



**CENTRE FOR ENVIRONMENT AND DEVELOPMENT**  
(Recognised by Department of Scientific and Industrial Research, Government of India)

Thozhuvancode, Vattiyoorkavu P.O, Thiruvananthapuram – 695013, Ph: 0471 2369720, 2369721, 2369722,  
Fax: +91 -471-2369720 Email: [director@cedindia.org](mailto:director@cedindia.org) URL: [www.cedindia.org](http://www.cedindia.org)

**CERTIFICATE**

This is to certify that **Ms. Alvy Eldho**(Reg. No. 200011019912), Department of Environment Science and Management, SreeSankara College Kalady, successfully completed the dissertation work on “**Valorization of Plastic Waste in Ernakulam District**” towards partial fulfilment of the requirements for the award of the Degree of Master of Science in Environment Science and Management, Mahatma Gandhi University, Kottayam. This research was carried out at the Centre for Environment and Development, Thiruvananthapuram under our guidance and supervision during 9<sup>th</sup> May to 30<sup>th</sup> July, 2022.

**Ms. Jayanthi T.A**  
Scientist  
CED, Thiruvananthapuram  
Guide

**Dr. N.R. Chrips**  
Scientist  
CED, Thiruvananthapuram  
Co-Guide

**Dr. Babu Ambat**  
**Executive Director, CED**



**KERALA AGRICULTURAL UNIVERSITY**  
**AROMATIC AND MEDICINAL PLANTS RESEARCH STATION**

Odakkali, Asamannoor P.O., Ernakulam District, Kerala, India, PIN-683 549

Tel. (0484) 2658221; E-mail: amprs@kau.in; Website: http://amprs.kau.in

**Dr. Ancy Joseph**  
**Professor (Horticulture)**

**August 29, 2022**

**CERTIFICATE**

This is to certify that Ms. **Anakha P.V.**, [Reg No: 200011019913] 2<sup>nd</sup> year student of M.Sc. Environment Science and Management, Sree Sankara College, Mattoor has successfully completed her project on "**Comparative Morphological and Biochemical evaluation of *Boerhavia diffusa* and *Boerhavia erecta* ecotypes in Ernakulam District**" under the guidance of Dr. Ancy Joseph, Professor (Horticulture), Aromatic and Medicinal Plants Research Station (A.M.P.R.S), Odakkali during the period from April 2022 to June 2022.

During the above period, she was very punctual and has carried out project related laboratory works very efficiently.

Her character and conduct were good during the project period.

**I WISH HER ALL SUCCESS.**

**Dr. Ancy Joseph**

**PROFESSOR & HEAD**  
**Aromatic & Medicinal Plants**  
**Research Station**  
**(Kerala Agricultural University)**  
**Odakkali, Asamannoor - 683 549**





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Fax: +91 -471-2369720 Email: [director@cedindia.org](mailto:director@cedindia.org) URL: [www.cedindia.org](http://www.cedindia.org)

**CERTIFICATE**

This is to certify that **Ms. Arathy B** (Reg. No. 200011019914), Department of Environment Science and Management, SreeSankara College Kalady, successfully completed the dissertation work on “**Water Quality Status of Periyar River Using GIS**” towards partial fulfilment of the requirements for the award of the Degree of Master of Science in Environment Science and Management, Mahatma Gandhi University, Kottayam. This research was carried out at the Centre for Environment and Development, Thiruvananthapuram under our guidance and supervision during 9<sup>th</sup> May to 30<sup>th</sup> July 2022.

**Mr. Dileep Kumar M**  
Program Director  
CED, Thiruvananthapuram  
Guide

**Dr. N.R. Chrips**  
Scientist  
CED, Thiruvananthapuram  
Co-Guide

**Dr. Babu Ambat**  
Executive Director, CED



കൊച്ചി ശാസ്ത്ര സാങ്കേതിക സർവ്വകലാശാല  
**COCHIN UNIVERSITY OF SCIENCE AND TECHNOLOGY**  
**SCHOOL OF MARINE SCIENCES**



**DEPARTMENT OF CHEMICAL OCEANOGRAPHY**

സമുദ്ര രസതന്ത്ര വിഭാഗം

NO.COD/14/PROJECTS/2022-23

05/09/2022

**CERTIFICATE**

This is to certify that the present dissertation work entitled "Towards developing an efficient spectrophotometric sensor for automated in-situ measurements of pH" submitted to **Mahatma Gandhi University** in partial fulfilment of the requirement for the degree of **Master of Science in Environment Science and Management** is a bonafide record work done by **Ms Athira V. C. (Reg. No:200011019915)** at **Department of Chemical Oceanography (COD), School of Marine Sciences, Cochin University of Science and Technology (CUSAT)** under my guidance from **May 2022 to July 2022**.



