

**BEFORE THE HON'BLE NATIONAL GREEN TRIBUNAL
(SOUTHERN ZONE BENCH, CHENNAI)**

ORIGINAL APPLICATION NO. 141 OF 2021

In the matter of:
Tribunal on its own motion
Suo Motu based on the news item in Kerala
Kaumudi Newspaper, Web Edition dated 06.06.2021,
"A New Ray of Life Pallikkalar".

-VS-

The Principal Secretary to Govt. Of Kerala,
Environment Department,
Room No.406, 4th Floor Annex II,
Secretariat, Thiruvananthapuram and Ors.

----Respondent(s)

**ACTION TAKEN REPORT FILED BY THE SECRETARY, ENVIRONMENT
DEPARTMENT / 1ST RESPONDENT**

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Dated at Chennai on this the 22nd February, 2024.

for. G. K. K. Kumaresan
24/2/24

M/s. E.K.KUMARESAN

Standing Counsel for State Government of Kerala - NGT(SZ) Chennai Bench



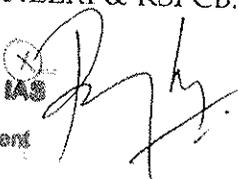
Action Taken Report filed by Secretary to Government,
Environment Department, Government of Kerala before the Hon'ble
National Green Tribunal (SZ) in Suo Motu
in OA No.27/2021 & OA No.141/2021.

It is submitted that as per the order of the Hon'ble National Green Tribunal (SZ) dated 12.01.2024 in OA No.27/2021 & OA No.141/2021, the Member Secretary, Kerala State Pollution Control Board (KSPCB) has submitted an action taken report in compliance to the order of the Hon'ble NGT (SZ) is as follows:-

a) Feasibility Study by CSIR-NEERI on the Development of Process Package for Domestic Sewage to meet Environmental Compliance at Pallikallar, Edappally, Perandoor canals

In the order dated 12.10.2023 of OA No. 141/2021 and OA No. 27/2021, the Hon'ble NGT (SZ) has recommended to reduce the duration of 15 months for Feasibility Study on the Development of Process Package for Domestic Sewage to meet Environmental Compliance at Pallikallar, Edappally, Perandoor canals by CSIR - NEERI. KSPCB has issued a letter KSPCB/1038/2023-AE-10 dated 30.10.2023 to Director NEERI to reduce the duration for feasibility study as recommended by Hon'ble National Green Tribunal. CSIR- NEERI has agreed to reduce the duration to 12 months through letter No.WWT/PM/KSPCB/05 dated 06.11.2023 (Copy enclosed).

Then MoU is executed between NEERI & KSPCB. Copy of the same is


Dr. Rathan U Kelkar IAS
Secretary
Environment Department
Govt. Secretariat
Thiruvananthapuram.

submitted as **Annexure A**. NEERI submitted invoice No.NEERI /23-24/367 dated 15.01.2024 for 1st installment of payment and the payment was sanctioned vide proceedings No.KSPCB/1038/2023-AE-10 dated 19.02.2024, submitted as **Annexure B**.

b) Value addition of water hyacinths and other strategies/activities

In the order dated 12.10.23 of OA 141/2021 and OA 27/2021, the Hon'ble NGT (SZ) has instructed to submit a detailed report indicating how the water hyacinth problem will be handled in its entirety along with the cost-effectiveness of the strategies/projects are to be furnished so that it may be useful to be recommended to other States. Kerala State Pollution Control Board has submitted a report vide KSPCB/38/2023-AE-13 dated 06/12/2023. In continuation to the report, further progress is detailed below:

As per the decision in the meeting held between KSPCB and Haritha Kerala Mission (HKM) on 16.11.2023, it was decided to extend the activities with involvement of various Stakeholder Departments and Agencies such as HKM, TERI, Suchitwa Mission, Irrigation Department, Urban Affairs, concerned Panchayats, KIDS and ROPE. A Video Conference meeting in this regard was conducted on 05.02.2024 chaired by Chairperson, KSPCB involving officials and representatives from those Departments and Agencies. Various suggestions and proposals for hyacinth eradication is detailed below:

a) Concept note from TERI "Developing circular economy through wetland restoration and livelihood improvement by combating water hyacinth in Vembanad kol wetland, Kerala" is submitted as **Annexure C**.


Dr. Rathan U Kulkar IAS
Secretary
Environment Department
Govt. Secretariat
Thiruvananthapuram

A study is being carried out in the Vembanad Kol wetland of Kerala with the idea of management of water hyacinth, involving protecting, restoring and managing the natural ecosystem. The project is a multi-disciplinary idea involving economic, governance and institutional approaches using the case of water hyacinth. Research by TERI is to reduce the cost of value added products. Once, the fibre is seasoned and processed, its durability is around 5 years. Initial study by TERI is core data collection, cost benefit analysis and working out market linkages & it takes around 6 months. At the end of the project a circular economy model will be suggested for Kerala which considers the environmental, social and economic aspects of sustainability.

b) KIDS, the agency which is already making value added products from long stem hyacinth plants expressed their willingness to impart training for Kudumbasree workers. Also, it was reported that they are already providing training in making value added products in Panchayats.

c) Haritha Kerala Mission reported about the activities of private agency at Madurai named ROPE which remove the hyacinth plants, then store in open land and later will be packed. The agency in Madurai has issue with marketing their products and needs facility for storage of the hyacinth and transportation is done by the agency itself.

d) Irrigation Department (Chief Engineer, Inland Navigation & Kuttanad Package), reported that Biogas agencies approached for utilizing water hyacinth for biogas plant, but continuous supply was needed which was difficult. So, it is suggested to entrust people near the canals for removing hyacinth by giving them a nominal fee for transportation and other arrangements. Also, if Government approval is obtained, they can support NGOs financially, as Inland Navigation Department is also

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Dr. Rathan U Kothar IAS
Secretary
Environment Department
Govt. Secretariat
Thiruvananthapuram

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benefited ultimately.

e) Other suggestions include mechanical removal by machines (proposal already raised by Irrigation Department in a meeting with DC), plants being used for soil reclamation, community level bio gas plants (min 500 Nos). Minutes of the meeting enclosed.

From the above, it is observed that action is taken by the different stakeholders. Hence it is humbly submitted that joint action is being taken for the management of water hyacinth in the State.

Thus it is humbly prayed that the above action taken report in compliance to the order dated 12.01.2024 of this Hon'ble National Green Tribunal may kindly be accepted.

Dated this the 22nd day of February, 2024.



Dr. Rathan U Kelkar IAS
Secretary
Environment Department
Govt. Secretariat
Thiruvananthapuram.

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महाराष्ट्र MAHARASHTRA

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NAGPUR TREASURY

76AA 414175

05 DEC 2023

Stamp Head Clerk / Sr. Clerk

MEMORANDUM OF AGREEMENT

This Memorandum of Understanding (hereinafter referred to as "MoA") is entered into on this 23th day of January 2024, by and between:

Council of Scientific and Industrial Research, a society registered under the Societies Registration Act (XXI of 1860), hereafter called '**CSIR**,' having its registered office at Anusandhan Bhavan, 2, Rafi Marg, New Delhi – 110 001 through Director, **National Environmental Engineering Research Institute**, having its office and laboratory at Nehru Marg, Nagpur, Maharashtra 440020, India (hereinafter called as '**CSIR-NEERI**,' which expression shall, unless repugnant to the context or meaning thereof be deemed to mean and include its successors and permitted assigns), of the First Party,

AND

Kerala State Pollution Control Board (KSPCB) was formed in 1974 to prevent and control various pollution, having head office at Pattom P.O., Thiruvananthapuram - 695 004, Kerala; India (herewith referred to as "KSPCB." which expression shall, unless repugnant to the context thereof, include its affiliates, associates, successors, substitutes, and permitted assigns) of the Second Party.

