

PROJECT

BIODIVERSITY

OF

SACRED GROOVES

PROJECT

SUBMITTED

BY

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BIODIVERSITY OF A SELECTED SACRED GROVES

INTRODUCTION :

Sacred groves are tracts of virgin forest with rich diversity, which have been protected by the local people for centuries for their cultural and religious beliefs and protect the villagers from different calamities. Every sacred grove carries its own legends, lore and myths which form the integral part of the sacred grove. An inextricable link between present society and past in terms of biodiversity, culture, religious and ethnic heritage exists in sacred groves. Sacred groves occur in many parts of India viz., Western Ghats, Central India, northeast India etc particularly where the indigenous communities live. Sacred groves acts as an ideal centre for biodiversity conservation. Several plants and animals that are threatened in the forest are still well conserved in some of the sacred groves. It has been observed that several medicinal plants that are not to be found in the forest are abundant in the sacred groves.

The Traditional worship practices show the symbiotic relation of human beings and nature. Disappearance of species due to habitat alteration, over-exploitation, pollution, global climate change and invasion

of exotic species is so fast that many valuable taxa many vanish even before they are identified and their scientific value is discovered.

Importance of the sacred groves

Ideal Centres for Biodiversity Conservation:

Gadgil and Mehta (1975, 1976) found a grove in the Kolaba district of Maharashtra harbouring a solitary specimen of the liana *Entada phaeoloides*. A new species of a leguminous climber *Kunstleria keralensis*, has been reported from one of the sacred groves of Kerala. *Ficus benghalensis* L. in sacred groves at Suriampettai plays the role of a Keystone species providing a niche for the large number of birds and plants. Khan (1997) reported that about 4% of the total plant species found in Meghalaya are confined to sacred groves.

Socio-Cultural practices and sacred species:

Religious and cultural importance of the species is a factor promoting their sustainable utilization as well as conservation (Singh 1998). Importance of the sociologically recognized plants which have linkage the deities of the groves or their other religious practices in maintaining the ecological balance. Khumbongmayum (2004) described 16 sacred species, found in different sacred groves of Manipur along with their associated religious beliefs and taboos. *Ficus religiosa* and *Ocimum sanctum*

are regarded as sacred by the Hindus. Sacred trees in different parts of India are related to different faiths and beliefs and have close linkage with local ecological values.

Ecological services of sacred groves:

The biodiversity-rich sacred groves of immense ecological significance. They also play an important role in the conservation of flora and fauna. Several ecological investigations have been made in sacred groves of Meghalaya. The regeneration status of some important species was studied in sacred groves of Karnataka, Meghalaya and Manipur. Vasanth (2001) carried out a detailed vegetation analysis of a sacred grove in Mandikoti village of the Udupi district in Karnataka. Sacred groves (Sarma) of Madhya Pradesh are characterised by the vegetation with a cluster of sal (*Shorea robusta*) trees. Garhwal Himalaya was lower, while density and basal cover values were significantly higher as compared with the other forest areas.

Ethnobotanical importance of the sacred groves:

Sacred groves are the good source of a variety of medicinal plants, fruits, fodder, fuelwood, spices etc. A study of the tree wealth in the life and economy of the tribal people in Andhra Pradesh revealed that various species are used by the different ethnic groups for various purposes including the treatment of common diseases and disorders. Tolchha-

Bhotiya sub-Community inhabiting the buffer zone villages of Nanda Devi Biosphere Reserve has a strong faith and belief in traditional healthcare system/ herbal treatment and depends on various medicinal plants.

Bhakat and pandit (2003) recorded from the Chalkigarih sacred grove in midnapore district (west bengal) 105 medicinal plant species of which 12 are threatened elsewhere in the district. A total of 120 medicinal plants widely used for the treatment of various ailments were reported from four sacred groves of Manipur. presence of a large number of medicinal plants is reported in 'Kavus' of Kerala and 'Harigali' sacred site of Garhwal Himalaya. Availability and habitat preference of critically endangered medicinal plants of west Himalaya were assessed for their conservation (Airi 2000).

Degradation of the sacred groves:

Belief and taboos are the constructive tools for conserving the sacred groves and erosion of belief and taboos has led to deterioration of groves (Wartak and Gadgil 1981, Tiwari 1998b, 1999). It has been seen that religious beliefs and taboos that were central to the protection of sacred groves are being eroded over the years due to various reasons and thus the present status of sacred groves is rather precarious. Sacred groves (Dams) located in shekhala village of Rajakham are becoming degraded due to

change in people's attitude towards conservation of biodiversity. Sacred groves in peepal and Khetarli villages of the state have been degrading due to uncontrolled grazing. Conversion of sacred groves into coffee plantations and human habitation is the major threat to the conservation of groves in Kodagu districts of Karnataka.

List of sacred groves in India:

Sacred groves of India are forest fragments of varying sizes, which are communally protected, and which usually have a significant religious connotation for the protecting community. Hunting and logging are usually strictly prohibited within these patches. Sacred groves did not enjoy protection via federal legislation in India. Some NGOs work with local villagers to protect such groves. Wildlife (Protection) Amendment Act of 2002 has introduced legislation for providing government.

Indian sacred groves are sometimes associated with temples / monasteries / shrines or with burial grounds. Sacred groves may be loosely used to refer to other natural habitat protected on religious grounds, such as Alpine meadows.

Location	No. of Sacred groves	Districts	Area (ha)	References
Andhra pradesh	800	-	-	Rao (1996)
Arumachala pradesh	101	4	-	Khan et al. (2007)
Assam	40	1	-	Deb unpublished data
Gujarat	29	1	0.42	Gupta et al. (2000)
Haryana	248	18	-	NAEB (1995)
Himachal pradesh	11	-	-	Singh et al. (1998)
Karnataka	1214	-	2407	Kalam (1996)
Kerala	2000	-	500	Rajendraprasad (1995)
Madhya pradesh	275	-	-	Srivastava (1994)
Maharashtra	1600	-	-	Deshmukh et al. (1998)
Manipur	365	-	-	Devi (2000)
Meghalaya	79	-	26,326	Tiwari et al. (1998a)
Nissa	322	-	50	Malhotra et al. (1997)
Rajasthan	9	-	158	Jha et al. (1998)
Sikkim	56	4	-	Chatterjee et al. (2000)
Tamil Nadu	448	28	-	Amrithalingam (1998)
Uttar pradesh	6	-	5500	Simha and Maikhuri (1998)
West Bengal	190	-	15	Deb and Malhotra (2001)

Sacred Groove No:- 9

- 1) Locality Name :- Sabbavaram
- 2) Area Name :- Sabbavaram
- 3) Name of the temple :- Uma Rameshwara Alayam
- 4) God Present :- Lord shiva
- 5) No: of trees :- 12
- 6) Name of the tree :- Vepa, Ravi (3), Banayan (2), Mareda (1), Mango, Ashoka (2).
- 7) Height of the tree :- 64mts, 110 mts.
- 8) Girth of the tree :- 64cms, 110cms, 39cm, 80cm.
- 9) No: of branches :- Many trees - Many branches.
- 10) No: of bird types :- 2 types
- 11) Insects :- 2 types
- 12) Name of birds :- Sparrows, Crows, squirrels
- 13) Insects types :- small & big ants.
- 14) Age of the tree :- 20 years.
- 15) Language of the People :- Telugu
- 16) Name of the person given information :- S.V. Narayana
- 17) Total Area :- 1 acre.

A small pond is there in front of the temple i.e., dug in olden days for bathing but now it is used by the temple. Special prayers was done in Kartika masam. Festival is celebrated on January 20 or 21.



Sacred Grove NO:- 11

- 1) Locality Name :- Sabbavaram
- 2) Area Name :- Goticcoda village
- 3) Name of the temple :- Sri. Sri. Paradesi Ammavari Alayam
- 4) God Present :- Paradesimamba
- 5) No: of trees :- 2
- 6) Name of the tree :- Vepa & small tulasi plant
- 7) Height of the tree :- 60 feet.
- 8) Girth of the tree :- 150 cm
- 9) No: of branches :- 2 Main & 12-sub
- 10) No: of bird types :- 3+1 = 4
- 11) Insects :- 4
- 12) Name of birds :- Mina, Kathira bird, crow, coloured dove
- 13) Insects types :- Grasshopper, Ants, butterflies, termites
- 14) Age of the tree :- 50+ years
- 15) Language of the people :- Telugu
- 16) Name of the person given information :- Pydithalli
- 17) Total Area :- 1 1/2 acre

The tree is being worshiped from 100+ years. The temple was constructed on 3-5-1999. Much importance was given to the tree rather than the idol of goddess.



Sacred Groove NO:- 12

- 1) Locality Name :- Sabbauram
- 2) Area Name :- Goticada village
- 3) Name of the temple :- Santoshimata temple
- 4) God Present :- Santoshimata
- 5) No: of trees :- 1
- 6) Name of the tree :- Vepa
- 7) Height of the tree :- 20 feet
- 8) Girth of the tree :- 100 cm
- 9) No: of branches :- main - 4 ; sub - many
- 10) No: of bird types :- 2
- 11) Insects :- 1
- 12) Name of birds :- Crows, parrots & many other.
- 13) Insects types :- Ants.
- 14) Age of the tree :- 30 years
- 15) Language of the people :- Telugu
- 16) Name of the person given information :- Rama devi
- 17) Total Area :- 1 acre

The temple was built in 2008. The tree is being worshipped by local people. A nest is found on the tree. The people are celebrating festival on Rakhi festival.



Sacred Grove NO 1-13

- 1) Locality Name :- Sabbavaram
- 2) Area Name :- Bondavanipalem
- 3) Name of the temple :- Mutyalamma Temple
- 4) God Present :- Mutyalamma
- 5) No: of trees :- 4
- 6) Name of the tree :- Vepa, Rawi, Banyan & Date palm
- 7) Height of the tree :- 15 mts
- 8) Girth of the tree :- 40 cm.
- 9) No: of branches :- few
- 10) No: of bird types :- 2
- 11) Insects :- 2
- 12) Name of birds :- Parrots & some other small birds.
- 13) Insects types :- Grasshoppers, lizard (tonda)
- 14) Age of the tree :- 120+ years
- 15) Language of the People :- Telugu
- 16) Name of the person given information :- Pydithalli
- 17) Total Area :- 1 cent

The people used to pray this goddess long ago. There was a belief that this goddess gave her precious things to the other goddess her sister and she left the village. Eventhough the people never dare to cut of these trees.



Sacred Grove No: - 14

- 1) Locality Name :- Sabbavaram
- 2) Area Name :- Goticada colony
- 3) Name of the temple :- Sri. Sri. Haridimamba temple
- 4) God Present :- Haridimamba
- 5) No: of trees :- 1
- 6) Name of the tree :- Musidi
- 7) Height of the tree :- 15 feet
- 8) Girth of the tree :- 88 cm
- 9) No: of branches :- 4
- 10) No: of bird types :- 2
- 11) Insects :- 2
- 12) Name of birds :- Crows, squirrels
- 13) Insects types :- Ants, Grasshoppers
- 14) Age of the tree :- 30⁺ years
- 15) Language of the People :- Telugu
- 16) Name of the person given information :- Srinu
- 17) Total Area :- $\frac{1}{2}$ acre

The local people believe that this goddess is protecting the village & the people. The temple is present from 70 years ago.



Sacred Groove NO-15

- 1) Locality Name :- Ammavari Veedhi
- 2) Area Name :- Allipuram
- 3) Name of the temple :- Kotta Ammavari temple
- 4) God Present :- Kotta Ammavaru
- 5) No: of trees :- 1
- 6) Name of the tree :- Ravi
- 7) Height of the tree :- 60 Feet
- 8) Girth of the tree :- 10mts
- 9) No: of branches :- Main-3, sub-10
- 10) No: of bird types :- 1
- 11) Insects :- 2
- 12) Name of birds :- Crows
- 13) Insects types :- ants, spiders
- 14) Age of the tree :- 50+ years
- 15) Language of the People :- Telugu
- 16) Name of the person given information :- Maheshwara Rao
- 17) Total Area :- 3 cents

Temple was built 10 years ago. The tree is receiving the prayers of the local people. A nest is found on the tree.

List of Sacred grooves in Andhra Pradesh:

The state of Andhra Pradesh shared the traditions of sacred grooves with other parts of the country. There are about 713 sacred grooves identified in Eastern Ghats districts of Andhra Pradesh. Some of the very important grooves are existing in 26 protected areas. However large number of grooves are seen outside, mostly being protected by the people under religious prohibition of felling.

Important sacred grooves in Eastern Ghats districts of Andhra Pradesh:

1. Anantapur:

There are about 73 sacred grooves of which 21 are hotspots, 11 major grooves and 41 minor grooves. "Thimmamma marimumu" - The largest banyan tree (*Ficus benghalensis*) in the world is seen in this district at Gooty Bailu village.

