



17.2.4. Participation in International Collaboration and Research to Review Comparative Approaches and Develop Best Practices for Tackling the SDGs

St. Peter's Institute of Higher Education and Research (SPIHER) actively participates in international collaborations and research initiatives aimed at reviewing comparative approaches and developing global best practices for advancing the Sustainable Development Goals (SDGs). Through partnerships with universities, governments, non-governmental organizations (NGOs), and international agencies, SPIHER contributes to the global dialogue on sustainable development by analyzing successful strategies from around the world and adapting them to diverse regional and local contexts.

International Collaboration for Knowledge Exchange

SPIHER recognizes that achieving the SDGs requires the exchange of knowledge and experience across countries and sectors. The university is actively involved in international research networks and collaborative projects that address key SDG challenges such as **climate change, poverty alleviation, gender equality, and sustainable urban development**.

Through partnerships with leading institutions across **Europe, North America, Asia, and Africa**, SPIHER engages in cross-cultural dialogue and comparative analysis to identify what works best in different socio-economic and environmental contexts.

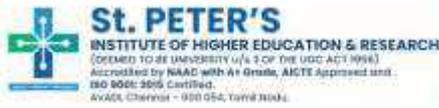
For instance, SPIHER participates in international consortia focusing on **sustainable agriculture and renewable energy**, sharing insights from its own regional research while integrating global innovations. Successful models such as **agro ecological farming practices in sub-Saharan Africa** and **solar-powered micro grids in rural India** serve as examples of how shared learning can inform practical, scalable solutions worldwide.

Comparative Approaches to SDG Challenges

SPIHER conducts comparative research to evaluate and learn from how various countries implement SDG-related strategies. This includes examining international policies and frameworks in areas such as **climate action (SDG 13), quality education (SDG 4), and good health and well-being (SDG 3)**.

For example, SPIHER's researchers have analyzed **green energy initiatives in Scandinavian nations** and **climate resilience models in Southeast Asia** to understand effective policy mechanisms and community-driven responses. Insights from these comparative studies are then contextualized and applied to inform **evidence-based recommendations** for India and other developing nations.

To further support this global knowledge exchange, SPIHER regularly organizes **international conferences, symposia, and workshops** that convene policymakers, researchers, and



practitioners from around the world. These events provide platforms to review and discuss the comparative successes, innovations, and challenges in achieving the SDGs, thereby helping to build a shared repository of international best practices.

Developing International Best Practices

Building on its comparative research and collaborative networks, SPIHER contributes to the creation of adaptable, evidence-based best practice frameworks for SDG implementation. The university's research outcomes often translate into **policy briefs, technical toolkits, and strategic action plans** designed to guide policymakers and development practitioners.

Faculty members and research collaborators work together to produce **publications and guidelines** that highlight successful interventions, explore their transferability across regions, and recommend strategies for scaling up effective solutions. These efforts help bridge the gap between global research and local application, ensuring that sustainable development practices are both context-sensitive and globally informed.

Conclusion

Through sustained international collaboration and comparative research, SPIHER plays a vital role in identifying and developing global best practices for achieving the Sustainable Development Goals. By sharing insights, learning from global experiences, and adapting proven strategies to local contexts, SPIHER helps ensure that sustainable development initiatives are grounded in evidence and optimized for real-world impact.

This collaborative and research-driven approach positions SPIHER as a key contributor to the advancement of global sustainability, fostering knowledge exchange and innovation that drive collective progress toward the SDGs.

The university actively engages with international universities, research organizations, and industries to promote joint publications that address global challenges aligned with the United Nations Sustainable Development Goals.

International Collaborative research publications

Bioremediation of heavy metals by an unexplored bacterium, *Pseudoxanthomonas mexicana* strain GTZY isolated from aerobic-biofilm wastewater system | Environmental Science and Pollution Research.

