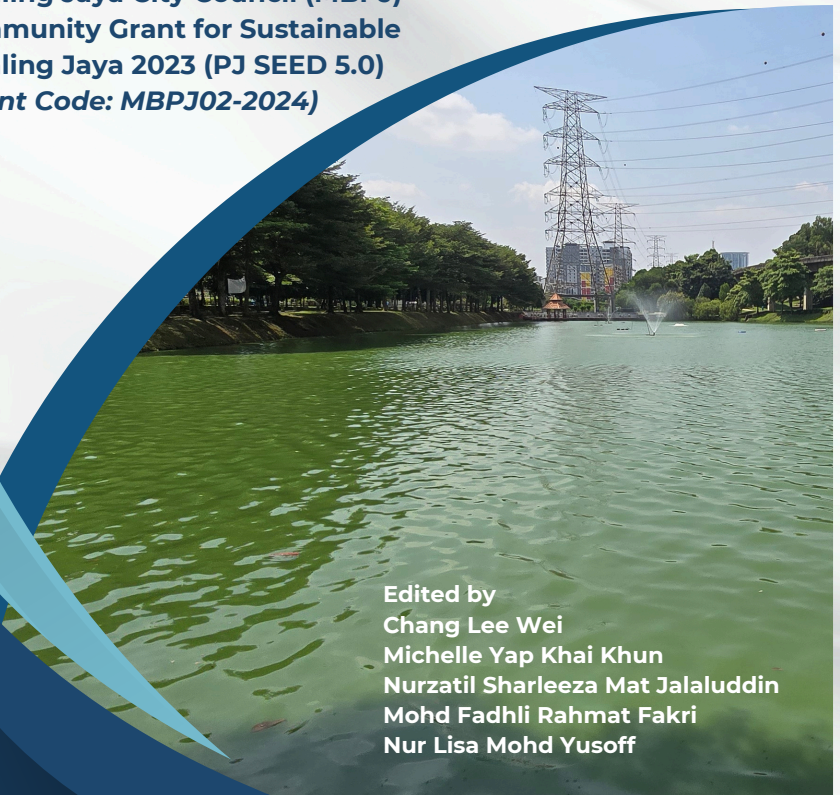


Handbook on

GUARDING OUR WATER TOGETHER

Supported & Funded by
Petaling Jaya City Council (MBPJ) -
Community Grant for Sustainable
Petaling Jaya 2023 (PJ SEED 5.0)
(Grant Code: MBPJ02-2024)



Edited by
Chang Lee Wei
Michelle Yap Khai Khun
Nurzatil Sharleeza Mat Jalaluddin
Mohd Fadhli Rahmat Fakri
Nur Lisa Mohd Yusoff

Handbook on Guarding Our Water Together 2024

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Preface

Freshwater is fundamental to life, yet our water resources face increasing threats from pollution and degradation. The case of Tasik Taman Aman in Petaling Jaya, currently affected by cyanobacterial blooms and cyanotoxins, illustrates the urgent challenges we face. While local authorities like the Petaling Jaya City Council play a crucial role, the protection of our water resources must be a shared responsibility involving all community members.

"Guarding Our Water Together" addresses this need for collective actions. This handbook provides a practical framework for understanding and participating in water resource protection. Through five comprehensive chapters, it guides readers through project fundamentals, methodologies, outputs, recommendations, and future directions. The content is designed to support both project partners and beneficiaries in their efforts to protect and preserve our valuable water resources.

This handbook is more than a guide—it is a call to action for community-driven environmental stewardship. By working together, we can transform challenged water bodies like Tasik Taman Aman into examples of successful community-based environmental management.

Chang Lee Wei
Chief Editor / Project Leader
Guarding Our Water Together:
Unveiling the Hidden World of Water Security and Ecosystems



ABOUT THE HANDBOOK

► INTRODUCTION

This handbook is a pivotal component of the "Guarding Our Water Together" initiative, aiming to disseminate knowledge, promote the project, and share outcomes with a broad audience. It serves as a comprehensive resource to enlighten stakeholders, including local communities, policy makers, and environmental enthusiasts, about the significance of water security and ecosystem health. The handbook will facilitate understanding of the challenges and solutions surrounding freshwater resources, underscored by the project's findings on cyanobacterial blooms and microplastic pollution. By offering detailed insights and practical guidance, it seeks to foster a well-informed community, equipped to actively participate in water conservation efforts and contribute to sustainable environmental practices.



► WHO SHOULD READ THIS HANDBOOK?

This handbook provides resources and guidance to a diverse range of stakeholders in freshwater ecosystem management, health and security of freshwater resources. This includes:

- Local city councils with interests in replicating similar community-based initiatives
- Scientists and researchers utilising citizen scientists in their work and have interest in freshwater ecosystem management, health and security of freshwater resources.
- Local communities, especially citizen scientists supporting freshwater ecosystem management, health and security of freshwater resources.
- Users of lake resources especially Tasik Taman Aman
- Civil societies and non-governmental organisations with interests in freshwater ecosystem management, health and security of freshwater resources.

SCOPE OF THE HANDBOOK

► HANDBOOK HAS FIVE (5) CHAPTERS

This handbook encapsulates the unique opportunities and challenges presented by the "Guarding Our Water Together" project. It lays out the strategic framework that guides project and program operations, explaining the fundamental principles involved and their application at the project level. The handbook covers both the knowledge needed to engage in or lead the "Guarding Our Water Together" project during the project implementation period and the skills necessary to enhance collaboration and readiness among partners and project activities.



By exploring the project cycle step-by-step, readers can understand the essential actions, success factors, and challenges they may encounter as project partners and project beneficiaries. Each chapter offers practical tips and advice for navigating every phase of a project, from the initial idea generation and forming partnerships, through project implementation, and finally, project closure.

The handbook is composed of five (5) chapters as listed below:

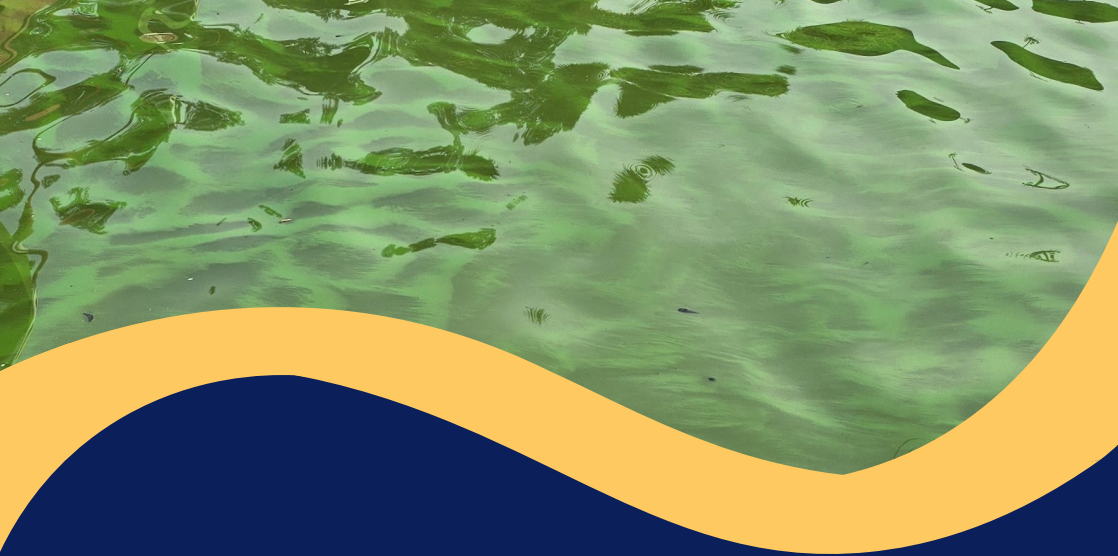
- **Project Overview:** Underscores the significance of the proposed project and project objectives
- **Project Design:** Presents a detailed description of the methodologies implemented to accomplish the project goals.
- **Project Findings:** Examines the tangible results, deliverables, and outcomes achieved through the project's execution.
- **Activities & Dissemination Strategies:** Provides comprehensive documentation of project activities and media engagement throughout the project duration.
- **Recommendation & Way Forward:** Presents strategy recommendations for various stakeholders, including local councils and communities. It concludes with a project summary and proposes suggestions for future work.



