

PROJECT PROFILE

VOT NUMBER : R.J130000.6801.4J774



Project Title

**CITIZEN SCIENCE & OPEN SCIENCE FOR PLANETARY HEALTH BOOTCAMP
(COSPHE)**

Research Area

Project Leader: LAr. Dr. Zanariah Jasmani

(Names of Team Members)

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ABSTRACT (120 words)

The Citizen Science & Open Science for Planetary Health (COSPHE) is a community-based knowledge transfer programme designed to strengthen environmental awareness, scientific literacy, and sustainable practices among diverse community groups. Implemented through three programme series in 2025, COSPHE engaged rural communities, school students, industry players, and local authorities using citizen science and open science approaches. The key thematic areas comprise five core modules: River Water Quality Monitoring, Water Quality Assessment (Biological Indicators), Biodiversity Mapping (iNaturalist), Eco-Art (Ecoprint), and Sustainable Planting (Hugel Culture) Through hands-on modules and a Train-of-Trainers (ToT) model, the programme empowered participants to contribute to environmental monitoring and stewardship. Overall, COSPHE successfully enhanced community participation, promoted SDG-aligned sustainability actions, and strengthened university–community–industry collaboration in support of planetary health.

1. INTRODUCTION

The COSPHE programme was initiated to bridge scientific knowledge and community action in addressing environmental and planetary health challenges. Targeting several communities, the initiative employs "Citizen Science" and "Open Science" approaches to democratise scientific knowledge, allowing community members to actively participate in data collection alongside professional researchers. Unlike conventional research-driven projects, COSPHE emphasised participatory learning, citizen science, and open data practices to ensure inclusivity and long-term impact. The programme aligns with Sustainable Development Goals (SDGs), particularly SDG 4 (Quality Education), SDG 11 (Sustainable Cities and Communities), SDG 13 (Climate Action), SDG 14 (Life Below Water), and SDG 15 (Life on Land). By combining interactive learning, practical training, and on-site fieldwork, COSPHE aims to cultivate a sense of shared responsibility for environmental protection while enriching public understanding of science.

2. METHODOLOGY (PROGRAM MODULES)

The program utilizes a hands-on, modular approach adapted to site suitability and participant demographics. A total of five (5) technical modules were developed and introduced:

Module 1: River Water Quality Monitoring: Focuses on water quantity and quality management, teaching participants the scientific principles of water conservation.

Module 2: Water Quality Assessment Based on Biological Indicators: Utilizes aquatic macroinvertebrates to determine river health without relying solely on chemical tests.

Module 3: Biodiversity Database Using iNaturalist: Introduces digital biodiversity mapping, where participants identify and record local flora and fauna using mobile devices.

Module 4: Eco-Art Module (Ecoprint): Teaches the use of botanical resources (leaves/flowers) to create sustainable fabric patterns, promoting alternatives to synthetic dyes.

Module 5: Sustainable Planting and Composting: Introduces the "Hugel Culture System" and organic cultivation methods to improve soil health and food security.

Implementation Strategy: The program follows a Train of Trainers (ToT) model, equipping participants with the skills to become facilitators and disseminate knowledge within their own networks, ensuring a sustainable transfer of knowledge. Module selection for each series was adapted based on site suitability, participant profile, and logistical considerations.

3. PROGRAM FRAMEWORK

The program is grounded in the concept of Planetary Health, recognizing the inextricable link between human well-being and the health of natural systems. It leverages Citizen Science, defined here as public participation in data collection and scientific inquiry. This approach is documented to enhance scientific literacy and foster "Open Science"—the collaborative creation of knowledge that is accessible to all.

By engaging communities in technical tasks such as biological monitoring and digital mapping, the project shifts the paradigm from passive beneficiaries to active contributors in environmental management .

4. PROGRAM OUTCOMES

The effectiveness of the COSPHE modules was demonstrated through the successful execution of three distinct series, each tailored to the specific location and community needs. Across the three series, more than 250 participants were involved, including villagers, school students, teachers, industry representatives, local authorities, and UTM facilitators.

1. **Series 1** (Rural Community Engagement) – Kampung Sungai Besoi, Kulai.
Date: 03rd July 2025 Focus: Focused on biological indicators for river health, eco-art using local rural botanical resources, and sustainable planting techniques for homesteads.
2. **Series 2** (School-Based Programme) – Tunku Mahkota Ismail Youth Centre, Johor Bahru.
Date: 29th & 30th July 2025
Focus: Engaged youth and urban participants in sustainability modules suitable for recreational and park environments.
3. **Series 3** (Industry & Agency Engagement) – Sekawan Campsite, Gunung Pulai
Date: 4th October 2025
Focus: Focused on biodiversity mapping and conservation awareness in a protected forest reserve setting.

5. PROGRAM IMPACT

The COSPHE program successfully demonstrated that complex scientific concepts—ranging from water quality assessment to digital biodiversity mapping—can be effectively transferred to communities through structured, hands-on modules.

Key Technical Findings:

- **Water Quality:** Participants successfully identified sensitive and tolerant aquatic species, providing an immediate assessment of river health status .
- **Digital Biodiversity:** Utilization of the iNaturalist app resulted in the contribution of local flora and fauna data to the global biodiversity network. **Sustainable**
- **Living:** Participants demonstrated the ability to create eco-printed fabrics and implement composting systems, proving the economic and environmental viability of the modules.

Post-activity surveys indicated high levels of participant satisfaction and understanding. The program evaluation indicates a successful reception of the modules, with participants gaining practical skills in environmental monitoring and sustainable living. Average scores for programme benefits, facilitator effectiveness, and activity suitability exceeded 4.7 out of 5 across series. Participants also demonstrated a strong intention to apply knowledge gained in daily life, indicating meaningful behavioural impact.

6. HUMAN CAPITAL DEVELOPMENT

The programme contributed to human capital development by nurturing environmental stewardship, STEM interest among youth, leadership skills through ToT implementation, and practical sustainability competencies among communities and industry participants.

1. **Water Quality Assessment:** Participants successfully learned to identify sensitive and tolerant aquatic species. This proved to be a simple, effective, and low-cost method for the community to monitor river health without needing complex lab equipment .
2. **Digital Competency:** The use of the iNaturalist app was effective in introducing "Citizen Science" concepts. Participants were able to capture, classify, and upload biodiversity data, contributing to a global network and enhancing their digital literacy .
3. **Sustainable Creativity:** The Eco-Art (Ecoprint) module was well-received for its ability to turn local botanical resources into economic value. Participants learned to create unique fabric patterns, promoting eco-friendly alternatives to synthetic dyes .
4. **Agricultural Techniques:** Participants gained practical knowledge of the "Hugel Culture System" for composting, learning layering techniques that improve soil health and water retention for organic farming .

7. CONCLUSION

COSPHe has successfully established a comprehensive and inclusive model for community-engaged scientific learning under Universiti Teknologi Malaysia (UTM). Each series focused on a distinct target group community members (Series 1), school students (Series 2), and industry partners (Series 3) representing a holistic continuum of citizen participation in science and sustainability. Through its series of hands-on modules on water quality monitoring, biodiversity documentation, sustainable planting, and eco-crafting, COSPHe empowered participants to understand the interconnections between human health and ecosystem well-being the foundation of Planetary Health. The program not only disseminated scientific knowledge but also strengthened research collaboration, built environmental awareness, and generated locally relevant data for sustainability research. In conclusion, the COSPHe program series serves as a successful model for integrating scientific research, education, and community partnership in achieving the broader vision of a resilient, healthy, and sustainable planet.

APPENDIXES

*** Refer to the attached document to view the full report to the UNESCO Malaysia National Commission.*



UTM
UNIVERSITI TEKNOLOGI MALAYSIA

PROGRAMME REPORT

CITIZEN SCIENCE & OPEN SCIENCE FOR PLANETARY HEALTH (COSPHE)

LAr Dr. Zanariah Jasmani
Kiflee bin Jimpi



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- Dr. Nur Syamimi Binti Zaidi
- Dr. Siti Nur Fatimah Moideen
- Muhamad Hairulnizam bin Ishak
- Dr. Huszalina Binti Hussin

* other contributors are as listed in the documents.

A total of five (5) modules were introduced under the COSPHE program. The modules implemented are as follows:

- Module 1: River Water Quality Monitoring at the River Trail
- Module 2: Water Quality Assessment Based on Biological Indicators
- Module 3: Biodiversity Database Using the iNaturalist Application
- Module 4: Eco-Art Module Using Botanical Resources (Ecoprint)
- Module 5: Sustainable Planting and Composting Techniques

Throughout the implementation of the three COSPHE program series, not all modules were conducted in every session. The selection of modules depended on site suitability, number of participants, and availability of facilitators.

MODULE 1: RIVER WATER QUALITY MONITORING



Module Leader

Dr. Nur Syamimi Binti Zaidi

Facilitators

1. Prof. Dr. Zainura Zainon Noor
2. Dr. Zulfaqar Sa'idi
3. Ts. Siti Fadilla Md Noor
4. Siti Hanna Elias
5. ChM. Mohd Faiz Foze
6. Nurul Hana Mohamed
7. Fateha Abdul Razak

SUMMARY OF THE MODULE

This module was an engaging and educational activity designed for participants to explore the importance of water quantity, water quality, and their role in conserving this essential resource. Through hands-on activities and interactive learning sessions, participants learned how water was managed, the challenges faced in maintaining its cleanliness and availability, and simple actions they could take to help protect it for the future. Furthermore, participants gained an understanding of the scientific principles behind water conservation and how their actions—both big and small—could contribute to preserving water for their communities and the planet.

MODULE 2: WATER QUALITY ASSESSMENT BASED ON BIOLOGICAL INDICATORS



Module Leader

Dr. Siti Nur Fatimah Moideen

Facilitators

1. Ts. Dr. Muhamad Zulhasif Mokhtar
2. Ts. Dr. Josilva A/L M Muniandy
3. Dr. Nor Azidawati Haron
4. Nurul Syuhada Binti Sadikon
5. Nur Dalilah Binti Othman

SUMMARY OF THE MODULE

This module focuses on assessing river water quality using biological indicators. Participants were introduced to the concept that the presence and abundance of aquatic macroinvertebrates and microorganisms can serve as indicators of river health. Through field observations, participants learned to identify and classify selected species that are sensitive or tolerant to pollution, thereby determining the level of water cleanliness. This hands-on approach provided a simple yet effective method to evaluate ecosystem health without relying solely on laboratory-based chemical tests. By the end of the training, participants were able to interpret river health status based on the biological communities present in the water.

MODULE 3: BIODIVERSITY DATABASE USING INATURALIST



Module Leader

LAr. Dr. Zanariah Jasmani

Facilitators

1. Dr. Noor Amira Binti Sarani
2. Dr. Teoh Mee Yei
3. Dr. Nur Fatihah Tajul Ariffin
4. Kiflee Bin Jimpi

SUMMARY OF THE MODULE

This module focuses on building a biodiversity database using the iNaturalist application. Participants were introduced to the concept of citizen science through digital biodiversity mapping, where they learned to identify and record local plant and animal species. Through hands-on exploration, participants used mobile devices to capture, upload, and classify their observations, contributing valuable data to a global biodiversity network. This activity not only enhanced their understanding of local ecosystems but also fostered environmental curiosity and digital awareness. By the end of the module, participants were able to document and share biodiversity findings responsibly, promoting awareness of species conservation and the importance of preserving natural habitats.

MODULE 4: ECO-ART MODULE FROM BOTANICAL RESOURCES - ECOPRINT



Module Leader

**Mr. Muhamad
Hairulnizam bin Ishak**

Facilitators

1. Nurulhuda Binti Radznam
2. Sabrina Binti Zainal Abidin
3. Jani Akmal Bin Jaapar
4. Muhammad Hairulnizam Bin Ishak
5. Norfarhana Khairunisa Binti Abdul Rahman

SUMMARY OF THE MODULE

This module focuses on eco-art creation using botanical resources through the technique of ecoprint. Participants were introduced to the concept of utilizing natural leaves and flowers to produce unique patterns on fabric, highlighting the artistic value of local biodiversity. Through hands-on practice, they learned to arrange, press, and transfer plant pigments onto plain cloth, resulting in creative and sustainable artwork. This activity not only encouraged appreciation of nature and creativity but also promoted the use of environmentally friendly materials as an alternative to synthetic dyes. By the end of the module, participants were able to create their own eco-printed fabric while gaining awareness of the potential of natural resources in sustainable art practices.