Bioremediation of heavy metals by an unexplored bacterium, *Pseudoxanthomonas mexicana* strain GTZY isolated from aerobic-biofilm wastewater system

Nelofer Abdul Raheem, Ganesh-Kumar Selvaraj, Kalimuthu Karuppanan, Govindarajan Ganesan, Saravanan Soorangkattan, Balachandran Subramanian, Shivani Ramamurthy Baluraj, Dhilip Kumar Rajaiah, Imran Hasan

Abstract:

We prompted to characterize a wastewater bacterium, *Pseudoxanthomonas mexicana* GTZY, that efficiently transforms toxic mercury and arsenic, explores its bioremediation capability, and reveals their relevant gene resistance operons. The isolated strain was characterized by its phylogenetic, biochemical, and phenotypic properties. The strain GTZY potentially removed 84.3% of mercury and their mercury volatilization (Hg(II) to Hg(0)) was confirmed using the X-ray film method, and its respective merA gene was PCR amplified. In addition, strain GTZY efficiently removed arsenate (68.5%) and arsenite (63.2%), and showed resistance up to > 175 and > 55 mM, respectively. Their genomic annotations disclosed the linkage of Tn2-transposon and int1 in both ends of mer operon (merAPTR). The co-existence of arsP and arsH proteins in its intrinsic ars operon (arsCPRH) was extremely diverse from its ancestral species. We believe that the mercury resistance-conferring mer operon of *P. mexicana* GTZY presumably derived horizontally from other species in the reactor, while the arsenic resistance-conferring intrinsic ars operon was highly diversified and evolved from its ancestral species. By considering the potential of the strain GTZY to transform heavy metals, this can be used to recover contaminated sites.

FULL TEXT LINKS



Environ Sci Pollut Res [Int. 2025 Aug;32(37):22036-22050. doi: 10.1007/s11356-024-34602-1.
Epub 2024 Aug 8.

Bioremediation of heavy metals by an unexplored bacterium, *Pseudoxanthomonas mexicana* strain GTZY isolated from aerobic-biofilm wastewater system

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Govindarajan Ganesan ⁴, Saravanan Soorangkattan ⁵, Balachandran Subramanian ⁶,
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PMID: 39115732 DOI: 10.1007/s11356-024-34602-1

Abstract

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Dhivya M, Karthi S, Amala K, Vasantha-Srinivasan P, Han YS, Al Obaid S, Senthil-Nathan , Park KB. Phytometabolites from coral jasmine flower extracts: Toxic effects on *Spodoptera litura* and enzyme inhibition in nontarget earthworm *Eisenia fetida* as an alternative approach. Environmental Research. 2024 Jul 1;252:118896.

Phytometabolites from coral jasmine flower extracts: Toxic effects on *Spodoptera litura* and enzyme inhibition in nontarget earthworm *Eisenia fetida* as an alternative approach - PubMed

TOXIN REVIEWS
<https://doi.org/10.1080/15569543.2024.2379299>



REVIEW ARTICLE



Phytochemical strategies for combating *Spodoptera litura* (Fab.): a review of botanicals and their metabolites

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ABSTRACT

The adverse effects of the lepidopteran pest, *Spodoptera litura* (Fab.) on crops, result in significant economic losses due to decreased crop productivity and the cost of pest control measures. Using synthetic chemicals to manage this polyphagous pest can adversely impact the environment and contribute to the development of pesticide resistance in other insects. Integrated pest management strategies, including biological control agents, are often recommended to manage *S. litura* infestations in a more sustainable and environmentally friendly manner. Compared with synthetic chemicals, herbal pesticides are generally considered nontoxic for the environment. They often have lower toxicity toward non-target organisms, thus reducing the risk of harming beneficial animals and other wildlife. Botanicals include a variety of phytochemicals that can potentially help in managing polyphagous pests, such as *S. litura*. Improving herbal-based nano-pesticides (HB-Np) that can serve as carriers for bioactive compounds would enable their controlled and targeted release. Therefore, the present review aims to highlight the impact of different resistance mechanisms employed by the lepidopteran larvae against synthetic chemicals and efficacy of herbal extracts, essential oils, and herbal-based nano-formulations in targeting the polyphagous pest, *S. litura*, and the key challenges associated with sustainable pest management in the agriculture sector.

