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Journal of Archaeology, Tourism & Anthropology

Department of Archaeology

Faculty of Social Sciences

University of Kelaniya

Sri Lanka

Volume IV: Issue II 2024 **ISSN 2783-8706** **ISSN 2792-1263 (Online)**

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Prof. Mangala Katugampola

Editor in Chief,
Department of Archaeology,
Faculty of Social Sciences,
University of Kelaniya.

Volume IV: Issue II 2024

Department of Archaeology

Faculty of Social Sciences
University of Kelaniya
Sri Lanka

The Department of Archaeology traces its origins back to 1973, when it was first established as a sub-department under the Department of History. In 1977, it gained independent departmental status, marking a significant milestone in the advancement of archaeological studies at the institution.

The department currently offers Archaeology, Tourism and Cultural Resource Management, and Anthropology as subjects under the Bachelor of Arts (General) Degree Program, and Archaeology, Tourism, and Cultural Resource Management under the Bachelor of Arts (Special) Degree Program. In addition, the department conducts Master of Arts (MA) and Master of Social Sciences (MSSc) degree programs focusing on various aspects of Archaeology.

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Grounded in a multidisciplinary and multivocal approach, Archaeology is closely connected with fields such as Tourism and Cultural Resource Management, reflecting its relevance in both academic and applied contexts. The department promotes a student-centered learning environment, integrating theoretical knowledge with practical skills in fieldwork, research, and heritage management, thereby preparing students for diverse professional and academic pathways.

Volume IV: Issue II 2024

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Journal of Archaeology, Tourism & Anthropology

Volume IV *Issue II* *2024*

TRIVALENT

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Volume IV *Issue II* *2024*

Peer Review Committee

TRIVALENT/ත්‍රිසංයුජ: Journal of Archaeology, Tourism & Anthropology

ISSN 2783-8706

Cover Page: D.S.A Munasinghe

Compiling and Page set up: Sithumi Boteju

Graphic Designing: D.S.A Munasinghe

Published by: Department of Archaeology, University of Kelaniya

Printed by: Vidyalankara Publications

Table of Contents

A Scientific Study of the Bronze Tara image from Sri Lanka at the British Museum for evaluating its provenance

Arjuna Thanthilage

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Abstract

This paper discusses the recent controversy on the provenance of the Life Size Tara image found in Sri Lanka and now deposited at the British Museum. The Tara image was first studied using stable lead isotopic methods during a study on South Indian bronze images by an Indian scholar. By comparing Stable Lead Isotopic Ratio Values and trace elemental values of South Indian images with the Tara image, the present idea of the possible South Indian origin of this Tara image has emerged. Unfortunately, by that time, no Sri Lankan historical bronze images had been studied with Stable Lead isotopes or Trace elements for any comparison of the Tara image with other contemporary Sri Lankan bronze images. This study uses later obtained Stable Lead Isotope and Trace element values of Sri Lankan historical bronze images by the author to address the controversy on the provenance of the Tara image found in Sri Lanka and now deposited at the British Museum by critically evaluating the Tara image that to the Stable Lead Isotope and Trace elemental trends of Sri Lankan bronze images. This study shows that the Tara image closely matches four Sri Lankan images as a group, and the source of lead that had been used to make the Tara image is also known in the country. This paper also suggests that the Tara image may have belonged to the MLG2 School of image production that existed during the latter part of the Anuradhapura period in Sri Lanka. Furthermore, this study argues that the Tara image is incorporated more into the Sri Lankan context through Stable Lead Isotope values, and matched with the four Sri Lankan images closely, rather than to the South Indian Context.

Keywords: *Bronze, Lead Isotope, Trace elements, British museum Tara, Buddhist Icons*

Introduction

The Theravada Buddhist traditions mainly influenced the inception of Sri Lanka's historic art and architecture. But beyond the 6th–7th Century BCE, archaeological and historical evidence shows that Mahayanism started to influence the existing Theravada ideology in Sri Lanka. The Mahayanism ideology was a pan-regional ideology during that period, and inevitably, Sri Lanka may have been subjected to that ideology with the new maritime trade linking South East Asia, China, and India. Historical records indicate Sri Lankan King Mahasena (274 – 301 CE) even patronized the Mahayana ideology (Wickramagamage 1990). Archaeological evidence shows that Theravada monasteries had absorbed Mahayana art and architectural features widespread in the country. Hence, Sri Lanka possesses a rich collection of sculptures depicting Mahayana deities as stone or metal sculptures, carvings in rock faces, etc., throughout the country, and some of them were world-famous masterpieces Kurunegala Tara, Avalokitesvara Veheragala (Photographs 1 & 2). Tara is a female Bodhisattva Deity in the Mahayana Buddhism. Tara images, specially made out of copper alloys, were dated to the 7^{th} – 9^{th} Century AD and have been found in different parts of Sri Lanka (Schroeder 1990)

The life-size gilded Tara image exhibited at the British Museum (acc. no. OA-1820-6-12-14, see photograph 7) had been found in the 1800s somewhere between Trincomalee and Batticaloa on the eastern coast of Sri Lanka, and then the governor Sir Robert Brownrigg later donated it to the British Museum. Sharadha Srinivasan analyzed this Tara image for stable lead isotope and trace element while doing the metallurgical study on South Indian bronze images (Srinivasan 1999 (a): 95). Comparing stable lead isotope ratio values and trace element values of this Tara image with values of some South Indian Bronzes, she argues the possibility of it having a South Indian origin. She further stated that the trace element trends of Tara's image fit Pallava's trend and suggested perhaps the re-use of Pallava metal (Srinivasan 1999 (b): 204). She referred to Tara's image's already published compositional analysis results (Schroeder 1990). When Srinivasan conducted a lead isotope and trace element study for South Indian bronze images, no Sri Lankan bronze

image was studied with such analyses. The author was able to conduct a lead isotopic and trace element study for Sri Lanka's historical bronze icons in 2003 at the Natural History Museum in Stockholm, Sweden. This analysis result has opened up a new opportunity to study the South Indian and British Museum Tara image's lead isotopic and trace elemental results in the Sri Lankan context.

This paper aims to compare the lead isotope results of the Tara image with those of Sri Lankan bronze images, address the existing controversy regarding the provenance of this Tara image, and open up a discussion.

Lead Isotope Analysis Method

There are four stable isotopes of lead metal present in the world. i.e., lead-206, lead-207, lead-208 and lead-204. It is a known fact now that the isotopic composition of lead in minerals from different parts of the world has distinct values and is the basis for lead isotope geochronology and lead isotope geochemistry. Generally, the minerals contain minute amounts of lead as an impurity. The isotopic composition of lead varies in nature over a range of up to 5 percent (Gale et al. 1982: 12), which is much higher than the analytical precision of the scientific methods used to measure the isotopic compositions in the minerals, enabling the isotopic composition of lead to be used as an indicator of the provenance of the ore sources. The advantage of looking at the isotopic composition of an element rather than at the abundances, or the abundance pattern, of minor and trace elements is that the isotopic composition of an element does not change from ore to artifact, regardless of the metallurgical processes used. (Begemann et el.1987: 269) The isotopic compositions of the four stable isotopes are usually expressed as abundance ratios of $Pb^{208/206}$, $Pb^{207/206,}$ and $Pb^{204/206}$.

Lead isotopic composition of unalloyed copper gives isotopic characteristics of the copper source (Gale et el.1982: 12). The isotopic matching of leaded artifacts may be due to the lead coming from a single common source or due to the objects having being made from the same batch of metal containing lead from mixed sources which may have archaeological significance for shared geography or chronology.

(Sirinivasan 1999(a): 93) The thermal ionization mass spectrometry (TIMS) method was used for the lead isotopic analysis of this study. The lead isotopic analysis was carried out using the facilities at the lead isotopic laboratory, Natural History Museum, Stockholm.

Stable Lead Isotope ratio and trace element analysis of Sri Lankan images

The results of the lead isotope analysis of Sri Lankan late Anuradhapura period Buddhist, leaded bronze images representing 6^{th} – 9^{th} Century BCE, and Polonnaruwa period Hindu images (11^{th} - 13^{th} Century BCE) were summarized here to consider the Tara image's values. The stable lead isotope ratio values of Pb 207/206, Pb 208/206, and Pb 206/204 were obtained. By plotting the lead isotope ratio values, Pb 207/206 Vs Pb 208/206 in a scatter plot (see Graph 1), the distribution of values in the scatter plot showed that they were grouped into six different lead isotope groups named MLG1 to MLG6. These same lead isotopic image groups were confirmed by the scatter plot of Pb 207/206 Vs Pb 206/204 indicating the validity of such lead isotope grouping among the images (Thantilage 2008 (a): 62). This may have been mainly due to the differences in origins of lead from where the lead was obtained for the production of images time to time. For ease of visualizing Sri Lankan results and parallel South Indian bronze images, only the South Indian images are shown, and Sri Lankan results are represented by their isotopic group boundaries (Graph 2 and Graph 3).