MODULE 5: SUSTAINABLE PLANTING AND COMPOSTING TECHNIQUES



Module Leader

Dr. Huszalina Binti Hussin

Facilitators

1. Dr. Azman Abd Saad
2. Ruhaidah Mohd Aris @ Mohd Aziz
3. Nik Azizah Binti Nik Li

SUMMARY OF THE MODULE

This module introduces participants to the Hugel Culture System, focusing on its concept, techniques, and applications in sustainable agriculture. Through a 15-minute session, participants will gain insights into the benefits of this system, such as improved soil health, enhanced water retention, and eco-friendly cultivation practices. A 5-minute demonstration video will provide a visual understanding of the setup process, layering techniques, and practical applications of the system. Additionally, the module covers the selection of suitable plants, seed sowing techniques, and the principles of organic cultivation for herbs, vegetables, and other crops. Together, these sessions aim to equip participants with the knowledge and practical skills needed to implement sustainable and organic cultivation methods effectively.

SERIES 1

CITIZEN SCIENCE & OPEN SCIENCE FOR PLANETARY HEALTH BOOTCAMP (COSPHE)

VENUE: BALAIRAYA KG. SG. BESOI, KULAI
DATE: 03 JULY 2025



3 GOOD HEALTH
AND WELL-BEING



5 GENDER
EQUALITY



6 CLEAN WATER
AND SANITATION



7 AFFORDABLE AND
CLEAN ENERGY



13 CLIMATE
ACTION



Programme Background

The Citizen Science and Open Science for Planetary Health (COSPHe) program serves as a strategic platform to strengthen community capacity in addressing environmental and sustainability challenges. Targeting rural community, the initiative integrates citizen science and open science principles to promote collaborative knowledge creation and environmental stewardship. The program was organized to engage the local community in scientific activities that support Sustainable Development Goal (SDGs). This initiative not only enriches public understanding of science but also allows participants to be directly involved in collecting scientific data alongside professional researchers.

Through a blend of interactive learning sessions, practical training, and on-site fieldwork, COSPHe fosters scientific literacy while cultivating a sense of shared responsibility for environmental protection. Key activities include river water quality monitoring using biological indicators, and the adoption of best recycling practices to reduce waste generation. The program aimed to empower the community and as active contributors to sustainability efforts through a Train of Trainers (ToT) model. This model equipped participants to become facilitators capable of disseminating knowledge within their own communities, thus creating a sustainable knowledge transfer network.

Three Modules were selected:

- Module 1: Water Quality Assessment Based on Biological Indicators
Lead by Dr. Siti Nur Fatimah binti Moideen
- Module 2: Eco-Art Module from Botanical Resources – Ecoprint
Lead by LAr. Dr. Zanariah binti Jasmani and Mr. Kiflee bin Jimpi
- Module 3: Sustainable Planting and Composting Techniques
Lead by Dr. Huszalina bt. Hussin

The Citizen Science and Open Science for Planetary Health (COSPHe) program was organised by the Campus Sustainability Centre (CCS), Universiti Teknologi Malaysia (UTM), in collaboration with the Kulai Municipal Council (MPKu). The program was successfully held at Balairaya Kampung Sungai Besoi Murni Jaya and officiated by MPKu Council Member, Hjh. Nurul Nadia Ab. Azis. The event brought together more than 150 participants, comprising local residents from 6 villages and members of the Kulai UMNO Women's Committee. The program aimed to transfer knowledge from the university to the community while equipping participants with sustainable practices that can be applied in daily life.



Three interactive modules were introduced during the program. **Module 1** focused on assessing river water cleanliness using biological indicators, where microorganisms served as measures of water quality. **Module 2** highlighted eco-art through the creation of plant-based patterns on fabric bags using natural resources from the surrounding area. **Module 3** provided training on sustainable planting and composting techniques, with compost produced from food waste used as organic fertiliser.

Objectives

01

To provide exposure to the general public about the basic concepts of science and their importance in everyday life.



02

To encourage public participation through data collection and the solution of real scientific problems.



03

To strengthen the concept of Open Science by developing human capital and widely sharing scientific information.



04

To help society understand global issues such as climate change and environmental conservation through scientific approaches.

Venue

The COSPHe program was held at Balairaya Kampung Sungai Besoi Murni Jaya, Kulai, which served as a central meeting point for the surrounding villages. The venue was chosen to ensure accessibility for local residents and to create an inclusive setting for community engagement.

Its location near natural surroundings, including river areas, provided an ideal environment for hands-on activities such as water quality monitoring, biodiversity exploration, and eco-based workshops.



Location Module 1



Location Module 2



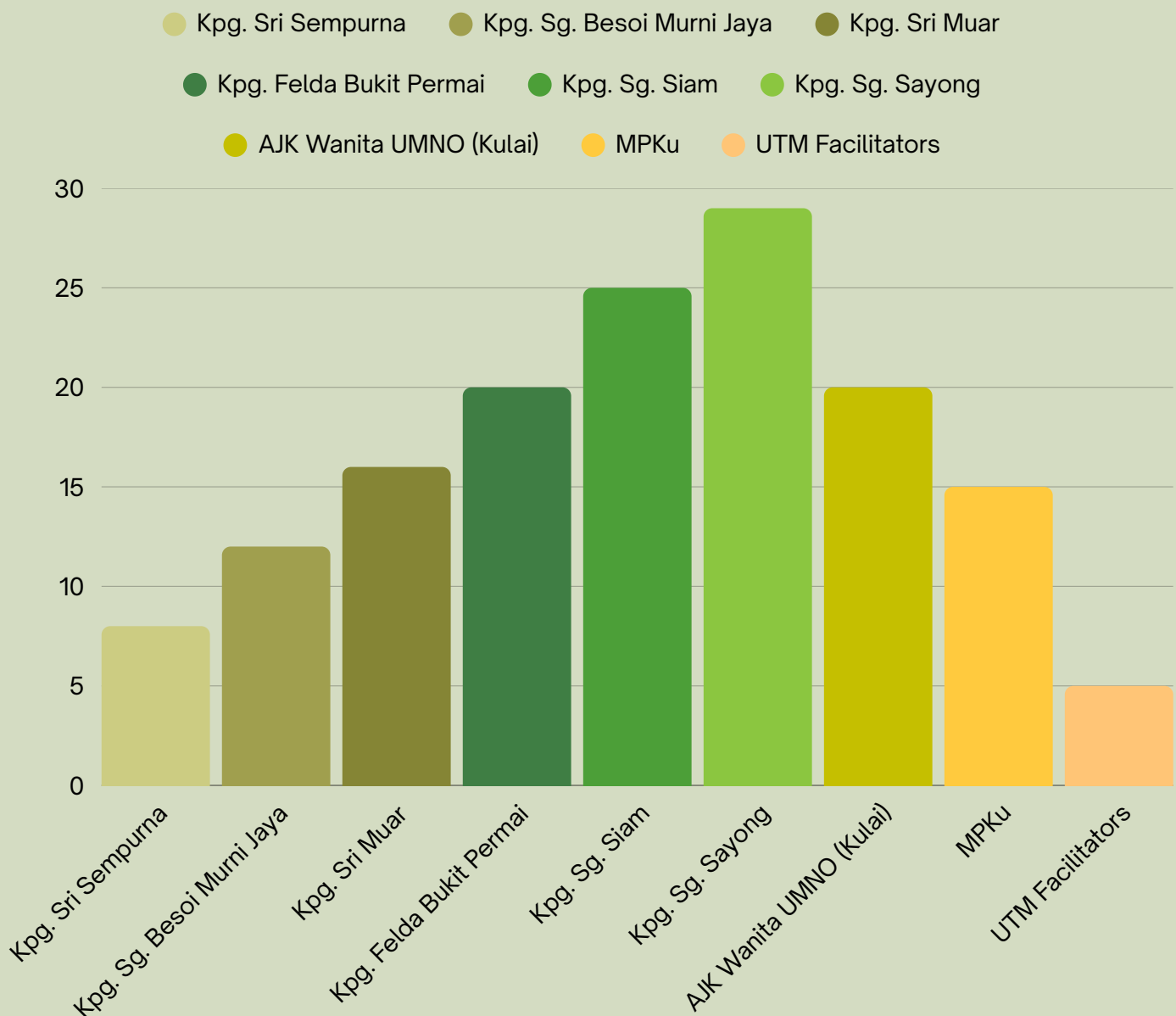
Location Module 3

Module	Name of module
Module 1	Water Quality Assessment Based on Biological Indicators
Module 2	Eco-art Module From Botanical Resources - Ecoprint
Module 3	Sustainable Planting and Composting Techniques

Participants

A total of 150 local residents from 6 villages and members of the Women's Committee of UMNO Kulai Division participated in the COSPHe program. Their active involvement demonstrated strong community engagement and enthusiasm in learning about sustainable practices, environmental stewardship, and the importance of collective action in protecting the ecosystem.

Through interactive and hands-on activities, participants gained practical skills and awareness on sustainable living, enabling them to serve as environmental ambassadors in their respective communities.



Programme Impacts and Benefits

01 *Improve Environmental Awareness*

The programme help participants gained knowledge on how microorganisms can serve as biological indicators of water cleanliness.

This experience strengthened their understanding of freshwater ecosystems and built awareness of the importance of protecting river health.



02 *Creative Engagement with Nature*

The eco-printing activity provided participants with a creative way to connect with the natural environment. By using locally sourced plants to produce artistic patterns on fabric, the community was exposed to sustainable art practices that foster appreciation for biodiversity and cultural expression.



03 *Strengthened Sustainable Waste Management Practices*

The composting module and the waste collection drive by MPKu encouraged participants to adopt practical solutions for managing organic and household waste. The successful collection of **94 kg of used cooking oil and nearly 300 kg of fabric** showcased tangible community involvement in recycling.



MODULE 1

WATER QUALITY ASSESSMENT BASED ON BIOLOGICAL INDICATORS

03 JULY 2025 | *BALAIRAYA KG. SG. BESOI MURNI JAYA*

Head of Module	Dr. Siti Nur Fatimah Moideen
Facilitators	• Ts. Dr. Muhamad Zulhasif Mokhtar • Ts. Dr. Josilva A/L M Muniandy • Dr. Nor Azidawati Haron • Nurul Syuhada Binti Sadikon • Nur Dalilah Binti Othman
Objectives	Water Quality Assessment Based on Biological Indicators is a collaborative approach that engages local communities in evaluating river health through the observation of aquatic organisms. This method highlights how the diversity and abundance of certain species, such as macroinvertebrates and microorganisms, serve as natural indicators of water quality and ecosystem condition. • To assess river water quality based on biological indicators: Participants are trained to identify and classify organisms that are sensitive or tolerant to pollution. By observing the biological communities present in the river, the community can determine its overall health and suitability for sustaining life. • To raise community awareness on river conservation: By directly engaging community members in the biological monitoring activities, the program aims to increase their understanding of the importance of protecting water resources. This hands-on involvement encourages them to share knowledge and advocate for the protection of the river trail within the broader community.
Module's Summary	• Learned about the role of aquatic macroinvertebrates and microorganisms as biological indicators of river health. • Gained skills in identifying species that are sensitive or tolerant to pollution. • Practiced field sampling and classification of organisms to evaluate water quality. • Interpret river health status based on the diversity and abundance of biological communities.