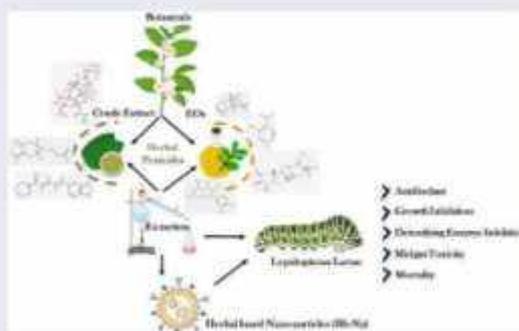
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botanicals; essential oils; chemical resistance; phytochemicals; mode of action; green pesticides

GRAPHICAL ABSTRACT



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^hSupplemental data for this article can be accessed online at <https://doi.org/10.1080/15569543.2024.2379299>.

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This study, involving researchers from multiple countries, demonstrates how shared scientific strengths can accelerate innovation in sustainable pest management.

By investigating phytometabolites from coral jasmine flower extracts and evaluating their effects on *Spodoptera litura* and non-target organisms like *Eisenia fetida*, the research not only contributes valuable ecological insights but also showcases the benefits of cross-border academic cooperation. The collaboration enabled the pooling of advanced analytical techniques, laboratory capabilities, and domain expertise, resulting in a more comprehensive and impactful scientific output.

This joint research effort reinforces the importance of global partnerships in strengthening scientific capacity, promoting environmentally responsible solutions, and advancing the broader sustainability agenda. It stands as a clear example of how international knowledge exchange contributes to building a more sustainable and scientifically empowered world.

<https://ieeexplore.ieee.org/abstract/document/10717525>

Adaptive Neuro-Fuzzy Inference System based Control of Non-Isolated Boost Converter for Hybrid Renewable Sources

**Syed Suraya; Shaik Mohammad Irshad; Shaik Abdul Saleem; Majahar Hussain
Mahammad; G. P. Ramesh**

Abstract:

Hybrid renewable sources suffer from the problems of low efficiency and low output voltage under variable input conditions. The involvement of power electronic converters in the hybrid renewable system helps in the effective use of the generated power supply. Whereas the variable constraints of power generation from these hybrid sources along with the switching of the power electronic switches affect the quality of the voltage and current at the load. This research article proposes a control technique based on Adaptive neuro fuzzy inference system (ANFIS) for Current Fed Switched Inverter (CFSI) to yield the high output voltage gain from hybrid DC source with good power quality in load parameters. CFSI performance has been analyzed by measuring the voltage gain, settling time, and total harmonic distortion with the RL and BLDC motor load. The outcomes of the MATLAB simulation results of proposed current fed switched inverter with ANFIS control technique is validated by experimental setup with digital signal controller DSPIC33FJ32MC202.

This article “**Adaptive Neuro-Fuzzy Inference System–based Control of Non-Isolated Boost Converter for Hybrid Renewable Sources**” demonstrates SPIHER’s strong involvement in international collaborative research. The publication brings together global experts in renewable energy, power electronics, and intelligent control systems to develop an

advanced ANFIS-based controller that enhances the performance of hybrid renewable power systems. This joint research effort highlights effective knowledge-sharing and co-authorship across countries, supporting sustainable technology development and offering solid evidence of SPIHER's contribution to international research partnerships

Conferences > 2024 1st International Conf...

Adaptive Neuro-Fuzzy Inference System based Control of Non-Isolated Boost Converter for Hybrid Renewable Sources

Publisher: **IEEE** [Cite This](#) [PDF](#)

Syed Suraya | Shaik Mohammad Irshad | Shaik Abdul Saleem | Majahar Hussain Mohammad | **G. P. Ramesh** | All Authors

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Full
Text Views

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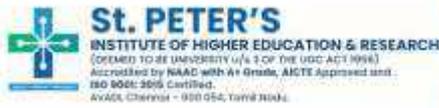
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Figures

References

Keywords

Metrics



International Collaboration in research as Reviewer in international scientific journals

Faculty members of SPIHER actively contribute to international research development by serving as 'Reviewers for renowned International scientific journals. This role showcases SPIHER's strong global academic engagement and commitment to maintaining high standards of research integrity.