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CHAPTER 1

Project Overview



OVERVIEW

Malaysia, like many other countries, currently stands on the brink of a water crisis exacerbated by multiple interconnected factors. These include pollution and environmental degradation, climate change impacts, unsustainable practices, inadequate traditional water management strategies, limited public awareness and environmental stewardship, as well as governance and policy challenges.

In Selangor, these issues are particularly acute, with freshwater resources critical to both human and ecological health coming under increasing pressure. Recent years have seen reports documenting the worsening quality of local lake water due to pollutants such as microplastics and toxic algal blooms, highlighting the urgency of the situation.

In response to these multifaceted challenges, University Malaya (UM) and Monash University Malaysia have initiated "Guarding Our Water Together", a project aimed at addressing these pressing issues through innovative scientific approaches and robust community engagement.



This project funded by the Petaling Jaya City Council (MBPJ), recognises that effective freshwater management in the modern context requires not only technological solutions but also a fundamental shift in public awareness and participation.

It seeks to implement cutting-edge monitoring and treatment technologies, foster public education and awareness programs, encourage community-led water monitoring and conservation initiatives, promote sustainable water use practices, and collaborate with policymakers to develop more effective freshwater management strategies.

By addressing both the technical aspects of freshwater management and the crucial role of public awareness and environmental stewardship, "Guarding Our Water Together" aims to create a more resilient and sustainable water future for Selangor and potentially serve as a model for other regions facing similar challenges.

This comprehensive approach acknowledges that traditional water management strategies alone are insufficient, and that public engagement and environmental consciousness play a vital role in safeguarding our precious water resources for future generations.





>>>>

TASIK TAMAN AMAN PETALING JAYA

Tasik Taman Aman, located in Section 22 of Petaling Jaya, Selangor, is a former tin-mining pool transformed into a recreational lake for public enjoyment. While the park offers numerous amenities, it currently faces significant water quality issues that threaten its ecosystem and recreational value, raising concerns among local residents and frequent visitors.

This urban lake, like many others, suffers from poor water circulation and is prone to water quality degradation due to runoff from surrounding catchments. The lake's problems are exacerbated by unnaturally high inputs of nitrogen (N) and phosphorus (P) from polluting runoffs, leading to uncontrolled algal and aquatic plant growth. This results in a cycle of algal blooms followed by massive die-offs, depositing large quantities of organic matter on the lake bed. As this matter decomposes, it consumes oxygen in the water column and releases additional N and P, fueling further algal growth.

Recent reports indicate that the lake water has turned a murky green due to algal blooms, which are harmful to the aquatic species within

>>>>





the ecosystem. The situation has been worsened by the actions of irresponsible anglers who have turned off the lake's aerators, further compromising water quality. These visible changes have not gone unnoticed by the local community, who have expressed growing concern about the lake's deterioration.

Maintaining healthy levels of dissolved oxygen is crucial for the lake's health, as oxygen aids in the breakdown of decaying vegetation and other nutrients. Without sufficient oxygen at the bottom, beneficial bacteria and insects cannot biodegrade the organic sediment at the lake bed, leading to a deterioration of overall water quality.

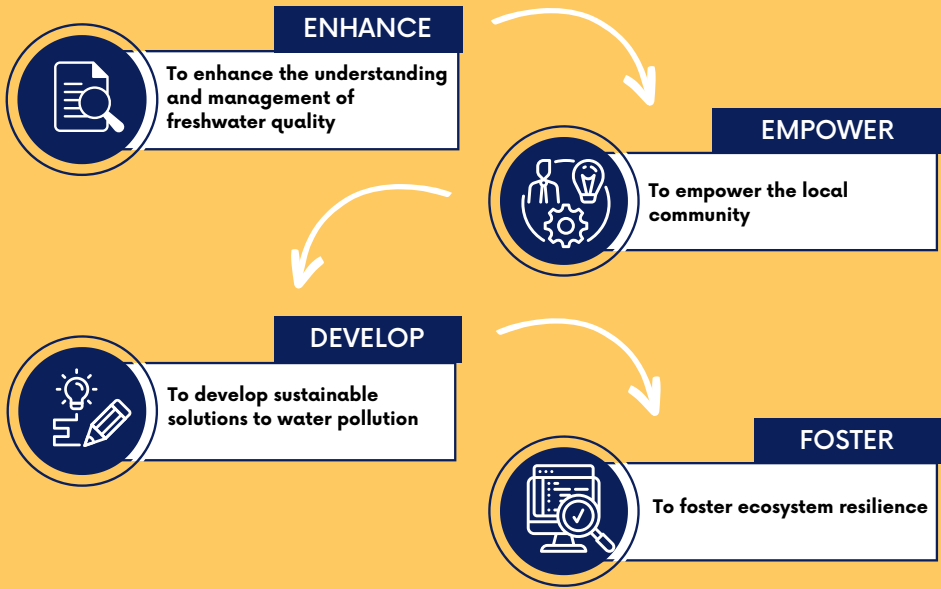
The issues plaguing Tasik Taman Aman have mobilized the local community, with residents and park users becoming increasingly vocal about the need for action. Their involvement in safeguarding the lake is crucial, as they serve as the eyes and ears on the ground, reporting issues and advocating for conservation efforts. Community engagement has ranged from organizing clean-up events to forming local environmental groups dedicated to the lake's preservation.

To address these pressing issues, the involvement of experts is urgently needed, along with continuous support from the MBPJ and active participation from the community. This collaborative effort between authorities, experts, and local residents is essential to improve water quality, rejuvenate the ecosystem, and restore Tasik Taman Aman to its former glory as a vibrant recreational space for the community. The success of any restoration efforts will rely heavily on the ongoing stewardship and vigilance of the local community in protecting this valuable urban oasis.





PROJECT OBJECTIVES



Community



› OBJECTIVE 1

Enhance Understanding and Management of Freshwater Quality:

Together with the involvement of citizen scientists, we wish to implement continuous assessment of water quality parameters. With this, we are able to establish a rapid response mechanism for timely interventions based on data insights and create a comprehensive database to track long-term trends and inform future management decisions.

› OBJECTIVE 3

Develop Sustainable Solutions to Water Pollution:

This project focuses on addressing challenges posed by microplastics and algal blooms through targeted research and intervention strategies. We implement community education programs on reducing plastic waste and preventing nutrient runoff, advocate for evidence-based policies to protect water resources at local and state levels, and collaborate with experts to develop and implement innovative water treatment technologies.

› OBJECTIVE 2

Empower the Local Community:

Our goal is to engage residents as citizen scientists in water quality monitoring programs and provide training workshops on water resource management and conservation techniques. We establish a community-led water stewardship program and create platforms for knowledge sharing and collaborative problem-solving among community members.