MODULE 1

WATER QUALITY ASSESSMENT BASED ON BIOLOGICAL INDICATORS

SUMMARY OF PARTICIPANTS

<i>Participant Categories</i>	<i>Total of Participation (person)</i>
Community	103
Facilitators	5

PROGRAMME IMPACTS

<i>Short-term impact</i>	<i>Long-term impact</i>
• Participants quickly understand how river organisms show water quality. • Participants learn basic techniques to observe and identify aquatic life. • Participants feel motivated to join river conservation activities.	• Participants continue assessing river health using biological indicators. • A stronger sense of responsibility grows for protecting rivers. • Consistent monitoring and care contribute to healthier river ecosystems.

Summary

In this module, participants were introduced to the use of biological indicators as an effective tool to assess river water quality. Through hands-on activities, they gained practical experience in identifying and interpreting aquatic organisms to evaluate river health. The module also helped strengthen community awareness on the importance of maintaining clean and healthy rivers while encouraging continuous monitoring and stewardship of local river ecosystems.

MODULE 1

WATER QUALITY ASSESSMENT BASED ON BIOLOGICAL INDICATORS



MODULE 2

ECO-ART MODULE FROM BOTANICAL RESOURCES - ECOPRINT

03 JULY 2025 | *BALAIRAYA KG. SG. BESOI MURNI JAYA*

Head of Module	LAr. Dr. Zanariah Jasmani and Mr. Kiflee Jimpi
Facilitators	• Nurulhuda Binti Radznam • Sabrina bt Zainal Abidin • Jani Akmal Bin Jaapar
Objectives	The Eco-Art Module using botanical resources introduces participants to the creative process of producing natural fabric designs through the technique of ecoprint. This approach not only highlights the artistic potential of plants but also encourages sustainable practices that value the use of natural resources. • To create eco-printed artwork: Participants are guided to collect leaves and flowers from the surrounding area and use them to transfer natural pigments onto plain fabric. This hands-on activity allows them to explore artistic expression while learning how biodiversity can be incorporated into everyday creative practices. • To raise community appreciation of nature and sustainability: By engaging participants directly in the ecoprint process, the module fosters deeper awareness of the importance of utilizing natural resources responsibly. This experience inspires creativity, strengthens appreciation of local biodiversity, and encourages participants to adopt more environmentally friendly practices in their daily lives.
Module's Summary	• Learned about the concept of ecoprint and the use of natural botanical resources for creating fabric designs. • Learned to identify and collect suitable leaves and flowers from the surrounding environment for “printing” process. • Gained hands-on practice in arranging plant materials and transferring natural pigments onto fabric using simple tools. • Participants were taught how to observe, interpret, and appreciate the patterns produced as a form of sustainable eco-art.

MODULE 2

ECO-ART MODULE FROM BOTANICAL RESOURCES - ECOPRINT

SUMMARY OF PARTICIPANTS

<i>Participant Categories</i>	<i>Total of Participation (person)</i>
Community	103
Facilitators	3

LEARNING OUTCOMES

Participants will be proficient in creating eco-friendly Ecoprint works and will be able to apply this knowledge to craft projects or businesses focused on sustainability.

PROGRAMME IMPACTS

<i>Short-term impact</i>	<i>Long-term impact</i>
• Participants gain new creative skills in sustainable art using natural resources. • Increased appreciation of local biodiversity through direct interaction with plants. • Immediate engagement and enjoyment from producing personalized eco-art pieces.	• Encourages sustainable practices by reducing reliance on synthetic dyes and harmful chemicals. • Fosters creativity and innovation, opening opportunities for eco-friendly craft-based entrepreneurship. • Builds stronger community awareness of the value of nature as both an artistic and environmental resource.

MODULE 2

ECO-ART MODULE FROM BOTANICAL RESOURCES - ECOPRINT



MODULE 3

SUSTAINABLE PLANTING AND COMPOSTING TECHNIQUES

03 JULY 2025 BALAIRAYA KG. SG. BESOI MURNI JAYA	
Head of Module	Dr. Huszalina Binti Hussin
Facilitators	• Dr. Azman Abd Saad • Ruhaidah Mohd Aris @ Mohd Aziz • Nik Azizah Binti Nik Li
Objectives	The Sustainable Planting and Composting Techniques module is a community-driven initiative that empowers local residents with practical knowledge to cultivate plants using eco-friendly methods while reducing organic waste. This approach not only promotes food security and greener spaces but also fosters sustainable lifestyles within the community. • To practice sustainable planting: Participants were introduced to simple gardening methods that can be applied in their own homes or community areas. By learning how to grow plants effectively, they contribute to local greening efforts and promote healthier living environments. • To promote composting practices: Participants were guided on how to convert kitchen and garden waste into compost, a natural fertilizer that enriches soil and reduces reliance on chemical alternatives. This hands-on involvement encourages the community to manage organic waste responsibly while benefiting from healthier and more productive soil.
Module's Summary	• Learned practical methods for sustainable planting that can be applied at home or in community gardens. • Gained hands-on experience in composting by converting kitchen and garden waste into natural fertilizer. • Understood the benefits of compost in improving soil health and reducing reliance on chemical fertilizers. • Encouraged to adopt sustainable practices that reduce waste and promote greener living.

MODULE 3

SUSTAINABLE PLANTING AND COMPOSTING TECHNIQUES

SUMMARY OF PARTICIPANTS

<i>Participant Categories</i>	<i>Total of Participation (person)</i>
Community	103
Facilitators	3

LEARNING OUTCOMES

Cultivate an awareness of the importance of sustainable farming practices for environmental conservation.

PROGRAMME IMPACTS

<i>Short-term impact</i>	<i>Long-term impact</i>
• Participants gain immediate knowledge of simple planting and composting methods. • Increased awareness of how food and garden waste can be turned into useful compost. • Motivation to start small-scale planting and composting at home.	• Reduction in household organic waste through consistent composting practices. • Healthier soils and sustainable local food production with less reliance on chemical fertilizers. • Strengthened community culture of sustainable living and waste reduction.

MODULE 3

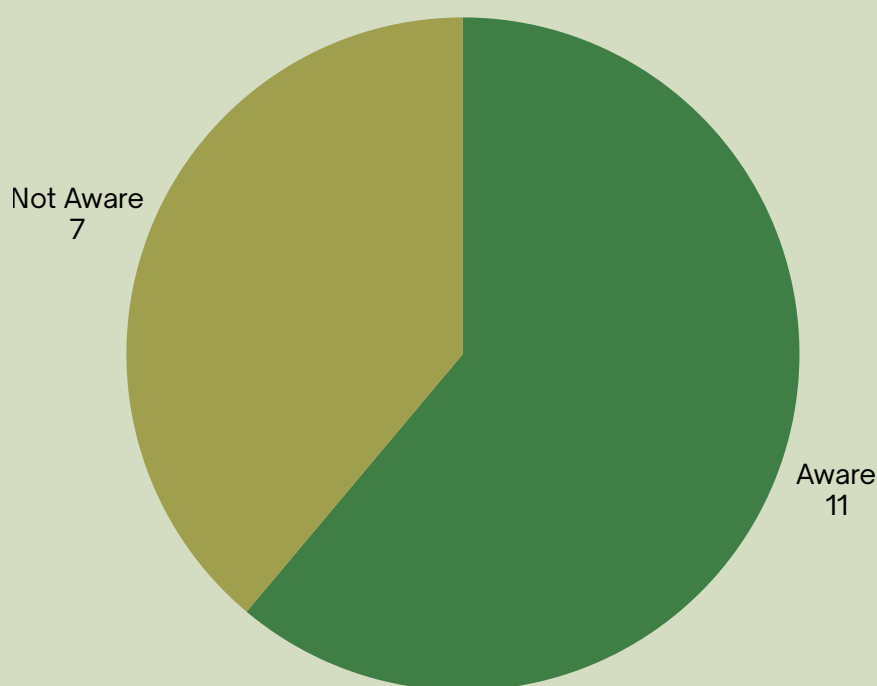
SUSTAINABLE PLANTING AND COMPOSTING TECHNIQUES



OVERALL FEEDBACK

POST-ACTIVITY SURVEY

- A questionnaire was conducted to evaluate the level of understanding, satisfaction, and effectiveness of the COSPHe Program at Sungai Besoi. A total of 18 participants from the local community took part in the survey.
- 11 participants were aware of the program objectives before joining, while 7 were not; the statement “This program benefits the community” scored an average of 4.94/5, and the activities were rated as easy to understand and suitable for the community level with an average score of 4.82/5.
- All 18 participants strongly agreed that facilitators provided clear and helpful explanations, and satisfaction with management aspects (registration, location, meals, schedule) achieved an average score of 4.72/5.
- 17 participants understood how to identify biological indicators in river water (one did not), the awareness module on water pollution and hands-on activities both scored 4.76/5, and all 18 participants understood the composting and sustainable planting techniques and intended to apply them at home or in their village.

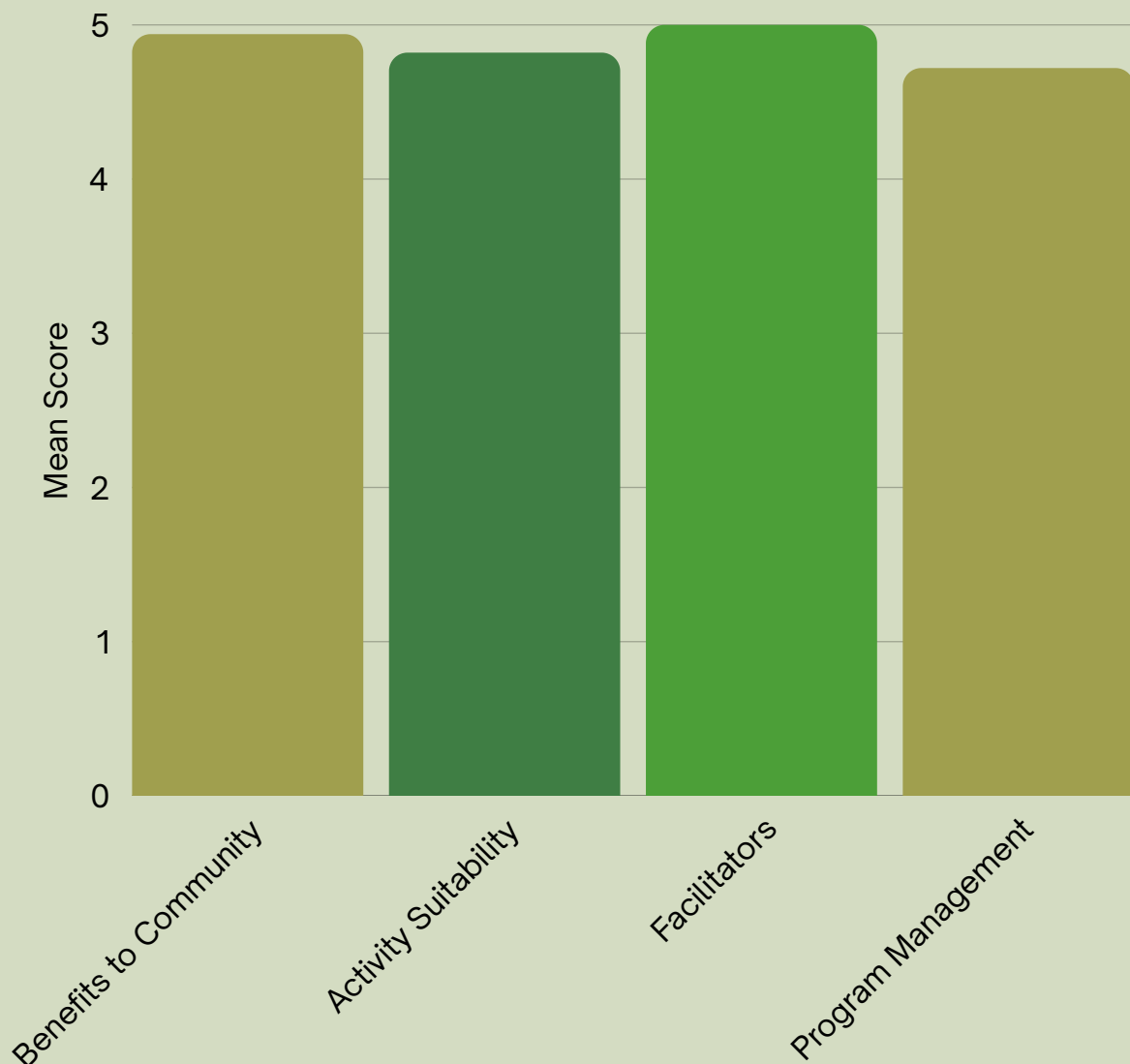


Awareness of Program Objectives

OVERALL FEEDBACK

POST-ACTIVITY SURVEY

- Overall, the survey results show a high level of satisfaction and understanding among participants regarding the COSPHe Program. Participants not only enjoyed the activities but also demonstrated a strong intention to apply the knowledge gained in their daily lives, proving that community-based, hands-on modules such as ecoprinting, bioindicator assessment, and composting effectively raise awareness and encourage active community involvement in environmental conservation.