By reviewing manuscripts submitted by researchers from different countries, SPIHER faculty support the global scientific community, promote quality research practices, and facilitate knowledge exchange across borders. Their involvement as reviewers helps strengthen collaborative networks, enhances the visibility of SPIHER in international academic platforms, and fosters mutual learning with global experts.

This practice represents a meaningful form of international research collaboration recognized by the global academic ecosystem. Through these contributions, SPIHER plays an active role in advancing research excellence, supporting innovation, and nurturing partnerships that contribute to sustainable development.



Reviewer in International journal of Applied Power Engineering

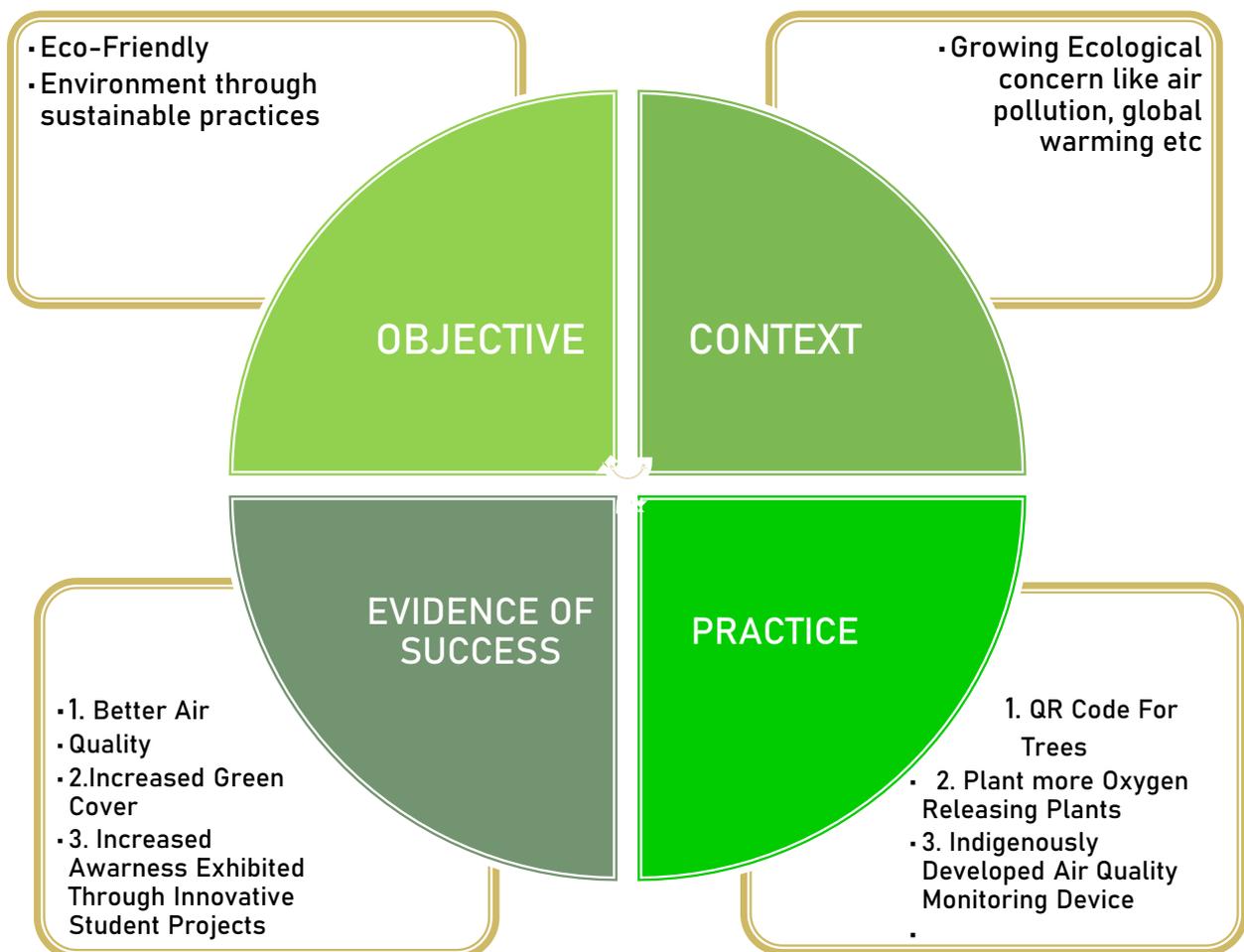


Reviewer in International journal of Applied Power Engineering

SPIHER develop International Best Practice on tackling the SDGs

BEST PRACTICE – CLEAN AND GREEN CAMPUS

The institution implements ‘CLEAN AND GREEN CAMPUS’ as one of the best practices. Contributing towards keeping the campus clean and green is a step towards combating against growing ecological concerns like air pollution, global warming etc., major threats to the mother earth. The institution is naturally inclined to support green campus initiatives as 70% of the campus comes under green cover. To conserve the available natural resource and increase the biodiversity environmental awareness must be followed by sustainable practices. In this endeavor the eco club of the Institution has taken several initiatives to reduce the carbon footprint and inculcate green practices among all the stakeholders and through them to the society at large. Listed below is the brief summary of green practices adopted by the Institution, the context and the positive outcome of the practice.