**Dr Jorphin Joseph**

**Dr. Jorphin Joseph**  
 Assistant Prof  
 Department of Chemical Oceanography  
 School of Marine Sciences  
 Cochin University of Science and Technology (CUSAT)  
 Kochi-16, Kerala





NO.COD 14/PROJECTS 2022-23

06/09/2022

## CERTIFICATE

This is to certify that the present dissertation work entitled "*Chemical fractionation of trace metals in sediments of the Arabian sea*" submitted to *Mahatma Gandhi University* in partial fulfilment of the requirement for the degree of *Master of Science in Environment Science and Management* is a bonafide Project work done by *Aysha sherbin (Reg No: 200011019916)* at *Department of Chemical Oceanography, Cochin University of Science and Technology (CUSAT)* under my guidance from *May 2022 to August 2022*.

Guide:

Shaju S S

Assistant professor

Department of Chemical oceanography

Cochin University of Science and Technology



**Dr. SHAJU S. S**  
 Assistant Professor & Head  
 Dept. of Chemical Oceanography  
 School of Marine Sciences  
 Cochin University of Science & Technology  
 Kochi-682016, India

## CERTIFICATE

This is to certify that Ms. BINITHA VARGHESE M.Sc. Environment Science and Management student of Sree Sankara College, Kalady has successfully completed the Dissertation titled **A GEOSPATIAL APPROACH FOR ASSESSING THE DROUGHT CONDITION IN THRISSUR DISTRICT DURING THE PERIOD OF 2015 TO 2017** towards the partial fulfillment of the requirements for the award of Degree of Master of Science in Environment Science and Management, Mahatma Gandhi University, Kottayam. This research was carried out at Kerala Agricultural University, Vellanikkara under my guidance and supervision and has not previously formed the basis for the award of any Degree, Diploma, Associate ship or Fellow ship or similar title to any University.

Place: Vellanikkara

Date: 29/07/2022

Dr. P. Lincy Davis

**Dr. P. LINCY DAVIS**

Assistant Professor

Dept. of Agricultural Meteorology

College of Agriculture

Kerala Agricultural University

Vellanikkara, Thrissur - 680 636

Department of Agricultural Meteorology

College of Agriculture, Vellanikkara





**Cochin University of  
Science and Technology**

**Dr Preethy Chandran**  
Assistant Professor

**School of Environmental Studies**

Kochi 682022, Kerala, India

Mob: +91 9621756771, +91 9751177768

E-mail: preethychandran@cusat.ac.in

preethypreethy@gmail.com

Website: www.cusat.ac.in

Dated: 16.08.2022

### CERTIFICATE

This is to certify that the present dissertation work entitled “**Disinfectant characteristics of Antimicrobial resistant (AMR) *Enterobacteriaceae* isolated from Periyar river**” submitted to **Mahatma Gandhi University** in partial fulfilment of the requirement for the degree of **Master of Science in Environmental Science and Management** is a bonafide record work done by **Ms Chandni H Nair (Reg No:200011019918)** at **School of Environmental Studies (SES) Cochin University of Science and Technology (CUSAT)** under my guidance from **May 2022 to July 2022**.



**Dr Preethy Chandran**

Assistant Professor  
School of Environmental  
Studies  
Cochin University of Science  
and Technology



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**CERTIFICATE**

This is to certify that **Ms. Darsana Sudhakaran** (Reg. No. 200011019919), Department of Environment Science and Management, Sree Sankara College, Kalady, successfully completed the dissertation work on “**Forest Types and their Spectral Profile of Peppara Wildlife Sanctuary, Western Ghats, India**” towards partial fulfilment of the requirements for the award of the Degree of Master of Science in Environment Science and Management, Mahatma Gandhi University, Kottayam. This research was carried out at the Centre for Environment and Development (CED), Thiruvananthapuram under our guidance and supervision during 9<sup>th</sup> May to 30<sup>th</sup> July, 2022.