2. Chittoor:

There are 133 sacred grooves of which 25 are major grooves and 25 moderate and 83 are minor grooves. Following is the list of some of the very important grooves of this district are:

- (i) Talakona (ii) Jeerakona (iii) Tumbura Theertham
- (iv) Sadasiva Kona (v) Chakra Theertham.

3.

There are about 76 sacred groves of which 25 are considered as major groves including 8 hotspots. About 300 plant species are recorded from these sacred groves.

4. East Godavari :

There are 10 well preserved groves, 3 less distributed groves and 2 distributed. Following is the list of well preserved and less distributed groves are (i) Talupulamma Jora (ii) Annamaram (iii) Kerkenda (iv) Bhairuapalem (v) Rampa Hill area.

5. Guntur :

There are 17 sacred groves, of which 14 groves are distributed and only 3 are less disturbed. There are 14 big trees with girths varying from four meters to six meters and age varying from 100 years to 300 years. These include *Ficus benghalensis*, *Ficus amplissima*, *Ficus religiosa* and *Azadirachta indica*. Three better preserved groves are (i) Kotappa Konda (ii) Kondaveedu (iii) Nagarjuna Konda.

6. Khammam :

There are 3 groves - (i) Nugur fort (ii) Parmasala (iii) Sthambhadri, Khammam fort.

7. Krishna :

There are 12 sacred groves and most of the groves are disturbed and only 3 are less disturbed.

The better preserved groves are (i) Kamakadurgamma.

Sacred Groove No:- 8

- 1) Locality Name :- Sabbavaram
- 2) Area Name :- Goticada colony
- 3) Name of the temple :- Bulokamma Temple
- 4) God Present :- Bulokamma
- 5) No:- of trees :- 2
- 6) Name of the tree :- Ravi, Nepa
- 7) Height of the tree :- 100 feet
- 8) Girth of the tree :- 280 cm, 140 cm
- 9) No:- of branches :- Main - 5; 2; sub - 20, 5
- 10) No:- of bird types :- 2
- 11) Insects :- 2
- 12) Name of birds :- Crows, bats
- 13) Insects type :- Ants, butterflies
- 14) Age of the tree :- 120+ years
- 15) Language of the people :- Telugu
- 16) Name of the person given information :- Pydithalli
- 17) Total Area :- 2 cents.

The temple was constructed 100+ years ago. The tree is being prayed as goddess. The festival is in November and 4 villages combinely celebrate the festival



Konda (ii) Kondapalli Groove (iii) Tirumalagiri (iv) Gundala
matha groove (v) Kolleti Kota.

8. Kurnool :

There are 115 sacred groves. 39 of them are classified as major groves and 76 are minor groves. 14 better groves are (i) Jagannatha gattu (ii) Kambagiri Konda (iii) Chandrayuni gudi (iv) Mahandi (v) Paladhara - panchadhara.

9. Mahabubnagar :

There are 9 Groves having good-to-moderate vegetation. There are 6 more groves with a few trees often on plains, 7 Groves lacking vegetation and two groves protected recently but not treated as sacred: The better preserved groves are : (i) Kadalivanam found in Nagarjunasagar Srishailam Tiger Reserve (N.S.T.R) (ii) Jellupenta (iii) Yettam (iv) Koyalakonda area.

10. Nalgonda :

There are 9 sacred groves of which two groves in forest with good vegetation and 2 groves in moderate vegetation, the other 5 groves with poor vegetation. Following are the better preserved groves - (i) Yadagirigutta (ii) Chandrimgutta (iii) Marketpalli (iv) Ethipothala.

11. Nellore :

There are 87 groves of which 21 are classified as major groves with 4 highly diversified sacred groves. They are (i) Narasimha Konda (ii) penusila Narasimha (iii) Melapattu groove (iv) Siddulaiah Konda.



Sacred Groove NO : 4

- 1) Locality Name :- Dabagarden
- 2) Area Name :- Neelamma Vepachettu Dcon
- 3) Name of the temple :- Sri Kanaka Durga Alayam
- 4) God Present :- Kanaka Durga.
- 5) No: of trees :- 2
- 6) Name of the tree :- Ravi & Kamugu
- 7) Height of the tree :- 20 feet
- 8) Girth of the tree :- 108 cm
- 9) No:- of branches :- 3 & 3
- 10) No:- of bird types :- 1
- 11) Insects :- Ants
- 12) Name of birds :- Crows - nest is present
- 13) Insects type :- Ants
- 14) Age of the tree :- 30+ years
- 15) Language of the people :- Telugu
- 16) Name of person given information :- Jagam J.V
- 17) Total Area :- 10 gajalu

Goddess was present over there from many years but the temple was constructed recently (4-5 years) by some Auto drivers.



Sacred Groove No :- 5

- 1) Locality Name :- Gnanapuram
- 2) Area Name :- Convent Junction (Atchiampeta)
- 3) Name of the temple :- Yerrimamba temple
- 4) God Present :- Yerrimamba
- 5) No: of trees :- 1
- 6) Name of the tree :- Neredu, Coconut tree
- 7) Height of the tree :- 15 feet & 20 feet
- 8) Girth of the tree :- 5.4 mts
- 9) No: of branches :- 3 main branches ; 10⁺ - sub branches
- 10) No: of bird types :- 2
- 11) Insects :- 2
- 12) Name of birds :- sparrow & oriole
- 13) Insects type :- small & big ants
- 14) Age of the tree :- 60 - 70 years
- 15) Language of People :- Telugu
- 16) Name of person given information :- Sanyasi Rao.
- 17) Total Area :- 1 acre.

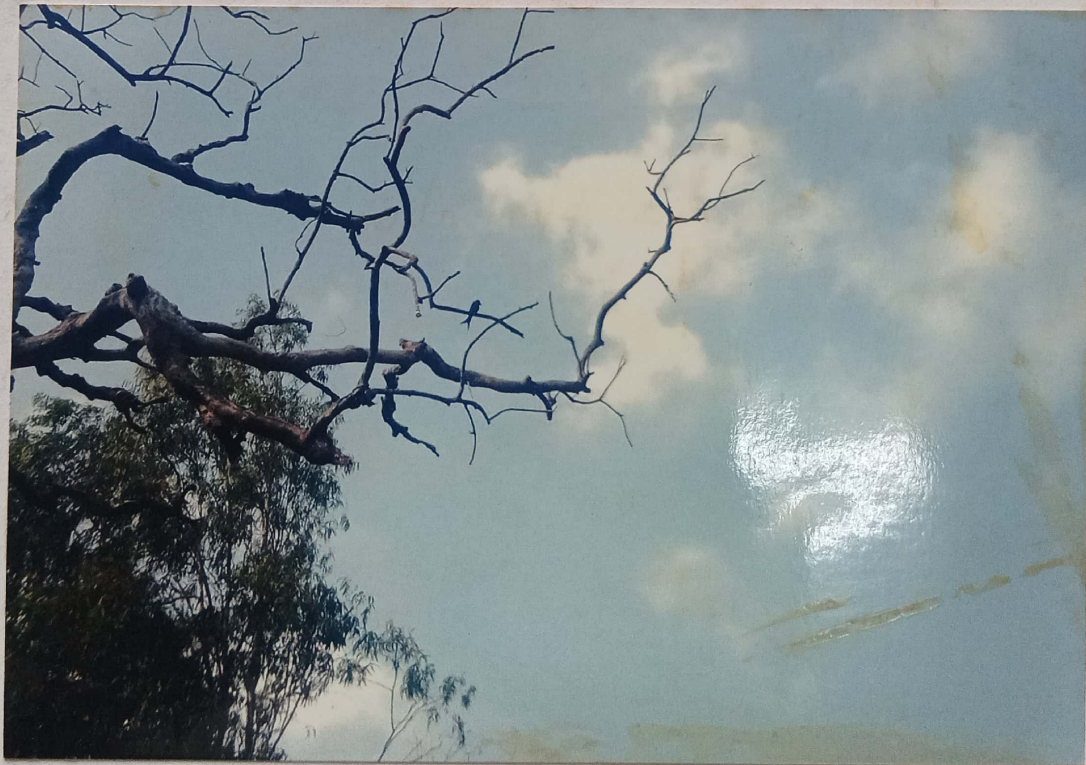
The temple was there from above 200 years. The Government undertaken it 7 years ago. The Neredu tree is being worshiped by the people. There was a belief that the goddess gives children for the people who lack children.



SacredGrooveNo:-6

- | | |
|--|--|
| 1) Locality Name | :- Allipuram |
| 2) Area Name | :- Neralla koneru road |
| 3) Name of the temple | :- Sri.Sri.Sri. Racha Polamamba Temple |
| 4) God Present | :- Racha Polamamba |
| 5) No: of trees | :- 2 |
| 6) Name of the tree | :- Nepa, coconut |
| 7) Height of the tree | :- 10 feet, 15 feet |
| 8) Girth of the tree | :- 3mts |
| 9) No: of branches | :- 3 main ; 8-sub |
| 10) no: of bird types | :- 2 |
| 11) Insects | :- 1 |
| 12) Name of birds | :- Cukoo bird, crow |
| 13) Insects type | :- Ants |
| 14) Age of the tree | :- 8 years |
| 15) Language of People | :- Telugu |
| 16) Name of the person given information | :- Pydiraju |
| 17) Total Area | :- 1/2 acre |

The temple was constructed 80 years ago and it is reconstructed recently.



Sacred Grove No: - 10

- 1) Locality Name :- Sabbavaram
- 2) Area Name :- Goticwada Colony
- 3) Name of the temple :- Nookalamma temple
- 4) God Present :- Nookalamma
- 5) No: of trees :- 1
- 6) Name of the tree :- Vepa
- 7) Height of the tree :- 15 feet
- 8) Girth of the tree :- 40 cm
- 9) No: of branches :- Main-2, sub-8
- 10) No: of bird types :- 2 types.
- 11) Insects :- 2 types
- 12) Name of birds :- Crows, parrots
- 13) Insects types :- spiders, Ants
- 14) Age of the tree :- 10-15 years.
- 15) Language of the people :- Telugu
- 16) Name of the person given information :- Pydithalli
- 17) Total Area :- 1 cent.

The temple was constructed recently. The tree is being worshiped as goddess. The festival is done on Kotta Amavasya.

12. prakasham :

There are 59 groves of which 25 are considered major grove. Some of them are (i) Bairava-kona (ii) Singarayakonda (iii) malakonda.

13. west Godavari :

There are about 17 sacred groves of which four groves are well preserved and 13 are disturbed. Some of the well preserved groves are (i) pattiseema (ii) padauegi (iii) Jeelakerragutta (iv) Gubbalamangamma.

14. Srikakulam :

There are 30 sacred groves of which 8 are well preserved and 14 disturbed. The other 8 groves are highly disturbed groves due to biotic pressures and extension of agriculture. The major groves are (i) Jagatimetta (ii) mallemma Malli (iii) Tarlakota (iv) Telukunchi (v) Subhalaya (vi) Telimelapuram.

15. Vizianagaram :

There are about 32 sacred groves of which 11 are well preserved, 12 less disturbed and 9 are disturbed. Some of the well preserved groves are - (i) punyagiri (ii) paramma Konda (iii) Jayathi (iv) Neredu valasa (v) Gbrada (vi) Bothili (vii) chitrakonda Boddamalasa (viii) Addapu Sila (ix) Konada (x) phoolbagh (xi) Bobbili.

Sacred Groove No 1-7

- 1) Locality Name :- Sabbavaram
- 2) Area Name :- Sabbavaram
- 3) Name of the temple :- Sri. Durga Mamba Alayam
- 4) God Present :- Durga Mata
- 5) No: of trees :- 3
- 6) Name of the tree :- Banayan, Mesidi, Dirvichettu
- 7) Height of the tree :- 700 feet, 15 feet, 15 feet
- 8) Girth of the tree :- 240 cm, 100 cm, 125 cm
- 9) No: of branches :- 4 main, sub-many
- 10) No: of bird types :- 3 types
- 11) Insects :- 2 types
- 12) Name of birds :- Crows, bats, Eagles
- 13) Insects type :- Ants, lizards
- 14) Age of the tree :- 100⁺ years.
- 15) Language of People :- Telugu
- 16) Name of the person given information :- Naga Raju
- 17) Total Area :- 1½ acre

The Vijayawada temple and this temple was built at once. The age of the temple is 100⁺ years.



Handwritten text in a script, likely Telugu, is visible on a light-colored surface. The text is faint and appears to be a list or a set of instructions, possibly related to the educational activity shown in the photograph above.