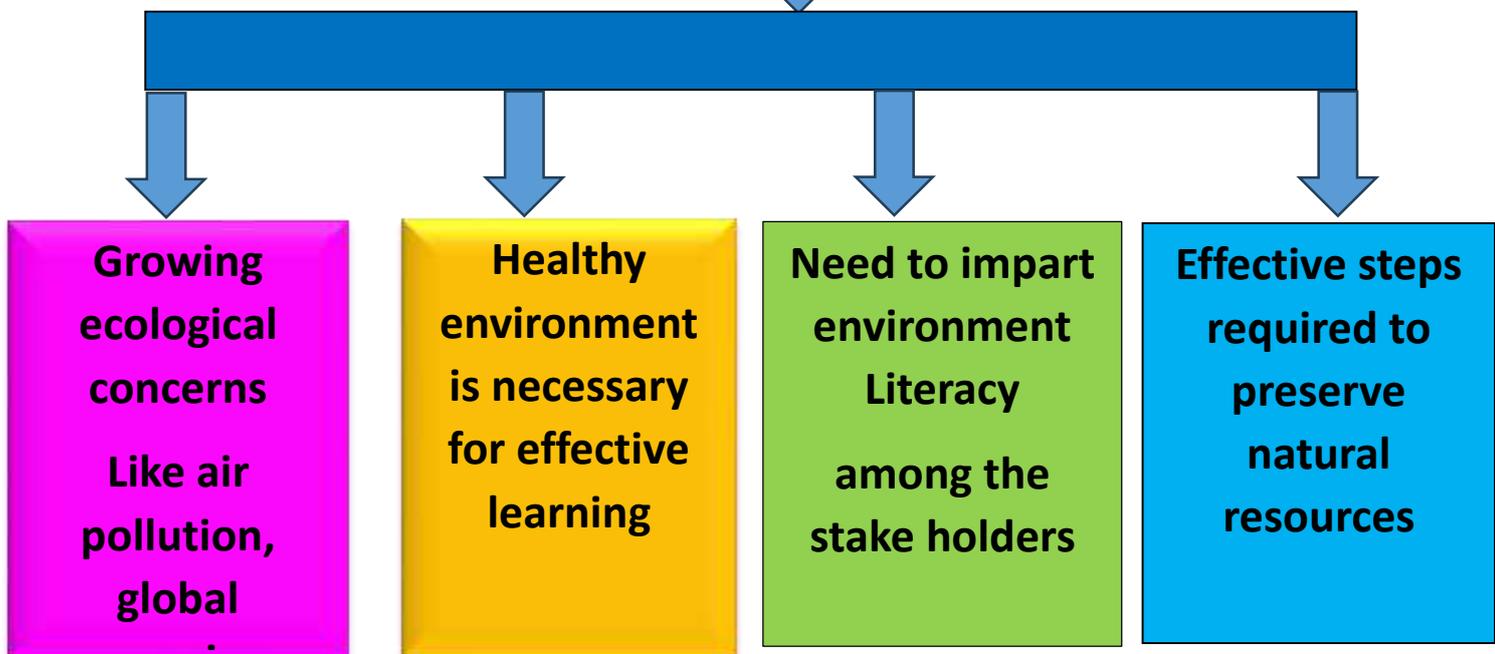


OBJECTIVES OF THE PRACTICE

- 1 • Adopting Eco-friendly practices
- 2 • Ensuring pollution free environment
- 3 • Increase the green cover in the campus
- 4 • Increase awareness among its stakeholder the need to preserve natural resources
- 5 • Preserve natural resources by adopting 3R (Reduce, Reuse and Recycle)

CONTEXT OF THE PRACTICE

CONTEXT



PRACTICES ADOPTED TO KEEP THE CAMPUS CLEAN AND GREEN

Indigenously
designed and
developed Air
Quality
Monitoring
device

Cutting of Trees
Prohibited

Regular
maintenance of
green cover,
ban on use of
plastic

Practices
adopted to
keep the
