water gets contaminated and turn out to be unfit for not only for the residents but for the plants of the Jnanabharathi .Hence recharging of under ground water by arresting runoff of rain water through infiltration or by harvesting tho rain water in

tho series of check dame in the Jnanbharathi Campus is of utmost necessity to avert the danger of water contamination.

Thus, the sylvan eco friendly campus could be saved. Otherwise the vrishabavathy will be most harmful if measures are not taken to cleanse the Vrishabavathy and to raise ground water table of the campus – The Jnanabharathi. The glory of bangalore with immumerable tanks spread over, and a river Vrishabavathyflowing in it , could have been compared to the premier cities like paris with its river sienna ; London with its river thames and Vienna with river "Danube" but ,alss, that glory could be dreamed or cold be a reality .

Time only will answer.

Apiculture-fast emerging area of Economic Entomology / Zoology

Dr. C. Chandrasekhara Reddy
Department of Zoology, Bangalore University, Bangalore-560 056

Apiculture is the rearing and maintaining of honeybees for production of honey and other products of economic importance. It is rapidly gaining importance as one of the fastest emerging field of modern biology, zooogy and entomology. Apiculture or beekeeping is indispensable and fascinating subject of great interest to the students of life sciences and biological sciencies. Sound knowledge of Apiculture is prerequisite for all entrepreneurs of industries and commererce, medicine and pharmacy, nutrition and confectionary, agriculture and horticulture, plant breeding and genetics. Insights in Apiculture greatly enhance the knowledge of economists, sociologists, engineers and architects. It provides unlimited pleasure and inspritation to hobbyists and nature lovers. Honeybees perhaps are the classical examples of eco-friendly, true social, kinselection, sex determination, altruism and non-predatory and non-reproductive life. Apiculture is perhaps the one of the best interdisciplinary subjects of immense pure and applied value. The essence of bee's life is sacrifice, service and cooperative living. Honeybees are the only well known organisms that covert national waste into national health and wealth. Bees collect nectar and pollen from flower species that otherwise go waste like water flowing into ocean. The study of life history and morphology of honeybee is important in understanding the success and function of colonies in their natural environment.

Apiculture can make useful contribution for enriching and enhancing crop as well as man's life. It is well recognized as one of the best agro-based rural industry. Beekeeping industry is a viable economic activity and a source for a stable occupation for rural masses. Apiculture has lot of potentials and immense applications and has a magnificiant future in all agricultural countries like India. Apiculture can be raised to the status of viable occupation in tropical climates provided there is an appropriate blend of scientific and developmental efforts. Tropical countries are rich in flora, have favourable climate and phenology. It is heartening that the Indian Apiculture is flourishing with Asiatic as well as European honeybees.

Flowers are the main stay in the life of bees. From flowers they obtain pollen, the protein rich food used mostly to feed the brood and nectar, the carbohydrate fluid for the flight, foraging, hive activity and for developing brood. Honeybees are the most important pollinators in agriculture. The honey flow and dearth periods vary from one location to another and with altitudes. A floral calendar which catalogues the flowers, their value to bees, their

abundance and time and duration of bloom, contains essential information for sound management in beekeeping. Floral calendars need to be produced for the ecological regions in which beekeeping is practiced. Floral calendars for several regions can be used to plan for migratory beekeeping. When dearth commences in one ecological region, the bees can be moved to another where bee flowers are abundant. In this way, extra honey crops can be harvested. Floral calendars are useful for keeping the bees for pollination purposes. Good pollen and nectar availability will stimulate active pollination ecology is the fertile area of Apiculture in assessing the floral rewards and bee visitation. Bee attractiveness of a flower is also dependence on the quality and quantity of nectar. Time and duration of flower dehiscence and pollen anthesis decides the frequency of bee visitation.

Pollination is an important input for better and higher production and is indispensable in oil seed, fruit and vegetable seed production. Besides producing increased yield, bee pollination results in formation of well shaped, larger grains and more viable seed than the self pollinated plants. Bee pollination provides part time employment to many farmers, beekeepers and unskilled workers and spare time employment to students, women and underemployed people.

Bio-park of the Jnana Bharathi campus is the paradise for beekeeping as it provides copious quantity of both pollen and nectar through out the year. Naturally, beekeeping in the park greatly enriches floral diversity by increased pollination. Bee flora of bio-park consists of several well known medicinal plants which in turn yields honey of unique medicinal value. The Bio-park is totally free from peticide spray and as such the honey of Bio-park is pure organic honey. Apiary is the star attraction of Biopark. The well established modern apiary can easily be the source of eternal inspiration and education to visitors of all age groups. Apiary- cum- beepark significantly promotes the eco-tourism of jnanabharathi campus.

Apiculture and its role in biodiversity conservation and education

Dr. M.S.REDDY
Centre *for* Apiculture Studies, Department of Zoology, Bangalore University, Jnana Bharathi, Bangalore-560 056, e-mail : jenureddy@yahoo.co.in

Apiculture is a fast emerging economically important subject and it has been recognized as one of the most profitable industries in all developed countries as well as in agriculturally advanced countries. Keeping honeybees in man made hives and managing their activities by employing the various methods of practices is popularly known as beekeeping. Scientific rearing and managing honeybees for the production of honey and other bee products is called Apiculture. Honeybees are widely used for the production of large quantity of honey, beeswax, royal jelly, propolis, pollen and bee venom. Besides the production of bee products, honeybees, stingless bees, bumble bees and other species of bees have been well recognized as the best pollinators of many agricultural, horticultural crops and extensively used in the large scale production of seeds including hybrid seeds. Apiculture/ beekeeping has gradually emerged as one of major areas of eco-tourism and a promising area of health, wealth and education. Bees have been playing a greater role in enhancing the biodiversity of many plant species through pollination and honeybee's innate behaviour of flower constancy and floral fidelity. The emulative skills of bees can be adopted as role model organisms in human wellbeing.

Honeybees and their importance:

Honeybees are the classical examples of converters of natural waste into national health and wealth. No insect has received as much attention as the honeybee not only from a practical point of view, but also in terms of honey and wax production and their value as pollinator, but also from the scientific perspective. Honeybees have fascinated the mankind since the dawn of civilization. Bees always admired for their sustained flight, powerful sting, intimacy with flowers, astonishing industry, well-defined social organization, caste system, division of labour and hygienic behaviour. Cross-pollination and its importance was recognized long time before its biological meaning was understood. There are several species of bees, known to mankind, of which few of them have been identified as honeybees which produce honey and other bee products. Important honeybee species known and identified in India are *Apis cerana (Plate.1)* (Indian hive bee), *Apis mellifera* (Plate-2)(European

honeybee), *Apis dorsata* (Wild bee / rock bee), *Apis florea* (Little bee). Other species like *Apis laboriosa, Apis andreniformis, Apis koschenikovi* in addition, few other sub species have been identified in few regions of Asian countries. Importance of honey and honeybees lies in the fact that, their mention has been made in all religious scriptures. Honey has been used for medicines, as food and to perform religious rituals. Several value added products have been developed which not only enhanced the value of primary product honey and other bee products but also the value of secondary products.

Bee products and their importance:

Honey : Honey is the most important primary product of beekeeping both from a quantitative and an economic point of view. It was also the first bee product used by mankind in ancient times. The history of use of honey is parallel to the history of man and in virtually every culture evidence can be found of its use as a food source and as symbol employed in religious and therapeutic ceremonies. "*Honey is the natural sweet substance produced by honeybees from the nectar of blossoms or from the secretion of living parts of plants or excretions of plant sucking insects on the living parts of plants, which honeybees collect, transform and combine with specific substances of their own, store and leave in the honey comb to ripen and mature*". The average production of honey from *Apis cerana, A. mellifera* and *A dorsata* was 6.7 kg, 25.5 kg and 35.5 kg respectively.

Pollen : Pollen is a protein rich substance collected by bees from the flowers while foraging (Plate-5,6). From a bee's point of view pollen is the most important product of the hive. Bees visit flowers simply to harvest floral rewards for themselves and their larvae. Pollination is an incidental feature of their floral fidelity and the ability of their fuzzy bodies to transport pollen grains. Pollen supplies all the bees nutrients for brood rearing as well as for adult growth and development. Without adequate pollen supplies which are obtained either through foraging of from stores in the form of 'Bee bread' a colony could not long exist. Pollen is being used as natural food supplement having high protein content and great application as an health food. Commercially pollen can be harvested from *A. cerana* and *A. mellifera.*

Royal jelly : Royal jelly is a milky white substance secreted by the hypopharyngeal gland some times called the brood food gland of young worker (nurse) bees to feed young larvae and the adult queen bee. Commercially, royal jelly can be collected while queen rearing. From each strong and well manged colony of *A.mellifera* during a season of 5-6 months can produce approximately 500 gm of royal jelly. Since the product is perishable, producers must have immediate access to proper cold storage in which the royal jelly is stored until it is sold or shifted to the collection centre. Royal jelly has the potential use as a dietary ingredient in both human foods and

for animals. In Asia it is being used as an additive to food vials containing pollen extract and honey.

Propolis : The propolis is a mixture of various quantities of beeswax and resins collected by the honeybees from plants, particularly from flowers and leaf buds. Bees have been observed scraping the protective resins of flower and leaf buds with their mandibles and then carries them to the hive like pollen pellets on their hind legs. These resins are used by worker honeybees to line the inside of next cavities and all brood combs, repair combs, seal small cracks in the hive, reduce the size of the hive entrances. The advantage of propolis is that it has antibacterial and antifungal effects in protecting the colony against diseases.

Beeswax : Beeswax is an another bee product secreted by 4 pairs of wax glands located on the ventral side of worker honeybee. Young bees in the bee hive, after feeding the brood with royal jelly, secrete small platelets and using this they take part in construction of hive with the help of beeswax. Wax is also used for covering the cells filled with ripen honey. For centuries beeswax was appreciated as the best material for making candles. Ancient jewelers and artisans knew how to form delicate objects from wax and cast them later in precious metals. Colours of ancient wall paintings and icons contain beeswax which has remained unchanged for more than 2000 years. Beeswax is being used in medicinal practices and in creams and lotions. Of all the primary bee products it has been and remain the most versatile and most widely used material.

Bee venom: Among the many species of insects, only very few have the ability of defending themselves with sting and venom injection during stinging. All insects that can sting are members of the order Hymenoptera which include ants, wasps and bees. The sting is believed to have evolved from egg laying apparatus of the ancestral hymenopterans species, only females can sting. Honeybees venom is produced by two glands associated with the sting apparatus of worker bees. Honeybee venom is a clear, odourless, watery liquid and contains number of volatile compounds which are easily lost during collection. The toxicity of *Apis cerana* venom has been reported to be twice as high as that of *A.mellifera*. It is being used for treatment of various kinds of ailments.

Bio-park and flora of Jnanabharathi:

The Bio-park region of the jnanabharathi campus is enriched with several hundred species of not only medicinal plants but also large number several other plants like, road side avenue trees *Peltaphorum pterocarpum* (Plate-3) , *Acacia auriculiformis* (Plate-4) Neem, *Syzygium cuminii*, Tabebuia, Eucalyptus, Coconut in some parts., several hundred species of herbs and shrubs, gene pool of threatened species of western ghats have diversified flora all through the year which is an ideal green patch and a large lung space for not only to

human beings but also a permanent food reserve for large number of insects, birds, reptiles and mammals and microbial fauna and flora in south western part of Bangalore.

Apiary/Centre for Apiculture studies:

The Centre for Apiculture Studies was established in the midst of biopark of Jnana bhartahi campus by laying the foundation stone on 11th March 2006 by the then Hon'ble Minister for Science and Technology Sri. Ramachandra Gowda in the presence of Prof. Dr.M.S.Thimmappa, the then Vice Chancellor, Bangalore University. The infrastructure facility is being created over the years and the manpower / expertise available in bee science and technology in the University would largely benefit in conservation and sustainability of medicinal plants, and other flora through effective pollination service.

Biodiversity conservation and education:

As a long term plan and as one of the measures for conservation of flora and fauna of the bio-park, it has been proposed to have domesticated honeybee colonies (*Apis cerana indica* and *Apis mellifera*) in different locations to cover the entire bio-park region. Beekeeping in the botanical gardens, bio-parks greatly enriches floral diversity by increased pollination. It has also been proposed to have an ***"International Bee Museum***" as a part of eco-tourism showcasing traditional beekeeping practices, modern bee management practices, observation hives (Glass hives), products etc., arranging special lectures, showing films on bees and beekeeping, conducting traning programmes for beginners, advanced training programmes, Diploma courses in Apiculture, M.Sc., programme in Apiculture and other outreach activities.

" ….imagine there are no bees on this planet earth. There will be no plants, if no plants, no animals. If no plants and animals, man cannot survive"

Plate-1 A frame of *Apis cerana indica* showing brood, pollen and honey stores

Plate-2 Commercial apiary of *Apis mellifera* with super/honey chamber

Photo 3: *Peltophorum pterocarpum* a good source of bee forage in JB campus of Bangalore University

Photo 4: *Acacia auriculiformis* a good source of bee forage in JB campus of Bangalore University

Plate-5 Honeybees collecting pollen and nectar from flowers

Plate – 6 *Apis dorsata* worker bee collecting pollen from flowers

IMPORTANCE OF WETLAND AND ITS ECOSYSTEM

Dr. Bela Zutshi
Department of Zoology, Bangalore University,
Jnana Bharathi, Bangalore-560 056

Freshwater is a single most important natural resource for human well-being, survival and socioeconomic development. It is sensitive to human activites and can be easily over-exploited or polluted. "Hydrologic cycle" comprises nature's method of replenshing, redistributing and purifying the world's natural water resources. It has no specific beginning or ending. This is accomplished by evaporation of liquid water from the Earth's surface into gaseous form which enters the atmosphere as water vapour(clouds) and then it is eventually returned back to Earth's surface by precipitation in the form of rain or snow.

Nature largely dictates the absolute quantity of available water (in the form of precipitation) in a given drainage basin or catchment. However, human water demands fundamentally influence the relative quantity of available water. This is a major impetus for the construction of artificial lakes or impoundments, thereby allowing humans to store water for use as when required.

Water flow or drainage over the land surface represents the part of the hydrologic cycle of most concerns to humans because it represents the primary interface between water resources in nature and human use. The primary factor determining whether precipitation (rain) will seep underground into the soil, or flow over it to streams and rivers, is the type of soil and the extent to which it is already saturated with moisture. The dry soil absorbs the initial precipitation thereby "wetting" the soil. With the increase in the volume and duration of precipitation, the soil becomes saturated with water. Thereby, with the additional precipitation the volume of water carried in drainage channels usually increases with the development of the area and flows over the land surface, rather than seeping into it eventually forming lakes or wetlands.

The Ramsar Convention defines wetlands as areas of water, marsh, or peatland whether natural or artificial, permanent or temporary with water that is static or flowing. Wetlands are a vital support system providing a range of ecological or hydrological functions as recharging groundwater, flood storage, sediment and nutrient retention , fishery habitat and water purification.

Considering all the above findings and literature the water bodies and wet lands are been developed at Bangalore University Biopark, so as to improve the ground water level, fauna, flora and the ecosystem of the campus area.

Relevent Elements Of An Environmentally Sustainable Freshwater Management Plan.

1. The knowledge and information gained by accurate assessment of water problems to be conveyed to decision maker for implimentation.
2. To maximize the benefits of water resources for the people of this and subsequent generations while at the same time ensuring basic social needs and maintenance of beneficial ecosystem services.
3. Incorporating appropriate technologies as rainwater harvesting
4. Public awareness, education and participation – a fundamental need to solve water related problems. To enhance human attitudes to protect and wisely use available water resources.
5. To identify and assess the water needs of aquatic ecosystem and to incorporate these into wetland development plan at an early stage.
6. Proactive approach to water issues is less expensive than remediation a requirement for the ever increasing population and growth of mega-cities and their associated water needs.

Fresh Water is a fundamental feature of a Global landscape.

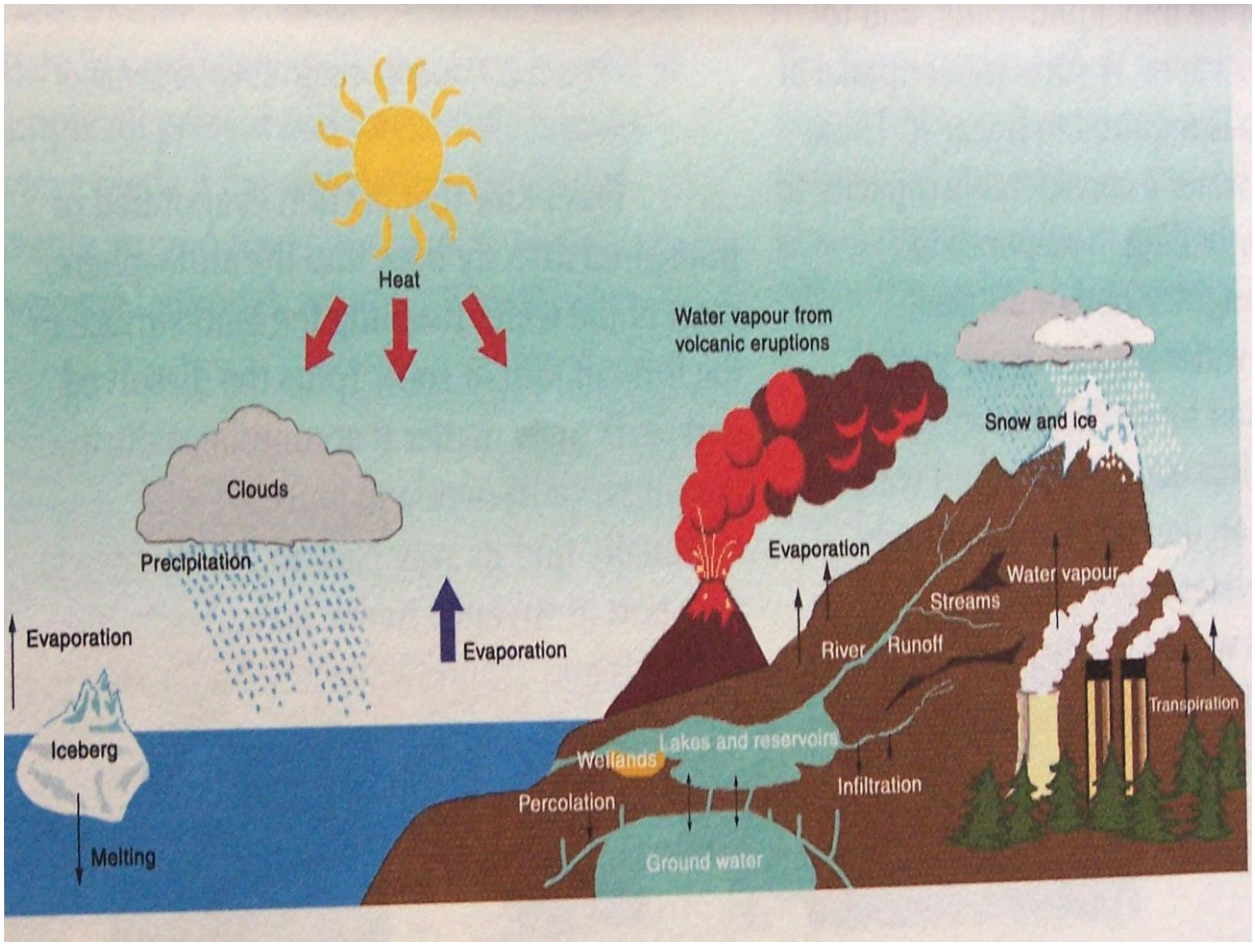


Fig : THE HYDROLOGIC CYCLE

Bangalore University JB Campus- an Ideal habitat for two economically important Semiparsites

Dr. S. R. Ambika, Smitha, G. & Anand raju, V.
Dept. Boatny Bangalore University Bangalore 560056.
ambika_sr2000@yahoo.co.in

Bangalore University Campus **has a congenial habitat for two hemi-parasites of the order** Santalales. ***Dendrophthoe falcata* is a stem parasite and *Santalum album* is a root parasite.**

Though these plants are parasites they do not bring in damage to the host plant but beautify the surrounding and provide nectar and food to insects and birds during winter. Seed dispersal for both the species is by birds. The seeds remain undigested in their droppings and germinate under favorable conditions.

Uses of *Dendrophthoe falcata*

- **To treat asthma**
- **As a tranquillizer for various nervous conditions and for treatment of mental exhaustion**
- **Fractures can be set right by applying the paste of the foliage on the affected region.**
- **To treat various gynecological problems**

Uses of *Santalum album*

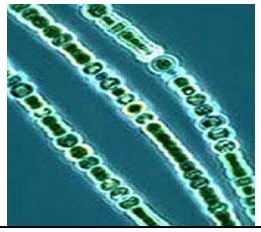
- **Wood and oil are used in incense, perfumes, decorative pieces and in medicine**
- **Alpha- and beta-santalol found in Sandalwood oil possess antibacterial and sedative properties.**
- **Sandalwood oil is used as a medicine for bronchitis and inflammation in mucous tissue.**
- **Sandalwood paste cools and calms the entire body and mind. It affects the circulatory, digestive, respiratory and nervous systems.**
- **It relieves fever, thirst, burning sensation and stops sweating. It is good for fever or overexposure to the sun.**
- **Sandalwood helps the awakening of intelligence. It also aids in the transmutation of sexual energy**

The Diversity of Organisms in a spoon full of soil

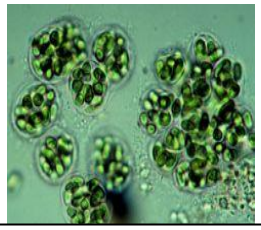
A spoon full of soil (1g has as many microbes that is more than the population of China !!!. And has more diversity than the different types of mammals in the entire world.

Some of the prominent organisms are Cyanobcateria, that fix atmospheric Nitrogen, Soil algae, fix Nitrogen and loosen soil. Rhizobium in association with leguminous roots fix atmospheric Nitrogen and enrich soil with nutrients.

Arthropods with a rich diversity decompose organic matter of the soil while the annelids decompose, mix and process the soil. Besides these, the predatory Nematodes (Fungal & Bacterial feeding) also have a great role in removing the toxic organisms from the spoil and condition it only with beneficial nutrients.



Cyanobacteria- Fix Atmospheric



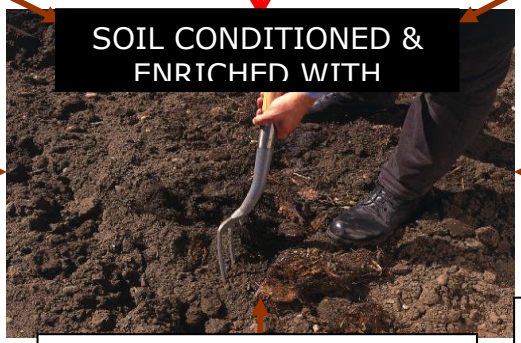
Soil algae- Nitrogen fixation & loosen soil

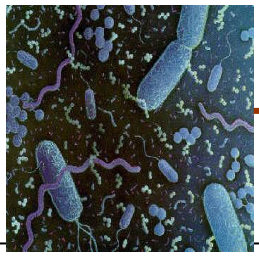
Arthropods- organic matter

Leguminous roots in association with

Annelids – it mixes, decomposes &

SOIL CONDITIONED & ENRICHED WITH

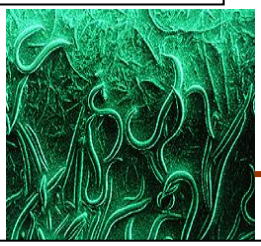




Bacteria- fix nitrogen & accelerate soil

Fungi- form soil aggregates due to

PREDATORY NEMATODES (Regulate nitrogen mineralization for plants by



Bacterial feeding

Fungal feeding

SUCH A SOIL IS IDEAL FOR PLANT

ಬೆಂಗಳೂರು ವಿಶ್ವವಿದ್ಯಾಲಯದ ಜ್ಞಾನಭಾರತಿ ಕ್ಯಾಂಪಸ್‌ನಲ್ಲಿ ಬಯೋಡೈವರ್‌ಸಿಟಿಪಾರ್ಕ್‌ನಿನ (ಜೈವಿಕ ವೈವಿದ್ಯಮಾನ) ಅಭಿವೃದ್ಧಿ ಆಗಿರುವ ಬಗ್ಗೆ ಪ್ರಸ್ತುತ ಸ್ಥಿತಿ ವರದಿ.

ಎಸ್.ನಾರಾಯಣಸ್ವಾಮಿ
ಸಂಚಾಲಕರು ಬಯೋಪಾರ್ಕ್
ತೋಟಗಾರಿಕೆ ಅಧೀಕ್ಷಕರು
ಬೆಂಗಳೂರು ವಿಶ್ವವಿದ್ಯಾಲಯ
ಬೆಂಗಳೂರು – ೫೬

ಎ.ಎನ್. ಯಲ್ಲಪ್ಪರೆಡ್ಡಿ
ಸಲಹೆಗಾರರು ಬಯೋಪಾರ್ಕ್
ಬೆಂಗಳೂರು ವಿಶ್ವವಿದ್ಯಾಲಯ
ಬೆಂಗಳೂರು – ೫೬

ಬೆಂಗಳೂರು ನಗರದ ಒಳಭಾಗದಲ್ಲಿ ಎರಡು ವಿಶಿಷ್ಟ್ಯ ಉದ್ಯಾನಗಳು (ಲಾಲ್‌ಭಾಗ್ ಮತ್ತು ಕಬ್ಬನ್‌ಪಾರ್ಕ್) ಇವು ಬೆಂಗಳೂರು ನಗರಕ್ಕೆ ಒಳ್ಳೆಯ ವಾತವರಣವನ್ನು – ಹಸಿರು,ಆಮ್ಲಜನಕ ಮತ್ತು ಸಸ್ಯರಾಶಿ ಇವುಗಳನ್ನು ನೀಡುತ್ತಿವೆಯಾದರೂ ಇಂದಿನ ಬೆಂಗಳೂರು ನಗರದ ಜನಸಂಖ್ಯೆಗೆ ಇವುಗಳ ಕೊಡುಗೆ ಸಾಕಾಗುತ್ತಿಲ್ಲವೆಂದು ಈ ಹೊಸ ಸಹಸ್ರ ಮಾನದಲ್ಲಿ (೨೦೦೦ನೇ ಇಸವಿ) ಸರ್ವೇಕ್ಷಣ ಮಾಡಿದಾಗ ಗಮನಕ್ಕೆ ಬಂದಿತ್ತು. ವಿಶಾಲವಾಗಿ ಬೆಳೆಯುತ್ತಿರುವ ಬೆಂಗಳೂರು ನಗರಕ್ಕೆ ಮತ್ತೊಂದು ವಿಶಿಷ್ಟ ಉದ್ಯಾನ ಅಗತ್ಯವಿರುವುದು ಅಂದಿನ ಬೆಂಗಳೂರು ವಿಶ್ವವಿದ್ಯಾಲಯದ ಕುಲಪತಿಗಳು ಡಾ. ಕೆ. ಸಿದ್ಧಪ್ಪ ಮತ್ತು ಖ್ಯಾತ ಪರಿಸರವಾದಿ ಶ್ರೀ.ಎ.ಎನ್. ಯಲ್ಲಪ್ಪರೆಡ್ಡಿಯವರು ಮನಗಂಡರು.

ಬೆಂಗಳೂರು ವಿಶ್ವವಿದ್ಯಾಲಯದ ಜ್ಞಾನಭಾರತಿ ಆವರಣವು ಸುಮಾರು ೧೧೦೦ (ಒಂದು ಸಾವಿರದ ಒಂದು ನೂರು) ಎಕರೆ ವಿಸ್ತೀರ್ಣಗಳಲ್ಲಿ ಹೊಂದಿದ್ದು ಹಲವು ರೀತಿಯ ಮಣ್ಣಿನ ವರ್ಗಗಳು, ಹಲವು ರೀತಿಯ ಸಸ್ಯಸಂಪತ್ತು, ಹಲವು ರೀತಿಯ ಪ್ರಾಣಿ ಪಕ್ಷಿಗಳು ಮತ್ತು ಹಲವು ರೀತಿಯ ವಾತವರಣ ಇಲ್ಲಿ ಇದ್ದು ಒಂದು ವಿಶಿಷ್ಟವಾದ ಜೈವಿಕ ವೈವಿದ್ಯವನ (ಐ ಜಾಷಿಣಾಥಿ ಕಿಡಿಂಗ) ವನ್ನು ಸ್ಥಾಪಿಸಲು ವಿಶ್ವವಿದ್ಯಾಲಯದ ಕುಲಪತಿಗಳು ಅಂದಿನ ಸರ್ಕಾರದ ಅರಣ್ಯ ಮಂತ್ರಿಗಳಾದ ಶ್ರೀ.ಕೆ.ಹೆಚ್. ರಂಗನಾಥ್ ಅವರನ್ನು ಕೋರಿದರು. ಅವರು ೧೯೯೯ನೇ ಇಸವಿಯ ಡಿಸೆಂಬರ್ ತಿಂಗಳಲ್ಲಿ ಜ್ಞಾನಭಾರತಿ ಆವರಣಕ್ಕೆ ಭೇಟಿ ನೀಡಿದ್ದರು. ಇಲ್ಲಿ ಈ ವಿನೂತನ ಬಯೋಪಾರ್ಕ್‌ನ್ನು ಸ್ಥಾಪಿಸಲು ಎಲ್ಲ ನೆರವುಗಳನ್ನು ನೀಡುವುದಾಗಿ ಆಶ್ವಾಸನೆ ನೀಡಿದರು.

ಸದರಿ ಬಯೋಪಾರ್ಕ್ ಅಭಿವೃದ್ಧಿಗಾಗಿ ಒಂದು ಪರಿಣಿತ ಸಮಿತಿಯನ್ನು ವಿಶ್ವವಿದ್ಯಾಲಯದಲ್ಲಿ ರಚಿಸಲಾಯಿತು. ಈ ಸಮಿತಿಗೆ ವಿಶ್ವವಿದ್ಯಾಲಯದ ಎಲ್ಲ ಇಲಾಖೆಗಳ ಮುಖ್ಯಸ್ಥರನ್ನು ಹಾಗೂ ಅರಣ್ಯ ಇಲಾಖೆಯ ಹಿರಿಯ ಅಧಿಕಾರಿಗಳನ್ನು ಪರಿಸರ ಅಭಿವೃದ್ಧಿಯಲ್ಲಿ ತೊಡಗಿಕೊಂಡಿರುವ ಕೆಲವು ಸಂಘ ಸಂಸ್ಥೆಗಳನ್ನು (ಎನ್.ಜಿ.ಓ) ಮತ್ತು ಪರಿಸರ ಪರಿಣಿತ ಶ್ರೀ.ಎ.ಎನ್. ಯಲ್ಲಪ್ಪರೆಡ್ಡಿಯವರನ್ನು ಆಮಂತ್ರಿಸಲಾಯಿತು. ಈ ಮಧ್ಯೆ (ಫೆಬ್ರವರಿ ೨೦೦೦) ಬೆಂಗಳೂರು ವಿಶ್ವವಿದ್ಯಾಲಯದ ತೋಟಗಾರಿಕೆ ಇಲಾಖೆಗೆ ಹೊಸದಾಗಿ ಕರ್ನಾಟಕ ಸರ್ಕಾರದ ತೋಟಗಾರಿಕೆ ಇಲಾಖೆಯಲ್ಲಿ ಸೇವೆಸಲ್ಲಿಸುತ್ತಿದ್ದ ಸಹಾಯಕ ತೋಟಗಾರಿಕೆ ನಿರ್ದೇಶಕರು ಎಸ್. ನಾರಾಯಣಸ್ವಾಮಿಯನ್ನು ಪ್ರತಿನಿಯೋಜನೆ ಮೇರೆಗೆ ವಿಶ್ವವಿದ್ಯಾಲಯದ ತೋಟಗಾರಿಕೆ ಇಲಾಖೆಯ ಅಧೀಕ್ಷಕರನ್ನಾಗಿ ನೇಮಿಸಲಾಯಿತು. ಇವರ ಸೇವೆಯನ್ನು ಬಯೋಪಾರ್ಕ್ ಅಭಿವೃದ್ಧಿಗಾಗಿ ಬಳಸಿಕೊಳ್ಳಲು ಇವರನ್ನು ಬಯೋಪಾರ್ಕ್ ಸಮಿತಿಯ ಸಂಚಾಲಕರನ್ನಾಗಿ ವಿಶ್ವವಿದ್ಯಾಲಯದ ಅಧಿಸೂಚನೆ ದಿನಾಂಕ :೫–೫–೨೦೦ ಆದೇಶದಲ್ಲಿ ನೇಮಿಸಲಾಯಿತು.

ಜ್ಞಾನಭಾರತಿ ಆವರಣದಲ್ಲಿ ಬಯೋಪಾರ್ಕ್ ಅಭಿವೃದ್ಧಿಗಾಗಿ ಒಂದು ವಿಸ್ತೃತಿ ಯೋಜನೆಯನ್ನು ಸಿದ್ಧಪಡಿಸಿ ಕರ್ನಾಟಕ ಸರ್ಕಾರದ ಅರಣ್ಯ ಇಲಾಖೆಯು ಮಂಡಿಸಲಾಯಿತು. ಸದರಿ ಯೋಜನೆಯನ್ನು ಅರಣ್ಯ ಇಲಾಖೆಯು ಪುರಸ್ಕರಿಸಿ ಮೊದಲನೆ ಹಂತದಲ್ಲಿ ೭ ಎಕ್ಟೇರ್ (ಸುಮಾರು ೧೧ ಎಕರೆ) ವಿಸ್ತೀರ್ಣದಲ್ಲಿ ೨೦೦೦ ಇಸವಿ ಜೂನ್ ತಿಂಗಳಲ್ಲಿ ಅನುಷ್ಠಾನಗೊಳಿಸಲು ಕೆಲಸ ಶುರುಮಾಡಲಾಯಿತು. ಈ ಯೋಜನೆಯ ರೂಪ ರೇಷೆಗಳು ಈ ರೀತಿ ಇವೆ.

೧. ಇಡೀ ಜ್ಞಾನಭಾರತಿ ಆವರಣವನ್ನು ಸರ್ವೆ ಮಾಡಿಸಲಾಯಿತು.
೨. ಇಲ್ಲಿನ ನೆಲ, ಜಲ, ಸಸ್ಯ, ಮರ, ಹಳ್ಳ, ಕೊಳ್ಳ, ಮೈದಾನ ಪ್ರದೇಶ ಇವುಗಳೆಲ್ಲ ಗಮನಕ್ಕೆ ತೆಗೆದುಕೊಂಡು ಇಡೀ ಪ್ರದೇಶವನ್ನು ಒಂಬತ್ತು (೯ಸೆಕ್ಟರ್) ವಿಭಾಗಗಳಾಗಿ ವಿಂಗಡಿಸಲಾಯಿತು. ಈ ಒಂಬತ್ತು ವಿಭಾಗಗಳನ್ನು ೫ ವರ್ಷಗಳ (ಐದು) ಯೋಜನೆಯಲ್ಲಿ ಹಂತ ಹಂತವಾಗಿ (ಕ್ಷಚಿಜ ತಿಜಿ) ಅಭಿವೃದ್ಧಿ ಪಡಿಸಲು ಯೋಜಿಸಲಾಯಿತು.

೩. ಇಡೀ ಆವರಣದ ಹಳ್ಳ, ಕೊಳ್ಳ, ಕಾಲುವೆ ಇವುಗಳಲ್ಲಿ ಹರಿದು ಹೋಗುವ ಮಳೆ ನೀರನ್ನು ಶೇಖರಿಸಲು ಅಣೆ ಕಟ್ಟುಗಳನ್ನು (ಛಿheಛಿಞ ಆಡಿಚಿಟಿ) ನಿರ್ಮಿಸಲು ಯೋಜಿಸಲಾಯಿತು.

೪. ಬಯೋಪಾರ್ಕ್‌ನಲ್ಲಿ ನೆಡಲು ಪಶ್ಚಿಮ ಘಟ್ಟಗಳಿಂದ ನಾಶಕ ಅಂಜಿನಲ್ಲಿರುವ ಸಸ್ಯಗಳನ್ನು ತಂದು ನೆಡಲು ಯೋಜಿಸಿತು. ಈ ಕೆಳಕಂಡ ಕಾರ್ಯರೂಪ ಉದ್ಯಾನಗಳನ್ನು (ಈuಟಿಛಿಣioಟಿಚಿಟ ಉಚಿಡಿಜeಟಿs) ಅಭಿವೃದ್ಧಿಪಡಿಸಲು ಯೋಜಿಸಿತು. (ಎ) ನಿತ್ಯಹರಿದ್ವರ್ಣ (ಬಿ) ಔಷಧಿಯ ವನಗಳು – ಶುಶ್ರುತವನ, ಚರಕವನ, ಸಂಜೀವವನ (ಸಿ) ಕದಂಬವನ (ಡಿ) ಕ್ಷೀರವನ (ಇ) ವಟವೃಕ್ಷವನ (ಎಫ್) ದೇವ ಕಣಿಗಲುವನ (ಜಿ) ತ್ರಫಲವನ (ಹೆಚ್) ಬಕುಳವನ (ಐ) ಮಧುವನ (ಜೆ) ಅಶ್ವತ್ತವನ (ಕೆ) ಕುಬ್ಜವೃಕ್ಷವನ (ಎಲ್) ಸೌಗಂಧಿಕವನ (ಎಮ್) ಪಂಚವಟಿ (ಎನ್) ಪಂಚವ್ಕಲ ವೃಕ್ಷಧಾಮ (ಓ) ಶ್ರೀತಾಳೇವನ (ಔಡಿಛಿhiಜ ಏouse)

೫. ಜ್ಞಾನಭಾರತಿ ಆವರಣದ ಮಣ್ಣು ಮತ್ತು ನೀರಿನ ಸಂರಕ್ಷಣೆ ಹಾಗೂ ಸದ್ವಿನಿಯೋಗ. '(Soiಟ ಚಿಟಿಜ ತಿಚಿಣeಡಿ ಛಿoಟಿseಡಿvಚಿಣioಟಿ)

೨೦೦೦ನೇ ಇಸವಿ ಜೂನ್ ತಿಂಗಳಲ್ಲಿ ಒಳ್ಳೆಯ ಮುಂಗಾರು ಮಳೆ ಬಿದ್ದು ಜ್ಞಾನಭಾರತಿ ಆವರಣದಲ್ಲಿ ಈ ಬಯೋಪಾರ್ಕ್ ಕೆಲಸಗಳನ್ನು ಶುರುಮಾಡಲು ಒಳ್ಳೆಯ ಶುಭ ಸೂಚನೆ ದೊರೆಕಿತ್ತು. ಯಾವುದೇ ಆಡಂಬರ ಕಾರ್ಯಕ್ರಮವಿಲ್ಲದೆ ಅರಣ್ಯ ಇಲಾಖೆಯ ನೌಕರರು ಮತ್ತು ವಿಶ್ವವಿದ್ಯಾಲಯದ ತೋಟಗಾರಿಕೆ – ತೋಟಗಾರರು ವಿಶ್ವವಿದ್ಯಾಲಯದ ಅತಿಥಿಗೃಹದ ಅಕ್ಕ ಪಕ್ಕ ಹಾಗೂ ಹಿಂಭಾಗದಲ್ಲಿ ಸುಮಾರು ೫೦ ಎಕ್ಟೇರ್ ವಿಸ್ತೀರ್ಣದಲ್ಲಿ (ಸೆಕ್ಟರ್ ಒಂದು) ಕಾಲುವೆಗಳನ್ನು ಗುಂಡಿಗಳನ್ನು ತೋಡಲಾಯಿತು. ಮಳೆ ನೀರು ಹರಿದು ಹೋಗದಂತೆ ಈ ಗುಂಡಿಗಳಲ್ಲಿ ಮತ್ತು ಕಾಲುವೆಗಳಲ್ಲಿ (ಅheಛಿಞ ಜಚಿms) ನೀರು ಶೇಖರಿಸುವ ರೀತಿ ಸಸ್ಯಗಳನ್ನು ನೆಡಲಾಯಿತು. ಮೊದಲನುಯದಾಗಿ ನಿತ್ಯ ಹರಿದ್ವರ್ಣವನ್ನು, ಶ್ರೀಫಲವನ, ಸಂಜೀವಿನಿವನ ಇವುಗಳಲ್ಲಿ ಗಿಡಗಳನ್ನು ನೆಡಲಾಯಿತು. ಮೊದಲನೆ ವರ್ಷದಲ್ಲಿ ಸುಮಾರು ಒಂದು ಲಕ್ಷ ಗಿಡಗಳನ್ನು ನೆಡಲಾಯಿತು. ಇದೇ ಜೂನ್ ತಿಂಗಳಲ್ಲಿ ಮಣ್ಣು ನೀರು ಮತ್ತು ಸಸ್ಯಸಂರಕ್ಷಣೆ ಧ್ಯೇಯವನ್ನು ಇಟ್ಟುಕೊಂಡು ಎನ್.ಎಸ್. ವಿದ್ಯಾರ್ಥಿಗಳು ಬಯೋಪಾರ್ಕ್‌ನಲ್ಲಿ ಸಾವಿರಾರು ಗಿಡಗಳು ನೆಟ್ಟಿರುತ್ತಾರೆ. ಒಂದು ಕೆರೆಯ ಹೊಳುನ್ನು ಹೊರ ತೆಗೆದು ನೀರು ಶೇಖರಿಸಲು ಸಹಕರಿಸಿರುತ್ತಾರೆ. ಬಯೋಪಾರ್ಕ್‌ನಲ್ಲಿ ಕಳೆ, ಪಾರ್ಥೇನಿಯಂ ಇತ್ಯಾದಿಗಳನ್ನು ತೆಗೆದು ಸ್ವಚ್ಛಮಾಡಿರುತ್ತಾರೆ. ಇದೇ ವರ್ಷ ಸೆಪ್ಟಂಬರ್‌ನಲ್ಲಿ ಭಾರತ ಸರ್ಕಾರದ ಜೀವ ತಂತ್ರಜ್ಞಾನ ಇಲಾಖೆಯ ಸಲಹೆಗಾರರು ವಿಶ್ವವಿದ್ಯಾಲಯಕ್ಕೆ ಭೇಟಿಕೊಟ್ಟು ಬಯೋಪಾರ್ಕ್‌ನ್ನು ವೀಕ್ಷಿಸಿರುತ್ತಾರೆ. ಈ ಬಯೋಪಾರ್ಕ್‌ನಲ್ಲಿ ಆಗಿರುವ ಅದ್ಭುತ ಕೆಲಸವನ್ನು (ಖeಛಿoಡಿಜs) ದಾಖಲಿಸಿ ಕೊಂಡಿರುತ್ತಾರೆ. ಇವರ ಶಿಫಾರಿಸ್ಸಿನ ಮೇರೆಗೆ ವಿಶ್ವವಿದ್ಯಾಲಯಕ್ಕೆ ಜೀವ ತಾಂತ್ರಿಕತೆ ಹಾಗೂ ಜೀವ ವೈವಿಧ್ಯತೆ ಬಗ್ಗೆ ಹೆಚ್ಚಿನ ಸಂಶೋಧನೆ ಮಾಡಲು ೮೦ಲಕ್ಷ ರೂಪಾಯಿಗಳ ಧನ ಸಹಾಯವನ್ನು ಮಂಜೂರು ಮಾಡಿರುತ್ತಾರೆ.