› OBJECTIVE 4

Foster Ecosystem Resilience:

We aim to restore and maintain riparian habitats to act as natural filters and buffers, implement green infrastructure solutions to manage stormwater and reduce pollution, and monitor and protect aquatic biodiversity as indicators of ecosystem health.

PROJECT SIGNIFICANCE



The "Guarding Our Water Together" project is awarded under the Petaling Jaya Sustainable Community Grant (PJ SEED 5.0) and implemented for 12 months beginning 1 January 2024. The project is pivotal in building the foundation to understand the core issues underlying the water quality problem in Tasik Taman Aman through an action-oriented, participatory approach involving both experts and the public. More importantly, this project aligns with global sustainable development goals by ensuring clean water and sanitation, life below water, and life on land, thereby contributing to a more sustainable and resilient future.

Our efforts today are crucial in ensuring that future generations inherit thriving aquatic ecosystems and sustainable water resources. By fostering a culture of environmental stewardship and collaborative action, we are working towards a future where water is universally recognized and protected as the precious, life-sustaining resource it truly is.

By achieving project objectives, "Guarding Our Water Together" aims to create a holistic approach to water resource management. This initiative not only seeks to improve immediate water quality and ecosystem health but also strives to build a foundation for long-term environmental resilience and community well-being.

IN SUPPORT OF:





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CITY COUNCIL



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**WATER
WARRIORS**

sekitar 



unesco

Member of
Associations and Clubs



PROJECT IMPLEMENTATION

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MONTH 1 - 2: CONCEPTUALISATION & FIELD ASSESSMENT

- Stakeholder engagement
- Site visit
- Project management and coordination

MONTH 2 - 3: METHODOLOGY & DESIGN

- Participation of Citizen Scientist
- Water sampling

MONTH 3 - 9: DATA COLLECTION & ANALYSIS

- Microalgae identification
- Microplastics and heavy metals detections
- Cyanotoxins and Toxicity Profiles

MONTH 9 - 11: PUBLIC ENGAGEMENT & OUTREACH

- Newspaper articles
- Forum
- Exhibition
- Handbook



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CHAPTER 2

Project Design

WATER SAMPLING

>>>>

The sampling sites at Tasik Taman Aman in this project were designated as Zone A, Zone B, and Zone C. Sampling was conducted according to a schedule of twice monthly visits from March to May, followed by monthly visits from June to August, totaling 9 sampling dates throughout 2024.

The water sampling sites were established at three (3) specific collection points with the following coordinates:

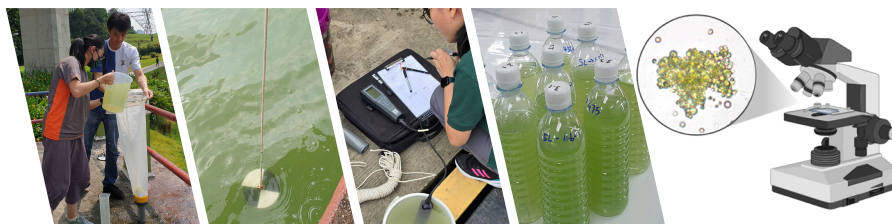
- Zone A - 3°06'11.0"N 101°37'28.5"E
- Zone B - 3°06'12.2"N 101°37'31.5"E
- Zone C - 3°06'08.3"N 101°37'35.3"E



METHODS & WORKFLOW

>>>>

For MICROALGAE IDENTIFICATION and WATER TURBIDITY, water, planktonic and flagellate algae in the water were concentrated using a phytoplankton net with a mesh size of 10 μm . The water sample containing the concentrated algae was stored in a screw-cap plastic bottle and then transported to the laboratory under cold conditions for rapid processing. Physical parameters such as dissolved oxygen and pH were determined with a multiparameter. Water turbidity was measured on-site using a Secchi dish. The Secchi disk is lowered into the water until it is no longer visible, then the depth is measured. High Secchi depth readings indicate clearer water, while low Secchi depths suggest higher turbidity.



The identification of microalgae is conducted through a systematic analysis of fresh liquid samples using a compound microscope. The procedure commences by depositing a drop of the liquid sample onto a clean slide, subsequently covering it delicately with a coverslip using a needle or forceps to prevent the formation of bubbles. The slide was examined under the microscope to identify microalgae based on morphological characteristics like cell shape, structure, size, colony formation patterns, and distinct cellular structures. These observations were sketched to assist in documenting critical morphological characteristics for precise identification. Then these unique and essential characters of an unknowing organism needed to be compared with the features of an identified organism that are available in published scientific monographs, journals, books, or taxonomic keys.

The purpose of water sampling collection at Tasik Aman

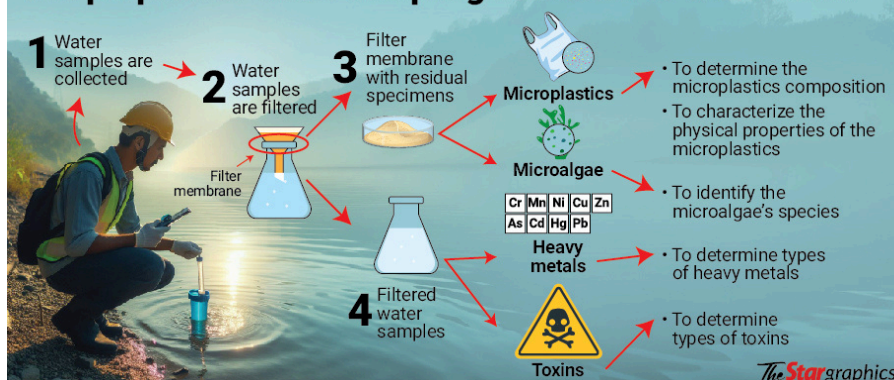


Figure 1: The summary of work flow for water sampling at Tasik Taman Aman (retrieved from The StarMetro. (May 24, 2024). Academics pool brainpower to combat algal invasion)



For CYANOTOXINS DETECTION, 1 litre of water was collected in high-density polyethylene (HDPE) bottles from each water sampling site. These samples were transported to the laboratory at Monash University Malaysia and stored at 4°C for preservation. The samples were then filtered through Whatman® GF/C filter paper (47 mm, 1 µM) using a vacuum pump filtration unit to remove particulate matter and debris, after which the filtered samples were stored at -20°C. The water samples were then detected and quantified for cyanotoxin levels using liquid chromatography-mass spectrometry (LC-MS). The water samples were also tested for their toxicity in human skin cells.

Separately, for MICROPLASTIC & HEAVY METALS DETECTION, 5 litre of lake water were collected from each water sampling site and underwent a series of processes such as preservation with nitric acid, filtration, digestion with hydrochloric acid and nitric acid, then final analysis for heavy metals using an Atomic Absorption Spectrometer (AAS). The metals tested included copper (Cu), iron (Fe), manganese (Mn), nickel (Ni), and zinc (Zn). Meanwhile, analysis for microplastics presence was conducted using a Fourier Transform Infrared Spectroscopy (FTIR).



Cr	Mn	Ni	Cu	Zn
As	Cd	Hg	Pb	...



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CHAPTER 3

Project Findings



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MICROALGAE

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Based on the examination of water samples under a compound microscope, four predominant taxa of microalgae were identified. The first identified species was *Microcystis aeruginosa* (Kützing) Kützing, a colonial cyanobacteria. *Microcystis* sp. are unicellular spherical cells (1-9 μm) that typically have a large number of cells embedded in mucilage, forming irregular or subspherical colonies, and can be either free-floating or affixed to a substrate. These blue-green algae are known for its potential to produce toxins such as microcystins.