The scatter plot of Pb 207/206 Vs Pb 208/206 (Graph 1) shows the lead isotopic ratio distribution of Sri Lankan Anuradhapura and Polonnaruwa period Buddhist images (7^{th} – 11^{th} Century AD). It shows that the majority of the Sri Lankan images were grouped within the group MLG1. Apart from that, a few images were closely grouped in the MLG2 group and the MLG4 group. All the images in Graph 1 were subjected to trace element studies, and the results will be discussed in the next paragraph.

Trace element Study of the Sri Lankan images

The recent archaeological studies in the Seruwila area, on the East coast of Sri Lanka, south of Trincomalee, have identified the historical mining and smelting of copper ore on an industrial scale from the 4th Century BCE to the 12th Century BCE (Thantilage, A and Vithanage, I). The trace elemental studies conducted by the Geological Survey of Sri Lanka on this copper deposit had identified certain trace elemental ratio characteristics. They have shown that the deposit contains characteristically high Nickel and the ratio of Cobalt/Nickel is greater than 0.43 (Jayawardhana and Padmasiri 1977). Interestingly, the trace element analysis of Sri Lankan bronze images shows the majority of Anuradhapura period bronze images have their Cobalt/Nickel ratio greater than 0.43 and make a separate group with the Cobalt/Nickel vs. iron/Nickel scatter plot and has been attributed to the bronzes made out of copper obtained from the Seruwila deposit (Thantilage 2008 (a):86)). (In the Seruwila copper deposit copper ore found along with the magnetite)

Nevertheless, the majority of the images in the MLG1 lead isotopic group had their Cobalt/Nickel ratio greater than 0.43, and the same images make a separate image group in the trace element scatter plot of the Cobalt/Nickel vs. iron/Nickel, indicating their possible origin of copper as the Seruwila deposit. Three images seen on the left side of the MLGI group in Graph 1 also had Cobalt/Nickel values greater than 0.43, indicating the origin of copper could have been similar to that of MLG1 images, but lead may have come from a different origin. The author has shown elsewhere that the lead isotope values of the MLG1 group matched the lead source of the Mediterranean region. Hence, the difference may be due to the different batches of lead obtained, possibly through the Roman trade. (Thantilage 2008 (a):86)

The stable lead isotope ratio values of the British Museum Tara image grouped well within the isotopic group of MLG2, in which Sri Lankan images and some lead ingots (found from Tissamaharama, in Southern Sri Lanka) grouped closely (Graph 1 and Graph 2).

Lead isotope ratio value of British Museum Tara with Lead ingots and lead coins from Tissamaharama, Sri Lanka

As mentioned earlier, the British Museum Tara image is grouped with the Sri Lankan image group MLG2. The Sri Lankan sample of objects selected for lead isotopic analysis not only contained leaded bronze images but few Gajalakshmi lead coins and also pieces of lead ingot found from Akurugoda, Tissamaharama found accidentally from an illegal gem mining in an ancient settlement mound. Graph 2 shows the distribution of lead isotope values of Tissamaharama lead coins and ingots over the Tara image. A piece of lead ingot from Akurugoda, Tissamaharama, closely matches the British Museum Tara in the MLG2 group. Apart from that, four Sri Lankan bronze masterpieces, dated to the latter part of the Anuradhapura period, as of the Tara image, were also grouped with the Tara image in the MLG2 group (Graph 1), indicating the use of that particular source of lead for the production of Sri Lankan bronze images. This matching indicates that the particular source of lead from which the lead had been obtained to make the British Museum Tara's image was known in Sri Lanka. The Sri Lankan bronze images closely matched with the Tara image in the MLG2 group will be discussed next.

Anuradhapura period images that are grouped with the Tara image in MLG2 lead group

The majority of the Anuradhapura and Polonnaruwa period Bronze images studied here were lead isotopically grouped in the MLG1 group. Most of the icons in the MLG1 group had a Cobalt/Nickel ratio greater than 0.43 and made a separate group in the trace element scatter plot, indicating the copper may have been obtained from the local Seruwila copper deposit. This image group consists of world-class masterpieces such as the Avalokiteswara image from Veheragala (photograph 1)

The lead isotopic group, MLG2, consists of four Sri Lankan images belonging to the latter part of the Anuradhapura period (7^{th} – 9^{th} Century AD), which are more or less contemporary to the Tara image(see Photographs 3 – 6). They have closely grouped with the Tara image and the piece of lead ingot from Akurugoda. The Buddha image

in photograph 2 was found in Batticaloa in the same area as where the Tara image was found, in the Eastern region of the country. The other images were the famous Buddha image found in the Badulla area in the South Eastern part of the country, the Buddha image found in Thiriyaya Monastery in the Eastern region, and the Vajrapani Bodhisattva image found in the Kurunegala area, in the North Central region of the country. Notably, the images in MLG1 and MLG2 groups have differences in resource utilization, technology, and stylistic features. The Author elsewhere had suggested that these images in the two isotopic groups may have represented a different school of image production during the Anuradhapura period, especially considering similarities within each group of images (Thantilage, A. 2008). By considering the stylistic and technological features of the recently discovered life-size Buddha image from Pallama in Puttlam District (Photograph 8), the north-western part of the country, the author suggested the possibility of relating, to the MLG2 group of image productions. (Thantilage, A. 2010 (b)). In the backdrop that Life-size bronze images are extremely rare in the Sri Lankan historical context, this would be an important piece of information since Tara is also a life-size image, and no life-size image is seen in the MLG1 image group. If that is the case. it shows that the production of life-size bronze castings is known to the MLG2 group of image production.

Reasons for assigning the latter Anuradhapura period images representing two schools of image production could be summarized as follows.

MLG1 school:

Only use copper from the local Seruwila source

Only use a lead source (MLG1) throughout

They have been found mainly in and around the Anuradhapura area

Image features/ Technology (casting/gilding, etc.)

MLG2 school:

Use of copper from a source other than the local Seruwila source

Only use lead source MLG2 throughout

They have been found outside the Anuradhapura area

Image features/ Technology (casting/gilding, etc.)

The Tara image satisfies the three main criteria in the MLG2 School image production mentioned above. (The trace element results of the Tara image do not match the Seruwila deposit.) Of the four images with which the Tara image was isotopically grouped, only the Tara image has been gilded. All the images were cast with hollow cast technology. Other than that, image features and technology more closely match the MLG2 School of Images.

Comparison with Indian images

Graph 3 shows the South Indian chronologically parallel images to the Tara over the Sri Lankan lead groups (MLG1 – MLG6), determined by the mean values of closely grouped Sri Lankan images.

In the Indian context, the Tara image is closely matched with only one gilded Buddha image from Nagapattainam (Sirinivasan 1999 (b): 202 – 204). (see graph 3). In the Sri Lankan context, Tara's image closely matches the Sri Lankan MLG2 group icons as a group, rather than that of the image from Nagapattainam, which has fallen outside the boundaries of the MLG2 lead isotope group. This emphasizes that Tara's image would have been closely incorporated with the Sri Lankan images in the lead isotope group MLG2. Further, in the Indian context, there is only one later Pallava period image (which may be more or less chronologically parallel to the Tara) grouped in the Sri Lankan lead isotope group MLG2 in comparison to the four Sri Lankan images that closely match Tara within the group. Interestingly, out of those five images in the MLG2, three images were found from the same Eastern coastal area of the island.

Notably, Later Pallava and Early Vijayala Chola images, the images that are more or less chronologically parallel to that of Tara in the Indian context, have been closely grouped with the Sri Lankan image group MLG1, in which 90% of the Sri Lankan Anuradhapura period images have been grouped. This indicates a very interesting fact: until about the 9th Century AD, Sri Lanka and India had obtained lead from a common source. It has been shown elsewhere by comparing the lead isotope values from the ancient mines and artifacts from the Mediterranean region that it is most probable that this lead may have been from the Mediterranean region and obtained through ancient long-distance trade with the Romans (Thantilage 2008 (a):86).

The lead isotopically overlapping of South Indian Later Pallava and Early Vijayala Chola images that are parallel to the late Anuradhapura period, with the Sri Lankan images in the group MLG1, indicates that resource utilization for the production of those images may have some common ground, i.e., both countries may have obtained lead from the same Roman trade. However, it seems this trend had changed after the early Calukya-Chola period (1070 -1125 AD) since later South Indian images do not match the Sri Lankan groupings.

When considering the four late Anuradhapura period images closely matched with the Tara image in the MLG2, those four Sri Lankan images match each other not only with lead isotopically but with trace elementally, showing that they may have a common origin.

In the Indian context, only one middle Pallava image, more or less chronologically parallel to the Tara, matches the Sri Lankan lead group MLG2. It is clear, at least with the Sri Lankan results, that the use of MLG2 lead source would have been more intense in the Sri Lankan context during the latter part of the Anuradhapura period, as five images closely matched with that group.

