APPLICATION FORM FOR OBTAINING RESEARCH GRANTS

Closing Date: December 31, 2022

Instructions: *All applicants should fill Sections I and II of the application. Three (03) copies of the completed application form should be submitted and one copy of the above will be used as an 'Official Copy' and the applicants should sign only this copy in Section II. Applicants are advised to go through the 'Guidelines for Providing Research Grants' before filling application form.*

SECTION I – GENERAL INFORMATION

1. **Name of Applicant/s:** P.G.C.S.Jayasinghe

   (a) Principle Investigator: Dr. A.S.Mahaliyana
   (b) Co-investigator/s:

2. **Designation:** Undergraduate

   (a) Principle Investigator: Senior Lecturer
   (b) Co-investigator/s:

3. Department: Department of Animal Science

(a) Principle Investigator: Department of Animal Science

(b) Co-investigator/s:

4.Faculty: Faculty of Animal Science and Export Agriculture

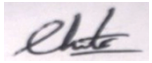
5. Contact details:

Telephone: 0705061482
Email: aqt18048@std.uwu.ac.lk

6. Title of the Research Project: Tourism and Chemical Water Pollution: A Global Analysis

7. Expected date to commence the Research Project:

8. Prepared according to the guidelines and submitted for consideration.



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Signature of Applicant Date

SECTION II – INFORMATION ON RESEARCH PROJECT

1. **Title of the Research Project**: Tourism and Chemical Water Pollution: A Global Analysis
2. **Research scope**:

Over the past ten years, the tourism sector has grown to become one of the largest industries in the global economy. Approximately 9% of the world's GDP made up its whole contribution. Tourism has grown quickly, human tourism activities have increased in extent and intensity, which have increased environmental issues while providing significant economic benefits (Wang & Han, 2021). The environment altered to varying degrees by the tourism sector to improve the comfort of tourists. They will also emit various pollutants throughout their travels.

Pharmaceutical and personal care items are the principal subjects of environmental investigations. When petroleum-carrying ships, accidentally spilled oily layers appear on the water surface is also a threat (Lizardi-Jiménez et al., 2015). The improper disposal of waste, raw sewage and harmful chemicals exposed by hotels and recreational places is another significant problem. Chemical Pollutants (CP) in that waste will cause harmful effects on human communities and aquatic life.

3. Rationale:

There are previous studies regarding Chemical Water Pollution (CWP) in Aqua Tourism Areas (ATA) in the world. Many of these studies have reported contaminations by various types of CP in ATA. However, there is no global analysis to quantitatively integrate those studies. This study will be important to fill that research gap. It will be provided an overview of CWP in ATA. Meta-analysis is a statistical technique for thoroughly examining and integrating a lot of analytical data from many different investigations. Meta-analysis typically takes one or more results, or "effect sizes," from each study.

4. Objective/s:

Main Objective

- To quantify the Mean concentration of cp in different regions

Specific Objectives

- To develop a map regarding the spatial distribution of CP in Coastal and Inland ATP
- To determine tourism activities' relationship between to Chemical Water Pollution
- To assess ecological risk and seafood risk of reported chemical contaminants.

5. Methodology in brief:

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5.1 Search Strategy

The literature review will be begun with previously published research on chemical water pollution due to tourism activities from January 2000 to November 2022. This literature search aims to collect and synthesize all available evidence on chemicals that are exposed from tourism places near inland and coastal water bodies. It will be conducted using Google Scholar. Keywords that will be used for this study are 'Water pollution in tourism places', 'Water Pollution by tourist hotels effluents', 'Coastal pollution by UV filters', 'Chemical water pollution by tourism', 'Water pollution by recreational tourist activities' and 'Water pollution by tourist transporting boats'.

5.2 Article screening

After searches will be completed resulting documents will be imported to Mendeley, an open-source reference manager. Duplicate files will be combined via Mendeley's duplicate merge tool. Articles will be screened on language. Non-English articles will be excluded. The Abstract will be independently screened with each classifying the title as 'relevant' 'not relevant' or 'may be relevant' to the research topic. The full text for all 'relevant' sources will be collected and screened based on the eligibility criteria. Studies reporting chemical pollutants in surface water, biota and sediments will be retrieved. Only studies mentioning quality assessment and quality control will be selected **Fig 01**.