The second taxa identified was *Chlorella* sp., a unicellular green alga belonging to the phylum Chlorophyta. The cells exhibit spherical, subspherical, or ellipsoid morphology, measuring from 2 to 10 μm in diameter, either single or aggregated in small, irregular colonies containing up to 64 cells; mucilage may be present or absent. The chlorella cell possesses a unique cup-shaped chloroplast that houses the green photosynthetic pigments chlorophyll-a and -b, and it lacks flagella.

The third taxa found was *Scenedesmus* sp., a green alga from Order Sphaeropleales. *Scenedesmus* sp. can be single celled or colonial, forming 2- to 32-celled, usually 4- or 8-celled coenobia; surrounding

mucilaginous matrix present or absent. *Scenedesmus* sp. cells are arranged in a linear, alternating, or 2-3 row pattern, either touching the lateral walls or simply in the subpolar region. Cells range in size from 3-78 x 2-10 µm and can be almost spherical to ellipsoidal, elongate, or fusiform. The cell poles can have a capitate, obtuse, acute, or long tapering shape.

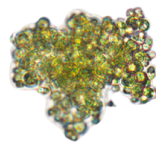
Navicula sp., a diatom belonging to the class Bacillariophyceae within the phylum Heterokontophyta, was the fourth taxa obtained. The genus *Navicula* is one of the most species-diverse genera within Bacillariophyceae. *Navicula* are unicellular and have an elliptical to lanceolate shape with rounded, flat, or capitated ends. This shape is similar to the boat-shaped, shape of pennate diatoms and has striated valve surfaces on both sides. Striations display diversity and may be visible or invisible under a light microscope. The central area may display thickening; however, it does not possess a banded stauros structure.

The identification process based on morphological characteristics, such as cell shape, size, colony formation patterns, and specific cellular structures, proved effective in assessing the microalgal diversity in the aquatic environment. However, to achieve a more comprehensive and confirmatory analysis, integrating isolation, purification, and molecular techniques is recommended, as these methods could enhance the accuracy and reliability of the findings.



HOW SMALL ARE MICROALGAE?

Microalgae are photosynthetic unicellular microorganisms, which range between 0.2 and 200 µm and can be found in a wide range of ecological and colonized habitats.



Microcystis aeruginosa



***Chlorella* sp.**



***Scenedesmus* sp.**



***Navicula* sp.**



x x x

CYANOTOXINS AND TOXICITY PROFILE

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+ + + +
+ + + +

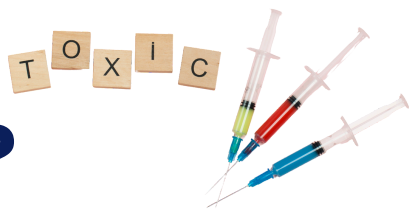
The study investigated cyanotoxins, harmful toxins produced by cyanobacterial blooms, in Tasik Taman Aman, a recreational lake. Eutrophication, or nutrient accumulation, promotes cyanobacterial blooms, posing risks to water safety and the surrounding ecosystem.

Tasik Taman Aman was found to have high levels of cyanotoxins such as microcystin-LR and nodularin. Although these cyanotoxin levels are slightly below the safe levels for recreational use, these cyanotoxins cannot be neglected because their levels are exceeding safe levels as edible sources which can potentially enter human food chains. The cyanotoxin levels are varying across sampling zones (Zones A, B, and C) and peaking during the warmer months. The water samples from zones A and B had a comparable higher Cytotoxicity Index on human skin cells, than water samples from Zone C.



LC-MS profiling of cyanotoxins in water samples by Dr. Michelle Yap, Monash University Malaysia

WHAT DO WE FOUND?



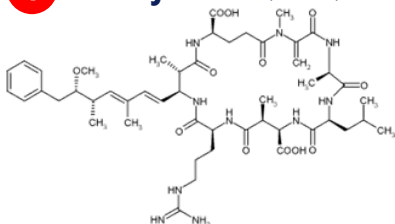
DID YOU KNOW?



WHAT IS MICROCYSTIN?

Microcystin is a family of toxins produced by species of freshwater cyanobacteria, known as *Microcystis aeruginosa*. They can potentially be threatening to human health.

1 Microcystin-LR (MLR)



*Most common microcystin

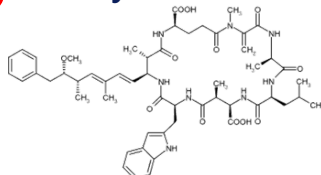
DID YOU KNOW?



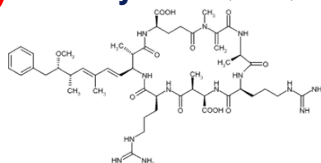
WHAT IS CYTOTOXICITY TEST?

This test examines the potential toxicity of the water samples on human skins

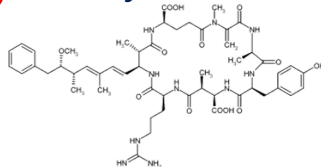
2 Microcystin-LW (MLW)



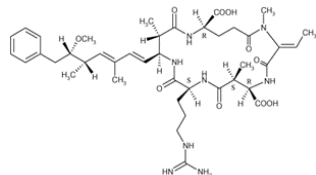
3 Microcystin-RR (MRR)



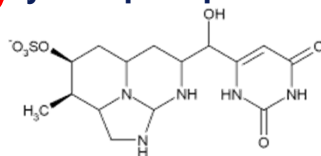
4 Microcystin-YR (MYR)



5 Nodularin (NOD)



6 Cylindrospermopsin (CYL)





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MICROPLASTIC & HEAVY METALS

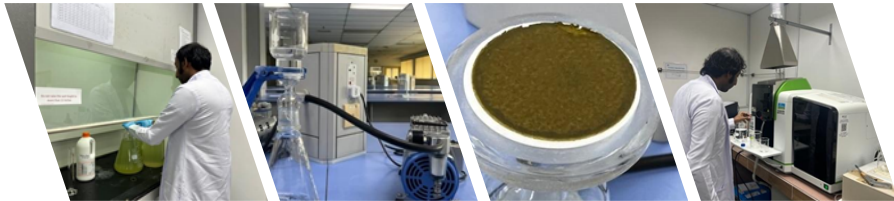
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Our results indicated that the heavy metal concentrations in Tasik Taman Aman all fell within Class 1 under Malaysia's National Water Quality Standards (NWQS). This means the heavy metal levels, including iron (Fe), zinc (Zn), and manganese (Mn), were within natural ranges, while nickel (Ni) and copper (Cu) were mostly undetectable (below the detection limits). Class 1 water is considered clean, suitable for recreational activities, and can support sensitive aquatic life due to its low metal concentrations.

Whereas, for microplastics analyses, the water samples collected showed consistent presence of synthetic or semi-synthetic materials (polymers). The predominant component identified was Polyester (specifically Polyester containing Kaolin clay), along with related industrial chemicals including 2-Butyne (a compound used to enhance plastic flexibility), boron trifluoride (a chemical that helps create polymers), and trimethyl borate (an additive that makes materials resist fire).

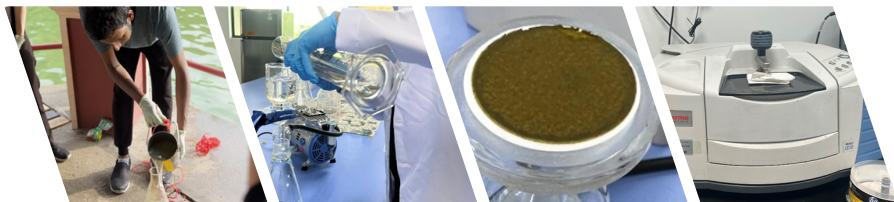
HOW DO WE DO IT?