Later Polonnaruwa Hindu bronzes

When considering later Polonnaruwa period images (12 – 13th Century AD), the four Hindu Bronze images, which were chronologically later than the Tara grouped in the MLG2 lead isotope group (Graph 4). Interestingly, one Hindu image made with local

Seruwila copper is thought to belong to the Sri Lankan school of Hindu Sculptures (Lakdusinghe, S). When overlapping lead isotope ratio values of the South Indian images (Sirinivasan, S. 1999 (a) 95 – 97), there are three Chalukya Chola images grouped with the Sri Lankan image group MLG2. This might have shown that both Sri Lanka and India may have used lead from this common source until the 12^{th} – 13^{th} Century AD. It seems Polonnaruwa Hindu bronzes have shown some distinct lead isotope signatures, showing some uniqueness of them, as there are no South Indian contemporary images in MLG3 and MLG5 lead groups, in which groups there are a considerable number of Polonnaruwa Hindu bronzes were present. Further, there are two South Indian later Chalukya Chola images grouped in the Sri Lankan lead isotope group MLG4, but notably no Sri Lankan Polonnaruwa period Hindu bronze fell within that group.

Conclusion

In the Sri Lankan context, the Tara image more closely matches lead isotopically with the group of four late Anuradhapura images, in which three of them have been found in the same area as that of the Tara image, in contrast to the Indian context, where lead isotopically matched only with one Buddha image from Nagapattinam. However, it is important to consider that this particular Nagapattinam Buddha image does not match the Sri Lankan lead isotope group MLG2, in which the Tara image is closely grouped with four other Sri Lankan images. Nevertheless, a closely matching piece of pure lead ingot (a piece of a lead ingot, that had been found in the soil layer along with the leaded Gajalakshmi coins made in the same Tissamaharama, Akurugoda area) with the MLG2 group would undeniably indicate that this MLG2 lead source would have been known to Sri Lanka during the latter part of Anuradhapura period contemporary to the Tara. The Gajalakshmi coins were well-dated to the Anuradhapura period. In other words, this indicates that the lead from this particular lead source that had been taken to make Tara was also known and utilized during the contemporary or even earlier time in Sri Lanka.

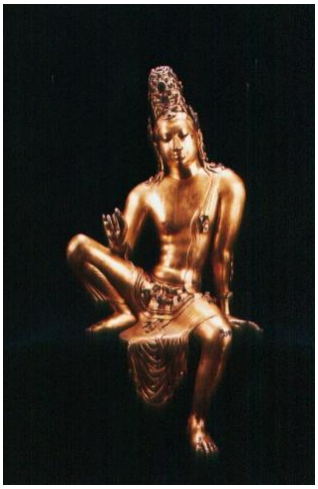
Trace elementally, none of the MLG2 group images were matched with the trace element trends of the local Seruwila copper source. This has been attributed to the existence of a possible second school of image production during the Anuradhapura period (Thantilage, A. 2010 (b)). Unfortunately, the trace element results of the Tara image published in the study by Schroeder (Schroeder 1990: 551) gave a very unusual value of the Cobalt/Nickel element ratio of 2.65, which is not even consistent with the South Indian image values either. So doubtful about the amount of accuracy of those results for conducting any comparison.

When considering the five images in MLG2, out of these five images, there are three images, including Tara have been found in the same eastern coastal area. All four images that the author was able to analyze and attribute to the MLG2 group matched each other very closely, not only with the lead isotopically but also with trace elementally. Because of this close matching in different dimensions, we may strongly argue the possibility that these four images could have a common origin. Three images out of four images in the MLG2 have been found in the same area as the Tara image. The four images in the group match closely with each other both isotopically and trace elementally. Since two images in the group were discovered from the Badulla and Kurunegala areas outside the eastern region (Photographs 4 & 6), we may conclude that this image school may have also been known to other parts of the country.

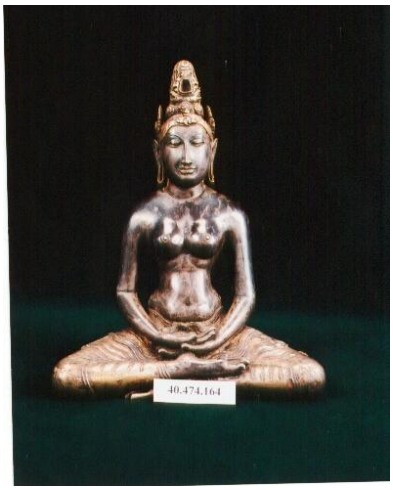
Accordingly, it is clear that the Tara image closely matched and made a group with some Sri Lankan late Anuradhapura period Buddhist icons, unlike in the Indian context, where it had only lead isotopically grouped with one image, and even that particular image does not match with the MLG2 image group, in which Group that theTara image closely group with four Sri Lankan images.

Finally, as concluding remarks, we may argue that there is a good possibility of having all five images in the lead isotope group MLG2 share the same common origin. Hence, in the Sri Lankan context, there is not enough evidence to suggest the Tara image may have a different origin than the closely matching others in the same group.

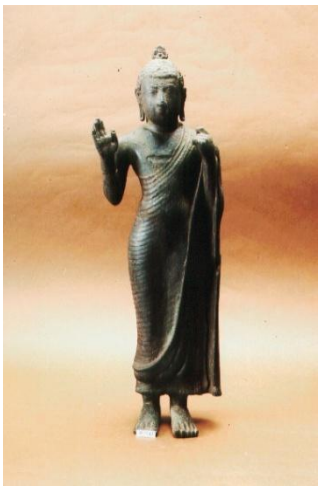
Unfortunately, the trace elemental results of the Tara image have a very high Co/Ni value that cannot compare with any of the images in this study, raising doubts about the results. It is extremely essential to take into account all five images together in the MLG2 group before any provenance attribution in the future. Further stylistic and art historical studies on these five images would have also been helpful in this endeavor.



Photograph 1: *Avalokiteswara image from Veheragala, Anuradhapura*



Photograph 2: *Tara image late Anuradhapura period found from Kurunegala*



Photograph 3: *Buddha Image Late Anuradhapura Period Kankayanodai, North Batticaloa*