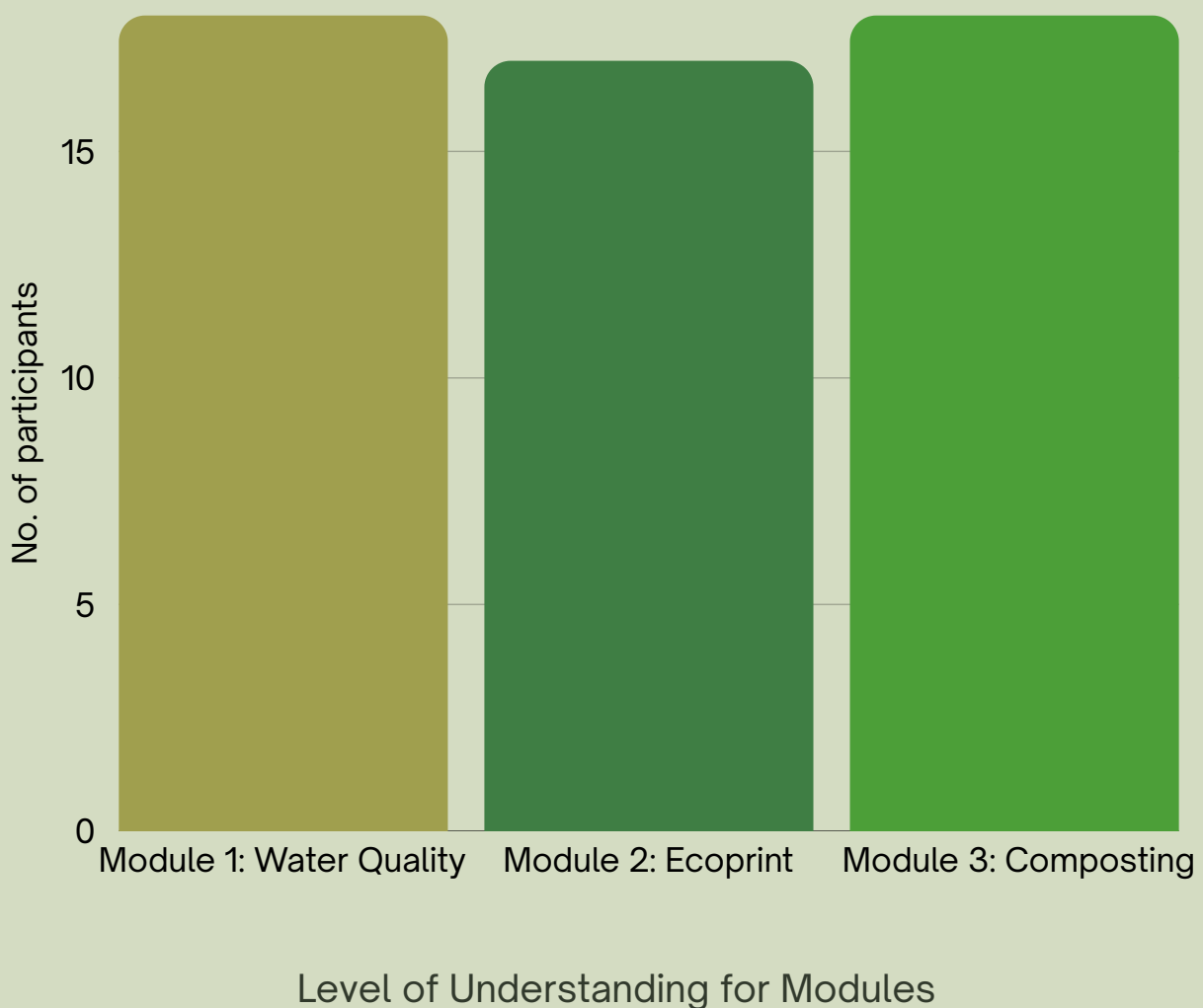


Mean Score of Feedback

OVERALL FEEDBACK

POST-ACTIVITY SURVEY

- Overall, the survey results show a high level of satisfaction and understanding among participants regarding the COSPHe Program. Participants not only enjoyed the activities but also demonstrated a strong intention to apply the knowledge gained in their daily lives, proving that community-based, hands-on modules such as ecoprinting, bioindicator assessment, and composting effectively raise awareness and encourage active community involvement in environmental conservation.



SERIES 2

CITIZENSCIENCE & OPENSOURCE FOR PLANETARY HEALTH BOOTCAMP (COSPHE)

VENUE: TUNKU MAHKOTA ISMAIL
YOUTH CENTER (TMIYC), JOHOR BAHRU
DATE: 29 & 30 JULY 2025



Programme Background

The Knowledge Transfer Program, COSPHe Series 2 was conducted as a continuation of the first COSPHe initiative, focusing on expanding citizen science learning among primary school students in Johor Bahru. This second series specifically engaged primary school students from five schools across Johor Bahru, giving them hands-on exposure to environmental and scientific inquiry outside the classroom. COSPHe 2 encouraged participants to explore the interconnectedness between human health and ecosystem well-being — a concept central to Planetary Health.

The program also aligned with the Ministry of Education Malaysia's Kem Lestari Generasi MADANI initiative, which promotes sustainability learning based on the SDGs. By integrating scientific exploration with community-based activities, the program sought to instill awareness of environmental stewardship and inspire young learners to contribute toward sustainable development.

The main objective of COSPHe Series 2 was to empower school students to contribute actively to environmental and planetary health through four interactive learning modules designed using the Train of Trainers (ToT) approach.

Four (4) modules were delivered, as follows:

- Module 1: Water Quality Monitoring
- Module 2: Biodiversity Database Using iNaturalist
- Module 3: Eco-Art Module from Botanical Resources – Ecoprint
- Module 4: Sustainable Planting and Composting Techniques

The Citizen Science and Open Science for Planetary Health (COSPHe) Series 2 was successfully organized by the Campus Sustainability Centre, Universiti Teknologi Malaysia (UTMCCS) in collaboration with Sekolah Kebangsaan (P) Sultan Ibrahim. The two-day program, held from 29 to 30 July 2025 at the Tunku Mahkota Ismail Youth Centre (TMIYC), Johor Bahru, brought together 100 primary school students from 12 national and vernacular schools across the Johor Bahru district. This initiative aimed to introduce young learners to the concepts of citizen science and open science, emphasizing their roles in promoting planetary health. Through this program, participants were encouraged to engage in scientific learning and environmental stewardship, fostering early awareness of sustainability issues.



Welcoming remarks by the project leader LAr Dr. Zanariah Jasmani

Four interactive modules were introduced in the COSPHe program. **Module 1** focused on water quality assessment, teaching students the importance of clean water and simple assessment methods. **Module 2** used the iNaturalist app to explore and record local biodiversity, promoting awareness and appreciation of the environment. **Module 3** introduced EcoPrint, where participants created plant-based patterns using natural materials. Lastly, **Module 4** covered composting techniques, turning organic waste into natural fertilizer.

Objectives

01

Strengthened UTM's collaboration with school communities through citizen science, ensuring research relevance and social value.

02

Established partnerships with the Johor Bahru District Education Office (PPD) and Sekolah Kebangsaan (P) Sultan Ibrahim, paving the way for potential CSR and government-supported research collaborations.



04

To help society understand global issues such as climate change and environmental conservation through scientific approaches.

05

To foster interest in STEM fields among participants, especially the younger generation.

06

To equip youth with practical scientific skills and relevant monitoring techniques for environmental care.



Venue

The COSPHeSecond Series program was held at the Tunku Mahkota Ismail Youth Centre (TMIYC), Johor Bahru, which served as a strategic venue for accommodating participants from multiple schools across the district. The location provided a conducive environment for interactive learning and collaboration among students, teachers, and facilitators.

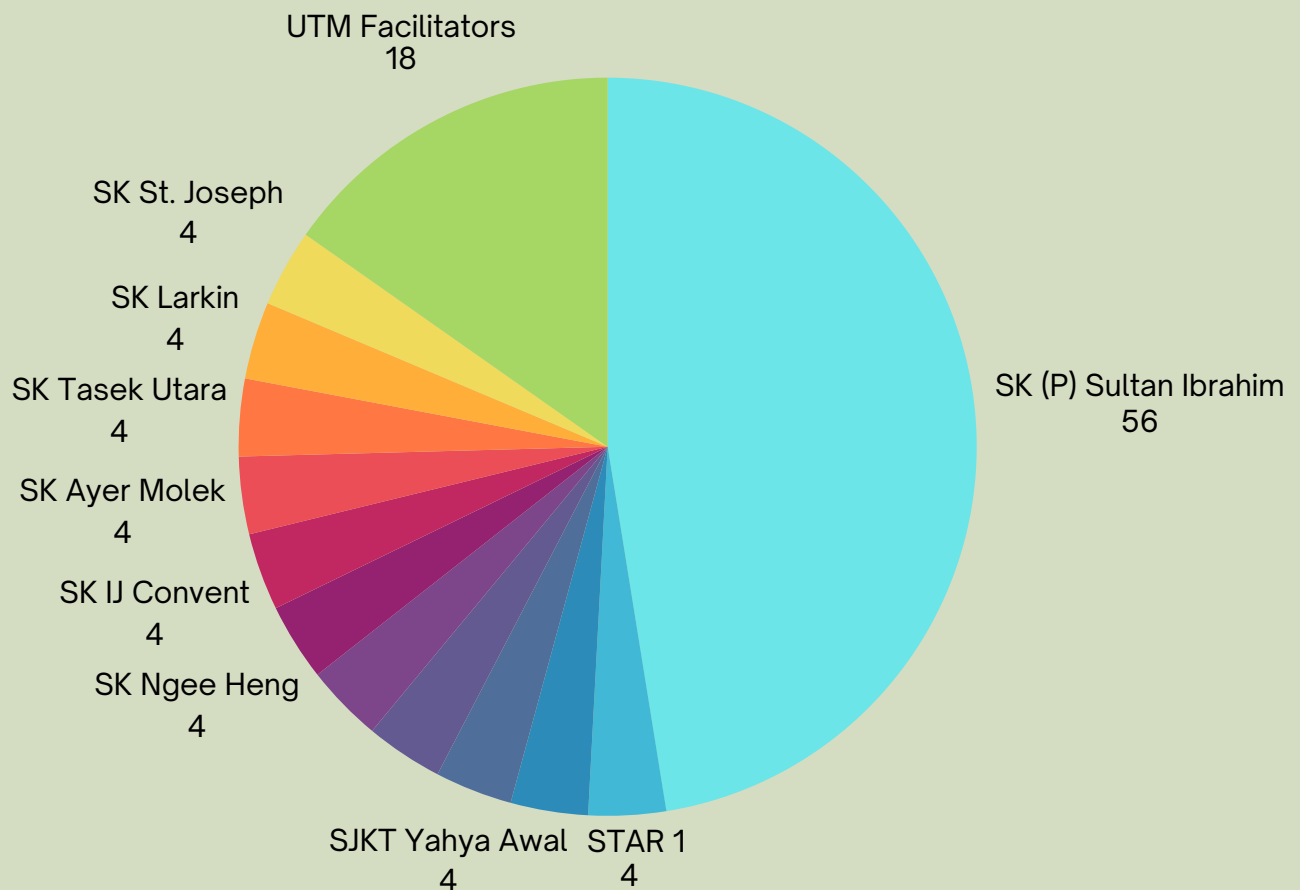
Situated in an accessible urban area with well-equipped facilities, TMIYC offered the ideal setting for both indoor and outdoor activities, including water quality assessments, eco-art workshops, composting demonstrations, and biodiversity exploration sessions.