**Dr. Thrivikramji K P**  
Emeritus Professor and  
Program Director, CED  
Thiruvananthapuram  
Co-Guide

**Dr. Chrips N R**  
Scientist, CED  
Thiruvananthapuram  
Guide

**Dr. Babu Ambat**  
Executive Director  
CED





# Mahatma Gandhi University

## SCHOOL OF ENVIRONMENTAL SCIENCES

Priyadarsini Hills P.O., Kottayam-686560, Kerala, India

**Dr.E.V.Ramasamy** MTech, PhD  
Professor

### CERTIFICATE

This is to certify that the project work entitled “**Occurrence of Heavy Metals in the Road Dust Samples From National Highway, Kerala**” is an original work done by **Mr. Denny Varghese** being submitted to the Mahatma Gandhi University in partial fulfillment of the requirement for the award of the degree of **Master of Science in Environmental Science and Management**, Sree sankara college, Kalady is an authentic record of work carried out by him under my guidance at the School Of Environmental Sciences, Mahatma Gandhi University, Kottayam. To the best of my knowledge, no part of the dissertation has formed the basis for the award of any degree, diploma of any university.

P.D.Hills  
Date: 5/09/2022

  
(Dr.E.V.Ramasamy)





DAS/2/2022-23

12-09-2022

**CERTIFICATE**

This is to certify that the dissertation work entitled "Seasonality of Criteria Pollutants over India" submitted to *Mahatma Gandhi University* in partial fulfilment of the requirement for the degree of *Master of Science in Environment Science and Management* is a bonafide record work done by *Fitha Shajahan (Reg No: 200011019921)* at *Cochin University of Science and Technology (CUSAT)* under my guidance from *May 2022 to August 2022*.

Dr. Lekshmy P. R.,

Assistant professor,

Department of Atmospheric Sciences,

Cochin University of Science and Technology.

Dr. Lekshmy P. R.  
Assistant Professor  
Department of Atmospheric Sciences  
School of Marine Sciences  
Cochin University of Science & Technology  
Foreshore Road, Kochi - 682 016



# SCHOOL OF ENVIRONMENTAL STUDIES

COCHIN UNIVERSITY OF SCIENCE AND TECHNOLOGY

Cochin University P. O., Kochi - 682 022, Kerala, India

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Prof. (Dr.) V. SIVANANDAN ACHARI  
Professor

(M) : 09495383342 / 07736391643 / 0484 2862550

(R) : 0484 2306133 / 0484 2968342

Email: vsachari@cusat.ac.in / vsacharii@gmail.com  
vsachan@gmail.com / ses@cusat.ac.in

19/08/2022

## CERTIFICATE

This is to certify that the dissertation entitled “**Hydrogeochemical Evaluation of Groundwater Quality of Alappad Coast for Drinking Purposes; Water Quality Index Studies**” submitted to Mahatma Gandhi University, Kottayam, in partial fulfilment of the requirement for the degree of Master of Science in Environment Science and Management is an authentic record of original work done by **Ms. Gayathri A (Reg No: 200011019922)**, M.Sc. Student, Department of Environment Science and Management, Sree Sankara College, Kalady, under my guidance in the School of Environmental Studies, Cochin University of Science and Technology, Kochi- 682022 during the period from 6<sup>th</sup> May 2022 to 31<sup>st</sup> July 2022. The results embodied in the dissertation work have not been submitted to any other Institution or University for the award of any Degree or Diploma.

Prof.(Dr.) V. SIVANANDAN ACHARI  
DEAN  
Faculty of Environmental Studies  
School of Environmental Studies  
Cochin University of Science & Technology  
Cochin - 682 022, Kerala, INDIA

Prof. Dr. V Sivanandan Achari  
(Supervising Guide)





## CERTIFICATE

Certified that this thesis entitled "**ROOTING PATTERN AND GEOTECHNICAL INFLUENCES OF SELECTED BAMBOO SPECIES IN THE MIDLAND LATERITES OF KERALA**" is a record of research work done independently by **Mr. Gokul Krishna T B** under my guidance and supervision and that it has not previously formed the basis for the award of any degree, diploma, fellowship, or associateship to him.