National Museum, Colombo Museum Reg. No.: 35.77.12

Photograph 4: *Buddha Image 5th - 6th Century AD Baddulla*

National Museum, Colombo Museum Reg. No.:13. 11 . 289

Photograph 5: *Buddha Image 7th Century AD Thiriyaya*

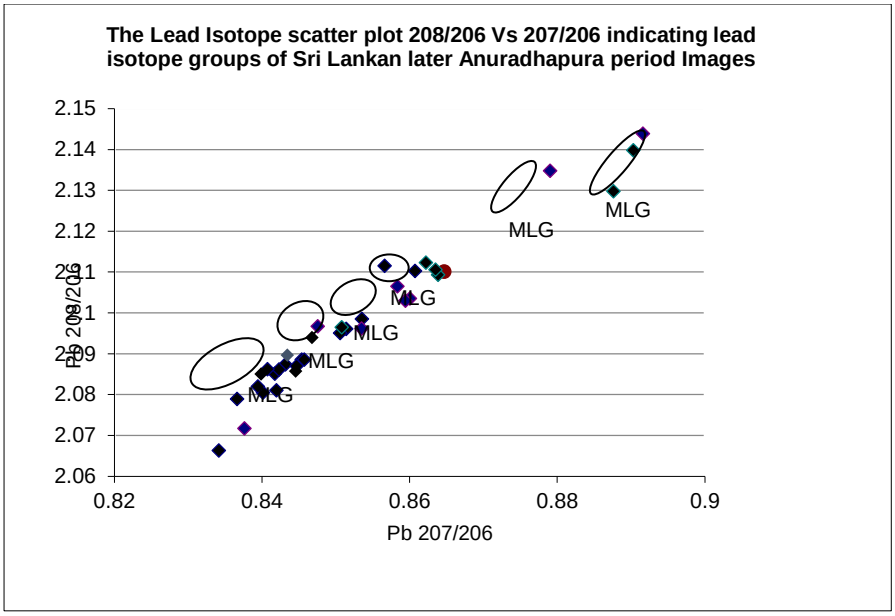
Archaeological Museum, Anuradhapura

Photograph 6: *Vajrapani Bodhisattva, 9th Century AD, Kurunegala District*

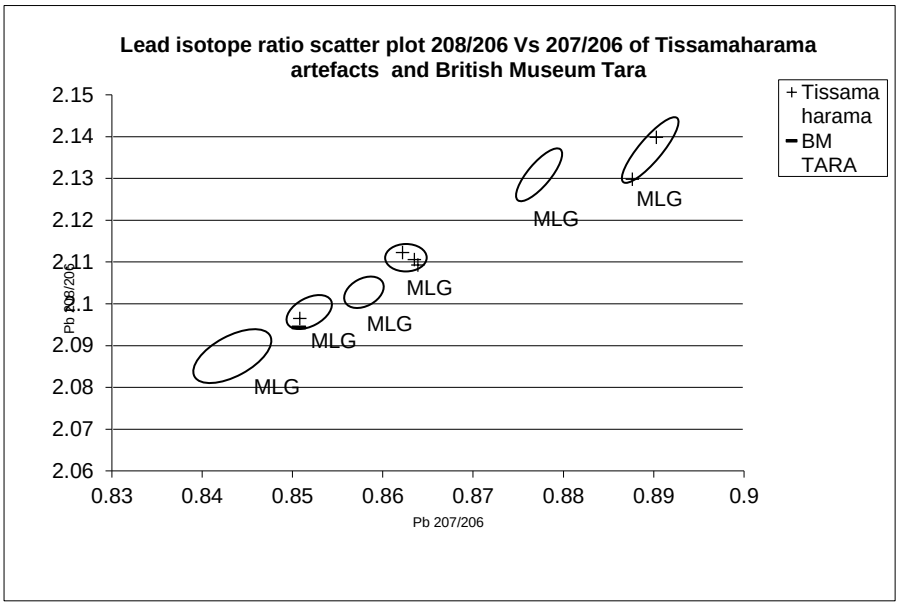
Department of Archaeology, Sri Lanka

Photograph 7: *Tara's image was found in Sri Lanka and is now deposited at the British Museum*

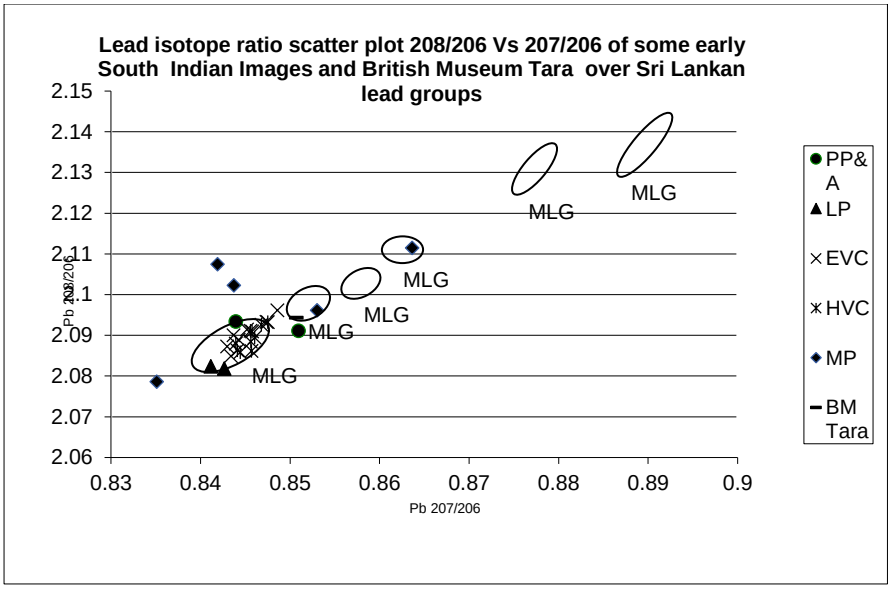
Photograph 8: *Life-size Buddha image discovered in Pallama in Puttlam District*



Graph 1: Lead isotope scatter plot showing lead isotope groups (MLG1 – MLG6) determined by the lead isotope ratio distribution of the Sri Lankan later Anuradhapura period images

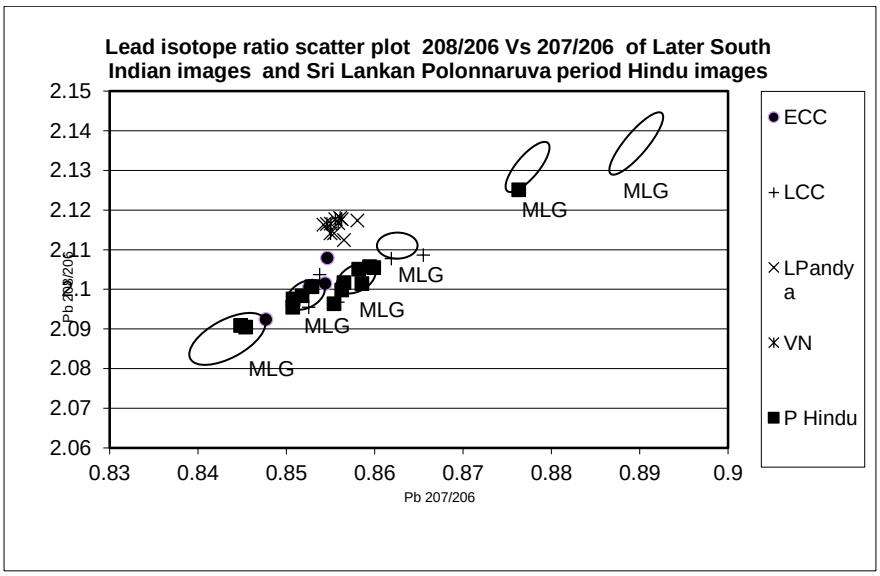


Graph 2: A piece of pure lead ingot from Tissamaharama is closely grouped with the Tara image at the British Museum, inside the Sri Lankan lead isotope group of MLG2. (Only the Tissamaharama artifacts in the graph1 are indicated in Graph 2 for convenience)



Graph 3: *Lead isotope ratio distribution of early South Indian images (Sirinivasan 1999a), contemporary to the Latter Anuradhapura period, and British Museum Tara image over Sri Lankan lead groups. Note that one middle Pallava image has been grouped with MLG2.*

PP&A – Pre Pallava and Andra (c. 200 – 600 AD), MP – Middle Pallava (c. 600 – 850 AD), LP – Later Pallava (c. 850 – 875 AD), EVC – Early Vijayala Chola (c. 875 – 940 AD, HVC High Vijayala Chola (c. 940 – 1070), BM Tara - British Museum (as in Sirinivasan 1999b: 207)



Graph 4: *Lead isotope distribution of Plonnaruva period (12 – 13 Century AD) Hindu images and later South Indian images (Sirinivasan 1999a) over Sri Lankan lead isotope groups. Please note that some later Chalukya-Chola images have been grouped with the Sri Lankan lead isotope group MLG2.*

ECC – Early Chalukya –Chola (c. 1070 – 1125 AD), LCC – Later Chalukya – Chola (c. 1125 – 1279 AD), L Pandya – Later Pandya (c. 1279 – 1336 AD), VN – Vijayanagara

Acknowledgment

I wish to express my deepest gratitude to Prof. Senake Bandaranayake, Former Director of the Postgraduate Institute of Archaeology, Sri Lanka, Prof. Paul J.J. Sinclair, Professor of Archaeology, Department of Archaeology and Ancient History, Uppsala University, Sweden, and Mr. S. Lakdusinghe, the former Director of the PGIAR and the National Museum Department, Sri Lanka, for their immense help and encouragement. This project would not have been possible without the financial support I received through the SAREC/SIDA-supported ECHR (Environmental Change and Human Response) program conducted by Prof. Paul J.J. Sinclair, Department of Archaeology and Ancient History, Uppsala University, Sweden, and the Postgraduate Institute of Archaeology (PGIAR), University of Kelaniya. I also wish to thank Dr. Kjell Billstrom, Natural History Museum, Stockholm, Sweden, who supervised and conducted the lead isotope analysis of the metal samples for this study.

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A Review of Paleolithic Sites in Nagpur District of Vidarbha Region, Maharashtra, India

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Abstract

This research paper presents a thorough examination of the evolution of Paleolithic studies in Nagpur district since India's independence. By meticulously compiling data from a range of scholarly sources, including journals, PhD theses, Master's Dissertations, and articles, we construct a comprehensive narrative of the region's Paleolithic research landscape. This historical overview offers insights into the progress made in understanding early human cultures in the Nagpur district and reveals significant archaeological findings over time. Through a meticulous analysis of this multifaceted historical record, our paper contributes to a deeper understanding of the rich archaeological heritage of this region and underscores the importance of ongoing Paleolithic research in advancing our knowledge of human prehistory.