List of Sacred groves in Visakhapatnam

There are about 30 sacred groves of which 10 are well preserved, 15 less disturbed and 5 are disturbed. Some of the well preserved groves are - (i) Gudilova (ii) Kailasagiri (iii) Lingalathirugudu (iv) Madhavadhara (v) Mathragundam (vi) Rakshagiri (vii) Simhachalam (viii) Upamaka (ix) Vaddadi (x) Vaddadi madugula.

Some of the species in India & A.P. region :

1. *Ficus benghalensis*
2. *Ficus amplissima*
3. *Ficus religiosa*
4. *Azadirachta indica*
5. *Dipterocarpus indicus*
6. *Shorea robusta*
7. *Ocimum sanctum*

Conclusion :

From the project I got the idea that some of the plant species like *Ficus benghalensis*, *Ficus amplissima*, *Ficus religiosa* and *Azadirachta indica* which are identified as sacred grooves have attained the age 100 to 300 years, girth 4 to 6 meters. From Guntur District.

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GROOVES

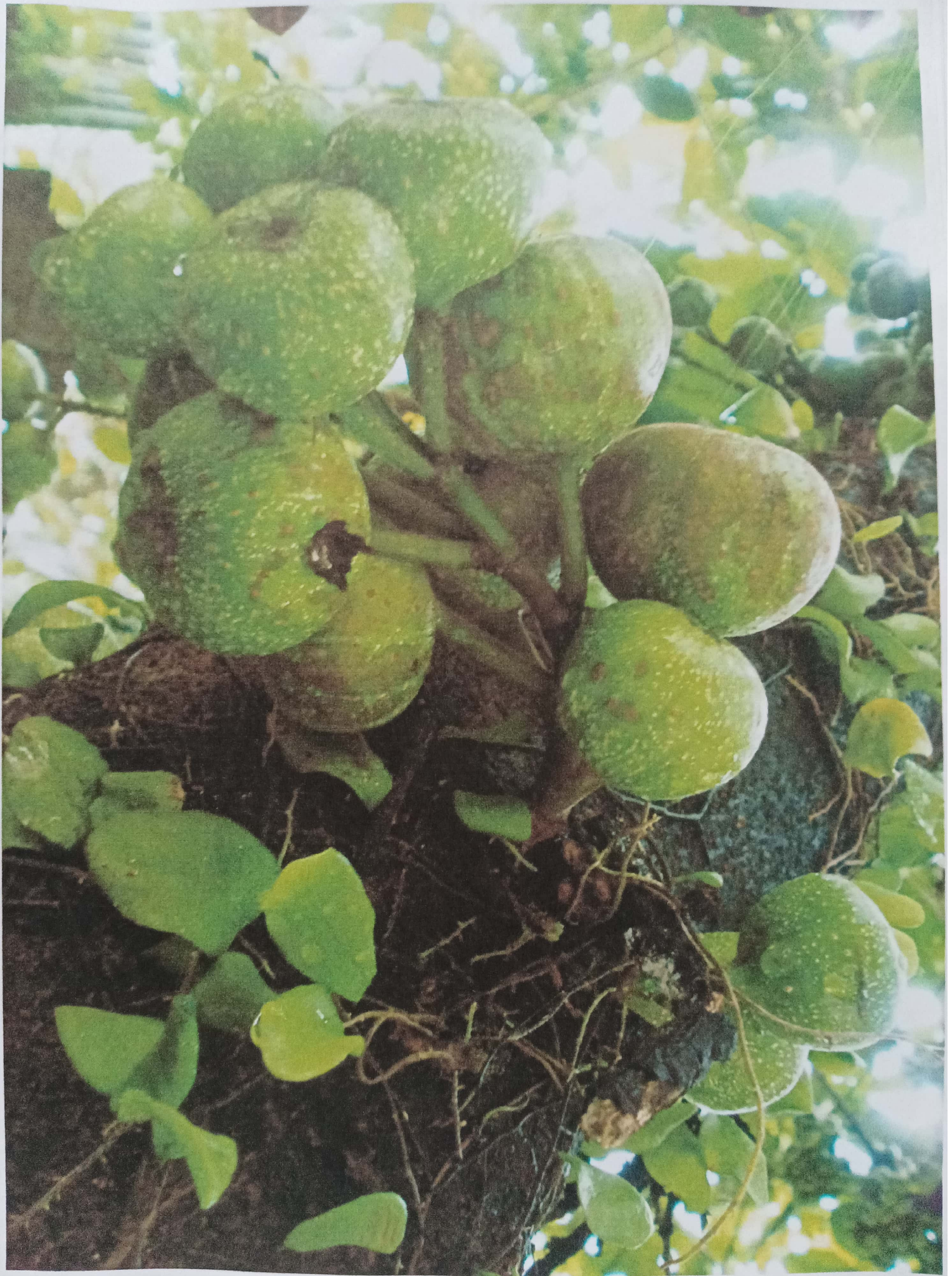


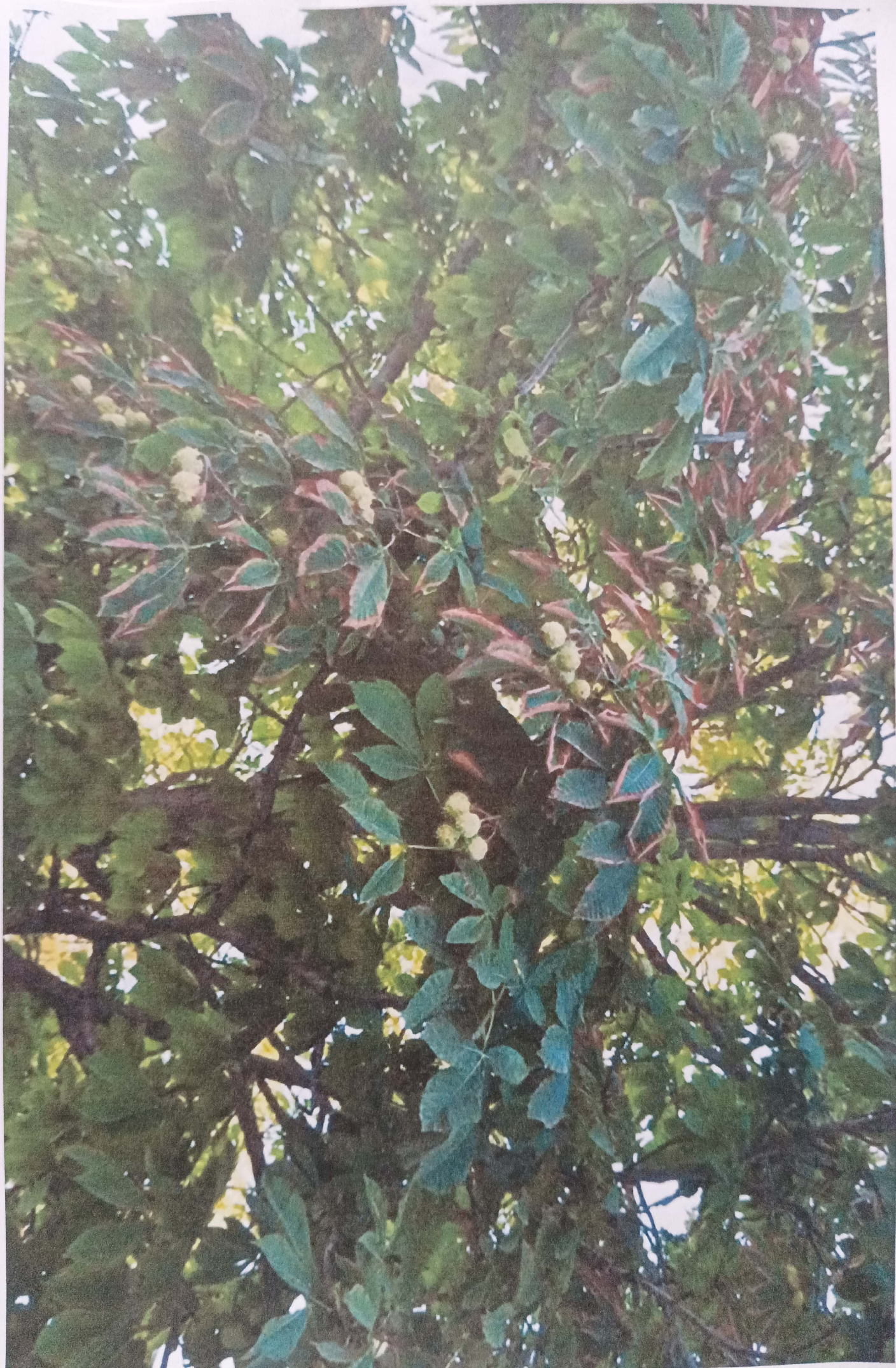






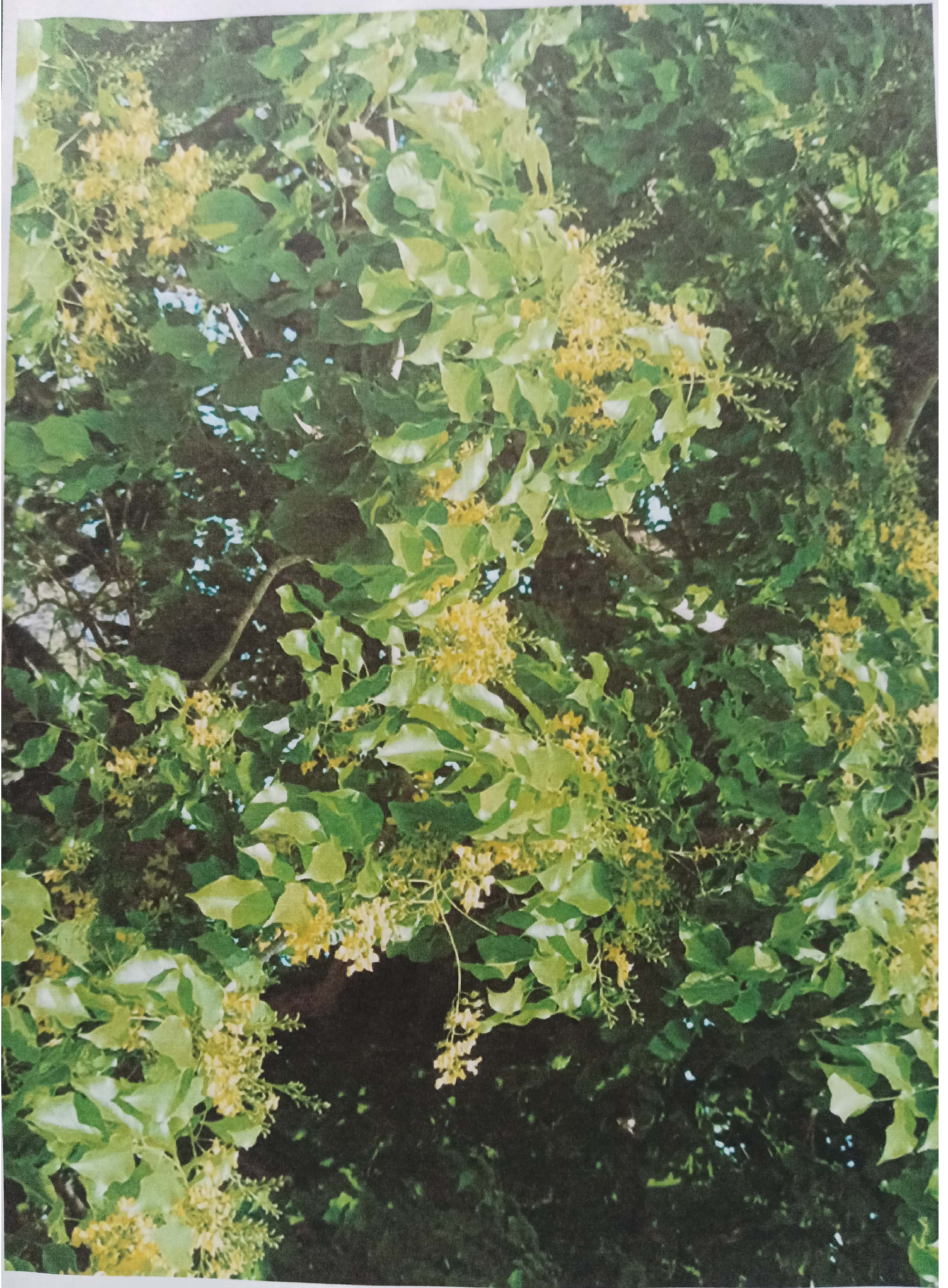








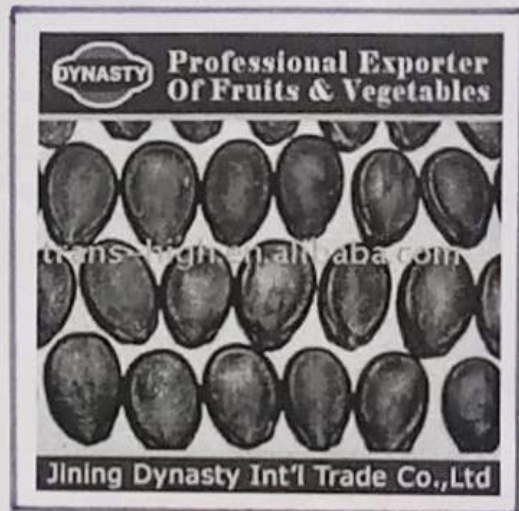




BOTANY PROJECT



SOYABEAN



WATERMELON

SYNTHETIC SEEDS

COTTON



PAPAYA



PREPARED BY – R. SUBHASHINI AND K. LAVANYA (IIIBSc - MBC)