HEAVY METAL ANALYSIS



(a) Preservation of water samples in HNO_3 and HCl . (b) Filtering cooled solution. (c) Retained organic matter on filter paper after filtration. (d) Analysis using AAS.

MICROPLASTICS ANALYSIS



(a) Lake water samples collection (5 L at each zone). (b) Filtration of water samples to collect particles. (c) All particles (synthetic & organic) are retained on filter paper. (d) Detection of synthetic materials (micro- & nano- plastics) using FTIR.



Heavy metals are metallic elements with relatively high densities, atomic weights, or atomic numbers. They can be toxic or poisonous at low concentrations, especially to aquatic living species



Microplastics can pose many serious risks to human health, and the environment. Once in the ocean, microplastics can no longer be removed and are threatening marine life



Danger lurks in still waters

Efforts are underway to save a Petaling Jaya lake inundated with harmful microalgae and find the best methods to rehabilitate other polluted freshwater ecosystems in the Klang Valley. >2&3

Within Taman Aman park in Section 22, Petaling Jaya, which is covered with microalgae. — FAHIAN GHANI/The Star



UNIVERSITI
MALAYA

CHAPTER 4

Activities &

Dissemination Strategy

COURTESY VISIT

➤ COURTESY VISIT AND WALK-ABOUT BY THE MAYOR OF PETALING JAYA AT TAMAN AMAN



(PETALING JAYA, Mac 31, 2024) In a significant step toward environmental sustainability, the Mayor of Petaling Jaya, Tuan Hj. Mohamad Zahri Samington, conducted a meaningful walkabout at Taman Aman park on March 31, 2024. The visit marked a pivotal moment for the Guarding Our Water Together project, demonstrating the city's commitment to environmental stewardship and community engagement.

During the morning inspection, Mayor Samington was accompanied by Councilor Nalina Nair and executive committee members of Friends of Taman Aman (FoTA). The delegation engaged in detailed discussions about the lake's water quality and various challenges facing the recreational space, which has long served as a vital community hub for Petaling Jaya residents.

The mayor also expressed his strong support for the "Guarding Our Water Together" initiative, particularly emphasizing its role in enhancing the water quality of Tasik Taman Aman. This initiative aligns with the city's broader vision of transforming Petaling Jaya into a more vibrant, sustainable, and environmentally conscious urban city. The success of this project could serve as a model for similar environmental initiatives across other parks and water bodies in the region.

In a significant development during the visit, the mayor endorsed a proposal by project leader Nuratiqah Mohamad Norpi to organize a mini exhibition at Taman Aman in November 2024. The mayor's commitment extends beyond mere approval, as he agreed to both co-organize and co-fund the exhibition, demonstrating the city council's strong dedication to environmental education and community engagement.





STAKEHOLDER ENGAGEMENT



MONASH
University
MALAYSIA



KELAB SAHABAT TAMAN AMAN PJ
FRIENDS OF TAMAN AMAN PJ

► FOTA'S 14TH AGM SHOWCASES COMMUNITY UNITY AND ENVIRONMENTAL COMMITMENT

(PETALING JAYA, May 18, 2024) The Friends of Taman Aman (FoTA) celebrated a significant milestone with the successful completion of its 14th Annual General Meeting on May 18, 2024. The event was honored by the presence of distinguished guests, Kampung Tunku State Assemblywoman YB Madam Lim Yi Wei and Councilor Madam Nalina Nair, who delivered inspiring speeches highlighting the importance of community engagement in environmental conservation.

A key highlight of the AGM was the presentation of the Guarding Our Water Together project's progress report by FoTA Chairperson Mr. Thayakugan Rajendram. While the project team was unable to attend physically, they submitted a comprehensive update on their water quality initiative at Tasik Taman Aman. The report outlined current findings including microalgae and cyanotoxin identification, progress in identifying pollution sources, and upcoming events of the project.

Established over a decade ago, FoTA continues to serve as a vital bridge between the local council and community members in the Taman Aman area. The organization has pledged its full support to the Guarding Our Water Together initiative, demonstrating its ongoing commitment to environmental stewardship and community enhancement. Through this collaboration, FoTA aims to facilitate community engagement in environmental conservation while supporting the implementation of water quality improvement measures at Tasik Taman Aman.





PUBLIC FORUM

► PUBLIC FORUM "GUARDING OUR WATER TOGETHER" IN CONJUNCTION WITH WORLD ENVIRONMENT DAY SYMPOSIUM



(KUALA LUMPUR, June 24, 2024) The Public Forum "Guarding Our Water Together" jointly organized by Monash University Malaysia, was held in conjunction with the World Environment Day Symposium on June 24, 2024, aimed to address critical environmental issues and explore innovative solutions, special highlights on water conservation and plastic pollution.

Moderated by Dr. Michelle Yap from Monash University, the discussion began with a presentation by Dr. Faddrine Jang from Monash University, titled "Trash Talk: The Underwater Drama of Plastic Pollution." Dr. Jang highlighted the detrimental effects of plastic pollution on aquatic ecosystems. Following this, Assoc. Prof. Dr. Nurhidayatullaili from the NANOCAT Research Center (UM) delivered her presentation titled 'Advancements in Water Security: Harnessing Advanced Materials for Purification and Protection. Her talk focused on the application of various nanotechnology and advancements contributing to water security. Mr. Affan Nasaruddin from the UM Sustainable Development Centre (UMSDC) and Water Warriors then shared insights on the 'Water Warriors Living Lab: Restoration of Tasik Varsiti, Universiti Malaya Through 'Heartware - Hardware - Software' Approach'. His talk highlights the essential elements of humanistic approach called 'heartware' in driving sustainability solutions.

The hybrid forum provides valuable insights into effective science communication and community engagement, critical components in driving sustainable change and has successfully attracted close to 100 participants, whom many are university students and local public.





SAMPAH SNAGGER 002

► INSTALLATION OF INNOVATIVE WASTE COLLECTION SYSTEM AT TAMAN AMAN



(PETALING JAYA, July 24, 2024) In addition to the laboratory analyses, the study also implemented SAMPAH SNAGGER 002 at Tasik Taman Aman on July 2024, an innovative waste collection system whose name combines the Malay word for garbage ("sampah") with the action of quick removal ("snagging"). These mini trash barriers were constructed using locally sourced materials and designed for easy installation, enabling community participation in both construction and maintenance. The barriers were strategically placed to intercept water pollution at its source. The Sampah Snagger 001 by Sekitar Kita was initially installed at a stream within Universiti Malaya with the assistance of 12 UM students.

Regular maintenance of the Sampah Snagger is crucial, weekly collection and analysis of trapped debris was conducted to characterize the type of waste accumulated in the water body. This proactive maintenance schedule also ensures that collected litter is promptly removed, disposed of responsibly, or recycled.

By reducing the volume of pollutants in the water, this initiative not only contributes to cleaner lake ecosystems but also alleviates the financial burden on local governments tasked with waterway clean-up efforts. These cost-saving measures can be reinvested into broader efforts aimed at improving water quality and infrastructure across Selangor, aligning with the objectives outlined in the United Nations Sustainable Development Goal 6 (SDG 6) for clean water and sanitation. The ongoing Selangor water crisis underscores the urgency of implementing such sustainable solutions to safeguard water resources and promote a resilient water future for the region.