CSIR-NEERI and KSPCB are hereinafter individually referred to as the 'party' and collectively as 'parties.'

1001 - (6) 07/12/2023

ताचा प्रकार/अनुच्छेद क्रमांक - ४
 (नौदणी करणार आहेत का?)
 पी होणार असल्यास दुय्यम निबंधक कार्यालयाचे नांव
 ठरवतील वर्णन
 बदला रकम, गुद्रांक शुल्क रक्कम
 तसे विविध वेतान्याचे नांव, रक्कम सही दि.
 ने असल्यास त्यांचे नांव, पत्ता सही दि.
 कसया पत्रव्यवहारे नांव
 द्रोत्र विदेशाची सही, दिवशी अनु. क्र. दि
 श्री. मा. क. चोखर, 39567
 अ. नं. १२/८९ फाईल क्र. ४६०१००९
 नेदहाधिकारी कार्यालय, नागपूर.

CSIR - Neevi

Nagpur,

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1. Preamble

WHEREAS, CSIR represents that it has at its National Environmental Engineering Research Institute, Nagpur (CSIR-NEERI) established R&D expertise and has footprints globally in the area of environmental science and engineering, including environmental system design and modeling, air, water, wastewater, and waste management, environmental impact and risk assessment, environmental biotechnology and genomics, environmental materials, environmental remediation, etc.

Member Secretary, Kerala State Pollution Control Board (KSPCB), Thiruvananthapuram, requested vide letter [No. PCB/HO/EE3/O.A/No.27 / 2021 (SZ)/ 2021] dated May 08, 2023, to Director CSIR-National Environmental Engineering Research Institute, Nagpur, to send the two experts for a site visit considering the feasibility of the Phytoid Wastewater Treatment Technology and submit the site visit report. Accordingly, a two-member team from CSIR-NEERI, Nagpur, comprising Er. Pravin Manekar, Principal Scientist, Dr. S. Bhuvanesh, Senior Scientist, and officials of different Government Departments visited the different sites during May 11-13, 2023.

The Site Visit Report on observation and the way forward for discharge of untreated domestic sewage/septage and effluent from the respective municipality, houseboat, and prawn peeling industries into different water bodies was submitted to the KSPCB, Thiruvananthapuram on May 30, 2023. Based on the CSIR-NEERI's Site Visit Report, KSPCB requested CSIR-NEERI, Nagpur vide letter [No. PCB/HO/EE3/OA. No. 27/2021(SZ)/2021] dated July 04, 2023, to submit the Project Proposal with the scope of the work and financial budget. Based on the request of KSPCB, the three Project Proposals were submitted to KSPCB on July 28, 2023.

Lateral, the Member Secretary of the KSPCB requested through email, dated August 23, 2023, a Feasibility Study on the Development of a Process Package for Domestic Sewage to Meet Environmental Compliance for two sites, Pallikalar and Edappally - Perandoor canal (copy is enclosed). Accordingly, CSIR-NEERI, Nagpur, has prepared a revised proposal and submitted it to KSPCB on September 22, 2023 (**Annexure I**).

The competent authority of KSPCB has approved the revised project proposal entitled "Feasibility Study on Development of Process Package for Treatment of Domestic Sewage to Meet Environmental Compliance at Pallikalar and Edappally-Perandoor Canal" with project Cost of Rs. 45 lakhs +GST vide letter No KSPCB/1038/2023-AE-10 dated September 23, 2023 received CSIR-NEERI on October 5, 2023 requested CSIR-NEERI to submit the draft MoA for releasing of first installment before taking up the project (**Annexure-II**). The draft MoA was submitted to KSPCB on November 8 and 28, 2023, to finalize it. The component authority of KSPCB, Thiruvananthapuram, approved the Draft MoA-wide letter No. KSPCB/1038/2023-AE-10 dated November 28, 2023 (**Annexure-III**). Accordingly, the revised MoA with the project proposal was submitted to the concerned committee with a request to revise the time duration from 15 to 12 months. The component authority of CSIR-NEERI approved the MoA with a change in project duration from 15 to 12 months (**Annexure-IV**). The terms and conditions for carrying out the project are given below:

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2. Responsibilities of CSIR-NEERI

To prepare a feasibility report on the process package for the treatment of domestic sewage to Meet Environmental Compliance with the following scope of the work:

- Delineation of the stormwater and raw sewage catchment area discharged into the Canal/Nallah/Drain.
- Physico-chemical characterization of two seasons (based on the primary data) and quantification (based on the secondary data) of domestic sewage from different municipalities flowing into the Canal/Nallah/Drain.
- Population forecasting for designing the hydraulic load and estimating pollution loads of sewage discharge from different municipality areas on the proposed treatment scheme. Evaluation of Drain/Canal/Nallah configuration for the feasibility of In-situ or Ex-situ treatment.
- Delineation of the site-specific In-situ or Ex-situ treatment scheme to meet Environmental Compliance.
- A topography survey of the Drain/Canal/Nallah as per In-situ or Ex-situ treatment
- Delineation of conceptual frame design of the recommended treatment scheme with basic engineering design details and specifications (excluding the detailed engineering) for treating the domestic sewage flowing into the Nallah /drain/Canal.
- Tentative cost estimation of the recommended In-situ or Ex-situ treatment schemes with project implementation strategy and schedule
- Preparation of process package for In-situ or Ex-situ treatment for sewage from the above-mentioned municipalities flowing into Nallah/Canal/drain.

3. Responsibilities of KSPCB

- KSPCB shall provide all relevant secondary data/information/reports, detailed project reports, drawings, maps, Drain/Canal/Nallah flow data, etc., which must be made available to CSIR-NEERI to prepare a feasibility Report (soft and hard copies).
- KSPCB shall depute one Senior Technical Official from the different offices of the KSPCB by name/designation to coordinate different Local Authorities with the CSIR-NEERI team during fieldwork, monitoring, meetings, discussion, and site visits.
- Assistance in collecting and transporting wastewater to CSIR-NEERI, Nagpur, for treatability studies.
- KSPCB shall provide cleaning of the site's nearby area or provide access to the drains if in case it is not accessible.
- KSPCB shall make skilled workers available during field investigations.
- KSPCB shall provide laboratory facilities for onsite wastewater analysis with a water supply and electrical point provision.
- KSPCB shall provide lodging and boarding and arrangement of transportation for pick up and drop facilities for the CSIR-NEERI team in the Guest House/Hotel and site visits for field work, meetings, monitoring and presentation, etc.
- KSPCB shall provide comments on the submitted reports within 15 days of submission.

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4. Project Duration: 12 months

The date of start of the project study will be after receipt of the first installment of the Project Cost.

5. Financial Arrangement

KSPCB, Thiruvananthapuram, will disburse of Rs. 45 Lakhs+ GST to CSIR-NEERI as per the proposal submitted by CSIR-NEERI.

The payment terms are as follows:

- 50% +GST of the project cost shall be released in advance to NEERI after the signing of the MoA.
- 20% +GST of the project cost after submission of the Inception and Interim Reports.
- 20% +GST of the project cost after submission of the Draft Report.
- 10%+GST after submission of the Final report.

6. Confidentiality

The Parties, to the extent of their respective rights to do so, shall exchange such technical information and data as is reasonably required of each Party to perform its responsibilities under this MoA. All these information, including without limitation all oral and written information about know-how, industrial secrets, methods, technical data and information, as well as commercial, financial and operational data and information related to this MoA shall be kept in strict confidence and treated as non-public, confidential and proprietary information ("Information"), regardless of whether identified or marked as "proprietary" or "confidential".