campus clean
and green

Observing
environment
awareness days
like World
Environment day,
Eco club

QR Code to
identify plant
species



INDIGENOUSLY DEVELOPED AIR POLLUTION MONITORING EQUIPMENT

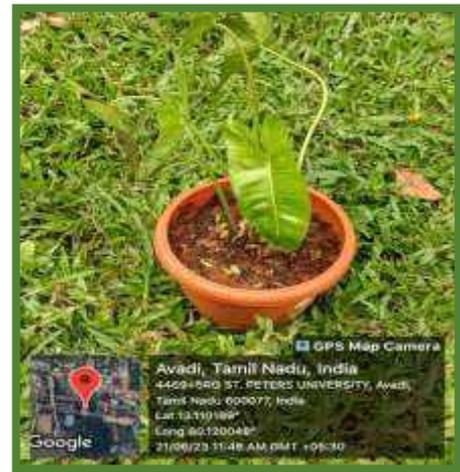


QR CODE FOR TREES

ECO FRIENDLY PLANTS AVAILABLE IN THE CAMPUS



Ficus Elastica Rubber Tree

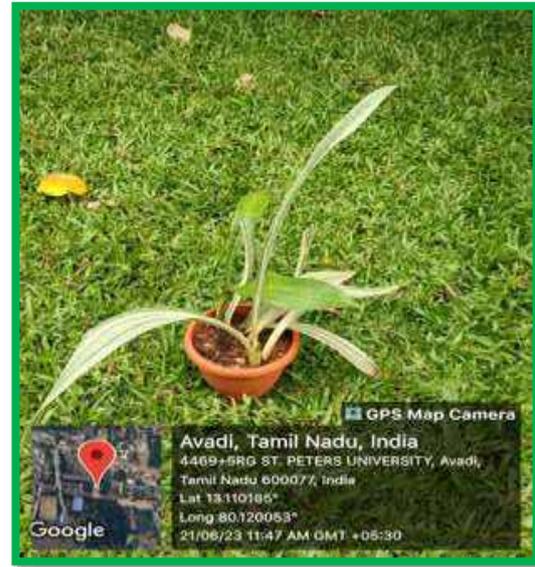


Alocasia



Aloe Vera

OXYGEN PRODUCING PLANTS IN THE CAMPUS



Dracaena trifasciata Snake Plants



Ficus benjamina

ECO CLUB ACTIVITIES



Green Campus Day Celebration- Faculty and students involved in cleaning the campus

ECO CLUB ACTIVITIES Contd.