Module	Name of module	Location
Module 1	River Water Quality Monitoring	Kubus Lestari
Module 2	Biodiversity Database with iNaturalist	Canopy Walk
Module 3	Modul Seni Eko Sumber Botani - Ecoprint	The Stage
Module 4	Sustainable Planting and Composting Techniques	Chill Pods

Participants

The COSPHe Series2 program successfully gathered 100 primary school students from 12 national and vernacular schools across the Johor Bahru district. The participants represented diverse backgrounds and age groups, fostering an engaging and collaborative learning environment throughout the two-day program.



Their active participation in each module from water quality monitoring and eco-printing to composting and biodiversity mapping reflected strong enthusiasm and curiosity toward environmental sustainability. The involvement of young learners also demonstrated the program's success in nurturing early awareness of planetary health issues while encouraging students to become future advocates for environmental conservation in their schools and communities.

Programme Impacts and Benefits

01 *Enhanced Environmental Awareness*

The program successfully enhanced students' understanding of environmental issues, particularly in the areas of water conservation, waste management, and biodiversity. Through interactive, hands-on modules, participants developed a deeper appreciation for the importance of protecting natural resources.



02 *Cultivation of Sustainable Practices*

By engaging in activities such as eco-printing and composting, students learned practical and creative ways to adopt sustainability in daily life. These skills encourage long-term behavioural changes that contribute to waste reduction and responsible resource use.



03 *Empowerment Through Citizen Science*

The program empowered young participants to take an active role in environmental observation and data collection through tools like the iNaturalist app. This exposure fostered scientific curiosity and instilled a sense of responsibility to contribute to local and global sustainability efforts.



MODULE 1

RIVER WATER QUALITY MONITORING AT THE RIVER TRAIL

29 & 30 AUGUST 2025 | TUNKU MAHKOTA ISMAIL YOUTH CENTER (TMIYC)

Head of Module	Dr. Nur Syamimi Binti Zaidi
Facilitators	• Prof. Dr. Zainura Zainon Noor • Dr. Zulfaqar Sa'idi • Ts. Siti Fadilla Md Noor • Siti Hanna Elias • ChM. Mohd Faiz Foze • Nurul Hana Mohamed • Fateha Abdul Razak
Objectives	In general, water quality measurement with local communities is a collaborative approach aimed at ensuring that the maintenance and preservation of rivers and their ecosystems can be performed better, as well as a greater awareness of the importance of conserving clean water resources. In particular, the main objectives of the module are: • To assess local river water quality: By measuring water quality parameters such as temperature, acidity and alkalinity (pH), dissolved oxygen content, and the concentration of certain chemicals such as phosphate and nitrate in the river water, local residents can continuously assess the health of the river ecosystem and the suitability of the water for human use • To raise community awareness on maintaining river water quality: By involving local community representatives in the water quality measurement process, it is hoped that their awareness can be raised and they can spread the word about the importance of maintaining water quality and protecting local rivers to the general public.
Module's Summary	• Participants learned about physical water quality parameters such as temperature and turbidity. • Participants learned about chemical water quality parameters such as pH, dissolved oxygen, phosphate, and nitrate. • Participants learned how to use multiparameter water quality testers and user-friendly chemicals to measure various water quality parameters.

MODULE 1

RIVER WATER QUALITY MONITORING

SUMMARY OF PARTICIPANTS

<i>Participant Categories</i>	<i>Total of Participation (person)</i>
Students	100
Facilitators	8

PROGRAMME IMPACTS

<i>Short-term impact</i>	<i>Long-term impact</i>
• Increased awareness among participants about the importance of monitoring and maintaining river water quality. • Improved understanding of basic water testing techniques and parameters. • Enhanced interest in environmental science through hands-on, outdoor learning experiences.	• Encourages responsible water conservation habits. • Inspires participants to promote clean river initiatives. • Builds awareness for future citizen science involvement.

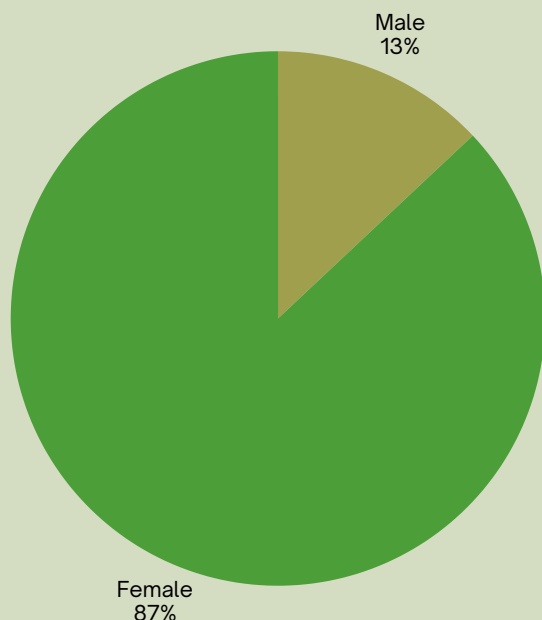
<i>Summary</i>
In this module, participants were introduced to river water quality monitoring through practical, field-based activities. They learned how to measure key water parameters such as pH, turbidity, and dissolved oxygen to assess the river’s condition. The module also emphasized the importance of clean and healthy waterways, fostering awareness and encouraging participants to take an active role in protecting and conserving local river ecosystems.

MODULE 1

RIVER WATER QUALITY MONITORING

PRE- AND POST-ACTIVITY SURVEY

- This survey was conducted to assess the participants' level of knowledge and understanding of water quality issues before and after participating in the related learning module. A total of 100 participants took part in this survey.

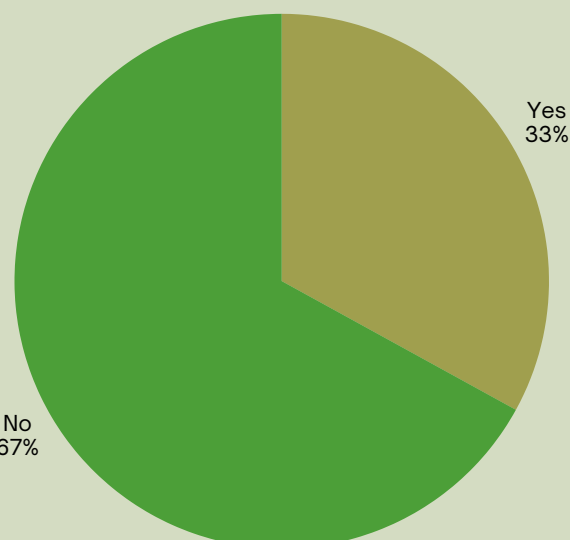


The analysis results show that the majority of participants were female (87%), while male participants made up 13%. In terms of prior exposure, only 33% of participants had previously attended activities or courses related to water or the environment, while 67% had not.

This indicates that most participants gained new knowledge through the implementation of this module.

The distribution shows whether participants had been previously exposed to this module. Based on the pie chart, the majority of participants had no prior exposure to the module, indicating that the learning content was new and informative for most of them.

This suggests that the program successfully reached participants who had limited background knowledge on the topic, thereby enhancing their understanding of water quality issues through hands-on learning and practical engagement.



MODULE 1

RIVER WATER QUALITY MONITORING

PRE- AND POST-ACTIVITY SURVEY

- Based on the comparison between the pre- and post-module responses, there was a significant improvement in seven out of eight statements, indicating an increase in participants' understanding.
- Questions such as “Assessing water quality helps detect pollution levels” and “Water quality can be tested using simple kits or portable devices” showed an increase of 26 and 20 correct responses, respectively.
- For the statement “Clear water is always safe to drink,” the number of correct responses decreased from 57 to 34. However, this decrease actually reflects improved understanding, as participants now recognize that clear water is not necessarily safe for drinking without proper quality testing.
- Statements related to the responsibility of maintaining water quality and individual practices also showed improvement, indicating that participants became more aware of their personal role in protecting water resources.

MODULE 1

RIVER WATER QUALITY MONITORING

Soalan	Sebelum			Selepas		
	Betul	Salah	Kurang Pasti	Betul	Salah	Kurang Pasti
1. Kualiti air penting untuk keselamatan manusia dan alam sekitar.	94		6	99		1
2. Air yang jernih semestinya selamat untuk diminum.	57	15	28	34	53	13
3. Menilai kualiti air boleh membantu mengesan tahap pencemaran.	38	16	46	64	9	27
4. Air yang tercemar boleh menyebabkan penyakit kepada manusia.	77	9	14	94	2	4
5. Kualiti air boleh diuji menggunakan kit ujian atau alat mudah alih.	36	13	51	69	7	24
6. Hanya pihak berkuasa yang bertanggungjawab menjaga kualiti air.	30	37	33	45	42	13
7. Membuang minyak masak ke dalam sinki tidak menjejaskan kualiti air.	16	51	33	22	71	7
8. Saya boleh membantu menjaga kualiti air melalui amalan harian saya.	69	5	26	78	4	18

MODULE 1

RIVER WATER QUALITY MONITORING



MODULE 2

BIODIVERSITY DATABASE USING INATURALIST

29 & 30 AUGUST 2025 | TUNKU MAHKOTA ISMAIL YOUTH CENTER (TMIYC)

Head of Module	LAr. Dr. Zanariah Jasmani
Facilitators	• Dr. Noor Amira Binti Sarani • Dr. Teoh Mee Yei • Dr. Nur Fatihah Tajul Ariffin • Kiflee Bin Jimpi
Objectives	The Biodiversity Database Module using iNaturalist introduces participants to the process of exploring and documenting local flora and fauna through digital citizen science. Students explored biodiversity within the TMIYC area using the iNaturalist mobile app. They learned basic digital photography and species identification to record flora and fauna • To document local biodiversity: Participants are guided to explore their surroundings, identify different plant and animal species, and record their observations using the iNaturalist mobile application. This hands-on activity allows them to capture photos, upload findings, and contribute to a shared biodiversity database accessible to researchers and the public. • To raise awareness of ecosystem conservation: By directly engaging participants in biodiversity documentation, the module fosters a deeper appreciation for local ecosystems and the species that inhabit them. This experience not only enhances environmental literacy but also encourages continued involvement in community-based conservation and responsible stewardship of natural habitats.
Module's Summary	• Learned about the concept of biodiversity documentation and the use of the iNaturalist application for recording species observations. • Learned to identify and capture photos of local plants and animals found in the surrounding environment. • Gained hands-on experience in uploading, classifying, and sharing biodiversity data through the iNaturalist platform. • Participants were taught how to interpret and appreciate the diversity of species while understanding their role in ecosystem.

MODULE 2

BIODIVERSITY DATABASE USING INATURALIST

SUMMARY OF PARTICIPANTS

<i>Participant Categories</i>	<i>Total of Participation (person)</i>
Community	100
Facilitators	5

LEARNING OUTCOMES

Participants will be proficient in using the iNaturalist application to document and identify local biodiversity and will be able to apply this knowledge in environmental projects, school activities, or community-based conservation efforts focused on sustainability.

PROGRAMME IMPACTS

<i>Short-term impact</i>	<i>Long-term impact</i>
• Increased awareness of local biodiversity and its ecological importance. • Improved digital awareness through the use of the iNaturalist application • Enhanced observation and identification skills of local flora and fauna.	• Development of continuous biodiversity monitoring habits within the community. • Strengthened sense of environmental responsibility and conservation advocacy. • Contribution to a growing digital biodiversity database that supports research and education.