The Parties agree to use the Information only for the purpose of this MoA and shall protect such Information from disclosure to others using the same degree of care used to protect their own confidential information. The Information shall not be reproduced in any form, sold, traded, published or otherwise disclosed to anyone in any manner, whatsoever except as required by one Party to the other Party.

Notwithstanding the foregoing, the Parties may disclose the Information without the other Party's prior written consent only to the extent such Information:

- (i) is already known to the Party as of the date of disclosure;
- (ii) is already in possession of the public or becomes available to the public other than through the act or omission of the Party receiving the information;
- (iii) is independently developed by one of the Parties without reliance on the Information of the other Party; or
- (iv) is required to be disclosed under applicable law or by a governmental order, decree, regulation or rule (provided that the requested Party shall give written notice to the other Party prior to such disclosure).

All such Information, in whatever form, provided by either Party, shall at all times remain the property of the Party disclosing the information and the other Party shall exercise all care and caution to ensure that such information is duly protected. The Party receiving the information shall, if expressly requested by the other Party, promptly destroy or immediately return to the party disclosing the information, all

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tangible material(s), papers, computerized media containing the information by way of notes, summaries, image, data or word processing files etc.

In the event of any accidental disclosure or discovery of any unauthorized use of Information, the party receiving the information shall immediately notify the other Party about such accidental disclosure or unauthorized use.

Confidentiality obligations concerned herein shall be applicable for a period of three years from the expiry/termination of this MoA.

7. Entire Understanding

This MoA contains the entire understanding between the parties and supersedes all prior contemporary oral or written agreements, commitments, understanding or communication with respect to the subject matter hereof

8. Amendment

The MoA shall be amended on the basis of mutual agreement in writing. All amendment(s) or modification(s) to this MoA shall be binding on each party provided the same is / are recorded in writing and signed by all Parties.

9. Effective Date And Duration of MoA

This MoA shall come into force for all purposes and intents with effect from the date of signing of this MoA and shall remain valid for 2.5 years unless any of the parties gives a written notice to the other party of its intentions to terminate the MoA, 90 (ninety) days in advance. The MoA may be extended for a further period and on such terms and conditions as may be mutually agreed.

10. Termination of MoA

- a. This MoA may be terminated by any party by giving 90 (ninety) day notice in writing to the other party of its intension to do so.
- b. In the event, the parties mutually agree to terminate this MoA, or the MoA is terminated on account of Force Majeure or non-fulfillment of the obligations of the respective parties or otherwise for any other reasons, the termination shall take effect from the date and time to be agreed upon mutually or in accordance with the termination notice, as the case may be.
- c. In the event of termination of the MoA the rights and obligations of the parties hereto shall be settled by mutual discussion.

11. Settlement of Disputes

- a. In the event of any question/dispute /difference arising under the agreement or in connection herewith (except as to matters the decision of which is specially provided under this agreement) the same shall be referred to the Delhi International Arbitration Centre for appointment of Arbitrator to adjudicate the dispute or place of arbitration shall be considered based on the mutual discussion and agreement.
- b. The award of the Arbitrator shall be final and binding on the parties. The Arbitrator may give interim award(s) and /or directions, as may be required.
- c. Subject to the aforesaid provision, the arbitration and conciliation Act, 1996 and the rules made hereunder and any modification thereof from time to time

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being in force shall be deemed to apply to the Arbitration proceedings under this clause.

12. Force Majeure

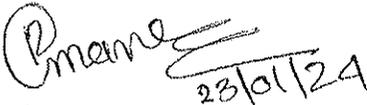
Neither party shall be held responsible for non-fulfillment of their respective obligations under this Agreement due to the exigency of one or more of the force majeure events such as but not limited to Acts of God, war, flood, earthquakes, strike, lockouts, epidemics, riots, civil commotion, etc. provided on the occurrence and cessation of any such events, the party affected thereby shall give a notice in writing to the other party within one month of such occurrence or cessation. If the force majeure condition continues beyond six months, the parties shall then mutually decide about the future course of action.

13. Indemnity

KSPCB shall defend, indemnify, release and hold harmless to CSIR-NEERI from and against any claims, damages, liability or costs, to the extent such claims damages, liability or costs do not arise from the negligent or willful acts or any of its agents or employees in connection with their respective performance under this MoA.

In witness whereof the parties hereto have entered into this MoA effective as of the day and year first above written.

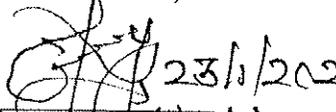
For and on behalf of **CSIR-NEERI**

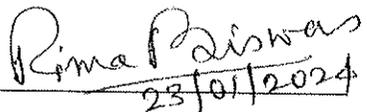
Signature 
 Name **Pravin Manekar**
 Designation **Principal Scientist**

Seal 1

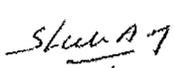
इ. प्रो. वि. मणकर / Dr. Pravin P. Manekar
 वैज्ञानिक / Scientist
 सी.एस.आई.आर. / C.S.I.R.
 राष्ट्रीय पर्यावरण अभियांत्रिकी अनुसंधान संस्थान
 National Environmental Engineering Research Institute
 नेहरु मार्ग, नागपुर / Nehru Marg, Nagpur-440020

Witness: (Name and Address)

1.  23/1/2024
 (Ritesh Vijay)
 CSIR-NEERI

2.  23/01/2024.
 Rima Paiswas Mondal.
 Principal Scientist-
 CSIR-NEERI

For and on behalf of **KSPCB**

Signature 
 Name **SHEELA A.M.**

Designation **Dr. SHEELA A. M.**
 MEMBER SECRETARY

Seal 2



Witness: (Name and Address)

1.  (PRAVITHA P.R. AEE, KSPCB)

2.  (RAMYA G., EE, KSPCB)

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Annexure-I

Revised Project Proposal

Feasibility Study on Development of Process Package for Treatment of Domestic Sewage to Meet Environmental Compliance at Pallikalar and Edappally-Perandoor Canal

Sponsor



**Kerala State Pollution Control Board,
Thiruvananthapuram**

Handwritten text in Malayalam script, likely a signature or stamp, partially obscured and difficult to read.



**CSIR-National Environmental Engineering Research Institute
Nehru Marg, Nagpur – 440 020**



September 22, 2023

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1.0 Preamble

Member Secretary of Kerala State Pollution Control Board (KSPCB), Thiruvananthapuram, requested vide letter [No. PCB/HO/EE3/O.A/No.27/2021 (SZ)/2021] dated May 08, 2023, to Director CSIR-National Environmental Engineering Research Institute, Nagpur, to send the two experts for a site visit considering the feasibility of the Phytoid Wastewater Treatment Technology and submit the site visit report. Accordingly, a two-member team from CSIR-NEERI, Nagpur, comprising Er. Pravin Manekar, Principal Scientist, Dr. S. Bhuvanesh, Senior Scientist, and officials of different Government Departments visited the different sites during May 11-13, 2023:

The identified site Canal/Drain/Nallah/River/Lake carried untreated domestic wastewater and solid and plastic wastes from different municipality areas. The Site Visit Report on observation and the way forward for discharge of untreated domestic sewage/septage and effluent from the respective municipality, houseboat, and prawn peeling industries into different water bodies was submitted to the KSPCB, Thiruvananthapuram on May 30, 2023. Based on the CSIR-NEERI's Site Visit Report, KSPCB requested CSIR-NEERI, Nagpur vide letter [No. PCB/HO/EE3/OA. No. 27/2021(SZ)/2021] dated July 04, 2023, to submit the Project Proposal with the scope of the work and financial budget. Based on the request of KSPCB, the Project Proposal for a feasibility study for developing a process package for domestic sewage to meet Environmental Compliance has been prepared and submitted to KSPCB on July 28, 2023.