PRODUCTION OF SYNTHETIC SEEDS

Synthetic seeds

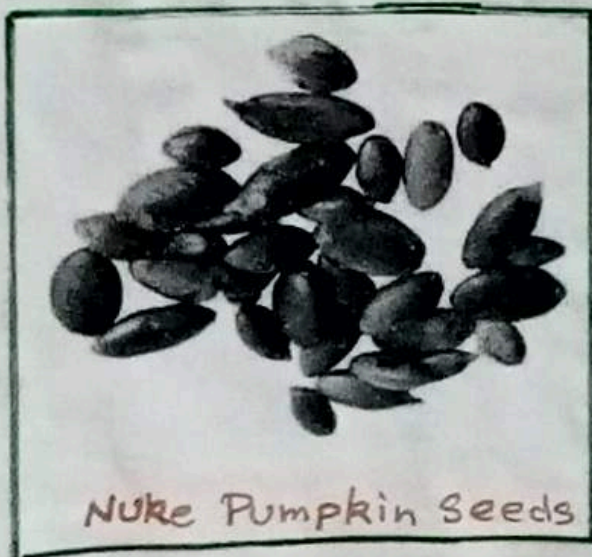
Synthetic seeds can be defined as the artificial encapsulation of somatic embryo, shoot buds or aggregates of cell or any tissues which has the ability to form a plant in *in-vitro* or *ex-vivo* condition.



Caraway seeds



KIWI SEEDS



Nuke Pumpkin seeds



SUNFLOWER SEEDS

Synthetic Seed Production

Synthetic seed production method can be of two types.

1. Desiccated System

2. Hydrated System

1. Desiccated System for Synthetic Seed Production:

Prior to encapsulation, somatic embryos are first hardened to withstand desiccation. Then these hardened embryos are encapsulated artificially with the use of appropriate growth medium.

2. Hydrated System for Synthetic Seed Production:

The gel used to enclose somatic embryos remain hydrated. Various water soluble gels, can be used for the purpose of encapsulation, like alginate, gel xite, locust bean gum, Sodium alginate with gelatin. However alginate is the most suitable gel.



Synthetic Seeds
of
Black Pepper

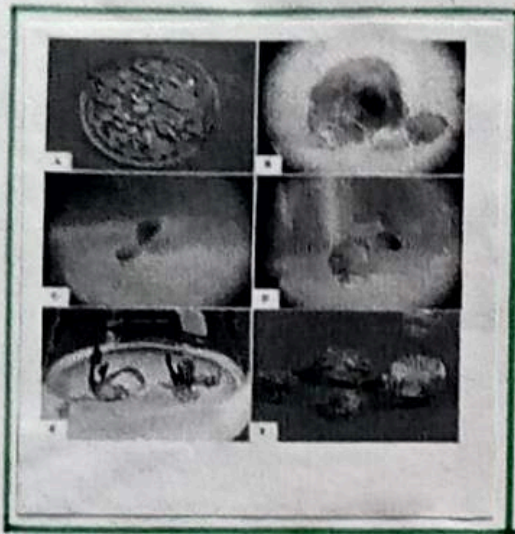
geled embryos are washed with water or MS basal medium.

- The synthetic seeds are ready.
- Alternatively, a burette is filled with sodium alginate solution (1-5%) dripped into calcium nitrate solution (100 mM) drop by drop. Somatic embryo is inserted into the drop formed at the burette tip sodium alginate drop along with the somatic embryo falls into the solution of calcium nitrate.
- Useful adjuvants like growth regulators, herbicides, insecticides, fungicides and Micorrhiza Such can be supplied to be the somatic embryo while encapsulating along with the matrix.

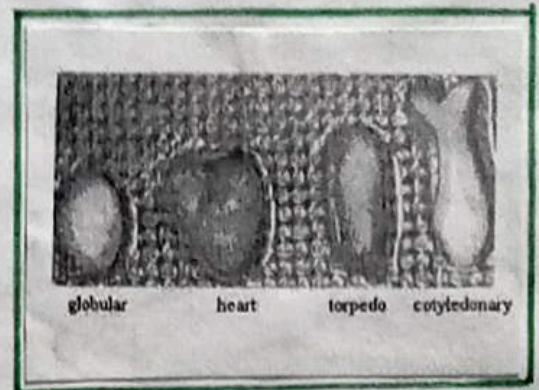
2. Molding Method:

This method undergoes the following

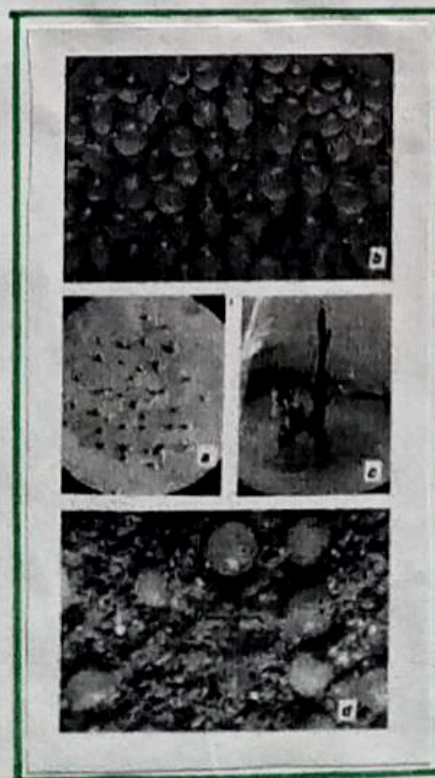
- This method follows simple procedure of mixing of embryos with temperature dependant gel (eg:- gel, xite, agar)
- Cells get coated with the gel at lowering of the temperature



Production of Synthetic
Seed by Encapsulating.



Overview of Dry
Synthetic Seed
Production



Artificial Seed
Technology Development

Uses

- ✦ Mixed genotype plantations - Suitable for this as for monoculture
- ✦ Germplasm Conservation
- ✦ Elite plant genotypes - Synthetic seed technique protects and permits economical mass propagation of elite plant genotypes
- ✦ Permits direct field use - hardening is necessary as it is in tissue culture plants. It permits direct field sowing.
- ✦ Facilitates study of seed coat formation, function of endosperm in embryo development and seed germination and Somaclonal Variation
- ✦ Hybrid production:- Synthetic seed production technique. Can be used for the production of hybrids which have unstable genotypes or show seed sterility. It can be used in the combination with embryo rescue technique. The rescued embryo can be encapsulated with this technique.

Xerosere - 5



Xerosere - 6



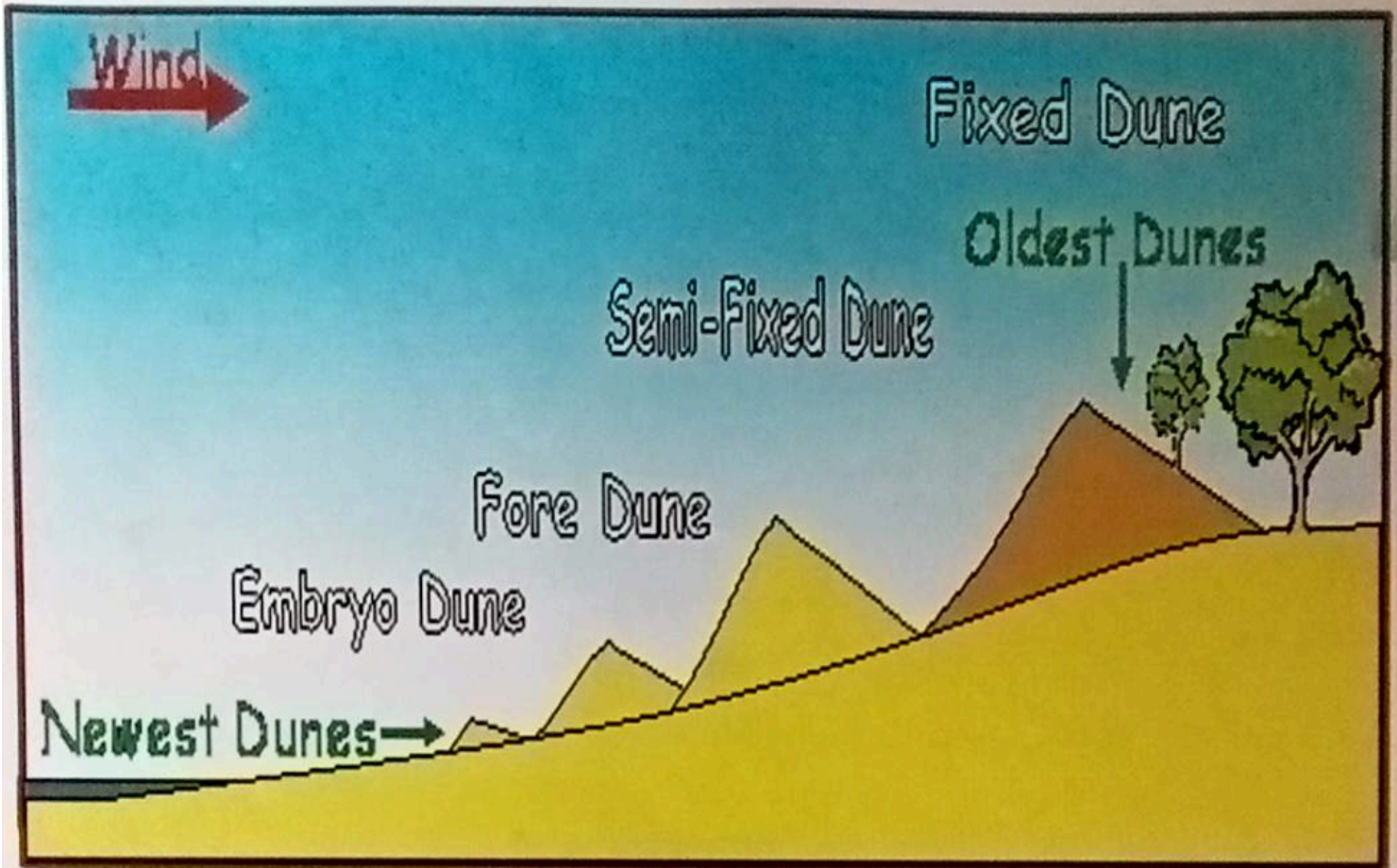
Xerosepe - 5

Succession is a directional change in plant and animal communities with time. There are two major types of succession: primary and secondary. Primary succession occurs on sites that have not previously been occupied by vegetation. The environmental conditions tend to be harsh and unfavourable, and the process is typically slow because of this. An example of primary succession is the development of a sand dune ecosystem. Secondary succession occurs on sites that have previously been occupied by well established communities. Conditions in these areas are much more favourable, making secondary succession a faster process. An example here is regrowth after a forest fire.

Xerosepe - 6

Mountain scrublet with *Ranunculus oboleucos*
(Fontinalo *Ranunculetum*, Littorelletea).