ಮತ್ತೊಂದು ಗಮನಿಸಬೇಕಾದ ವಿಷಯ – ಜ್ಞಾನಭಾರತಿ ಆವರಣದ ನೀಲಗಿರಿ ಮರಗಳ ಜಾಗವನ್ನು ತೆರೆವು ಮಾಡಿ ಅಲ್ಲಿ ಬಯೋಪಾರ್ಕ್‌ನ್ನು ಅಭಿವೃದ್ಧಿಪಡಿಸಲು ಸೆಪ್ಟೆಂಬರ್ ೨೦೦೦ನೇ ಇಸವಿಯಲ್ಲಿ ವಿಶ್ವ ವಿದ್ಯಲಯದ ಸಿಂಡಿಕೇಟ್ ನೀಲಗಿರಿ ಮರಗಳನ್ನು ತೆಗೆಯಲು ಅನುಮತಿ ನೀಡಿತು. ಕರ್ನಾಟಕ ರಾಜ್ಯ ಕೈಗಾರಿಕಾ ನಿಗಮ ಮತ್ತು ವಿಶ್ವವಿದ್ಯಾಲಯವು ಒಪ್ಪಂದವಾಗಿ ಅದರಂತೆ ೧೭೩ಟನ್ ನೀಲಗಿರಿ ಮರಗಳನ್ನು ತೆಗೆಯುವ ಬಗ್ಗೆ ಕರ್ನಾಟಕ ಲೋಕಾಯುಕ್ತರು ಆಕ್ಷೇಪ ಮಾಡಿದರು. ತದನಂತರ ಈ ಬಯೋಪಾರ್ಕ್‌ನಿನ ಧೇಯೋದೇಶಗಳನ್ನು ವಿಶ್ಲೇಷಣೆ ಮಾಡಿದನಂತರ ತಮ್ಮ ಅಪೇಕ್ಷಣೆಯನ್ನು ಕೈಬಿಟ್ಟು ಬಯೋಪಾರ್ಕ್‌ನ್ನು ಲಾಲಾಬಾಗ್ ಮಾದಿರಯಲ್ಲಿ ಅಭಿವೃದ್ಧಿ ಪಡಿಸಲು ಮಾನ್ಯ ಲೋಕಾಯುಕ್ತ ಸಲಹೆ ನೀಡಿರುತ್ತಾರೆ. ನೀಲಗಿರಿ ಮರಗಳನ್ನು ತೆಗೆದ ಸ್ಥಳದಲ್ಲಿ ಮನುಷ್ಯರಿಗೆ ಉಪಯೋಗವಾಗುವಂತಹ ವನಗಳನ್ನು ನಿರ್ಮಿಸಲು ತಿಳಿಸಿರುತ್ತಾರೆ. ಇವರ ಸಲಹೆಗಳನ್ನು ಗಮನದಲ್ಲಿ ಇಟ್ಟುಕೊಂಡು ಈ ನೀಲಗಿರಿ ಮರಗಳನ್ನು ತೆಗೆದಿರುವ ಪ್ರದೇಶದಲ್ಲಿ (ಸೆಕ್ಟರ್ ೪ರಲ್ಲಿ) ಚರಕಗಣವನ, ಶುಶ್ರುತವನ, ಮತ್ತು ಸಂಜೀವಿವನಗಳನ್ನು ಕರ್ನಾಟಕ ವನ ಸಂವರ್ದನಾ ಟ್ರಸ್ಟ್‌ನಿನ ನೆರವಿನೊಂದಿಗೆ ನಿರ್ಮಿಸಲಾಗಿದೆ.

ಸೆಕ್ಟರ್ ೨ರಲ್ಲಿ ೨೦೦೧–೦೨ನೇ ಸಾಲಿನಲ್ಲಿ ೨೫ಎಕರೆ ಪ್ರದೇಶದಲ್ಲಿ ಕರ್ನಾಟಕ ಸರ್ಕಾರದ ಅರಣ್ಯ ಇಲಾಖೆ ಮತ್ತು ದಾನಿಗಳಾದ ಶ್ರೀ. ದೇವರಾಜು ಅವರ ನೆರವಿನಿಂದ ಸುಮಾರು ಹತ್ತು (೧೦)ಸ್ಮೃತಿ ವನಗಳನ್ನು (ಕುಲಪತಿಗಳ ವಾಸಗೃಹ ಹಿಂಭಾಗ) ನಿರ್ಮಿಸಲಾಗಿದೆ. ಇವುಗಳೆಂದರೆ – ಪಂಚವಟಿ ಕದಂಬವನ, ಬಕುಳವನ, ಅಶ್ವತ್ತ, ಅಶೋಕವನ, ಕ್ಷೀರವನ, ದೇವಕಣಿಗಲೆವನ, ವಟವೃಕ್ಷವನ, ಹೊಂಗೆವನ ಮತ್ತು ಬೇವಿನ ವನ. ಈ ವನಗಳಲ್ಲಿ ಸುಮಾರು ೫(ಐದು)ಸಾವಿರ ವೃಕ್ಷಗಳ ಸಸ್ಯಗಳನ್ನು ನೆಡಲಾಗಿದೆ. ಈಗ ಅವು ಆಳೆತ್ತರಕ್ಕೆ ಬೆಳದು ನಿಂತಿವೆ.

ಇದೇ ವರ್ಷದಲ್ಲಿ ಸೆಕ್ಟರಲ್ಲಿ ಸುಮಾರು ೨೫ಎಕರೆ ಪ್ರದೇಶದಲ್ಲಿ ಹಣ್ಣು ಬಿಡುವ ಮರಗಳ ಸಸ್ಯಗಳನ್ನು ಅಂದರೆ ಇದನ್ನು ಮಧುವನ ಎಂದು ಕರೆಯಲಾಗುತ್ತಿದೆ. ಮಾವು, ನೆಲ್ಲಿ, ಹುಣಸೆ, ಹಲಸು, ಕವಳೆ, ಕಾಫಿ, ಪಪಾಯಿ, ಹಿಪ್ಪೀನೇರಳೆ, ನೇರಳೆ ಇತ್ಯಾದಿ ಸಸಿಗಳನ್ನು ನೆಡಲಾಗಿದೆ.

ಸೆಕ್ಟರ್ ೮ – ೯ರಲ್ಲಿ ಇದೇ ವರ್ಷ ಆಡಳಿತ ಕಛೇರಿ ಹಿಂಭಾಗದ ಸುಮಾರು ಒಂದು ನೂರು (೧೦೦) ಎಕರೆ ಪ್ರದೇಶದಲ್ಲಿ ಒಂದು ಲಕ್ಷಕ್ಕೂ ಹೆಚ್ಚಿನ ವಿವಿಧ ಜಾತಿಯ ಮರಮುಟ್ಟು ಮತ್ತು ಮೇವು, ಹಣ್ಣು ಹೂವು ಬಿಡುವಂತಹ ವೃಕ್ಷ ಸಸಿಗಳನ್ನು ನೆಟ್ಟಿದ್ದು ಇವು ಆಳೆತ್ತರಕ್ಕೆ ಬೆಳೆದು ನಿಂತಿವೆ.

೨೦೦೨–೦೩ನೇ ಸಾಲಿನಲ್ಲಿ ಸುಮಾರು ೧೦ ಎಕರೆ ಪ್ರದೇಶದಲ್ಲಿ ಪಂಚವಲ್ಕಲ ವೃಕ್ಷಧಾಮ ಅತ್ತಿ, ಆಲ, ಬಸರಿ, ಗೋಣಿ ಮತ್ತು ಅಶ್ವತಃ ಈ ವೃಕ್ಷಗಳ ಸಸ್ಯಗಳನ್ನು ಒಂದು ಯೋಜನೆ ಮಾದರಿಯಲ್ಲಿ ನೆಡಲಾಗಿದೆ. ಈ ಸ್ಥಳವು ಒಂದು ಗುಡ್ಡದ ಪ್ರದೇಶಗಳಲ್ಲಿದ್ದು ವಿಶ್ವವಿದ್ಯಾಲಯದ ಸುಂದರ ತಾಣವಾಗಲಿದೆ.

೨೦೦೩–೦೪ನೇ ಸಾಲಿನಲ್ಲಿ ಒಂದು ವಿಶೇಷ ಉದ್ಯಾನವನ್ನು (ಕುಬ್ಜವೃಕ್ಷವನ) ರಚಿಸಲಾಯಿತು. ಬೆಂಗಳೂರು ನಗರದ ಬೋನ್‌ಸಾಯ್ ಸ್ಟಡಿ ಸರ್ಕಲ್ ಎಂಬ ಸಂಸ್ಥೆಯು ವಿಶ್ವವಿದ್ಯಾಲಯದ ಜೊತೆ ವ್ಯವಹರಿಸಿ ತಮ್ಮ ಸಂಸ್ಥೆಯಿಂದ ಒಂದು ಸುಂದರವಾದ ಕುಬ್ಜ ವೃಕ್ಷವನ್ನು ಕುಲಪತಿಗಳ ವಾಸಗೃಹದ ಮುಂಭಾಗದ ಆವರಣದಲ್ಲಿ ಅಭಿವೃದ್ಧಿಪಡಿಸಿರುತ್ತಾರೆ. ಈ ಉದ್ಯಾನವನವು ಬಹಳ ಚಿಕ್ಕದಾಗಿದ್ದರೂ ಬಹಳ ಸುಂದರವಾಗಿದ್ದು ಮನಮೋಹಕವಾಗಿದೆ.

೨೦೦೪–೦೫ನೇ ಸಾಲಿನಲ್ಲಿ ಜ್ಞಾನಭಾರತಿ ಆವರಣದ ಒಂದು ಪ್ರಾಕೃತಿಕ ಕಣಿವೆ ಪ್ರದೇಶದಲ್ಲಿ ಸ್ವಾಗಂಧಿಕಾ ಉದ್ಯಾನವನ್ನು (ಂಡಿಠಚಿ ಱಿಡಿಳ) ಅಭಿವೃದ್ಧಿ ಪಡಿಸಲಾಗುತ್ತದೆ. ಸುಗಂಧ ಸುವಾಸನೆ ಬೀರುವಂತಹ ಚಂಪಕಾ, ರಾತ್ರಿರಾಣಿ, ಗುಲಾಭಿ, ಕಾಡು ಸಂಪಿಗೆ, ಮಿಡಿಮಾವು, ನಾಗಸಂಪಿಗೆ, ಪುದಿನಾ, ಇತ್ಯಾದಿಗಳನ್ನು ನೆಡಲಾಗಿದೆ. ಇನ್ನೂ ಹಲವಾರು ಜಾತಿಯ ಮಲ್ಲಿಗೆ ಹೂ ಗಿಡಗಳನ್ನು ತರಿಸಿ ನೆಡಲು ಯೋಜಿಸಲಾಗಿದೆ.

ಈ ಬಯೋಪಾರ್ಕ್‌ಗೆ ಅಂತರ ರಾಷ್ಟ್ರೀಯ ಸ್ಥಾನಮಾನವು ದೊರಕಿದೆ. ಇತ್ತೀಚಿಗೆ ಸಿಂಗಪುರ ದೇಶದ ಪರಿಸರ ಇಲಾಖೆಯಿಂದ (ಇಟಿತುಡಿಔಟಿಟಚಿಟಿಣ ಛಿಟಚಿಟಿಛಿಟ) ಸುಮಾರು ೨೦ ವಿದ್ಯಾರ್ಥಿಗಳು ಬಯೋಪಾರ್ಕ್‌ಗೆ ಬೇಟಿಕೊಟ್ಟಿರುತ್ತಾರೆ. ಬೆಂಗಳೂರು ವಿಶ್ವವಿದ್ಯಾಲಯದ ಎನ್.ಎಸ್. ವಿದ್ಯಾರ್ಥಿಗಳೊಂದಿಗೆ ಶ್ರಮದಾನ ಮಾಡಿ ಬಯೋಪಾರ್ಕ್‌ಗೆ ಹಲವಾರು ಸಸ್ಯ ಗಿಡಗಳನ್ನು ವಿಶ್ಲೇಷಣೆ ಮಾಡಿರುತ್ತಾರೆ. ಈ ಗಿಡಗಳ ಬಗ್ಗೆ ಚಿತ್ರ ಸಂಪದ (ಂಟಭಿಚಿ) ವನ್ನು ಪ್ರಕಾಶಿಸುತ್ತಾರೆ.

ಕಳೆದ ವರ್ಷ ಕೆನಡಾ ದೇಶದ ಪರಿಸರ ಪ್ರಜ್ಞೆ ಹೊಂದಿರುವ ಕೆನಡಿಯನ್ ಕ್ಲಿನ್ ಟೆಕ್ನಾಲಜಿ ಸಂಸ್ಥೆಯ ವ್ಯವಸ್ಥಾಪಕ ನಿರ್ದೇಶಕರು ಬಯೋಪಾರ್ಕ್‌ಗೆ ಭೇಟಿ ನೀಡಿ ಇದನ್ನು ಮುಕ್ತ ಕಂಠದಿಂದ ಹೊಗಳಿರುತ್ತಾರೆ. ಎನ್.ಎನ್.ಎಸ್. ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ ಒಂದು ಪ್ರವಚನವನ್ನು ನೀಡಿರುತ್ತಾರೆ.

೨೦೦೨ನೇ ವರ್ಷದಲ್ಲಿ ಕೆನಡಾ ದೇಶದ ಟೊರೆಂಟೋ ನಗರದಲ್ಲಿ ನಡೆದ ಅಂತರರಾಷ್ಟ್ರೀಯ ತೋಟಗಾರಿಕೆ ಸಮ್ಮೇಳನದಲ್ಲಿ ಈ ಬಯೋಪಾರ್ಕ್ ಬಗ್ಗೆ ಒಂದು ಪ್ರಬಂಧವನ್ನು ಬಯೋಪಾರ್ಕ್ ಸಂಚಾಲಕರಾದ ತೋಟಗಾರಿಕೆ ಅಧೀಕ್ಷಕ ಎಸ್. ನಾರಾಯಣಸ್ವಾಮಿಯವರು ಮಂಡಿಸಿರುತ್ತಾರೆ.

ಬೆಂಗಳೂರು ನಗರದಲ್ಲಿ ಇತ್ತೀಚಿಗೆ ಮಳೆಗಾಳಿಗೆ ಹಲವಾರು ವೃಕ್ಷಗಳು ಬಿದ್ದು ಹೋಗಿದ್ದು ಇದರಿಂದ ಪ್ರಾಣಹಾನಿ, ಆಸ್ತಿಹಾನಿ ಆಗಿರುತ್ತದೆ. ಬಯೋಪಾರ್ಕ್ ಸಲಹೆಗಾರರಾದ ಶ್ರೀ.ಎ.ಎನ್. ಯಲ್ಲಪ್ಪ ರೆಡ್ಡಿಯವನ್ನು ಈ ವೃಕ್ಷಗಳ ಬಗ್ಗೆ ಅಧ್ಯಯನ ಮಾಡಲು ಕೋರಿರುತ್ತಾರೆ. ಈ ಸಂಬಂಧ ಬೆಂಗಳೂರು ವಿಶ್ವವಿದ್ಯಾಲಯದ ಸಹಯೋಜನೆಯೊಂದಿಗೆ ಭಾರತೀಯ ವೃಕ್ಷ ಸಂಘವು 'ವೃಕ್ಷಗಳ ಯೋಜನೆ ಹಾಗೂ ಬೆಳವಣಿಗೆ ಬಗೆ" ಒಂದು ವಿಚಾರ ಸಂಕಿರಣವನ್ನು ಯೋಚಿಸಲಾಗಿತ್ತು. ಮಾನ್ಯ ಕುಲಪತಿಗಳು ಈ ಸಂದರ್ಭದಲ್ಲಿ ಬಯೋಪಾರ್ಕ್‌ನಲ್ಲಿ ಬೆಳೆದಿರುವ ಮೂರು ಲಕ್ಷ ವೃಕ್ಷಗಳ ಬಗ್ಗೆ ಮಾಹಿತಿಯನ್ನು ನೀಡಿರುತ್ತಾರೆ.

ಬಯೋಪಾರ್ಕ್‌ಗೆ ಇಡೀ ಭಾರತದಲ್ಲಿಯೇ ಒಂದು ವಿಶಿಷ್ಟಸ್ಥಾನ ಬಂದಿದೆ. ಬೆಂಗಳ್ರರಿಗೆ ವಿಶ್ವದಲ್ಲಿಯೇ ಒಂದು ಪ್ರಮುಖ ಸ್ಥಾನವಿರುವುದನ್ನು ಮನಗಂಡು ವಿಶ್ವವಿದ್ಯಾಲಯವು ಈ ಪಾರ್ಕ್‌ನ್ನು "ಬೆಂಗಳೂರು ಬಯೋಪಾಕ" ಎಂದು ನಾಮಕರಣ ಮಾಡಿದೆ. ಈ ಬಯೋಪಾರ್ಕ್‌ನ್ನು ಕಾಪಾಡಿಕೊಂಡು ಹೋಗುವುದು, ನಿರ್ವಹಿಸಿಕೊಳ್ಳುವುದು ಮತ್ತು ಉಪಯೋಗಿಸಿಕೊಳ್ಳೂವುದು ವಿಶ್ವವಿದ್ಯಾಲಯದ ಅಧ್ಯಾಪಕರು ಮತ್ತು ವಿದ್ಯಾರ್ಥಿಗಳ ಜವಾಬಾýರಿಯಾಗಿರುತ್ತದೆ.

ಬಯೋಪಾರ್ಕ್ ಅಭಿವೃದ್ಧಿಗೆ ನೀಡಿರುವ ಸಂಘ ಸಂಸ್ಥೆಗಳು

೧. ಅರಣ್ಯ ಇಲಾಖೆ – ಕರ್ನಾಟಕ ಸರ್ಕಾರ, ಬೆಳಗಾವಿ, ಧಾರವಾಡ, ಹುಬ್ಬಳ್ಳಿ, ಸಿರಸಿ, ಹೊನ್ನಾವರ, ಕೊಡಗು, ಮಡಿಕೇರಿ, ಹಾಸನ, ತುಮಕೂರು, ಕೋಲಾರ, ಮಂಡ್ಯ, ಜಿಲ್ಲೆಗಳಿಂದ ವಿಶೇಷ ವೃಕ್ಷ, ಸಸ್ಯಗಳನ್ನು ತರಿಸಿಕೊಟ್ಟು, ಅವುಗಳನ್ನು ಬಯೋಪಾರ್ಕ್‌ನಲ್ಲಿ ನೆಡಲು ನೆರವು ನೀಡಿದ್ದಾರೆ.

೨. ಕರ್ನಾಟಕ ರಾಜ್ಯ ಅರಣ್ಯ ಕಾರ್ಖಾನೆ ನಿಗಮ ಜ್ಞಾನಭಾರತಿ ಆವರಣದಲ್ಲಿ ಸ್ರಚಿಸಿದ ಪ್ರದೇಶಗಳಲ್ಲಿ ನೀಲಗಿರಿ ಮರಗಳನ್ನು ಸರ್ಕಾರಿ ದರಗಳಲ್ಲಿ ಖರೀದಿ ಮಾಡಿ ಸ್ಥಳವನ್ನು ಬಯೋಪಾರ್ಕ್ ಅಭಿವೃದ್ಧಿಗಾಗಿ ತೆರವು ಮಾಡಿದ್ದಾರೆ.

೩. ಎನ್.ಎಸ್.ಎಸ್. ವಿದ್ಯಾರ್ಥಿಗಳು ಬಯೋಪಾರ್ಕ್‌ನಲ್ಲಿ ಗಿಡಗಳಿಗೆ ನೀರು ಹಾಕಿ, ಪಾತಿ ಮಾಡಿ ಸ್ವಚ್ಛಮಾಡಿರುತ್ತಾರೆ.

೪. ಭಾರತ ಸರ್ಕಾರದ ಕೇಂದ್ರ ನೀರು ಸಂರಕ್ಷಣೆ ಮಂತ್ರಾಲಯ ಬಯೋಪಾರ್ಕ್‌ನಲ್ಲಿ ೫ ಚೆಕ್ ಡ್ಯಾಮ್‌ಗಳನ್ನು ಕಟ್ಟಿಸಿರುತ್ತಾರೆ, ಇದಕ್ಕೆ ತಾಂತ್ರಿಕ ನಿರ್ದೇಶನವನ್ನು ನೀಡಿರುತ್ತಾರೆ.

೫. ಜೀವತಂತ್ರ ಜ್ಞಾನ ಇಲಾಖೆ, ಭಾರತ ಸರ್ಕಾರ ಬಯೋಪಾರ್ಕ್‌ನ ಬೆಳವಣಿಗೆಯನ್ನು ಗಮನಕ್ಕೆ ತೆಗೆದುಕೊಂಡು ಬೆಂಗಳೂರು ವಿಶ್ವವಿದ್ಯಾಲಯದಲ್ಲಿ ಜೀವತಾಂತ್ರಿಕತೆ, ಜೀವ ವೈವಿದ್ಯತೆ ಬಗ್ಗೆ ಹೆಚ್ಚಿನ ಸಂಶೋಧನೆಗಾಗಿ ೮೦ಲಕ್ಷರೂಪಾಯಿಗಳ ಧನ ಸಹಾಯ ನೀಡಿದ್ದಾರೆ.

೬. ಕರ್ನಾಟಕ ವ'ನ ಸಂವರ್ಧನ ಟ್ರಸ್ಟ್ ಹಸಿರು ಹೆಚ್ಚಿಸುವ ವಿನೂತನ ಯೋಜನೆಯನ್ನು ಕೈಗೆತ್ತಿಕೊಂಡು ಬಯೋಪಾರ್ಕ್‌ನಲ್ಲಿ ತಮ್ಮ ಯೋಜನೆಯನ್ನು ಹಮ್ಮಿಕೊಳ್ಳುವ ಚರಕವನ ನಿರ್ಮಿಸುವ ಮೂಲಕ ಇಡೀ ರಾಜ್ಯದಲ್ಲಿ ಸಸ್ಯಗಳನ್ನು ನೆಡುತ್ತಿದೆ.

೭. ಭಾರತೀಯವಿಜ್ಞಾನ ಸಂಸ್ಥೆಯ ಖಖಖಖ ಖಾಡಿಚಿ ವಿಭಾಗವು ಹಲವಾರು ಉಪಯುಕ್ತ ಮರಗಳ ಃಜಿಪಿಡಿಟಿ ಸಸ್ಯಗಳನ್ನು ಬಯೋಪಾರ್ಕ್‌ಗೆ ಒದಗಿಸಿದೆ.

೮. ಬೈಪ್ ಗ್ರಾಮಾಂತರ ಅಭಿವೃದ್ಧಿ ತಿಪಟೂರು, ಸದರೀ ಸಂಸ್ಥೆಯು ಕೃಷಿ ವೈವಿದ್ಯ ಸಸಿ ಬೀಜಗಳನ್ನು ಗಿಡ ಮರ ಸಸಿಗಳನ್ನು ಬಯೋಪಾರ್ಕ್‌ಗೆ ಒದಗಿಸಿದೆ.

೯. ಕೇಂದ್ರ ರೇಷ್ಮೆ ಅಧೀನದ ರೇಷ್ಮೆ ಹುಳ ಮತ್ತು ಹಿಪ್ಪು ನೇರಳೆ ಳಸಸ್ಯಗಳನ್ನು ಒದಗಿಸಿದೆ.

೧೦. ಶ್ರೀ ರಾಮಯ್ಯರೆಡ್ಡಿ – ಹೆಸರಾಂತ ದಾನಿಗಳು ಚರಕವನಕ್ಕೆ ಧನಸಹಾಯ ನೀಡಿದ್ದಾರೆ.

೧೧. ಶ್ರೀ. ದೇವರಾಜು ಕುಟುಂಬದವರು ತಮ್ಮ ಕುಟುಂಬದ ಹೆಸರಿನಲ್ಲಿ ಸ್ಮೃತಿ ವನಗಳ ನಿರ್ಮಾಣಕ್ಕೆ ದೇಣಿಗೆ ನೀಡಿದ್ದಾರೆ.

೧೨. ಶ್ರೀ ದೇವರಾಜ – ತಮ್ಮ ೫೦ನೇ ಜನ್ಮದಿನಾಚರಣೆಯನ್ನು ಬಯೋಪರ್ಕ್‌ನಲ್ಲಿ ಪಂಚವಲ್ಕಲ ವೃಕ್ಷ ದಾಮವನ್ನು ನಿರ್ಮಿಸಲು ದೇಣಿಗೆ ನೀಡುವ ಮೂಲಕ ಆಚರಿಸಿದ್ದಾರೆ.

"ಬೆಂಗಳೂರು ಬಯೋಪಾರ್ಕ್' ಒಂದು ಸಂಕ್ಷಿಪ್ತವರದಿ"
ಅರಣ್ಯ ಇಲಾಖೆಯಿಂದ ವಿಶ್ವವಿದ್ಯಾಲಯದಲ್ಲಿ ನೆಡತೋಪು ಚಟುವಟಿಕೆ

ಜ್ಞಾನಭಾರತಿ ಆವರಣದಲ್ಲಿ ೨೦೦೦–೦೧ನೇ ಸಾಲಿನಲ್ಲಿ ಒಟ್ಟು ೭೦ ಹೆ. ಪ್ರದೇಶದಲ್ಲಿ ಜೀವವೈವಿಧ್ಯ ಉದ್ಯಾವನವನ್ನು ನಿರ್ಮಿಸಲಾಗಿದೆ. ಇದನ್ನು ಸಾಗರೋತ್ತರ ಜಪಾನಿನ ಸಹಕಾರ ಬ್ಯಾಂಕಿನ ನೆರವಿನ ಯೋಜನಿಯಡಿಯಲ್ಲಿ ಕಾರ್ಯಗತಗೊಳಿಸಲಾಗಿದೆ. ಈ ಉದ್ಯಾನವನದಲ್ಲಿ ವಿವಿಧ ಜಾತಿಯ ಒಟ್ಟು ೩೭೦೦೦ ಸಸಿಗಳನ್ನು ನೆಟ್ಟು ಪೋಷಿಸಲಾಗಿದೆ. (ಮಾದರಿ – ೪ರಲ್ಲಿ ೫೦ ಹೆ. ಹಾಗೂ ಮಾದರಿ ೭ರಲ್ಲಿ ೨೦. ಹೆ.)

ಈ ರೀತಿ ನಿರ್ಮಿಸಲಾದ ಜೀವವೈವಿಧ್ಯ ನೆಡುತೋಪಿನಲ್ಲಿ ಹೆಚ್ಚಿನ ಪ್ರಮಾಣದಲ್ಲಿ ಔಷಧಿ ಸಸ್ಯಗಳಿಗೆ ಒತ್ತುಕೊಡಲಾಗಿದೆ. ವಿಶೇಷವಾಗಿ ಹೃದಯಕಾಯಿಲೆ, ಮಧುಮೇಹ, ದೃಷ್ಟಿ ಮಾಂದ್ಯ, ಮೂತ್ರಕೋಶ ತೊಂದರೆ ಇತ್ಯಾದಿಗಳಿಗೆ ಉಪಯುಕ್ತ ಔಷಧಿಗಳನ್ನು ಒದಗಿಸುವ ಸಸ್ಯಗಳ ಪ್ರತ್ಯೇಕ ವನಗಳನ್ನು ನಿರ್ಮಿಸಲಾಗಿದೆ. ರಾಸಾಯನಿಕ ಕೀಟನಾಶಕಗಳ ಬದಲಾಗಿ ಪ್ರಕೃತಿದತ್ತವಾಗದ ಕೀಟನಾಶಕ ಗುಣಗಳನ್ನು ಹೊಂದಿದ ಸಸ್ಯಗಳ ಸಂಶೋಧನೆಗಾಗಿ ಒಂದು ಪ್ರತ್ಯೇಕ ವನವನ್ನು ನಿರ್ಮಿಸಲಾಗಿದೆ.

೨೦೦೦–೦೧ನೇ ಸಾಲಿನಲ್ಲಿ ಪರಿಹಾರಾತ್ಮಕ ನೆಡುತೋಪು ಯೋಜನೆಚುಡಿಯಲ್ಲಿ ೪೦ ಹೆ ಪ್ರದೇಶವನ್ನು ಅರಣ್ಯೀಕರಣಗೊಳಿಸಲು ಕೈಗೆತ್ತಿಕೊಳ್ಳಲಾಗಿದೆ. ಈಗಾಗಲೇ ೧೦ ಹೆ. ಪ್ರದೇಶವನ್ನು ಸಸಿನೆಟ್ಟು ಅಭಿವೃದ್ಧಿಪಡಿಸಲಾಗಿದೆ. ಉಳಿಕೆ ಪ್ರದೇಶವನ್ನು ಮಳೆಗಾಲದಲ್ಲಿ ನೆಟ್ಟು ಅಭಿವೃದ್ಧಿಪಡಿಸಲಾಗುವುದು ಈ ಪ್ರದೇಶದಲ್ಲಿ ಒಟ್ಟು ೮೦,೦೦೦ ಸಸಿಗಳನ್ನು ನೆಟ್ಟು ಹೆಚ್ಚು ಸಾಂದ್ರದ ಉರುವಲು, ಮೇವಿನ ಹಾಗೂ ಹಣ್ಣಿನ ನೆಡುತೋಪು ನಿರ್ಮಾಣದ ಯೋಜನೆ ಇದೆ.

ಈಗ ವನಸಂವರ್ಧನ ಯೋಜನೆಚುಡಿಯಲ್ಲಿ ೨೨ ವಿವಿಧ ವನಗಳನ್ನು ನಿರ್ಮಿಸುವ ಯೋಜನೆ ಇದೆ. ಕೆಲವು ವನಗಳನ್ನು ಉದಾಃ– ಅಶೋಕವನ ಹಾಗೂ ಬೃಹತ್ ಪಂಚವಟಿ ವನಗಳು ಪವಿತ್ರವನಗಳಾಗಿದ್ದು ಆಯರ್ವೇದ ಹಾಗೂ ಆಧ್ಯಾತ್ಮಿಕ ಹಿನ್ನೆಲೆಯನ್ನು ಹೊಂದಿವೆ. ಉಳಿದ ವನಗಳು ಮನುಕುಲಕ್ಕೆ ಅತ್ಯಂತ ಪ್ರಯೋಜನಕಾರಿ ಮರಗಳಾಗಾದ ನೆಲ್ಲಿ, ಬೋರೆ, ರಂಜಲು, ಅಂಟುವಾಳ, ಬಿಲ್ವಪತ್ರೆ, ಬೇಲ, ನೇರಳೆ, ಕದಂಭ, ಮುರುಗಲು ಇತ್ಯಾದಿ ಜಾತಿಯ ಮರಗಳ ವಂಶವನ್ನು ರಕ್ಷಿಸುವ ವಂಶವಾಹಿ ರಕ್ಷಣಾ ನೆಡುತೋಪುಗಳಾಗಿವೆ. ಈ ವಿಶೇಷ ವನಗಳು ಆಯಜಾತಿಯ ಮರಗಳ ಸಂಶೋಧನೆ, ಅಧ್ಯಯನ ಹಾಗೂ ಉತ್ತಮ ತಳಿಗಳ ಅಭಿವೃದ್ಧಿಗೆ ಸಹಾಯಕಾರಿಯಾಗಲಿವೆ. ಒಟ್ಟು ೨೨ ವನಗಳಲ್ಲಿ ಇಂದು ವಿಶ್ವಪರಿಸರದಿನಾಚರಣೆಯ ಅಂಗವಾಗಿ ಸುಮಾರು ೧೨೦೦ ಸಸಿಗಳನ್ನು ನೆಡುವದನ್ನೊಳಗೊಂಡ ವಿವಿಧ ಜಾತಿ ಒಟ್ಟು ೨೫೦೦ ಸಸಿಗಳನ್ನು ನೆಡುವ ಕಾರ್ಯಕ್ರಮವಿದೆ.

ಮೇಲೆ ತಿಳಿಸಿದ ಎಲ್ಲಾ ನೆಡುತೋಪುಗಳ ರಕ್ಷಣೆಗಾಗಿ ೮ ಕಿಮೀ. ಪಶ್ಮದಾಟದಂತಹ ಕಂದಕವನ್ನು ನಿರ್ಮಿಸಿ ಅದರ ಏರಿಯಮೇಲೆ ಬಿದಿರು, ಗೊಬ್ಬರಗಿಡ, ತೇಗ, ಬೀಟೆ, ಹೊನ್ನೆ ಇತ್ಯಾದಿ ಜಾತಿಯ ಸಸ್ಯಗಳನ್ನು ಬೆಳೆಸಿ ಬೇಲಿಯಂತೆ ಜೈವಿಕ ತಡೆಯನ್ನು ನಿರ್ಮಿಸಲಾಗಿದೆ.

ಮೇಲಿನ ಎಲ್ಲಾ ಅಭಿವೃದ್ಧಿ ಕಾರ್ಯಗಳಿಂದ ಉತ್ತಮವಾದ ಮಣ್ಣು ಹಾಗೂ ನೀರಿನ ಸಂರಕ್ಷಣೆಯಾಗಿದ್ದು ವಿಶ್ವವಿದ್ಯಾಲಯದ ಆವರಣದಲ್ಲಿ ಅಂತರ್ಜಲ ಉತ್ತಮವಾಗಿ ಅಭಿವೃದ್ಧಿ ಹೊಂದಿದೆ ಎಂದು ತಿಳಿದು ಬಂದಿದೆ. ಇದಲ್ಲದೆ ವಿವಿಧ ಸಸ್ಯಗಳನ್ನು ಅವಲಂಬಿಸಿ ಜೀವಿಸುವ ಪಕ್ಷಿ ಪ್ರಾಣಿ ಹಾಗೂ ಚಿಟ್ಟೆಗಳ ಸಂಖ್ಯೆಯು ಹೆಚ್ಚುತ್ತಿರುವುದು ಎಲ್ಲರೂ ಗಮನಿಸಬೇಕಾದ ಅಂಶ.

ಚರಕಗಣ ಮತ್ತು ಸುಶ್ರುತಗಣ ವನದ ಕಿರು ಪರಿಚಯ

ಸದಾಕಾಲ ಉದ್ವೇಗ, ಜೀವನದ ಯಾಂತ್ರಿಕತೆ ಹಾಗೂ ಇಂದಿನ ಯುಗದ ವಿಶಿಷ ತೆಯಾದ ವೇಗದ ಕಾಲದೊಂದಿಗೆ ವೇಗವಾಗಿ ಓಡುವ ತವಕ, ಸಾಧ್ಯವಾಗುವಷ್ಟು ಸೌಲಭ್ಯವನ್ನು ಕಂಡುಕೊಳ್ಳಲು ಹವಣಿಸುತ್ತಾ, ಸಾಧನೋಪಕರಣಗಳನ್ನು ಪಡೆಯಲು ಸಿಕ್ಕಿದಷ್ಟು ಅವಕಾಶ ಬಾಚಿಕೊಳ್ಳುವ ಮಹದಾಕಾಂಕ್ಷೆ, ನಿರಂತರ ಸ್ಪರ್ಧೆ, ಸೋಲು, ಗೆಲುವು ಇವೆಲ್ಲದರ ನಡುವೆ ಸಂತೋಷದಲ್ಲಿ ಎಂದು ಹುಡುಕುವ ಕಾಲ ಮಾನವನಿಗೆ ಒಚಿದೊದಗಿದೆ. ಸ್ಥೂಲವಾಗಿ ನೋಡಿದರೆ ನಮ್ಮ ಜೀವನ ವಿಧಾನವೇ

ಈ ರೀತಿಯಾಗಿದ್ದುದೇ ಮುಖ್ಯ ಕಾರಣವೆನಿಸಿದರೆ ಆಶ್ಚರ್ಯವೇನಿಲ್ಲ. ಈ ಎಲ್ಲ ಪರಮಾವಧಿಗಳಿಂದ ಹೊರಬರಲು ಮನುಷ್ಯ ಮತ್ತೆ ಪ್ರಾಚೀನಕಾಲಕ್ಕೆ ಹೋಗಲೇಬೇಕಾಗಿದೆ. ಸುಲಭ, ಉತ್ತಮ, ಗರಿಷ್ಠ ಮಟ್ಟದ ಜೀವನ ಪದ್ಧತಿಯನ್ನು ಹೊಂದಬೇಕಾದರೆ ಅದು ಆರ್ಯರ್ವೇದದಲ್ಲಿ ಹೇಳಿರುವಂತಹ ಜೀವನ ವಿಧಾನದಿಂದ ಮಾತ್ರ ಸಾಧ್ಯ.