**Dr S SANDEEP**  
Principal Scientist and Head,  
Department of Soil Science  
KSCSTE-Kerala Forest Research Institute





കൊച്ചി ശാസ്ത്ര സാങ്കേതിക സർവ്വകലാശാല  
**Cochin University of Science and Technology**

മരൈൻ ജിയോളജി ആൻഡ് ജിയോഫിസിക്സ് വകുപ്പ്  
**DEPARTMENT OF MARINE GEOLOGY AND GEOPHYSICS**

**SCHOOL OF MARINE SCIENCES, FINE ARTS AVENUE, KOCHI-682 016, INDIA**

**Head of the Department**

No.MGD/30A/2022-2023/ 231

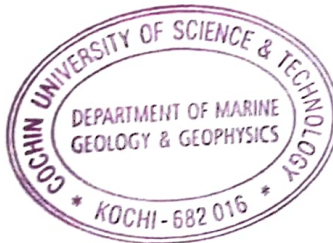
20.09.2022

**CERTIFICATE**

This is to certify that the present dissertation work entitled "*Paleo-to-Neorarchean Evolution of Biligiri Rangan Block, Southern India: Constraints from SHRIMP Geochronology data*" submitted to *Mahatma Gandhi University* in partial fulfilment of the requirement for the degree of *Master of Science in Environment Science and Management* is a bonafide record work done by *Ms Gopika J (Reg No: 200011019924)* at *Cochin University of Science and Technology (CUSAT)* under *Dr. Ratheesh Kumar R.T.* in the *Department of Marine Geology and Geophysics* from *May-July' 2022.*

Supervisor: *Dr. Ratheesh Kumar R T*  
Assistant professor

**Dr. Ratheesh Kumar R.T**  
Assistant Professor  
Dept. of Marine Geology & Geophysics  
School of Marine Sciences  
Cochin University of Science & Technology  
Lake Side Campus, Fine Arts Avenue, Kochi - 682 016



**Dr. Joji V S**  
Associate Professor &  
Head of the Department



**KSCSTE - CENTRE FOR WATER RESOURCES  
DEVELOPMENT AND MANAGEMENT**  
**ജവവിഭവ വികസന വിനിയോഗ കേന്ദ്രം**



KSCSTE-CWRDM

An Institution of Kerala State Council for Science, Technology & Environment, Govt. of Kerala  
മകരള ശാസ്ത്ര സാങ്കേതിക പരിമുഖിതി കൗൺസിൽ സമാഹരണ, മകരള സർക്കാർ

**CERTIFICATE**

This is to certify that Ms. JITHULA SEBASTIAN (Reg. No 200011019925) has carried out the dissertation work entitled "**Investigation on hydrochemical status of surface water and Groundwater in a fresh water lake**" under my supervision and guidance at Training and Outreach Research Group of Centre of Water Resources Development and Management (CWRDM), Kozhikode, Kerala. This work has been carried out for the partial fulfillment of the requirement for the award of Degree of **Master of Science in Environmental Science and Management**, Sree Shankara College, Kalady, Aluva. It is further certified that the present work has not been submitted by her to any other University for the award of Degree or Diploma

Place: Kunnamangalam

Date: 17/08/2022

Dr. Jayasooran K K

Scientist B

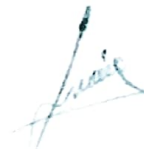
TORG

## CERTIFICATE

This is to certify that Ms. KAVYA BABU M.Sc. Environment Science and Management student of Sree Sankara College, Kalady has successfully completed the Dissertation titled **COMPARISON OF STATISTICAL MODELS FOR THE FORECASTING OF RICE YIELD IN KERALA** towards the partial fulfillment of the requirements for the award of Degree of Master of Science in Environment Science and Management, Mahatma Gandhi University, Kottayam. This research was carried out at Kerala Agricultural University, Vellanikkara under my guidance and supervision and has not previously formed the basis for the award of any Degree, Diploma, Associate ship or Fellow ship or similar title to any University.

Place: Vellanikkara

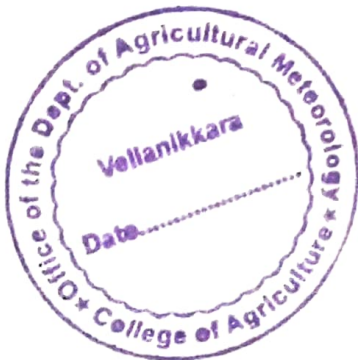
Date: 29/07/2022

  
Dr. P. Lincy Davis

Dr. P. LINCY DAVIS  
Assistant Professor

Dept. of Agrl. Meteorology  
College of Agriculture  
Kerala Agricultural University  
Department of Agricultural Meteorology  
Vellanikkara, Thrissur-680 656

College of Agriculture, Vellanikkara



## CERTIFICATE

This is to certify that Ms. KRISHNENDU, A M.Sc. Environment Science and Management student of Sree Sankara College, Kalady has successfully completed the Dissertation titled **SPATIAL AND TEMPORAL VARIATION OF WEATHER PARAMETERS IN KERALA** towards the partial fulfillment of the requirements for the award of Degree of Master of Science in Environment Science and Management, Mahatma Gandhi University, Kottayam. This research was carried out at Kerala Agricultural University, Vellanikkara under my guidance and supervision and has not previously formed the basis for the award of any Degree, Diploma, Associate ship or Fellow ship or similar title to any University.