Lateral, the Member Secretary of the KSPCB requested through email, dated August 23, 2023, a Feasibility Study on the Development of a Process Package for Domestic Sewage to Meet Environmental Compliance for two sites, Pallikalar and Edappally - Perandoor canal (copy is enclosed). Accordingly, CSIR-NEERI, Nagpur, has prepared a revised proposal considering the two sites for submission to the sponsor.

2.0 About CSIR-NEERI

CSIR-NEERI is India's premier research institute dealing in environmental science and engineering. The institute comprises research departments dealing with various components of the environment. The role of the institute is to provide scientific and

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technical information and services to the various authorities and industries and promote planning, policy, and management strategy for the regional environmental efforts in India as well as overseas. More than 300 scientific and technical staff members make CSIR-NEERI a highly qualified partner, contributing analytical facilities and extensive knowledge on various aspects of the environment. Among the various environmental domains, the institute has been dealing with the research and development of better and scientific water and wastewater management practices for more than four decades. The primary focus of water and wastewater management has been shifting over the years from treatment to reuse and recycling in recent years. The institute has also assisted various regulatory agencies viz. Ministry of Environment, Forests and Climate Change (MoEFCC), Central and State Pollution Control Boards (CPCB), Municipal Corporations, State Industrial Development Corporations, and Public and Private Sectors on various aspects of Solid Waste, Water, and Sewage Management. The institute is equipped with highly skilled scientific and technical manpower and necessary facilities making it highly competent in undertaking the above-mentioned task.

3.0 Objective

The project's objective is to prepare the feasibility report for developing the process package for domestic sewage from the above-mentioned identified municipalities' area to meet Environmental Compliance.

4.0 Scope of Work:

Based on the above objective, the following will be the scope of work for the project:

- Delineation of the stormwater and raw sewage catchment area discharged into the Canal/Nallah/Drain.
- Physico-chemical characterization of two seasons (based on the primary data) and quantification (based on the secondary data) of domestic sewage from different municipalities flowing into the Canal/Nallah/Drain.
- Population forecasting for designing the hydraulic load on the treatment scheme.

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- Estimation of pollution loads of sewage discharge from different areas of municipalities.
- Evaluation of Drain/Canal/Nallah configuration for the feasibility of In-situ or Ex-situ treatment.
- Delineation of the site-specific In-situ or Ex-situ treatment scheme to meet Environmental Compliance.
- A topography survey of the Drain/Canal/Nallah as per In-situ or Ex-situ treatment
- Delineation of conceptual frame design of the recommended treatment scheme with basic engineering design details and specifications (excluding the detailed engineering) for treating the domestic sewage flowing into the Nallah /drain/Canal.
- Tentative cost estimation of the recommended In-situ or Ex-situ treatment schemes.
- Project implementation strategy and schedule for in-situ or Ex-situ treatment
- Preparation of process package for In-situ or Ex-situ treatment for sewage from above-mentioned municipalities flowing into Nallah/Canal/drain.
- Submission of Report.

5.0 Sponsor: Kerala State Pollution Control Board, Thiruvananthapuram

6.0 Duration of Project : 15 Months

7.0 Project Cost : 45 lakhs + GST as applicable

8.0 Payment Schedule : 50% with work order + Goods & Service Tax*.
 - 20%+GST* after the Inception and Interim Reports
 - 20%+GST* after submission of Draft Report
 - 10%+GST* after submission of Final report

*As applicable on date of disbursement. In addition, the party shall pay all taxes including surcharges of Central Government and State Government as applicable on the date of payment. All such taxes are subject to change as per directive of Government of India/State Government.

- Goods and Service Tax Code (Registration No.): 27AAATC2716R2ZE.
- NEERI is exempted from income-tax under section 35(1) (ii) of the Income Tax Act 1961.
- The date of start of the study will be after receipt of the first installment of the Project Cost.

9.0 Deliverables:

Feasibility Report on Process Package for Treatment of Domestic Sewage to Meet Environmental Compliance

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10.0 Validity of the project proposal: 90 days

11.0 Disbursement:

Name of the Beneficiary	The Director, National Environmental Engineering Research Institute, Nehru Marg, Nagpur – 440020
Name of the Bank	State Bank of India, NEERI Branch, NEERI, Nagpur – 440020 (Maharashtra)
Savings Account Number	30266513766
IFSC No.	SBIN0004224
GSTIN	27AAATC2716R2ZE
JPAN	AAATC2716R

12.0 Disclaimer:

CSIR-NEERI shall carry out an independent study and submit the report. KSPCB shall exercise due diligence for making appropriate decisions to implement the report's contents.

13.0 Status of CSIR-NEERI:

If the matter is subjudice, CSIR-NEERI shall render the consultancy services under the agreed terms and shall not be a party to represent on behalf of KSPCB in any legal matters or proceedings.

14.0 Inputs and activities required and carried out by the KSPCB

- All relevant secondary data/information/reports, detailed project reports, drawings, maps, Drain/Canal/Nallah flow data, etc., must be made available to CSIR-NEERI to prepare a feasibility Report (soft and hard copies).
- Nominate one Senior Technical Official from the different offices of the KSPCB by name/designation for coordinating different Local Authorities with the CSIR-NEERI team during fieldwork, monitoring, meetings, discussion, and site visits.
- Assistance in collecting and transporting wastewater to CSIR-NEERI, Nagpur, for treatability studies.
- Skilled workers are to be made available during field investigations.
- Laboratory facilities for onsite wastewater analysis with a water supply and electrical point provision.

(17)

- Provide the lodging and boarding facilities for the CSIR-NEERI team in the Guest House/Hotel at site visits for field work, meetings, etc.
- Comments on the submitted reports within 15 days of submission.

15.0 Contact Persons

Er. Pravin Manekar Principal Scientist Wastewater Technology Division CSIR-National Environmental Engineering Research Institute Nehru Marg Nagpur-440 020 (9423404128)	Dr. Ritesh Vijay Senior Principal Scientist and Head Wastewater Technology Division CSIR-National Environmental Engineering Research Institute Nehru Marg Nagpur-440 020 (9422803805)
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(18)

Annexure-II

PROCEEDINGS

Sub:- Feasibility study on development of process package for treatment Domestic sewage to meet Environmental compliance at Pallikkalar and Edappally Perandoor Canal - Sanctioned – Orders issued.

KERALA STATE POLLUTION CONTROL BOARD

No. KSPCB/1038/2023-AE-10

Date: 23.09.2023

- Read:
1. Order of Hon'ble NGT dated 02/02/2023, 20/03/2023, 15/05/2023 & 17/07/2023 in OA 27/2021(SZ)
 2. Order of Hon'ble NGT dated 16/02/2023, 24/03/2023, 15/05/2023 and 17/07/2023 in OA 141/2021(SZ)
 3. Order dated 28.02.2022, 23.08.2022, 06.01.2023 and 22.03.2023 of NGT in OA 147/2022
 4. This office letters of no PCB/HO/EE3/OA-27/2021(SZ)/2021 dated 18/03/2023 & 24/04/2023 addressed to the Director, NEERI
 5. Letter No. KSPCB/245/2023-AE-13/B dated 22/06/2023
 6. NEERI's letter No. KSPCB/02/ WWT/PM dated 30/06/2023
 7. This office letter No.PCB/HO/EE3/OA.No.27/202 (SZ)/2021 dated 04/07/2023
 8. Letter No. WWT/PM/KSPCB/03 dated 28/07/2023
 9. Email Communications with NEERI on 23/08/20023 & 24.08.2023
 10. Letter No. WWT/PM/KSPCB/04 dated 22.09.2023 from CSIR-NEERI