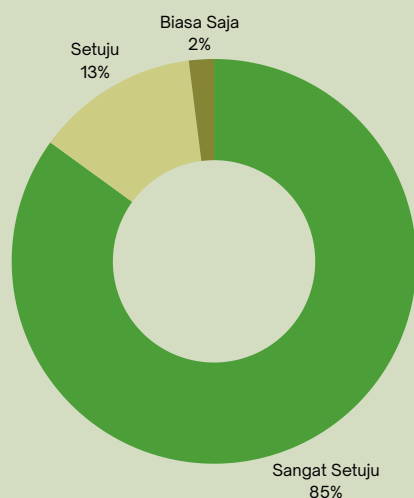
MODULE 2

BIODIVERSITY DATABASE USING INATURALIST

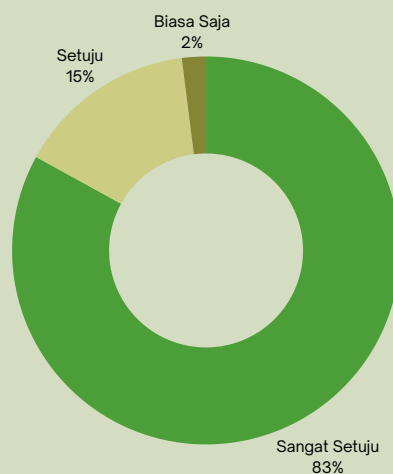
POST-ACTIVITY SURVEY

- A post-program survey was distributed to evaluate participants' satisfaction, level of engagement, and intention to continue using iNaturalist after the event.
- Over 90% of participants strongly agreed or agreed with all statements, showing consistently high satisfaction and engagement levels.
- Most important, sustained behavioral impact was observed, with 78 participants strongly agreeing and 20 agreeing that they intend to continue using iNaturalist after the program.

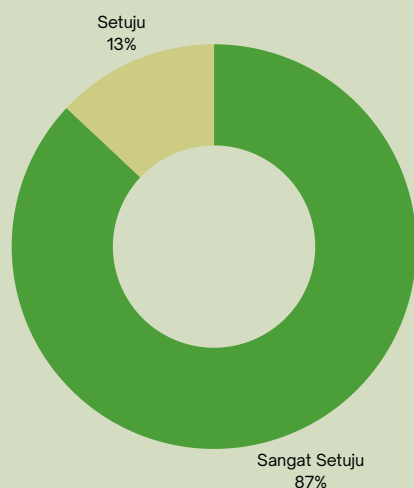
Q1: Saya seronok menyertai program iNaturalist.



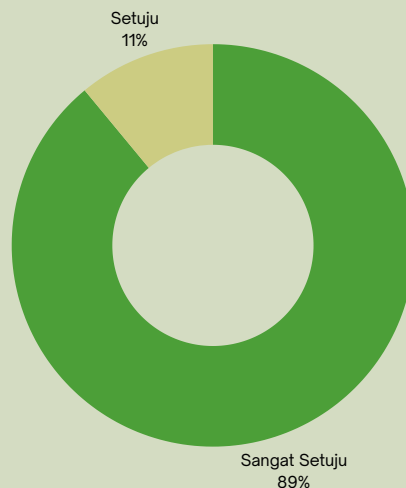
Q2: Aktiviti-aktiviti yang dijalankan sangat menarik.



Q3: Saya dapat mengenal banyak spesies flora dan fauna.



Q4: Fasilitator membantu saya memahami aktiviti.



MODULE 2

BIODIVERSITY DATABASE USING INATURALIST



MODULE 3

ECO-ART MODULE FROM BOTANICAL RESOURCES - ECOPRINT

29 & 30 AUGUST 2025 | TUNKU MAHKOTA ISMAIL YOUTH CENTER (TMIYC)

Head of Module	Mr. Muhamad Hairulnizam bin Ishak
Facilitators	• Nurulhuda Binti Radznam • Sabrina Binti Zainal Abidin • Jani Akmal Bin Jaapar • Muhammad Hairulnizam Bin Ishak • Norfarhana Khairunisa Binti Abdul Rahman
Objectives	The Eco-Art Module using botanical resources introduces participants to the creative process of producing natural fabric designs through the technique of ecoprint. This approach not only highlights the artistic potential of plants but also encourages sustainable practices that value the use of natural resources. • To create eco-printed artwork: Participants are guided to collect leaves and flowers from the surrounding area and use them to transfer natural pigments onto plain fabric. This hands-on activity allows them to explore artistic expression while learning how biodiversity can be incorporated into everyday creative practices. • To raise community appreciation of nature and sustainability: By engaging participants directly in the ecoprint process, the module fosters deeper awareness of the importance of utilizing natural resources responsibly. This experience inspires creativity, strengthens appreciation of local biodiversity, and encourages participants to adopt more environmentally friendly practices in their daily lives.
Module's Summary	• Learned about the concept of ecoprint and the use of natural botanical resources for creating fabric designs. • Learned to identify and collect suitable leaves and flowers from the surrounding environment for “printing” process. • Gained hands-on practice in arranging plant materials and transferring natural pigments onto fabric using simple tools. • Participants were taught how to observe, interpret, and appreciate the patterns produced as a form of sustainable eco-art.

MODULE 4

SUSTAINABLE PLANTING AND COMPOSTING TECHNIQUES

SUMMARY OF PARTICIPANTS

<i>Participant Categories</i>	<i>Total of Participation (person)</i>
Community	100
Facilitators	4

LEARNING OUTCOMES

Cultivate an awareness of the importance of sustainable farming practices for environmental conservation.

PROGRAMME IMPACTS

<i>Short-term impact</i>	<i>Long-term impact</i>
• Participants gain immediate knowledge of simple planting and composting methods. • Increased awareness of how food and garden waste can be turned into useful compost. • Motivation to start small-scale planting and composting at home.	• Reduction in household organic waste through consistent composting practices. • Healthier soils and sustainable local food production with less reliance on chemical fertilizers. • Strengthened community culture of sustainable living and waste reduction.

MODULE 4

SUSTAINABLE PLANTING AND COMPOSTING TECHNIQUES



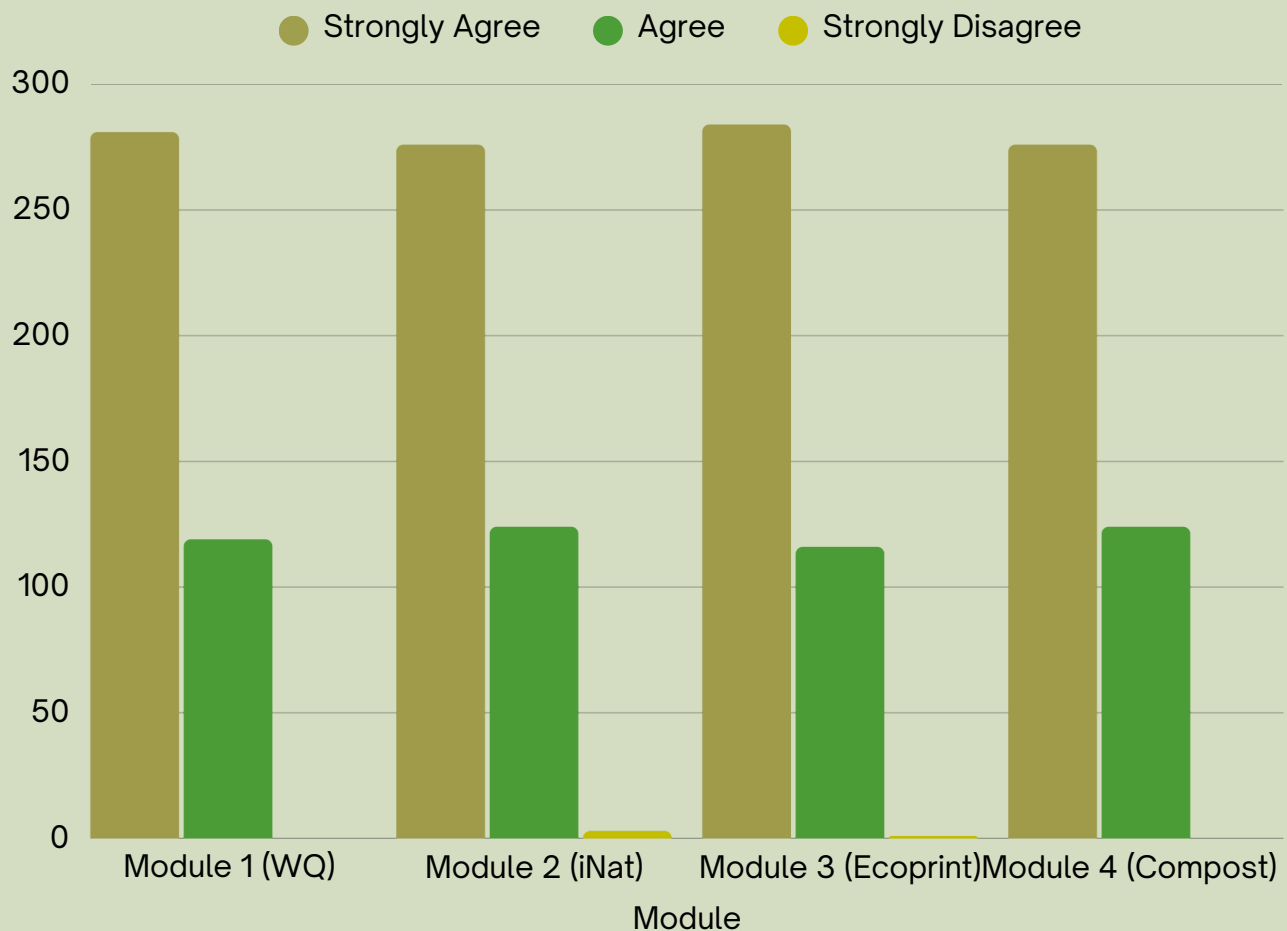
OVERALL FEEDBACK

POST-ACTIVITY SURVEY

- Overall, participants gave very positive feedback on the COSPHe program. Most rated the facilities as very satisfactory (366 votes), compared to satisfactory (133 votes), with no unsatisfactory ratings. The food category also showed high satisfaction, with 365 participants rating it very satisfactory. The activities received 371 votes for very satisfactory, while the overall program gained 361 votes, reflecting smooth implementation and good overall management.
- Module 4: Ecoprint received the highest Strongly Agree votes (284), showing it was the most popular module. This was followed by Module 1: Water Quality (281), Module 5: Compost (276), and Module 3: iNaturalist (276). The high number of Agree votes also shows participants were satisfied, though some saw room for improvement. No Strongly Disagree responses were recorded, reflecting overall positive feedback.



OVERALL FEEDBACK



In summary, the findings indicate that the COSPHe program successfully achieved a very high level of participant satisfaction across all aspects from facilities to the learning modules provided. This reflects the program's strong organization, engaging activities, and effective delivery of environmental education objectives. Overall, the positive feedback demonstrates that COSPHe had a meaningful impact on participants' learning experience and environmental awareness.



SERIES 3

CITIZEN SCIENCE & OPEN SCIENCE FOR PLANETARY HEALTH BOOTCAMP (COSPHE) SIRI 3

VENUE: SEKAWAN CAMPSITE, GUNUNG
PULAI
DATE: 04 OCTOBER 2025



Programme Background

COSPHe Series 3 was held on 4 October 2025 at Sekawan Campsite, Gunung Pulai. This series expanded the citizen science initiative by engaging industry partners and agency representatives in scientific research-based activities that support innovation and technological capacity building. By engaging professionals from industry and government agencies, the program demonstrated how collaborative science can enhance awareness and action towards sustainable ecosystem management.

The main objective of COSPHe Series 3 was to empower industry collaborators to contribute actively to environmental monitoring, data collection, and sustainable practices supporting planetary health. The program was conducted through five specialized hands-on modules.