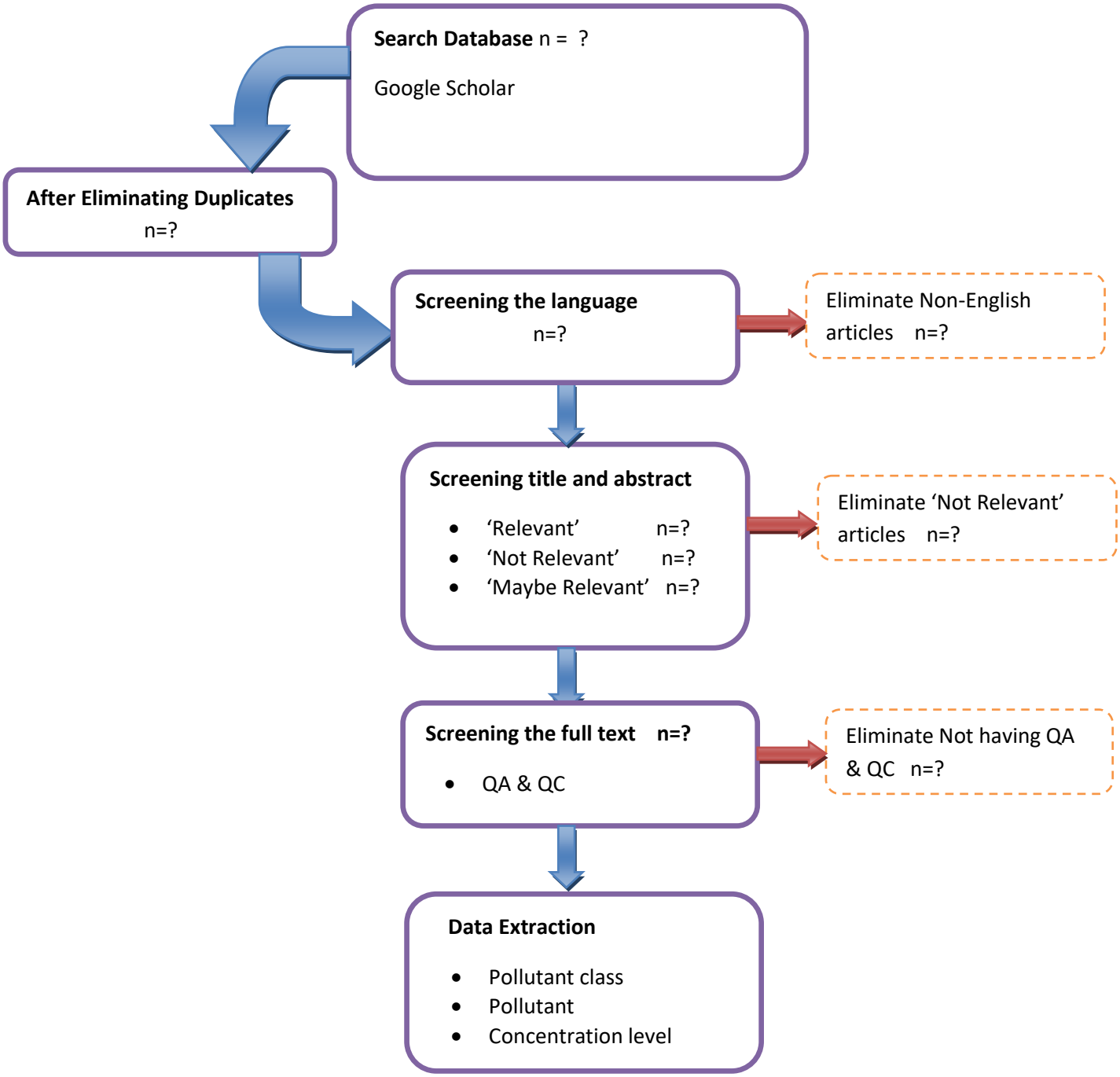


Fig 01: Study Selection process (Inclusion & Exclusion criteria that will be used to select article)

5.3 Data Extraction

The studies will be categorized according to Inland and Coastal regions. All methodology-related information on the study, Author, Year, location, pollutant class, pollutant, concentration and additional factors will be recorded **Table 01**. Each article remaining in the 'relevant' category that passed the study validity assessment will be used for the data extraction.

Table 01: Data extract from previous studies

Author	Year	Location	Sediment Type	Pollutant class	Pollutant	Concentration

5.4 Data Analysis

The spatial distribution of CP contents in Aquatic tourism places will be analyzed using ArcMap 10.8. Meta-analysis will be performed in RStudio with the metafor package. The overall effect size in the meta-analysis, which is a type of weighted mean, is typically the mean value of the analyzed variable. In this study, random/mixed effect model will be used. The number of samples and variance will be used to calculate weights. It can be said that results from large study areas with more sampling sites and smaller variances are more reliable to speculate on the global content. So more concentration will be given to the size of study area and the number of sampling sites (Sunlu, 2003)

6. References:

Bhadula, S., Sharma, V., & Joshi, B. D. (2014). Impact of touristic activities on water quality of Sahashtradhara stream, Dehradun. *International Journal of ChemTech Research*, *6*(1), 213–221.