Place: Vellanikkara

Date: 29/07/2022



Dr. B. Ajithkumar

Associate Professor & Head

Dept. of Agri. Meteorology

Associate Professor and Head

Kerala Agricultural University

Vellanikkara, Thrissur - 680 656

Department of Agricultural Meteorology

College of Agriculture, Vellanikkara







Director

Date .....

CERTIFICATE

This is to certify that the present dissertation work entitled "PREVALANCE OF MULTI DRUG RESISTANT *ENTEROBACTERIACEAE* IN PERIYAR RIVER AND THEIR BIOFILM CHARACTERISTIC" submitted to Mahatma Gandhi University in partial fulfillment of the requirement for the degree of Master of science in Environmental Science and Management, is an original work done by Ms. Mangal Rose (Reg.no:200011009928) under the supervision of Dr. Preethy Chandran, Assistant Professor, School of Environmental Studies, Cochin University of Science and Technology (CUSAT), Kochi-682022, Kerala. The results embodied in the dissertation work have not been submitted to any other Institute or University for the award of any other Degree or Diploma.

Kochi- 22

10. 08 2022



  
Dr. Usha K. Aravind

Professor and Director

DIRECTOR  
SCHOOL OF ENVIRONMENTAL STUDIES



# SCHOOL OF ENVIRONMENTAL STUDIES

COCHIN UNIVERSITY OF SCIENCE AND TECHNOLOGY

Cochin University P. O., Kochi - 682 022, Kerala, India

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Prof. (Dr.) V. SIVANANDAN ACHARI

Professor

(M) : 09495383342 / 07736391643 / 0484 2862550

(R) : 0484 2306133 / 0484 2968342

Email : vsachari@cusat.ac.in / vsacharii@gmail.com

vsachan@gmail.com / ses@cusat.ac.in

29/08/2022

## CERTIFICATE

This is to certify that the dissertation entitled “**STUDY ON DRINKING AND INDUSTRIAL SUITABILITY OF GROUNDWATER SOURCES OF AROOR, ALAPPUZHA, KERALA, INDIA**” submitted to Mahatma Gandhi University in partial fulfilment of the requirement for the degree of **Master of Science in Environmental Science and Management** is an original work done by Nafeeza Malik P M (Reg. No: 200011019929) under my guidance in School of Environmental Studies, Cochin University of Science and Technology during the period from **May 2022 to July 2022**. The results embodied in the dissertation work have not been submitted to any other Institution or University for award of any Degree or Diploma.

Prof. Dr. V. Sivanandan Achari  
Dean and Professor  
School of Environmental Studies  
Cochin University of Science and Technology  
Kochi – 682022, Kerala, India.

Prof.(Dr.) V. SIVANANDAN ACHARI  
DEAN

Faculty of Environmental Studies  
School of Environmental Studies  
Cochin University of Science & Technology  
Cochin - 682 022, Kerala, INDIA



Kochi – 682022



**CENTRE FOR ENVIRONMENT AND DEVELOPMENT**  
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Thozhuvancode, Vattiyookavu P.O, Thiruvananthapuram – 695013, Ph: 0471 2369720, 2369721, 2369722,  
Fax: +91 -471-2369720 Email: [director@cedindia.org](mailto:director@cedindia.org) URL: [www.cedindia.org](http://www.cedindia.org)

## CERTIFICATE

This is to certify that **Ms. Parvathy S** (Reg. No. 200011019930), Department of Environment Science and Management, SreeSankara College Kalady, successfully completed the dissertation work on “**Forest Fire Risk Zone Mapping in Peechi Vazhani Wildlife Sanctuary**” towards partial fulfilment of the requirements for the award of the Degree of Master of Science in Environment Science and Management, Mahatma Gandhi University, Kottayam. This research was carried out at the Centre for Environment and Development, Thiruvananthapuram under our guidance and supervision during 9<sup>th</sup> May to 30<sup>th</sup> July, 2022.