Five (5) modules were delivered, as follows:

- Module 1: River Water Quality Monitoring at the River Trail
- Module 2: Water Quality Assessment Based on Biological Indicators
- Module 3: Biodiversity Database Using iNaturalist
- Module 4: Eco-Art Module from Botanical Resources – Ecoprint
- Module 5: Sustainable Planting and Composting Techniques

The Citizen Science and Open Science for Planetary Health (COSPHe) Third Series was successfully organized by the Campus Sustainability Centre, Universiti Teknologi Malaysia (UTMCCS) in collaboration with the Majlis Bandaraya Iskandar Puteri (MBIP), Majlis Bandaraya Johor Bahru (MBJB), Majlis Perbandaran Kulai (MPKu), and Flex Ltd.. The one-day program, held on 04 October 2025 at the Sekawan Campsite, Gunung Pulai, gathered 60 participants comprising representatives from local authorities, industry partners, and community members. This third series continued the mission of promoting citizen science and open science as tools for advancing planetary health, focusing on practical engagement and collaborative learning in a natural setting.



The COSPHe Third Series featured five interactive modules. **Module 1** introduced Water Quality Monitoring, teaching participants how to observe and test water conditions. **Module 2** focused on Water Quality Assessment, helping them understand and interpret water quality based on biological indicators. **Module 3** used the iNaturalist app to explore and record local biodiversity. **Module 4**, EcoPrint, encouraged creativity through making natural prints with leaves and flowers. Lastly, **Module 5** taught Composting techniques to turn organic waste into useful fertilizer.

Objectives

01

Strengthened collaboration between researchers and industry partners, translating research outcomes into real-world environmental applications.

02

Expanded strategic partnerships with government, private, and non-governmental organizations.

03

To promote the concept of Planetary Health among industry and agency participants



04

To help society understand global issues such as climate change and environmental conservation through scientific approaches.

05

To encourage sustainable and regenerative practices in the workplace

06

To foster environmental stewardship and awareness through experiential learning

Venue

The COSPHe Third Series program was held at the Sekawan Campsite, Gunung Pulai, a nature-based venue that provided an ideal setting for hands-on environmental learning and outdoor engagement. Surrounded by lush greenery and natural water sources, the campsite created an immersive environment for participants to experience sustainability in action.

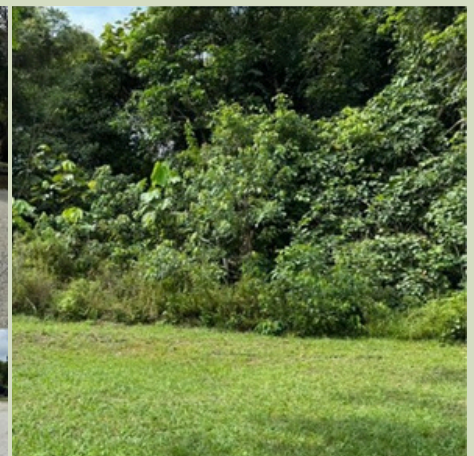
The location offered ample space and facilities for conducting interactive modules and its serene natural surroundings encouraged collaboration among participants from local authorities, industry partners, and the community, fostering a deeper appreciation for nature and sustainable practices.



MODULE 1



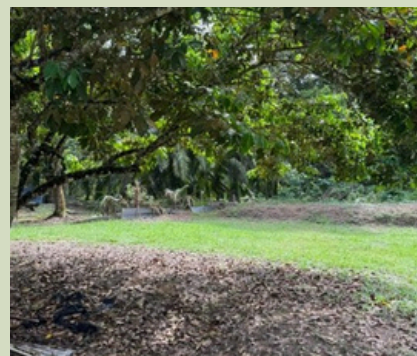
MODULE 2



MODULE 3



MODULE 4



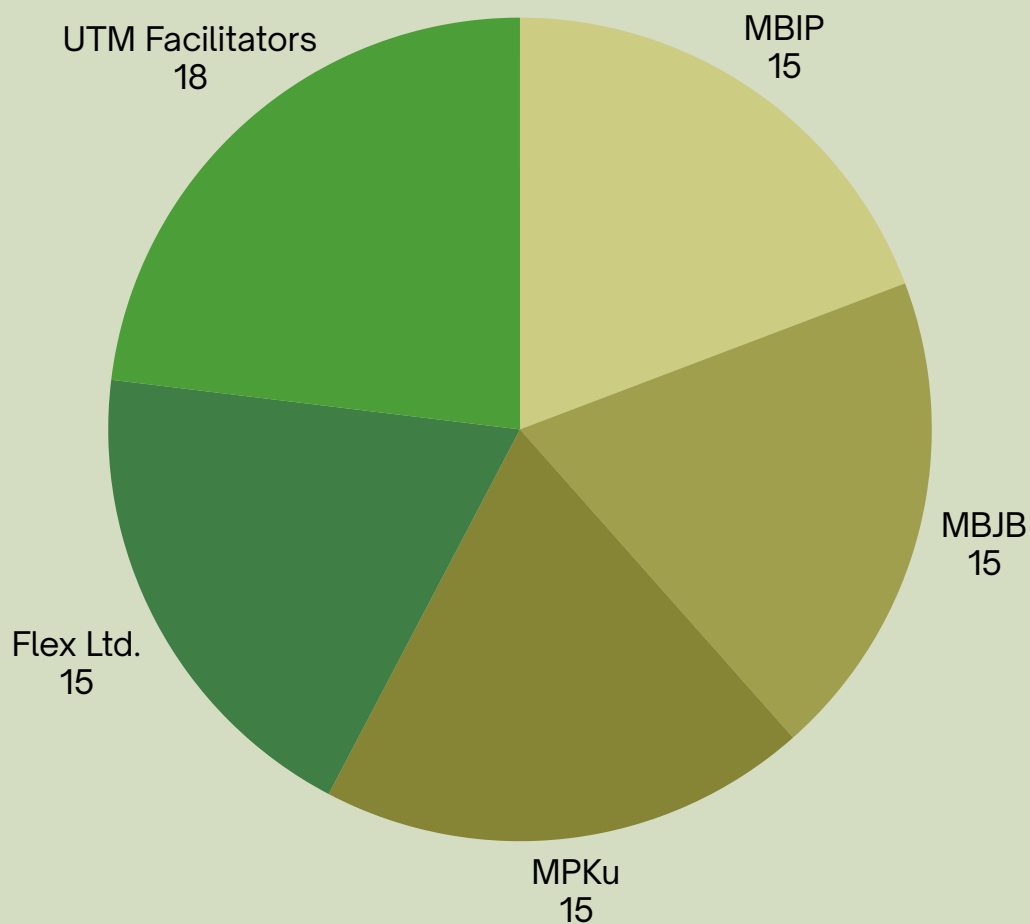
MODULE 5

Module	Name of module
Module 1	River Water Quality Monitoring
Module 2	Water Quality Assessment
Module 3	Biodiversity Database iNaturalist
Module 4	Modul Seni Eko Sumber Botani - Ecoprint
Module 5	Sustainable Planting and Composting Techniques

Participants

The COSPHe Third Series program successfully brought together 60 participants comprising representatives from local authorities, industry partners, and community members. This diverse group created a collaborative learning environment that encouraged knowledge sharing and cross-sector engagement throughout the one-day program.

Participants actively took part in all five modules, where their enthusiasm and teamwork reflected a strong commitment to advancing environmental sustainability. The program effectively strengthened partnerships between government agencies, industry, and the community while fostering a shared sense of responsibility toward promoting planetary health.



Programme Impacts and Benefits

01 *Enhanced Environmental Awareness*

The program successfully enhanced students' understanding of environmental issues, particularly in the areas of water conservation, waste management, and biodiversity. Through interactive, hands-on modules, participants developed a deeper appreciation for the importance of protecting natural resources.



02 *Strengthen Cross-Sector Collaboration*

The program fostered meaningful collaboration among local authorities, industry partners, and community members, encouraging joint action and shared responsibility in promoting planetary health. This collaboration also created opportunities for continuous engagement and future partnerships in sustainability-focused projects.



03 *Empowerment Through Citizen Science*

By engaging diverse stakeholders in experiential learning, the program inspired participants to apply the knowledge and techniques learned such as composting and EcoPrint in their own communities, contributing to long-term environmental stewardship.



MODULE 1

RIVER WATER QUALITY MONITORING AT THE RIVER TRAIL

04 OCTOBER 2025 | SEKAWAN CAMPSITE, GUNUNG PULAI

Head of Module	Dr. Nur Syamimi Binti Zaidi
Facilitators	• Prof. Dr. Zainura Zainon Noor • Dr. Zulfaqar Sa'idi • Ts. Siti Fadilla Md Noor • Siti Hanna Elias • ChM. Mohd Faiz Foze • Nurul Hana Mohamed • Fateha Abdul Razak
Objectives	In general, water quality measurement with local communities is a collaborative approach aimed at ensuring that the maintenance and preservation of rivers and their ecosystems can be performed better, as well as a greater awareness of the importance of conserving clean water resources. In particular, the main objectives of the module are: • To assess local river water quality: By measuring water quality parameters such as temperature, acidity and alkalinity (pH), dissolved oxygen content, and the concentration of certain chemicals such as phosphate and nitrate in the river water, local residents can continuously assess the health of the river ecosystem and the suitability of the water for human use • To raise community awareness on maintaining river water quality: By involving local community representatives in the water quality measurement process, it is hoped that their awareness can be raised and they can spread the word about the importance of maintaining water quality and protecting local rivers to the general public.
Module's Summary	• Participants learned about physical water quality parameters such as temperature and turbidity. • Participants learned about chemical water quality parameters such as pH, dissolved oxygen, phosphate, and nitrate. • Participants learned how to use multiparameter water quality testers and user-friendly chemicals to measure various water quality parameters.

MODULE 1

RIVER WATER QUALITY MONITORING AT THE RIVER TRAIL



MODULE 1

RIVER WATER QUALITY MONITORING AT THE RIVER TRAIL

PRE- AND POST-ACTIVITY SURVEY

- The survey was conducted to assess participants' understanding of the concept and key aspects of water quality before and after the implementation of the Water Quality Monitoring Module.
- The main objective of this survey is to determine the effectiveness of the module in enhancing participants' knowledge of water quality parameters, assessment methods, and the implications of water quality on biodiversity and human health.
- Each statement was evaluated based on three response options "Yes," "Not Sure," and "No" across two phases: before and after the module. A comparison, as shown in Table 2, was made to assess the improvement in participants' level of understanding.

Jadual 2: Perbandingan kaji selidik peserta sebelum dan selepas menjalani modul

No	Item Penilaian	Sebelum (Ya)	Selepas (Ya)	Peningkatan (%)
1	Faham perbezaan antara kuantiti air dan kualiti air	22	38	+42%
2	Faham interaksi parameter fizikal, kimia, biologi	4	38	+89%
3	Tahu contoh parameter fizikal	17	38	+55%
4	Tahu contoh parameter kimia	7	38	+82%
5	Tahu contoh parameter biologi	7	38	+82%
6	Faham kaedah pengukuran kualiti air	6	38	+84%
7	Boleh menilai keperluan pematuhan piawaian	9	38	+76%
8	Faham kesan kualiti air terhadap biodiversiti	23	38	+39%
9	Sedar kaitan pencemaran air dan kesihatan manusia	32	38	+16%
10	Yakin organisasi boleh memainkan peranan dalam perlindungan kualiti air	31	38	+18%

MODULE 1

RIVER WATER QUALITY MONITORING AT THE RIVER TRAIL

PRE- AND POST-ACTIVITY SURVEY

- In addition to technical knowledge, awareness and sense of responsibility also improved. For example, understanding of water quality impacts on biodiversity increased by 39%, and awareness of the link between water pollution and human health rose by 16%.
- Participants also showed greater confidence in their organizations' ability to help protect water quality (from 31 to 38 "Yes" responses). This shows that the module not only enhanced knowledge but also fostered a stronger sense of collective responsibility among participants.