A/10/23

ORDER

The Hon'ble NGT vide orders in OA 27/2021 & OA 141/2021 had directed to consider wastewater technology developed by NEERI. Accordingly Board had contacted NEERI and an online presentation was made by NEERI on 13/03/2023 with the officials of local bodies, Suchitwa Mission and KSPCB. Further NEERI was addressed to depute experts for field visit to understand the location and feasibility of this technology in Kerala condition on 18/03/2023 & 24/04/2023. Accordingly two scientists namely Er. Pravin Manekar and Dr. S. Bhuvanesh are deputed to conduct field visit from 11/05/2023 to 13/05/2023. Site visit was conducted by the NEERI scientists along with officials of KWA, Suchitwa Mission, LSGIs and Board. In the report CSIR-NEERI informed that for suggesting suitable/appropriate technology depending on the type of waste water, detailed feasibility study is required and detailed project proposal will be submitted after confirmation from the Board. Vide letter dated 22.06.2023 (reference 5) NEERI was addressed to submit a report with specific recommendations regarding suitable treatment technology applicable to different site in order to implement the same as a model. Based on NEERI's letter dated

J. J. J. Director

Dr. Nishu / Manu

Amu 4/10/23

SPR PREP FOR FILING
RY

(19)

30/06/2023 (reference 6), letter was issued on 04/07/2023 (reference 7) for submitting project proposal with scope of work and financial budget urgently.

In reply to letter dated 04/07/2023 (reference 7) NEERI has submitted 3 project proposals namely feasibility study on development of process package for domestic sewage and septage from Alappuzha house boats to meet environmental compliance, feasibility study on development of process package for domestic sewage to meet environmental compliance and feasibility study on development of process package for Prawn peeling industrial effluent to meet environmental compliance.

In compliance to the NGT orders in OA 27/2021 & OA 141/2021, it was decided to sanction the projects for Pallikalar and Edappally Perandoor Canal. As the Pallikalar (Karunagappally municipality) is not incorporated in the proposal and also site wise cost not provided, details were sought through email from NEERI on 23.08.2024 and 24.08.2024. Vide paper read 10 above CSIR NEERI submitted revised project proposal as below.

Project Title	Study Area	Objective	Amount	Duration
Feasibility study on development of process package for treatment Domestic sewage to meet Environmenal compliance at Pallikkalar and Edappally Perandoor Canal	Pallikkalar and Edappally Perandoor Canal	To prepare the feasibility report for developing the process package for domestic sewage from the above mentioned identified municipalities' area to meet Environmental Compliance.	45 lakhs+ GST as applicable	15 Months

The matter is examined in detail and sanction is hereby accorded to carry out the Feasibility study on development of process package for – Domestic sewage to meet Environmenal compliance at Pallikalar and Edappally -Perandoor Canal for an amount of Rs. 45,00,000/- (Forty Five Lakhs Only) excluding GST through CSIR – NEERI Nagpur, Maharashtra subject to the condition that split up of cost is to be submitted. The terms of payment is as follows.:

- 50% + GST of the project cost shall be released on signing the MOU
- 20% + GST after the inspection and interim reports
- 20% + GST on submission of the draft report

(20)

10% + GST on submission of the final report
The expenditure in this regard shall be met from the Account No.
Environmental Protection Fund.

Sd/-
CHAIRMAN

To

- ✓ The Director
CSIR – NEERI, Nehru Marg,
Vasant Nagar, Nagpur,
Maharashtra
2. The Accounts Officer

Copy to:

1. Er. Pravin Manekar
Principal Scientist
Wastewater Technology Divison
CSIR-National Environmental
Engineering Research Institute
Nehru Marg Nagpur – 440 020
2. Dr. Ritesh Vijay
Senior Principal Scientist and Head
Wastewater Technology Divison
CSIR-National Environmental
Engineering Research Institute
Nehru Marg Nagpur – 440 020
3. The Chief Environmental Engineer
Regional Office, Thiruvananthapuram/Ernakulam
4. The Environmental Engineer
District Office, Kollam/DO - 1 Ernakulam

FORWARDED BY ORDER

ASSISTANT ENGINEER - 10

21

Annexure-III

121
5/12/23

☎: General: 0471- 2312910, 2318153, 2318154, 2318155 Chairman: 2318150 Member Secretary: 2318151
e-mail: chn.kspcb@gov.in; ms.kspcb@gov.in FAX: 2318152 web: kspcb.kerala.gov.in

KERALA STATE POLLUTION CONTROL BOARD

കേരള സംസ്ഥാന മലിനീകരണ നിയന്ത്രണ ബോർഡ്

Pattom P.O., Thiruvananthapuram – 695 004

പട്ടം പി.ഒ., തിരുവനന്തപുരം - 695 004



KSPCB/1038/2023-AE-10

Date: 28/11/2023

From:

The Member Secretary

To:

✓ The Director
CSIR - NEERI, Nehru Marg,
Vasant Nagar, Nagpur, Maharashtra

Sub: Feasibility study on development of process package for treatment Domestic sewage to meet Environmental compliance at Pallikkalar and Edappally Perandoor Canal - reg

- Ref: 1. Order dated 12.10.2023 of the Hon'ble NGT (SZ) in OA No 141 of 2021 & OA No 27 of 2021
2. This Office Order of even No. dated 23.09.2023
3. That office Lr No. WWT/PM/KSPCB/05 dated 06.11.2023
4. Draft MoA received via email on 08.11.2023

Sir,

Kind attention is invited to the references. The draft MoA received via ref (4) is approved, subject to the condition that time schedule shall also to be incorporated as below:

Total time duration of the project will be 12 months. The following time line should be adhered to

Submission of Inception and interim reports - within 6 months

Submission of final draft - By 11 months

Submission of final report - 12 months

Urgent action may please be taken to submit duly signed MoU in stamp paper with the above modification

PRC No
for filing
BY
5/12/23

Yours faithfully,

SLMAS

MEMBER SECRETARY

✓ *Wheeler*
Am
5.12.23

Project Proposal

Feasibility Study on Development of Process Package for Treatment of Domestic Sewage to Meet Environmental Compliance at Pallikalar and Edappally-Perandoor Canal

Sponsor



**Kerala State Pollution Control Board,
Thiruvananthapuram**



**CSIR-National Environmental Engineering Research Institute
Nehru Marg, Nagpur – 440 020**



January, 2024

1.0 Preamble

Member Secretary of Kerala State Pollution Control Board (KSPCB), Thiruvananthapuram, requested vide letter [No. PCB/HO/EE3/O.A/ No.27 / 2021 (SZ)/ 2021] dated May 08, 2023, to Director CSIR-National Environmental Engineering Research Institute, Nagpur, to send the two experts for a site visit considering the feasibility of the Phytoid Wastewater Treatment Technology and submit the site visit report. Accordingly, a two-member team from CSIR-NEERI, Nagpur, comprising Er. Pravin Manekar, Principal Scientist, Dr. S. Bhuvanesh, Senior Scientist, and officials of different Government Departments visited the different sites during May 11-13, 2023.

The identified site Canal/Drain/Nallah/River/Lake carried untreated domestic wastewater and solid and plastic wastes from different municipality areas. The Site Visit Report on observation and the way forward for discharge of untreated domestic sewage/septage and effluent from the respective municipality, houseboat, and prawn peeling industries into different water bodies was submitted to the KSPCB, Thiruvananthapuram on May 30, 2023. Based on the CSIR-NEERI's Site Visit Report, KSPCB requested CSIR-NEERI, Nagpur vide letter [No. PCB/HO/EE3/OA. No. 27/2021(SZ)/2021] dated July 04, 2023, to submit the Project Proposal with the scope of the work and financial budget. Based on the request of KSPCB, the Project Proposal for a feasibility study for developing a process package for domestic sewage to meet Environmental Compliance has been prepared and submitted to KSPCB on July 28, 2023.