Xerosere - 3



Xerosere - 4



Xerosepe - 3

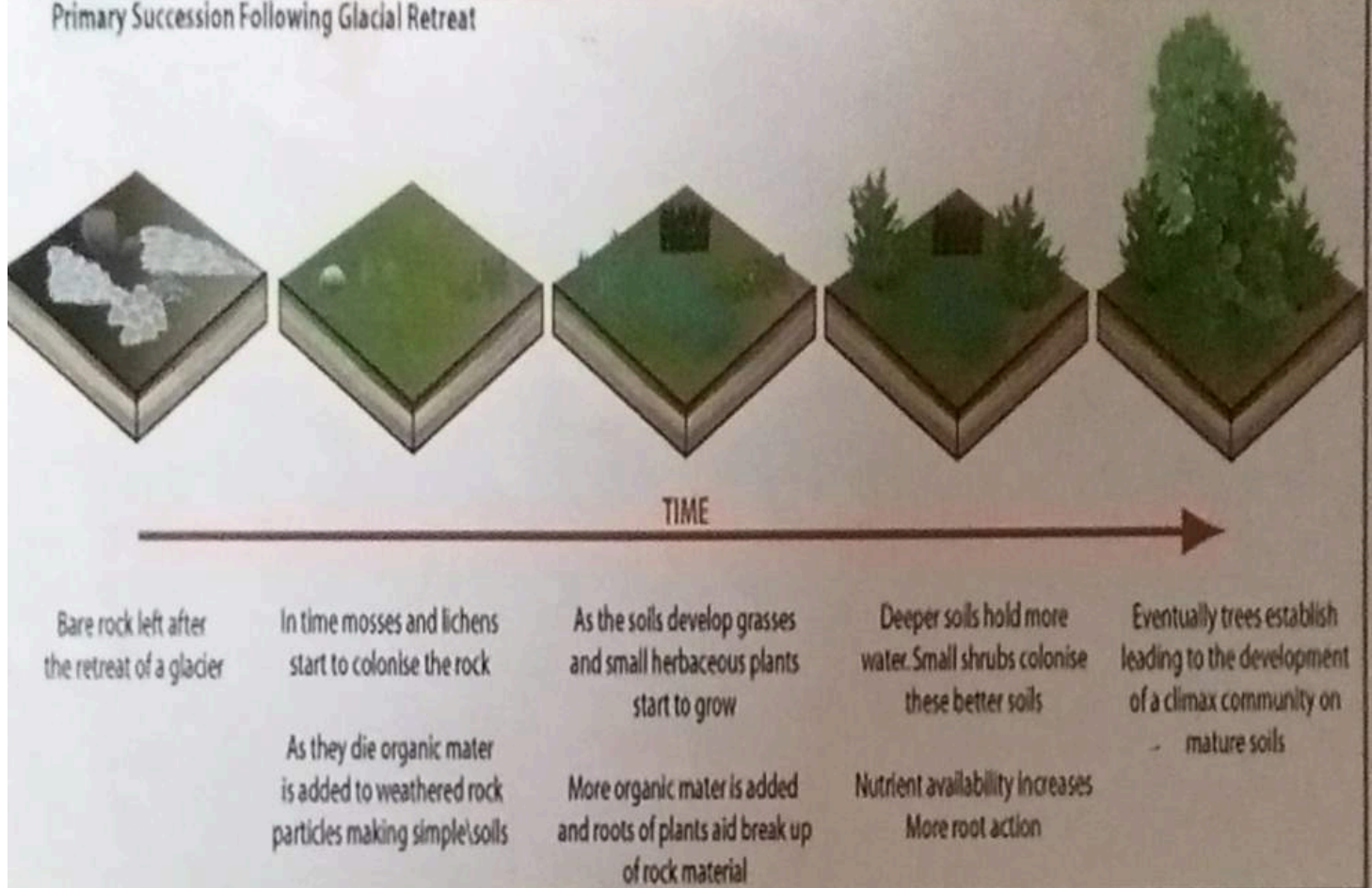
The nature of the fixed dune community is extremely variable depending on the pH of the substrate, and activities of grazing animals such as rabbits. If there is a lot of shell-sand present, the conditions will be alkaline and a diverse community of species will develop including the creeping willow, silverweed, Marsh pennywort, Creeping Bent grass and various sedges. If there is little shell-sand present, the conditions will be acidic and a smaller community of species will establish. Plants typical of acidic, low calcium soils will grow here, including Heather (*Calluna vulgaris*), Bell Heather, Sand sedge, and lichens and mosses.

Xerosepe - 4

Tide levels rise and fall, inpuelling sand to the system, which is then dried by the wind. Individual sand grains are able to take to the air and creep along the shore. They land, and dislodge a couple more grains, which in turn take to the air and do the same. This process is called saltation. The grains stop when they strike a static object of obstruction, such as a pile of seaweed or lump of drift wood.

Xerosere - 1

Primary Succession Following Glacial Retreat



Xerosere - 2



Xerosere - 1

Base rock left after the retreat of a glacier

In time mosses and lichens start colonise the rock

As they die organic matter is added to weathered rock

Particles making simple soils

As the soils develop grasses and small herbaceous plants start to grow.

More organic matter is added and roots plants aid break up of rock material.

Eventually trees establish leading to the development of a climax community on mature soils.

Xerosere - 2

The pond pictured above was deliberately constructed so that there would be a shallow slope at one end. But many natural ponds and lakes have a shallow slope between "wet" and "dry" land. - A hydrosere is the term used to describe a successional sequence in a freshwater environment.

Hydrosere - 5

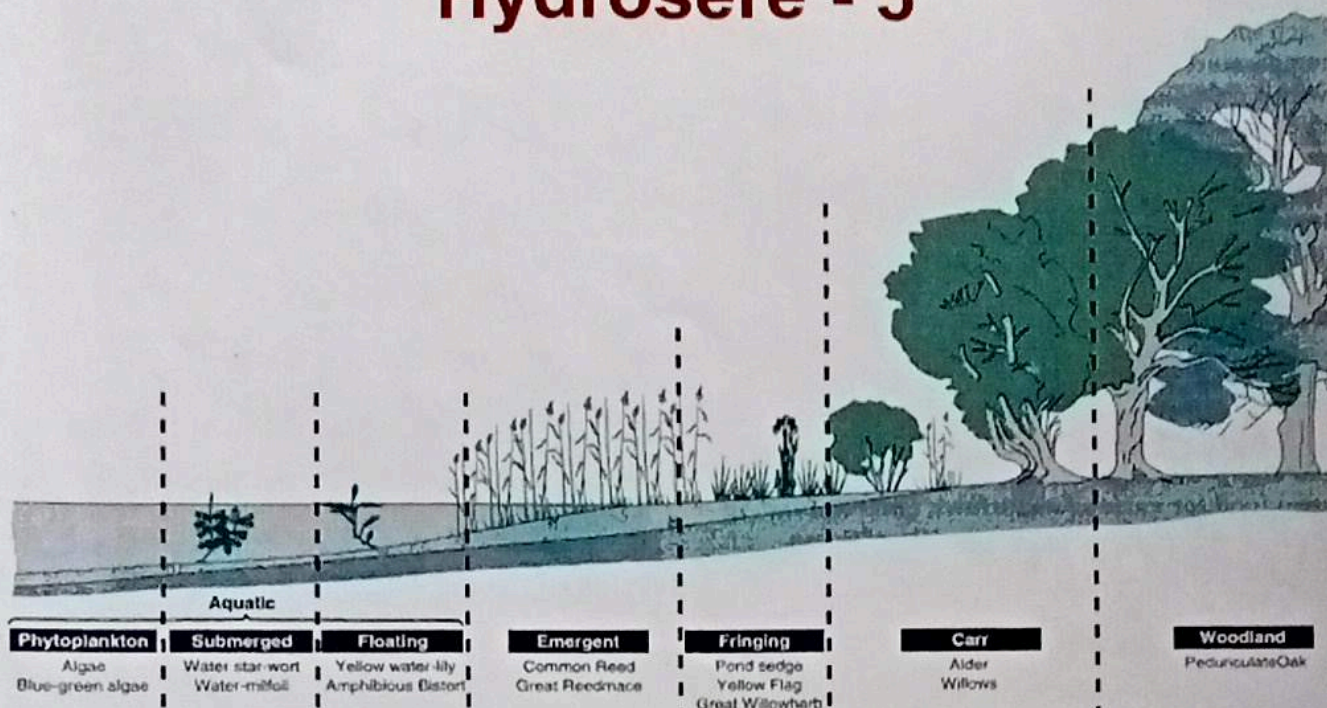
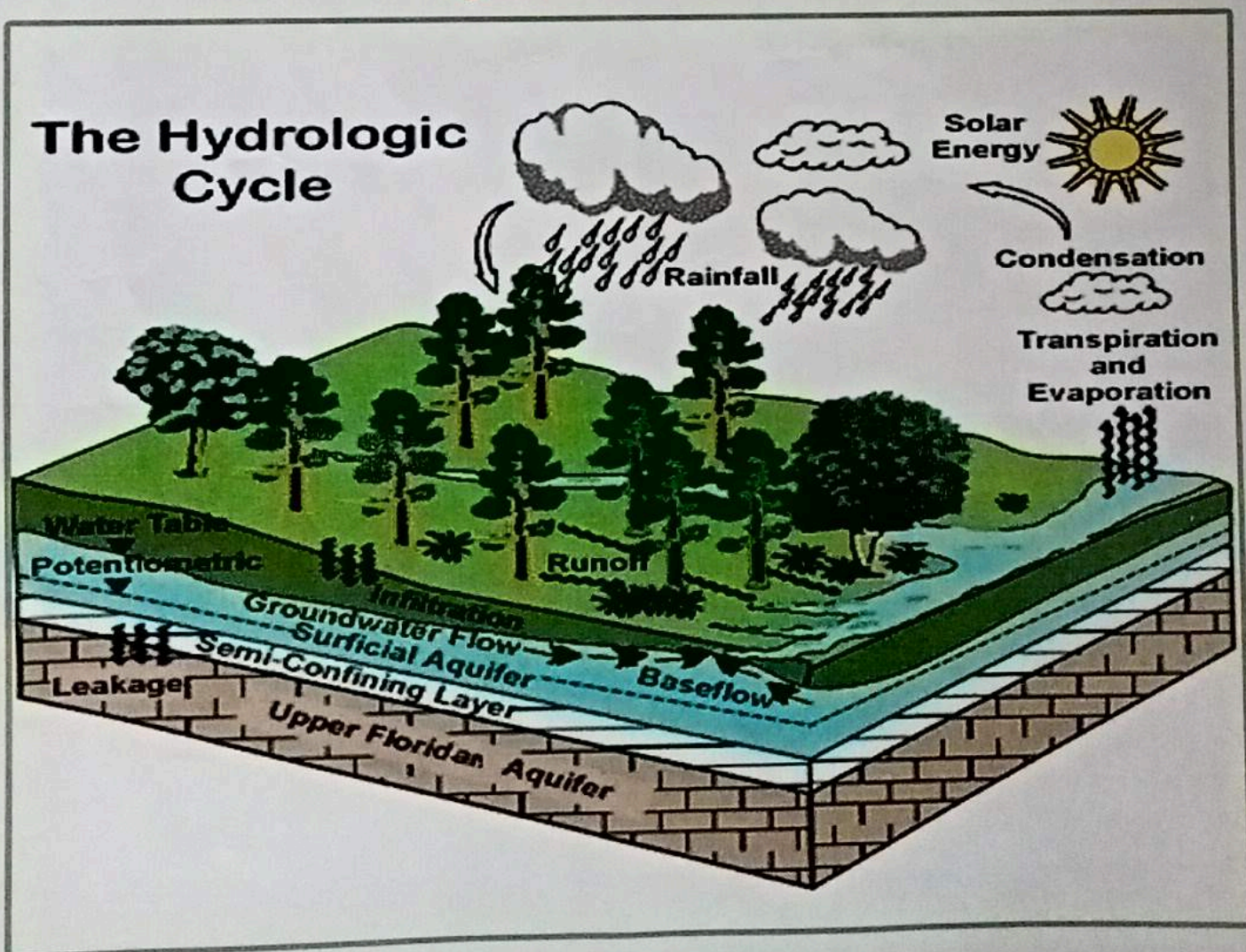


Figure 4.2 Schematic representation of the vegetational stages associated with succession in a shallow lake. The zones are also used to describe the stages of wetland vegetation.

Hydrosere - 6



Hydrosere - 5

We can predict many of the species that a wetland likely to attract from knowledge of their habitat preferences. Every species has a distinct range of requirements which dictates where it can occur - its niche. For example, many wetlands on active industrial sites are eutrophic and this is reflected in the flora and fauna that support many species of invertebrate fall into this category. For example, the Scarce Blue-tailed Damselfly is only to be found where there are shallow pools, containing short plants such as spike-rush, and which dry out in late summer. Similarly, salt marsh plants can be considered specialists. Species adapted to living in unusual situations will tend to have a limited distribution and, therefore, be of greater significance in nature conservation terms.