"During routine maintenance of Sampah Snagger 002, Mr. Affan Nasaruddin gave his fellow project members quite a scare when he spotted what appeared to be a human hand floating in the lake.

Hearts racing, they soon discovered the 'grim' finding was nothing more than a discarded doll's hand – bringing sighs of relief and a few nervous laughs all around."



MINI EXHIBITION @TAMAN AMAN



...



PJS.E.E.D
Preserving our Future. Enriching our Community. Empowering our Development.



MONASH
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MINI EXHIBITION @TAMAN AMAN

GUARDING OUR WATER TOGETHER



Free Entry

9am - 2pm

23 November 2024 (Saturday)

Basketball Court, Taman Aman, PJ



JOIN
US



Register
Here

OUR PROGRAMS:

PARK & LAKE CLEANING

AWARENESS TALK

RECYCLING & BUYBACK

COMPOSTING 101

EXHIBITION

STEM ACTIVITIES

CAR BOOT SALE

COMMUNITY TRIUMPH
SHARING SESSION

COMMUNITY PLEDGE WALL



Food will be provided
on a first come first serve basis

IN SUPPORT OF

6

CHARITIES

11

UNIVERSITY

13

UNIVERSITY

14

UNIVERSITY

15

UNIVERSITY

17

UNIVERSITY

RECYCLING & BUYBACK PROGRAM

Items that can be recycled:

Item	Price / kg
Used cooking oil	RM1.80
Paper	RM0.20
Beer / Tetrapak	RM0.20
Soft plastic	RM0.40
Hard plastic	RM0.30
Aluminium can	RM2.00
Iron	RM0.50
Tin	RM0.20

WE DO NOT ACCEPT:

DEMONSTRATION OF Food Waste Composting

EVERYONE RESEMBLES THE GARDEN CHANGE, SO DOES THE FOOD WASTE

IN THE REINVENTION

Carboot Sales

Register now to secure your spot!

- 23 November 2024 (Saturday)
- 8.00 am - 2.00 pm
- Parking Space near to Basketball Court, Taman Aman, PJ

SOFT TOYS | ACCESSORIES | CLOTHING | SHOES | HOMEGOODS | BOOKS

MINI EXHIBITION @TAMAN AMAN: LIST OF PROGRAMS



Park & Lake Cleaning



Awareness Talk



Exhibition



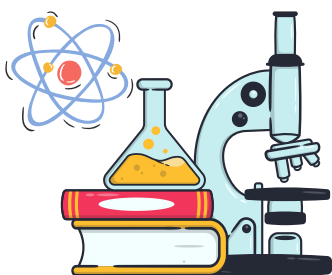
Recycling & Buyback



Composting 101



Car Boot Sale



STEM Activities



Community Triumph
Session



Community Pledge Wall



MEDIA COVERAGES

• • • •

► NEWSPAPER ARTICLES

Impacts of the collaborative work done under this PJ Seed project have been featured in national newspaper articles such as the StarMetro.

To date, the estimation of total media value gained has reached up to RM 840,000

Among the significant impacts that were highlighted include:

- Environmental restoration since the project aims to address the causes of algal blooms that disturbed the lake's ecological balance.
- Research-driven mitigation strategies as a way forward to solve urban water issues and promote sustainable practices in local water management.



Danger lurks in still waters

Efforts are underway to save a Petaling Jaya lake inundated with harmful microalgae and find the best methods to rehabilitate other polluted freshwater ecosystems in the Klang Valley. >2&3

PRINTED MEDIA

2 NEWS

WARRANTS OF ATTACHMENT

WARRANTS OF ATTACHMENT issued by the High Court in Petaling Jaya today, in a case involving the seizure of assets of a company, including a car, a house and other assets, to secure the payment of a loan.

FOOTBALL TOWN

Football town, a new development in Petaling Jaya, is set to become a hub for football-related activities, including a stadium, training grounds, and a museum.

FOR GARDENING LOVERS

A new garden, designed for gardening enthusiasts, is set to be launched in Petaling Jaya. The garden will feature a variety of plants, including rare and exotic species.

STAMP FEE

The stamp fee for the registration of a company in Petaling Jaya has been reduced, making it more affordable for small businesses.

ZAMBA BISHOP

The Bishop of the Roman Catholic Diocese of Kuala Lumpur has visited Petaling Jaya to oversee the construction of a new church.

TEKNO DANCE

A new dance performance, featuring a mix of traditional and modern styles, is set to be staged in Petaling Jaya.

PHOTO CONTEST

A photo contest, organized by a local organization, is set to be held in Petaling Jaya. The contest will encourage residents to capture the beauty of their surroundings.

CHARITY BAZAAR

A charity bazaar, organized to raise funds for a local charity, is set to be held in Petaling Jaya. The bazaar will feature a variety of goods, including clothing, food, and handicrafts.



Task Aman team members collect water samples from the lake. (Photo by: RANAN KHAN/Star)

Academics pool brainpower to combat algal invasion

Team from two varieties collecting data to save Task Aman in PJ

By AMAN AHMAD

aman.ahmad@star.com.my

PHOTO BY: RANAN KHAN/Star

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Team from two varieties collecting data to save Task Aman in PJ

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PHOTO BY: RANAN KHAN/Star

ENCOURAGING 'CITIZEN SCIENTISTS' TO MONITOR LAKE WATER

News 3

Encouraging 'citizen scientists' to monitor lake water

By AMAN AHMAD

aman.ahmad@star.com.my

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ENCOURAGING 'CITIZEN SCIENTISTS' TO MONITOR LAKE WATER

By AMAN AHMAD

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The purpose of water sampling location at Task Aman



Task Aman team members collect water samples from the lake.

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The purpose of water sampling location at Task Aman



DIGITAL MEDIA

Encouraging 'citizen scientists' to monitor lake water

By AIDA AHMAD

METRO NEWS
Friday, 24 May 2024

ENGAGING and educating the community about the importance of conserving freshwater is another primary objective of the project called 'Guarding Our Water Together: Unveiling the Hidden World of Water Security and Ecosystems'.

Universiti Malaysia (UM) Department of Research Management social research officer Nurulqah Mohamad Nargi said to achieve this, they designed various activities aimed at empowering local communities, like the Friends of Taman Aman (FotA).

FotA had approached Nurulqah along with her colleague Chang Lee Wei, a research officer from the university's Centre for Civilisational Dialogue (UMCCD), to address the pollution at Tasik Aman in Taman Aman, Petaling Jaya.

She said the project included capacity building and partnership with local authorities and engaging with FotA to promote the concept of 'citizen scientist'.

"We aim to enhance their understanding of freshwater conservation and the impacts of cyanobacterial (dense and sometimes toxic) blooms and microplastics.

"This will also foster a sense of ownership and responsibility among the local community," she said.

Long-term sustainability



Home For You Bookmarks Audio Search

Academics pool brainpower to combat algal invasion

By AIDA BINTI AHMAD

METRO NEWS
Friday, 24 May 2024



Tasik Aman in Taman Aman park in Section 22, Petaling Jaya is a haven to bird-watching. — FABIAN GIAN/The Star

ONCE a place of leisure with a vibrant ecosystem, Petaling Jaya's Tasik Aman is now a murky green expanse due to microalgae that has inundated the 2ha-wide lake.

Scientists from two separate universities are collaborating to gather data on the lake's dynamics and the reasons for Tasik Aman's decline.