Egresi, I. (2016). Tourism and Sustainability in Turkey: Negative Impact of Mass Tourism Development. *GeoJournal Library*, *121*, 35–53. https://doi.org/10.1007/978-3-319-47537-0_3

Lee, L. H., & Lee, Y. De. (2015). The impact of water quality on the visual and olfactory satisfaction of tourists. *Ocean and Coastal Management*, *105*, 92–99. https://doi.org/10.1016/j.ocecoaman.2014.12.020

Liu, B. P., & Liu, Q. G. (2013). Evaluating water environmental conditionality for tourism of national scenic-a case of Chaohu lake, China. *Advanced Materials Research*, *726–731*, 1245–1250. https://doi.org/10.4028/www.scientific.net/AMR.726-731.1245

Lizardi-Jiménez, M. A., Leal-Bautista, R. M., Ordaz, A., & Reyna-Velarde, R. (2015). Airlift bioreactors for hydrocarbon water pollution remediation in a tourism development pole. *Desalination and Water Treatment*, *54*(1), 44–49. https://doi.org/10.1080/19443994.2013.876670

Nelson, C., & Botterill, D. (2002). Evaluating the contribution of beach quality awards to the local tourism industry in Wales - The Green Coast Award. *Ocean and Coastal Management*, *45*(2–3), 157–170. https://doi.org/10.1016/S0964-5691(02)00053-4

Nuzula, N. I., Armono, H. D., & Rosyid, D. M. (2017). The Impact of Coastal Tourism Activities on Water Quality at Baluran National Park. *Iptek (Surabaya)*, *28*(2), 59–62.

Ryan, C., Huimin, G., & Chon, K. (2010). Tourism to polluted lakes: Issues for tourists and the industry. an empirical analysis of four Chinese lakes. *Journal of Sustainable Tourism*, *18*(5), 595–614. https://doi.org/10.1080/09669581003615608

Sunlu, U. (2003). Environmental impacts of tourism Local resources and global trades: Environments and agriculture in the Mediterranean region Bari : CIHEAM Options Méditerranéennes : Série A ENVIRONMENTAL IMPACTS OF TOURISM. *Séminaires Méditerranéens*, *57*, 263–270. http://om.ciheam.org/article.php?IDPDF=4001977http://www.ciheam.org/%5Cnhttp://om.ciheam.org/

Wang, Z. W., & Han, H. Le. (2021). Analysis on tourism environmental pollution and tourism economy-ecological environmental coordination degree: A case study from China. *Nature Environment and Pollution Technology*, *20*(3), 1353–1361. https://doi.org/10.46488/NEPT.2021.V20I03.049

7. **.Duration of Research Project:** 4 Months (16 weeks)

8. **Activity plan**:

Activity	Time frame															
	Month 01				Month 02				Month 03				Month 04			
	W1	W2	W3	W4	W1	W2	W3	W4	W1	W2	W3	W4	W1	W2	W3	W4
Literature review																
Proposal writing & submission																
Proposal Presentation																
Study selection																
Data extraction and quality assessment																
Statistical analysis																
Ecological Risk Assessment																
Thesis writing & submission																
Final Presentation																

9. **Project deliverables/Outputs**:

- Graphical interpretation regarding the spatial distribution of CP in Coastal and Inland ATA
- A Complete dataset of the concentration of recorded CP in ATA in the world in the past 22 years.

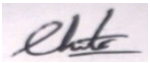
9. Benefits of this Research Project :

- This study will be useful to determine the abundance of CP in tourism areas and it will be helpful to get conservation measures to mitigate the effect of that CP.
- This will be provided a complete account of the CWP in ATA in the world. This will be important for future researchers and reviewers.
- The ecological risk assessment will emphasize the prevailing threat to aquatic resources and their organisms according to the data in available records.
- Also, this study increases the accuracy of previous studies regarding CWP.

10. Estimated cost:

Item	**Unit**	**Rate (Rs)**	**Quantity**	**Cost (Rs)**
Internet cost	1Gb	Rs.90	200	Rs.18,000
Printouts	1 page	Rs.10	100	Rs.1000
Miscellaneous	-	-	-	Rs.1900
Grand Total Cost (Rs)	-	-	-	**Rs.20,900**

Total amount in words: Twenty Thousand Nine hundred rupees.



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