Keywords: *Paleolithic, Vidarbha, Nagpur District, Exploration, Naikund.*

Introduction

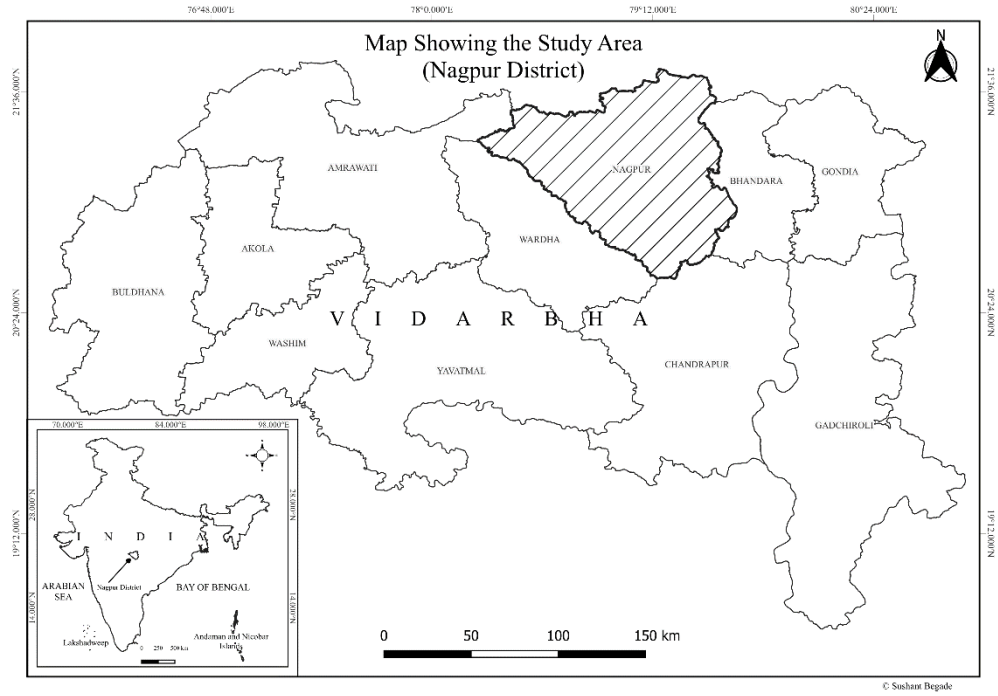
In India, over the past six decades, there has been a significant focus on studying the regional aspects of early human history. This concerted effort has led to the exploration of various smaller regions, each of which has unveiled intriguing discoveries. Among these regions, Maharashtra stands out as particularly promising when it comes to understanding Paleolithic cultures. This part of the country has provided compelling evidence spanning from the Lower Paleolithic to the Upper Paleolithic period.

The Nagpur District of the Vidarbha region of Maharashtra has a very rich record of Paleolithic culture. The explorations initiated by the Archaeological Survey of Indian (Prehistory Branch) in 1959-60 laid the foundations of Paleolithic research in this region. Koradi (IAR 1959-60: 31) became the first Paleolithic factory site in this region. Since after findings of palaeoliths at Naikund (IAR 1977-78:37), Kola Suran (IAR 1984-85: 52), Borgaon (Pandey 1985: 121-133), Dattawadi (IAR 1995-96: 57-58), etc, explorations in this region are moving at a pace.

This paper summarizes the post-Independence history of Paleolithic research in Nagpur district. It serves as a meticulous compilation of Paleolithic sites documented in various sources such as journals, PhD theses, Master's Dissertations, and other scholarly articles. Together, these sources provide a comprehensive narrative of the archaeological exploration and discoveries in this captivating region.

The Study Area

The Nagpur District of Vidarbha Region in Maharashtra comprises 14 sub-districts. It covers 9892 Km^2 area. The study area falls under two major river systems (*viz.* Wainganga and Wardha) and their tributaries (*viz.* Kanhan, Pench, Kolar, Sur, Aam, Maru, Chandrabhaga, Nag, Jam, Vena, Bor, and Bawanthadi, etc).



Map 1: *Highlighted portion of the map showing the study area (viz., Nagpur District).*

Topographically, the study area possesses varied topography due to a complex geological setup. The northern and north-western part of Nagpur district forms an inlying spur of the Satpura range, which shows plateaus and hillocks landforms and has the highest altitude of 652m AMSL (Map 2). The central part of the district lies on an undulating plain intersected by streams and rivers. The eastern and southern parts of the district have vast pediplain with gentle slopes towards the east and are also occupied by the Wainganga River basin.

Geologically, the rock formation in the study area is underlain by the Archaean rocks to the north and east and younger sedimentary rocks like Lameta and Gondwana, being embedded by flows (Deccan basalt) to the west and south. The major formations in the study area are shown in Table 1 (Geological Survey of India 2021; District Survey Report Nagpur 2022-2023).

Age	Formations
Recent	Alluvium
Upper Cretaceous to Lower Eocene	Deccan Basalt (Traps) associated with Intertrappean sediments
Cretaceous	Lameta Beds
Carboniferous to Permian	Gondwana Group: 1. Kamthi Formation 2. Talchir Formation
Archaean	Streaky Granitiegneisses Sausar and Sakoli series of metasediment

Table 1: *Geological Formations in Nagpur District.*

Map 2: *Digital Elevation Map of Nagpur District*

The present climate of the study area is characterized by hot summers, cold and dry winters, and well-distributed rainfall with an average of 1064.1 mm (District Survey Report Nagpur 2022-2023).

Paleolithic Research in Nagpur District

Paleolithic sites have been reported since the mid-20th century in the Nagpur District of the Vidarbha Region of Maharashtra. Many institutions and research scholars have contributed to these explorations, which are as follows:

Archaeological Survey of India (Prehistory Branch): In 1959-60, under the direction of Dr. R.V Joshi, Koradi was the first palaeolithic factory site which was discovered, where flakes and flake-blades with plain and narrow striking- platform were picked up from the low-lying hill, near Kali temple (IAR 1959-60: 31). In the same year, thirty-five artefacts of a scraper-flake-blade assemblage were picked up in situ in the cemented sandy gravel resting on the weathered Deccan trap on the Wuna river near village Khairi (IAR 1959-60: 33). In 1961-62, B.P Bopadikar found middle palaeolithic tools comprising points and scrapers in the loose gravel of Sand nullah at Nawegaon, Dhamangaon, Maroli and Bhamiwara (IAR 1961-62: 101). Another exploration undertook under Dr. R.V Joshi accompanied by B.P Bopadikar, S.D Kulkarni and Nawathe near the village Nawegaon Kheri, in which a trench dug out in the portion of Pench river yielded middle palaeolithic tools from a thin silty layer and gravelly rubble (IAR 1969-70: 24). In 1985-86, under the direction of B.P Bopadikar assisted by N.G Nikoshey, J.S Dubey and N.K Nimje carried out exploration along with river Wainganga and located lower, middle and upper palaeolithic sites at Ambhora Khurd, Itgaon, Maundi, Khabri, Jamgaon, Mohdura and Nawegaon (IAR 1985-86: 58), except Ambhora Khurd remaining all sites are now submerged in a Gosikhurd Irrigation project on Wainganga river. In 2013-14, N.G Nikoshey assisted by G.L Kakade, K.M Girhe and N.K Nimje conducted explorations in Kalmeshwar and several 26 more villages of several talukas in Nagpur district and reported them as middle palaeolithic sites (IAR 2013-14: 77-79).

Archaeological Survey of India (Excavation Branch I, Nagpur): In 1959-60, series II tools (cores, flakes, points, and scrapers) on chalcedony, chert, and jasper were discovered near the village Waddhamna on Nagpur-Amravati Road (IAR 1959-60: 72). In 1961-62, B.K. Thapar recovered Middle Paleolithic tools near Junapani and Phetri from the cairn-filling of the excavated megaliths, indicating cairn material was collected from the neighboring sites of Middle Paleolithic culture (IAR 1961-62: 101). In 1988-92, under the direction of Dr. Amrendra Nath, excavated Adam in which four Paleolithic handaxes were reported. They were made on basalt and quartzite (Dr. Nath A 2016: 207-208).

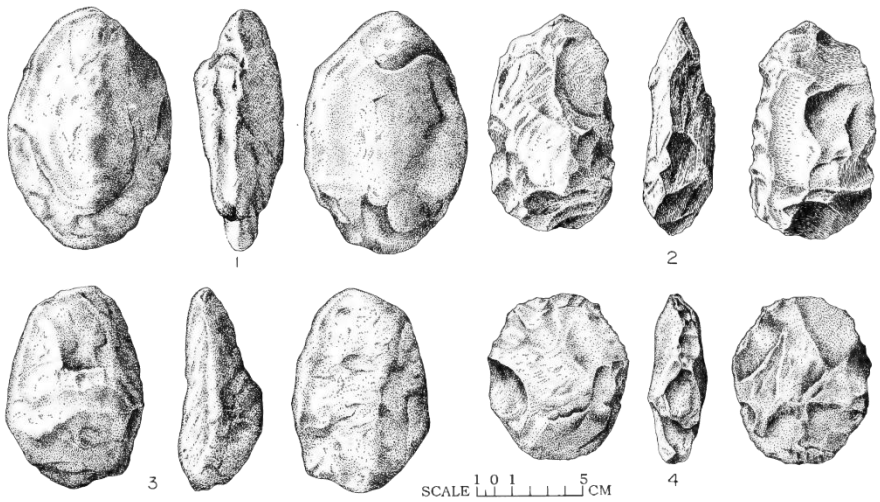


Figure 1: *Handaxes from Adam (Source: Dr. Nath A 2016: 207-208)*

Archaeological Survey of India (Central Circle): In 1968-71, Lai Chand Singh discovered upper paleolithic sites at Bhokara (IAR 1968-69: 17) and Gawasi (now Ashokban) (IAR 1970-71: 24).