**Dr. T R Vinod**

Program Director  
CED, Thiruvananthapuram  
Guide

**Dr. N.R. Chrips**

Scientist  
CED, Thiruvananthapuram  
Co-Guide

**Dr. Babu Ambat**  
**Executive Director, CED**



# Mahatma Gandhi University

## SCHOOL OF ENVIRONMENTAL SCIENCES

Priyadarsini Hills P.O., Kottayam-686560, Kerala, India

### CERTIFICATE

This is to certify that the project report entitled "ESTIMATION OF CARBON SEQUESTRATION POTENTIAL OF INDIAN SUNDARBANS USING REMOTE SENSING AND GIS" is an original work done by Ms. PRETTY J MALI of Department of Environment Science, Sree Sankara College, Kalady as part of her M.Sc. Environment Science and Management final semester project at Dr. R. Satheesh Centre for Remote Sensing and GIS, School of Environmental Sciences, Mahatma Gandhi University, Kottayam under my supervision and guidance and no part of this work has been submitted for any other degree, diploma or certificate programmes earlier.

Dr. Abin Varghese

Kottayam

31.08.2022

FACULTY IN CHARGE:  
Dr. R. Satheesh Centre for Remote Sensing and GIS  
School of Environmental Sciences  
Mahatma Gandhi University



## CERTIFICATE

This is to certify that Ms. RAIDA THOMAS M.Sc. Environment Science and Management student of Sree Sankara College, Kalady has successfully completed the Dissertation titled **FLOOD INUNDATION MAPPING USING SAR DATA FOR THRISSUR DISTRICT** towards the partial fulfillment of the requirements for the award of Degree of Master of Science in Environment Science and Management, Mahatma Gandhi University, Kottayam. This research was carried out at Kerala Agricultural University, Vellanikkara under my guidance and supervision and has not previously formed the basis for the award of any Degree, Diploma, Associate ship or Fellow ship or similar title to any University.



Dr. B. Ajithkumar

Associate Professor & Head  
Dept. of Agri. Meteorology  
College of Agriculture

Department of Agricultural Meteorology  
Kerala Agricultural University  
Vellanikkara, Thrissur - 680 656

College of Agriculture, Vellanikkara

Place: Vellanikkara

Date: 29/07/2022





# Mahatma Gandhi University

## SCHOOL OF ENVIRONMENTAL SCIENCES

Priyadarsini Hills P.O., Kottayam-686560, Kerala, India

**Dr.E.V.Ramasamy** MTech, PhD  
Professor

### CERTIFICATE

This is to certify that the project work entitled “Green synthesis of silver nanoparticles using *Alternanthera philoxeroides*: characterization and seedling growth assessment” is an original work done by Ms. Saniya Liz Fernandez being submitted to the Mahatma Gandhi University in partial fulfillment of the requirement for the award of the degree of Master of Science in Environmental Science and Management, Sree sankara college, Kalady is an authentic record of work carried out by her under my guidance at the School of Environmental Sciences, Mahatma Gandhi University, Kottayam. To the best of my knowledge, no part of the dissertation has formed the basis for the award of any degree , diploma of any university

P.D Hills  
Date: 05-09-2022

  
(Dr.E.V.Ramasamy)



KSCSTE-CWRDM

**KSCSTE - CENTRE FOR WATER RESOURCES  
DEVELOPMENT AND MANAGEMENT**  
**ജലവിഭവ വികസന വിനിയോഗ കേന്ദ്രം**

An Institution of Kerala State Council for Science, Technology & Environment, Govt. of Kerala  
കേരള ശാസ്ത്ര സാങ്കേതിക പരിസ്ഥിതി കൗൺസിൽ സ്ഥാപനം, കേരള സർക്കാർ



**CERTIFICATE**

This is to certify that the dissertation entitled **“BIOSORPTION STUDIES OF TOXIC METALS FROM AQUEOUS MEDIUM USING REGIONALLY ISOLATED MICROALGAL SPECIES”** is an authentic record of the research work carried out by **Ms. Sisira Sasikumar**. (Reg. No. 200011019934) under my supervision and guidance in the Ecology & Environment Research Group of the **Centre for Water Resources Development and Management (KSCSTE-CWRDM)**, Kunnamangalam, Kozhikode in partial fulfilment of the requirements for the degree of Master of Science in Environmental Science and Management from the Department of Environmental Science and Management, **SreeSankara College, Kalady (Mahatma Gandhi University, Kottayam)** and no part of this has been presented before for any degree in any university.