ರೋಗಗಳಿಗೆ ಅವಕಾಶವೀಯದೇ ಆಕಸ್ಮಾತ್ತಾಗಿ ಧಾಳಿಯಿಟ್ಟ ರೋಗಗಳನ್ನು ಆಮೂಲಾಗ್ರವಾಗಿ ತೆಗೆದುಹಾಕುವ ಸಾಮರ್ಥ್ಯವಿರುವ ಆಯುರ್ವೇದ ವೈದ್ಯಪದ್ಧತಿ ಕೇವಲ ರೋಗಗಳಿಗೆ ಮಾತ್ರ ಸಂಬಂಧಿಸಿದ್ದಲ್ಲ. ರೋಗಿಯ ಪ್ರಕೃತಿ. ದೇಹರಚನೆ, ಆತನ ಜೀವನ ವಿಧಾನಗಳನ್ನೂ ಸಹ ಅಭ್ಯಸಿಸಿ ಆತನ ದೇಹಕ್ಕೆ ಚಿಕಿತ್ಸೆ ನೀಡುವುದು ಇದರ ವಿಶಿಷ್ಟತೆ. ಪ್ರಕೃತಿಯ ಮಗುವಾದ ಮಾನವನಿಗೆ ಪ್ರಕೃತಿದತ್ತ ಮೂಲಿಕೆಗಳನ್ನು ಪಯೋಗಿಸಿ ಚಿಕಿತ್ಸೆ ನೀಡಿ ನಿಸರ್ಗಕ್ಕೆ ಇನ್ನೂ ಹತ್ತಿರವಾಗಿಸುವುದು ಗಮನ ಸೆಳೆಯುವ ಅಂಶ.

ಅಯುರ್ವೇದ ಚಿಕಿತ್ಸೆಯ ಪಿತಾಮಹ ಚರಕಾಚಾರ್ಯರ ಮೂಲಗ್ರಂಥವಾದ ಚರಕ ಸಂಹಿತೆಯಲ್ಲಿ, ಚಿಕಿತ್ಸೆಗೆ ಬಳಸಲ್ಪಡುವ ಗಿಡಮೂಲಿಕೆಗಳನ್ನು ಅವುಗಳ ಉಪಯೋಗಕ್ಕೆ ಹಾಗೂ ಪರಿಣಾಮಕ್ಕೆ ತಕ್ಕಂತೆ ವಿಂಗಡಿಸಿ ಪ್ರತಿಯೊಂದು ಗುಂಪಿಗೂ ಒಂದೊಂದು ಹೆಸರನ್ನು ಆಯಾ ಔಷಧಿಗಳ ಕಾರ್ಯಕ್ಕೆ ತಕ್ಕಂತೆ ನೀಡಲಾಗಿದೆ.

ಉದಾಹರಣೆ: 'ವರ್ಣ್ಯಗಣ್ಯ'– ಶ್ರೀಗಂಧ ಕಮಲ, ಜೇಷ್ಠಮಧು, ಮಂಜಿಷ್ಠ ಮುಂತಾದ ಮೂಲಿಕೆಗಳನ್ನೊಳಗೊಂಡಿರುವ ಈ ಗುಂಪಿನ ಔಷಧಿಗಳು ಚರ್ಮದ ಕಾಂತಿಯನ್ನೂ ಪ್ರಭೆಯನ್ನೂ ಹೆಚ್ಚಿಸುವುದೇ ಅಲ್ಲದೆ, ಸುಕ್ಕು, ಚರ್ಮ ಒಣಗುವಿಕೆಯನ್ನು ತಡೆಯುವುದರ ಮೂಲಕ ಚರ್ಮದ ಆರೋಗ್ಯವನ್ನು ಕಾಪಾಡುತ್ತದೆ.

ಹ್ಲಧ್ಯಗಣ : ಮಾವು, ಅಮಟೆಕಾಯಿ, ಓಟೆ ಹುಳು, ಎಲಚಿ, ಮಾದಾಳದಹಣ್ಣು ಮುಂತಾದ ಆಮ್ಲ (ಹುಳಿ) ರಸ, ಪ್ರದಾನವಾಗಿ ಉಳ್ಳ ಈ ಗಣದ ಹತ್ತು ಮೂಲಿಕೆಗಳು ಹೃದಯಕ್ಕೆ ಹಿತಕರವಾಗಿದ್ದು ಹೃದಯದ ಆರೋಗ್ಯವನ್ನು ಕಾಪಾಡುತ್ತವೆ. ಪಾತ್ರೆಯ ಕಿಲುಬನ್ನು ಹುಣಿಸೆಹಣ್ಣಿನ ಹುಳಿಯು ತೆಗೆದುಹಾಕುವಂತೆ ಹೃದಯದ ರಕ್ತನಾಳಗಳ ಜಿಡ್ಡಿನ ಅಂಶವನ್ನು ನಿವಾರಿಸಿ, ಹೃದಯವನ್ನು ಶುದ್ಧಗೊಳಿಸಿ ರೋಗಗಳನ್ನು ನಿವಾರಿಸುತ್ತವೆ.

ಲೇಖನೀಯ ಗಣ :– ಲೇಖನಿಯವೆಂದರೆ ಕೊಬ್ಬನ್ನು ಕರಗಿಸಿ ದೇಹದ ತೂಕವನ್ನು ಇಳಿಸುವಂತಹ ಔಷಧಗಳು, ಸೇರಿಕೊಂಡಿರುವ ಹೆಚ್ಚಿನ ಕೊಬ್ಬನಂಶವನ್ನು ಕರಗಿಸಿ ಶರೀರದ ಬೊಜ್ಜನ್ನು ಕರಗಿಸುತ್ತವೆ.

ಬಹುತೇಕ ಪ್ರಮುಖ ರೋಗ ರುಜಿನಗಳಿಗೆ ಪರಿಣಾಮಕಾರಿಯಾಗಬಲ್ಲ ಮೂಲಿಕೆಗಳ ಈ ೫೦ ಗಣಗಳಲ್ಲಿ ಆಯುರ್ವೇದ ವಿದ್ಯಾರ್ಥಿಗಳೇ ಅಲ್ಲದೇ ಉತ್ತಮ ರೀತಿಯಲ್ಲಿ ಜೀವನ ನಡೆಸಲಿಚ್ಚಿಸುವ ಯಾವುದೇ ಆಸಕ್ತರಿಗೂ ಕೂಡ ಮನದಟ್ಟಾಗುವಂತೆ ಔಷಧೀಯ ವನಸ್ಪತಿ ವರ್ಗೀಕರಿಸಲಾಗಿದೆ. ಅತ್ಯಮೂಲ್ಯವಾದ ಇಂತಹ ಔಷಧಿಯ ಗಿಡಗಳ ಕಡೆಗೆ ಯಂತ್ರದ ಅಧೀನದಲ್ಲಿರುವ ಮಾನವನ ಲಕ್ಷ್ಯವು ಕಡಿಮೆಯಾಗುತ್ತಿರುವಂತಹ ಇಂದಿನ ಕಾಲಮಾನದಲ್ಲಿ ಚರಕೋತ್ತ ಗಣ ಮೂಲಿಕೆಗಳ ಒಂದು ವನವನ್ನು ನಿರ್ಮಿಸುತ್ತಿರುವುದು ಒಂದು ಅತ್ಯುತ್ತಮ ಹೆಜ್ಜೆ. ಸ್ಥಾನಿಕವಾಗಿಯೇ ಅಲ್ಲದೆ, ಇನ್ನೆಲ್ಲಿಯೋ, ಹಿಮಾಲಯ, ವಿಂಧ್ಯಪರ್ವತಗಳಲ್ಲಿ ಮಾತ್ರ ಲಭ್ಯವಿರುವ ಎಲ್ಲಾ ಗಿಡಮೂಲಿಕೆಗಳನ್ನು ಏಕ ಸ್ಥಳದಲ್ಲಿ ಕಾಣಿಸಿಗುವಂತೆ ಮಾಡುವುದು ಇದರ ಮುಖ್ಯ ಉದ್ದೇಶ. ಏಕೆಂದರೆ ಹಿಮಾಲಯದಲ್ಲಿಯೋ ಇನ್ನೂ ಬೇರೆಲ್ಲೋ ದೂರ ಪ್ರದೇಶಗಳಲ್ಲಿ ಮಾತ್ರ ದೊರೆಯುವಂತಹವನಸಂಪತ್ತನ್ನು ವಿದ್ಯಾರ್ಥಿಗಳು ನೋಡುವುದೂ ಕಷ್ಟ, ಉದಾ:– ದೇವದಾರು. ಆಯುರ್ವೇದ ವೈದ್ಯರಿಗೆ ಅವಿನಾಭಾವವಾಗಿರುವ ಗಿಡಮೂಲಿಕೆಗಳ ಗುರುತಿಸುವಿಕೆ ವೈದ್ಯರ ಕುಶಲತೆಯನ್ನು ಹೆಚ್ಚಿಸುವುದರಿಂದ, ವಿರಳವಾದ ಗಿಡಗಳನ್ನು ಇಲ್ಲಿಯೇ ನೋಡುವಂತಾಗುವುದು ಸಂತೋಷಕರವಾದ ಸಂಗತಿ.

ಇಷ್ಟೇ ಅಲ್ಲದೇ ಕಾಡು ಕಡಿದು ಕಾಂಕ್ರೀಟ್ ಕಟ್ಟಡಮಯವಾಗಿರುವ ಈ ಜಗತ್ತಿನಲ್ಲಿ ಅತ್ಯಮೂಲ್ಯ ವನಸಂಪತ್ತು ಕಣ್ಣೀರಿಡತೊಡಗಿದೆ. ಕೆಲವು ಮೂಲಿಕೆಗಳು ಈಗಾಗಲೇ ಕ್ಷಣ್ಮರೆಯಾಗಿವೆ. ಇನ್ನು ಕೆಲವು ಅವಸಾನದ ಅಂಚಿನಲ್ಲಿವೆ. ಇಂತಹ ಅವಸಾನಕ್ಕೆ ಹತ್ತಿರವಾದ ಮೂಲಿಕೆಗಳನ್ನು ಜತನದಿಂದ ಕಾಪಾಡಿ, ಉಳಿಸಿ, ಬೆಳೆಸಿ, ಮನುಕುಲಕ್ಕೆ ಇನ್ನೂ ಹೆಚ್ಚಿನ ಆಯುರಾರೋಗ್ಯಗಳನ್ನು ಕೊಡವಂತಾಗುವುದು ಇನ್ನೊಂದು ಉದ್ದೇಶ.

ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ, ಸಂಶೋಧನಾಸಕ್ತರಿಗೆ, ವೈದ್ಯರಿಗೆ ಉತ್ತಮ ಮಾರ್ಗದರ್ಶಿಯಾಗಬಲ್ಲ ಈ ಯೋಜನೆ ಜನತೆಗೆ ಆಯುರ್ವೇದದ ಅಮುಲ್ಯ ಗಿಡಮೂಲಿಕೆಗಳ ಕುರಿತಾಗಿ ಅರಿವು ಮೂಡಿಸಬಲ್ಲದಾಗಿದೆ, ಸನಾತನ ವೈದ್ಯಪದ್ಧತಿಯ

ಪುನರುಜ್ಜೀವನಕ್ಕೆ ಪ್ರಮುಖ ಸೋಪಾನವಾಗಲಿದೆ. ಇಲ್ಲಿ ಇನ್ನೊಂದು ಸಂಗತಿ ಗಮನ ಸೆಳೆಯುತ್ತದೆ ಏನೆಂದರೆ – ಜೈವಿಕ ಸಮತೋಲನವನ್ನು ಕಾಪಾಡುವುದು ಕೃತಕವಾಗಿ ಬೆಳೆಸುತ್ತಿರುವ ಕಾಡುಗಳಲ್ಲಿ ಒಂದೇ ಪ್ರಭೇದದ ಗಿಡಗಳನ್ನು ಸಾಕಷ್ಟು ಸಂಖ್ಯೆಯಲ್ಲಿ ಬೆಳೆಯುತ್ತಿರುವುದರಿಂದ ಕಾಡಿನ ಸಹಜತೆಯಿಲ್ಲದೇ ಮಣ್ಣಿನಲ್ಲೂ ಕೂಡ ಸತ್ವಗಳಲ್ಲಿ ಏರುಪೇರುಂಟಾಗುತ್ತದೆ. ನೀಲಗಿರಿ ಗಿಡಗಳನ್ನು ನೆಡುವುದರಿಂದಲಂತೂ ಗೊತ್ತೇ ಇದೆ. ಆ ಮರಗಳ ಸಮೂಹದ ನಡುವೆ ಬೇರೆ ಹಸಿರು ಬೆಳೆಯದಿರುವುದು ಕ್ಷಣ್ಣೆದುರಿಗೆ ಸಾಡ್ಷಯಾಗಿದೆ. ವಿವಿಧ ಔಷಧೀಕೀಯ ಗಿಡಗಳನ್ನು ವೈವಿಧ್ಯಮಯವಾಗಿ ನೆಡುವುದರಿಂದ ಕಾಡಿನ ಸಹಜತೆಯನ್ನು ಕಾಯುವುದಲ್ಲದೇ ಜೈವಿಕ ಸಮತೋಲನದತ್ತಲೂ ಲಕ್ಷ್ಯಹರಿಸಿರುವುದು ನಮಗೆ ಗೋಚರವಾಗುತ್ತದೆ.

ಇದೇ ರೀತಿಯಲ್ಲಿ ಈ ವನದ ಪಕ್ಕದಲ್ಲಿ ಸುಶ್ರುತಾಚಾರ್ಯರು ಹೇಳಿರುವಂತಹ ೩೭ ಗಣಗಳ ಮೂಲಿಕೆಗಳನ್ನು ನೆಡುವುದು ಕೂಡ ಕಾರ್ಯರೂಪಕ್ಕೆ ಬರುತ್ತಿದೆ. ಗಿಡಮೂಲಿಕೆಗಳ ರಚನೆಗೆ ಅನುಗುಣವಾಗಿ ಹಾಗೂ ದೋಷಗಳ ಮೇಲಿನ ಪರಿಣಾಮಕ್ಕಾನುಗುಣವಾಗಿ ವಿಂಗಡಿಸಲಾಗಿರುವ ಈ ಗಣಗಳನ್ನು ನೆಡುವ ಯೋಚನೆ ಪ್ರಾರಂವಾಗಿದೆ.

ಭಾರತದಲ್ಲೇ ಏಕೆ ಪ್ರಪಂಚದಲ್ಲೇ ಮೊಟ್ಟ ಮೊದಲಿಗೆ ಕಾರ್ಯರೂಪಕ್ಕೆ ಬರುತ್ತಿರುವಂತಹ ಚರಕೋತ್ತಗಣ ವನದ ಕಲ್ಪನೆ ಬ್ಯಾತ ಪರಿಸರ ಪ್ರೇಮಿ ಪರಿಸರವಾದಿ ಶ್ರೀ ಯಲ್ಲಪ್ಪರೆಡ್ಡಿಯವರದು, ನಿಸರ್ಗದ ಮೇಲಿನ ಪ್ರೇಮಕ್ಕೆ ತಮ್ಮ ಆಶೀರ್ವಾದದ ಅಭಯ ಹಸ್ತ ನೀಡಿ, ಹರಸಿ, ಕಲ್ಪನೆಯ ಕೂಸು ನನಸಾಗಿ ಸಾಕಾರಗೊಳ್ಳುತ್ತಿರುವಂತೆ ಮಾಡುತ್ತಿರುವವರು ಪರಮಪೂಜ್ಯ ಶ್ರೀ ಶ್ರೀ ಶ್ರೀ ಬಾಲಗಂಗಾಧರನಾಥ ಮಹಾಸ್ವಾಮಿಗಳವರು.

ಈ ರೀತಿಯಲ್ಲಿ ಶುಭಾರಂಭಗೊಂಡ ಈ ಯೋಜನೆಗೆ ಪ್ರಥಮ ಕೊಡುಗೆಯಾಗಿ ಬೆಂಗಳೂರು ವಿಶ್ವವಿದ್ಯಾಲಯದ ಕುಲಪತಿಗಳಾದ ಡಾ: ಎಂ.ಎಸ್. ತಿಮ್ಮಪ್ಪ ರವರು ಸ್ಥಳಾವಕಾಶ ಮಾಡಿಕೊಟ್ಟು ಸರ್ವ ರೀತಿಯಲ್ಲಿ ಸಹಕರಿಸಿದ್ದಾರೆ.

ಚರಕೋಕ್ತ ಗಣ ವನದ ವಿಶಿಷ್ಟ ರೀತಿಯ ರಚನೆ, ಗಿಡಮೂಲಿಕೆಗಳ ಗುರುತಿಸುವಿಕೆ, ಸಂಗ್ರಹ ನೆಡುವಿಕೆಯಂತಹ ಪ್ರಮುಖ ಕಾರ್ಯಕ್ಷೇತ್ರದಲ್ಲಿ ತಮ್ಮ ಸಂಪೂರ್ಣ ಸಹಕಾರವನ್ನು ನೀಡಿರುವವರು ಶ್ರೀಕಾಲಭೈರವೇಶ್ವರ ಸ್ವಾಮಿ ಆಯುರ್ವೇದ ವೈದ್ಯಕೀಯ ಮಹಾವಿದ್ಯಾಲಯದ ವೈದ್ಯರು ಹಾಗೂ ವಿದ್ಯಾರ್ಥಿಗಳು.

ಕರ್ನಾಟಕ ವನಸಂವರ್ಧನಾ ಯೋಜನೆ ಮತ್ತು ದಾನಿಗಳಾದಂತಹ ಶ್ರೀಮತಿ ಜಯಮ್ಮ ಮತ್ತು ಶ್ರೀ ಹೆಚ್.ರಾಮಯ್ಯರೆಡ್ಡಿಯವರು ಧನ ಸಹಾಯ ನೀಡಿ ಯೋಜನೆಗೆ ಕೈಗೂಡಿಸಿರುತ್ತಾರೆ.

ಇಷ್ಟೇ ಅಲ್ಲದೇ ಅರಣ್ಯ ಇಲಖೆ ಹಾಗೂ ತೋಟಗಾರಿಕೆ ಇಲಾಖೆಯ ಸಿಬ್ಬಂಧಿಗಳೂ ಸಹ ಯೋಜನೆಯ ಸಫಲತೆಯಲ್ಲಿ ಕಾರಣರಾಗಿರುತ್ತಾರೆ.

ಸಪ್ತ ಋಷಿಗಳಲ್ಲಿ ಒಬ್ಬರಾದ ಭಗವಾನ್ ಆತ್ರೇಯರಿಗೆ ಅಗ್ನಿವೇಶ, ಭೇಲ, ಪರಾಶರ, ಜತುಕರ್ಣ ಕ್ಷಾರಪಾಣಿ ಮತ್ತು ಹಾರೀತ ಈ ಆರುಜನ ಶಿಷ್ಯರು ಭಗವಾನ್ ಆತ್ರೇಯರಿಂದ ಆಯುರ್ವೇದ ಜ್ಞಾನವನ್ನು ಪಡೆದು ವೈದ್ಯ ಗ್ರಂಥಗಳನ್ನು ರಚಿಸಿದರು : ಇದರಲ್ಲಿ ಅಗ್ನಿ ವೇಶನು ಬರೆದ ಅಗ್ನಿವೇಶ ತಂತ್ರವನ್ನು ಚರಕಾ ಚಾರ್ಯರು ಪರಿಷ್ಕರಿಸಿ, ಚರಕ ಸಂಹಿತವನ್ನು ರಚಿಸಿದರು ಮೂಲತಹ ಆತ್ರೇಯ ಶಿಷ್ಯನಾದ ಅಗ್ನಿವೇಶನಿಂದ ರಚಿತವಾಗಿರುವ ಚರಕ ಸಂಹಿತೆಯಿಂದ ಆರಿಸಿ ನಿರ್ಮಿಸಿರುವ ಈ ಚರಕಗಣ ವನಕ್ಕೆ ಭಗವಾನ್ ಆತ್ರೇಯರ ಪೀಠ ಪೂರಕವಾದುದು ಈ ಉದ್ದೇಶದಿಂದ ಚರಕಗಣ ವನದ ಪೂರ್ವ ಭಾಗದಲ್ಲಿ ಎತ್ತರವಾದ ಪ್ರದೇಶದಲ್ಲಿ ಆತ್ರೇಯ ಪೀಠವನ್ನು ಸ್ಥಾಪಿಸಲು ಯೋಜಿಸಲಾಗಿದೆ.

ಇದೇ ರೀತಿ ಆತ್ರೇಯ ಪೀಠದ ಅಡಿಯಲ್ಲಿ ಸಪ್ತ ಋಷಿಮಂಡಲ ಒಂದನ್ನು ರಚಿಸಿ. ಅದರಲ್ಲಿ ಆಯಾ ಋಷಿಗಳಿಗೆ ಪ್ರಿಯವಾದ ಸಸ್ಯಗಳನ್ನು ಬೆಳೆಸಲಾಗುವುದು.

ಚರಕಗಣ ವನದ ತಗ್ಗಾದ ಪ್ರದೇಶದಲ್ಲಿ ಒಂದು ತಾವರೆಯ ಕೊಳವನ್ನು ನಿರ್ಮಿಸಿ ,ಅದರಲ್ಲಿ ವಿವಿಧ ಜಾತಿಯ ಕಮಲ ಪುಷ್ಪಗಳನ್ನು ಬೆಳೆಸುವ ಯೋಜನೆ ಇದೆ.

ಜೇನು ನೊಣಗಳ ವಿಸ್ಮಯ ಜಗತ್ತು ಮತ್ತು ಬೆಂಗಳೂರು ಬಯೋಪಾರ್ಕ್‌ನ ಸಸ್ಯ ಸಂಪತ್ತು

ಡಾ: ಎನ್.ನಾಗರಾಜ,
ಯು.ಜಿ.ಸಿ. ಶೈಕ್ಷಣಿಕ ಸಿಬ್ಬಂದಿ ಕಾಲೇಜು,
ಬೆಂಗಳೂರು ವಿಶ್ವವಿದ್ಯಾಲಯ,
ಬೆಂಗಳೂರು – ೫೬೦೦ ೦೧.

ಶ್ರೀ. ಎಸ್.ನಾರಾಯಣಸ್ವಾಮಿ
ಹಿರಿಯ ಸಹಾಯಕ ತೋಟಗಾರಿಕೆ ನಿರ್ದೇಶಕ,
(ತೋಟಗಾರಿಕೆ ಅಧೀಕ್ಷಕ)
ಬೆಂಗಳೂರು ವಿಶ್ವವಿದ್ಯಾಲಯ, ಬೆಂಗಳೂರು.

ಬೆಂಗಳೂರು ಬಯೋಪಾರ್ಕ್‌ನಲ್ಲಿ ಜೇನು ಸಾಕಾಣಿಕೆ ಕೇಂದ್ರವನ್ನು ಯೋಜಿಸಲಾಗಿದ್ದು, ಇಲ್ಲಿನ ಸಸ್ಯ ಸಂಕುಲಕ್ಕೆ ಇದರಿಂದ ಬಹಳ ಸಹಾಯವಾಗಲಿದೆ. ಜೇನು ಮತ್ತು ಸಸ್ಯ ಇವುಗಳ ಮಧ್ಯೆ ಮಧುರವಾದ ಸಂಬಂಧ (ಖಿಟಟಿಣಾಖಿ ಖಜುಚಿಣಾಟ್ಟಿಖಿ) ಇದೆ. ಜೇನು ಕೃಷಿ ಬಗ್ಗೆ ಈ ಲೇಖನ ಆಸಕ್ತಿ ಮೂಡಿಸಲಿದೆ. ಪ್ರಾಣಿ ಪ್ರಪಂಚದಲ್ಲಿ ತಮ್ಮದೇ ಆದ ವಿಶಿಷ್ಟ ಬಹಳ ಕುತೂಹಲಕಾರಿ ಗುಣಗಳಿಂದ ಪ್ರಸಿದ್ಧವಾಗಿರುವ ಏಕೈಕ ಕೀಟಗಳೆಂದರೆ ಜೇನುನ್ರೊಣಗಳು. ಇವುಗಳು ಮನುಷ್ಯನಿಗೆ ಅಗತ್ಯವಾದ ನೈಸರ್ಗಿಕ ಸಿಹಿ ಎಚಿದೇ ಹೆಸರುವಾಸಿಯಾಗಿರುವ ಜೇನು ತುಪ್ಪವನ್ನು ಗಿಡ ಮರಗಳ ಹೂಗಳಿಂದ ಉತ್ಪತ್ತಿಯಾಗುವ ಮಕರಂದವನ್ನು ಶೇಖರಿಸಿ, ತಮ್ಮ ದೇಹದಲ್ಲಿ ಉತ್ಪತ್ತಿಯಾಗುವ ಕೆಲವು ಕಿಣ್ವಗಳನ್ನು ಸೇರಿಸಿ ರೆಕ್ಕೆ ಬೀಸುವುದರ ಮೂಲಕ ಮಕರಂದದ ತೇವಾಂಶವನ್ನು ಕಡಿಮೆ ಮಾಡಿ ಜೇನು ತುಪ್ಪವನ್ನು ಉತ್ಪಾದಿಸುತ್ತವೆ. ಇವುಗಳಿಂದ ದೊರೆಯುವ ಇತರ ಉತ್ಪನ್ನಗಳಾದ ಜೇನು ಮೇಣ, ಜೇನು ವಿಷ, ರಾಜಶಾಹಿರಸ ಮತ್ತು ಜೇನು ಪರಾಗ ಮತ್ತು ಇದಕ್ಕಿಂತ ಹೆಚ್ಚಾಗಿ ಅನೇಕ ಜಾತಿಯ ಗಿಡ ಮರಗಳು ಮತ್ತು ಬೆಳೆಗಳ ಪರಾಗ ಸ್ಪರ್ಶಕ್ರಿಯಯದಲ್ಲಿ ಪಾಲ್ಗೊಂಡು ತಳಿ ಅಭಿವೃದ್ಧಿ ಪಡಿಸುತ್ತಿರುವ ನೈಸರ್ಗಿಕ ತಳಿವರ್ಧತಗಳಾಗಿವೆ.

ಜೇನು ನೊಣ ಪ್ರಭೇದ'ಗಳು:

ಜೇನು ನೊಣಗಳಲ್ಲಿ ೯ ವಿವಿಧ ಪ್ರಚೋಧಗಳಿವೆ. ಅವುಗಳಲ್ಲಿ ಏಕೈಕ ಪ್ರಬೇಧವು ಇತ್ತೀಚೆಗೆ ಪ್ರಪಂಚದಾದ್ಯಂತ ಕಂಡು ಬಂದರೇ, ಉಳಿದ ೮ ಪ್ರಬೇಧಗಳು ಕೇವಲ ಏಷ್ಯಾಖಂಡದಲ್ಲಿ ಮಾತ್ರ ಕಂಡು ಬರುತ್ತವೆ. ಆದರೆ ಕರ್ನಾಟಕ ರಾಜ್ಯವೂ ಸ್ಫೇರಿದಂತೆ ಭಾರತಾದ್ಯಂತ ೫ ಪ್ರಬೇಧಗಳು ಕಂಡು ಬರುತ್ತಿದ್ದು, ಇವುಗಳಲ್ಲಿ ಏಪಿಸ್ ಸೆರಾವ (ತುಡುವೆ ಜೇನು) (ಅಚಿತಾಥಿ) ಮತ್ತು ಎಪಿನ್ ಮೆಲ್ಲಿಫೆರಾ (ಯೂರೋಪಿಯನ್) ಜೇನು ನೊಣಗಳನ್ನು ಪೆಟ್ಟಿಗೆಗಳಲ್ಲಿ ಸಾಕಣಿ ಮಾಡಬಹುದಾಗಿದೆ. ಕಡ್ಡಿ ಜೇನು (ಎಪಿಸ್ ಪ್ಲೋರಿಯಾ) ಮತ್ತು ಹೆಜ್ಜೇನು (ಎಪಿಸ್ ಡಾರ್ಸೇಟ) ಪ್ರಬೇಧಗಳು ಪರಿಸರದ ಗಿಡ ಮರಗಳ ಕೊಂಬೆಗಳಲ್ಲಿ ಸಾಮಾನ್ಯವಾಗಿ ಗೂಡನ್ನು ಕಟ್ಟುತ್ತವೆ.

ಜೇನು ನ್ರೊಣಗಳು ಎರಿಯನ್ನು (ಅಱಖ) ತಾವೇ ಪ್ರವಿಸಿದ ಶುದ್ಧವಾದ ಮೇಣದಿಂದ ಕಟ್ಟುತ್ತವೆ. ಇವು ಲಂಬಾಕಾರದ ಷಡ್ಬುಜಾಕೃತಿಯ (ಊಜಷಚಿರಿಟಚಿಟ) ಕಣಗಳಿಂದ ಕೂಡಿದ ಎರಿಗಳನ್ನು ಕಟ್ಟಿ ಮರಿಸಾಕಣಿ, ಪರಾಗ ಮತ್ತು ಜೇನು ತುಪ್ಪದ ಶೇಖರಣೆಗೆ ಎರಿಗಳನ್ನು ಬಳಸುತ್ತವೆ. ೯ ಅಕ್ಸಿ ೨ ಡೆಸಿನೋಯಿಕ ಆಮ್ಲವು ರಾಣಿ ನೊಣವು ಪ್ರವಿಸುವ ಜೋದಕ ರಾಸಾಯನಿಕ (ಞಜಾಱಟಚಿಖ) ದ ಮುಖ್ಯ ಅಂಶವಾಗಿದ್ದು ರಾಣಿಯ ಲೈಂಗಿಕ ಕ್ರಿಯೆಯಲ್ಲಿ ಗಂಡು ನ್ರೊಣಗಳನ್ನು ಆಕರ್ಷಿಸಲು ಸಹಕಾರಿಯಾಗಿದೆ.

ಐಸೋ ಪೆಚಿಟ್ಯೆಲ್ ಅಸಿಟೇಟ್ ಎಂಬುದು ಎಚ್ಚರಿಕೆ ನೀಡುವ ಮುಖ್ಯ ಚೋದಕ ರಾಸಾಯನಿಕವಾಗಿದ್ದು, ಆಹಾರ ಶೋಧನೆಯಲ್ಲಿ ಕೆಲಸಗಾರರ ನ್ರೆಣಗಳ ನೃತ್ಸವು ಸಹಕಾರಿಯಾಗುತ್ತದೆ. ಈ ನ್ರೆಣಗಳು ಪಾಲಾಗುವಿಕೆಯ (ಖಿಠಿಚಿಡಿಟಿಚಿಠಿ) ಮೂಲಕ ಕುಟುಂಬಗಳನ್ನು ದ್ವಿಗುಣಗೊಳಿಸುತ್ತದೆ.

ಜೇನು ನೊಣಗಳು ಕುಟುಂಬ ವ್ಯವಸ್ಥೆ:

ಜೇನು ನೊಣಗಳು ಸಂಘ ಜೀವಿಗಳಾಗಿದ್ದು, ಒಂದು ಸುವ್ಯವಸ್ಥಿತ ಜೇನು ಕುಟುಂಬದಲ್ಲಿ ಒಂದೋ ರಾಣಿ ನೊಣ, ಸುಮಾರು ೫ ಸಾವಿರದಿಂದ ೫೦ಸಾವಿರಕ್ಕೂ ಹೆಚ್ಚು ಕೆಲಸಗಾರ ನೊಣಗಳಿರುತ್ತವೆ. ಸಾಮಾನ್ಯವಾಗಿ ನೂರಾರು ಗಂಡು ನ್ರೆಣಗಳು ಹೊಸ ರಾಣಿಗಳು ಬೆಳೆಯುವಾಗ ಮತ್ತು ಪರಾಗ ಮತ್ತು ಮಕರಂದ ಹೆಚ್ಚಾಗಿ ದೊರೆಯುವ ಕಾಲದಲ್ಲಿ ಉತ್ಪತ್ತಿಯಾಗುತ್ತವೆ. ಕೆಲಸಗಾರ ನೊಣಗಳು ತಮ್ಮ ಕುಟುಂಬ ಕೋಸ್ಕರ ಮೊಟ್ಟೆ ಇಡುವುದನ್ನು ಬಿಟ್ಟು ಉಳಿದೆಲ್ಲಾ ಕಾರ್ಯಗಳನ್ನು ಮಾಡುತ್ತವೆ. ಇವು ತಮ್ಮ ಜೀವನಾವಧಿಯ ಮೊದಲ ಮೂರು ವಾರಗಳಲ್ಲಿ ಗೂಡಿನೊಳಗೆ ಮಾಡಬಹ್ಮದಾದಂತಹ ಕಾರ್ಯಗಳನ್ನು ನಿರ್ವಹಿಸಿದರೆ, ಆ ನಂತರದ ದಿನಗಳಲ್ಲಿ ಗೂಡಿನ ಹೊರಗೆ ಮಾಡಬಹುದಾದ ಕೆಲಸಗಳನ್ನು ನಿರ್ವಹಿಸುತ್ತವೆ. ಕೆಲಸಗಾರ ನ್ರೆಣಗಳು ಪ್ರಾಯಕ್ಕನುಗುಣವಾಗಿ ಗೂಡಿನ ಕಾರ್ಯವ್ಯೆಖರಿಯ ಅನುಭವಗಳನ್ನು ಪಡೆಯುತ್ತವೆ. ಶತ್ರುಗಳನ್ನು ಓಡಿಸುವುದಕ್ಕೆ ಶರೀರದ ಹಿಂಭಾಗದ ತುದಿಯಲ್ಲಿ ವಿಶಿಷ್ಟವಾದ ಕೊಂಡಿ ಮತ್ತು ಏರಿಗಳನ್ನು ಕಟ್ಟಲು ಹೊಟ್ಟೆಯಡಿಯಲ್ಲಿ ಮೇಣ ಉತ್ಪಾದಿಸುವ ಗ್ರಂಥಿಗಳು, ಪರಾಗವನ್ನು ಹೊತ್ತು ತರಲು ಹಿಂಗಾಲುಗಳಲ್ಲಿ ಪರಾಗ ಬುಟ್ಟಿ, ಮಕರಂದವನ್ನು ತರಲು ಹೊಟ್ಟೆಯಲ್ಲಿ ಮಧುಕೋಶ ಕುಟುಂಬದ ಇತರ ನ್ರೆಣಗಳನ್ನು ಆಕರ್ಷಿಸಿ ಒಂದೆಡೆ ಕೊಡಲು ಬೇಕಾಗುವ ಆಕರ್ಷಣಾ ದ್ರವವನ್ನು (ಂಣಣಡಿಚಿಛಿಣಚಿಟಿಣ) ಹೊರ ಸೂಸುವ ಗ್ರಂಥಿಗಳು, ಮರಿಗಳನ್ನು ಪೋಷಿಸಲು ರಾಜಶಾಹಿ ರಸವನ್ನು ಉತ್ಪಾದಿಸುವ ಗ್ರಂಥಿಗಳು ಮೊದಲಾದ ವಿಶಿಷ್ಟ ಅಂಗಗಳನ್ನು ಹೊಂದಿರುತ್ತವೆ.

ಒಂದು ಕುಟುಂಬದಲ್ಲಿ ಸಾಮಾನ್ಯವಾಗಿ ಒಂದೇ ರಾಣಿ ನೊಣವಿರುತ್ತದೆ. ಇದು ಪರಿಪೂರ್ಣ ಹೆಣ್ಣು ನೊಣವಾಗಿದ್ದು ಪ್ರಸ್ಥಹಾರಾಟದ ಮೂಲಕ ಸುಮಾರು ೧೫ ರಿಂದ ೨೦ ಗಂಡು ನೊಣಗಳೊಂದಿಗೆ ಜೀವನದಲ್ಲಿ ಕೇವಲ ಒಂದು ಬಾರಿ ಲೈಂಗಿಕ ಸಂಪರ್ಕವನ್ನು ಹೊಂದುತ್ತದೆ. ರಾಣಿ ನೊಣವು ಆಹಾರದ ಅಗತ್ಯಗನುಗುಣವಾಗಿ ಒಂದು ದಿನಕ್ಕೆ ೧೦೦೦ ದಿಂದ ೨೦೦೦ ಮೊಟ್ಟೆಗಳನ್ನಿಡುತ್ತದೆ ಮತ್ತು ತಾನು ಪ್ರವಿಸುವ ಚೋರಕ ರಾಸಾಯನಿಕದಿಂದ (ಕಾಜಡಿಠಿಣಚಿಟಿಜ) ಕುಟುಂಬದ ಎಲ್ಲಾ ಕೆಲಸ ಕಾರ್ಯಗಳನ್ನು ನಿಯಂತ್ರಿಸುತ್ತದೆ. ಇದು ಕೇವಲ ರಾಜ ಶಾಯಿ ರಸವನ್ನು ಮಾತ್ರ ತಿನ್ನುವುದರಿಂದ ೩ ರಿಂದ ೪ ವರ್ಷಗಳ ಕಾಲ ಬದುಕುತ್ತದೆ. ಆದರೆ ಕೆಲಸಗಾರ ನ್ರೆಣಗಳು ಜೇನು ತುಪ್ಪ ಮತ್ತ ಪರಾಗವನ್ನು ತಿನ್ನುವುದರಿಂದ ೪೦ ರಿಂದ ೫೦ ದಿನಗಳವರಿಗೆ ಮಾತ್ರ ಬದುಕಿರುತ್ತವೆ. ಗಂಡು ನೊಣಗಳ ಏಕೈಕ ಕಾರ್ಯವು ರಾಣಿ ನೊಣದೊಂದಿಗೆ ಲೈಂಗಿಕ ಸಂಪರ್ಕ ಹೊಂದುವುದಾಗಿದ್ದು ಅನಂತರ ಸಾಯುತ್ತವೆ. ಇವು ಜೇನು ಕುಟುಂಬದಲ್ಲಿ ಹೆಚ್ಚೆಂದರೆ ೩ ತಿಂಗಳುಗಳ ಕಾಲ ಬದುಕುತ್ತವೆ. ಕೆಲಸಗಾರ ನೊಣಗಳು ವಯಸ್ಸಿಗನುಗುಣವಾಗಿ ಕುಟುಂಬದ ಎಲ್ಲಾ ಕಾರ್ಯಗಳಲ್ಲಿ ತೊಡಗುತ್ತವೆ. ಅವುಗಳೆಂದರೆ ಉಷ್ಣತೆಯನ್ನು ನಿಯಂತ್ರಿಸುವುದು, ಮ್ಯರಿಗಳನ್ನು ಪೋಷಿಸುವುದು, ಏರಿ ಕಟ್ಟುವುದು, ಕಣಗಳಿಗೆ (ಅಜಟಿಟಿಟಿ) ಮುಚ್ಚಳ ಹಾಕುವುದು, ದ್ವಾರ ಪಾಲನೆ, ಪರಾಗ, ಮಕರಂದ, ನೀರು ಮುಂತಾದವುಗಳನ್ನು ತರುವುದು ಇತ್ಯಾದಿ. ಇವು ಯಾವಾಗಲು ಗೂಡಿನಲ್ಲಿ ೩೩–೩೫ ಸೆ. ಉಷ್ಣತೆಯನ್ನು ಕಾಪಾಡುತ್ತವೆ. ಈ ನೊಣಗಳು ಜೇನು ತುಪ್ಪವನ್ನು ಕದಿಯಲು (ಖಿಠಿಛಿಣಚಿಟಿ) ಬರುವ ಮತ್ತು ದಾರಿ ತಪ್ಪಿ ಬರುವ ನೊಣಗಳ ಮೇಲೆ ದಾಳಿ ಮಾಡಿ ಕುಟುಂಬವನ್ನು ರಕ್ಷಿಸುತ್ತವೆ.