Archaeological Survey of India (South-Western Circle): In 1981-82, S.N Raghunath located upper palaeolithic sites at Umred, Sadeswar, Gondpimpri, Bori and Adyal, in which tools are short blades and scrapers on chalcedony and agate (IAR

1981-82: 49). In same year, R.C Agarwal and Amarendra Nath collected middle palaeolithic tools (*viz.* borer-cum-scrapers, side scrapers, triangles, arrowheads, fluted cores and discoidal cores) at Hingna, tools were made on green jasper and chalcedony embedded in black cotton soil mixed with kankar (IAR 1981-82: 96).

Archaeological Survey of India (Aurangabad Circle): In the course of exploration of submergence area of lower Wunna Irrigation Project, M. Mahadevaiah noticed middle palaeolithic sites in Dhudhala, Jaipur, Borgaon, Khursapur, Kawadpur, Ridhora and Salai Rani (IAR 1985-86: 58).

Deccan College and Post-Graduate and Research Institute, Pune: In 1977-78, Professor R.V Joshi, Dr. G.L Badam and Rakesh Pandey explored the river Pench near Naikund and collected 327 middle and upper palaeolithic tools from river section, tools consist scrapers, burins, points, borers, knives, choppers, blades and flakes made on chert, chalcedony, agate, jasper and quartz, the tools were similar to those usually found in Wainganga basin (IAR 1977-78: 37; Pandey R.P 1981: 223-230). In 1984, during the excavations of megaliths by Professor S.B Deo, K Paddayya reported middle palaeolithic localities yielding scrapers, borer, points, blades, cores and flakes at Pipla and Telkamthi adjoining to these megalithic sites (Paddayya K 1984: 91-98). In subsequent year, R.P Pandey reported upper palaeolithic tools at Borgaon from the vicinity of megalithic burials (Pandey 1985: 121-133). In 1994-95, during the course of survey of river Kanhan (near Kamptee) several stone artefacts and well-preserved fossil of Bos namadicus were collected by G.L Badam and team, also rich assemblage of palaeolithic tools were traced at Wadi and Dattawadi area (IAR 1994-95: 55). In next year's continuation of exploration, they reported middle palaeolithic tools (flakes, scrapers and core made on chert and chalcedony) near Kamptee Cantonment area (IAR 1995-96: 56-57). In 2017-18, geomorphological investigations carried out around the site of Nagardhan, in which Joglekar and Imchen reported over hundred lower and middle palaeolithic tools, which consists handaxe, cleaver, scraper, chopper, flakes, points, blades and cores etc, mainly made on quartz (Joglekar 2017: 114-117; Joglekar and Imchen 2018: 261-275).

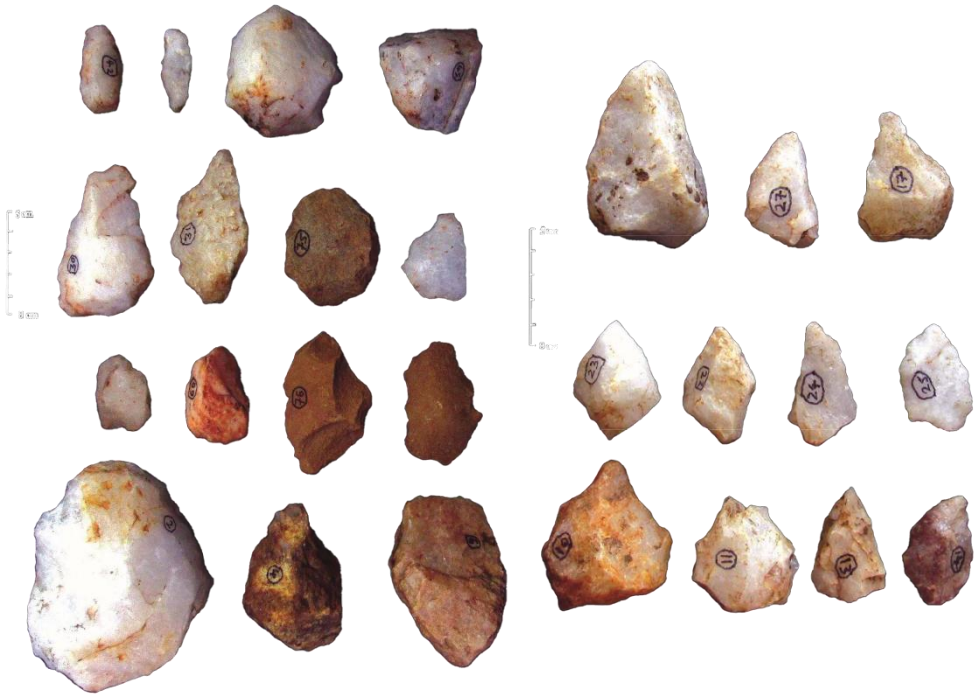


Figure. 2: *Middle Palaeolithic Tools from Nagardhan.*
(Source: Joglekar and Imchen 2018: 261-275)

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In 1977-78, Professor A.M Shastri collected middle palaeolithic tools from the bed of a small nullah and the adjoining fields at Ajni (in Nagpur City) (IAR 1977-78: 81). In the same year, he also discovered middle palaeolithic tools at Mahurjhari from the bed of a small rivulet flowing on the north of the village (IAR 1977-78: 101). In subsequent year, Dr. Chandrashekhar Gupta also noticed Lower and Middle palaeolithic tools at Mahurjhari, where lower palaeolithic tools only represent by choppers, found in the nullah flowing through the fields of village, whereas middle palaeolithic site yields blades, scrapers, flakes and core from the left bank of rivulet flowing on norther border of village (IAR 1979-80: 104). In 1984-85, Dr. Chandrashekhar Gupta discovered lower palaeolithic tools at Umred and Kola Suran

hill range (IAR 1984-85: 52). In 1994-95, Dr. Ismail Kellellu did exploration and discovered few lower and middle palaeolithic localities within the Nagpur city. At Nandanwan colony, tool comprising scraper, points, borers, choppers and handaxe were collected from earth dug out for constructing a well at a depth of 9.14 m below surface and all tools made on chert (IAR 1994-95: 57). In the Methodist church compound typical middle palaeolithic tools collected from surface (IAR 1994-95: 57). A trench laid for water pipeline in Bajaj nagar, yielded a small handaxe on quartzite and chopper, scrapper, points, blades and borers made on chert in stratified context (IAR 1994-95: 57). In subsequent year, under the direction of Dr. Chandrashekhar Gupta and Dr. Ismail Kellellu assisted by Pradeep Meshram, C.N Saharkar, Damodar Aglave, Jagdish Ramdam, Mukta Mohite, Vandana Khedikar and department students carried a trail excavation at Dattawadi, in which middle palaeolithic stone tools were recovered and tools are entirely made on locally available smoky-white chert and without any encrustation suggesting the site have been a factory site (IAR 1995-96: 57). In 2014, Dr. Prabash Sahu and his student Siddharth Gharde reported twenty-seven middle and upper palaeolithic tools from Sawali Khurd. Tools were classified as scraper, borer, point, blade and burin and they were made on chert and jasper (Sahu P 2019). In 2018, K.S Chandra, contributory lecturer of department reported similar kind of lower palaeolithic tools reported previously at Nandanwan, which consists handaxe, cleaver, blade and burin made on chert (Chandra K.S 2018: 1-17). In 2019, in the research for master's dissertation, department student Vivek Raut reported several lower, middle and upper palaeolithic sites at Bina Sangam, Mahuli, Sihora, Kirnarpur, Sukali and Mokhedi etc, all sites are on the banks of Kanhan river (Raut 2018-19: 21-29).