Green Campus Day Celebration- Faculty and students involved in cleaning the campus

Eco Club Activities- Field visits to nearby villages to engage students in environment friendly activities



Students visiting nearby villages to create environment awareness



SPIHER CAMPUS

MEASUREMENT OF SPIHER ENVIRONMENT PARAMETERS WITH THE DEVICE DESIGNED AND DEVELOPED BY SPIHER

(Funded Project Sponsored Ministry of Environment, Forest and Climate Change)

- Various environments related parameters like temperature, humidity, CO₂(PPM), CO(PPM) etc. measured with our indigenously designed air quality monitoring system shows that ambient atmosphere prevails with in our campus.
- AAQ (Ambient Air Quality) kit



DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Ministry of Environment, Forest & Climate Change

"Design, Development and Evaluation of Indigenous Sensors Based Air Quality Monitoring System and Data Analysis using Deep Learning"



AAQ KIT



Mounting the Kit



IQMD KIT



Drone Monitoring in Campus



Drone Monitoring in Study Area (Dump Yard)

- **Continuous motivation to the faculty and students regarding preserving natural resources and environment through various club activities and observing days of environment importance like World Environment Day, World Water Day etc., and enrolling the students in various national missions like Swatch Bharat Abhiyaan and NSS activities have been seen in the outcome of around 100 student projects completed in providing solution to enhance the environment and preserve natural resources.**

GREEN COVER AVAILABLE IN THE CAMPUS

S.No	Details of plant species	Numbers
1	Total number of Flowering plant species inside the Campus	216 species belonging to 115 Genera under 90 families
2	Total number of Non-Flowering plant species inside the Campus	12 species belonging to Lichens, Pteridophytes, Bryophytes and Mycoflora
3	Total number of Aquatic (hydrophytes) plant species	10

TREE DETAILS AVAILABLE IN THE CAMPUS

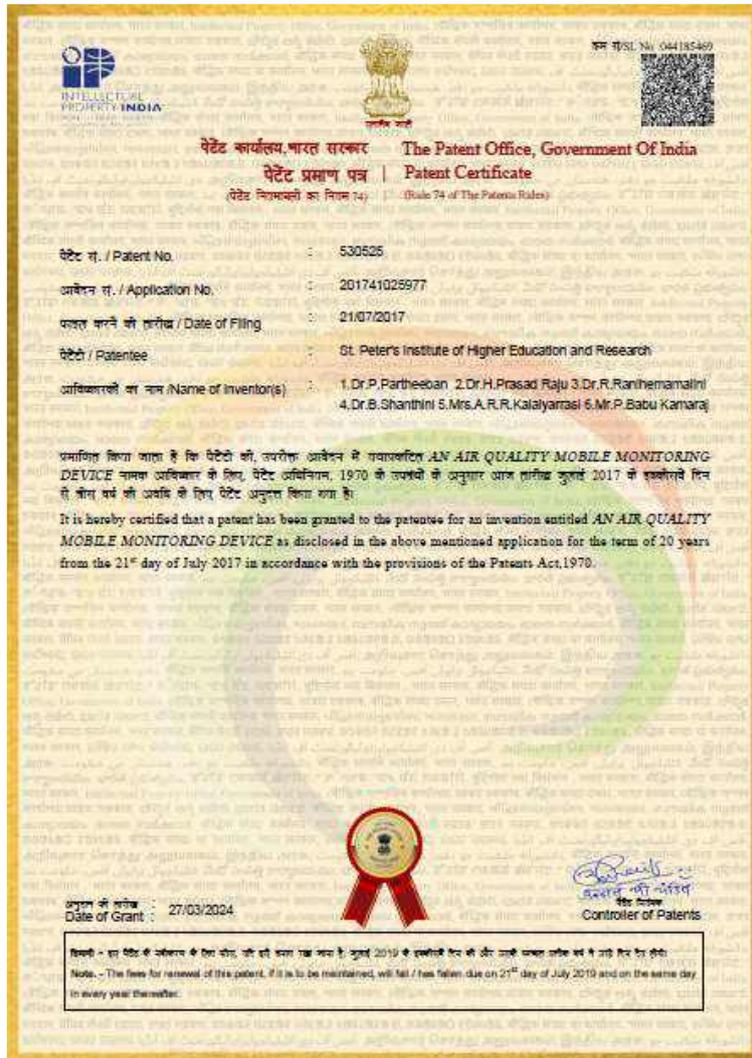
S.No	Scientific Name	Tamil Name	English Name	Family	Trees in Numbers
1	<i>Polyalthia longifolia</i> (Sonn.) Thwaites	Nettilingam	Ashoka Tree	Annonaceae	102
2	<i>Couroupita guianensis</i> Aubl.	Nagalingam	Cannonball Tree	Lecythidaceae	321
3	<i>Tectona grandis</i> L.f.	Thekku	Teak Tree	Lamiaceae	160
4	<i>Casuarina equisetifolia</i> L.	Savukku maram	Pine tree	Casuarinaceae	108
5	<i>Azadirachta indica</i> A.Juss	Vembu	Neem	Meliaceae	316
6	<i>Pongamia pinnata</i> (L.) Pierre	Pungai Maram	Indian Beech Tree	Fabaceae	321