Home For You Bookmarks Audio Search

Rubbish snagger installed at PJ lake

By AIDA AHMAD

METRO NEWS
Wednesday, 21 Aug 2024



A general view of Tasik Aman in Petaling Jaya. UM researchers are trying to find ways to address the microalgae problem there. — Fajaz

Universiti Malaysia (UM) researchers have invented an innovative device to trap the growing amount of waste that is fueling algae in Tasik Aman, located in Taman Aman, Petaling Jaya, Selangor.

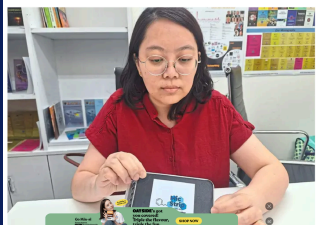
Constructed from nets and buoys and strategically anchored to poles along the banks, Sampah Snagger 002 acts as a barrier to trap floating debris on the lake.

UM Sustainable Development Centre (UMSDC) research officer Affan Nasaruddin said its primary objective was to combat the adverse effects of rubbish, especially plastics, on local aquatic ecosystems and public health.

Study shows high toxin levels at PJ's Tasik Aman

By AIDA AHMAD

METRO NEWS
Friday, 23 Aug 2024



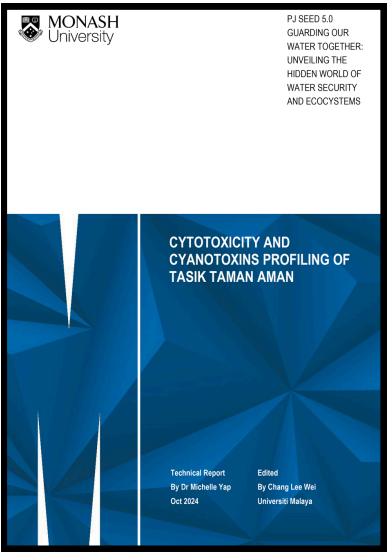
Yap showing the on-site rapid bioassay called MicroP for citizen scientists to test the presence of microcystin in aquatic bodies.



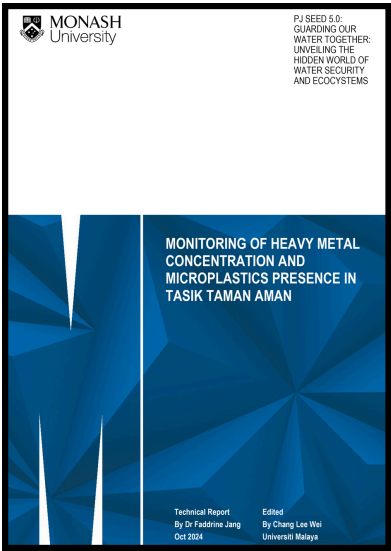
These digital media can be downloaded at the following links:

- The StarMetro. (August 23, 2024). Study shows high toxin levels at PJ's Tasik Aman. <https://www.thestar.com.my/metro/metro-news/2024/08/23/study-shows-high-toxin-levels-at-pjs-tasik-aman>
- The StarMetro. (August 21, 2024). Rubbish snagger installed at PJ lake. <https://www.thestar.com.my/metro/metro-news/2024/08/21/rubbish-snagger-installed-at-pj-lake>
- The StarMetro. (May 24, 2024). Academics pool brainpower to combat algal invasion. <https://www.thestar.com.my/metro/metro-news/2024/05/24/academics-pool-brainpower-to-combat-algal-invasion>
- The StarMetro. (May 24, 2024). Encouraging 'citizen scientists' to monitor lake water. <https://www.thestar.com.my/metro/metro-news/2024/05/24/encouraging-citizen-scientists-to-monitor-lake-water#:~:text=ENGAGING%20and%20educating%20the%20community,of%20Water%20Security%20and%20Ecosystems>

➤ **TECHNICAL REPORT ON CYTOTOXICITY AND
CYANOTOXINS PROFILING OF TASIK TAMAN AMAN**



➤ **TECHNICAL REPORT ON MONITORING OF HEAVY
METAL CONCENTRATION AND MICROPLASTIC
PRESENCE IN TASIK TAMAN AMAN**





MROS
MALAYSIAN UNIVERSITY RESEARCH OFFICER SOCIETY



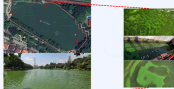
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MALAYSIA UNIVERSITY RESEARCH OFFICE SOCIETY

Azzin Md Kasim^{1,2}, Nuratiqah Mohamad Norpi^{1,2}, Lee Wei Chang^{1,2}, Michelle Khai Khun Yap³, Faddrine Jang³, Hui Yin Yeong³, Mohd Fadhlil Rahmat Fakri⁴, Affan Nasaruddin⁵, Norshahzila Idris⁶, Nurzati Sharleeza Mat Jalaluddin⁷, Siti Norasiah Abd Kadir⁸

Azzin Md Kasim^{1,2}, Nuratiqah Mohamad Norpi^{1,2}, Lee Wei Chang^{1,2}, Michelle Khai Khun Yap³, Faddrine Jang³, Hui Yin Yeong³, Mohd Fadhlil Rahmat Fakri⁴, Affan Nasaruddin⁵, Norshahzila Idris⁶, Nurzati Sharleeza Mat Jalaluddin⁷, Siti Norasiah Abd Kadir⁸

INTRODUCTION

- Tamaran Aman lake is vulnerable to pollution, salination, climate change, and microplastic contamination.
- These issues may cause serious risks to both ecosystem and human health.
- We bring together multidisciplinary teams working in close collaboration with MEPP, NGOs and local communities to investigate on the water quality of Tamaran Aman lake.
- By involving citizen scientists, we fostered community engagement and improve public awareness of water-related issues.
- We also seek to deepen our understanding of conservation practices and the impacts of various pollutants on freshwater ecosystems.
- This is not just about scientific discovery; it's about creating actionable knowledge that can inform policy and drive sustainable management practices for Selangor's invaluable freshwater resources.



OBJECTIVES

- ### OBJECTIVES
- To engage and educate the community on freshwater conservation.
 - To identify microalgae species, particularly those that produce cyanotoxins at Taman Aman lake.
 - To evaluate water safety profiles through toxicity studies.
 - To examine the presence of microplastics and heavy metals at Taman Aman lake.

The purpose of water sampling collection at Tasik Aman



Zone	Median Cytotoxicity Index
A	56.45
B	55.53
C	48.93

Cytotoxicity studies showed median Toxicity Index of mean dose 48.93%



The analysis also revealed **consistent presence of synthetic and semi-synthetic materials (polyesters)**. The predominant component identified was **Polyester** (specifically Polyester containing Kaolin clay), along with related industrial chemicals including **2-Butyne** (a

compound used to enhance plastic flexibility),
boron trifluoride (a chemical that helps create



CERTIFICATE OF RECOGNITION

Congratulations to

BRONZE AWARD

AZRIN MD KASIM, NURATIQA MOHAMAD NORPI, LEE WEI CHANG,
MICHELLE KHAU KHUEN YAP, FADDRIE JANG, HUI YIN YEONG,
MOHD FADHLI RAHMAT FAKRI, AFFAN NASARUDDIN, NORSHAHZILA IDIRS,
NURZATI SHARLEEZA MAT JALALUDDIN, SITI NORASIAH ABD KADIR

as winner of **BEST PRESENTATION AWARD** in the
2nd Research Officer National Symposium (ReONS)
 in Universiti Malaya, Kuala Lumpur, on 19 - 20 November 2024