Hydrosere - 6

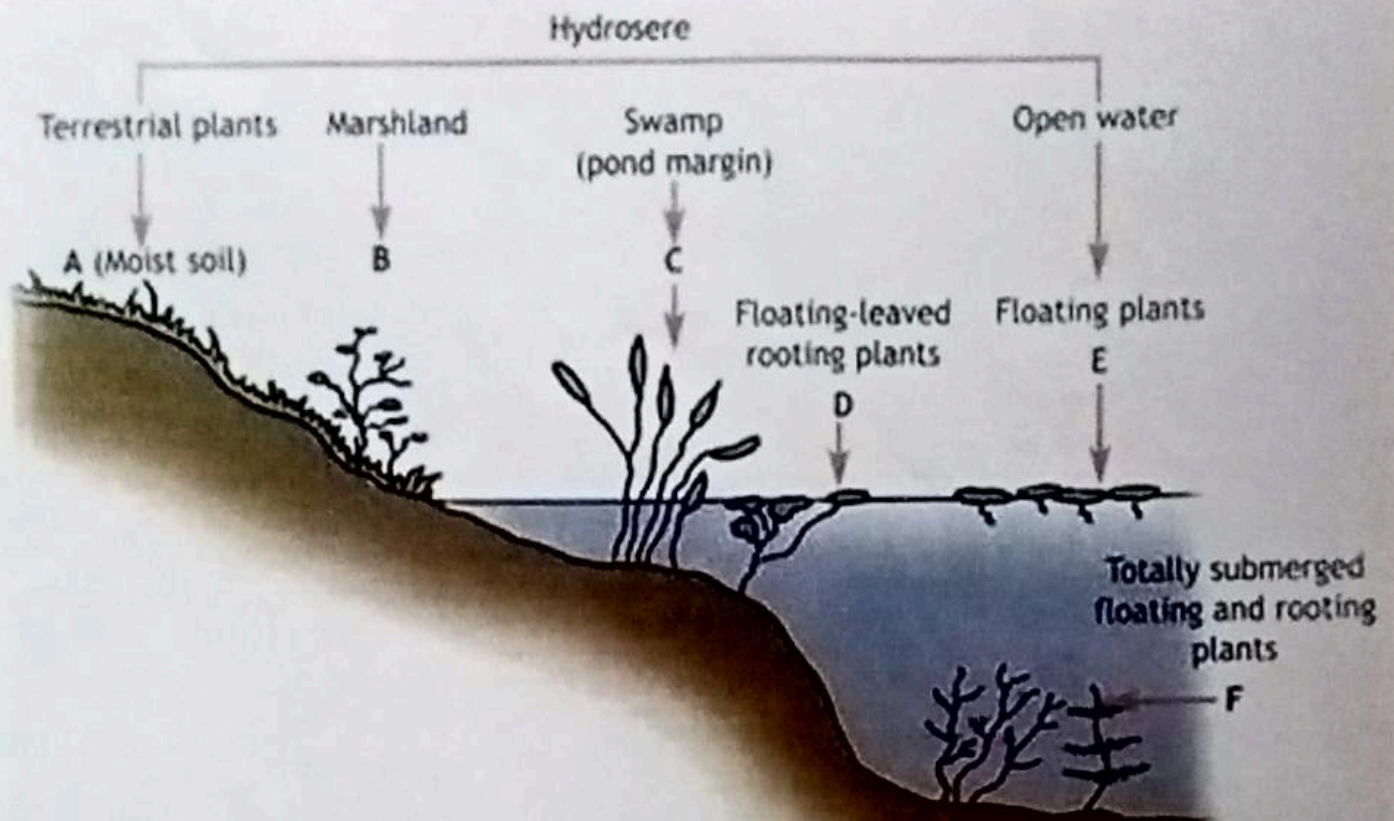
- Source - USA EPA - The Hydrologic Cycle - Ground water Basics.

In sum, I believe that once you know exactly why it is that you have this "problem", then the "solution" will be as equally apparent.

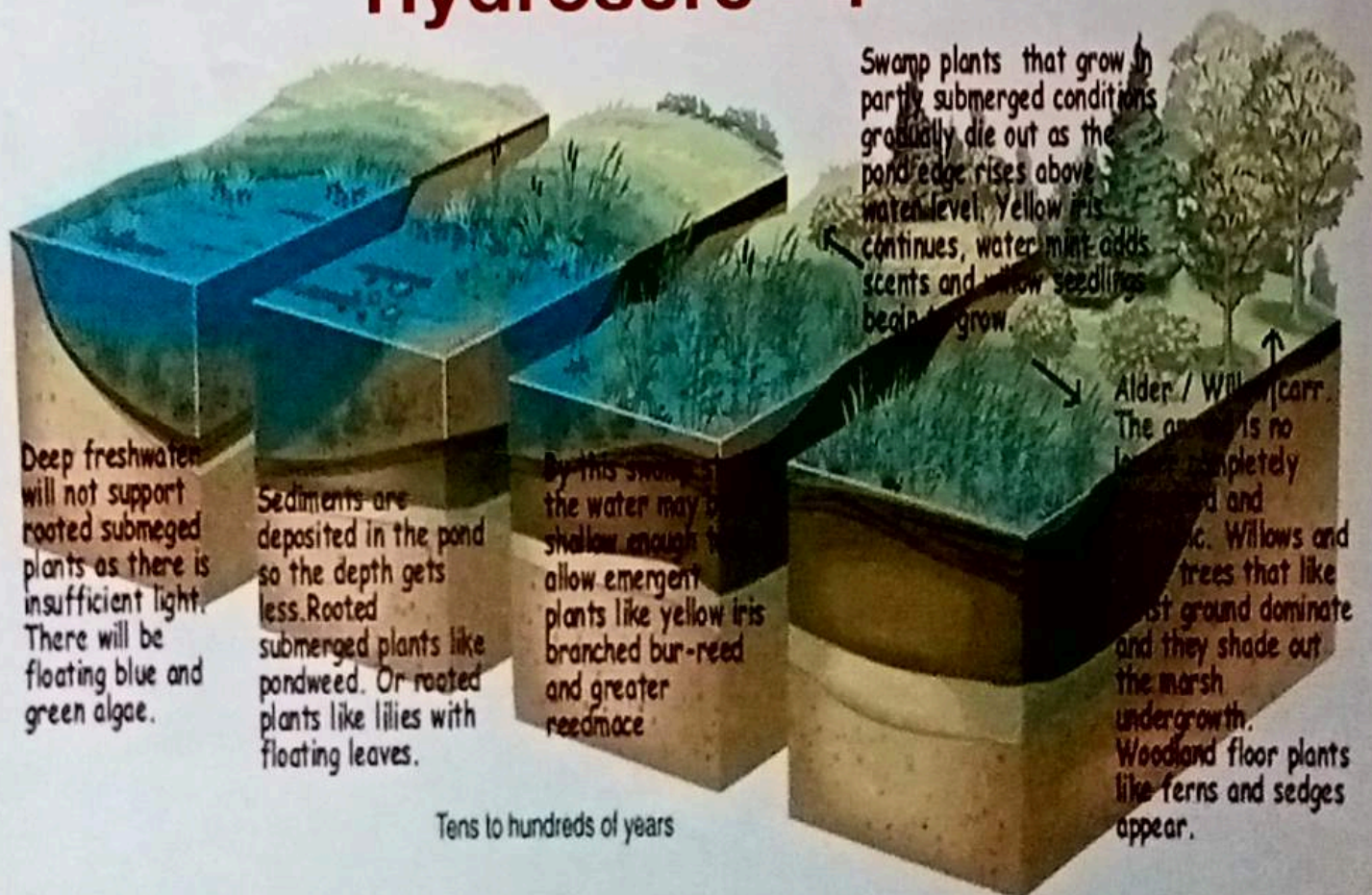
I look forward to following your journey

Cheerio for now, Markos.