Figure 3: *Palaeolithic Tools from Dattawadi.*
(Source: Department of A.I.H.C and Archaeology, R.T.M.N.U)

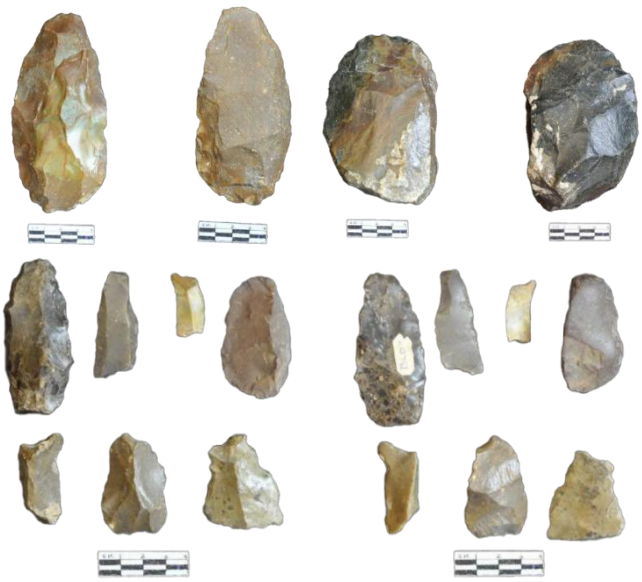
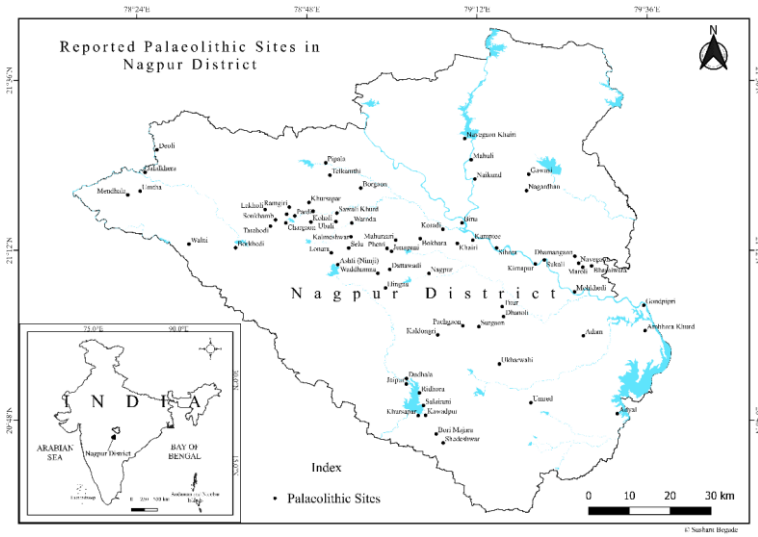


Figure 4: *Palaeolithic Tools from Nandanwan locality in Nagpur City.*
(Source: Chandra K.S 2018)

Figure 5: *Palaeolithic Tools from Sawli Khurd (Source: Sahu P 2019)*

*Fr*om 1959 to 2019, 74 palaeolithic sites has been reported so far in Nagpur district, which shown in Table 2 and Map 3.



Map 3: *Reported Paleolithic Sites in Nagpur District.*

Sr. No.	Site Names	Geo-coordinates	Culture	Reference
1	Adam	20°59'58" N, 79°27'04" E	LP	Dr. Nath A 2016: 207-208
2	Adyal	20°48'57" N, 79°31'46" E	UP	IAR 1981-82: 49
3	Ajni	21°07'05 N, 79°04'31" E	MP	IAR 1977-78: 81
4	Ambhora Khurd	21°00'40" N, 79°35'46" E	LP	IAR 1985-86: 58
5	Ashti (Nimji)	21°10'56"N, 78°52'8" E	MP	IAR 2013-14: 77
6	Bajaj Nagar	21°07'38" N, 79°03'41" E	MP	IAR 1994-95: 57
7	Bena Sangam	21°15'52" N, 79°09'53" E	MP, UP	Raut 2019: 21
8	Bhamiwara	21°09'53" N, 79°27'58" E	MP, UP	IAR 1961-62: 101
9	Bhokara	21°13'40" N, 79°03'58" E	UP	IAR 1968-69: 17
10	Borgaon	20°51'07" N, 79°03'24" E	MP	IAR 1985-86: 58
11	Borgaon (Buzruk)	21°20'46" N, 78°55'33" E	UP	Pandey 1985: 121-133
12	Bori (Majara)	20°46'05" N, 79°06'15" E	UP	IAR 1981-82: 49
13	Chakdoh	21°17'05" N, 78°44'59" E	MP	IAR 2013-14: 77
14	Chargaon	21°15'12" N, 78°44'53" E	MP	IAR 2013-14: 77

15	Dattawadi	21°09'22" N, 78°59'23" E	UP	IAR 1994-95: 55
16	Deoli	21°26'10" N, 78°26'50" E	MP	IAR 2013-14: 81
17	Dhamangaon	21°11'10" N, 79°25'46" E	MP, UP	IAR 1961-62: 101
18	Dhanoli	21°2'22" N, 79°15'52" E	MP	IAR 2013-14: 77
19	Dhudhala	20°53'55" N, 79'02'02" E	MP	IAR 1985-86: 58
20	Gawasi	21°22'49" N, 79°19'07" E	UP	IAR 1970-71: 24
21	Gondpimpri	21°04'15" N, 79°35'25" E	UP	IAR 1981-82: 49
22	Hingna	21°04'21" N, 78°57'34" E	MP	IAR 1981-82: 96
23	Jaipur	20°53'10" N, 79°02'00" E	MP	IAR 1985-86: 58
24	Jalalkheda	21°23'03" N, 78°25'11" E	MP	IAR 2013-14: 82
25	Junapani	21°11'53" N, 78°59'56" E	MP, UP	IAR 1961-62: 101
26	Kaldongri	21°00'10" N, 79°06'38" E	MP	IAR 2013-14: 77
27	Kalmeshwar	21°14'06" N, 78°55'34" E	LP, MP	IAR 2013-14: 78
28	Kamptee	21°13'26" N, 79°11'20" E	MP	IAR 1995-96: 56-57
29	Kawadpur	20°48'44" N, 79°04'43" E	MP	IAR 1985-86: 58

30	Khairi	21°12'59" N, 79°09'18" E	LP, MP, UP	IAR 1959-60: 33
31	Khursapar	20°48'40" N, 79°03'42" E	MP	IAR 1985-86: 58
32	Khursapar	21°18'55" N, 78°48'23" E	MP	IAR 2013-14: 78
33	Kirnapur	21°10'04" N, 79°20'14" E	LP, MP, UP	Raut 2019: 28
34	Kohali	21°16'01" N, 78°48'33" E	MP	IAR 2013-14: 78
35	Koradi	21°14'58" N, 79°07'03" E	LP, MP, UP	IAR 1959-60: 31
36	Lakholi	21°16'46" N, 78°41'24" E	MP	IAR 2013-14: 78
37	Lonara	21°11'39" N, 78°51'28" E	MP	IAR 2013-14: 78
38	Mahuli	21°24'49" N, 79°11'10" E	MP, UP	Raut 2019: 22
39	Mahurjhari	21°13'32" N, 79°00'38" E	LP, MP	IAR 1977-78: 81; IAR 1979-80: 104
40	Maroli	21°09'41" N, 79°26'55" E	MP,UP	IAR 1961-62: 101
41	Mendhala	21°19'49" N, 78°22'40" E	MP	IAR 2013-14: 83
42	Methodist Church	21°07'34" N, 79°05'32" E	MP	IAR 1994-95: 57
43	Mohkhedi	21°06'13" N, 79°25'44" E	LP, MP, UP	Raut 2019: 29
44	Nagardhan	21°20'10" N, 79°18'55" E	LP, MP	Joglekar and Imchen 2018: 261-275

45	Naikund	21°22'02" N, 79°11'42" E	MP	IAR 1977-78: 37
46	Nandanwan	21°08'19" N, 79°07'39" E	LP.MP	IAR 1994-95: 57; Chandra K.S 2018: 1-17
47	Navegaon	21°10'14" N, 79°26'19" E	MP, UP	IAR 1961-62: 101
48	Nawegaon Khairi	21°27'48" N, 79°10'17" E	MP, UP	IAR 1969-70: 24
49	Pachgaon	21°01'19" N, 79°10'02" E	MP	IAR 2013-14: 78
50	Pardi	21°16'50" N, 78°46'43" E	MP	IAR 2013-14: 78
51	Phetri	21°12'15" N, 78°59'18" E	MP, UP	IAR 1961-62: 101
52	Pipala (Bhadao)	21°24'19" N, 78°50'43" E	MP	Paddayya 1984: 92
53	Ramgiri	21°18'05' N, 78°45'31" E	MP	IAR 2013-14: 77
54	Ridhora	20°51'50" N, 79°03'44" E	MP	IAR 1985-86: 58
55	Salai Rani	20°49'53" N, 79°03'31" E	MP	IAR 1985-86: 58
56	Sawli Khurd	21°17'12" N, 78°52'16" E	MP,UP	Sahu P 2019
57	Selu	21°12'19" N, 78°53'54" E	MP	IAR 2013-14: 78
58	Shedeshwar	20°44'48" N, 79°07'08" E	UP	IAR 1981-82: 49