DR. CHEN CHEE DHANG
Organising Chairperson
2nd Research Officer National Symposium 2024
(ReONS)

fanyanti

DR. NORFARYATI KAMARUDDIN
President
Malaysian University Research Officer Society
(MROS)

Joint organised by:

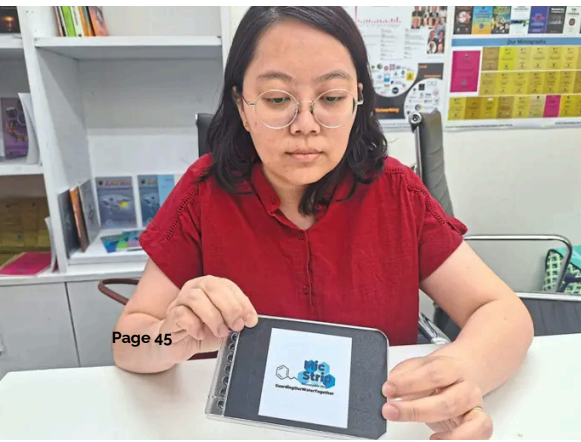




MAKING BIOTOXIN DETECTION ACCESSIBLE

Traditional methods for detecting dangerous aquatic biotoxins require expensive lab equipment, specialized training, and precious time we can't afford to waste. Thanks to the innovative vision of project members Dr. Michelle Yap and Mr. Chang Lee Wei, we now have MicStrip - a groundbreaking toolkit that puts the power of rapid biotoxin (microcystin) detection directly in the hands of local communities.

MicStrip transforms complex laboratory procedures into a simple on-site testing solution, enabling quick response times and proactive water safety management where it matters most. By eliminating barriers of cost, expertise, and infrastructure, MicStrip empowers local authorities to protect public health through timely detection and mitigation of water safety threats.



GUARDING OUR WATER TOGETHER

TRANSFORMING FROM LAB TO WATER SITE
in situ + on-site aquatic biotoxin (microcystin) detection toolkit

What is microcystin?

- Commonly found freshwater biotoxin globally.
- Produced exclusively by harmful cyanobacteria that grow in lakes, ponds, and stagnant river.
- Cannot be destroyed by cooking or boiling the water.
- Known to cause liver damage and potentially causing cancers.

Current detection methods of microcystin

- Use lab machine, e.g. Liquid Chromatography-Mass Spectrometry
- Laborious
- Expensive & Time-consuming
- Require specific training & adequate scientific knowledge



Key features MicStrip

- Designed for the detection of microcystin
- Cheap & Economical
- Convenient & User-friendly
- Easy-to-use, requires minimal training
- Fast & Accurate result
- Complete and the kit includes everything you need




SHOP NOW

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RECOMMENDATIONS



CHAPTER 5

Recommendations & Way Forward

RECOMMENDATIONS

► **SHORT-TERM STRATEGIES**

- **Immediate Cyanotoxin Monitoring & Early Warning System**
 - Establish frequent monitoring or implement a real-time multi-parameter sensor arrays with cloud-based data management system
 - Establish a certified laboratory partnership for rapid toxin analysis
 - Create a standardized reporting framework and develop threshold-based response protocols
- **Temporary Public Health Precautionary Measures**
 - Temporarily restrict recreational water activities, especially fishing
 - Establish clear criteria for restriction implementation and lifting
 - Develop enforcement protocols with local authorities
- **Community Education and Engagement**
 - Organize public awareness campaigns (community forums and workshops)
 - Create targeted educational materials for public
 - Establish community reporting system for water quality concerns
- **Zone-Specific Intervention Strategy**
 - Localized treatments or aeration systems at heavy algal growth areas or stagnant water sections
 - Monitor treatment effectiveness through regular water quality assessment
 - Conduct further testing to investigate other potential pollutants contributing to the high Cytotoxicity Index

RECOMMENDATIONS

► LONG-TERM STRATEGIES

- **Nutrient Management and Water Quality Control**
 - Focuses on controlling nutrient runoff into the lake by installing buffer zones/nutrient trapping systems around water edges to filter runoff
 - Implement stormwater management systems
 - Quarterly sediment analysis and regular sediment removal and management
- **Habitat Restoration and Ecological Balancing**
 - Introduce native aquatic plants and organisms that feed on cyanobacteria
 - Create planting/introduction schedule and monitor species establishment
- **Research Partnership Network for Continuous Monitoring**
 - Partner with local universities, environmental organizations, and citizen scientists to establish long-term collaborative initiatives for water quality research, ecological studies, and trainings for monitoring protocols and regular reporting system
- **Predictive Management System**
 - Install advanced monitoring stations and collect environmental parameters
 - Track weather patterns and record seasonal changes
 - Create microalgae blooming prediction models and develop early warning systems
 - Establish intervention triggers and regular model updating
- **Public Health and Aquatic Life Impact Assessment**
 - Conduct a detailed study on the potential bioaccumulation of cyanotoxins in aquatic organisms and its subsequent impact on human food chains
 - Develop safety guidelines and regular health impact reviews

WAY FORWARD



The path to restoring and protecting Tasik Taman Aman requires a carefully orchestrated approach that balances immediate action with long-term sustainability. Our journey begins with urgent measures to address the current cyanobacterial crisis. These immediate steps, while crucial, are just the beginning of our comprehensive restoration effort.

In the coming months, it is essential to forge partnerships with local universities, environmental organizations, and community groups to establish a robust scientific foundation for our work. Simultaneously, a community engagement program that transforms local residents into active stewards of their water resources is highly encouraged. Through citizen science initiatives and educational programs, we aim to build a knowledgeable and engaged community that understands the vital role they play in protecting their local water bodies.

As we move forward, we are hoping that regular monitoring of water quality metrics, biodiversity indicators, and community participation levels will help us track our progress and adjust our strategies as needed. Through careful documentation of our methods and results, we aim to create a model of community-led environmental stewardship that can be replicated across other urban lakes facing similar challenges.

This way forward is more than just a plan—it is a commitment to transforming how we protect our water resources. By combining scientific expertise with community action, we can create a sustainable framework for water resource management that serves both current and future generations. The “Guarding Our Water Together” project represents not just the revival of a single water body, but the beginning of a broader movement toward community-driven environmental conservation in Malaysia.

Nuratiqah Mohamad Norpi
Project Leader

Guarding Our Water Together:

Unveiling the Hidden World of Water Security and Ecosystems

ACKNOWLEDGEMENTS

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- YB Madam Lim Yi Wei, Kampung Tunku State Assemblywoman
- Tuan Hj. Mohamad Zahri Samingon, Mayor of Petaling Jaya
- Madam Nalina Nair A/P Rama Krishnan, Councilor of Zone 19 (Section 20, Section 21 & Section 22)
- Mr. Loh Y Lun, Councilor of Zone 8 (SS2)
- Mr. Mohd Zaim bin Mohd Nor, Occupational Safety, Health and Environment (OSHE) Unit
- Madam Filzah Zahirah Saiful Razi, Department of Solid Waste Management and Public Cleansing

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- Sekitar Kita for their technical expertise in establishing the Sampah Snagger initiative

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- UM Sustainable Development Centre (UMSDC)
- UM STEM Centre
- UM Water Warriors
- UM Community Engagement Centre (UMCares)
- Estates Department:
 - Madam Mairuz Asmarafariza Azlan
 - Mr. Hisyamuddin Che Harun

The success of this initiative reflects the power of collaboration between local government, academic institutions, and community organizations in protecting our precious water resources.

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