Hydrosere - 3



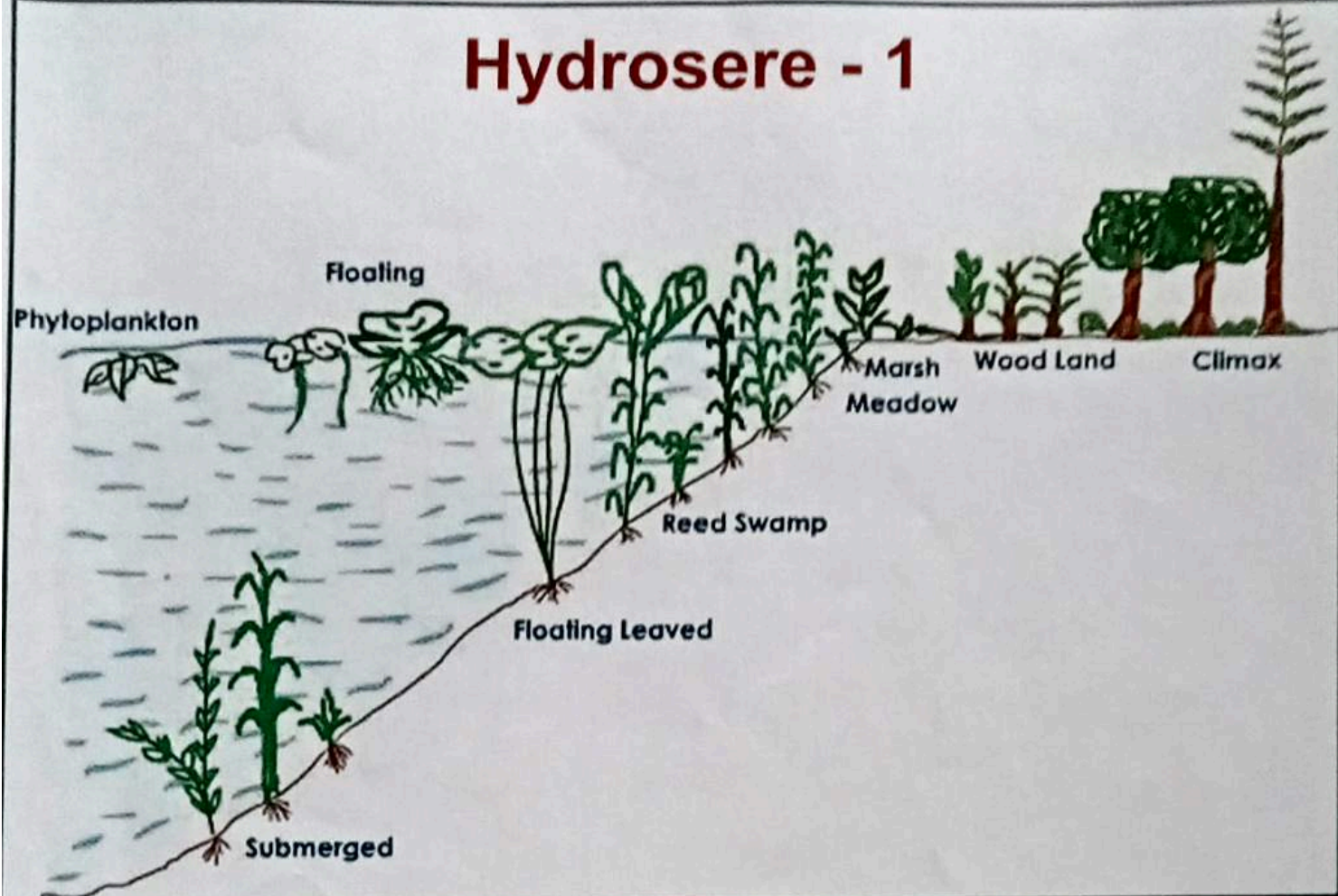
Hydrosere - 4



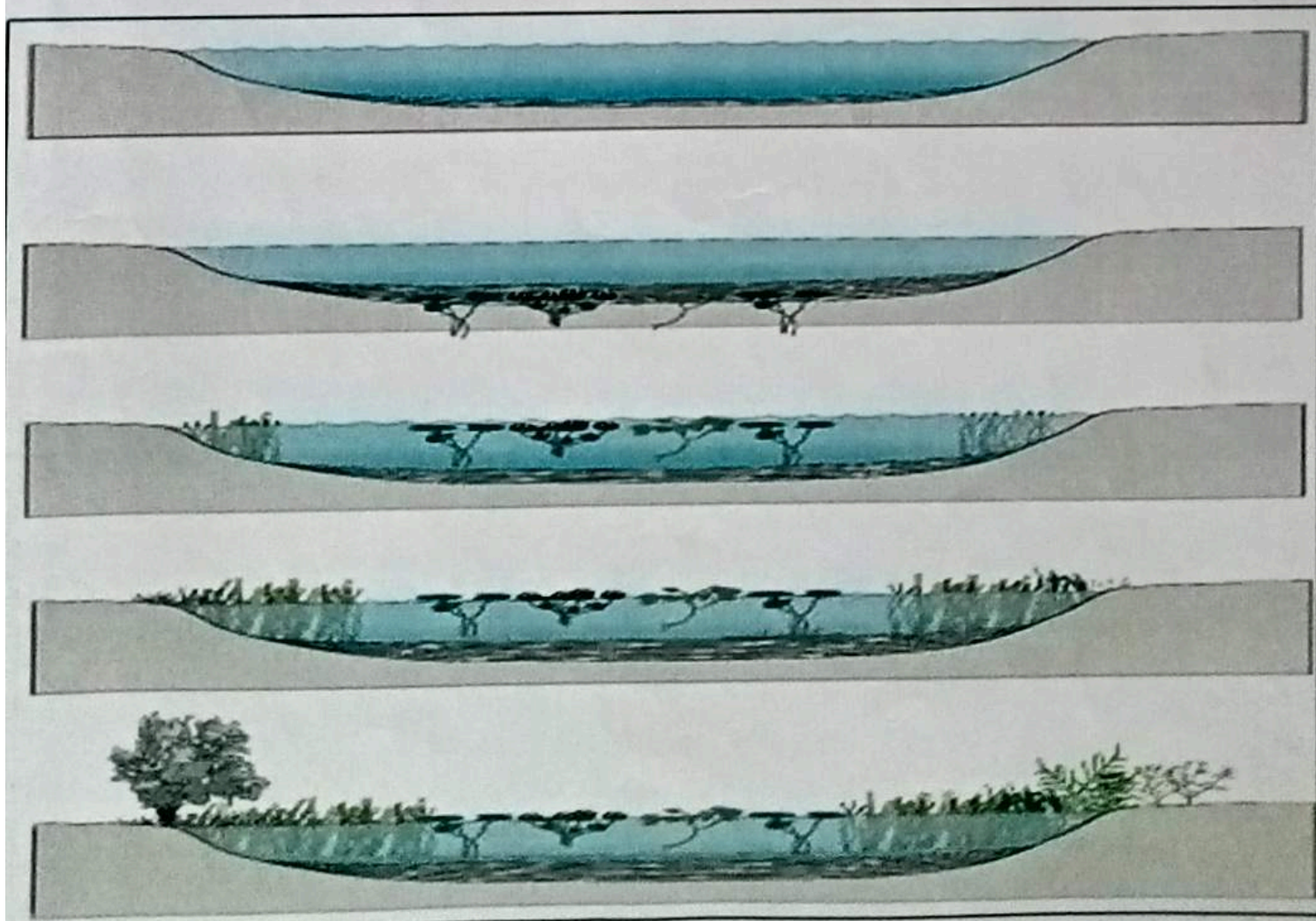
Hydrosere - 3

Natures Cape Specialises in native wildlife ponds etc. - Please Contact us for further information Before you proceed to pond plant catalogue page, We recommend you print out the following diagram - each hydrosere has a letter associated with it - know as a zone. In the catalogue description of plants we sell, there is a corresponding letter to the zone or zones that are most appropriate for that plant. [click here to go to the pond plant catalogue.](#)

Hydrosere - 1



Hydrosere - 2



Hydrosere - 1

Stages of plant Succession of plant Succession in a lake or pond (Hydrosere)

Trend of succession in a Hydrosere

Pioneer Community	Seral communities						climax communities
1	2	3	4	5	6	7	
phytoplankton stage e.g.: Diatoms, Bacteria, Cyanobacteria, green algae	Rooted - Submerged stage e.g. Elodea, Hydrilla, Vallisneria, Utricularia, Potamogeton	Rooted - Floating stage e.g. Nymphaea Trapa, Azolla, Lemna, Wolffia, Pistia.	Reed - Swamp stage e.g. Sagittaria, Phragmites, Typha, Scirpus.	Sedge. meadow stage e.g. Juncus, Cyperus, Eleocharis, Carex.	woodland stage e.g. Salix, Populus, Alnus, Cornus	Forest stage e.g. Temperate mixed Tropical Tropical Deciduous.	

Hydrosere - 2

- 1) Deep Freshwater no rooted plants because of lack of light in deep water.
- 2) Community only microorganisms and phytoplankton.
- 3) Sediments get carried into the pond allowing rooted submerged and floating to start to grow.
- 4) Sediments continue to build up.
- 5) A marsh community builds up around the pond margins.
- 6) Reeds and grasses develop around pond margin trapping more sediment.
- 7) Reeds take over more of the pond as more silt build up.
- 8) As the soils around the edge dry from water logged to damp, tree species such as damp, tree species such as willow and alder become established.

PROJECT ON **Hydrosere & Xerosere System**



Project Submitted By:

S.Priya Darshini

2013-14

3rd B.Sc

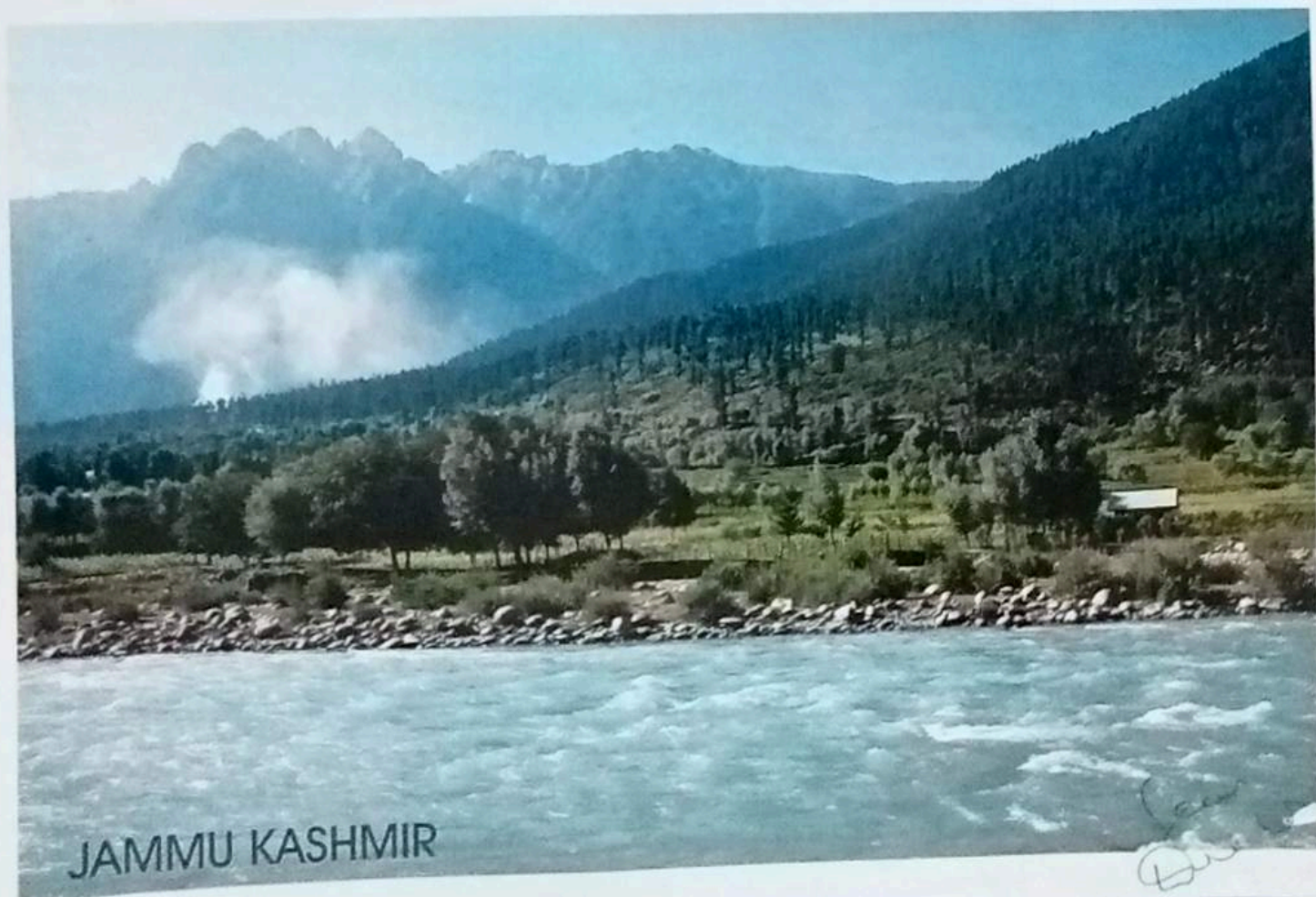
Visakha Govt. Degree College for womens, Vizag