ಜೇನು ನೊಣಗಳು ದೇಹದ ಮೇಣದ ಗ್ರಂಥಿಗಳಿಂದ ಸ್ರಲಿತವಾಗುವ ಮೇಣದಿಂದ ಎರಿಯನ್ನು ಕಟ್ಟುತ್ತವೆ. ಎರಿಯು ವಿಸ್ಮಯಕಾರಿಯಾದ ವಾಸ್ತುಶೈಲಿಯಿಂದ (ಂಟಟಿಚಿಡಿಚಿಟಿಚಿ ಂಡಿಛಿಛಿಣಚಿಜಞಛಿಣಣಡಿಜ) ಕೂಡಿ ಕಣಗಳು ಷಟ್ಬುಜಾಕೃತಿಯಲ್ಲಿದ್ದು ಚಿಕ್ಕ ಕಣಗಳಲ್ಲಿ ಕೆಲಸಗಾರ ನೊಣಗಳನ್ನು ಮತ್ತು ದೊಡ್ಡ ಕಣಗಳಲ್ಲಿ ಗಂಡು ನೊಣಗಳನ್ನು ಸಾಕಣೆ ಮಾಡುತ್ತವೆ. ಆದರೆ ರಾಣಿ ನೊಣವನ್ನು ಸಾಕಣೆ ಮಾಡಲು ಕಣಗಳನ್ನು ವಿಶೇಷವಾಗಿ ಉದ್ದ ಹಾಗೂ ದೊಡ್ಡದಾಗಿ ಎರಿಯ ಕೆಳ ತುದಿಯಲ್ಲಿ ಕಟ್ಟುತ್ತವೆ. ಜೇನು ನೊಣಗಳು ನಿರ್ಮಿಸುವ ಎರಿಯ ಕಣಗಳು ಷಡ್ಬುಜಾಕೃತಿಯಲ್ಲಿ ಕಣಗಳ ಭಾರವನ್ನು ತಡೆದುಕೊಳ್ಳುವ ಶಕ್ತಿಯನ್ನು ಪರೀಕ್ಷಿಸಿದಾಗ, ಷಡ್ಬುಜಾಕೃತಿಯ ರಚನೆಯಲ್ಲಿ ಅನೇಕ ಅನುಕೂಲಕರ ಅಂಶಗಳಿರುವುದು ಕಂಡು ಬರುತ್ತದೆ. ವೃತ್ತಾಕಾರ, ತ್ರಿಕೋಣಾಕಾರ, ಚತುರ್ಬುಜಾಕಾರ, ಪಂಚಭುಜಾಕಾರ, ಷಡ್ಬುಜಾಕಾರ ಹಾಗೂ ಅಪ್ಟಭುಜಕಾರ ಇತ್ಯಾದಿಯಾಗಿ ವಿವಿಧ ಆಕಾರದ ಕಣಗಳನ್ನು ಹೋಲಿಸಿ ಚತುರ್ಭುಜಾಕಾರ, ತ್ರಿಭುಜಾಕಾರ ಮತ್ತು ಷಡ್ಬುಜಾಕಾರದ ಕಣಗಳ ಭಾರವನ್ನು ತಡೆದುಕೊಳ್ಳುವ ಶಕ್ತಿಯನ್ನು ಪರೀಕ್ಷಿಸಿದಾಗ, ಷಡ್ಬುಜಾಕಾರದ ಕಣಗಳ ರಚನೆಯಿಂದ ಕಡಿಮೆ ಸ್ಥಳದಲ್ಲಿ ಹೆಚ್ಚು ಕಣಗಳನ್ನು ನಿರ್ಮಿಸಿ ಮೊಟ್ಟೆ ಮರಿಗಳನ್ನು ಸಾಕಲು ಹಾಗೂ ಹೆಚ್ಚು ಆಹಾರದ ಸಂಗ್ರಹಣೆಗೆ ಅವಕಾಶವಾಗುವುದಲ್ಲದೇ, ಸೂಕ್ತ ಕಣಗಳನ್ನು

ರಚಿಸಲು ಬೇಕಾಗುವ ಹೆಚ್ಚಿನ ಮೇಣ, ಸಮಯ ಮತ್ತು ಶ್ರಮ ಕಡಿಮೆಯಾಗಿರುತ್ತದೆ. ಇವು ಒಂದಕ್ಕೊಂದು ಸಮಾನಂತರವಾದ ಅನೇಕ ಎರಿಗಳನ್ನು ನಿರ್ಮಾಣ ಮಾಡುವಾಗ ಎರಿಗಳ ನಡುವಣ ಅಂತರವನ್ನು ನಿರ್ದಿಷ್ಟ ಪ್ರಮಾಣದಲ್ಲಿಡುತ್ತವೆ. ಈ ಅಚಿತರದಲ್ಲಿ ಜೇನು ನೊಣಗಳು ಸರಾಗವಾಗಿ ಸಂಚರಿಸಿ ಕುಟುಂಬದ ವಿವಿಧ ಕೆಲಸ ಕಾರ್ಯಗಳನ್ನು ಸುಲಭವಾಗಿ ನಿರ್ವಹಿಸುತ್ತವೆ. ಈ ಜಾಗವು ಸುಲಭವಾಗಿ ಗಾಳಿ ಮಾಡಲು, ಕಣಗಳಿಂದ ಮರಿಗಳು ಬೆಳವಣಿಗೆಯಾಗಿ ನೊಣಗಳು ಹೊರ ಬರಲು ಮತ್ತು ಕುಟುಂಬದ ಉಷ್ಣತೆಯನ್ನು ನಿಯಂತ್ರಿಸಲು ಅವಶ್ಯಕವಾಗಿರುತ್ತದೆ.

ಜೇನು ನೊಣಗಳಲ್ಲಿ ಮುಖ್ಯವಾಗಿ ಮೂರು ವಿವಿಧ ನೃತ್ಯಗಳನ್ನು ಕಾಣಬಹುದು. ಅವುಗಳೆಂದರೆ, ವೃತ್ತಾಕಾರದ ನೃತ್ಯ, ಬಾಲ ಅಲುಗಾಡಿಸುವ ನೃತ್ಯ, ಮತ್ತು ಹೊಟ್ಟೆಯನ್ನು ಮೇಲೆ ಕೆಳಗೆ ಅಲುಗಾಡಿಸುವ ನೃತ್ಯ. ಇವುಗಳ ವೃತ್ತಾಕಾರದ ನೃತ್ಯವು ಆಹಾರದ ಲಭ್ಯತೆ, ಬಾಲ ಅಲಗಾಡಿಸುವ ನೃತ್ಯ ಆಹಾರದ ದೂರ ಮತ್ತು ಆಹಾರ ಸಿಗುವ ಸ್ಥಳಗಳನ್ನು ತಿಳಿಯಲು ಮತ್ತು ಹೊಟ್ಟೆಯನ್ನು ಮೇಲೆ ಕೆಳಗೆ ಅಲಗಾಡಿಸುವ ನೃತ್ಯವು ಆಹಾರ ತರುಂತೆ ನೊಣಗಳನ್ನು ಪ್ರಚೋದಿಸಲು, ರಾಣಿ ನೊಣದ ಬೆಳವಣಿಗೆಯನ್ನು ನಿಯಂತ್ರಿಸಲು ಮತ್ತು ಕುಟುಂಬ ವಿಭಜನೆಯನ್ನು ತಿಳಿಯಲು ಸಹಾಯಕವಾಗುತ್ತದೆ. ಈ ನೃತ್ಯಗಳು ಎರಿಗಳ ಮೇಲೆ ನಡೆಯುತ್ತವೆ.

ಜೇನು ನೊಣಗಳು ಪ್ರಮುಖ ಆಹಾರವಾದ ಮಕರಂದ ಮತ್ತು ಪರಾಗವನ್ನು ಸಸ್ಯಗಳಿಂದ ಪಡೆಯುತ್ತವೆ. ಪ್ರಪಂಚದ ಸುಮಾರು ೨,೫೦,೦೦೦ ಹೂ ಬಿಡುವ ಸಸ್ಯ ಪ್ರಬೇಧಗಳಲ್ಲಿ ಅನೇಕ ಸಸ್ಯಗಳು ಪರಾಗ ಸ್ಪರ್ಶಕ್ಕಾಗಿ ಜೇನು ನೊಣಗಳನ್ನು ಅವಲಂಬಿಸಿವೆ. ಈ ಸಸ್ಯಗಳಲ್ಲಿ ಸುಮಾರು ೪೦,೦೦೦ ಪ್ರಬೇಧಗಳು ಜೇನು ನೊಣಗಳಿಗೆ ಉತ್ತಮ ಆಹಾರವನ್ನು ಒದಗಿಸುತ್ತವೆ.

ಜೇನು ನೊಣಗಳು ಗಿಡ ಮರಗಳ ಮತ್ತು ಬೆಳೆಗಳ ಪರಾಗ ಸ್ಪರ್ಶ ಕ್ರಿಯೆಯಲ್ಲಿ ಪ್ರಮುಖ ಪಾತ್ರವನ್ನು ವಹಿಸುತ್ತವೆ. ಇವುಗಳ ಕಾಲುಗಳಲ್ಲಿ ಪರಾಗವನ್ನು ಕೊಂಡೊಯ್ಯಲು ಪರಾಗದ ಬುಟ್ಟಿಗಳಿದ್ದು ಇವುಗಳ ಪೂರ್ಣ ಶರೀರ ಹಾಗೂ ಕಾಲುಗಳು ರೋಮದಿಂದ ಅವೃತವಾಗಿರುವುದರಿಂದ ಅಧಿಕ ಸಂಖ್ಯೆಯ ಪರಾಗ ರೊಣಗಳನ್ನು ಹೂವಿನಿಂದ ಹೂವಿಗೆ ವರ್ಗಾಯಿಸಬಲ್ಲವು. ಪರಾಗ ಮತ್ತು ಮಕರಂದಗಳಿಗಾಗಿ ಜೇನು ನೊಣಗಳು ಒಂದು ಬೆಳೆಯನ್ನು ಸಂದರ್ಶಿಸಿದರೆ, ಆ ಬೆಳೆಯಲ್ಲಿ ಅವುಗಳ ಸಂಗ್ರಹಣೆ ಮುಗಿಯುವ ತನಕ ಅದೇ ಬೆಳೆಯನ್ನು ಸಂದಿರ್ಶಸುವುದರಿಂದ ಪರಾಗ ಸ್ಪರ್ಶಕ್ರಿಯೆ ಪರಿಣಾಮಕಾರಿಯಾಗಿರುತ್ತದೆ.

ಈ ರೀತಿ ಜೇನು ನೊಣಗಳು ಮಾನವನಿಗೆ ಜೇನು ತುಪ್ಪ ಮತ್ತು ಇತರ ಪದಾರ್ಥಗಳನ್ನು ನೀಡುವುದಲ್ಲದೇ, ಮನುಷ್ಯನಿಗೆ ತಿಳಿಯದೇ ಬೆಳೆಗಳ ಪಸಲನ್ನು ಹೆಚ್ಚಿಸುತ್ತಿರುತ್ತದೆ. ಇಷ್ಟೆ ಅಲ್ಲ, ಅನೇಕ ಗಿಡ ಮರಗಳು ಜೇನು ನೊಣಗಳಂತಹ ಶ್ರಮ ಕೀಟಗಳನ್ನೇ ಪರಾಗ ಸ್ಪರ್ಶರ ಕ್ರಿಯೆಗೆ ಅವಲಂಬಿಸಿದ್ದು, ಇವುಗಳಿಲ್ಲದಿದ್ದರೋ ಎಷ್ಟೋ ಸಸ್ಯ ಪ್ರಬೇಧಗಳು ನಾಶವಾಗುತ್ತಿದ್ದವು. ಇದರ ಜೊತೆಗೆ ಇವು ಒಂದು ಬೇಧ ಗಿಡದಿಂದ ಮತ್ತೊಂದು ಪ್ರಬೇದ ಗಿಡ ಅಥವಾ ಮರದಿಂದ ಮರಕ್ಕೆ ಪರಕೀಯ (ಅಡ್ಡಿ ಹಾಯುವುದು) ಪರಾಗ ಸ್ಪರ್ಶ ಮಾಡುವುದರಿಂದ ನೈಸರ್ಗಿಕವಾಗಿ ಅಧಿಕ ಫಲನ್ನು ನೀಡುವ ಮಿಶ್ರ ತಳಿಗಳ (ಹೈಬ್ರಿಡ್) ಸೃಷ್ಟಿಯಲ್ಲಿ ಪ್ರಮುಖ ಪಾತ್ರವನ್ನು ವಹಿಸಿ ನೈಸರ್ಗಿಕ ಸಮತೋಲನೆಯನ್ನು (ಪರಿಸರ ಸಮತೋಲನ) ಕಾಪಾಡುತ್ತವೆ.

ಬೆಂಗಳೂರು ಬಯೋಪಾರ್ಕ್‌ನಲ್ಲಿ ಮೂರು ನೂರು ಪ್ರಬೇಧಗಳಲ್ಲಿ ಹಾರಿಸಿರುವ ಮೂರು ಲಕ್ಷ ಗಿಡ ಬಳ್ಳಿ, ಮರಗಳನ್ನು ಬೆಳೆಸಲಾಗಿದೆ, ಇವುಗಳಲ್ಲಿ ಮುಕ್ಕಾಲುಭಾಗ ಹೂ ಬಿಡುವ ಸಸ್ಯ : ಮರಗಳಾಗಿದ್ದು ತಮ್ಮ ಪರಾಗ ಕ್ರಿಯೆಗೆ ಜೇನು ನೊಣಗಳ ಅವಶ್ಯ ಬಹಳ ಇದೆ. ಅದೇ ರೀತಿ ಈಗಾಗಲೇ ಇಲ್ಲಿ ಸ್ಥಾಪಿಸಲಾಗುತ್ತಿರುವ ಜೇನು ಕೃಷಿ ಕೇಂದ್ರದಲ್ಲಿ ಸಾಕಲಾಗುವ ಜೇನು ನೊಣಗಳಿಗೆ ಸಾಕಾಗುವಷ್ಟು ಪುಷ್ಪ ಸಂಪತ್ತು ತುಂಬಿದೆ. ಸಂಶೋಧನಾ ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ ಈ ಬಗ್ಗೆ ಸಂಶೋಧನೆ ಮಾಡಲು ಬಯಲು ಪ್ರಯೋಗಾಲಯ (ಈಗಾಗಲೇ ಪ್ರಾರಂಭಿಸಲಾಗಿದೆ) ಸಿದ್ಧಗೊಂಡಿದೆ. ಸಾರ್ವಜನಿಕರು ಈ ಜೇನು ನೊಣಗಳ ವಿಸ್ಮಯ ಜಗತ್ತನ್ನು ಅಧ್ಯಯನ ಮಾಡಲು ಸೂಕ್ತ ಸ್ಥಳ – ಬಯೋಪಾರ್ಕ್ ಬಯೋಪಾರ್ಕ್‌ನ ಸಸ್ಯ ಸಂಪತ್ತು – ಅಂದರೆ ತಂಗಡಿ ಜಾತಿ, (ಕ್ಯಾಷಿಯಾ) ಹುಣಸೆ, ಕಾಪರ್ ಪಾಡ್ (ಹಳದಿ ಗುಲ್ ಮೊಹರ್) ತನಬರ್ಜಿಯಾ, ತಬೂಬಿಯಾ, ಬಹುನಿಯಾ, ಅಗಸೆ, ಅಶೋಕ, ನಾಗಲಿಂಗ ಪುಷ್ಪ, ಕಮರಾಕ್ಷಿ, ಬಿಳಿಂಬ, ಹೊಂಗೆ, ಇತ್ಯಾದಿ ಮರಗಳು ಹೇರಳವಾಗಿವೆ. ಈ ವೃಕ್ಷ ಸಂಪತ್ತು ಜೇನು ಕೃಷಿಯನ್ನು ಸಾದರಗೊಳಿಸಲು ಸಹಕಾರಿಯಾಗಿದೆ.

ಯುನೆಸ್ಕೋ ಘೋಷಿಸಿರುವ **ಅಂತರರಾಷ್ಟ್ರೀಯ ಭೂಗ್ರಹ – ೨೦೦೮** ಇದಕ್ಕೆ ಸಂಬಂಧಿಸಿದ ಕಾರ್ಯಕ್ರಮಗಳನ್ನು ಬೆಂಗಳೂರು ವಿಶ್ವವಿದ್ಯಾಲಯ ಹಮ್ಮಿಕೊಂಡಿದ್ದು ಈ ಸಂದರ್ಭದಲ್ಲಿ ಜ್ಞಾನಭಾರತಿ ಆವರಣದ ಹಸಿರನ್ನು ಹೆಚ್ಚಿಸಿದ ಮಹಾವ್ಯಕ್ತಿಗಳನ್ನು ಸ್ಮರಿಸಿದೆ ಮತ್ತು ಜೀವಂತ ಇರುವ ವ್ಯಕ್ತಿಗಳಿಗೆ ಸನ್ಮಾನಮಾಡಿದೆ. ಆ ವ್ಯಕ್ತಿಗಳ ಕಿರುಪರಿಚಯ ಇಲ್ಲಿದೆ

ಡಾ॥ ಹೆಚ್. ನರಸಿಂಹಯ್ಯ

ದಿ॥ ಡಾ॥ ಹೆಚ್. ನರಸಿಂಹಯ್ಯನವರು ಬೆಂಗಳೂರು ವಿಶ್ವವಿದ್ಯಾಲಯದ ಉಪ ಕುಲಪತಿಗಳಾಗಿದ್ದ ಅವಧಿಯಲ್ಲಿ ನಗರ ಮಧ್ಯದಿಂದ ಆಡಳಿತ ಕೇಂದ್ರ ಕಛೇರಿಯನ್ನು ಇಲಾಖೆಗಳನ್ನು ನಗರದ ಹೊರ ವಲಯದ ೧೫೦೦ ಎಕರೆ ವಿಸ್ತಾರವುಳ್ಳ ಆವರಣಕ್ಕೆ ಸ್ಥಳಾಂತರಿಸಿದ ಮಹತ್ಕಾರ್ಯವನ್ನು ಮಾಡಿದರು. ಈ ಹೊಸ ಅವರಣಕ್ಕೆ "ಜ್ಞಾನಭಾರತಿ" ಎಂದು ನಾಮಕರಣ ಮಾಡಿದರು. ಬೆಂಗಾಡಾಗಿದ್ದು ಈ ಆವರಣದಲ್ಲಿ ಸಾವಿರಾರು ಸಂಖ್ಯೆಯಲ್ಲಿ ಸಸಿ: ಗಿಡಮರಗಳನ್ನು ನೆಡುವ ಕಾರ್ಯಯೋಜನೆಯನ್ನು ಹಮ್ಮಿಕೊಂಡರು. ಕೆಲವೇ ವರ್ಷಗಳಲ್ಲಿ ಜ್ಞಾನಭಾರತಿ ಆವರಣಕ್ಕೆ ಹಸಿರು ತುಂಬಿದರು. ನಗರದ ಪ್ರತಿಷ್ಠಿತ ಉದ್ಯಾನಗಳಾದ ಲಾಲ್‌ಬಾಗ್ ಮತ್ತು ಕಬ್ಬನ್‌ಪಾರ್ಕ್‌ನಲ್ಲಿರುವ ಪುಷ್ಪ ವೃಕ್ಷಗಳನ್ನು ಇಲ್ಲಿ ತಂದು ನೆಡುವ ಕಾರ್ಯಕ್ಕೆ ಡಾ॥ ಎಂ. ಹೆಚ್.ಮ್ಮರಿಗೌಡರನ್ನು ಸಲಹೆಗಾರರನ್ನಾಗಿ ನೇಮಿಸಿದರು. ಮುಂದಿನ ಹಸರಿ ಯೋಜನೆಗಳಿಗೆ ಭದ್ರ ಬುನಾದಿಯನ್ನು ಹಾಕಿದ ಡಾ॥ ಹೆಚ್ ನರಸಿಂಹಯ್ಯನವರ ಅಮೋಘ ಸೇವೆಯನ್ನು ಸದಾ ಸ್ಮರಿಸಿಕೊಳ್ಳುವ ನಿಟ್ಟಿನಲ್ಲಿ ವಿಶ್ವವಿದ್ಯಾಲಯವು ಆವರಣದಲ್ಲಿನ ಬಯೋಪಾರ್ಕ್‌ಗೆ ಪ್ರವೇಶ ನೀಡುವ ಪ್ರಮುಖ ಮಾರ್ಗಕ್ಕೆ "ಡಾ॥ ಹೆಚ್. ನರಸಿಂಹಯ್ಯ ಮಾರ್ಗ" ಎಂದು ನಾಮಕರಣ ಮಾಡಿ ತನ್ನ ಗೌರವವನ್ನು ಹೆಚ್ಚಿಸಿಕೊಂಡಿದೆ.

ಡಾ॥ ಎಂ. ಹೆಚ್. ಮರೀಗೌಡ

ದಿ॥ ಡಾ॥ ಎಂ. ಹೆಚ್. ಮರೀಗೌಡ ೧೯೪೩ರವರೆಗೂ ಕರ್ನಾಟಕ ಸರ್ಕಾರದ ತೋಟಗಾರಿಕೆ ಇಲಾಖೆಯ ನಿರ್ದೇಶಕರಾಗಿದ್ದರು. ಇವರ ಸೇವಾವಧಿಯಲ್ಲಿ ತೋಟಗಾರಿಕೆ ವೃತ್ತಿಗೆ ಒಂದು ಪ್ರಮುಖ ಸ್ಥಾನ ಕೊಡಿಸಿದ್ದಲ್ಲದೆ ತೋಟಗಾರಿಕೆಯನ್ನು ರಾಜ್ಯದ ಹಳ್ಳಿ ಹಳ್ಳಿಗೂ ವಿಸ್ತರಿಸಿದರು. ಇಡೀ ದೇಶದಲ್ಲಿಯೇ ಸಸ್ಯ ಸಂಪತ್ತಿಗೆ ಹೆಸರಾಗಿರುವ ಬೆಂಗಳೂರಿನ ಲಾಲ್‌ಬಾಗ್‌ನ್ನು ರಾಜ್ಯದ ಮೂಲೆ ಮೂಲೆಯಲ್ಲಿ ನರ್ಸರಿಗಳನ್ನು ಅಭಿವೃದ್ಧಿ ಮಾಡುವ ಮೂಲಕ ತಲುಪಿಸಿದರು.

ವೃಕ್ಷ ಶಾಸ್ತ್ರ ಅಂದರೆ ಆರ್ಬೂರಿಕ್ಲಚರ್ ಅಥವಾ ಸಾಲು ವೃಕ್ಷಗಳನ್ನು ಅಭಿವೃದ್ಧಿಗೊಳಿಸುವಲ್ಲಿ ವಿಶೇಷ ಪರಿಣಿತಿ ಹೊಂದಿದ್ದ ಡಾ॥ ಮರೀಗೌಡರನ್ನು ಜ್ಞಾನಭಾರತಿ ಆವರಣದಲ್ಲಿ ವೃಕ್ಷ ಸಂಪತ್ತನ್ನು ಬೆಳೆಸಲು ಸಲಹೆಗಾರರನ್ನಾಗಿ ಬೆಂಗಳೂರು ವಿಶ್ವವಿದ್ಯಾಲಯ ನೇಮಿಸಿತು. ಈ ಅವಕಾಶವನ್ನು ಡಾ॥ ಎಂ.ಹೆಚ್. ಮರೀಗೌಡರು ಬಹಳ ಚೆನ್ನಾಗಿ ಬಳಸಿಕೊಂಡರು. ಜ್ಞಾನಭಾರತಿ ಆವರಣದ ಹೆದ್ದಾರಿ, ದಾರಿ, ಉದ್ಯಾನ, ಇಲಾಖೆಗಳ ಒಳಾಂಗಣ ಮತ್ತು ಹೊರಾಂಗಣಗಳಲ್ಲಿ ಹೂ ಬಿಡುವ, ಹಣ್ಣು ನೀಡುವ, ನೆರಳು ಕೊಡುವ, ವೃಕ್ಷಗಳನ್ನು ನೂರಾರು ಸಂಖ್ಯೆಯಲ್ಲಿ ನೆಡಿಸಿದ್ದಾರೆ. ಈಗ ಅದರ ಫಲ ಪುಷ್ಪ ವೈಭವವನ್ನು ಜ್ಞಾನಭಾರತಿ ಆವರಣದಲ್ಲಿ ಕಾಣಬಹುದು.

ಡಾ॥ ಎಂ.ಹೆಚ್. ಮರೀಗೌಡರ ನಿಸ್ವಾರ್ಥ ಸೇವೆಯನ್ನು ಪರಿಗಣಿಸಿ ಸದಾ ಅವರ ನೆನಪಿನಲ್ಲಿ ಅವರಣದ ಜೈವಿಕ ವನದ ಮತ್ತೊಂದು ಮಾರ್ಗಕ್ಕೆ "ಡಾ॥ ಎಂ.ಎಚ್. ಮರೀಗೌಡ ಮಾರ್ಗ" ಎಂದು ವಿಶ್ವವಿದ್ಯಾಲಯ ನಾಮಕರಣ ಮಾಡಿದೆ.

ಡಾ. ಎನ್.ಆರ್.ಶೆಟ್ಟಿ

ಬೆಂಗಳೂರು ವಿಶ್ವವಿದ್ಯಾಲಯದ ಕುಲಪತಿಗಳಾಗಿ ಸೇವೆ ಮಾಡಿರುವ ಡಾ॥ ಎನ್.ಆರ್. ಶೆಟ್ಟಿಯವರು ತಮ್ಮ ಗುರುತನ್ನು ಇಲ್ಲಿ ಸಿಬ್ಬಂದಿಯ ಹೃದಯಾಳಾದಲ್ಲಿ ಬಲವಾಗಿ ನೆಟ್ಟಿದ್ದಾರೆ. ತಮ್ಮ ಅವಧಿಯಲ್ಲಿ ಪ್ರತಿಯೊಬ್ಬರ ಪ್ರೀತಿ, ವಿಶ್ವಾಸವನ್ನು ಗಳಿಸಿ, ಬಹಳ ವಿನಯವಾಗಿ ನಡೆದು ಕೊಂಡಿದ್ದಾರೆ, ಇದಕ್ಕೆ ಇಂದಿಗೂ ಅವರು ಹೊಂದಿರುವ ಜನಪ್ರಿಯತೆಯೇ ಸಾಕ್ಷಿ.

ಇತಿಹಾಸದಲ್ಲಿ ಬೌತಿಕ ವಸ್ತುಗಳ ಮುಖಾಂತರ ತಮ್ಮ ಗುರುತನ್ನು ಬಿಡುವುದು ಸಾಮಾನ್ಯ ವಿಷಯ. ಆದರೆ ಡಾ॥ ಎನ್.ಆರ್. ಶೆಟ್ಟಿಯವರು ತಮ್ಮ ಮಾನವೀಯತೆಯನ್ನು ಮೆರೆಸಿ ತಮ್ಮ ಗುರುತನ್ನು ಬಿಟ್ಟಿದ್ದಾರೆ. ಯಾವುದೇ ಆಸೆ ಆಕಾಂಕ್ಷೆ ಇಲ್ಲದೆ ತಮಗೆ ಸಿಕ್ಕ ಅವಕಾಶವನ್ನು ಸದ್ಬಳಕೆ ಮಾಡಿಕೊಂಡು ಈಗಲೂ ಸಮಾಜ ಸೇವೆ ಮಾಡುತ್ತಿರುವ ಶ್ರೀ. ಎನ್.ಆರ್. ಶೆಟ್ಟಿಯವರ ಹೆಸರನ್ನು ಜ್ಞಾನಭಾರತಿ, ಆವರಣದ ಬಯೋಪಾರ್ಕ್‌ಗೆ ಪ್ರವೇಶ ನೀಡುವ ರಸ್ತೆಯೊಂದಕ್ಕೆ ಡಾ॥ ಎನ್.ಆರ್. ಶೆಟ್ಟಿ ರಸ್ತೆ ಎಂಬ ವಿಶ್ವವಿದ್ಯಾಲಯ ನಾಮಕರಣ ಮಾಡಿದೆ.

ಡಾ॥ ಕೆ ಸಿದ್ದಪ್ಪ

ಹೊಸ ಸಹಸ್ರಮಾನ ಅಂದರೆ ೨೦೦೦ನೇ ಇಸವಿಯ ಜನವರಿಯಲ್ಲಿ ಜ್ಞಾನಭಾರತಿ ಆವರಣದಲ್ಲಿ ಬಯೋಪಾರ್ಕ್ ಎನ್ನುವ ಅದ್ಬುತ ಯೋಜನೆಯನ್ನು ಬೆಂಗಳೂರು ವಿಶ್ವವಿದ್ಯಾಲಯ ಕೈಗೆತ್ತಿಕೊಂಡಿತ್ತು. ಈ ಯೋಜನೆಯು ಅಂದಿನ ಉಪ ಕುಲಪತಿ ಡಾ॥ ಕೆ. ಸಿದ್ಧಪ್ಪನವರ ಕನಸಿನ ಕೂಸು, ೨೦೦೦ ದಿಂದ ೨೦೦೩ ಮದ್ಯದ ಮೂರು ವರ್ಷಗಳಲ್ಲಿ ೩೦೦೦ ಎಕರೆ ಪ್ರದೇಶದಲ್ಲಿ ೩೦೦೦ ವಿವಿಧ ಜಾತಿಯ ಮೂರು ಲಕ್ಷ ಸಸಿಗಳನ್ನು ನೆಡಲಾಯಿತು. ಈಗ ಈ ಸಸ್ಯಗಳು ವೃಕ್ಷಗಳಾಗಿ ನಿಂತಿವೆ. ಇಡೀ ಜ್ಞಾನಭಾರತಿ ಆವರಣ ಹಸಿರುಮಯವಾಗಿದೆ. ಡಾ॥ ಕೆ. ಸಿದ್ದಪ್ಪನವರ ಕೋರಿಕೆ ಮೇರೆಗೆ ಕರ್ನಾಟಕ ಸರ್ಕಾರ ಮತ್ತು ಕರ್ನಾಟಕ ವನ ಸಂವರ್ದನ ಟ್ರಸ್ಟ್ ಎರಡೂ ಸೇರಿ ರಾಜ್ಯದಲ್ಲಿ ಗಿಡ ನೆಡುವ ಮಹತ್ವ ಯೋಜನೆಯನ್ನು ಈ ಬಯೋಪಾರ್ಕ್‌ನಲ್ಲಿ ನೂರಾರು ಗಿಡಗಳನ್ನು ನೆಡುವ ಮೂಲಕ ಶುರು ಮಾಡಲಾಯಿತು. ಡಾ॥ ಕೆ. ಸಿದ್ದಪ್ಪನವರು ಮೂಲತಃ ಸಸ್ಯ ಪ್ರೇಮಿ, ತಮ್ಮ ಕುಲಪತಿ ಅವಧಿಯಲ್ಲಿ ವಿಶ್ವವಿದ್ಯಾಲಯದ ಸೆಂಟ್ರಲ್ ಕಾಲೇಜು ಆವರಣದಲ್ಲಿ ಮತ್ತು ಜ್ಞಾನಭಾರತಿ ಆವರಣದ ಆಡಳಿತ ಕಛೇರಿ ಮುಂಭಾಗ ಹಾಗೂ ಕುಲಪತಿಗಳ ಅಧಿಕೃತ ನಿವಾಸದ ಆವರಣದಲ್ಲಿ ಸುಂದರ ಉದ್ಯಾನಗಳನ್ನು ರೂಪಿಸಲು ಬಹಳ ದುಡಿದಿದ್ದಾರೆ. ಶ್ರೀಯುತರ ಹಸಿರು ಪ್ರೇಮವನ್ನು ಹಾಗೂ ವಿಶ್ವವಿದ್ಯಾಲಯದ ಆವರಣದ ಹಸಿರು ವೃದ್ಧಿಗೆ ಮಾಡಿರುವ ಸೇವೆಯನ್ನು ಪರಿಗಣಿಸಿ ಬಯೋಪಾರ್ಕ್‌ನಲ್ಲಿನ ಪ್ರಮುಖ ಮಾರ್ಗಕ್ಕೆ "ಡಾ॥ ಕೆ. ಸಿದ್ದಪ್ಪ ಮಾರ್ಗ" ಎಂದು ಹೆಸರು ನೀಡಿ ಅವರನ್ನು ಗೌರವಿಸಲಾಗಿದೆ.

ಡಾ॥ ಎಂ.ಎಸ್. ತಿಮ್ಮಪ್ಪ

ಮನುಷ್ಯರ ಮಕ್ಕಳ ಮನಸ್ಸನನ್ನು ಅರ್ಥ ಮಾಡಿಕೊಂಡು ವರ್ತಿಸುವ ಮನೋವಿಜ್ಞಾನಿ ಡಾ॥ ಎಂ.ಎಸ್. ತಿಮ್ಮಪ್ಪ, ಆದರೆ ಅವರು ಹಲವಾರು ಬಾರಿ ತಾವು ಮನುಷ್ಯ ಮಾತ್ರರ ಮನೋವಿಜ್ಞಾನಿಯಲ್ಲ ಸಸ್ಯಗಳ ಮನೋವಿಜ್ಞಾನಿಯು ಹೌದೆಂದು ತಮ್ಮ ಪ್ರವಚನಗಳಲ್ಲಿ ನಿರೂಪಿಸಿದ್ದಾರೆ. ಸಸ್ಯಗಳಿಗೆ ಜೀವವಿದೆಯೆಂದು, ಆ ಜೀವಕ್ಕೆ ಜ್ಞಾನವಿದೆಯೆಂದು, ಆ ಜ್ಞಾನಕ್ಕೆ, ಪ್ರಜ್ಞೆ ಇದೆಯೆಂದು, ಸಸ್ಯಗಳು ಸಂಗೀತಕ್ಕೆ ಮಿಡಿಯುತ್ತವೆಂದು, ಹಲವಾರು ಸಾರಿ ಬಯೋಪಾರ್ಕ್‌ನಲ್ಲಿ ಶ್ರಮದಾನ ಮಾಡುವ ಓ.ಖಿಖ ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ ಪ್ರವಚನ ನೀಡಿದ್ದಾರೆ.

ಬೆಂಗಳೂರು ವಿಶ್ವವಿದ್ಯಾಲಯದ ಆಡಳಿತಾಧಿಕಾರಿ ಅಂದರೆ ಕುಲಸಚಿರಾಗಿದ್ದಾಗ ಬಯೋಪಾರ್ಕ್ ಯೋಜನೆಯನ್ನು ಅನುಷ್ಠಾನಗೊಳಿಸಲು ಅರಣ್ಯ ಇಲಾಖೆಗೆ ಪ್ರಸ್ತಾವನೆ ಮಂಡಿಸಿದರು. ಉಪ ಕುಲಪತಿಯಾಗಿ ನೇಮಕಗೊಂಡು, ಹುದ್ದೆಯನ್ನು ವಹಿಸಿಕೊಂಡ ಕೇವಲ ಒಂದು ತಾಸಿನನಂತರ ಬಯೋಪಾರ್ಕ್‌ಗೆ ಅಧಿಕೃತವಾಗಿ ಬೇಟಿ ನೀಡಿದರು. ಅಲ್ಲಿನ ಚೆಕ್ ಡ್ಯಾಮನ್ನು ಪರಿಶೀಲಿಸಿದರು.

ಬಯೋಪಾರ್ಕ್ ಯೋಜನೆಯಡಿ ಚರಕವನ, ಶುಶ್ರುತವನ, ಪಂಚವಲ್ಕ ವೃಕ್ಷದಾಮ, ಕುಬ್ಜ ವೃಕ್ಷವನ – ಇವುಗಳ ಅಭಿವೃದ್ಧಿಗೆ ಕ್ರಿಯಾತ್ಮಕವಾಗಿ ಸ್ಪಂದಿಸಿದ್ದಾರೆ. ಜ್ಞಾನಭಾರತಿ ಆವರಣದ ಅಂತರ್ಜಲ ಹೆಚ್ಚಿಸಲು ಕಾರ್ಯಕ್ರಮ ಅನುಷ್ಠಾನಗೊಳಿಸಿದ್ದಾರೆ. ಗಾಂಧಿ ಭವನದ ಉದ್ಯಾನಕ್ಕೆ ಪ್ರೋತ್ಸಾಹನೀಡಿದ್ದಾರೆ. ಇವರ ಸೇವೆಯನ್ನು ಪರಿಗಣಿಸಿ ವಿಶ್ವವಿದ್ಯಾಲಯ ಮೊದಲನೆ ಚಕ್ "ಡ್ಯಾಮ್ ರಸ್ತೆಗೆ ಡಾ॥ ಎಂ.ಎಸ್. ತಿಮ್ಮಪ್ಪ ಮಾರ್ಗ" ಎಂದು ಹೆಸರು ನಿಡಿ ಗೌರವಿಸಿದೆ.

ಶ್ರೀ ರಾಮಯ್ಯ ರೆಡ್ಡಿ

ದಿ॥ ಶ್ರೀ ರಾಮಯ್ಯ ರೆಡ್ಡಿ, ಬೆಂಗಳೂರು ಜಿಲ್ಲೆಯ ದಕ್ಷಿಣ ತಾಲ್ಲೂಕಿನ ಅರಳೂರು ಗ್ರಾಮದವರು. ತಮ್ಮ ಜೀವನದಲ್ಲಿ ಗಳಿಸಿದ ಸಂಪತ್ತಿನಲ್ಲಿ ಸ್ವಲ್ಪ ಭಾಗವನ್ನಾದರೂ ಪ್ರಕೃತಿಗೆ ಮುಡಿಪಾಡಿಗಿಡಲು ಪಣ ತೊಟ್ಟಿದ್ದರು. ಈ ಕೆಲಸಕ್ಕೆ ಶ್ರೀ.ಎ.ಎನ್.ಯಲ್ಲಪ್ಪರೆಡ್ಡಿಯವರನ್ನು ಬಳಸಿಕೊಂಡರು. ಬೆಂಗಳೂರು ವಿಶ್ವವಿದ್ಯಾಲಯದ ಆವರಣದಲ್ಲಿ ಆರೋಗ್ಯ ವೃದ್ಧಿಸುವ ಸಸ್ಯಗಳನ್ನು ಬೆಳೆಸಲು ಸುಮಾರು ಮೂರು ಲಕ್ಷ ರೂಪಾಯಿಗಳನ್ನು ದೇಣಿಗೆಯಾಗಿ ನೀಡಿದ್ದಾರೆ. ಇದರ ಫಲದಿಂದ ಈಗ ವಿಶ್ವವಿದ್ಯಾಲಯ ಆವರಣದಲ್ಲಿ ಚರಕವನ ಬೆಳೆದುನಿಂತಿದೆ. ಅಲ್ಲಿ ಸಾವಿರಾರು ರೋಗಗಳನ್ನು ಗುಣ ಪಡಿಸುವ ಗಿಡ: ಬಳ್ಳಿ ವೃಕ್ಷಗಳು ಸಮೃದ್ಧವಾಗಿ ಬೆಳೆಯುತ್ತಿವೆ.

ಬಯೋಪಾರ್ಕ್‌ನ ಒಳಗೆ ಸುಗಮವಾಗಿ ವಿದ್ಯಾರ್ಥಿಗಳು, ವಿಜ್ಞಾನಿಗಳು, ಸಾರ್ವಜನಿಕರು ಸುಗಮವಾಗಿ ಓಡಾಡಲು ಮಾರ್ಗಗಳನ್ನು ನಿರ್ಮಿಸುವ ಕೆಲಸಕ್ಕೆ ಶ್ರೀ. ಆರ್. ರಾಜಶೇಖರ್ ರೆಡ್ಡಿ ಈ ವರ್ಷದಲ್ಲಿ ೫೦ ಸಾವಿರ ರೂಪಾಯಿಗಳು ದೇಣಿಗೆ ನೀಡಿದ್ದಾರೆ.