7	<i>Caesalpinia sappan</i> .L.	Sappangu, Patamgam	Sappan Wood	Fabaceae	420
8	<i>Samanea saman</i> (Jacq.) Merr.	Thoongu Moonji Maram	Rain Tree, Sleepy Faced Tree	Fabaceae	236
9	<i>Syzygium cumini</i> (L) Skeels	Naval	Indian blackberry or Jamun	Myrtaceae	32
10	<i>Pisidium guajava</i> L.	Koyaa	Guava	Myrtaceae	11
11	<i>Terminalia arjuna</i> (Roxb.) Wight & Arn	Poomarudhu, Neelamarudhu	Arjuna	Combretaceae	32
12	<i>Terminalia catappa</i> .L.	Nattuvaduma i	Indian Almond	Combretaceae	26
13	<i>Mangifera indica</i> L.	Mamaram	Mango Tree	Anacardiaceae	20
14	<i>Ficus benghalensis</i> L.	Aalamaram	Banyan	Moraceae	6
15	<i>Ficus religiosa</i> L.	Arasa maram	Peepal tree, Pipal tree	Moraceae	9
16	<i>Thespesia populnea</i> L.	Poovarasu	Indian tulip tree	Malvaceae	22
TOTAL					2142

Granted Patent under Best Practice for SPIHER

Patent Granted for “An Air Quality Mobile Monitoring Device”

SPIHER achieved a significant milestone with the granting of a patent for its innovative product titled ‘An Air Quality Mobile Monitoring Device’. This best practice highlights SPIHER’s strong commitment to promoting research, collaboration, and sustainable solutions that directly benefit society. The patented device is designed to measure air quality in real time and can be easily carried to different locations. Its user-friendly, mobile design makes it especially valuable for monitoring pollution levels in communities, supporting public health, and creating awareness about environmental safety. The development of this device involved coordinated efforts by faculty researchers, student teams, and technical experts, reflecting SPIHER’s culture of teamwork and knowledge sharing. By securing this patent, SPIHER reinforces its commitment to creating practical solutions for societal challenges and promoting sustainable development through research and innovation.



Patent Granted in line with SPIHER’s Best Practice

Conclusion:

The initiatives under **SDG 17.3.4** effectively demonstrate the institution’s commitment to strengthening partnerships and mobilizing resources for sustainable development. Through collaborative programmes, stakeholder engagement, and shared platforms for knowledge exchange, the institution has successfully enhanced cross-sector cooperation and expanded opportunities for mutual growth. These efforts have not only supported capacity-building and community outreach but have also nurtured long-term relationships that contribute to collective progress. Overall, the activities carried out under SDG 17.3.4 highlight the importance of inclusive partnerships, reaffirming the institution’s dedication to advancing global sustainability goals through coordinated and impactful action.