SUMMARY

Overall, the survey results show a clear improvement in participants' knowledge and awareness after completing the module. They not only understood the importance of water quality for health and the environment but also showed a more responsible attitude toward protecting water resources. The module successfully achieved its main goal of enhancing participants' understanding and awareness of water quality issues and the importance of sustainable practices in daily life.

MODULE 2

WATER QUALITY ASSESSMENT BASED ON BIOLOGICAL INDICATORS

04 OCTOBER 2025 | SEKAWAN CAMPSITE, GUNUNG PULAI

Head of Module	Dr. Siti Nur Fatimah Moideen
Facilitators	• Ts. Dr. Muhammad Zulhasif Mokhtar • Ts. Dr. Josilva A/L M Muniandy • Dr. Nor Azidawati Haron • Nurul Syuhada Binti Sadikon • Nur Dalilah Binti Othman
Objectives	Water Quality Assessment Based on Biological Indicators is a collaborative approach that engages local communities in evaluating river health through the observation of aquatic organisms. This method highlights how the diversity and abundance of certain species, such as macroinvertebrates and microorganisms, serve as natural indicators of water quality and ecosystem condition. • To assess river water quality based on biological indicators: Participants are trained to identify and classify organisms that are sensitive or tolerant to pollution. By observing the biological communities present in the river, the community can determine its overall health and suitability for sustaining life. • To raise community awareness on river conservation: By directly engaging community members in the biological monitoring activities, the program aims to increase their understanding of the importance of protecting water resources. This hands-on involvement encourages them to share knowledge and advocate for the protection of the river trail within the broader community.
Module's Summary	• Learned about the role of aquatic macroinvertebrates and microorganisms as biological indicators of river health. • Gained skills in identifying species that are sensitive or tolerant to pollution. • Practiced field sampling and classification of organisms to evaluate water quality. • Interpret river health status based on the diversity and abundance of biological communities.

MODULE 2

WATER QUALITY ASSESSMENT BASED ON BIOLOGICAL INDICATORS

SUMMARY OF PARTICIPANTS

<i>Participant Categories</i>	<i>Total of Participation (person)</i>
Industry Partners	60
Facilitators	8

PROGRAMME IMPACTS

<i>Short-term impact</i>	<i>Long-term impact</i>
• Participants quickly understand how river organisms show water quality. • Participants learn basic techniques to observe and identify aquatic life. • Participants feel motivated to join river conservation activities.	• Participants continue assessing river health using biological indicators. • A stronger sense of responsibility grows for protecting rivers. • Consistent monitoring and care contribute to healthier river ecosystems.

Summary

In this module, participants were introduced to the use of biological indicators as an effective tool to assess river water quality. Through hands-on activities, they gained practical experience in identifying and interpreting aquatic organisms to evaluate river health. The module also helped strengthen community awareness on the importance of maintaining clean and healthy rivers while encouraging continuous monitoring and stewardship of local river ecosystems.

MODULE 2

WATER QUALITY ASSESSMENT BASED ON BIOLOGICAL INDICATORS



MODULE 3

BIODIVERSITY DATABASE USING INATURALIST

04 OCTOBER 2025 SEKAWAN CAMPSITE, GUNUNG PULAI	
Head of Module	LAr. Dr. Zanariah Jasmani
Facilitators	• Dr. Noor Amira Binti Sarani • Dr. Teoh Mee Yei • Dr. Nur Fatihah Tajul Ariffin • Kiflee Bin Jimpi
Objectives	The Biodiversity Database Module using iNaturalist introduces participants to the process of exploring and documenting local flora and fauna through digital citizen science. This module emphasizes the importance of biodiversity monitoring and how simple technological tools can be used to contribute valuable environmental data. • To document local biodiversity: Participants are guided to explore their surroundings, identify different plant and animal species, and record their observations using the iNaturalist mobile application. This hands-on activity allows them to capture photos, upload findings, and contribute to a shared biodiversity database accessible to researchers and the public. • To raise awareness of ecosystem conservation: By directly engaging participants in biodiversity documentation, the module fosters a deeper appreciation for local ecosystems and the species that inhabit them. This experience not only enhances environmental literacy but also encourages continued involvement in community-based conservation and responsible stewardship of natural habitats.
Module’s Summary	• Learned about the concept of biodiversity documentation and the use of the iNaturalist application for recording species observations. • Learned to identify and capture photos of local plants and animals found in the surrounding environment. • Gained hands-on experience in uploading, classifying, and sharing biodiversity data through the iNaturalist platform. • Participants were taught how to interpret and appreciate the diversity of species while understanding their role in ecosystem.

MODULE 3

BIODIVERSITY DATABASE USING INATURALIST

SUMMARY OF PARTICIPANTS

<i>Participant Categories</i>	<i>Total of Participation (person)</i>
Industry Partners	60
Facilitators	5

LEARNING OUTCOMES

Participants will be proficient in using the iNaturalist application to document and identify local biodiversity and will be able to apply this knowledge in environmental projects, school activities, or community-based conservation efforts focused on sustainability.

PROGRAMME IMPACTS

<i>Short-term impact</i>	<i>Long-term impact</i>
• Increased awareness of local biodiversity and its ecological importance. • Improved digital awareness through the use of the iNaturalist application • Enhanced observation and identification skills of local flora and fauna.	• Development of continuous biodiversity monitoring habits within the community. • Strengthened sense of environmental responsibility and conservation advocacy. • Contribution to a growing digital biodiversity database that supports research and education.

MODULE 3

BIODIVERSITY DATABASE USING INATURALIST



MODULE 4

ECO-ART MODULE FROM BOTANICAL RESOURCES - ECOPRINT

SUMMARY OF PARTICIPANTS

<i>Participant Categories</i>	<i>Total of Participation (person)</i>
Industry Partners	60
Facilitators	5

LEARNING OUTCOMES

Participants will be proficient in creating eco-friendly Ecoprint works and will be able to apply this knowledge to craft projects or businesses focused on sustainability.

PROGRAMME IMPACTS

<i>Short-term impact</i>	<i>Long-term impact</i>
• Participants gain new creative skills in sustainable art using natural resources. • Increased appreciation of local biodiversity through direct interaction with plants. • Immediate engagement and enjoyment from producing personalized eco-art pieces.	• Encourages sustainable practices by reducing reliance on synthetic dyes and harmful chemicals. • Fosters creativity and innovation, opening opportunities for eco-friendly craft-based entrepreneurship. • Builds stronger community awareness of the value of nature as both an artistic and environmental resource.

MODULE 4

ECO-ART MODULE FROM BOTANICAL RESOURCES - ECOPRINT



MODULE 5

SUSTAINABLE PLANTING AND COMPOSTING TECHNIQUES

SUMMARY OF PARTICIPANTS

<i>Participant Categories</i>	<i>Total of Participation (person)</i>
Industry Partners	60
Facilitators	4

LEARNING OUTCOMES

Cultivate an awareness of the importance of sustainable farming practices for environmental conservation.

PROGRAMME IMPACTS

<i>Short-term impact</i>	<i>Long-term impact</i>
• Participants gain immediate knowledge of simple planting and composting methods. • Increased awareness of how food and garden waste can be turned into useful compost. • Motivation to start small-scale planting and composting at home.	• Reduction in household organic waste through consistent composting practices. • Healthier soils and sustainable local food production with less reliance on chemical fertilizers. • Strengthened community culture of sustainable living and waste reduction.

MODULE 5

SUSTAINABLE PLANTING AND COMPOSTING TECHNIQUES



OVERALL FEEDBACK

PRE- AND POST-ACTIVITY SURVEY

- Most participants were highly satisfied with the facilities provided. The venue, equipment, cleanliness, and accessibility were rated as good, with 96 “Very Satisfactory” and 28 “Satisfactory” responses. This shows that the facilities were well managed and supported the program’s success.
- Participants were very satisfied with the food provided. Most rated it as “Very Satisfactory” (107) and “Satisfactory” (18), with no neutral or negative responses. The meals were well-prepared, sufficient, clean, and served according to the schedule. Overall, the food arrangement met participants’ expectations and contributed to their comfort during the program.

Kategori	Soalan	Sangat Memuaskan	Memuaskan	Neutral	Tidak Memuaskan	Sangat Tidak Memuaskan
FASILITI	1. Fasilitas program (bilik, dewan, kawasan) selesai digunakan sepanjang program.	18	6	1		
	2. Kemudahan tempat duduk dan ruang aktiviti mencukupi untuk semua peserta.	21	4			
	3. Peralatan yang disediakan (contohnya projektor, mikrofon) berfungsi dengan baik.	19	6			
	4. Kebersihan kawasan fasiliti dijaga dengan baik sepanjang program.	20	5			
	5. Lokasi program mudah diakses oleh peserta.	18	7			
	JUMLAH	96	28	1	0	0

Kategori	Soalan	Sangat Memuaskan	Memuaskan	Neutral	Tidak Memuaskan	Sangat Tidak Memuaskan
MAKANAN	1. Hidangan makanan disediakan mengikut tentatif.	22	3			
	2. Pilihan makanan yang diberikan adalah mencukupi dan memuaskan.	21	4			
	3. Kualiti makanan dan minuman.	21	4			
	4. Kebersihan makanan dan tempat makan.	21	4			
	5. Penyediaan makanan mengambil kira aspek kepelbagaian (lengkap dengan buah dan sayuran).	22	3			
	JUMLAH	107	18	0	0	0

OVERALL FEEDBACK

PRE- AND POST-ACTIVITY SURVEY

- Participants were very satisfied with the activities conducted. A total of 98 rated “Very Satisfactory” and 27 “Satisfactory”, with no neutral or negative responses. The activities were engaging, relevant to program objectives, and well-organized. Clear instructions from facilitators and sufficient time allocation helped enhance participants’ knowledge and skills throughout the program.
- Participants were highly satisfied with the overall program, with 95 rating it “Very Satisfactory,” 28 “Satisfactory,” and only 2 “Neutral.” The facilitators provided clear guidance and the program ran smoothly. The activity offered a valuable hands-on experience and had a positive impact, with many participants showing interest in joining similar programs in the future.

Kategori	Soalan	Sangat Memuaskan	Memuaskan	Neutral	Tidak Memuaskan	Sangat Tidak Memuaskan
AKTIVITI	1. Aktiviti yang dijalankan menarik dan memberi pengalaman baharu.	21	4			
	2. Pengisian program relevan dengan objektif yang ditetapkan.	21	4			
	3. Masa yang diperuntukkan bagi setiap aktiviti adalah mencukupi.	18	7			
	4. Arahan yang disampaikan oleh fasilitator jelas dan mudah difahami.	20	5			
	5. Aktiviti membantu meningkatkan pengetahuan/kemahiran peserta.	18	7			
	JUMLAH	98	27	0	0	0

Kategori	Soalan	Sangat Memuaskan	Memuaskan	Neutral	Tidak Memuaskan	Sangat Tidak Memuaskan
PROGRAM	1. Kandungan program selaras dengan apa yang saya jangkakan.	17	7	1		
	2. Program dijalankan dengan teratur.	20	5			
	3. Program memberi impak positif kepada diri saya.	19	5	1		
	4. Saya berpuas hati dengan keseluruhan perjalanan program.	21	4			
	5. Saya berminat untuk menyertai program seumpama ini lagi pada masa akan datang.	18	7			
	JUMLAH	95	28	2	0	0

CONCLUSION

COSPHe has successfully established a comprehensive and inclusive model for community-engaged scientific learning under Universiti Teknologi Malaysia (UTM). Each series focused on a distinct target group community members (Series 1), school students (Series 2), and industry partners (Series 3) representing a holistic continuum of citizen participation in science and sustainability.

Through its series of hands-on modules on water quality monitoring, biodiversity documentation, sustainable planting, and eco-crafting, COSPHe empowered participants to understand the interconnections between human health and ecosystem well-being the foundation of Planetary Health. The program not only disseminated scientific knowledge but also strengthened research collaboration, built environmental awareness, and generated locally relevant data for sustainability research.

In conclusion, the COSPHe program series serves as a successful model for integrating scientific research, education, and community partnership in achieving the broader vision of a resilient, healthy, and sustainable planet.