ಸುಸಂಸ್ಕೃತ ಮತ್ತು ಸುಂದರ ಕಾರ್ಯ ಕ್ರಮಗಳಿಗೆ ಸದಾ ಸ್ಪಂದಿಸುವ ಶ್ರೀ. ರಾಮಯ್ಯ ರೆಡ್ಡಿಯವರ ಕುಟುಂಬವನ್ನು ವಿಶ್ವವಿದ್ಯಾಲಯ ಪ್ರಶಂಸಿಸುವುದಲ್ಲದೆ ಬಯೋಪಾರ್ಕ್‌ನ ಮಾರ್ಗವೊಂದಕ್ಕೆ "ಶ್ರೀ ರಾಮಯ್ಯ ರೆಡ್ಡಿ ಮಾರ್ಗ" ಎಂದು ನಾಮಕರಣ ಮಾಡಿದೆ.

ದಿ : ಪಯಾಸ್ – ಅರಣ್ಯ ಅಧಿಕಾರಿ

ಹೊಸ ಸಹಸ್ರಮಾನದ ಮೊದಲನೇ ಮಾಸದಲ್ಲಿ ಅಂದರೆ ೨೦೦೦ನೇ ಇಸವಿ ಜನವರಿ ತಿಂಗಳಲ್ಲಿ ಜ್ಞಾನಭಾರತಿ ಆವರಣದಲ್ಲಿ ಎಲ್ಲಿಲ್ಲದ ಸಡಗರ. ಸಾವಿರಾರು ವಿವಿಧ ಜಾತಿಯ ಸಸ್ಯಗಳು, ನೂರಾರು ಕೆಲಸಗಾರರು, ಹತ್ತಾರು ಜೆಸಿಬಿ ಯಂತ್ರಗಳು ಅರಣ್ಯ ಇಲಾಖೆಯಿಂದ ಶ್ರೀ. ಪಯಾಸ್‌ರೊಂದಿಗೆ ಬಂದಿಳಿದವು. ಮುಂಗಾರು ಮಳೆ ಪ್ರಾರಂಭವಾದೊಡನೆ ಶ್ರೀ ಪಯಾಸ್ ತಮ್ಮ ಕಾರ್ಯ ಶುರು ಮಾಡಿದರು. ಜ್ಞಾನಭಾರತಿಯ ಮೈದಾನವನ್ನು ಉತ್ತು ಗಿಡಗಳನ್ನು ನೆಟ್ಟರು.

ಇಂದು ಶ್ರೀ ಪಯಾಸ್ ನಮ್ಮೊಂದಿಗಿಲ್ಲ. ಆದರೆ ಅವರು ನೆಟ್ಟ ಗಿಡಗಳು ಇಂದು ಮರಗಳಾಗಿ ನಿಂತಿವೆ. ವಿಶ್ವವಿದ್ಯಾಲಯದ ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ, ಅದ್ಯಾಪಕರ ಈ ಮರಗಳು ಬಯಲು ಪ್ರಯೋಗಶಾಲೆಗಳಾಗಿವೆ. ಮತ್ತು ಸಾರ್ವಜನಿಕರಿಗೆ ನೆರಳು, ಆಮ್ಲಜನಕರ ನೀಡುತ್ತವೆ. ಈ ಬಯೋಪಾರ್ಕ್ ಬೆಂಗಳೂರು ನಗರಕ್ಕೆ ಶ್ವಾಸಕೋಶವಾಗಿದೆ. ಇದು ಶ್ರೀ. ಪಯಾಸ್ ನೀಡಿದ ಕೊಡುಗೆ. ಇವರ ಕೊಡುಗೆಯನ್ನು ವಿಶ್ವವಿದ್ಯಾಲಯ ಗಮನಿಸಿ ಶ್ರೀಯುತರ ಸೇವೆಯನ್ನು ಸ್ಮರಿಸಿಲಾಗಿದೆ.

ಶ್ರೀ. ಪ್ರವೀಣ ಚಂದ್ರ ಪಾಂಡೆ

ಕರ್ನಾಟಕ ರಾಜ್ಯದ ಇಲಾಖೆಯ ಅರಣ್ಯ ಮುಖ್ಯ ಸಂರಕ್ಷಣಾಧಿಕಾರಿ ಆಗಿದ್ದ ಶ್ರೀ ಪಾಂಡೆ ಇಂದು ನಮ್ಮೊಂದಿಗಿಲ್ಲ. ಜ್ಞಾನಭಾರತಿ ಆವರಣದ ಬಯೋಪಾರ್ಕ್‌ಗೆ ರೂಪ ರೇಶೆಗಳನ್ನು ಕೊಟವರು ಅವರು. ಮುಂದಿನ ಪೀಳಿಗೆಗೆ ಹಸಿರುವನವನ್ನು ನೀಡಿದವರು ಅವರು. ಅರಣ್ಯ ಇಲಾಖೆಯ ದ್ಯೇಯೋದ್ದೇಶಗಳನ್ನು ಎತ್ತಿ ಹಿಡಿದವರು ಅವರು. ಅಂತಹ ಮಹನೀಯರಿಗೆ ಇಂದು ಬೆಂಗಳೂರು ವಿಶ್ವವಿದ್ಯಾಲಯಗೌರವ ಪೂರಕವಾಗಿ ನಮಿಸಿ ಗೌರವವನ್ನು ಸಲ್ಲಿಸಲಾಗಿದೆ.

ಪ್ರೊಫೆಸರ್ ಎಸ್. ಕೆ. ರಾಮಚಂದ್ರರಾವ್

ದಿ.ಎಸ್.ಕೆ. ರಾಮಚಂದ್ರರಾವ್ ಬೆಂಗಳೂರು ವಿಶ್ವವಿದ್ಯಾಲಯದಲ್ಲಿ ತತ್ವಶಾಸ್ತ್ರ ವಿಷಯದಲ್ಲಿ ಪ್ರಾಧ್ಯಾಪಕರಾಗಿದ್ದವರು. ಕ್ರಮೇಣ ಶ್ರೇಷ್ಠ ಮನೋವಿಜ್ಞಾನಿಯಾಗಿ ನಿಮಾನ್ಸ್‌ನಲ್ಲಿ ಹಲವಾರು ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ ಮಾರ್ಗದರ್ಶಿಯಾಗಿದ್ದರು.

ನಗರ ಪರಿಸರದಲ್ಲಿ ವೃಕ್ಷಗಳನ್ನು ನೆಡಲು ಜಾಗೃತಿ ಮೂಡಿಸಿದರು. ಈ ಬಗ್ಗೆ ಪ್ರಬಂಧಗಳನ್ನು ರಚಿಸಿ ವಿಜ್ಞಾನಿಗಳಿಗೆ, ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ ಮತ್ತು ಸಾರ್ವಜನಿಕರಿಗೆ ವಾಚನ ಮಾಡಿದ್ದರು. ತತ್ವಶಾಸ್ತ್ರ, ಪ್ರಕೃತಿ, ಪರಿಸರ, ವೇದ, ಉಪನಿಷತ್ತುಗಳ ಬಗ್ಗೆ ನಿರರ್ಗಳವಾಗಿ ಮಾತನಾಡಬಲ್ಲವರಾಗಿದ್ದರು. ಎಲ್ಲಕ್ಕೂ ಮಿಗಿಲಾಗಿ ಪರಿಸರವಾದಿಗಳಿಗೆ ಉತ್ತೇಜನ ನೀಡಿದರು.

ಜ್ಞಾನಭಾರಿತಿ ಆವರಣದಲ್ಲಿನ ಚರಕವನ ಮತ್ತು ಶುಶ್ರುತವನಕ್ಕೆ ಅವರು ಬುನಾದಿ ಹಾಕಿದ್ದಾರೆ. ಅವರು ಬೆಂಗಳೂರು ವಿಶ್ವವಿದ್ಯಾಲಯಕ್ಕೆ ಸಲ್ಲಿಸಿರುವ ಸೇವೆಯನ್ನು ಗುರುತಿಸಲಾಗಿದೆ. ಬಯೋಪಾರ್ಕ್‌ನಲ್ಲಿರುವ ಚರಕವನಕ್ಕೆ ಶ್ರೀಯುತರ ಹೆಸರನ್ನಿಟ್ಟು ಅವರಿಗೆ ಅರ್ಪಿಸಲಾಗಿದೆ

ಪ್ರೊ.ಫೆಸರ್ ಸಿ.ಜಿ. ಕೃಷ್ಣಸ್ವಾಮಿ

ದಿವಂಗತ ಕೃಷ್ಣಸ್ವಾಮಿ ಬೆಂಗಳೂರು ವಿಶ್ವವಿದ್ಯಾಲಯದ ಅರ್ಥಶಾಸ್ತ್ರದ ವಿಷಯದಲ್ಲಿ ಪ್ರಾಧ್ಯಾಪಕರಾಗಿದ್ದು,ಕ ತಮ್ಮ ವರ್ಚಸ್ಸಿನಿಂದ ತಮ್ಮದೇ ಆದ ಶಿಷ್ಯಕೋಟಿಯನ್ನು ಹೊಂದಿದ್ದರು. ಸಾಹಿತ್ಯ, ನಾಟಕ ಕಲೆ ಮತ್ತು ತೋಟಗಾರಿಕೆ ಇವು ಅವರಿಗೆ ಮೆಚ್ಚಿನ ವಿಷಯಗಳಾಗಿದ್ದವು.

ವಿಶ್ವವಿದ್ಯಾಲಯದ ಗಾಂಧಿಭವನದ ನಿರ್ದೇಶಕ ಹೊಣೆಯನ್ನು ಹೊತ್ತುಕೊಂಡ ನಂತರ ಅದಕ್ಕೆ ಭೌತಿಕವಾಗಿ ಅಲ್ಲದೆ ಬೌದ್ಧೀಕವಾಗಿ ಪುನರುಜ್ಜೀವನ ನೀಡಿದರು. ಅದರ ಸುತ್ತಲೂ ಸುಂದರವಾದ ಉದ್ಯಾನವನ್ನನು ಅಭಿವೃದ್ಧಿಗೊಳಿಸಿದರು. ಪ್ರತಿವರ್ಷ ಜೂನ್ ತಿಂಗಳಲ್ಲಿ ಪರಿಸರ ದಿನಾಚರಣೆಯನ್ನು ಆಚರಿಸಿ ವಿಶ್ವವಿದ್ಯಾಲಯದ ಪರಿಸರಕ್ಕೆ ತಮ್ಮದೇ ಆದ ಕೊಡುಗೆಯನ್ನು ನೀಡಿದರು. ಸದಾ ಚಿಲುಮೆಯ ಸ್ಫೂರ್ತಿಯಾಗಿದ್ದ ಶ್ರೀ ಸಿ.ಜಿ.ಕೆ. ಇಂದು ನಮ್ಮೊಂದಿಗಿಲ್ಲ. ಆದರೆ ಅವರ ಧ್ಯೇಯೋದ್ದೇಶಗಳು, ಅವರ ತತ್ವಗಳು ವಿಶ್ವವಿದ್ಯಾಲಯದ ವಿದ್ಯಾರ್ಥಿಗಳಲ್ಲಿ ಮನದಾಳದಲ್ಲಿ ಸ್ಮೃತಿಯಾಗಿ ಉಳಿದಿವೆ.

ವಿಶ್ವವಿದ್ಯಾಲಯವು ಶ್ರೀ ಸಿ.ಜಿ.ಕೆ ರವರ ಅಮೋಘ ಸೇವೆಯನ್ನು ಸದಾ ಸ್ಮರಿಸುತ್ತದೆ.

ಬೆಂಗಳೂರು ವಿವಿ ಆವರಣದಲ್ಲಿ ಬೊನ್ಸಾಯ್ ಉದ್ಯಾನವನ

❖ **ಲತಾರಾವ್**

ಅಧ್ಯಕ್ಷರು

ಬೊನ್ಸಾಯ್, ಸ್ಟೀಸ್‌ಸರ್ಕಲ್

ಬೆಂಗಳೂರು ಈಗ ನಗರವಾಸಿಗಳಿಗೆ ಜಪಾನಿ ಕಲಾ ಪ್ರಕಾರವಾದ ಬೊನ್ಸಾಯ್ ಉದ್ಯಾನವನದ ಮೂಲಕ ಸೃಷ್ಟಿಯ ಸೊಬಗನ್ನು ಉಣಬಡಿಸಿದೆ. ಇಂಥ ವಿಶಿಷ್ಟ ಪರಿಕಲ್ಪನೆಗೆ ಕಾಯಕಲ್ಪ ನೀಡಿರುವ ಸಂಸ್ಥೆ "ವೃಕ್ಷಾ" ಎಂಬ ಬೊನ್ಸಾಯ್ ಸ್ಟಿ ಸರ್ಕಲ್.

ಭಾರತದಲ್ಲೂ ಬೊನ್ಸಾಯ್ ಕಲೆಯನ್ನು ಪ್ರಚುರಪಡಿಸಬೇಕೆಂಬ ಹಂಬಲದೊಂದಿಗೆ ೧೯೯೦ರಲ್ಲಿ ಆರಂಭಗೊಂಡ ವೃಕ್ಷಾ ಸಂಸ್ಥೇ ಭದ್ರ ನೆಲೆಯನ್ನು ಕಂಡುಕೊಂಡಿದ್ದು ಉದ್ಯಾನನಗರಿ ಬೆಂಗಳೂರಿನಲ್ಲಿ. ಕೆಲ ಸಮಾನ ಮನಸ್ಸಕ ಮಹಿಳೆಯರ ಒತ್ತಾಸೆಯಿಂದ ಆರಂಭಗೊಂಡ ಸಂಸ್ತೆ. ಒಂದು ದಶಕದ ಅವಧಿಯಲ್ಲಿ ಪುರುಷರನ್ನು ಒಳಗೊಂಡ ಸದಸ್ಯರ ಸಂಖ್ಯೆಯನ್ನು ೧೫೦ಕ್ಕೆ ಏರಿಸಿಕೊಂಡಿದೆ.

ಕೈಗಾರಿಕೀಕರಣ, ನಗರೀಕರಣ ಪ್ರಭಾವದಲ್ಲಿ ಸುಲುಕಿ ಒದ್ದಾಡುತ್ತಿರುವ ನಗರವಾಸಿಗಳಿಗೆ ಸ್ವಲ್ಪ ಹೊತ್ತು ಪ್ರಕೃತಿಯ ಮಡಿಲಿನಲ್ಲಿ ಕಾಲ ಕಳೆಯಲು ವೃಕ್ಷಾಸಂಸ್ಥೆ ೨೦೦೩ರಲ್ಲಿ ಬೆಂಗಳೂರು ವಿಶ್ವವಿದ್ಯಾಲಯದ ಆವರಣದಲ್ಲಿ ಕುಲಪತಿಗಳ ವಾಸಗೃಹ ಮುಂಭಾಗದಲ್ಲಿ ಸುಮಾರು ೧/೩ ಎಕರೆ ಪ್ರದೇಶದಲ್ಲಿ ಕುಬ್ಜ ವೃಕ್ಷವನವನ್ನು ನಿರ್ಮಿಸಿದೆ. ವಿಶಾಲವಾದ ಹರಡಿಕೊಂಡಿರುವ ಉದ್ಯಾನವನ ಳಞ ಬಗೆಯ ದೇಶೀಯ ಸಸ್ಯ ಪ್ರಭೇದಗಳನ್ನು ಹೊಂದಿದೆ. ಅವುಗಳ ಪೈಕಿ ಅಲ, ಸೀಬೆ, ಸಪೋಟ, ನಿಂಬೆ, ಚೆರಿ, ಕ್ರಿಸ್‌ಮಸ್ ಟ್ರೀ, ಚೈನೀಸ್ ಟ್ರೀ ಮತ್ತು ಹಲವು ಹೂ ಪ್ರಕಾರಗಳಾದ ಪಾರಿಜಾತ, ಎರಿಕ್ರೀನಾ (ಹಾಲುವಾಣ). ಹೆಮೀಲಿಯಾ, ದಾಸವಾಳ ಹೂಗಳನ್ನು ಹೊಂದಿದೆ. ಒಟ್ಟಾರೆ ಹೇಳಬೇಕಾದರೆ ಅತಿ ಸಣ್ಣ ಸಣ್ಣ ಆಕಾರದ ಸಸ್ಯ ಪ್ರಭೇದಗಳನ್ನು ಇಲ್ಲಿ ಕಾಣ ಸಿಗುತ್ತವೆ.

ವೃಕ್ಷಾ ಸಂಸ್ಥೆಯ ಅಧ್ಯಕ್ಷರಾದ ಶ್ರೀಮತಿ ಲತಾರಾವ್ ಅವರು ಹೇಳುವಂತೆ 'ನಗರವನ್ನು ಸುಂದರವಾಗಿಸಲು ಸೂಕ್ತವಾದ ಸ್ಥಳವನ್ನು ಪತ್ತೆ ಮಾಡುವ ಸಂದರ್ಭದಲ್ಲಿ ಬೆಂಗಳೂರು ವಿಶ್ವವಿದ್ಯಾಲಯದ ಜ್ಞಾನ ಭಾರತಿ ಕ್ಯಾಂಪಸ್ ಕಣ್ಣಿಗೆ ಬಿತ್ತು. ನಗರದ ಜಂಜಡಗಳಿಂದ ಹೊರಗಿದ್ದು, ಪ್ರಕೃತಿಯ ಸೆರಗಿನಲ್ಲಿ ಬಂಧಿತಗೊಂಡಿದ್ದ ವಿಶ್ವವಿದ್ಯಾಲಯವೇ ಸೂಕ್ತ ಸ್ಥಳ ಎಂದು ನಿರ್ಧರಿಸಲಾಯಿತು. ಇದಕ್ಕೆ ಉಪಕುಲಪತಿಗಳಾದ ಕೆ. ಸಿದ್ದಪ್ಪ. ಎಂ.ಎಸ್. ತಿಮ್ಮಪ್ಪಕೂಡ ಒಪ್ಪಿಗೆ ನೀಡಿದರು. ಅದೇ ಹೊತ್ತುಗೆ ವಿಶ್ವವಿದ್ಯಾಲಯವೂ ಕೂಡ ಬಯೋಪಾರ್ಕ್ ನಿರ್ಮಿಸಿ ಹಸಿರನ್ನು ತರುವಲ್ಲಿ ಕಾರ್ಯ ನಿರತವಾಘಿತ್ತು.

ಉದ್ಯಾನವನ್ನು ನಿರ್ಮಿಸುವ ಮುನ್ನ ಈ ಪ್ರದೇಶದ ಸುತ್ತ ಗಿಡಗಂಟಿಗಳು ಮತ್ತು ಕಾಡು ಮರಗಳೇ ಆವರಿಸಿಕೊಂಡಿದ್ದವು. ಅತಿ ಒರಟು ಒರಟಾಗಿದ್ದ ನೆಲ, ಕಳೆಗಳಿಂದ ಕೂಡಿತ್ತು. ವಿಶ್ವವಿದ್ಯಾಲಯದ ಉದ್ಯಾನವನದ ಜವಾಬ್ದಾರಿಯನ್ನು ಹೊತ್ತಿದ್ದು ವೃಕ್ಷಾ ಮೊದಲು ಪ್ರದೇಶವನ್ನು ಸ್ವಚ್ಛಗೊಳಿಸಿ, ನೆಲವನ್ನು ಸಮತಟ್ಟಾಗಿಸಿ, ಕಾಲು ದಾರಿಯನ್ನು ವಿನ್ಯಾಸಗೊಳಿಸಿತ್ತು. ತದನಂತರ ಒಂದು ವಿನ್ಯಾಸಗೊಳಿಸಿತ್ತು. ತದನಂತರ ಒಂದು ದಿಣ್ಣೆಯನ್ನು ನಿಮಿಸಿ ಅದರ ಮೇಲೆ ಬೊನ್ಸಾಯ್ ಗಿಡಗಳನ್ನು ನೆಡಲಾಯಿತು.ಅದರ ಸುತ್ತ ಒಂದು ಸುಂದರಕೊಳವನ್ನೂ ನಿರ್ಮಿಸಲಾಯಿತು.

ಹೀಗೆ ಅತಿ ಕಡಿಮೆ ಅವಧಿಯಲ್ಲೇ ಸೊಗಸಾದ ನೆಲ ಹಸಿರು ಜನ್ಮ ತಳೆಯಿತು. ವಾಯುಮಾಲಿನ್ಯ ಮತ್ತಿತರ ಅಹಿತಕರ ವಾತಾವರಣಗಳಿಂದ ಉದ್ಯಾನವನ್ನು ಸುರಕ್ಷಿಸಲು, ಉದ್ಯಾನವನದ ಸುತ್ತ ಬಿದಿರು ಮತ್ತು ಸೈಪ್ರಸ್ ಮರಗಳನ್ನು ನೆಡಲಾಯಿತು. ಇವು ಮಾಲಿನ್ಯವನ್ನು ತಡೆಗಟ್ಟುವಲ್ಲಿ ಪರಿಣಾಮಕಾರಿಯಾಗಿ ಕಾರ್ಯ ನಿರ್ವಹಿಸುತ್ತದೆ.

ಇಷ್ಟೇ ಅಲ್ಲದೆ ವಿನಾಶದ ಅಂಚಿನಲ್ಲಿರುವ ಕೆಲ ಅಪರೂಪದ ಸಸ್ಯ ತಿಳಿಗಳನ್ನು ಕಾಪಾಡುವಲ್ಲಿ ವೃಕ್ಷಾ ಬೊನ್ಸಾಯ್ ಉದ್ಯಾನವನ ನೆರವು ನೀಡುತ್ತದೆ. ಶತಮಾನಗಳವರೆಗೂ ಈ ಸಸ್ಯ ಪ್ರಭೇದಗಳನ್ನು ಇಲ್ಲಿ ಸುರಕ್ಷಿತವಾಗಿ ಇಡಬಹುದು.

ವೃಕ್ಷಾ ಸಂಸ್ಥೆ ಈ ಉದ್ಯಾನವನ್ನು ಕೆಲ ಬೆಲೆ ಬಾಳುವ ವಿದೇಶಿ ಪ್ರಬೇಧಗಳನ್ನು ಸಹ ಪರಿಚಯಿಸಿದೆ. ಒಮ್ಮೆ ಸೂಕ್ತ ರಕ್ಷಣೆ ದೊರಕಿ ಮೇಪಲ್ ಬ್ರಜಿಲಿಯನ್ ರೈನ್ ಟ್ರೀ ಮತ್ತಿತರೆ ಸಸಿಗಳನ್ನು ಇಡ ಬಹುದು. ಈ ನಿಟ್ಟಿನಲ್ಲಿ ವಿಶ್ವವಿದ್ಯಾಲಯದ ರಕ್ಷಣೆ ನೀಡುವುದಾಗಿ ಸಮ್ಮತಿ ಸ್ರಚಿಸಿದೆ. ಈ ಕುಬ್ಜ ವೃಕ್ಷ ಉದ್ಯಾನ ಬಯೋಪಾರ್ಕ್ ವನಗಳಲ್ಲಿ ಒಂದಾಗಿದೆ.

ವೃಕ್ಷ ಸಂಸ್ಥೇ ಪರಿಸರ ಜಾಗೃತಿಗೆ ಸಂಬಂಧಿಸಿದ ಹಲವು ಆಂದೋಲನಗಳಲ್ಲಿ ಇತರೆ ಸಂಸ್ಥೇಗಳೊಂದಿಗೆ ತೊಡಗಿಸಿ ಕೊಳ್ಳುತ್ತಾ ಬಂದಿದೆ. ಈ ನಿಟ್ಟಿನಲ್ಲಿ ಬೆಂಗಳೂರಿನ ಸ್ವಯಂ ಸೇವಾ ಸಂಸ್ಥೇಯಾದ ಗ್ರೀನ್ ಹೆಲ್ತ್ ಕ್ಲಬ್‌ನೊಂದಿಗೆ ಸೇರಿ ಔಷಧಿ ಸಸಿಗಳ ಬಗ್ಗೆ ಸಾರ್ವಜನಿಕರಲ್ಲಿ ತಿಳುವಳಿಕೆ ಮೂಡಿಸಲು ತೊಡಿಸಿಕೊಂಡಿದೆ. ಇದು ಪ್ರತಿ ವರ್ಷ ಔಷಧಿ ಸಸ್ಯಗಳನ್ನು ಈ ಸಂಸ್ಥೆಗೆ ಕೊಡಗೆ ನೀಡುತ್ತಿದೆ. ಬೊನ್ಸಾಯ್ ಕುರಿತು ವೃಕ್ಷ ವಿಚಾರ ಸಂಕಿರಣ.

ಕಾರ್ಯಗಾರ, ವಸ್ತು ಪ್ರದರ್ಶನವನ್ನು ಪ್ರತಿವರ್ಷ ಸಂಸ್ಥೆ ಏರ್ಪಡಿಸುತ್ತದೆ. ಆಗಾಗ್ಗೆ ವಿದೇಶಿ ತಜ್ಞರಿಂದ ಸಂವಾದವನ್ನು ನಡೆಸುತ್ತಾ ಬಂದಿದೆ. ಈ ಕಾರ್ಯಕ್ರಮಗಳಿಂದ ಬರುವ ಹಣವನ್ನು ವೃಕ್ಷಾ ಸಂಸ್ಥೆ ಅಂಗವಿಕ ಲರ ಏಳಿಗೆಗಾಗಿ ದುಡಿಯುತ್ತಿರುವ ಸಂಸ್ಥೇಗಳಿಗೆ ದೇಣಿಯಾಗಿ ನೀಡುತ್ತಿದೆ. ಸಂಸ್ಥೆಯನ್ನು ಮುಂಬೈನ ಬೋನ್ಸಾಯಿ ಸ್ಟಡಿ ಗ್ರೂಪ್ ಆಫ್ ಇಂಡೋ ಜಪಾನಿಸ್ ಅಸೋಸಿಯೇಷನ್ ಸನ್ಮಾನಿಸಿದೆ. ಇತ್ತೀಚೆಗೆ ಮೈಸೂರಿನ ಆಶ್ರಯದಲ್ಲಿ ಜರುಗಿದ ಅಂತರ ರಾಷ್ಟ್ರೀಯ ಬೊನ್ಸಾಯ್ ಸಮ್ಮೇಳನ ಮತ್ತು ಪ್ರದರ್ಶನದಲ್ಲಿ ಭಾಗವಹಿಸಿತ್ತು.

ಬೆಂಗಳೂರು ವಿಶ್ವವಿದ್ಯಾಲಯದ ಈಗಿನ ಕುಲಪತಿಗಳಾದ ಡಾ॥ ಹೆಚ್.ಎ. ರಂಗನಾಥ ಹಾಗೂ ಅವರ ಕುಟುಂಬದವರು ಬೋನ್ಸಾಯ್ ಉದ್ಯಾನದ ನಿರ್ವಹಣೆಗೆ ವಿಶೇಷ ಗಮನ ಹರಿಸಿರುವುದು ವೃಕ್ಷ ಸಂಸ್ಥೇಗೆ ಬಹಳ ಸಂತೋಷ ತಂದಿದೆ.

CONCEPT OF LIFE, HEALTH AND PEACE

A.N. Yellappa Reddy, Project Coordinator of Biodiversity Park

The challenge before us is to create a sustainable world because 21st century is a century of Biology or otherwise is an era of ecology. 250 years ago industrial era introduced fossil fuels with the result the global scenario as altered, damaged and disturbed. Since 50 yrs an era of destruction is being felt at global level, regional level and local level.

The loss of biodiversity poses a big challenge and nearly 2/3 of world biodiversity will vanish in another two to three decades. The scientist have analyzed the ecosystem services and community services and understood the values and given an economic interpretation for eco system services which includes Life Health, and Peace. To cite an example in New York city watershed management delivers one billion worth pure, cheap, best quality water. It explains we have to interact with organisms and ecosystems and learn their language. The choice before us preserving, protecting and nurturing the biodiversity.

Miracles in the womb of earth:

Roots of each plant sp. Have burrowing cells and them worn out by contact with stones and pebbles. These burrower roots are replaced immediately by different cells to prove into the regions until they reach the source of nourishment.

Once they reach the source of nourishment they die. They are replaced by cells designed to dissolve mineral salts and collect the resulting essential elements from the womb of the mother earth. Each species rigidly abide to their swadharma samanyadharma which poses great ability to draw traces elements and pummthese elements from cell to cell and to the entire plant, cleverly designing, cleverly apportioning distinct elements to root, to bark, to stem to flower and to seed. This products produced in each plant entirely depends on their swadharma to provide food to cure and prevent diseases and pest.

This role of swadharma is regulated by protoplasm that is watery gelatins substance. This unique substance varies from species to species and they play vital role not only in physical life of a plant and also introduce site specific smart element to protect the health of the plant and the ecosystem. This vital loop to maintain the health of the ecosystem and the health of the

living organism has to be maintained failing which susceptible, failing which the disease and pest will take over. This loop of biodiversity also plays immeasurable role to convert solar energy into chemical energy and wide range of complex chemicals depending on their swadharma which is a samaanya dharma which takes care of the health of the ecosystem and the organisms. For example formation of **charakavana** and 50 **ganas** in each gana, 10 different ganas will highlight the role of biodiversity in maintaining the health of human systems.

Like roots, canopy of a tree gives connectivity to the greater and wider world of life, of birds, moth's butterflies, ants etc, .as explained above pyaras the root worka like a pump and water is a universal solvent which helps to carry elements from root to leaf flower fruit and seed. This chain of life and its interconnection has to be understood and maintained. Intensive human activities and chemical application to the living system have created unimaginable chemical and biological imbalances.

Realizing this 3rd icon world conservation congress which was held in 17-25th of November 2004, the theme was" people and nature- only one world". The congress aim was to present comprehensive- accurate and up to date evidence on the state of plants and biodiversity of our planet. The Bngalore University has made an attempt to create a platform to understand the planet earth. The congress aim was to secure the future. To secure the future the congress has addressed the following things.

1. *Put an end to wanton act of destruction.*
2. *Present models of development needs serious appraisal.*
3. *The world needs a global protocol to prevent pollution.*
4. *It insisted to develop green technologies and switch over to renewable resources.*

Icon congress has said that over 1/3rd of the world biodiversity is in the red list according to Craig Hilton Tyler, icon Programme officer. according to congress, there is much to be discovered about key species especially in the tropical world, fresh water ecosystem etc., the scientist, politicians and economists have realized the value of biodiversity and their roles in the well being of human beings .they provide food, medicine, filter air, absorb noxious, gaseous emissions and that and filter water, decompose waste, generate fertile soil, pollinate and disperse seeds. According to them about 20000 species are at risk of extinction, largely because environmental damage caused by mankind.

Under the above circumstances, Bangalore University has made an attempt to establish a biodiversity park which will provide live settings to undertake studies to understand the planet earth and the miracle of the womb of the mother earth.

LIFE

Dr, S.R.AMBIKA and Dr.N.Nandini

Understanding Life through Biodiversity and BU Sweet Spots:

The Core Committee highlights the concept and importance of Biodiversity with respect to the following: What is Life and where it exists? What is Health and the components which promote them? What is Peace and where exactly the Peace lies?

Life is colorful consisting of three shades;

- **Brown (Soil),**
- **Green (Biodiversity) and**
- **Blue (Water Resources)**

1. Brown (Soil):

Soil is the basic foothold of terrestrial ecosystems that supports plant growth and serves as a habitat for a wide range of flora and fauna. The nutrient cycling process will not be completed without soil decomposers. Precisely, soil is the land surface of the earth. A gram of soil has millions of life forms in it. With the help of son god's energy, mother earth is performing the job of providing nourishment to all living creatures.

Mother earth has got great ability to retain elixir of life:

Materials of biological origin (partially decayed plant and animal remains and products synthesized by micro organisms) constitute soil organic matter. It supplies sulphur and phosphorus to soil organisms. Also it gives nitrogen when needed. The minimum part of the organic matter resistant to decay is termed as humus, which constitutes about only 5% of the total soil. The nutrient content of the humus is considerably more (C/N ratio is 10-14; c/p ratio is 100; c/s ratio is 80-100) and therefore when mineralized by microbes it releases the nutrients which can then be absorbed by plants.

Mother Earth can complex with a variety of metals ions such as copper, lead, iron, nickel, manganese, cobalt, calcium, zinc, and magnesium. Above all, humus is very essential for plant growth as it is responsible for the formation of stable aggregates in soil. It is responsible for the moisture holding capacity of the medium textured soils. The root system shade provided by grass to canopy, several layers of skin help to retain moisture and also to facilitate infiltration. So the water stored in the womb of mother earth with the help of the total ecosystem will be available as elixir of life for all living creatures.

This presious water is found in rivers, springs, streams, wells; etc. Water in soil determines the soil's energy to do work. It is expressed as per unit quantity of water. Water that escapes when the soil is kept at 105^{o}c for 24 hours is termed as soil water. Only the water that is not bound within the structure of soil minerals (water of crystallization) will be vaporized. Soil water accompanied by dissolved salts is called soil solution both the soil water and water of crystallization is not available to plants the absence of available water, the plants wilts and the soil at this state is called wilting point. Three different forces facilitate movement of water in the soil and they are capillary force, gravitational force and osmotic force, the sum total of all these forces is the water potential without the vegetation and deep several layers of skin over the body of the mother earth, the rain water will gallop and reach the ocean, so the natural interventions of rich biodiversity makes the rain water to crawl, to walk, and also to store enough water. This stored water is evaporated through evapotranspiration to maintain atmospheric air quality that is relative humidity which is maintained to facilitate water in air. In the absence of adequate level of atmospheric air, the lungs will get ceased or desiccated.

The leaf litter, the floral parts, the fruit part, generated by the plants will be added to the soil regularly to maintain the productive ability of the soil and it is the source of food to billions of living organisms.

The living organisms perform several services in the soil. Soil fauna like wood lice, earthworms and eelworms act on the organic matter to break them into pieces by bacteria and fungi according to their need, they break down the organic substrates and use them. The residue obtain by the decomposition process is an insoluble condensed heterogeneous polymeric material. Amino acids accompanied with the oxidized aromatic compounds for the humus material. Oxidation of aromatic compounds is microbe based and the humus with its high density phenolic, carbonyl, and carboxylic functional groups acts as an excellent binding agent. It interlinks metal ions by chelation and pH-dependent cations exchange capacity (ECE).

The micro and macro animals, burrow animals, white ants etc., structures several engineering interventions to trap and retain water and also to transform the texture and structure, porosity and the chemical composition of the soil is altered to facilitate the productivity. The soil organisms like earthworms facilitate the dispersion of both organic and inorganic content, which ultimately change its structural organization.

The soil temperature under the cover of grass and vegetation will be 5-6o c lower than the ambient temperature; whereas in a barren area the temperature of the earth will be 8-10^{o}c higher than the ambient temperature. The vegetation and their root system will hold the soil and prevent soil erosion, floods, and droughts and ensures food security to the living creatures. Several animals, burrowers, including bees, flies, and butterflies play a critical role in pollination and serve this person which helps in natural vegetation of the ecosystem.

Soil microbes:

In a spoon of soil contains millions of microorganisms. Mole (an soil burrower) places an important role in soil fertility. Soil microbes play a predominant role in the decomposition process. The type of microbial community present in the soil depends on the nature of the soil. This is because, organisms utilize a wide variety of substrates for energy source and based on the energy source they depend on, and they are classified into two types, autotrophs and heterotrophs. Again based on the need of the above two, they are classified into three types

- aerobes
- anaerobes and
- Facultative anaerobes.

These organisms secrete enzymes, which bring about decomposition and chemical transformation process in the soil. Therefore measurement of enzyme activity gives an indication of the extent of specific processes in soil, which in turn gives a real picture about the soil fertility.

Bacteria:

These are the smallest unicellular prokaryotes (0.5-1 x 1.0- 2.0µm), the most abundant group and usually more numerous than others, the number varies between 108 and 1010 cell per gram of soil. They are either cocci or rod shaped (bacilli).examples of some of the soil bacteria are ***agrobacterium, arthrobacter, bacillus, alcaligens, clostridium, corynabacterium, erwinia, nitrosomonas, nitrobacter, Pseudomonas, rhizobium, thiobacillus***. Their population in the soil depends on the availability of organic matter, cultivation practices, different soil types and their micro environment. There are found in high number in cultivated than virgin land, maximum in rhizosphere and less in non rhizosphere soil possibility due to aeration and nutrient availability. The inner region of soil aggregates contained higher level of gram – negative, while the outer region contained higher level of gram- positive bacteria, this may be due to polymer formation, motility, surface changes, and life cycle of bacteria involved. Since, the soil habitat favors the growth of a variety of microorganisms, decomposition process is easier.

Population of **soil fungi** ranges from 2x104-1x106 propagules per gram dry soil. In presence of abundant nutrient (leaf, litter and compost) their hyphae structure aggregate together to form rhizomorphs; they have well developed enzyme system to decompose all components of plant material including the most resistible tannin lignin, and cellulose compounds. Since they adapt themselves to the acidic pH, they are the dominant decomposers of acidic soils. Some specific groups of fungi exhibit a mutual relationship with plant roots to form a structural association called mycorrhiza. Some of the soil saprophytes are ***alternaria, aspergillus, cladosporium, humicola, dematium.***

Algae:

These are the initial colonizers of barren land supplying organic materials for the subsequent invaders, polysaccharides secreted by them act as binding agents and thus they agglomerate the soil particles and stabilize them. In association with fungus (lichen), they act as pollution indicator in places where the atmosphere is contaminated with sulphur dioxide.one of the important role of blue green algae is that it has revolutionized the field of agriculture microbiology due to use of cyanobacterial biofertilizers.On the other hand they can be used in reclamation of sodicsoil i.e.alkaline soil sewage treatment,etc. The prominent genera are ***anabaena, calothrix, oscillatoria, aulosira, nostoc, scytonema, tolypothirx.***

Cyanobacteia

This is the typical example of algae with a characteristic ability to fix nitrogen and photosynthesise. This makes them as an ideal candidate to maintain the fertility of the soil ecosystem.

Actinomycetes

These are widely distributed and found to be dominant in warmer temperature. The important members of actinomycetes are ***actinomyceses, actinoplanes, micromonospora, microbispora, nocardia, streptomyces; thermo actinomycetes***.The most limiting factor is the pH, which governs the abundance in soil. Its luxuriant growth is favored by neutral or alkaline pH (6.0-8.0). Protozoa, they are either phototropic or saprophytic. Under unfavorable conditions i.e. dry condition, they form eggs and feed on bacteria and fungi and have a check on their population. It is reported that while feeding on bacteria and fungi they liberate the nutrients and therefore help in the nutrient cycling in the soil environment. They are heterotrophic in nature and utilize the nutrient source from plant residue in soil and composts.

II. Green (Plant Biodiversity):

Grass is called as "Green Belt" for Mother Earth as it tightens the soil, holds in its place and prevents soil erosion, soil infertility, and loss of productivity, drought and rise in temperature of the soil. It detoxifies the body of human being and hence acts as Green Blood. Economically also grass is very important as it not only provides food to mankind but also acts as shelter for variety of life forms. In this regard many sweet spots are found in the Biodiversity Park where various interspecific species are growing together in harmony in phenomenon known as Sweet Spots:

Sweet Spot No. 1

Bangalore University has many spots wherein there are more than three medicinal plants growing together in harmony Eg***. Terminalia belarika, Philanthus embelica, Azardicta Indica (Neem)*** found in sweet spot no.1. An ecological profile was studied, and the natural biotechnology involved in this ecological profile. In the sweet spot where all the 3 trees are growing equally which shows that there is some active principle involved which is proved by their healthy appearance. Leaves collected from this spot were converted into compost and analysis of the compost proved the medicinal properties of all the three plants viz. ***Terminalia belarika, Philanthus embelica, and Neem***. The soil science of this sweet spot says that soil and the plant grown on it, both define each other, the soil profile or ecological profile and the active principle in the sweet spot is involved in the healthier growth of three medicinal plants together shows the cumulative effect than compared with the growth of each of the single tree alone on the soil.

III. Blue –Aquatic Life (wet land management):

Sweet spot No. 2:

Bio-park has about three wetlands showing the interface between a truly terrestrial ecosystem and aquatic ecosystems. These wetlands serve as water purifiers and protect terrestrial areas adjoining them from storms, floods and tidal damage. Biopark can become a carbon bank as wetlands can act as a source for carbon sequestration. There's a need to study these hydric points for the study of carbon sinks.