Lateral, the Member Secretary of the KSPCB requested through email, dated August 23, 2023, a Feasibility Study on the Development of a Process Package for Domestic Sewage to Meet Environmental Compliance for two sites, Pallikalar and Edappally - Perandoor canal (copy is enclosed). Accordingly, CSIR-NEERI, Nagpur, has prepared a revised proposal considering the two sites for submission to the sponsor.

2.0 About CSIR-NEERI

CSIR-NEERI is India's premier research institute dealing in environmental science and engineering. The institute comprises research departments dealing with various components of the environment. The role of the institute is to provide scientific and

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technical information and services to the various authorities and industries and promote planning, policy, and management strategy for the regional environmental efforts in India as well as overseas. More than 300 scientific and technical staff members make CSIR-NEERI a highly qualified partner, contributing analytical facilities and extensive knowledge on various aspects of the environment. Among the various environmental domains, the institute has been dealing with the research and development of better and scientific water and wastewater management practices for more than four decades. The primary focus of water and wastewater management has been shifting over the years from treatment to reuse and recycling in recent years. The institute has also assisted various regulatory agencies viz. Ministry of Environment, Forests and Climate Change (MoEFCC), Central and State Pollution Control Boards (CPCB), Municipal Corporations, State Industrial Development Corporations, and Public and Private Sectors on various aspects of Solid Waste, Water, and Sewage Management. The institute is equipped with highly skilled scientific and technical manpower and necessary facilities making it highly competent in undertaking the above-mentioned task.

3.0 Objective

The project's objective is to prepare the feasibility report for developing the process package for domestic sewage from the above-mentioned identified municipalities' area to meet Environmental Compliance.

4.0 Scope of Work:

Based on the above objective, the following will be the scope of work for the project:

- Delineation of the stormwater and raw sewage catchment area discharged into the Canal/Nallah/Drain.
- Physico-chemical characterization of two seasons (based on the primary data) and quantification (based on the secondary data) of domestic sewage from different municipalities flowing into the Canal/Nallah/Drain.
- Population forecasting for designing the hydraulic load on the treatment scheme.

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- Estimation of pollution loads of sewage discharge from different areas of municipalities.
- Evaluation of Drain/Canal/Nallah configuration for the feasibility of In-situ or Ex-situ treatment.
- Delineation of the site-specific In-situ or Ex-situ treatment scheme to meet Environmental Compliance.
- A topography survey of the Drain/Canal/Nallah as per In-situ or Ex-situ treatment
- Delineation of conceptual frame design of the recommended treatment scheme with basic engineering design details and specifications (excluding the detailed engineering) for treating the domestic sewage flowing into the Nallah /drain/Canal.
- Tentative cost estimation of the recommended In-situ or Ex-situ treatment schemes.
- Project implementation strategy and schedule for in-situ or Ex-situ treatment
- Preparation of process package for In-situ or Ex-situ treatment for sewage from above-mentioned municipalities flowing into Nallah/Canal/drain.
- Submission of Report.

5.0 Sponsor: Kerala State Pollution Control Board, Thiruvananthapuram

6.0 Duration of Project : 12 Months

7.0 Project Cost : 45 lakhs + GST as applicable

8.0 Payment Schedule : 50% with work order + Goods & Service Tax*
 - 20%+GST* after the Inception and Interim Reports
 20%+GST* after submission of Draft Report
 - 10%+GST* after submission of Final report

*As applicable on date of disbursement. In addition, the party shall pay all taxes including surcharges of Central Government and State Government as applicable on the date of payment. All such taxes are subject to change as per directive of Government of India/State Government.

- Goods and Service Tax Code (Registration No.): 27AAATC2716R2ZE.
- NEERI is exempted from Income-tax under section 35(1) (ii) of the Income Tax Act 1961.
- The date of start of the study will be after receipt of the first installment of the Project Cost.

9.0 Deliverables:

Feasibility Report on Process Package for Treatment of Domestic Sewage t to Meet Environmental Compliance

(26)

10.0 Validity of the project proposal: 90 days**11.0 Disbursement:**

Name of the Beneficiary	The Director, National Environmental Engineering Research Institute, Nehru Marg, Nagpur – 440020
Name of the Bank	State Bank of India, NEERI Branch, NEERI, Nagpur – 440020 (Maharashtra)
Savings Account Number	30266513766
IFSC No.	SBIN0004224
GSTIN	27AAATC2716R2ZE
JPAN	AAATC2716R

12.0 Disclaimer:

CSIR-NEERI shall carry out an independent study and submit the report. KSPCB shall exercise due diligence for making appropriate decisions to implement the report's contents.

13.0 Status of CSIR-NEERI:

If the matter is subjudice, CSIR-NEERI shall render the consultancy services under the agreed terms and shall not be a party to represent on behalf of KSPCB in any legal matters or proceedings.

14.0 Inputs and activities required and carried out by the KSPCB

- All relevant secondary data/information/reports, detailed project reports, drawings, maps, Drain/Canal/Nallah flow data, etc., must be made available to CSIR-NEERI to prepare a feasibility Report (soft and hard copies).
- Nominate one Senior Technical Official from the different offices of the KSPCB by name/designation for coordinating different Local Authorities with the CSIR-NEERI team during fieldwork, monitoring, meetings, discussion, and site visits.
- Assistance in collecting and transporting wastewater to CSIR-NEERI, Nagpur, for treatability studies.
- Skilled workers are to be made available during field investigations.
- Laboratory facilities for onsite wastewater analysis with a water supply and electrical point provision.

(27)

- Provide the lodging and boarding and arrangement of transportation for pick up and drop facilities for the CSIR-NEERI team in the Guest House/ Hotel at site visits for field work, meetings, monitoring and presentation, etc.
- Comments on the submitted reports within 15 days of submission.

15.0 Contact Persons

Er. Pravin Manekar	Dr. Ritesh Vijay
Principal Scientist	Senior Principal Scientist and Head
Wastewater Technology Division	Wastewater Technology Division
CSIR-National Environmental	CSIR-National Environmental
Engineering Research Institute	Engineering Research Institute
Nehru Marg Nagpur-440 020	Nehru Marg Nagpur-440 020
(9423404128)	(9422803805)

(28)

PROCEEDINGS

(Present: Er. Sreekala.S, Chairperson)

Sub: Feasibility study on development of process package for treatment Domestic sewage to meet Environmental compliance at Pallikkalar and Edappally-Perandoor Canal-Released of Ist Installment-Sanctioned-Orders issued.

KERALA STATE POLLUTION CONTROL BOARD

No. KSPCB/1038/2023-AE-10

Thiruvananthapuram

Dated:19.02.2024

Read: 1. Order of Hon'ble NGT dated 02/02/2023, 20/03/2023, 15/05/2023 & 17/07/2023 in OA 27/2021 (SZ)

2. Order of Hon'ble NGT dated 16/02/2023,24/03/2023,15/05/2023 and 17/07/2023 in OA 141/2021(SZ)

3. Proceedings no. even dated 23.09.2023

4. Hon'ble NGT Order dated 12.10.2023 in OA 27/2021 & OA 141/2021

5. This office letter of even dated 30.10.2023

6. Lr.No. WWT/PM/KSPCB/05 dated 06.11.2023 from CSIR -NEERI

7. This Office letter even dated 28.11.2023

8. MoU signed between Board and NEERI on 23.01.2024

9. Invoice No. NEERI/23-24/367 dated 15.01.2024 for an amount Rs. 26,55,000/-

ORDER

The Hon'ble NGT vide orders in OA 27/2021 & OA 141/2021 (ref.1 &2) had directed to consider waste water technology developed by NEERI. Accordingly, Board had contacted NEERI and a proposal for feasibility study on development of process package for domestic sewage to meet environmental compliance at Pallikkalar and Edappally- Perandoor Canal for an amount of Rs. 45,00,000/-(Forty Five Lakhs Only) excluding GST was sanctioned vide ref.3 for CSIR-NEERI Nagpur, Maharashtra.