*Under the Guidance of
Dr. P. Sreevani, Lecturer in Botany*

NATURAL ECO SYSTEM in INDIA



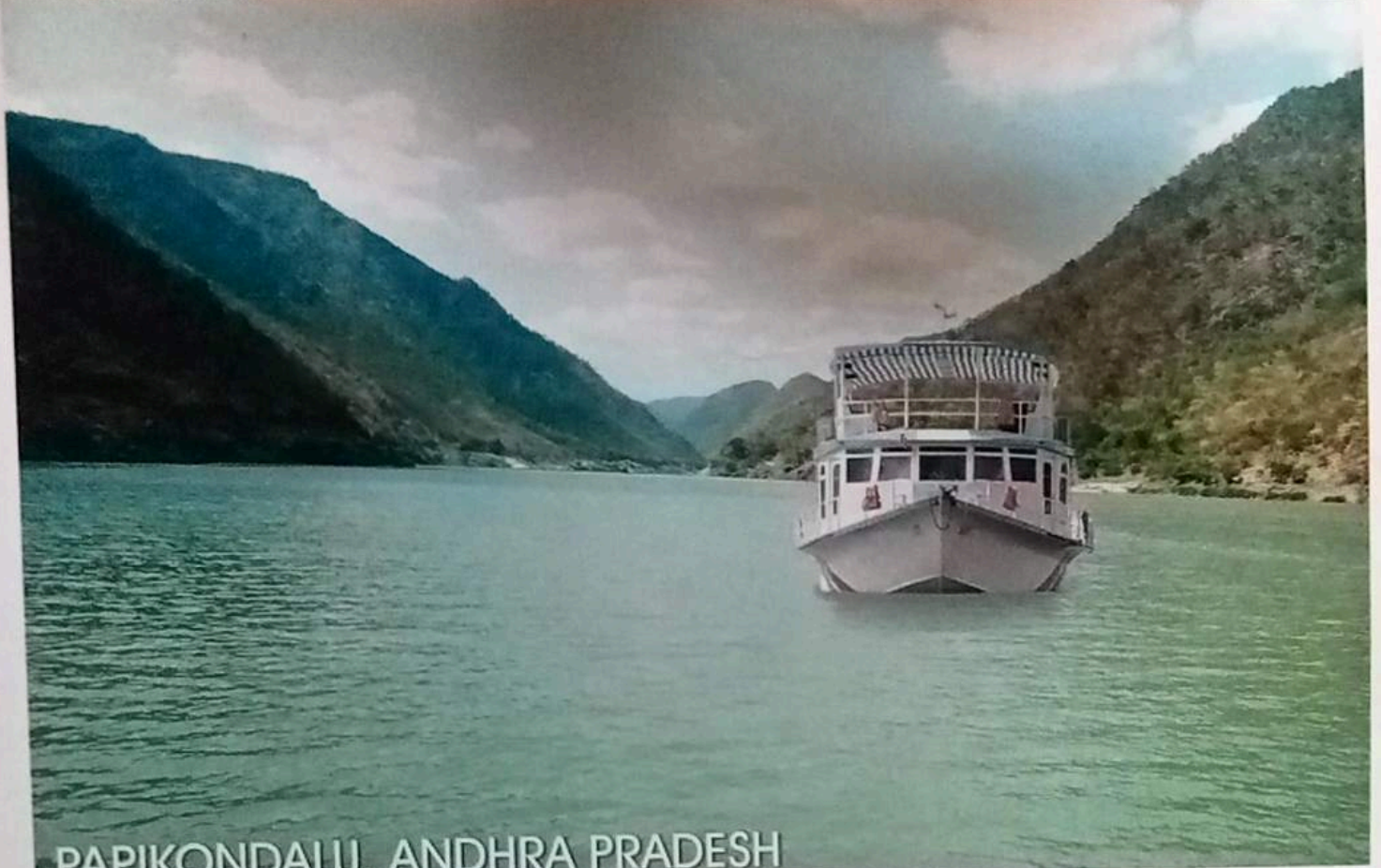
KERALA BACKWATERS



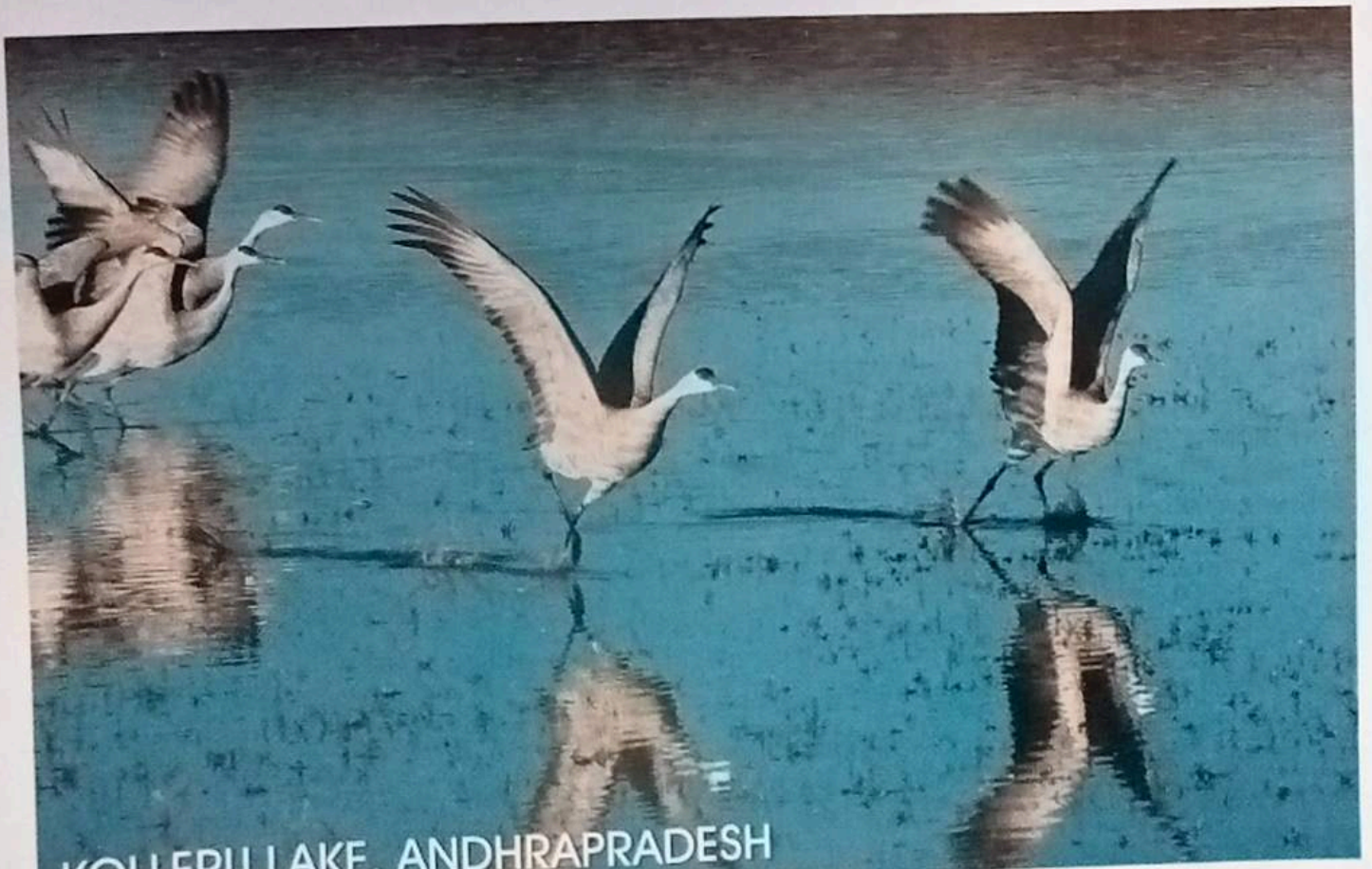
JAMMU KASHMIR



NATURAL ECOSYSTEM **in ANDHRA PRADESH**



PAPIKONDALU, ANDHRA PRADESH



KOLLERU LAKE, ANDHRAPRADESH

PROJECT ON
NATURAL
ECOSystem

Project Submitted by:

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Visakha Govt. Degree College for Womens, Vizag

NATURAL ECOSYSTEM

DEFINATION:

Living organisms and their non-living environment form an intergrated unit in which all biotic and abiotic components of the environment work in complete coordination for the well being of the whole unit is called "Natural ecosystem".

The term "ecosystem" was coined by Tansley (1935).

COMPONENTS:

Components which influence the ecosystem are the potential energy and the inorganic materials organised in the form of living body.

Components are characterised below:

A. BIOTIC COMPONENTS:

They constitute living members.

a. Producers:

Which trap solar energy and convert it into potential chemical energy.

b. Consumers:

Which directly depend upon the producers for energy.

EXAMPLES:

- ⇒ Density of heterotrophic bacteria in Meghadri mangrove ecosystem, Visakha east Coast of India.
- ⇒ Andra university, Visakhapatnam.
- ⇒ Coastal & marine ecosystem in the urban settlements like Vizag & Kakinada. They are rich ecosystems, which are very productive notification, exploration of oil and natural gas also permitted bet ween low tide.
- ⇒ Araku Vally, Visakhapatnam.
- ⇒ Papikondalu, Andrapradesh.
- ⇒ Kolleru Lake, Andrapradesh.
- ⇒ Kerala Backwaters.
- ⇒ Jammu Kashmir.

3. Decomposers:

All the microorganisms which cause decomposition of the dead remains of plants and animals and utilise a part of the product of decomposition and release the rest of it for use by the producers.

B. ABIOTIC COMPONENTS:

These are as follows:

a. Air:

Oxygen, Nitrogen, Carbondioxide etc.

b. Water:

Liquid, Vapour, or in solid form.

c. Salts:

Inorganic Compounds of nitrogen, phosphorus, Calcium, potassium, Sulphur etc.

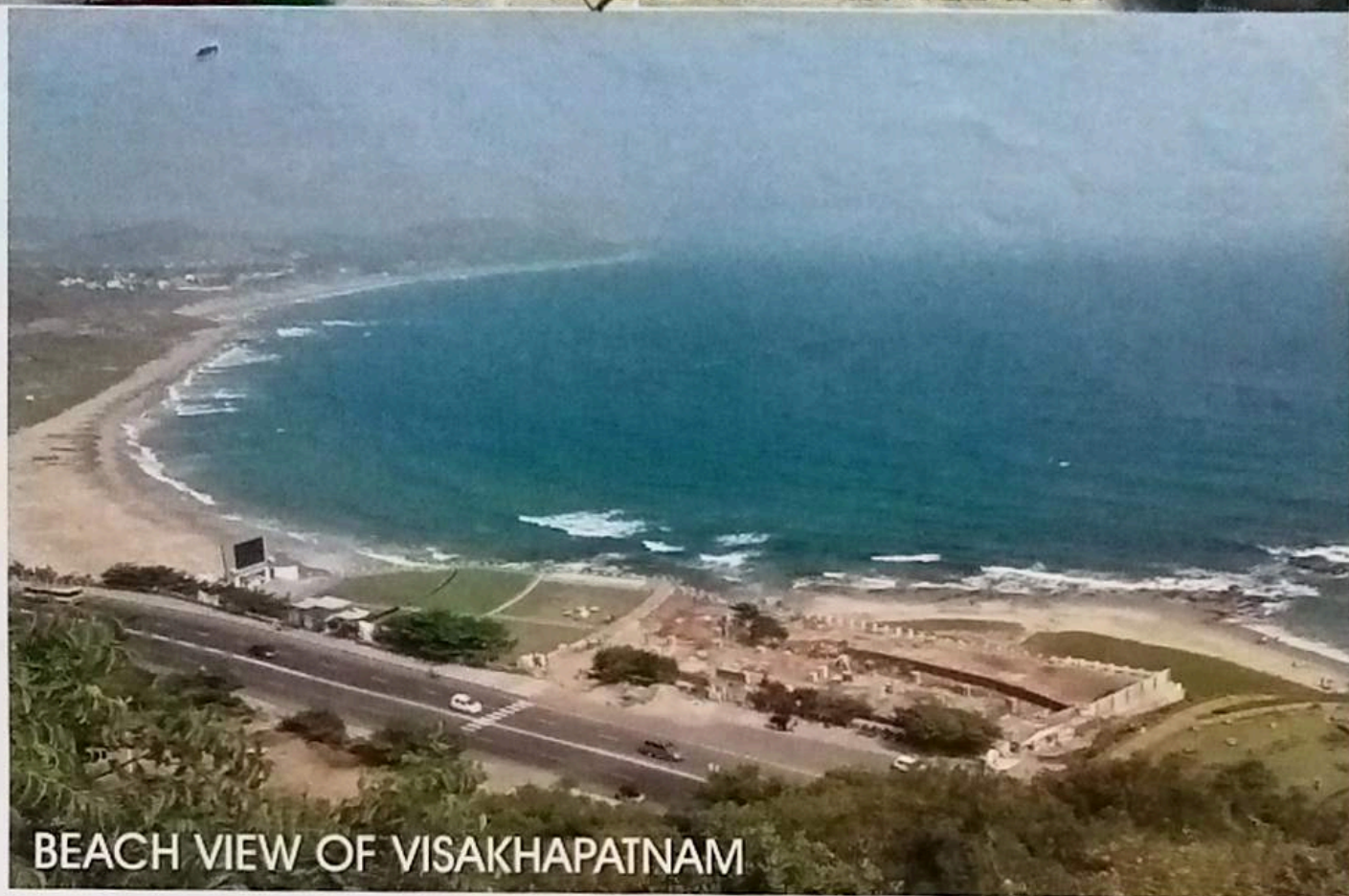
d. Light:

Sunlight is the source of all energy that flows through the producers, Consumers, and decomposers.

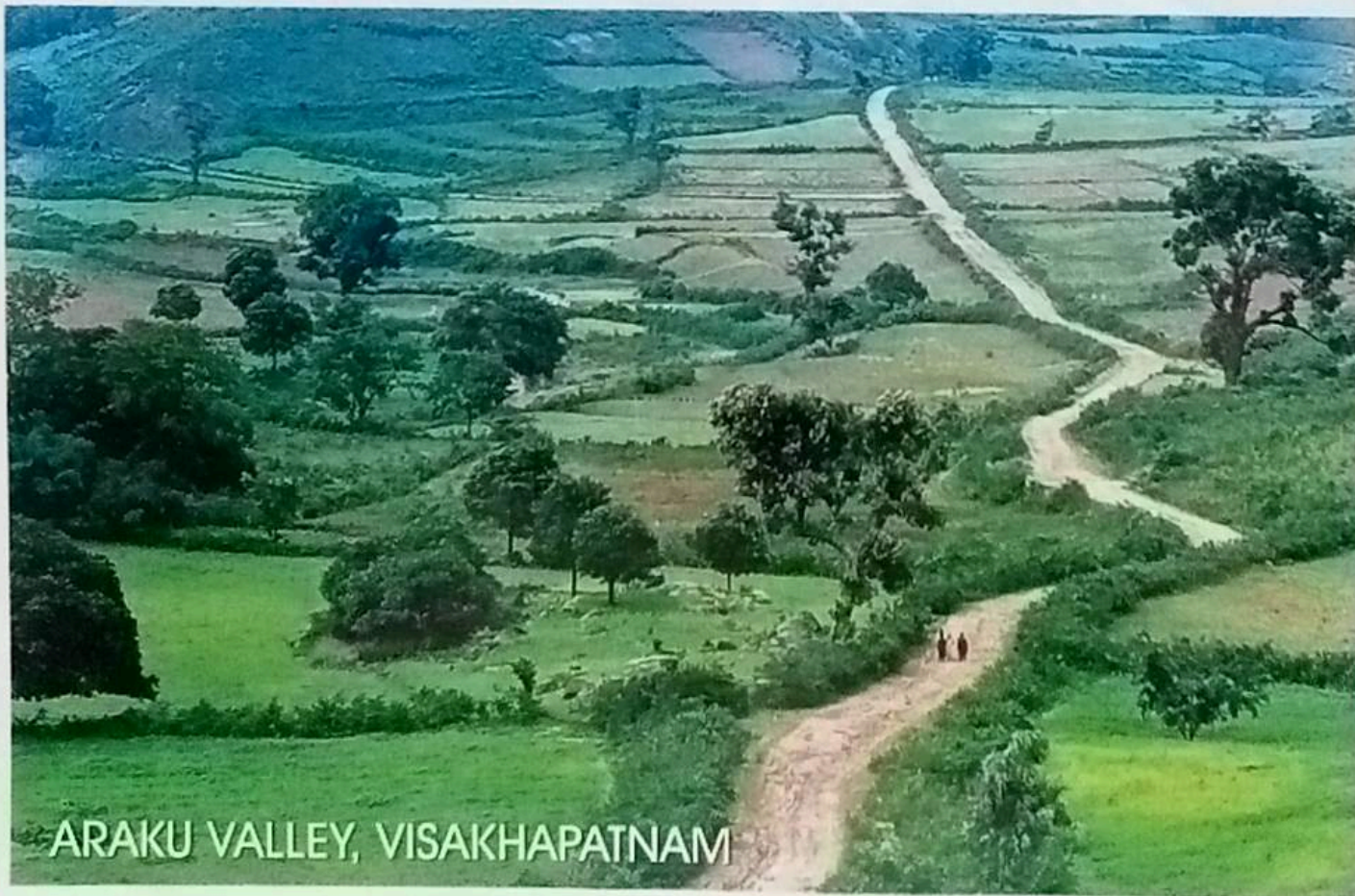
e. Temperature:

Temperature regulates all chemical process of life.

NATURAL ECO SYSTEM in VISAKHAPATNAM



BEACH VIEW OF VISAKHAPATNAM



ARAKU VALLEY, VISAKHAPATNAM