One major role of plants in maintaining the health of environment is that of phytosanitation and phytoremediation. Phytosanitation. Sanitation signifies the removal of diseased parts - shoots, flower cushions and pods, from the infected plants. The ecological profile present in these spot is ***duck weed, azolla, water hyacinth, Polygonum, Hydrilla, Volvox, Scytonema, Blue-green algae, Lemna, Cats-tail, Nymphea***, etc.

The study of biocapsules of Bangalore University Campus aims at spreading the awareness among the common man that life, health, happiness and peace all are interconnected and lies in the nature. So let's be a little selfish and protect Mother Earth to protect ourselves.

Air as an Ecological Matrix for a Colorful Life

Air is the common name for the combination of gases that make up the earths atmosphere. Air itself is not a gas, but rather a mixture of individual gases, each of which retains its own particular properties. It is composed of Oxygen, Nitrogen, carbon dioxide and vapours of water. The air is utilized by organisms in the process of respiration to liberate chemical energy from food during oxidation. The presence of Oxygen, Nitrogen and carbon dioxide in air is of great importance, because these gases keep on cycling in nature between organisms and their atmosphere through various cycles such as Carbon cycle, Nitrogen cycle, Water cycle etc.

The earth's atmosphere is an envelope of gases exceeding to a height of 200 kms. Atmosphere constitutes protective cover of gases surrounding the earth which sustains life and saves it from unfriendly environment of outer space. The lowest atmosphere ie the troposphere contains about 70% mass of the atmosphere. It has mainly three categories of gaseous components viz major, minor and traces. For major gases like nitrogen and oxygen concentrations vary but to a very little extent with time, while for trace gases, the values tend to converge as the averaging time lengthens.

The average composition of air is: Oxygen=20.90%, Nitrogen=78.10%, Carbon dioxide=0.04% and the rest 0.96% includes ozone, argon, water vapours etc.

Global Atmospheric Changes:

Global warming has become a major scientific and political issue during last decade. The global temperature had risen by only 4 degree Celsius over the last 1800 years. However, because of rapid industrization; it has increased by 0.5^0 C- 1.0^0 C. Since the last century, when weather records started being maintained on the basis of data collected from about 2000 weather stations located around the world. The rate of global warming for the past quarter century was greater than any previous period since 1800. The fact that 1998 recorded the highest temperature ever is quite alarming. The scientists are concerned about the warming trend that seems to be emerging with every passing year. If this trend continues, global warming of approximately 1.5^0 C by 2015-2050 and 3^0 C by 2050-2100, with greater increases taking place at latitudes has been predicted.

Global warming and atmospheric changes:

Many predictions are being made about the changes in world climate as a result of global warming. Taking into considerations the theories put forth by general scientists, the following generalizations may be made:

- *If the concentration of co_2 other GHG's continues to rise at the present rate, the concentration of co_2 will reach about 600ppm by the year 2030, increasing average global temperature by 1.5-4.5^0 C. Rise in temperature will be grater in higher latitudes in the northern hemisphere, and will be medium in the world in the middle latitudes .In India, the increase will rage from a low 1^0 c in summer to a peak 3.4^0 c in winter. The highest increase will occur in northern parts.*

- *Besides changes in global temperature, there would be a shift in rainfall pattern. At high latitudes and high mid-latitudes rainfall may increase by 5% in summer and possibly up to 15% in winter. At lower mid-latitudes, summer rainfall is likely to become very limited and winter rainfall may decrease by 5-10%. In India, the rainfall will be enhanced over northern region and southern peninsula during summer. However, a decrease in monsoon rainfall is expected over the central plains of India covering parts of Bihar and Eastern Uttar Pradesh, both of which are major agricultural zones.*

- *According to several estimates, the level of sea water would rise by 20-140 cm in various parts of the world. The sea levels around the world have already risen by 30 cm over the past century. The implied rate of rise is about 4-6 cm per annum which is 2-6 times faster than that over the last 100 year. As the sea water raises, vast areas of Bangladesh, Maldives and India are likely to be hit by storms and flood. It has been estimated that the annual mean sea level rise in India by 2030 would be 20 cm along the coast of West Bengal, 10 cm along Andra Pradesh and about 5 cm along Kerala.*

- *Increase in potential evapo-transpiration could be expected to accompany the increase in temperature. Marked water stress may occur in areas where there is no corresponding increase in precipitation.*

- *The amount of ice and snow on earth would slowly decrease exposing more dark surfaces thus causing further rise in temperature. Increase in oceanic temperature contains 60 times less carbon dioxide than the ocean and the latter acts as a sink. A reduction in the capacity of sea water to dissolve carbon dioxide would drastically increase global carbon dioxide thus creating vicious circle.*

Green House Effects:

The green house effect on earth means progressive warming up of earth's surface due to the blanketing effect of man-made carbon dioxide in the atmosphere. Carbon dioxide is a natural constituent of the atmosphere but its concentration is increasing in the air at an alarming rate. It released by

combustion of fossil fuels. About half of carbon dioxide emitted stays in the atmosphere and the other half of it is removed by the oceans and plants. The increased amount of carbon dioxide in atmosphere is found to increase the temperature of earth. The green house effect is also known as Global Warming.

Impact of green house effects:

- *Rising sea level*
- *Changes in precipitation pattern*
- *Effects on organism*
- *Increase in desert formation desertification*

Sinks of atmospheric Gases

Oceans as well as vegetation are the most important sinks for most atmospheric gases. Sink is a medium which is capable of retaining and interacting with a long-lived pollutant, though not necessarily indefinitely.

Plants are capable of taking up the atmospheric gases without active metabolism. Some plants have the ability to metabolize the gas, resulting in creating an optimum concentration gradient for further absorption. In addition, there are a number of other sinks also, for example. Lime stone wall acts as the sink for atmospheric acid.

Kyoto protocol

From December 1 through 1, 1997, more than 160 nations met in Kyoto, Japan, to negotiate binding limitations on green house gases for the developed nations, pursuant to the objectives of the frame work convention on climate change of 1992. The outcome of the meeting was the Kyoto protocol, in which the developed nations agreed to limit their green house gas emissions, related to the levels emitted in 1990. The United States target is to reduce emissions from 1990 levels by 7% during the period 2008 to 2012. Green house gases primarily carbon dioxide can be control or mitigate in terms of carbon sequestration.

Carbon sequestration

Increase of carbon dioxide in the atmosphere (0.04%) has become one of the global environmental issues in recent years because of its potential to change world climate. Burning of fossil fuels and smoke emission by industries, particularly by the cement factories are some of the reasons attributed for rise of atmospheric carbon dioxide. Increase in the rate of destruction of terrestrial vegetation has been considered as an important source contributing significant amount of carbon to the environment. Due to terrestrial forests destruction, the carbon sink is diminishing, and the biomass extracted from these forests is also adding to carbon pool in the atmosphere.

Carbon sequestration is capturing of atmospheric carbon and storing it by one of several mechanisms to reduce green house gases and thereby reduce global warming. Carbon may be stored in living (green vegetation and forests) or non-living reservoirs (soil, geological formation, oceans and woody products). The removal and long term storage of carbon dioxide from the atmosphere can be carried out by the use of natural carbon sinks, primarily the forests in the form of increasing plant biomass.

Biomass burning is the burning of living and dead vegetation. It includes the human initiated burning of vegetation for land clearing and land use change as well as natural lightening-induced fires. Humans are responsible for about 90% of biomass burning with only a small percentage of natural fires contributing to the total amount of vegetation burned.

Burning vegetation releases large amounts of particulates (solid carbon combustion particles) and gases.

Vegetation of BU acts as a sink- a natural storage area for carbon dioxide by storing it over time through the process of photosynthesis. As burning occurs, it can releases hundreds of years worth of stored carbon dioxide into the atmosphere in a matter of hours. Burning also will permanently destroy an important sink for carbon dioxide if the vegetation is no replaced.

BUTTERFLIES: THE COLOUR OF LIFE

Vivek, P.E.S college, Bangalore.

Family Papilionidae: - Swallowtails

These are large Butterflies having tail like projection in there hind wing. The largest species of Butterfly (southern Birdwing) and the most of the threatened one (Blue Mormon, Paris Peacock, Malabar Banded Peacock and Common Banded peacock) belongs to this family. They have large and long fore wings which helps them in strong flight. They use there hind wings to balance their body during flight .They keeps on beating while they are taking nectar from the flower Lantana, ixora, Mussaenda, Cosmos, Zinnia, Leea, Cinnamomus etc.
Identified species of this family

Common Mormon (Papilio stichius)
Common Mormon (Papilio polytes.L)
Common Mormon (Papilio romulus)
Common Rose (Pachliopta aristolochiae)
Crimson Rose (Pachliopta hector.L)
Bluebottle (Graphium sarpedon.L)
Common Jay (Graphium doson)
Tailed Jay (Graphium agamemnon)
Lime Butterfly (Papilio demoleus.L)

Pieridae: - Whites and yellows

This butterfly is very common in mud-puddling areas near water bodies. This family is widely distributed in the campus the members of this family can be seen from open grass land to moist deciduous forest. Few of the family members usually flies in high altitudes (ex: - Jezebel, Grate Orange Tip) and few of them do it occasionally (ex: - Psyche).In morning hour they moves from flower to flower to take the nectar. But they do visit flowers often (Lantana, Madicago sativa, Momordica charantia, Punica granatum, Sesbania sesban, Sida cordifolia, Tagetes erecta, Asteraceae (Lagascea, Tridax Bidens, Ageratum), Vicoa, Blepharistemma laebinia, Leucas, Crepis, Gmelina and Maerua.

Butterflies belong to this family are:

Common Gull (*Cepora nerissa)*
Pioneer (*Anaphaeis aurota*.F)
Wonderer (*Pararonia valeria*)
Jezebel (*Delias eucharis*.D)
Great Orange Tip (*Hebomoea glaucippe*.L)
Crimson Tip (*Colotis danae*)
Yellow Orange Tip (*Ixas pyrene*)
Small orange tip (*Colotis etrida*.B)
Mottled Emigrant (*Catopsilia pyranthe*)
Common Emigrant (*Catopsilla pomona*.F)
Grass Yellow (*Eurema hecaba*.L)
Small grass yellow (*Eurema brigitta*.C)
Spotless grass yellow (*Eurema laeta*.B)
Psyche (*Leoyosia nina*.F)

Cabbage white, a butterfly belongs to this family, is wiped out now a day as its larvae is considered as a major pest of cabbage and killed by certain chemical pesticide. This phenomenon is showing the result of breaking the rules of nature. We should concentrate on biopesticides rather using chemical pesticides. Certain species of praying mantis is natural predator for them and can be used in vegetation to prevent their attack.

Praying Mantis

Cabbage White Butterfly

Nymphalidae: - Brush-footed Butterflies

In this family a lots of differentiation can be seen on the family members. In most of them the legs are of no use and they are not walk able and they are modified as brush like things which helps them to hold the surface and provide a good grip to the surface, therefore the name brush-footed Butterfly. As an example, the most common member of this family is evening brown which is known to all and found in shadow in winter.

They basically feed on nectar but some of them feed on tree sap and rotting fruit it also visits mammalian herbivore droppings. It also prefers such plants as Adelocaryum, Cipadessa fruticosa, Tridax ,Clerodendron serratum, Lantana, Leea, Premna, Antidesma, Gymnosporia montana, Mikania, Cosmos ,Tagetus, Zinnia, Celosia, Gliricidia,Gmelina arborea, Syzygium, Meyenia . The butterflies from this family are:-

Sailer (*Neptis hylus.*M)
Great Eggfly (*Hypolimnas bolina*.L)
Danaid Eggfly (*Hypolimnas misippus*.L)
Yellow Pansy (*Junonia hierta*.F)
Peacock pansy (*Junonia almana*)
Lemon Pansy (*Junonia lemonias*)
Blue pansy (*Junonia orithya*.L)
Chocolate pansy (*Precis iphita.*C)
Commander (*Moduza procris*)
Plain Tiger (*Danaus chrysippus*.L)
Striped Tiger (*Danaus genutia*.C)
Blue Tiger (*Tirumala liminiace*)
Dark Blue Tiger (*Tirumala septentrionis*.B)
Baronet (*Euthalia nais.*F)
Common Bushbrown (*Mycalesis perseus*)
Tawny Coster (*Acraea violae*)
Common Castor (*Ariadne merione*)
Nawab (*Polyur athams*.D)
Common evening brown (*Melanitis leda*.L)
Dark evening brown (*M. phedima*.S)
Great evening brown (*M. zitenius* .H)
Common leopard (*Phalanta phalanta*.D)
Common Baron (*Euthalia aconthea.*C)
Angled castor (*Ariadne ariadne*)
Nilgiri tiger (*Paranticia nilgiriensis*)

Common palmfly (*Elymnias hypermenstra*)
Common crow (*Euploea core*)
Double-branded crow (*Euploea Sylvester*.F)




Lycaenidae: - Blue

The members belongs to this family are small and usually flies in the ground level.This butterflies found in open scrubs (Ex Grass Blue, Silver Line, Grass Jewel etc.) from shades of the rain forest (Ex Sunbeam, Peacock Royal, Indigo Flash, Oak Blue etc.). They take nectar from small flowers of grassland such as Alternanthera, Bidens, Tridax, Sida Manvestrum etc.

The Butterflies from this family are:

Zebra blue (*Leptotes plinius*)
Common Pierrot (*Castalius rosimon*.F)
Red pierrot (*Talicada nyseus*.G)
Line Blue (*Prosotas nora* C&R .F)
Common silverline (*Spindasis vulcanus*.F)
Pea Blue (*Lampides boeticus*.L)
Common Cerulean (*Jamides celeno*)
Gram-blue (*Euchrysops cnejus*.F)
Grass-jewel (*Zizula*)
Peacock Royal (*Tajuria cippus*. F)
Hedge Blue (*Actolepis puspa*.H)


Hesperiidae: - Skippers

These are very fast flying butterflies. They fund to be bouncing and skipping in the field therefore the name skipper. They have huge thorax due to the presence of supporting wing muscles. They have delta wings which helps them on their active movements. They fly at ground level and occasionally goes high. They actively take nectar during the day time. They prefer Lantana, Glycosmis, Chromolaena Buddleia, Impatiens, Asystasia, Blepharis, Peristrophe, Crossandra, Sida, Leea, Hedychium, Costus, Tridax.

The Butterflies from this family are:
Indian Skipper (*Spialia galba*.F)
Tamil Grass Dart (*Taractrocera ceramas*.H)
Chestnut Bob (*Iambrix salsala*.M)
Common Banded Awl(*Hasora chromus*.C)
Restricted Demon (*Notocrypta curvifascia*)
Rice Swift (*Borbo cinnara*.W)



Biodiversity of the Reptiles in Jnana Bharati Campus of Bangalore University

Kunal Ankola, Sampath Kumar & Puttaraju. H.P
Department of Sericulture & Life sciences, Bangalore University, Bangalore-56.

Bangalore University located in the Garden City of Bangalore. It was established in July 1964. In consonance with this expression in 1973 the university moved into new campus named "Jnana Bharati" (JB) located on a sprawling 1,100 acres of land. The Jnana Bharati Campus of Bangalore University has very rich forest area. It has nearly four to five areas, which are mentioned as "BIOPARK". Since it has very thick vegetation, it consists of very rich biodiversity.

The Bangalore University has very rich Reptile biodiversity. One can find here very good population of lizards and snakes. In this connection a biodiversity survey was made in the forest area of the Bangalore University. This expedition is called as Herpato Fauna Expedition. The main objective of this expedition was:

- To check the population of the reptiles in their Natural habitat
- To know the relationship of Human with these animals
- To study the impact of increase in human population on reptiles in the forest
- Effect of increase in the population of natural enemies on the reptiles.

The whole forest area of the University was divided in six major zones where the Herpato Fauna was most oftenly found. The entire six zones of the University campus were surveyed for the reptiles. The result of this survey is as follows

	Zone A	Zone B	Zone C	Zone D	Zone E	Zone F
➢ Common Geco	**20**	**15**	**44**	**52**	**6**	**15**
➢ Chameleon	**6**	**----**	**1**	**2**	**----**	**----**
➢ Garden Lizard	**1**	**----**	**1**	**1**	**1**	**----**
➢ Snake Lizard	**----**	**12**	**18**	**----**	**----**	**----**
➢ Draco	**----**	**----**	**----**	**----**	**----**	**----**

Total:

- Common Geco- 152
- Chameleon - 09
- Garden Lizard - 04
- Snake Lizard - 30
- Draco - 00

	Zone A	Zone B	Zone C	Zone D	Zone E	Zone F
➢ Cobra	➢ ----	➢ ----	**4**	**2**	**1**	**2**
➢ King Cobra	➢ ----	➢ ----	**----**	**----**	**----**	**----**
➢ Russell's Viper	➢ 1	➢ ----	**3**	**2**	**----**	**----**
➢ Saw Scaled Viper	➢ ----	➢ -----	**1**	**----**	**----**	**----**
➢ Rat Snake	➢ 2	➢ 2	**5**	**1**	**----**	**1**
➢ Krait	➢ ----	➢ -----	**----**	**----**	**----**	**----**
➢ Keel Back	➢ 1	➢ ----	**1**	**----**	**-----**	**----**
➢ Python	➢ ----	➢ -----	**----**	**----**	**----**	**----**

Total:

Cobra	-09
King Cobra	-00
Russell's viper	-06
Saw Scaled Viper	-01
Rat Snake	-11
Krait	-00
Keel Back	-02
Python	-00

Even though very low numbers of reptiles were found, it can predicted that still more reptiles are present. During this expedition it was found that there is a decrease in the population of these reptiles, perhaps due to the following reasons,

- Human interference in the forest area is increasing day by day which may cause some disturbance in the ecology of these animals
- Increase of the natural enemies of these animals like mongoose, eagle, Owl, and other birds

During this expedition we also found a good population of mongoose which is one of natural enemies of the snakes. In addition some birds like eagle which feeds on Lizards as well as snakes were also found. From this expedition it is suggested for an in-depth survey and study of reptiles in the University campus, which will help in understanding its diversity.

Gecko

Rat Snake

Cobra

HEALTH
Dr.Venkataswamy

Where health lies:

The health of the man and the ecosystem and the habitats lies in biodiversity. Because, they are the true extra terrestrials and they were the first to convert the mineral world into a habitat to suit life- it is a perfect magic.

To understand the perfect magic we have to comprehend the language of nature, its soul and its reason. The inner world of plants is hidden from our gaze.

The association of organisms forms a community, that relation exists between organisms that is called in ecological terms boicoenosis.the boicoenosis is controlled and regulated by biogenesis, that is living matter arises from living matter, that means only living things can synthesize chemical substances from complex inanimate substances. These substances decorate the land scape with well designed biomorphological features.

These natural phenomenons are embedded with the spirit of love and the poetry of nature. this spirit of love and poetry of life started fading when coal and fossil fuel industry quickened the destruction of the vast land scape by belching chimneys and automobiles and polluting the streams underground aqua fires etc.,

The purpose of this programmed is to revive the spirit of love and to look nature with a clear mind, clear eye, clear heart. That means the wealth and health resides as stated by muttu Swamy deekshitar" Nirmala hridaya nivasini, komala hridaya nivasini.

The question is if you ant to survive and live meaningfully, and to hand over the living planet with full complements of biogenesis and biosensors or in other words with full heartbeat to the younger generation we shall have to bring in a sea –change in human affairs. This shift alone can restructure the weak and webs of life by crafting the new biology. The philosopher Johann Wolfgang von Goethe says contribution to biology with their concept of morphology of leaf and other well designed manifestations in plants have well defined deeper functions.

Kachadeva the son of guru gives a vivid description n of leaf which tallies with an American noble prize winner Melvin Calvin. His discovery in

photosynthesis that plant chlorophyll under the influence of sun's rays can give up electrons to a semiconductor such as zinc oxide. Calvin and his co workers created a green photo element, which produces a current of approximately 0.1 microamperes /square centimeter. The chlorophyll acts as electro pump. Calvin has calculated that chlorophyll photo element with an area of 10 sq m could yield a kilowatt of power that is a chemical energy. This conversion of energy or medicine via chlorophyll and with the help of biogenesis with the help of smart elements by individual sp is the safe way to heal the diseases of all living creatures and also the maladies of the ecosystem.

Nachiketa is a born biologist. He started exploring the fascination of life.- his fascination is grown to a great height and focused when he encountered the death god(yama). The death god recognized his irresistible lure to explore the life and his curiosity to search the knowledge has opened a new leaf in the philosophy of life. He fulfilled his quest to make rational sense of living phenomena. He explains in katopanished.It explains the countless disconnected facts. These facts can be understood only when we see the heap of things of unassembled gears and springs which works in the clock of biological life.

The first and second law of thermodynamics explains the concept of the katopanishads; The first law- holds that energy is not lost from the universe. The second law states that- energy is not lost, but it does dissipate from concentrated to diluted form (death), by losing its ability to perform biological functions. Or in other words it flows from one physical system to another or breaking down the vitalism of the life which existed to perform a biological function.

E.coli contains considerable number of human genes also. This e.coli without environmental constraints a single E.coli bacterium reproduces into a mass equal to all living things on earth. The death god explains these biological impulses to satisfy the burning desire about death and life to Nachiketha. Einstein also explains the impulse of unified theory. The death god explains to use the living elements of nature as a guide to understand nature. He also explains the following things.

1. *All organisms maintain high degree of organization for a specific function.*
2. *They acquire and use energy.*
3. *they use and transmit the end products as characteristics to their offspring's in the form of seeds*
4. *They discard call the products including their genes to their children.*
5. *A plant or an animal cell will have a full genetic complement. Realizing this concept of life Bernard shah proposes a scientific religion that is what*

katopanishad speaks. It speaks matter and energy doesn't mechanically flow through food chains and food webs. It transforms by way of myriad of feedback loops that interlinks the endless metabolic network I search of homeostasis that means it builds in the wisdom to all plants. This built in wisdom is taking care of our health in the form of biodiversity.

6. *There is nothing neither lovelier on this planet than a flower nor more essential than a plat, tree, shrub, and climber. The true matrixes of life exists in biodiversity, without them, no organism can breath or eat.*
7. *A single ray plant has 13 million root lets with a combined length of 380million miles. Root hairs estimated are 14 billion with a total length of 660 miles from almost a distance from pole to pole. Therefore we have to understand the miracles in the womb of mother earth.*

ಆರೋಗ್ಯ

ಆಧುನಿಕ ವಿಜ್ಞಾನ ಇಂದು, ಮನುಷ್ಯನಿಗೆ ಹಕ್ಕಿಯಂತೆ ಆಕಾಶದಲ್ಲಿ ಹಾರುವುದನ್ನು ಕಲಿಸಿದೆ. ಮೀನಿನಂತೆ ನೀರಿನಲ್ಲಿ ಈಜುವುದನ್ನು ಕಲಿಸಿದೆ. ಆದರೆ ಮಾನವನಂತೆ ಭೂಮಿಯ ಮೇಲೆ ಬದುಕುವುದನ್ನು ಕಲಿಸಲಿಲ್ಲ.

ಜಗತ್ತಿನ ಸಕಲ ಚರಾ–ಚರಗಳು ಪ್ರಕೃತಿಯ ಜೊತೆಯಲ್ಲಿ ಹೊಂದಿಕೊಂಡು ಸಾಮರಸ್ಯದಿಂದ, ಸಹಬಾಳ್ವೆ ನಡೆಸುತ್ತಿವೆ. ವಿಶ್ವಸೃಷ್ಟಿಯಲ್ಲಿ ತಾನೇ ಶ್ರೇಷ್ಠ ಎಂದು ಹೆಮ್ಮೆಯಿಂದ ಬೀಗುತ್ತಿರುವ ಮಾನವ ಮಾತ್ರ, ಪ್ರಕೃತಿ ಮಾತೆಯ ಮೇಲೆ ದೌರ್ಜನ್ಯವನ್ನು ನಡೆಸುತ್ತಾ ಅವಳ ಮೇಲೆ ತನ್ನ ಸಾರ್ವಭೌಮತ್ವವನ್ನು ಸ್ಥಾಪಿಸಲು ಹೊರಟಿರುವ ಇಂದಿನ ಮಾನವನನ್ನು ನೋಡಿದರೆ, ಇವನು ಪಶು–ಪಕ್ಷಿ, ಮೃಗಗಳಿಗಿಂತಲೂ ಕೀಳಾಗಿ ಕಾಣುತ್ತಾನೆ. ಅಲ್ಲವೆ?

ಭೂಮಂಡಲದ ಸಕಲ ಜೀವರಾಶಿಗಳಲ್ಲಿ ತಾನೇ ಶ್ರೇಷ್ಠ, ಬುದ್ಧಿವಂತ ಎಂದು ಭಾವಿಸಿರುವ ಮಾನವ ಒಂದು ಪೂರ್ಣ ಪರಾವಲಂಬಿ ಜೀವಿಯೇ ಸರಿ!! ಭರಣಿಯಲ್ಲಿ ತನ್ನ ಅಸ್ಥಿತ್ವಕ್ಕೆ ಆಧಾರವಾಗಿರುವ, ಆಹಾರ, ಔಷಧಿಗಳಿಗಾಗಿ ಜಗತ್ತಿನ ಮತ್ತೊಂದು ಅದ್ಭುತ ಸೃಷ್ಟಿಯಾದ ಸಸ್ಯ ಸಂಕುಲವನ್ನು ಪೂರ್ಣವಾಗಿ ಅವಲಂಬಿಸಿದ್ದಾನೆ. ಎಂಬುದು ಶತಸತ್ಯ. ವೃದ್ಧಿಯಲ್ಲಿನ ಜಡ, ನಿರೀಂದ್ರಿಯ, ಪಾಂಚಭೌತಿಕತತ್ವಗಳನ್ನು ಬಳಸಿಕೊಂಡು ಸ್ವತಂತ್ರವಾಗಿ ಬದುಕುವ ಸಾಮರ್ಥ್ಯ ಇವನಿಗೆ ಇಲ್ಲ. ಈ ರಹಸ್ಯ ತಿಳಿದಿರುವುದು ಸಸ್ಯ ಸಂಕುಲಕ್ಕೆ ಮಾತ್ರ.

ಗರ್ಭಿಣಿಯಾದ ತಾಯಿ ತಾನು ಅಹಾರವನ್ನು ಸೇವಿಸಿ ಅದನ್ನು ಜೀವರಸವನ್ನಾಗಿ ಪರಿವರ್ತಿಸಿಕೊಂಡು. ತನ್ನ ಪೋಷಣೆಮಾಡಿಕೊಳ್ಳುವುದೇ ಅಲ್ಲದೆ ಗರ್ಭದಲ್ಲಿರುವ ತನ್ನ ಶಿಶುವಿನ ಬೆಳವಣಿಗೆ ಪೋಷಣೆ, ರಕ್ಷಣೆಗೆ ಕಾರಣ ವಾಗುತ್ತಾಳೆ. ಹಾಗೆಯೇ ಭೂಮಂಡಲದ ಜಡ, ನಿರೀಂದ್ರಿಯ ಪಂಚಭೂತ ತತ್ವಗಳನ್ನು ಬಳಸಿಕೊಂಡು ಬ್ರಹ್ಮಾಂಡದ ದಿವ್ಯ ಸೌರಶಕ್ತಿಯ ಸಹಾಯದಿಂದ ಅದನ್ನು ಸೇಂದ್ರೀಯ ಅದ್ಭುತ ಜೀವಶಕ್ತಿಯನ್ನಾಗಿ ಪರಿವರ್ತಿಸಿಕೊಂಡು. ಸ್ವತಂತ್ರವಾಗಿ ಬದುಕುವ ರಹಸ್ಯ ಕಲೆ ಸಸ್ಯ ಸಂಕುಲಕ್ಕೆ ಮಾತ್ರ ತಿಳಿದಿದೆ. ಹೀಗೆ ಪರಿವರ್ತಿಸಿಕೊಂಡು ಜೀವ ಶಕ್ತಿಯಿಂದ ತನ್ನ ಪೋಷಣೆ, ರಕ್ಷಣೆ ಹಾಗೂ ಸಂತಾನಾಭಿವೃದ್ಧಿ ಮಾಡಿಕೊಂಡು ತಾನೇ ತಾನಾಗಿ ಬದುಕುವ ಸಸ್ಯಗಳು ಜಗತ್ತಿನ ಸಕಲ ಜೀವ ಜಂತುಗಳ ಬದುಕಿಗೆ ಆಧಾರವಾದ ಆಹಾರ, ಔಷಧಗಳನ್ನು ನೀಡಿ ತಾಯಿಯಂತೆ ಪೋಷಣೆ ಮಾಡುತ್ತವೆ.

ಈ ಮಹತ್ವದ ರಹಸ್ಯವನ್ನು ಅರಿತಿದ್ದ ನಮ್ಮ ಪ್ರಾಚೀನ ಋಷಿ, ಮುನಿಗಳು, ತಮ್ಮ ದಿವ್ಯ ಜ್ಞಾನದಿಂದ ಈ ವನಸ್ಪತಿಗಳ, ರಸ, ಗುಣ, ವೀರ್ಯ ವಿಪಾಕೆ, ಹಾಗೂ ಔಷಧಿ ಗುಣಗಳನ್ನು ಆಳವಾಗಿ ಅಧ್ಯಯನ ಮಾಡಿ, ಗುರ್ತಿಸಿ, ಅವುಗಳು ಮಾನವ ಕಲ್ಯಾಣಕ್ಕಾಗಿ ಹೇಗೆ ಉಪಯೋಗಿಸಿಕೊಳ್ಳಬಹುದು. ಎಂಬ ಜ್ಞಾನವನ್ನು ಆಯುರ್ವೇದ ವೈದ್ಯ ಶಾಸ್ತ್ರದಲ್ಲಿ ಬಹಳ ವಿಸ್ತಾರವಾಗಿ ತಿಳಿಯ ಪಡಿಸಿದ್ದಾರೆ.
ಅಗ್ನಿವೇಶ, ಚರಕ, ಸುಶ್ರುತ, ಧನ್ವಂತರಿ, ವಾಗ್ಬಟ, ಬೇಲ, ಮುಂತಾದ ಪ್ರಾಚೀನ ಆಯುರ್ವೇದಾಚಾರ್ಯರು, ಈ ವಿಜಯದ ಬಗ್ಗೆ ಇನ್ನು ಆಳವಾಗಿ ಅಧ್ಯಯನಮಾಡಿ, ಯಾವ ಸಸ್ಯ, ಯಾವ ಯಾವ ಪಾಂಚಭೌತಿಕ ತತ್ವಗಳನ್ನು ಎಷ್ಟು ಪ್ರಮಾಣದಲ್ಲಿ ಉಪಯೋಗಿಸಿಕೊಂಡು, ತನ್ನ ಬೆಳವಣಿಗೆ ಪೋಷಣೆ, ಸಂತಾನಾಭಿವೃದ್ಧಿಗೆ ಬಳಸಿಕೊಳ್ಳುತ್ತದೆ. ಮತ್ತು ರೋಗ ನಿರೋಧಶಕ್ತಿಯನ್ನು ಹೆಚ್ಚಿಸಿಕೊಂಡು ಆರೋಗ್ಯವನ್ನು ಕಾಪಾಡಿಕೊಳ್ಳುವ ಹಾಗೂ ರೋಗ ಬಂದಾಗ ಅದನ್ನು ನಿವಾರಿಸಿಕೊಳ್ಳಲು ಬೇಕಾಗುವ ಔಷಧಿ ತತ್ವಗಳನ್ನು ತಯಾರಿಸಿಕೊಂಡು ಪರಿಸರದ ಜೊತೆಯಲ್ಲಿ ಸಾಮರಸ್ಯದಿಂದ ಬದುಕುತ್ತದೆ, ಎಂಬುದನ್ನು ಅರಿತಿದ್ದರು. ಹಾಗೆಯೇ ಅವುಗಳಲ್ಲಿ ಇರಬಹುದಾದ ಔಷಧಿ ಸತ್ವಗಳನ್ನು ಮನುಷ್ಯನಿಗೆ ಬರಬಹುದಾದ ಔಷಧಿ ಸತ್ವಗಳನ್ನು ಮನುಷ್ಯನಿಗೆ ಬರಬಹುದಾದ ರೋಗಗಳ ನಿವಾರಣೆಗೆ ಸಮರ್ಪಕವಾಗಿ ಹೇಗೆ ಬಳಸಿಕೊಳ್ಳಬಹುದು ಎಂಬುದರ ಬಗ್ಗೆ ತಾವು ರಚಿಸಿರುವ ಆರ್ಯುವೇದ ಗ್ರಂಥಗಳಲ್ಲಿ ಹೇಳಿದ್ದಾರೆ.

ಇದಲ್ಲದೆ ಒಂದು ವನಸ್ಪತಿಯ ಯಾವ ಭಾಗ, ಮನುಷ್ಯನ ಶರೀರದ ಯಾವ ಅಂಗದಲ್ಲಿ ಉಂಟಾಗುವ ನಿರ್ದಿಷ್ಟ ರೋಗದ ಚಿಕಿತ್ಸೆಗೆ ಎಷ್ಟು ಪ್ರಮಾಣದಲ್ಲಿ ಯಾವ ರೂಪದಲ್ಲಿ ಉಪಯೋಗಿಸಿಬೇಕು ಎಂಬುದನ್ನುಸಹ ಬಹುಸ್ಪಷ್ಟವಾಗಿ ಹಾಗೂ ವೈಜ್ಞಾನಿಕವಾಗಿ ವಿವರಿಸಿದ್ದಾರೆ.

ಆಯುರ್ವೇದ ಪಿತಾಮಹ ಚರಕಾಚಾರ್ಯರು ಸುಮಾರು ೫೦೦೦ ವರ್ಷಗಳ ಹಿಂದೆ ತಾವು ರಚಿಸಿರುವ ಮಹಾನ್ ಗ್ರಂಥ. "ಚರಕ ಸಂಹಿತೆ"ಯಲ್ಲಿ ರೋಗ ವಿಧಾನ, ರೋಗಲಕ್ಷಣ ಹಾಗೂ ಅವುಗಳ ಚಿಕಿತ್ಸೆಯ ಬಗ್ಗೆ ಸುವಿಸ್ತಾರವಾಗಿ ವಿವರಿಸಿದ್ದಾರೆ.

ಇದರ ಜೊತೆಗೆ ಚಿಕಿತ್ಸೆಗೆ ಬೇಕಾಗುವ ಸುಮಾರು ೭೦೦೦ ವನಸ್ಪತಿಗಳ ವಿವರಗಳನ್ನು ನೀಡಿದ್ದಾರೆ. ಈ ಎಲ್ಲಾ ಔಷಧಿ ಸಸ್ಯಗಳ, ಹೆಸರು, ಸ್ವರೂಪ, ಬೆಳೆಯುವ ಸ್ಥಳ ಕಾಲ, ಅವುಗಳ ಔಷಧಿಗುಣಗಳು ಇತ್ಯಾದಿ ಎಲ್ಲಾ ವಿವರಗಳನ್ನು ಸುಲಭವಾಗಿ ಜ್ಞಾಪಕವಿಟ್ಟುಕೊಳ್ಳಲು ಕಷ್ಟದ ಕೆಲಸ ಎಂದು ಯೋಚಿಸಿದ ಚರಕಾಚಾರ್ಯರು ಅವುಗಳ ಔಷಧಿಗುಣಗಳ ಆಧಾರದ ಮೇಲೆ ವರ್ಗೀಕರಿಸಿ ಚರಕ ಸಂಹಿತೆ ಸೂತ್ರಜ್ಞಾನ ಳನೇ ಅಧ್ಯಯದಲ್ಲಿ ಈ ವರ್ಗೀಕರಣದ ವಿವರಗಳನ್ನು ತಿಳಿಸಿದ್ದಾರೆ.

ಸಮಾನ ಔಷಧಿಯ ಗುಣಗಳುಳ್ಳ ಹತ್ತು ವನಸ್ಪತಿಗಳನ್ನು ಒಂದು ಗುಂಪಾಗಿಮಾಡಿ ಅದಕ್ಕೆ ಬಿಂದು ಗಣ ಕರೆದಿದ್ದಾರೆ. ಹೀಗೆ ಹತ್ತು ವನಸ್ಪತಿಗಳಿಂದ ಕೂಡಿರುವ ಒಂದು ಗಣ, ಒಂದು ನಿರ್ದಿಷ್ಟ ರೋಗ ನಿವಾರಣೆಗೆ ಉಪಯೋಗಕ್ಕೆ ಬರುತ್ತದೆ.

ಉದಾಹರಣೆಗೆ ಕುಷ್ಠಘ್ನಗಣ, ಎಂದರೆ ಚರ್ಮರೋಗಗಳ ನಿವಾರಣೆಗೆ ಉಪಯೋಗವಾಗುವ ಹತ್ತು ವನಸ್ಪತಿಗಳು ಇಲ್ಲಿವ ಈ ಕುಷ್ಠಘ್ನ ಗ್ಣದಲ್ಲಿ ೧. ಹರೀತಕಿ (ಅಳಲೆಕಾಯಿ) ೨. ಖದಿರ (ಕಗ್ಗಲಿ) ೩. ವಿಡಂಗ (ವಾಯುವಿಡಂಗ) ೪. ಆಮಲಕೀ (ನೆಲ್ಲಿ ಕಾಯಿ) ೫. ಚಲ್ಲಾತಕ (ಕಾಡುಗೇರು) ೬. ಸಪ್ತ ಪರ್ಣಿ (ಏಳೆಲೆ ಬಾಳೆ) ೭. ಹರಿದ್ರಾ (ಅರಿಶಿನ) ೮. ಅರಗ್ವದ (ಕಕ್ಕೆ) ೯. ಕರವೀರ (ಕಣಿಗಲೆ), ೧೦. ಜಾತಿಪತ್ರ (ಮಲ್ಲಿಗೆ), ಎಂಬ ಹತ್ತು ವನಸ್ಪತಿಗಳನ್ನು ಸೇರಿಸಲಾಗಿದೆ. ಈ ಎಲ್ಲಾ ವನಸ್ಪತಿಗಳಲ್ಲಿಯೂ ಚರ್ಮರೋಗಗಳನ್ನು ಗುಣ ಪಡಿಸಲು ಒಂದು ಸಾಮಾನ್ಯ ಗುಣವಿದೆ.
ಇದೇ ರೀತಿಯಾಗಿರುವ ಮತ್ತೊಂದು ಗಣ, "ಹೃದ್ಯಗಣ", ಈ ಹೃದ್ಯಗಣದಲ್ಲಿ ೧. ಆಮ್ರ (ಮಾವಿನಹಣ್ಣು) ೨. ಅಮ್ರಾಂತಕ (ಅದುಟಿ) ೩. ಲಕುಚ (ಗಜನಿಂಬೆ) ೪. ಕರಮರ್ದ (ಕಮರದ ದ್ರಾಕ್ಷಿ) ೫. ವೃಷಾಮ್ಲ (ಗೆರಸಿಗೆ ಹುಳಿ) ೬. ಆಮ್ಲವೇತಸ (ಓಟ ಹುಳಿ) ೭. ಕವಲ (ದಪ್ಪ ಎಲಚಿ) ೮. ಬಿದರ (ಸಣ್ಣ ಎಲಚಿ(೯. ದಾಡಿಮ (ದಾಳಿಂಬೆ) ೧೦. ಮಾತುಲುಂಗ (ಮಾದಳದ ಹಣ್ಣು) ಈ ಹತ್ತು ಹಣ್ಣುಗಳಿವೆ. ಇಲ್ಲಿನ ಎಲ್ಲಾ ಹಣ್ಣುಗಳು ಹೃದಯಕ್ಕೆ ಪುಷ್ಟಿಯನ್ನು ನೀಡಿ ಹೃದಯದ ಆರೋಗ್ಯವನ್ನು ರಕ್ಷಣೆ ಮಾಡಲು ಸಹಾಯಕವಾಗಿವೆ. ಮತ್ತೊಂದು ಮಹತ್ತರವಾಧ ರೋಗ ನಿವಾರಕಗುಣ "ಮೂತ್ರ ವಿರೇಚನೀಯ ಗಣ", ಮೂತ್ರರೋಗಕ್ಕೆ ಚಿಕಿತ್ಸೆಗೆ ಉಪಯೋಗವಾಗುವ ಹತ್ತು ವನಸ್ಪತಿಗಳ ಸಮೂಹವೇ ಮೂತ್ರ ವಿರೇಜನಿಯಗಣ.