Vide ref.4 the Hon'ble NGT in its order dated 12.10.2023 has recommended to reduce the length of the period for the feasibility study, 15 months proposed by NEERI so that the same model can be extended to other places where there is no Under Ground Sewage System.

Vide ref.5, KSPCB requested NEERI to reduce time duration in compliance to the Hon'ble NGT order and CSIR, NEERI vide ref.6 informed that they shall try its best to complete project activities in 12 months. Vide ref.7, letter was issued to CSIR-NEERI regarding approval of draft MoU.

Vide ref.8, MoU was executed between CSIR-NEERI and KSPCB and vide ref (9) CSIR-NEERI has submitted invoice for release of first instalment . As per terms of payment in MoU, Ist instalment (50% of sanctioned amount) is to be released after signing of MoU and hence sanction is hereby accorded for the release of **Rs 26,55,000/- including GST(Rupees Twenty Six Lakh Fifty Five Thousand Only)** to the account of CSIR NEERI, Nagpur, Maharastra.

The expenditure in this regard shall be met from Environment Protection Fund Account (A/c No: 67366954329)

Sd/-

CHAIRPERSON

To

The Accounts Officer

FORWARDED BY ORDER



ASSISTANT ENVIRONMENTAL ENGINEER-1

Copy to :

CSIR NEERI

Nehru Marg, Nagpur, Maharashtra-440020

(29)

DEVELOPING CIRCULAR ECONOMY THROUGH WETLAND RESTORATION AND LIVELIHOOD IMPROVEMENT BY COMBATING WATER HYACINTH IN VEMBANAD KOL WETLAND, KERALA

Concept Note

Invasive alien species (IAS) are those that are introduced intentionally or unintentionally into areas where they are not native¹. They are a major threat to nature and nature's contributions to people. There has been an introduction of almost 37,000 alien species to regions and biomes around the world. Target 6 of the Kunming-Montreal Global Biodiversity Framework (KMGBF) emphasizes reducing the rate of introduction and establishment of invasive alien species by at least 50 per cent by 2030. Target 3 of the framework also sets an ambition to effectively and equitably protect and conserve 30 per cent of all lands, freshwater bodies, and oceans by 2030. The presence of IAS stands as a challenge in attaining the Sustainable Development goals.

Statement of problem

The aquatic invasives are a threat to the wetlands in India, one of the most biodiverse areas which supports the livelihood of more than 1 billion people with about 660 million people depending on fishing and aquaculture². Water Hyacinth (*Eichhornia crassipes*) a native of the Amazon basin of South America was introduced as an aquatic plant into India. It is the most invasive weed species in the world that has spread to more than 80 countries over the past century³. Studies point out that in 8 months, 10 water hyacinth plants can reproduce into 655,360 plants, covering approximately half a hectare⁴. It suppresses native plants, blocking waterways, and reducing dissolved oxygen in the water. The asexual reproduction mode, high survival adaptations, and stimulated rapid growth in waters rich in nutrients such as organic matter make it difficult to contain. The presence of water hyacinth affects the ecosystem services delivery of the ecosystem and can be termed as ecosystem dis-service. They affect the provisioning service of food/fisheries, regulating service of water provisioning service, nutrient regulation, cultural service of recreation and the supporting service of habitat provision. The thick floating weed mats harbor pathogenic micro-organisms, pests, and insect larvae, promoting diseases like schistosomiasis, dengue, chikungunya, and malaria⁵. This erodes the health of the residents and the users of the water. There is a lack of primary data on the economics of the invasive species particularly from the point of loss of ecosystem services. In

¹ IUCN issues brief. 2021

² Invasive Alien Species-Threat to inland wetlands of India. Centre for Biodiversity Policy and Law (CEBPOL). National Biodiversity Authority-India.

³ Datta, A., Maharaj, S., Prabhu, N. G., Bhowmik, D., Marino, A., Akbari, V., Rupavatharam, S., Sujeetha, J. A. R., P., Anantrao, G. G., Poduvattil, V. K., Kumar, S., Kleczkowski, A. 2021. Monitoring the Spread of Water Hyacinth (*Pontederia crassipes*): Challenges and Future Developments. *Front. Ecol. Evol., Sec. Biogeography and Macroecology*, 9, <https://doi.org/10.3389/fevo.2021.631338>

⁴ <https://www.icrisat.org/world-environment-day-making-weeds-waste-profitable-an-ai-based-tool-from-icrisat/>

⁵ Datta et al. Monitoring the Spread of Water Hyacinth (*Pontederia crassipes*): Challenges and Future Developments. *MINI REVIEW article. Front. Ecol. Evol.*, 28 January 2021. *Sec. Biogeography and Macroecology*, 9 - <https://doi.org/10.3389/fevo.2021.631338>

(30)

India, there is no exclusive legislation or policy to deal with the invasive alien species but the Management Action Plans (MAP) focus on the activities to control invasive species along with conservation and restoration of biodiversity. There is a lack of comprehensive plan to tackle the growing menace of invasive alien species in freshwater inland waterbodies in India. Even with these ecosystem damages happening, there is a huge knowledge gap on the economic impact of the invasives⁶. The key challenges lie with the fact that there has been a lot of challenges in addressing the spread of invasive species which require a real time monitoring, participation of multi-stakeholders and a complete economic and financial management with the objective of recovery of products and byproducts. The proposed research project is a multidisciplinary idea involving economic, governance and institutional approaches using the case of water hyacinth.

With this background, there is a pressing need on:

1. Stakeholder mapping with respect to the channeling of green funds to grassroot communities
2. Economics of the water hyacinth from the perspective of human health and wellbeing
3. Cost benefit analysis of the management of the invasive species and the ecosystem disservices
4. Creation of circular economy focusing on the weed to wealth concept through the creation of green entrepreneurship.

The study is proposed to be carried out in the Vembanad Kol wetland of Kerala. The management of the water hyacinth is of prime importance, which involves protecting, restoring and managing the natural ecosystem. This is important from the aspect of the revival of the natural wetland which can act as a Nature-based Solution and generation of a bequest value for the ecosystem.

Development of a circular economy model

Circular economy (CE) strategy is crucial in developing towards sustainable growth and meeting the Sustainable Development Goals by creating value via business models. The outcome of the cost benefit analysis helps in developing the triple bottom line, which considers the environmental, social, and economic aspects of sustainability, or the circular economy, which aims to eliminate waste and keep resources in use. The use of low-end technology which is ecofriendly is suggested which involves the preparation of the craft with the long stem variety present and the paper which uses all the parts of the water hyacinth. The marketing channels for the same will also be identified for the sustained economic yield from the products that are produced. At the end of the study a circular economy model will be suggested for the state of Kerala which considers the environmental, social, and economic aspects of sustainability.

Dr Divya Soman,
 Scientist B,
 Teri School of Advanced Studies (Deemed to be University),
 New Delhi

⁶ Explained: How Invasive Alien Species Cost the Indian Economy \$127.3 Billion In Last 6 Decades. India Times. 14 May 2022



सी. एस. आय. आर. - राष्ट्रीय पर्यावरण अभियांत्रिकी अनुसंधान संस्थान
CSIR - National Environmental Engineering Research Institute

नेहरू मार्ग, नागपुर - ४४० ०२०, महाराष्ट्र, भारत Nehru Marg, Nagpur 440 020, Maharashtra, India



Er. Pravin Prabhakarroa Manekar, B.E., M.Tech.
Principal Scientist
Wastewater Technology Division
www.neeri.res.in

Assistant Professor (Engineering Sciences)
Academy of Scientific & Innovative Research
E-mail: p_manekar@neeri.res.in
Phone: +91 712 224 9763; +91 712 224 9885-88 Extn. 689

Speed post/ Email

WWT/PM/KSPCB/05

November 06, 2023

To,
Member Secretary,
Kerala State Pollution Control Board (KSPCB)
Pattom, P.O. Thiruvananthapuram-659004.