CWRDM

29.08.2022

Mr. Injas K

Scientist B

Ecology & Environment Research Group



**KERALA AGRICULTURAL UNIVERSITY**  
**AROMATIC AND MEDICINAL PLANTS RESEARCH STATION**

Odakkali, Asamannoor P.O., Ernakulam District, Kerala, India, PIN-683 549  
Tel. (0484) 2658221; E-mail: amprs@kau.in; Website: http://amprs.kau.in

**Dr. Ancy Joseph**  
**Professor (Horticulture)**

**August 29, 2022**

**CERTIFICATE**

This is to certify that Ms. **Vani Govind**, [Reg No: 200011019935] 2<sup>nd</sup> year student of M.Sc. Environment Science and Management, Sree Sankara College, Mattoor has successfully completed her project on "**Comparative Morphological and Biochemical evaluation of *Eclipta prostrata* ecotypes in Ernakulam District**" under the guidance of Dr. Ancy Joseph, Professor (Horticulture), Aromatic and Medicinal Plants Research Station (A.M.P.R.S), Odakkali during the period from April 2022 to June 2022.

During the above period, she was very punctual and has carried out her project related laboratory work very efficiently.

Her character and conduct were good during the project period.

**I WISH HER ALL SUCCESS..**



**Dr. Ancy Joseph**  
**PROFESSOR & HEAD**  
Aromatic & Medicinal Plants  
Research Station  
(Kerala Agricultural University)  
Odakkali, Asamannoor - 683 549





# Mahatma Gandhi University

## SCHOOL OF ENVIRONMENTAL SCIENCES

Priyadarsini Hills P.O., Kottayam-686560, Kerala, India

### CERTIFICATE

This is to certify that the project report entitled "COASTAL VULNERABILITY ASSESSMENT AND SHORELINE CHANGE ANALYSIS ALONG GOA COASTAL REGION USING GEOSPATIAL TECHNIQUES" is an original work done by Mr. VISHNU SUBRAN of Department of Environment Science, Sree Sankara College, Kalady as part of his M.Sc. Environment Science and Management final semester project at Dr. R. Satheesh Centre for Remote Sensing and GIS, School of Environmental Sciences, Mahatma Gandhi University, Kottayam under my supervision and guidance and no part of this work has been submitted for any other degree, diploma or certificate programmes earlier.

Dr. Abin Varghese

Kottayam

31.08.2022

FACULTY IN CHARGE  
Dr. R. Satheesh  
Centre for Remote Sensing and GIS  
School of Environmental Sciences  
Mahatma Gandhi University



## KERALA WATER AUTHORITY

Phone: 0484 – 2623476

Office of the Assistant Executive Engineer,  
P.H Head Works Sub Division, Aluva.

### CERTIFICATE

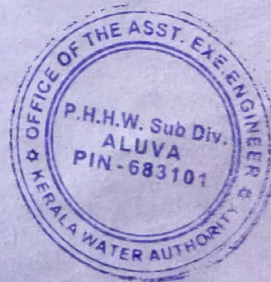
This is to certify that **24** Students of Department of Environment Science and Management Accompanied by **4** Faculty members of Sree Sankara college ,Kalady visited the 225 MLD Water Treatment Plant, Aluva, on **1<sup>st</sup> August 2022** as a part of fulfillment of academic curriculum.

Aluva

01/08/2022

ASSISTANT EXECUTIVE ENGINEER

ASSISTANT EXECUTIVE ENGINEER  
P.H HEAD WORKS SUB DIVISION  
KERALA WATER AUTHORITY  
ALUVA



## **WATER TREATMENT PLANT VISIT, ALUVA**

**01.08.2022**

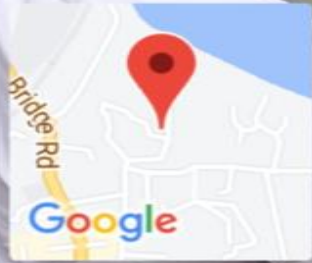
The students along with the faculties of the department visited one of the important water treatment plant in Ernakulum dist., Aluva. Student got an excellent opportunity to find out the functioning of the plant and the water purification methods provided in the plant. Here the treatment techniques are applied to make the water more acceptable for a desired end use. Before the water is distributed to the households, the water has to undergo a number of water treatment techniques in which the students are able to see and understand at the site itself.