ಇದರಲ್ಲಿ ೧. ವೃಷಾದನ (ಬದನಿಗೆ) ೨. ಶ್ವದಂಷ್ಟ್ರಾ (ನಿಗ್ಗಿಲು) ೩. ವಸುಕ (ಶಿವಮಲ್ಲಿಗೆ) ೪. ವಸಿರ (ಉತ್ತರಣಿ ಬೀಜ) ೫. ಪಾಷಾನಭೇದ (ಹಿಟ್ಟುಳುಕ) ೬. ದರ್ಭ (ದರ್ಬೆ) ೭. ಕುಶ (ವಿಶ್ವಮಿತ್ರದರ್ಭೆ) ೮. ಕಾಶ (ಬಿಳಿ ತೆನೆ ಬಿಡುವ ದರ್ಬೆ) ೯. ಗುಂಧ್ರ (ಶುಂಠಿ ಹುಲ್ಲು) ೧೦. ಇತ್ಕಟಮೂಲ (ಕಬ್ಬಿನಬೇರು) ಇವು ಹತ್ತು ಸೇರಿ ಮೂತ್ರ ವಿಕೇಜನಿಯ ಗಣದ್ರವ್ಯಗಳಾಗಿವೆ. ಇವುಗಳೆಲ್ಲವೂ ಮೂತ್ರ ಪಿಂಡ ಮತ್ತು ಮೂತ್ರ ಕೋಶದ ಎಲ್ಲಾ ರೀತಿಯ ರೋಗಗಳಿಗೆ ಅತಿ ಉಪಯುಕ್ತ ವನಸ್ಪತಿಗಳಾಗಿವೆ.
ಇದಲ್ಲದೆ, ಜ್ವರಘ್ನಗಣಬಲಗಣ ಜೀವನೀಯಸಣ, ಸ್ತನ್ಯಜನ ನಿಯಗಣ, ವರ್ಣಗಣ, ಇತ್ಯಾದಿ, ೫೦ ಗಣ ಗಳನ್ನು ಇದಲ್ಲಿ ವಿವರಿಸಲಾಗಿದೆ. ಈ ರೀತಿಯಾಗಿ ಒಂದುಗಣದಲ್ಲಿ ಹತ್ತು ವನಸ್ಪತಿಗಳು ಇದ್ದು. ಒಟ್ಟು ೫೦ಗಣದಲ್ಲಿ ೫೦೦ ಸಸ್ಯಗಳ ವಿವರ ಇಲ್ಲಿದೆ.

ಆಯುರ್ವೇದ ಪಿತಾಮಹಾ ಚರಕಚಾರ್ಯರು ಸುಮಾರು ೫೦೦೦ ವರ್ಷಗಳ ಹಿಂದೆ ರಚಿಸಿರುವ ತಮ್ಮ ಮಹಾನ್ ಆಯುರ್ವೇದ ಗ್ರಂಥ 'ಚರಕ ಸಂಹಿತೆ'ಯಲ್ಲಿ ಅತ್ಯಂತ ವೈಜ್ಞಾನಿಕವಾಗಿ ವರ್ಗಿಕರಿಸಿ ವಿವರಿಸಲಾಗಿರುವ ಈ ೫೦೦ ಅಮೂಲ್ಯ ವನಸ್ಪತಿಗಳನ್ನು ಒಂದೇ ಸ್ಥಳದಲ್ಲಿ ಬೆಳೆಸಿ, ಆಯುರ್ವೇದ ವೈದ್ಯರು, ವಿದ್ಯಾರ್ಥಿಗಳು ಸಸ್ಯ ಶಾಸ್ತ್ರಜ್ಞರು, ಸಂಶೋಧನಕಾರರು, ಇವುಗಳನ್ನು ವೈಜ್ಞಾನಿಕವಾಗಿ ಅಧ್ಯಯನ ಮಾಡಲು ಅನುಕೂಲವಾಗಲೀ ಎಂಬ ಘನ

ಉದ್ದೇಶದಿಂದ ಮಹಾನ್ ಪರಿಸರವಾದಿ ಶ್ರೀಮಾನ್ ಎ.ಎನ್. ಎಲ್ಲಪ್ಪ ರೆಡ್ಡಿಯವರು ಈ ಚರಕ ಗಣವನದ ನಿರ್ಮಾಣದ ರೂವಾರಿಯಾಗಿದ್ದಾರೆ.

ಶ್ರೀ ಆದಿ ಚುಂಚನಗಿರಿ ಶಿಕ್ಷಣ ಟ್ರಸ್ಟಿನ ಶ್ರೀ ಕಾಲಭೈರವೇಶ್ವ ಸ್ವಾಮಿ ಆಯುರ್ವೇಕಾಲೇಜು, ಆಸ್ಪತ್ರೆ ಮತ್ತು ಸಂಶೋಧನಾ ಕೇಂದ್ರ ವಿಜಯನಗರ, ಬೆಂಗಳೂರು– ೪೦, ಇವರು, ಪರಮ ಪೂಜ್ಯ ಜಗದ್ಗುರು ಶ್ರೀಶ್ರೀಶ್ರೀ ಬಾಲಗಂಗಾಧರ ನಾಥಸ್ವಾಮಿಗಳವರ ಆರ್ಶಿರ್ವಾದದೊಂದಿಗೆ ಬೆಂಗಳೂರು ವಿಶ್ವವಿದ್ಯಾಲಯದ ಆವರಣದಲ್ಲಿ 'ಚರಕವನ' ವನಸ್ಪತಿ ಉದ್ಯಾನವನ್ನು ನಿರ್ಮಾಣವಾಗಿದೆ.

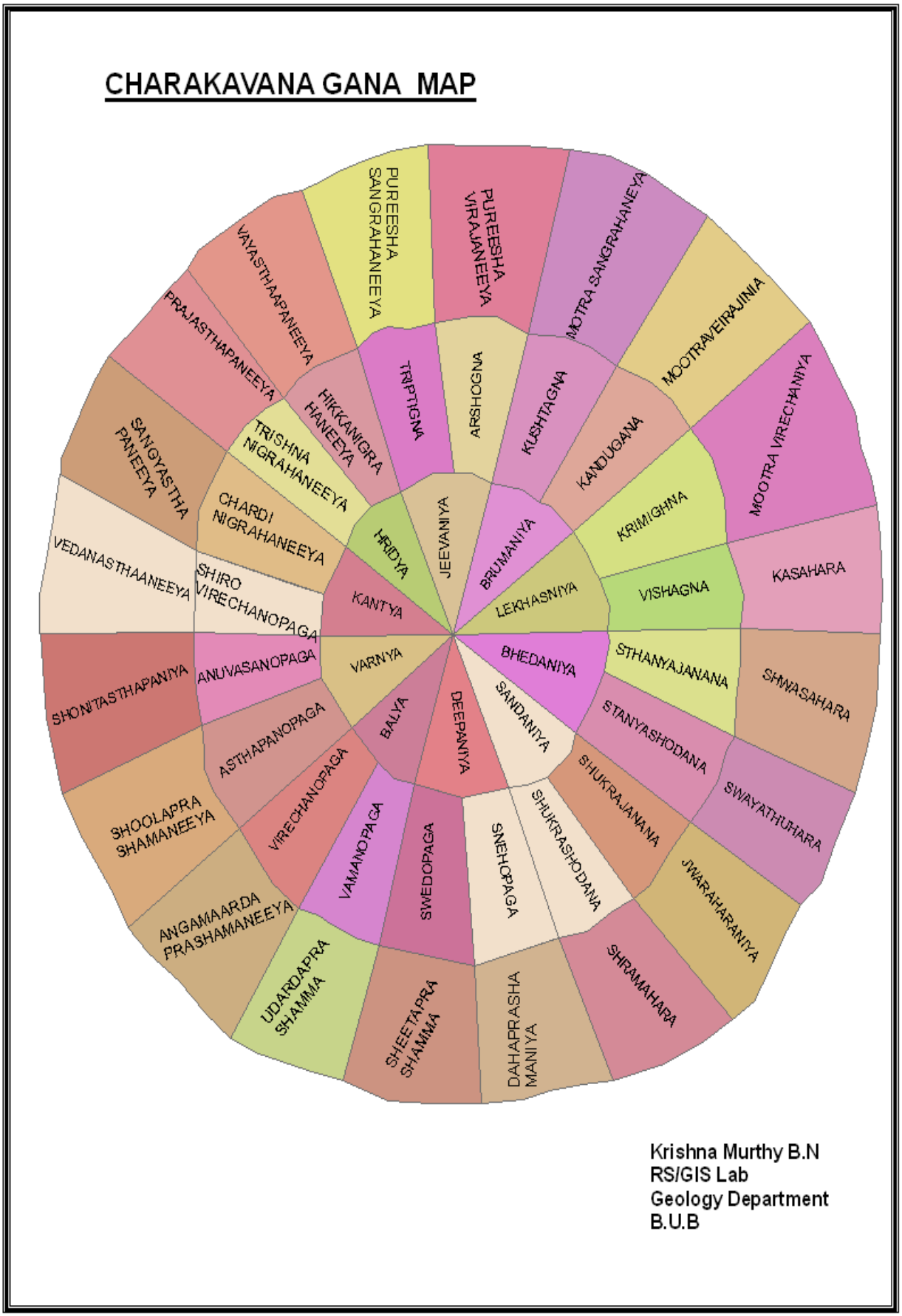
ಬೆಂಗಳೂರು ವಿಶ್ವವಿದ್ಯಾಲಯದಿಂದ ಕುಲಪತಿಗಳು ಈ ಉದ್ಯಾನದ ಬಗ್ಗೆ ಆಸಕ್ತಿ ವಹಿಸಿ ತಮ್ಮ ವಿಶ್ವವಿದ್ಯಾಲಯದ ಆವರಣದಲ್ಲಿ ಸ್ಥಳಾವಕಾಶನೀಡಿ ಪ್ರೋತ್ಸಾಹಿಸಿದ್ದಾರೆ.
ಈ ಉದ್ಯಾನದ ಮಹತ್ವವನ್ನು ಅರಿತ ಕೆಲವು ಚಿಂತನಾಶೀಲ ನಾಗರೀಕರು ಇದರ ಅಭಿವೃದ್ಧಿಗೆ ಉದಾರವಾಗಿ ಸಹಾಯ ಮಾಡಿ ಸಹಕರಿಸಿದ್ದಾರೆ. ಇಂಥಹವರಲ್ಲಿ ಶ್ರೀ.ಮಾನ್ ಹೆಚ್. ರಾಮಯ್ಯ ರೆಡ್ಡಿ ಸ್ಮರಣಾರ್ಹ.

ದಿನಾಂಕ ೫–೬–೨೦೦೨ರಂದು ಪರಮಪೂಜ್ಯ ಜಗದ್ಗುರು ಶ್ರೀಶ್ರೀಶ್ರೀ ಬಾಲಗಂಗಾಧರನಾಥ ಮಹಾಸ್ವಾಮಿಗಳವರಹಾಘೂ ಇನ್ನು ಇಥರ ಪ್ರಮುಖ ಗಣ್ಯ ವ್ಯಕ್ತಿಗಳ ಉಪಸ್ಥಿತಿಯಲ್ಲಿ ಪ್ರಾರಂಭವಾದ ಚರಕವನ''ಇಂದು ರಾಷ್ಟ್ರದಲ್ಲೇ ಒಂದು ಅಪೂರ್ವ ಔಷಧೀಯ ಸಸ್ಯಗಳ ಉದ್ಯಾನ ವನವಾಗಿ ಬೆಳೆದು ನಿಂತಿದೆ. ವಿದ್ಯಾರ್ಥಿಗಳು ವೈದ್ಯರು, ವಿಜ್ಞಾನಿಗಳು ಹಾಗೂ ಸಂಶೋಧಕರ ಒಂದು ಪ್ರಮುಖ ಅಧ್ಯಯನ ಕೇಂದ್ರವಾಗಿ ಬೆಳೆಯುತ್ತಿರುವುದು ಒಂದು ಸಂತೋಷದ ಸಂಗತಿ.

ನಾಗರೀಕತೆಯ ಹೆಸರಿನಲ್ಲಿ ತನ್ನ ಭೌತಿಕ ಜ್ಞಾನದ ಕೃಷಿಯನ್ನು ತೀರಿಸಿಕೊಳ್ಳುವ ತವಕದಿಂದ ವಿಜ್ಞಾನವೆಂಬ ಮರೀಚಿಕೆಯ ಬೆನ್ನುಹತ್ತಿ ಹೊರಟಿರುವ ಮಾನವ ತನ್ನ ಅವಸಾನದ ಅಂಚಿಗೆ ತಾನೇ ಬಂದು ನಿಂತಿದ್ದಾನೆ. ಪ್ರಕೃತಿಯ ನಿಯಮಗಳನ್ನು ಗಾಳಿಗೆ ತೂರಿ, ಜಗತ್ತಿನಲ್ಲಿ ನಾನೇ ಅತಿಬುದ್ಧಿವಂತ, ನನಗೆ ವಿಜ್ಞಾನದ ಬಲವಿದೆ ಎಂದು ಭಾವಿಸಿ, ನಾಗರೀಕತೆ ಮತ್ತು ಅಭಿವೃದ್ಧಿಯ ಹೆಸರಿನಲ್ಲಿ ಪ್ರಕೃತಿಯಲಲಿನ ಸಸ್ಯ ಸಂಕುಲವನ್ನೇ ನಾಶಮಾಡಲು ತೊಡಗಿದ್ದಾನೆ. ಗರ್ಭವತಿಯಾದ ಸ್ತ್ರೀ, ತನ್ನ ಗರ್ಭದಲ್ಲಿ ಶಿಶುವನ್ನು ಪೋಷಿಸಿ, ರಕ್ಷಿಸುವಂತೆ ನಮ್ಮನ್ನು ರಕ್ಷಿಸುತ್ತಿರುವ ತಾಯಿಯಂತೆ ನಮ್ಮನ್ನು ರಕ್ಷಿಸುತ್ತಿರುವ ಸಸ್ಯ ಸಂಕುಲವನ್ನು ಕಡೆಗಣಿಸಿ, ತಾಯಿಯ ನಾಭಿನಾಳದಿಂದ ಬೇರ್ಪಟ್ಟು ಬದುಕಲು ಹೊರಟ ಗರ್ಭಸ್ಥ ಶಿಶುವಿನಂತೆ ಪ್ರಕೃತಿಯಿಂದ ದೂರನಾಗಿ ಬದುಕುವ ಹುಚ್ಚುಸಾಹಸಕ್ಕೆ ಕೈಹಾಕಿದ್ದಾನೆ ಈ ಹುಲುಮಾನವ.

ಇಂಥಹ ಪರಿಸ್ಥಿತಿಯಲ್ಲಿರುವ ಇಂದಿನ ನಾಗರೀಕನಿಗೆ ಸೃಷ್ಟಿಯಲ್ಲಿ ಮಾನವನಿಗೂ, ಸಸ್ಯಸಂಕುಲಕ್ಕೂ ರಹಸ್ಯ ಹಾಗೂ ಅಪೂರ್ವ ಸಂಬಂಧವನ್ನು ತಿಳಿಸಿ. ಹೇಳುವ, ಒಂದು ಸರಳ ವಿಶಿಷ್ಠ ಮಾಧ್ಯಮ. ಈ ವನಸ್ಪತಿ ವನಗಳ ನಿರ್ಮಾಣ ಕಾರ್ಯ ಯೋಜನೆ. ಜಗತ್ತಿನ ಎಲ್ಲಾ ಜೀವ ಜಂತುಗಲ ಹಆಗೂ ಮಾನವ ಬದುಕಿಗೆ ಪ್ರಕೃತಿಯಂತೆ ನೀಡಿರುವ ಅಮೂಲ್ಯ ಕೊಡುಗೆಯಾದ ಸಸ್ಯ ಸಂಕುಲವನ್ನು ಉಳಿಸಿ ಬೆಳೆಸುವುದೇ ಈ ಔಷಧಿವನಗಳ ಭವ್ಯ ಉದ್ದೇಶ ರೋಗರಹಿತ ಬದುಕಿಗೆ ಇಂಥಹ ಕಾರ್ಯ ಯೋಜನೆಗಳು ನಾಂದಿ ಹಾಡುತ್ತವೆ.

''ಸರ್ವೇಜನಃ ಸುಖೀನೋಭವಂತು।।''


CHARAKAVANA GANA MAP
PUREESHA SANGRAHANEEYA
PUREESHA VIRAJANEEYA
MOTRA SANGRAHANEEYA
MOOTRAVIRAJINIA
MOOTRA VIRECHANIYA
KASAHARA
SHWASAHARA
SWAYATHUHARA
JWARAHARANIYA
SHRAMAHARA
DAHAPRASHAMANIYA
SHEETAPRASHAMMA
UDARDAPRASHAMMA
ANGAMAARDA PRASHAMANEEYA
SHOOLAPRASHAMANEEYA
SHONITASTHAPANIYA
VEDANASTHAANEEYA
SANGYASTHAPANEEYA
PRAJASTHAPANEEYA
VAYASTHAAPANEEYA
HIKKANIGRAHANEEYA
TRISHNANIGRAHANEEYA
CHARDINIGRAHANEEYA
SHIRO VIRECHANOPAGA
ANUVASANOPAGA
ASTHAPANOPAGA
VIRECHANOPAGA
VAMANOPAGA
SWEDOPAGA
SNEHOPAGA
SHUKRASHODANA
SHUKRAJANANA
STANYASHODANA
STHANYAJANANA
VISHAGNA
KRIMIGHNA
KANDUGANA
KUSHTAGNA
ARSHOGNA
TRIPTIGNA
JEEVANIYA
HRIDYA
KANTYA
VARNYA
BALYA
DEEPANIYA
SANDANIYA
BHEDANIYA
BRUMANIYA
LEKHASNIYA
Krishna Murthy B.N
RS/GIS Lab
Geology Department
B.U.B

1		**JEEVANIYA GANA**	**Name in Sanskrit**	**Botanical Name**
	1		JIVAKA	
	2		RISHABAKA	
	3		MEDA	
	4		MAHAMEDA	
	5		KAKOLI	
	6		KSIRAKAKOLI	
	7		MUDAPARNI	PHASEOLUS TRILOBUS
	8		MASAPARNI	
	9		JIVANTI	LEPTADENIA RETICULATA
	10		MADHUKA	GLYCYRRHIZA GLABRA
2		**BRUMANIYA GANA**		
	1		KSIRINI	MIMOSOPS HEXANDRA
	2		RAJAKSAVAKA	EUPHORBIA MICRIPHYLLA
	3		ASHVAGANDHA	WITHANIA SOMNIFERA
	4		KAKOLI	
	5		KSIRAKAKOLI	
	6		VATYAYANI	SIDA RHOMBIFOLIA
	7		BHADRAUDANI	SIDA CORDIFOLIA
	8		BHARADVAJI	THESPESIA LAMPUS
	9		PAYASYA	IPOMOEA PANICULATA
	10		RSHYAGANDHA	
3		**LEKHASNIYA GANA**		
	1		MUSTA	CYPRUS ROTUNDUS
	2		KUSTA	SAUSSUREA LAPPA
	3		HARIDRA	CURCUMA LONGA
	4		DARUHARIDRA	BERBERIS ARISTATA
	5		VACHA	ACORUS CALAMUS
	6		ATIVISHA	ACONITUM HETEROPHYLLUM
	7		KATUROHINI	PICRORHIZA KURROA
	8		CHITRAKA	PLUMBAGA ZEYLANICA
	9		CHIRABILWA	PONGAMIA PINNATA
	10		HAIMAVATI	IRIS VERSICOLOR
4		**BHEDANIYA GANA**		
	1		SUVAHA	OPERCULINA TURPETHUM
	2		ARKA	CALOTROPIS GIGANTEA
	3		URUBUKA	RICINUS COMMUNIS
	4		AGNIMUKHI	GLORIOSA SUPERBA
	5		CHITRA	BALIOSPERMUM MOMENTUM
	6		CHIRATAKA	PLUMBAGO ZEYLANICA
	7		CHIRABILVA	PONGAMIA PINNATA
	8		SHANKINI	CANSCORO DECUSSATA

	9		SAKULADANI	PICRRORHIZA KURROA
	10		SWARNASHIRI	ARGEMONE MEXICANA
5		**SANDANIYA GANA**		
	1		MADHUKA	GLYCYRRHIZA GLABRA
	2		MADHUPARNI	TINSPORA CORDIFOLIA
	3		PRSHNAPARNI	URARIA PICTA
	4		AMBASTAKI	CISSAMPELOS PARERIA
	5		SAMAANGA	RUBIA CORDIFOLIA
	6		MONCHARASA	SALMALIA MALBARICA
	7		DHATAKI	WOODFORDIA FRUTICOSA
	8		LODRA	SYMPLOCOS RECEMOSA
	9		PRIYANGU	CALLICARPA MACROOPHYLLA
	10		KATPHALA	MYRICA NAGI
6		**DEEPANIYA GANA**		
	1		PIPPALI	PIPER LONGUM
	2		PIPPALIMOOLA	PIPER LONGUM
	3		CHAVYA	PIPER CHABA
	4		CHIRTAKA	PLUMBAGO ZELYLANICA
	5		NAGARA	ZINGIBER OFFCINALES
	6		AMLAVETSA	RHEUM EMODI
	7		MARICHA	PIPER NIGRUM
	8		AJAMODA	TACHYSPERMUM ROXBURGHI
	9		BHALLATAKA	SEMICARPAS ANACARDIUM
	10		HINGU	FERULA NARTHEX
7		**BALYA GANA**		
	1		AINDRI	CITRULLUS COLOCYNTHIS
	2		RSHABHA	
	3		ATIRASA	ASPERGUS RACEMOSA
	4		RSHYPROKTA	TERAMNUS LIBIALIS
	5		PAYASYA	IPOMEA PANICULATA
	6		ASHWAGANDA	WITHANIA SOMNIFERA
	7		STHIRA	DESMODIUM GANGETICUM
	8		ROHINI	PCIRORHIZA KURROA
	9		BALA	SIDA CARDIFOLIA
	10		ATIBALA	ABTULON INDICUM
8		**VARNYA GANA**		
	1		CHANDANA	SANTALUM ALBUM
	2		TUNGA	CALOPHYYLOS INOPHYLLUM
	3		PADMAKA	PRUNUS CERASOIDES
	4		USHIRA	VATIVERIA ZIZANIOIDES
	5		MADHUKA	GLYCYRRHIZA GLABRA

	6		MANHISTA	RUBIA CARDIFOLIA
	7		SARIVA	HEMIDESMUS INDICUS
	8		PAYASYA	IPOMEA OANICULATA
	9		SITA	CYNODON DOCTYLON
	10		LATA	
9		**KANTYA GANA**		
	1		SARIVA	HEMIDESMUS INDICUS
	2		IKSHUMOOLA	SACCHARUM OFFICINARUM
	3		MADHUKA	GLYCYRRHIZA GLABRA
	4		PIPPALI	PIPER LONGUM
	5		DRAKSHA	VITIS VINIFERA
	6		KAITARYA	MYRICA NAGI
	7		HAMSAPADI	ADIANTUM LUNULATUM
	8		BRUHATI	SOLANUM INDICUM
	9		KANTAKARI	SOLANUM XANTHOCARPUM
	10		VIDARI	IPOMOEA PANICULATA
10		**HRIDYA GANA**		
	1		AAMRA	MANGIFERA INIDCA
	2		AMRATAKA	SPONDIAS PINNATA
	3		LIKUCHA	ARTOCARPUS LAKOOCHA
	4		KARAMARDA	CARISSA CARANDES
	5		VRAKSHAMLA	GARCINIA INDICA
	6		AMLAVESTASA	RHEUM EMODI
	7		KUVALA	ZIZYPHUS JUJUBA
	8		BADARA	ZIYZPHUS JUJUBA
	9		DADIMA	PUNICA GRANATUM
	10		MATHULUNGA	CITRUS MEDICA
11		**TRIPTIGNA GANA**		
	1		NAGARA	ZINGIBER OFFICINALE
	2		CHAVYA	PIPER CHABA
	3		CITRAKA	PLUMBAGO ZEYLANICA
	4		VIDANGA	EMBELIA RIBES
	5		MURVA	CLEMATIS TRILOBA
	6		GUDUCHI	TINOSPORA CORDIFOLIA
	7		VACHA	ACORUS CALAMUS
	8		MUSTA	CYPERUS ROTUNDUS
	9		PIPPALI	PIPER LOGUM
	10		PATOLA	TRICHOSANTHES DIOICA
12		**ARSHOGNA GANA**		
	1		KUTAJA	HOLARRHENA ANTIDSENTRICA
	2		BILWA	AEGLE MARMELOS
	3		CHITRAKA	PLUMBAGO ZEYLANICA
	4		NAGARA	ZINGIBER OFFICINALE

	5		ATIVISHA	ACONITUM HETEROPHYLLUM
	6		ABHAYA	TERMINALIA CHEBULA
	7		DHANVAYASAKA	FAGONIA CRETICA
	8		DARAHARIDRA	BERBERIS ARISTATA
	9		VACHA	ACORUS CALAMUS
	10		CHAVYA	PIPER CHABA
13		**KUSHTAGNA GANA**		
	1		KHADIRA	ACACIA CATECHU
	2		ABHAYA	TERMANILIA CHEBULA
	3		AMALAKA	EMBELICA OFFICINALIS
	4		HARIDRA	CURCUMA LONGA
	5		ARUSHKARA	SEMECARPUS ANACARDIUM
	6		SAPTAPARNA	ALSTONIA SCHOLARIS
	7		ARAGVADA	CASSIA FISTULA
	8		KARAVIRA	NERIUM ODORUM
	9		VIDANGA	EMBELIA RIBES
	10		JATHIPRAVALA	JASMINUM OFFICINALE
14		**KANDUGANA GANA**		
	1		CHANDANA	SANTALUM ALBA
	2		NALADA	NARDOSTACHYS JATAMANSI
	3		KRATAMALA	CASSIA FISTULA
	4		NAKTAMALA	PONGAMIA PINNATA
	5		NIMBA	AZARIDICTA INDICA
	6		KUTAJA	HOLARHENA ANTIDYSENTRICA
	7		SARSHAPA	BRASSICA NIGRA
	8		MADUKA	GLYCIRRHIZA GLABRA
	9		DARUHARIDRA	BERBERIS ARISTATA
	10		MUSTA	CYPERUS ROTUNDUUS
15		**KRIMIGHNA GANA**		
	1		AKSHWA	MORINGA OLIFERA
	2		MARICHA	PIPER NIGRUM
	3		GANDIRA	EUPHORBIA ANTIQURUM
	4		KEBUKA	COSTUS SPCIOSUS
	5		VIDANGA	EMBELIA RIBES
	6		NIRGUNDI	VITEX NIGUNDU
	7		KINIHA	ARCHRANTHES ASPERA
	8		SHWADAMSTRA	TRIBULUS TERRESTRIS
	9		VRSHAPARNIKA	
	10		AKUPARINIKA	
16		**VISHAGNA GANA**		
	1		HARIDRA	CURCUMA LONGA
	2		MANJISTA	RUBIA CARDIFOLIA

	3		SUVAHA	PLUCHEA LANCEOLATA
	4		ELA	ELLETARIA CARDAMOM
	5		PALINDI	
	6		CHANDANA	SANTALUM ALBA
	7		KATAKA	STRYCHNUS POTATORUM
	8		SIRISHA	ALBIZZIA LEBBECK
	9		NIRGUNDI	VITEX NIGUNDO
	10		SLESHMATAKA	CORDIA DICHOTOMA
17		**STHANYAJANANA GANA**		
	1		VIRANA	VETIVERIA ZIZANIODES
	2		SHALI	ORYZA SATIVA
	3		SHASTIKA	ORIZA SATIVA
	4		IKSHUVALIKA	ASTRACANTHA LONGIFOLIA
	5		DARBA	DESMOSTACHYA BIPPINATA
	6		KUSHA	DESMOSTACHYA BIPPINATA
	7		KASHA	SACCHARUM SPONTANEUM
	8		GUNDRA	SACCHARUM SARA
	9		ITKATA	
	10		KATRUNA	CYMBOPOGON SCHOENANTHUS
18		**STANYASHODANA GANA**		
	1		PATHA	CISSAMPELOD PARIERIA
	2		NAGARA	ZINGIBER OFFICINALE
	3		DEVADARU	CEDRUS DEODARA
	4		MUSTA	CYPERUS ROTUNDUS
	5		MURVA	CLEMATIS TRILOBA
	6		GUDUCHI	TINOSPORA CORDIFOLIA
	7		VATSAKA	HOLARHENA ANTIDYSENTRICA
	8		KIRATA TIKTA	SWERTIA CHIRATA
	9		KATUROHINI	PICRORRHIZA KURROA
	10		SARIVA	HEMIDESMUS INDICUS
19		**SHUKRAJANANA GANA**		
	1		JIVAKA	
	2		RISHABAKA	
	3		KAKOLI	
	4		KSHEERAKAKOLI	
	5		MUDGAPARNI	PHASEOLUS TRILOBUS
	6		MASHAPARNI	
	7		MEDA	
	8		VRADDAHARU	
	9		JATILA	NARDOSTACHYS JATAMAMSI

	10		KULINGA	ABRUS PRECOTORIS
20		**SHUKRASHODANA GANA**		
	1		KUSTA	SAUSSUREA LAPPA
	2		ELAVALUKA	BRUNUS CERASUS
	3		KATPHALA	MYRICA NAGI
	4		SAMUDRAPHENA	
	5		KADABA	ANTHOCEPHALOUS INDICUS
	6		IKSHU	SACCARUM OFFICINARUM
	7		KANDEKSHU	SACCARUM SPONTANEUM
	8		KOKILAKSHA	ASTERACANTHA LONGIFOLIA
	9		VASUKA	INDIGOFERA ENNEAPHYLLA
	10		USHIRA	VETIVERIA ZIZANOIDES
21		**SNEHOPAGA GANA**		
	1		MRDVIKA	VITIS VENIFERA
	2		MADHUKA	GLYCIRIZA GLABRA
	3		MADUPARNI	TINOSPORA CORDIFOLIA
	4		MEDA	
	5		VIDARI	IPOMEA PANICULATA
	6		KSHEERAKAKOLI	
	7		JIVAKA	
	8		JIVANTI	LEPTIDINIA RETICULATA
	9		KAKOLI	
	10		SHALAPARNI	DESMODIUM GANGETICUM
22		**SWEDOPAGA GANA**		
	1		SHIGRU	MORINGA OLEIFERA
	2		ERANDA	RICINUS COMMUNIS
	3		ARKA	CALOTROPIS GIGANTICA
	4		VRSHIRA	BOERHAAVIA DIFFUSA
	5		PUNARNAVA	BOERHAAVIA DIFFUSA
	6		YAVA	HORDEUM VULGAREA
	7		TILA	SESAMUM INDICUM
	8		KULATTA	DOLICUS BIFLORA
	9		MASHA	PHASEOLUS MUNGO
	10		BADARA	ZIZYPHUS JUJUBA
23		**VAMANOPAGA GANA**		
	1		MADHU	
	2		MADHUKA	GLYCIRRHIZA GLABRA
	3		KOVIDARA	BAUHINIA PURPUREA
	4		KARUBADARA	BAUHINIA VARIEGATA
	5		NIPA	ANTHOCEPHEOLUS CHINENSIS

	6		VIDULA	BARRINGTONIA ACUTANGULA
	7		BIMBI	COCCINIA INDICA
	8		SHANAPUSHPI	CROTOLARIA VERRUCCOSA
	9		SADAPUSHPI	CALOTROPIS GIGANTEA
	10		PRATYAKPUSHPI	ACYRANTHES ASPERA
24		**VIRECHANOPAGA GANA**		
	1		DRAKSHA	VITIS VINIFERA
	2		KASHMARYA	GMELINA ARBOREA
	3		PARUSHAKA	GREWIA ASIATICA
	4		ABAHAYA	TERMINALIA CHEBULA
	5		AMALAKA	EMBELICA OFFICINALIS
	6		BIBITAKA	TERMINALIA BELERICA
	7		KUVALA	ZIZYOHUS JUJUBA
	8		BADARA	ZIZYPHUS JUJUBA
	9		KARAKANDU	ZIZYPHUS NUNNUMLARIA
	10		PILU	SALVADRO PERSICA
25		**ASTHAPANOPAGA GANA**		
	1		TRIVRIT	OPERCULINA TURETHUM
	2		BILWA	AEGLE MARMELOS
	3		PIPPALI	PIPER LONGUM
	4		KUSTA	SAUSSUREA LAPPA
	5		SARASHAPA	BRASSICA NIGRA
	6		VACHA	ACORUS CALAMUS
	7		KUTAJA	HOLAREHNA ANTIDYSENTRICA
	8		SHATAPUSHPA	FOENICULUM VULGAREA
	9		MADUKA	GLYCYRRHIZA GLABRA
	10		MADANA	RANDIA DUMETORUM
26		**ANUVASANOPAGA GANA**		
	1		RASNA	PLUCHEA KABCEOLATA
	2		SURADARU	CEDRUS DEIDARA
	3		BILVA	AEGLE MARMELOS
	4		MADANA	RANDIA DUMETORIUM
	5		SATAPUSPA	FOENICULUM VULGARE
	6		VRSCIRA	BOEHAAVIA DIFFUSA
	7		PUNARNAVA	BOERHAAVIA DIFFUSA
	8		SVADAMSTRA	TRIBULUS TERRESTRIS
	9		AGNIMANTHA	CLERODENDRON PHLOMIDIS
	10		SYONAKA	OROXYLUM INDICUM
27		**SHIRO VIRECHANOPAGAGANA**		
	1		JYOTHISHMATHI	CELASTRUS PANICULATUS
	2		KSHAVAKA	CENTIPEDA MINIMA

	3		MARICHA	PIPER NIGRUM
	4		PIPPALI	PIPER LONGUM
	5		VIDANGA	ENGELIA RIBES
	6		SHIGRU	MORINGA OLEIFERA
	7		SARSHAPA	BRASSICA NIGRA
	8		APAMARGA	ACHYRANTHES ASPERA
	9		SHVETA	CLITORIA TERNATEA
	10		MAHASHVETA	CLITORIA TERNATA
28		**CHARDI NIGRAHANEEYA GANA**		
	1		JAMBU	SYZYGIUM CUMINI
	2		AMRA	MAGNIFERA INDICA
	3		MATULUNGA	CITRUS DECUMANA
	4		BADARA	ZIZPHUS JUJUBA
	5		DADIMA	PUNICA GRANATUM
	6		YAVA	HORDEUM VULGARE
	7		YASTIKA	GLYCYRRHIZA GLABRA
	8		USHIRA	VETIVERIA ZIZANIOIDES
	9		MRIT	EARTH
	10		LAJA	FRIED PADDY
29		**TRISHNA NIGRAHANEEYA GANA**		
	1		NAGARA	ZINGIBER OFFICINALE
	2		DHANVAYASAKA	FAGONIA CRITECA
	3		MUSTA	CYPRUS ROTUNDUS
	4		PARPATAKA	FUMERIA PARVIFLORE
	5		CHANDANA	SANTALUM ALBUM
	6		KIRTATIKTA	SWERTIA CHIRATE
	7		GUDUCHI	TINOSPORA CORDIFOLIA
	8		HRIVERA	PAVONIAO DORATA
	9		DHANYAKA	CORIANDRUM SATIVUM
	10		PATOLA	TRICHOSANTHES CUCUMERINA
30		**HIKKANIGRAHANEEYA GANA**		
	1		SHATI	HEDYCHIUM SPICATUM
	2		PUSHKARAMULA	INULA RACEMOSA
	3		BADARA	ZIZYPHUS JUJUBA
	4		KANTAKARI	SOLANUM XANTHOCARPUM
	5		BRIHATI	SOLANUM INDICUM
	6		VRIKSHARUHA	DENDROPHTHOE FALCATA
	7		ABHAYA	TERMINALIA CHABULA
	8		PIPPALU	PIPER LONGUM

	9		DURALABHA	FAGONIA CRETICA
	10		KULIRASHRINGI	RHUS SUCCEDENEA
31		**PUREESHA SANGRAHANEEYA GANA**		
	1		PRIYANGU	CALLICARPA MACROPHYLLA
	2		ANANTHA	HEMIDUSMUS INDICUS
	3		AMRA	MAGNIFERA INDICA
	4		KATVANGA	OROXYLUM INDICUM
	5		LODRA	SYMPLOCOS RESIMOSA
	6		MOCHARASA	SALMALIA MALABARICA
	7		SAMANGA	MIMOSA PUDICA
	8		DHATAKI	WOODFORDIE FRUTICOSA
	9		PADMA	CLERODENDRUM SERETUM
	10		PADMAKESHARA	NELUMBO NUCIFERA
32		**PUREESHA VIRAJANEEYA GANA**		
	1		JAMBU	SYZYGIUM CUMINI
	2		SHALLAKI	BOSWELLIA SERRATA
	3		KADHURA	
	4		MODHOOKA	MADHUKA INDICA
	5		SHALMALI	SALMALIA MALBERRICA
	6		SHREEVESHTAKA	PINUS ROXBURGHII
	7		FRIED EARTH	FRIED EARTH
	8		PAYASYA	IPOMOEA OANICULATA
	9		UTPALA	NYMPHAEA ALBA
	10		TILA	SESAMUM INDICUM
33		**MOTRA SANGRAHANEYA GANA**		
	1		JAMBU	SYZYGIUM CUMINI
	2		AMRA	MAGNIFERA INDICA
	3		PLAKSHA	FICUS LACOR
	4		VATA	FICUS BENGALENIS
	5		KAPITANA	ALBEZIA LEBBECK
	6		UDUMBARA	FICUS RECEMOSA
	7		ASHWATHA	FICUS RELIGIOSA
	8		BHALLATAKA	SEMICARUS ANACARDIUM
	9		ASHMANTAKA	BAUHINIA RECERNOSA
	10		SOMAVALKA	ACACIA CATECHA
34		**MOOTRAVEIRAJINIA GANA**		
	1		PADMA	NELUMBO NUCIFERA
	2		UTPALA	NYMPHAEA ALBA
	3		NALINA	NELUMBO NUCIFERA
	4		KUMUDA	NYMPHAEA ALBA
	5		SOUGANDIKA	
	6		PUNDARIKA	NYMPHAEA LOTUS

	7		SHATAPATRA	NELUMBO NUCIFERA
	8		MADHUKA	GLYCYRHIZA GLABRA
	9		PRIYANGU	CALLICARPA MACROPHYLLA
	10		DHATAKI	WOODFORDIA FRUTICOSA
35		**MOOTRA VIRECHANIYA GANA**		
	1		VRIKSHADANI	DENDROPHTHY FALCATA
	2		SWADAMSHTRA	TRIBULUS TERRESTRIS
	3		VASUKA	INDIGOFERA ENNESTRIS
	4		VASHIRA	GYNANDROPSIS GYNANDRA
	5		PASHANABHEDA	BERGENIA LINGULATA
	6		DARBHA	DESMOSTACHY BIPINNATA
	7		KUSHA	DESMOSTACHY BIPINNATA
	8		KASHA	SACCAHARUS SPONTANEUM
	9		GUNDRA	SACCAHARUS SARA
	10		ITKATA MULA	TYPHA SP.
36		**KASAHARA GANA**		
	1		DRAKSHA	VITUS VINIFERA
	2		ABHAYA	TERMINALIA CHEBULA
	3		AMALAKA	EMBILICA OFFICINALIS
	4		PIPPALI	PIPER LONGUM
	5		DURALABHA	FEGONIA CRETICA
	6		SHRINGI	RHUS SUCCEDANEA
	7		KANTAKAIKA	SOLANUM XANTHOCARPUM
	8		BRASHCIRA	BOERHABIA DIFFUSA
	9		PUNANAVA	BOERHABIA DIFFUSA
	10		KAAMALATI	PHYLLANTHUS NIRURI
37		**SHWASAHARA GANA**		
	1		SHATI	HEDYCHIUM SPICATUN
	2		PUSHKARA MOOLA	INULA RACEMOSA
	3		AMLAVETASA	RHEUMEMODI
	4		ELA	ELETTARIA CARDAMOMUM
	5		HINGU	FERULA NARTHEX
	6		AGARU	ACQUILARA AGALLOCHU
	7		SURASA	OCIMUM SANCTUM
	8		TAMALAKI	PHYLLANTUS NIRURI
	9		JIVANTI	LEPTADENIA RETICULATA
	10		CHANDA	