Sub.: Feasibility Study on Development of Process Package for Treatment to Meet Environmental Compliance at Pallikkalar and Edappally Perandoor Canal.

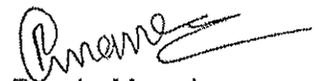
Ref.: KSPCB / 1038/2023-AE-13 dated October 30, 2023.

Ma'am,

With reference to your letter regarding the time frame of the above-mentioned project, CSIR-NEERI shall try its best to complete the project activities in twelve months as per the expectations of the Hon'ble National Green Tribunal (NGT) Southern Zone, Chennai. Further Memorandum of Agreement (MOA) will be communicated to you for necessary action at your end to start the project activities at the earliest

Thank you and warm regards.

Yours faithfully,


Pravin Manekar.



KERALA STATE POLLUTION CONTROL BOARD

കേരള സംസ്ഥാന മലിനീകരണ നിയന്ത്രണ ബോർഡ്

Pattom P.O., Thiruvananthapuram – 695 004

പട്ടം പി.ഒ., തിരുവനന്തപുരം - 695 004



Minutes of Meeting regarding the matter in OA No. 141/2021 held on 05/02/2024 at 11:00 am

The discussion via VC regarding the matter in OA No. 27/2021 & 141/2021, commenced at 11:00 am on 05/02/2024 with the Chairperson presiding. Chairperson welcomed the participants. The following officials attended the meeting.

1. Er.Shyam Gopal, Chief Engineer, Inland Navigation
2. Dr. Paul Thomas, Director, Kottapuram Integrated Development Society (KIDS)
3. Dr. Divya Soman, Scientist B, TERI School of Advanced Studies, New Delhi
4. Chief Engineer, Planning
5. Er. Ajmal E, Executive Engineer, Major Irrigation
6. Dr. Koshy P.S, Executive Engineer, Major Irrigation
7. Er. Balakrishnan E.P, Executive Engineer, Minor Irrigation
8. Shri. Abraham Koshy, Assistant Coordinator, Harithakeralam Mission
9. Joint Director, Swag Cell, LSGD
10. Dr. Sheela A. M, Member Secretary, KSPCB
11. Er. Bindhu Radhakrishnan, Chief Environment Engineer, KSPCB
12. Er. Pravitha P.K, Assistant Environment Engineer, KSPCB
13. Er. Ivan Biju Varghese, Assistant Engineer, KSPCB
14. Er. Reshma R Pillai, Assistant Engineer, KSPCB

Chairperson briefed about the order of the Hon'ble NGT on OA No. 27/2021 & 141/2021. Reports have been filed to Hon'ble NGT and based on this, the latest order was to stop the ill effects of water hyacinth and making of value added products from the same. Chairman said that this is an open discussion on the matter regarding water hyacinth and every department should share their perspective regarding the same.

The EE, Irrigation Department said that a meeting was conducted with District Collector and the suggestion was put forward to buy machines to remove hyacinth continuously. This can be done by coordinating 2-3 panchayats together, as assigning the work by tendering will not be profitable. After removal, biological/ chemical treatment can be given for further processing. If continuous removal is done using the machine, a complete

removal of hyacinth can be assured. Machine costs around 35 lakhs and skilled labourers are required to operate the machine.

The Chief Engineer, Inland Navigation informed that biogas agencies approached for utilizing water hyacinth for biogas plant. Agencies requested continuous supply of hyacinth. He also added, this hyacinth can be made to cubes by compression. If these agencies are promoted, with Govt. Subsidy, it will help to address the menace of hyacinth. Representative from KIDS informed that they are already producing value added products from hyacinth. But the stem is mainly used for making value added products and leaves and roots are mostly left behind without use. Thus, it results in regeneration of hyacinth. They are thinking of taking the pulp of hyacinth and make new paper by-products with root and leaf. So the plant can be completely removed and utilized. Scientist, TERI reported that the main issue with mechanization is there are chances of multiplication of hyacinth when they are cut in between the stem. She also added, long stem variety can be used for craft works and short stem variety can be used for pulp making. The storage in open land results in leaching of heavy metals accumulated in the plant, which may result in ground water contamination. So it can only be used for soil reclamation. Even though these are used for making briquettes, as water hyacinth have about 95% of water content, there is a high chance of fungal infection in hyacinth products and thus, people opt alternate products. It may also cause problems in biogas plant. It will be more economical, if provided in community level (Min 500 Nos.) with CSIR funding.

Chairperson enquired whether Inland navigation can initiate the matter. CE, Inland navigation said that they can take a lead, but the problem is they are unaware of the inputs. They can only initiate the proposal through the parties who are willing to take up the proposal. He suggested, mechanical removal is not a permanent method to remove water hyacinth and a better option is the conversion into value added products. If Government approval is obtained, they can support NGOs financially, as Inland Navigation Department is also benefited ultimately. Chairperson asked who is the responsible authority and CE, Inland Navigation informed that they are in charge of the areas near Kuttanad.

Representative from Harithakerala Mission said that they have made a tie-up with a private agency at Madurai named ROPE. They remove the hyacinth and are stored in open land which will be packed. It is necessary to make facilities to decompose the residue. LSGIs collect more amounts to take up these residues, so it should also be reduced. The agency in Madurai had an issue in marketing their products. The agency needs only a facility for storage of the hyacinth and transportation is done by the agency itself.

Chief Engineer, Inland Navigation suggested, it is better to entrust people near the canals for removing hyacinth by giving them a nominal fee for

transportation and other arrangements. Scientist, TERI said that neighbouring people already have an alternative source for their livelihood, so they are not willing as per the survey done by TERI. Hence it is better to make use of agencies like Kudumbasree and training can be given to ensure marketing of products. Training can be given to Kudumbasree by experts from Assam. Representative from KIDS said that, Kudumbasree is interested in the removal of water hyacinth. So it better take up the work through missions like Kudumbasree. They also expressed their willingness to impart training for these people. They are already providing value added products making training in Panchayats. Only long stems of this hyacinth can be used. So they used to dry these and store it. This is like providing a sustainable livelihood to the people in Kudumbasree. EE, Major irrigation said that mechanical removal will only be possible and after removal, rest of the works can be taken up by Kudumbasree.

Scientist, TERI informed that the problem is, as the products are handmade, they are costly and as the water content is high, chances of fungal infection is more and people chooses alternate products. So the researches done by TERI is in such a way to reduce the cost of these value added products. Fibre is seasoned and processed and its durability is around 5 years. Initial study by TERI is core data collection, cost benefit analysis and working out market linkages. It takes around 6 months for the study.

Chairperson instructed every department to share a note on the points discussed by different departments in the meeting. she said that the matter will be taken up at the higher level for further action .


CHAIRPERSON

**BEFORE THE HON'BLE NATIONAL
GREEN TRIBUNAL
(SOUTHERN ZONE BENCH, CHENNAI)**

**ORIGINAL APPLICATION NO. 141
OF 2021**

In the matter of:
Suo Motu "A New Ray of Life
Pallikkalar"

-VS-

The Principal Secretary to Govt. Of
Kerala,
Environment Department, Kerala
and others

----Respondent(s)

**ACTION TAKEN REPORT FILED BY
THE SECRETARY, ENVIRONMENT
DEPARTMENT/1ST RESPONDENT**

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of kerala**

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