The visit helps the students to understand about the type of plant used and to understand about the processes of water treatment. We are also able to see the treated water was stored and from there how it was supplied to various parts of Ernakulum district.





GPS Map Camera



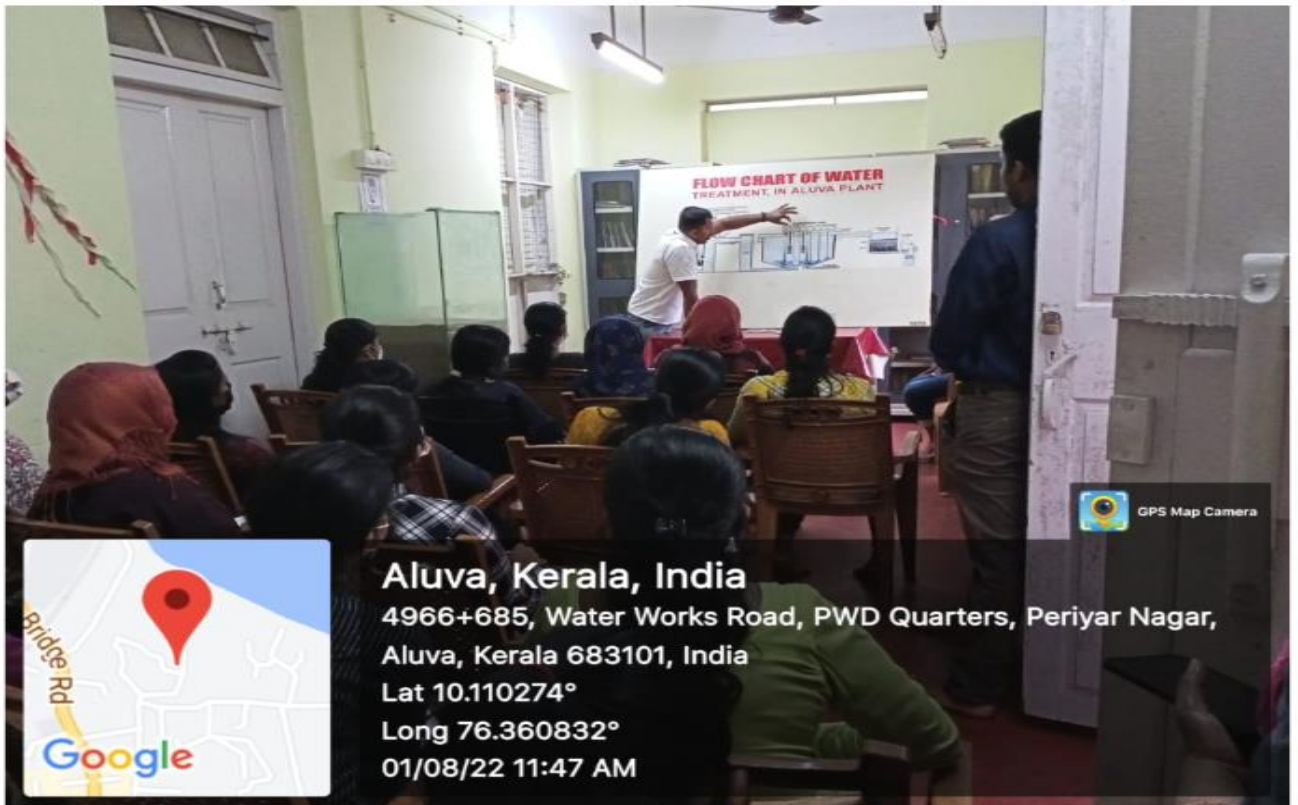
**Aluva, Kerala, India**

4966+685, Water Works Road, PWD Quarters, Periyar Nagar,  
Aluva, Kerala 683101, India

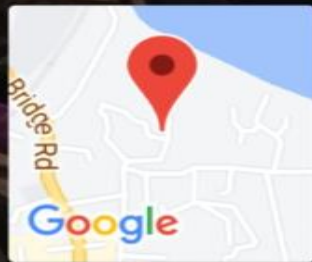
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Long 76.360823°

01/08/22 11:45 AM



GPS Map Camera



**Aluva, Kerala, India**

4966+685, Water Works Road, PWD Quarters, Periyar Nagar,  
Aluva, Kerala 683101, India

Lat 10.110274°

Long 76.360832°

01/08/22 11:47 AM