38		**SWAYATHUHARA GANA**		
	1		PATALA	STERSPERMUM SUAVEOLENS
	2		AGNIMANTHA	CLERODENDRUM PHLOMIDIS
	3		SHYONAKA	OROXYLUM INDICUM
	4		BILVA	AEGLE MERMELOS
	5		KASHMARYA	GMELIN ARBOREA
	6		KANTAKARI	SOLANUM XANTHOCARPUM
	7		BRHATI	SOLANUM INIDCUM
	8		SHALAPARNI	DESMODIUM GANGETICUM
	9		PRISHNAPARNI	URARIA PICTA
	10		GOKSHURA	TRIBULUS TERRETRIS
39		**JWARAHARANIYA GANA**		
	1		SARIVA	HEMIDSMUS INDICUS
	2		SHARKARA	SUGAR
	3		PATHA	CISAMPELOS PARERIA
	4		MANJISTA	RUBIA CORDIFOLIA
	5		DRAKSHA	VITUS VIRIFERA
	6		PILU	SALVODARA PERSICA
	7		PARUSHAKA	GREWIA ASIATICA
	8		ABHAYA	TERMINALIA CHEBULA
	9		AMALAI	EMBLICA OFFICINALS
	10		VIBHIAKI	TERMINALIA CHEBULA
40		**SHRAMAHARA GANA**		
	1		DRAKSHA	VITIS VINIFERA
	2		KHARJURA	PHOENIX SYLVESTRIS
	3		PRIYALA	BUCHANANIA LANZAN
	4		BADARA	ZIZPHUS JUJUBA
	5		DADIMA	PUNICA GRANATUM
	6		PHALGU	FICUS HISPIDA
	7		PARUSHAKA	GREWIA ASIATICA
	8		IKSHU	SACCHARUM OFFICINARUM
	9		YAVA	HORDEUM VULGARA
	10		SHASHTIKA	ORYZA SATIVA
41		**DAHAPRASHAMANIYA GANA**		
	1		LAJA	FRIED PADDY
	2		CHANDANA	SANTALUM ALBUM
	3		KASHMARYA	GRNELINA ARBOREA
	4		MADHUKA	MADHUCA INDICA
	5		SUGAR	
	6		NILOTPALA	NYMPHAEA STELLATA
	7		USHIRA	VETIVERIA ZIZANIOIDES

	8		SARIVA	HEMIDESMUS INDICUS
	9		GUDUCHI	TINSPORA CORDIAFOLIA
	10		HRIBERA	PAVONIA ODORATA
42		**SHEETAPRASHAMMA GANA**		
	1		TAGARA	VALARIANA WALLICHI
	2		AGARU	AQUILARIA AGALLOCHA
	3		DHANAYAKA	CORDIANDRUM SATIVUM
	4		SHRINGAVERA	ZINGIBER OFFICINALE
	5		BHUTIKA	TRACHYSPERUM AMMI
	6		VACHA	ACORUS CALAMUS
	7		KANTAKARI	SOLANUM ZANTHOCARPUM
	8		AGNIMANTHA	CLERODENDRUM PHLOMIDIS
	9		SHYONAKA	OROXYLUM INIDCUM
	10		PIPPALI	PIPER LONGUM
43		**UDARDAPRASHAMMA GANA**		
	1		TINDUKA	DEIOSPYROS PEREGRINA
	2		PRIYALA	BUCHANANIA LANZAN
	3		BADARA	ZIZPHUS JUJUBA
	4		KHADIRA	ACACIA CATECHU
	5		KADARA	ACACIA CATECHU
	6		SHATAPARNA	ALSTONIA SHOLARIS
	7		ASHWAKARNA	DIPTEROCARPUS ALATUS
	8		ARJUNA	TERMINALIA ARJUNA
	9		ASANA	TERMINALIA TOMENTOSA
	10		ARIMEDA	ACACIA CATECHU
44		**ANGAMAARDA PRASHAMANEEYA GANA**		
	1		VIDARIGANDHA	DESMODIUM GANGETICUM
	2		PRISHNAPARNI	URARIA PICTA
	3		BRIHATI	SOLANUM INDICUM
	4		KANTAKARI	SOLANUM XANTHOCARPUM
	5		ERANDA	RICINUS COMMUNIS
	6		KAKOLI	
	7		CHANDANA	SANTALUM ALBUM
	8		USHIRA	VETIVERIA ZIZANIODIES
	9		ELA	ELETTARIA CARDAMOMUM
	10		MADHUKA	GLYCYRRHIZA GLABRA
45		**SHOOLAPRASHAMANEEYA GANA**		

	1		PIPPALI	PIPER LONGUM
	2		PIPALIMOOLA	PIPER LONGUM
	3		CHAVYA	PIPER CHEBA
	4		CHITRAKA	PLUMBAGO ZYLANICA
	5		SHRINGAVERA	ZINGIBER OFFICINALE
	6		MARICHA	PIPER NIGRUM
	7		AHAMODA	TRACHYSPERMUM ROXBURGHIANUM
	8		AJAGANDHA	GYNANDROPSIS GYNANDRA
	9		AJAJI	CUMINUN CYMINUM
	10		GANDIRA	EUPHORBIA ANTIQURUM
46		**SHONITASTHAPANIYA GANA**		
	1		HONEY	
	2		MADHUKA	GLYCYRRHIZA GLABRA
	3		RUDHIRA	CROCUS SATIVA
	4		MOCHARASA	SALMALIA MALABARICA
	5		MARUTHKAPALA	
	6		LODHRA	SYMPLOCOS RACEMOSA
	7		GAIRIKA	FERRUM HAEMATITE
	8		PRIYANGU	CALLICARPA MACROPHYLLA
	9		LAJA	
	10		SHARKARA	
47		**VEDANASTHAANEEYA GANA**		
	1		SHALA	SHOREA ROBUSTA
	2		KATPHALA	MYRICA NAGI
	3		KADAMA	ANTHOCEPHALUS INDICUS
	4		PADMAKA	PRANUS CERSOIDES
	5		TUMBA	XANTHOXYLON ALATUM
	6		MOCHA RASA	SALMALIA MALBARAICA
	7		SHIRISHA	ALBAZZIA LEBBECK
	8		VANJULA	SALIX CAPREA
	9		ELAVALUKA	BRUNUS CERASUS
	10		ASHOKA	SARAKA INDICA
48		**SANGYASTHAPANEEYA GANA**		
	1		HINGU	FERULA NARTHEX
	2		KAITARYA	MURRAYA KOENIGII
	3		ARIMEDA	ACACIA CATEHU
	4		VACHA	ACORUS CALAMUS
	5		CHORAKA	ANGELICA GLAUCA
	6		VAYASTHA	BACOPA MONNIERI

	7		GOLOMI	ACORUS CALAMUS
	8		JATILA	NARDOSTACHYS JATAMAMSI
	9		PALANKASHA	COMMIPHORA MUKULA
	10		ASHOKAROHINI	PICRORHIZA KORROA
49		**PRAJASTHAPANEEYA GANA**		
	1		AINDRI	CITRULLUS COLOCYLTHIS
	2		BRAMHI	BACOPA MONNIERI
	3		SHATAVEERYA	CYNODON DACTYLON
	4		SAHASRAVEERYA	CYNODON DACTYLON
	5		AMOGHA	EMBLICA OFFICINALIS
	6		AVYATHA	TINOSPORA CORDIFOLIA
	7		SHIVA	TERMINALIA CHEBULA
	8		ARISHTA	PICRORHIZA KURROA
	9		VATYAPUSHPI	SIDA RHOMBIFOLIA
	10		VISHVAKSENANTA	CALLICARPA MACROPHYLLA
50		**VAYASTHAAPANEEYA GANA**		
	1		AMRITA	TINSPORA CORDIFLIA
	2		ABHAYA	TERMINALIA CHEBULA
	3		DHATRI	EMBLICA OFFICANALIS
	4		MUKTA	
	5		SWETA	CLITORIA TERANATEA
	6		JEVANTHI	LEPTADENIA RETICULATA
	7		ATIRASA	ASPARAGUS RACEMOUS
	8		MANDUKAPARNI	CENTELLA ASIATICA
	9		STHIRA	DESMODIUM GANGETICUM
	10		PUNARNAVA	BOERHAAVIA DIFFUSA

PEACE

A.N.Yellappa reddy

Feel an Emotional vibration while in Bio-Diversity Park

I. As soon as you enter the Bio-Diversity Park, give significance, and develop a contact and sincerely attempt to give a precise meaning to living dynamic elements.

When you give a precise meaning – you can experience a mental projection and a consciousness like a six months baby's vibration, which innumerably free from mental aberrations except indomitable love of MOTHER.

Once you start the experiencing the warmth and fragrance of Nature, the vibrations can be translated into thoughts. An intimate dialogue begins. Learn to converge the wide range of spectacles of cosmic vibrations of Bio-Diversity into cosmic thoughts and integrate this thought to mother earth. These cosmic vibrations are vital to trigger emotional orders of unification of genes among all living plants and animals.This emotional unification erases your EGO.

II. Call upon the living deity of life over the body of MOTHER EARTH – Our planet home with its beautiful depths where ELIXIR of life is circulated and preserved. Look to the heights and green chlorophyll which alone can convert Co2 into O2 (Kachadeva story) look to its spectrum of green canopy and its vitality and abundance of life, it harbors through its protein rich glands, its nectar, fragrance, fruits, fruit pulp, seed pollen, ovaries etc,. Let us pray to teach us your benevolence and how to acquire this altruism.

III. Call upon the summit of life form and observe and imbibe their doctrine of interdependence for social well being.

IV. Call upon the water that rim the man made counters and saucers from ridge to valley to facilitate sub surface flow and to enhance stream flow. Pray to teach us the phytosanitation techniques of hydrophytes and mesophytes, especially cattails and duck weeds like lemma, Ghirardelli, molffia, Azolla_magmphae_nelamhism, etc. They teach us the technology to purify polluted water.

V. Call upon the green blood and their family members (grass) and feed grains to all living creatures grass on the terrestrial eco system in like water in the marine eco system. They bind and nurture the soil and form a green sari on the designs to mother earth. This green mantle makes rain water to crewel over the surface and prevents direct insulations to Sun God. Soil temperature under grass cover will be 5to6° lower than the ambient temperature.

Pray to teach us their survival strategies with intense competition grazing, trampling, (cover graze with one mouth and trample with four legs) - their ability to adapt to fire ecology.

Call upon - world famous scented sandal trees, rich brown teak, call upon the innocent hare that nibble grass and bamboo, rose wood, red sanders.

Call upon combretaceae family i.e.Mathi, Bilimathis, Tharae Arjuna- thari in a triphala Arjuna is a Heart tonic. Call upon typical moist and dry deciduous co-dominant and pre-dominant species of Karnataka.

Call upon the well demarcated commonly classes of light demanders, shade bearers, shrub, herb, tubers, climbers and creepers, they lives on the perfect harmony.

They live together with earth in their roots and foliage facing sun god. But manufacture their own most complicated chemicals.

Each one synthesis complex chemicals to cure almost all diseases and to set right dysfunctions unction's of human body.

Pray to take care of us and our future generation.

VI. Call upon birds, butterflies, moths, insects, reptiles on your brothers and sisters.

Who contributes to up grade genetic codes of all plants and add grandeur of life to earth. All of them are the living ornaments to mother earth

Pray them to teach us the secretes of their body ornamentation and mobility techniques with out hurting. Look to the techniques of landing, flying etc.

VII. Call upon the Bio Park on summer, autumn, spring, moonlit and new moon days to get a glimpse of natural life.

The seasons, day and night govern the rhythms of life in Biodiversity Park.

Forget not you are a part of a great and wondrous universe. Pray them to maintain the orchestra of life in Biodiversity Park.

VIII. Call upon the NSS students who toiled to maintain the bio diversity park and others.

Express your sincere thanks and gratitude to all those who sweated.

Follow their doctrine of services.

IX. 10. Call upon to respect the spirit of love and truth prevailing, operating in Biodiversity Park. It will show us way to get rid of ego.

What we need to do in to align with its perfection and try to understand how they aligned to help us.

Imagine your life with out them. They can survive with you. Can you survive with out them?

Explore the answer with in your self for a better world holistic thinking - contributes to buildup of new consciousness to learn form nature i.e.,"Eco-sophy".

Ravindranath Tagore has built **Santineketan**- an enviro-habitation design to better human future. He built a culture of external expression of the habitat with nature. He launched a Momentum for creative urges and a spirit of synthesis to create a new humanistic order for better living conditions based on the theory of life on environment. His ecologic approaches take care of the vital forces of Sun, Earth Air and Water.

Holistic ecologic architecture can lead us into a harmony of the most desired whole; which will mean the creativity of overall ecologic arithmetic meaning fully derived out of ecologic vitality and Biologic vitalities incorporated in Biodiversity park.

Bangalore university scientists scholars and NSS students has given an inventive look for the revival of experience and structure expression of shanthiniketana.

A spirit of life, an art in action and interaction from barren landscape to eco-friendly habitat into the life of Bangalore children's and citizens. The eco-language and envoi-community culture to gain the strength to face unto the challenges of climate change. According to **Ravindranath Tagore** complete environmental knowledge will be the futuristic light for improvement of our quality of life. He use to emphasis that **Shanthiniketan** is a way of thinking, way of life, it is a concept of truth. Let us try to add a soul of **Shanthiniketan** to Bangalore children.

UNDERSTANDING THE PLANET-EARTH CAPSULES

A.N.YELLAPPA REDDY

Capsule-1:

"Are we aware that "All we were, and all we have emerge from Herb Womb – where you are standing?"

In a tropical country- where seasons are well defined. We have over 250 Hot to very hot bright sunny days and Short to very Short wet-spell seasons.

So what we need to do?

1. We need a Biophysical Media to soften the impact of sun over 250 – 300 days. We also a live Biophysical Media to track the elixir of life and flame of the life i.e. oxygen. During wet-spell of 50-70 days this biophysical media will have ability to trap over 2 million liters of water in an acre.
2. If it is not softened with a dynamic biophysical media, list out impacts

Impacts with biophysical media	**Impacts without biophysical media**
8-10 0 C of temperature will be less then ambient temperature Herb, Grass, Leaf letter 3-5 0 C Trees with climber 5-15 0 C This has to demonstrated in the field to students	In a naked media it higher than ambient temperature.

3. Imagine – you are standing on the life forms – they have role in the dark lace of underground taking and giving's. That taking transform the chemical structures into a fertile soil with full of life. In 1 Sq. Cm. of a healthy soil a great writer Douglas Chadwick – described "the tribes of mites – insect's larvae – earthworm- microorganism are abundant. Multicellular animals – they nearly match the weight of what ever the large creators are grazing over head including man on the same acreage.

4. We should know that –the little bee's metabolic rates in a tropical landscape are very high and greater biological effects. In their myriads roaming on the_ground – tunneling – turning (especially moles can turnover 20-25 tonnes of soils in a year and can convert over 25 tonnes of soil into sweet hot spot in an hectare.). These

moles and their community invertebrates break a part of soil and enrich it with life binding amino acids and other nitrogenous materials. Nitrogen fixing herbs, shrubs trees, climbers and their root biomass under the ground generates abundant nitrogenous materials which they can absorb readily.

This mechanical and chemical alteration aerates the soil and builds pathways for root hairs. The fungus (Mycorrizha) in most of tropical tree species). Each tree species have specific mycorrizha follows and restores the balance of supplying essential nutrients and controls soil nematodes and pathogens.

The crumbs structures formed by moles and other multicellular invertebrates lets air and water (they buildup green water in the undersurface and slowly releases to plant and permeates the root system to a living soil media).

Whereas in a lifeless and dying soil which gets compact where no new roots can penetrates easily and deeply suffer and weathers during long dry spell of over 200 days.

5. Imagine Industrial Farming: Repeated chemical application kills the life in the
soil followed by excess irrigation.

In highly advanced country like US, is losing 6 tonnes of soil to produce 1 tonnes of grains which they harvest. In 2006, Millennium Ecosystem Assessment Report says that – at global level we have lost over 40-50 % of fertile soil and remaining is degrading very rapidly.
So the loop of plants, weeds, decomposers forms a new soil i.e. the foundation of the civilization. That is all we were and all we have emerge from Herb Womb.

In the name of development and production are we pulling rug from under our feet. Genetist–Wes–Jackson has said modern agriculture as failed to produce a system that sustained its capital.

Capsule -2:

Soil and Vegetation is a media to filter and refine water.

1. Bangalore University Jnana Bharathi Campus is one of the world's ancient soils with a pH 5.5 – 6.8 and has the greatest ability to absorb toxic elements received from rainwater and from non-point source pollutants.

2. Tree canopy, Tree architecture – stem floor-leaf litter over the surface and root system – what role they play to be explained.

3. Leaf litter – humus-microorganism sponge layer stubbles on the twigs on the soil floor slows the running surface water and retards the speed of surface flow and enhances the storage of green water. The leaf mulch drastically reduces the soil temperature.

4. Explain green water concept related to the canopy which prevents isolation-and role of leaf mulch and humus storage capacity of green water.
   If possible design a protocol in a tray.

5. Green water enhances growing period of vegetation, relative humidity enhances soil fauna, and reduces desiccation of ambient air improves breathable hair quality.

6. The vegetation contributes immensely to filter air and water.
Demonstrate tree architecture, with the help of their plant appendages like hairs, spines etc. to trap suspended and particulate matter.

7. Locate sweet spot on the landscape of Biopark and explain the role of soil aroma and its role in maintaining the ecological health.

Capsule – 3:

The Naked Land Surface and its Impact.

1. It contributes unfiltered, unrefined muddy, slushy blood red water which clogs the
local streams and the volume increases to many folds and causes floods, siltation of
tanks and rivers reduction of water storage capacity.

2. In the tanks and rivers if the clarity of water is good, it facilitate solar light penetration
which helps in the growth of aquatic plants and this biologically activities increases?
DO level. Explain DO, BOD, COD, water quality parameters.

3. Explain importance of sanitary watershed management concept

5. Explain the role of wetlands, Ramsar Convention, role of lotus, lilies, acorus, and sentella asiatica.

Capsule – 4:

New Soil Formation – Virtuous Cycle of Life – Renews Life.

1. Explain impacts of plastic accumulation in soil profile and how it chokes the soil from aeration and filtration.

2. Explain the role of nurse crops and their role in checking the runoff speed and how it facilitates to enhance subsurface flow. Nurse crops help to renew soil and create a new life- life renewal mechanism operates relentlessly.

3. No new life means – millions of decomposers will disappear from the site due to lack of food. No food means to millions of invertebrates and no insectivorous birds- who feed on worms and eggs, a sort of a destructive feedback cycle sets in by negative manifestation by exposing mineral soil over 200-250 hot sunny days. Mother Earth suffers from high temperature and her temperature will be 5-15 0 C higher than the ambient temperature.

4. Explain albedo effect heat radiation, formation of heat Islands, decreased precipitation.

5. High water consumption, low evapo-transpiration and poor breathable air quality affects the quality of life.

Capsule – 5:

Where is our food, fresh water, medicine, raw material for industries, raw material for cosmetics, flavors, essences etc. are found?

1. The truth is all of them are Key to Vegetation.
2. Grass on the terrestrial ecosystem is like water in the marine ecosystem.

3. Forest is the mother of rivers
4. Rivers are the mother of fresh water fish

5. Growing problems in 21st century – Farming was invented about 10,000 years ago prior to that man also lived like other animals in the sylvan era. After invention of agriculture, an era of settlement came, i.e. an era of Iron, where man started using tools and machines. Tools and Machines are dictating man since 500 years. Today it is a Silicon Era, where software's, computer, are dictating man. Explain the impact of waste generated.

6. No doubt human are well fed, today because of huge grain harvest. Rich Class eats over 2100 calories and over 40% of population today suffers from excess weight and related problems- over 40% of population suffers from malnutrition and related problems.

Green revolution – maize, wheat, and rice started from traditional cross breeding to increase the percentage of plant biomass into grains. No doubt dwarf varieties doubled the proportion of cereal grains. Cereal grain production increase is attained by reckless use of fossil fuel i.e. oil based pesticides, herbicides; fertilizers were employed to increase production.

7. Scientist chooses plant strains that response well to the uptake of chemical fertilizers.

8. To put down the labour cost, gas and diesel power vehicles, pump sets to irrigate to draw fossil water were employed recklessly. Mechanized flowing, genetically modified crops are in circulation as super strains which are used in industrial farming.

9. Today's Global Thinking: What is good for industry is good for the country and society?

10. Industrial farming produces more food per unit of labour; the problem in Indian context arises here. Vast monoculture has provided feast for crop pests and also depleted the micronutrients in the soil which reduced the resistance power of the crops. Added to the above uninvited strains of blights (fungus disease) ate 80% of US crops. Any monocrop, Horticulture, Forest crops cost will be very high and wide range of crop pathogens, viruses, bacteria and fungi invades crops. Wherever nitrogen inputs are more, which invites more pests; it is like pouring kerosene to fire. We are trying to depressing their number with all kinds of technologies with chemical poisons. But their survivor rebound what kills them and make stronger.

No doubt, chemical application has helped and harvests are doubled but pesticides uses are increased nearly 20 folds. But that poisons not stopped the bugs to multiplying. So the disturbing aspect is how fast and how far pest adaptations can spread.

Jumping Genes in pests, DNA can move rapidly to new location and their genes can code an enzyme for chewing of very toxic chemicals.

Cartegeno Biosafety Regulation has to be enforced for safety regulations by introducing exotics. Agro chemical market is a billion dollar business and most of them are heavily subsidized.

Capsule – 6

Growing Problems:

1. 70% of antibiotics produced are administered to farm animals like cattle, sheep, goat and chickens, which are raised in cramped quarters and put them into constant risk from contiguous diseases e.g. anthrax, madcow diseases, bird flue etc. have taught us the lesson of ecological disasters.

2. Land under irrigation is doubled and 2/3rd of fresh water from dams, tanks, rivers and aquifers goes to agriculture. Fertilizer use as raised to 600%, nitrate contamination of water, eutrophication of water bodies, blue baby syndrome are the clear symptoms of the ecological catastrophe. Substantial subsidize component goes to fertilizer business. All the above fed a growing demand for oil. Cutler. Cleveland of Bouston University, Center for Energy and Environment Studies says in simple terms "the revolution of agriculture of the past 5 decades – what is called Green Revolution is another aspect of Industrial Revolution, i.e. how to use fossil fuels more cleverly to do various tasks – in this case to grow more wheat, maize, rice that is high rate of production and food exports are closely tide with the increase in the amount of fossil fuel used. On the same lines, the virtues of plastics were highlighted and introduced to help agriculture and related activities.

   Today, in American Farms, the fossil energy input is 10 times the amount of food energy they get back. The SEZ concept which Govt. of India is proposing encourages mechanization, fossil fuel consumption and large scale monoculture high demanding crops. Production cost increased by 80% of gross income of the farmers. Where the money does goes? Today, worlds' largest business is fertilizer, seeds, pesticides, herbicides.

10 MNC's control world 40% of agri-business, 6 MNC's control 85% grain business, 11 MNC's control 85% of agri-chemicals.

Capsule – 7:
Wetlands are the Ultimate Sinks of all our Sins to Mother Earth:

1. Wetlands take care of all the poisons we discharge in the form of effluent and the gaseous emission and which comes back to us in the form of food, fruits, vegetable, meat, milk etc. Look closer at a big problem, these years' floods have taken away millions of tonnes of top soil and our food is coming from this top soil.
2. Soil under our feet is living one with full of life. Soil contains life below the ground surface, as it does above.

3. Thousands of microbes in each square inch of a soil, such as mites, insects, etc., operate to create food. (Microbiologist can prepare a schematic map and help of a powerful lens they can demonstrate the micro and macro fauna found in the top soil). As explained in the earlier capsule they together forms the same weightage of animals grazing over the same acreage. Their metabolic rates are higher and biological effects of rolling, tunneling, turning, facilitates to pass through their guts eg. White ants etc., they enrich soil with enzymes, plant hormone, besides, they help in granulation of soil and enhances water holding capacity that is green water.

   All the above activities are closely linked to wet land productivity (Highlight Ramsar convention wetland guidelines).
   Oil based activities, plastic based activities are detrimental to aquatic life of the wetland..

4. Explain exquisite interfacing of species and habitat that support over 300 flowering plants in the Biodiversity Park.

Childish navivete of our thinking led us to greave consequences. The soft targets are younger generation.

Capsule – 8

Mechanistic Thinking

1. Close mind reductionist attitude of looking of our living system in isolation causes irreversible ecological consequences.

2. We have to understand the basic roles of life supporting loops of plants, decomposers, sweet spots, new soils, etc.

3. Any ecological alterations will not confined to site alone, the changes in any sites respells through neighbouring system because of radical interrupting C N O , nutrient, and water cycle.

4. Observe the Biodiversity Park which is serving as a biggest carbon sink of Bangalore. It also serves as a large water bank to Bangalore City. It serve as a Lung and Kidney to Bangalore Urbanites.

5. We have removed with the help of 5000 NSS students over 100 tracker loads parthenium and over 1000 loads of grass which have trap the carbon emitted automobiles of Bangalore.

6. Booming human population brought a fundamental shift in Bangalore landscape. Large number of migratory birds have abandoned their habitat and very endemic speicies shorea, talura and sclichera oleoza are endemic species to Bangalore have lost their habitate.

Capsule – 9

Urban Sprawl and its Impact:

1. We know the Earth is surrounded by a delicate envelope of life mantle which supplies breathable air, fresh water, food, etc. Noble Laurete, R. Tagore, was the first to impart knowledge of improvement of quality of life. According to him, life system sustainance on earth and our well being in true sense conducive ecological concept, strategies and their processes are vital for our survival.

   Ecological approach takes care of vital forces of sun, earth, air and water as explained in earlier capsules. Tagore recommends holistic ecological architecture alone can leads us into the harmony of the most desired 'WHOLE" derived from ecological vitality based on site specific climate.

2. Ravindranath **Shanthinekethan** Campus (Vishwabharathi) is built on ecological concept. Jnana Bharathi Biopark possesses all the elements of Vishwanbharthi. Biopark will regenerate the vital norms and spirit of life, art-in-action in the city of Bangalore.

   Reconstruction of environmental friendly habitat of life is an humble attempt by the authorities of Bangalore University.

The scientifically oriented the architectural eco-language of envoi-community culture, to improve the quality of life.

Capsule -10

Biodiversity Park Deliverse a Holistic Thinking and All of us have to be Learn from the Nature:

1. While walking, one feels their senses.
2. Young Scientist can innovate in areas of
    a. Self creatation
    b. Can learn eco-ethics
    c. Can realize his duties towards mother earth

3. One can imbibe (absorb) eco-social market economy.
4. One can pickup eco-social products
5. One can see the skills of eco-techniques and eco- services.
6. It is not only a just Science; it is deep ecology and deep Science.
7. Your purpose of visit to Biopark is to understand the nesus or relationship between current productive landscape management practices and financial forces which excludes ecological factors for temporary profits.
8. The financial forces imposing wide range of landscape practices for financial benefits.
9. During your short sojourn, you have to measure all your observations objectively and assess the values of vegetation especially natural regeneration of sandal wood and assess the quality of runoff water, assess the improvement in soil production and understand the duty of responsible of citizens as enunciated in our constitution article 51G and article 21 which explains the meaning of holistic life.

Tackling Environmental Challenges in Traditional Knowledge

Dr.N.Nandini

Climate change and loss of Biodiversity are two of the most important global environmental problems .They has serious local implications as well. Climate change is occurring and is affecting ecosystem and biodiversity. Mitigation options alone are not sufficient and adaptation projects designed to specifically reduce the impact of climate change have to be considered along with mitigation options. Biodiversity conservation leads preservation of larger gene pool with unique genotype of wild and domesticated species. Indian components of Biodiversity conservation include:

Charakavana: various medicinal plants are grown here and students of Ayurvedic Colleges are practically using for their studies.

Ayurveda – A science of life; teaches us how to live healthy and happy life in harmony with nature. It has a holistic approach to the positive health and longevity of life. In other words it is not just a science of medicine but it is art of approach to the happy, healthy and long life.

As per our ancient Indian scientific concept, this universe is made up of Pancha maha buthas, five principle elements like Prithvi, Agni, Tejo, Vayu and Akasha (i.e. earth, water, fire, wind and space). Human body the integral part of universe is also Panch Buthic, any deficiency or imbalance in this panch maha butha, the five elements in the body leads to disease. As the human body cannot make use of this inherit elements of the external universe, only the plant can convert this inherit into active principles and make use of them for their living. Knowing this secret our ancient ayurvedic physician adopted plants to supplements the deficiency and balanced the panch boutic elements in the body so they adopted the plants for treating the diseases.

Charka is one of the renounced scholars of Ayurveda who lived about 5000 years back has returned a book called "Charaka Samhita" which is an authority in Ayurveda. The means and methods of diagnosis and treatment of various diseases are very elaborately and scientifically dealt with in this book. Charka in his samhita describes about 7000 plants which are useful in treating various diseases. He has classified the herbs based on the therapeutic uses and into 50 ganas or groups thus 500 plants are grouped into 50 ganas, where each gana contains 10 plants of common therapeutically values. Kustagna is used for treating skin disease, jwargna is used for treating fever, and hridya are beneficial in toning up the heart.

LIST OF PLANTS SPECIES IDENTIFIED IN THE BIO-PARK, JNANABHARATHI, BANGALORE UNIVERSITY

"A"		"B"	
1	*Areca catechu*	35	*Bahunia tomentosa*
2	*Adathoda vesicosa*	36	*Bahunia malbaricum*
3	*Acalypha rosyfrills*	37	*Bahunia racemosa*
4	*Acalypha rosiana*	38	*Bahunia purpurea*
5	*Acalypha hispida*	39	*Bahunia accuminata*
6	*Acalypha nuda*	40	*Bredalia retusa*
7	*Accacia concivae*	41	*Bredadalia scandens*
8	*Accasia arabica*	42	*Bambusa nigra*
9	*Accassia catechu*	43	*Bambusa vulgaris*
10	*Accacia ferruginia*	44	*Bambusa*
11	*Accasia furnaceae*	45	*Bougain villlia*
12	*Aegle marmolosa*	46	*Bryvia nivosa*
13	*Agima tetra cantha*	47	*Brunfelsia Americana*
14	*Azardicta (neem)*	48	*Bambusa wamin*
15	*Allamanda nerrifolia*	49	*Bambusa bulgaris*
16	*Alpinia vanigata*	"C"	
17	*Alstonia scholaris*	50	*Calamus rotany*
18	*Alstonia madhegglia*	51	*Calamus sps*
19	*Altervanthera*	52	*Calopylum inopylum*
20	*Aloe vera*	53	*Calopylum witiana*
21	*Anthocephalus cadamba*	54	*Cordia myxa*
22	*Aphrosa Lindiliana*	55	*Cordial macloidi*
23	*Artocarpus hirsute*	56	*Cordial sebestena*
24	*Artocarpus incise*	57	*Cassia jayamica*
25	*Artocarpus lakacha*	58	*Cinnamomum zeylanicum*
26	*Artocarpus integrifolia*	59	*Cassia fistula*
27	*Artobotryrs*	60	*Cassia remigera*
28	*Asparagus*	61	*Courpita guianensis*
29	*Averola carambola*	62	*Callophyllum inophylum*
30	*Albizzia labek*	63	*Commiphora caudate*
31	*Albizzia richardiana*	64	*Casurina cunninghami*
32	*Areca catechu*	65	*Callianda haenctoceophale*
33	*Arudinaria Praini –climbingbamboo*	66	*Cassia biflora*
34	*Arundinaria hirsute –Petty shrubby bamboo*	67	*Codiaeum*

68	*Cassia cileta*	103	*Forgesia muricloe*
69	*Coffea arabica*	**"G"**	
70	*Cuphea igera*	104	*Garcinia indica*
"D"		105	*Garuga pinnata*
71	*Dalbergia Latifolia*	106	*Garcinia xhanthogynaum*
72	*Diospyros ebony*	107	*Gouzuma tomentosa*
73	*Dalibergia pamiculata*	**"H"**	
74	*Dillenia indica*	108	*Hopea weightiana*
75	*Diospora tupra*	109	*Hopea parviflora*
76	*Delonia regia*	110	*Hiptage madab lata*
77	*Dodonea viscosa*	111	*Hymnedictiarrum excelsa*
78	*Duranta sp*	**"I"**	
"E"		112	*Ixora chinesis*
79	*Eleocarpus serratus*	113	*Ixora coceninae*
80	*Eleocarpus oblongus*	**"J"**	
81	*Erbatonia coronaria*	114	*Jambusa vulgaris*
82	*Erythrina sps.*	115	*Tectona grandis*
83	*Euphorbia pulcherima*	**"K"**	
"F"			
84	*Ficus elastica*	116	*Lantana sellowiava*
85	*Ficus religiosa*	117	*Lantana zetute*
86	*Ficus triangularis*	118	*Lantana depressa*
87	*Ficus decora*	119	*Lolopetalus witiana*
88	*Ficus lyrata*	120	*Lee coccinae*
89	*Ficus nitida*	121	*Lee burgandy*
90	*Ficus carica*	**"M"**	
91	*Ficus glomerata*	122	*Madhuca indica*
92	*Ficus rox burgi*	123	*Madhuca latifalia*
93	*Ficus bengalensis*	124	*Michalia champaka*
94	*Ficus pandurata*	125	*Michalia nilgirika*
95	*Ficus infectoria*	126	*Mitragynaeparviflora*
96	*Ficus benjamina*	127	*Mimosops hexandra*
97	*Ficus Pumila*	128	*Mallotatous alba*
98	*Ficus repens*	129	*Mallotatous filipinensis*
99	*Ficus timetoria*	130	*Murayya exotica*
100	*Ficus sps*	131	*Magnifera indica*
101	*Faider bia albida*	132	*Magnolia*
102	*Ferun sps*	133	*Musa ponandisica*

134	*Melia compositae*	**"P"**	
135	*Morinda tinctoria [dye]*	148	*Pterocarpus marsupium*
136	*Metia dubia*	149	*Pterocarpus santalianum*
137	*Morus alba*	150	*Putrangiva*
138	*Morus indica*	151	*Pongamia*
139	*Morus serrata*	152	*Pterocarpus ascerifolium*
140	*Morus lavigata*	153	*Pterospermum*
141	*Morus pendulata*	154	*Pterocarpus*
"N"		155	*Pisiliarm indicom*
142	*Nyctanthus*	156	*Phylanthus emblica*
143	*Navdina domestica*	157	*Phylanthus niruri*
144	*Nerium*	158	*Pandanus tectorius*
"O"		159	*Passiflora edulis*
145	*Ochrocarpus longifolius*	160	*Pentas cornea*
146	*Ongenia dalbergiode*	161	*Plumbago capensis*
147	*Opopogan jabian (vel grass)*	162	*Plumbago alba*
"P"		163	*Phyllostachys aurea*
148	*Pterocarpus marsupium*	164	*Pseudo crantheum*
149	*Pterocarpus santalianum*	165	*Pilea caderi*
150	*Putrangiva*	166	*Phyllostachys aurea – golden bamboo*
151	*Pongamia*	167	*Phyllostachys heterocyclia - tortoisebam*
152	*Pterocarpus ascerifolium*	168	*Parkia biglandulosa*
153	*Pterospermum*	169	*Piper nigrum*
154	*Pterocarpus*	170	*Poplar*
134	*Melia compositae*	**"Q"**	
135	*Morinda tinctoria [dye]*	**"R"**	
136	*Metia dubia*	**"S"**	
137	*Morus alba*	171	*Sizygium cariabarum*
138	*Morus indica*	172	*Sizygium cuminii*
139	*Morus serrata*	173	*Sizygium rosea*
140	*Morus lavigata*	174	*Sizygium latum*
141	*Morus pendulata*	175	*Semicarpus anacardium*
"N"		176	*Saraca indica*
142	*Nyctanthus*	177	*Saraca canliflora*
143	*Navdina domestica*	178	*Semicarpus buknania*
144	*Nerium*	179	*Semicarpus ancardium*
"O"		180	*Spondias*
145	*Ochrocarpus longifolius*	181	*Santalum album*
146	*Ongenia dalbergiode*	182	*Sapindus emarginatus*
147	*Opopogan jabian (vel grass)*	183	*Saraca taipengensis*

184	*Soyamedia serrata (sone)*
185	*Sesbania sesban*
186	*Salix alba (poplar)*
187	*Spathyphyllum*
188	*Stereuliaalata*
189	*Sterculia colorata*
190	*Samanea saman*
191	*Santalum spicatus*
"T"	
192	*Tabebuia rosea*
193	*Tabebuia guacan*
194	*Tabebuia madgaskianum*
195	*Tabebuia avellaneadae*
196	*Thespesia populanea*
197	*Tectona grandis*
185	*Sesbania sesban*
186	*Salix alba (poplar)*
187	*Spathyphyllum*
188	*Stereuliaalata*
189	*Sterculia colorata*
190	*Samanea saman*
191	*Santalum spicatus*
"T"	
192	*Tabebuia rosea*
193	*Tabebuia guacan*
194	*Tabebuia madgaskianum*
195	*Tabebuia avellaneadae*
196	*Thespesia populanea*
197	*Tectona grandis*
198	*Thyrostaches siamensis*
199	*Tabernamontana varigata*
"U"	
"V"	
200	*Vateria indica*
201	*Verbena*
202	*Vitis*
"W"	
203	*Wreightia tintoria*
204	*Wreightia tomentosa*
"X"	
"Z"	
205	*Zizypus jujuba*
206	*Zizypus rugosa*

BANGALORE UNIVERSITY PROPOSED GENE BANK

Krishna Murthy B.N
RS/GIS Lab
Geology Department
B.U.B

CORE GROUP MEMBERS

Department of Geology:

1. Prof. Renuka Prasad.T.J
2. Chandan.G.S
   Research Scholar
3. Nandish.V
   Research Scholar
4. Krishna Murthy.B.N
5. Yogananda.K.S (M.Sc.Student)

Department of Environmental Science:

1. Dr.Nndini.N
   Reader and principal Investigator
2. Mr.Aboud S.Jumbe
   Ph.D Scholar
3. Dr.Sunitha N
   Lecture
4. Mrs.Sucharita Tardon
   Ph.D Scholar
5. Mrs.Anupama.B.S
   Ph.D Scholar
6. Ms Pavithra.S
   Ph.D Scholar
7. Mr. Durgesh.R
   Research Scholar
8. Mr. Keerthi kumar C.K
   Non-Teaching Staff
9. Mr. Kumar (M.Sc.Student)

Department of Botany:

1. Prof.Ambika S.R
2. Prof Tejavathi D.H
3. Dr.Sreenath.K.P
4. Prof.Prathibha
   Jyothi Nivas College B.U.B
5. Ms.Smitha .G
   Research Scholar
6. Mr.Anandraju.V
   Research Scholar

Department of Geography:

1. Prof.Eswarappa.B
2. Dr.Ashok Ajagi
3. Ms.Priya

Department of Zoology:

1. Dr. M.S. Reddy
2. Dr.Bela Zutshi

Department of Microbiology:

1. Dr.Srinivas

Department of Sociology:

1. Dr.R.Rajesh