59	Sihora	21°12'29" N, 79°14'28" E	MP, UP	Raut 2019: 25
60	Sonkhamb	21°16'19" N, 78°43'31" E	MP	IAR 2013-14: 78
61	Sukali	21°10'39" N, 79°21'30" E	MP, UP	Raut 2019: 28
62	Surgaon	21°01'11" N, 79°12'17" E	MP	IAR 2013-14: 78
63	Susundri	21°17'33" N, 78°48'54" E	MP	IAR 2013-14: 78
64	Tarabodi	21°15'23" N, 78°42'48" E	MP	IAR 2013-14: 78
65	Telkamthi	21°22'38" N, 78°51'16" E	MP	Paddayya 1984: 93
66	Titur	21°04'02" N, 79°15'33" E	MP	IAR 2013-14: 78
67	Ubali	21°16'02" N, 78°52'05" E	MP	IAR 2013-14: 78
68	Ukharwahi	20°55'15" N, 79°15'18" E	MP	IAR 2013-14: 79
69	Umred	20°51'04" N, 79°19'08" E	LP. UP	IAR 1981-82: 49; IAR 1984-85: 52
70	Umtha	21°20'26' N, 78°24'29" E	MP	IAR 2013-14: 83
71	Waddhamna	21°08'51" N, 78°58'05" E	MP, UP	IAR 1959-60: 72
72	Wadi	21°08'44" N, 78°59'14" E	UP	IAR 1994-95: 55
73	Walni	21°12'53" N, 78°31'19" E	MP	IAR 2013-14: 79

74	Waroda	21°15'52 N, 78°54'19" E	MP	IAR 2013-14: 79

Table 2: *Reported palaeolithic sites in Nagpur District (LP-Lower Palaeolithic; MP-Middle Palaeolithic; UP-Upper Palaeolithic)*

The Palaeolithic Culture of Nagpur District

Explorations and Excavations conducted in Nagpur district established the palaeolithic cultural sequence, which is summarized here as:

A. Lower Palaeolithic Culture: Ambhora Khurd (IAR 1985-86: 58) and Adam (Dr. Nath A 2016: 207-208) stand out as the sole locations where researchers exclusively discovered lower palaeolithic tool assemblages. Intriguingly, researchers also identified lower palaeolithic assemblages at an additional 9 multicultural sites. In Nagpur district, handaxes prominently characterize the lower palaeolithic assemblage, coexisting with cleavers, choppers, cores, and flakes. These tools were crafted from various raw materials such as chert, basalt and quartzite etc.

B. Middle Palaeolithic Culture: In Nagpur district, researchers reported a total of 41 middle palaeolithic sites, and within 21 of these multicultural palaeolithic sites come across middle palaeolithic tool assemblages. These tool collections include a variety of implements such as scrapers, flakes, cores, borers, points, knives etc, all crafted from materials like chert, chalcedony, jasper, agate, and quartz.

C. Upper Palaeolithic Culture: The presence of a industry primarily characterized by blades and burins is notable in this region. Substantial evidence supporting this claim comes from reports in Borgaon (Pandey 1985: 121-133) and Dattawadi (IAR 1995-96: 57-58). Additionally, researchers reported 9 upper palaeolithic sites and 18 of these multicultural palaeolithic sites yielding upper palaeolithic tool assemblages. Among the tools found in these assemblages are scrapers,

flakes, blades, and burins, all crafted from materials like quartz, chalcedony, chert, and jasper, among others.

Among the 74 sites that have been reported, 22 of them have been identified as multicultural palaeolithic sites based on the analysis of their stone tool assemblage. It's noteworthy that the majority of these Palaeolithic sites in the region were found in proximity to riverbeds or water bodies, possibly due to the scarcity of suitable raw materials in other landscapes.

Observation and Conclusion

In addition to the richness of palaeolithic artefacts found in Nagpur district, it's worth noting that researchers have historically used various terminologies to describe these palaeolithic assemblages. Terms such as 'series I or II tools,' 'Stone Age tools,' or 'palaeolithic tools' have been used interchangeably. Furthermore, in several studies, details about tool types, tool density, site characteristics and descriptions have been lacking. This has sometimes led to confusion about the precise location and nature of these sites.

To enhance the quality of future research efforts, a multidisciplinary approach is imperative. This approach should encompass diverse disciplines such as palaeoclimate studies, systematic surveys, GIS mapping, techno-morphological studies, and analysis of tool use in their primary contexts. Additionally, comprehensive explorations and excavations are essential to amass an abundant cultural material repository, enabling a more thorough study of the palaeolithic people of Nagpur district in the Vidarbha region. By adopting these comprehensive strategies, we can delve deeper into the past and gain a richer understanding of the lives of our palaeolithic ancestors in this region.

Acknowledgements

We would like to express our sincere appreciation to the numerous scholars, institutions, and researchers whose work and insights formed the foundation of this

paper. Their dedication to the field of prehistoric studies has been instrumental in shaping our understanding of the Nagpur district's archaeological heritage.

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Reconstructing the Ancient Mihinthale Tank: A GIS and Remote Sensing Approach to Uncovering Historical Landscapes in Sri Lanka

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Abstract

The study employs Geographic Information Systems (GIS) and Remote Sensing techniques to reconstruct the inundation area of the ancient Mihinthale tank, providing a comprehensive understanding of its historical landscape. The methodology involved several key steps, including the acquisition of Advanced Land Observing Satellite (ALOS) data to create a detailed Digital Elevation Model (DEM) of the study area. The DEM was processed using ArcGIS to generate contour lines and determine the maximum water level. GPS locations of the old tank bund were collected and integrated into ArcGIS to reconstruct the ancient bund. The reconstructed bund and contour lines were then used to delineate the potential inundation area. A comparison of the ancient tank's dimensions and capacities with its present-day counterpart reveals substantial differences. The current tank bund measures approximately 720 meters, while the ancient bund was around 1700 meters. The current tank covers an area of about 0.25 square kilometers, whereas the ancient tank extended over 0.98 square kilometers. The surface volume of the present tank is approximately 1,024,000 cubic meters, compared to about 5,033,000 cubic meters for the ancient tank. The investigation highlights the significance of the Mihinthale tank within the broader context of Sri Lankan monastic and hydraulic infrastructure. Historical evidence suggests that the ancient tank played a crucial role in sustaining the large monastic population in Mihinthale, supporting the hypothesis of an extensive tank bund connecting the Mihinthale monastery and Wasammale.

Keywords: *ALOS, DEM, GIS, Mihinthale Tank, Remote Sensing*

Introduction

Archaeology, in conjunction with Geographic Information Systems (GIS) and Remote Sensing, offers powerful tools to uncover and understand ancient landscapes. Those techniques have been used for different purposes of archeology such as forecasting archeological site locations (Espa et al., 2006), modeling for the prediction of archeological sites (Nsanziyera et al., 2018), mapping archeological sites (Richason & Hritz, 2006), archeological data management (Mafredas & Malaperdas, 2021), understanding behavioral patterns using geostatistical methods (Katugampola, 2021) and reconstruction of the historical landscape (Alexakis et al., 2011).

Recreating historical landscapes has become urgent due to anthropogenic and environmental processes such as erosion and sedimentation, and new technologies now allow archaeologists to complete surveys in a shorter time, a process that once took decades (Krleža et al., 2018). One of the technologies facilitating these expedited archaeological surveys and tasks is the application of GIS and remote sensing.

Alexakis et al. (2011) focused on a multidisciplinary approach that combined field surveys, statistical analysis, and GIS and remote sensing techniques to detect Neolithic settlements and reconstruct the Neolithic landscape while Krleža et al. (2018) mostly depend on remote sensing technologies for precise reconstruction and preservation of the historical landscape of the island of Rab, Croatia, through the creation of interactive 3D models. Liu et al. (2021) employed GIS and remote sensing techniques to analyze the land-water distribution and reconstruct the historical landscape of the Panlongcheng site by generating DEM and TIN base maps with modern artificial features removed, allowing for detailed topographical analysis and visualization. In addition, Farinetti. (2011) utilized a GIS-based approach to integrate archaeological, historical, and environmental data to assess the long-term settlement history and landscape character of Central Greece for the reconstruction and interpretation of the archaeological datasets.

Although using GIS and remote sensing technologies in Sri Lankan archaeological studies has become common practice, most applications are limited to site mapping and archaeological data management. However, Fernando, (2005) underscored the value of GIS-based computer applications in archaeology, notably in reconstructing ancient cultural landscapes, as demonstrated in the study of the lower Kirindi Oya basin in the Hambanthota District, where a GIS application depicted the cultural landscape over the past 2000 years, revealing significant changes in settlement patterns and human impacts on the natural landscape. Although Fernando (2005) attempted to reconstruct the ancient cultural landscape, the study primarily compares the present and past landscapes. In addition, Madduma Arachchi, (2023) attempted to recreate the landscape of Colombo Fort, Sri Lanka using the Georeferencing technique in GIS with a historical Dutch map of the Colombo fort.

The present landscape of Sri Lanka's North Central and Northwestern provinces offers insight into the ancient landscape, particularly concerning the ancient irrigation systems. Several arguments exist regarding the origins of Tank irrigation systems in Sri Lanka. Among these, the popular belief that early Aryan settlers developed the irrigation system is questioned by various scholars (Panabokke, 2010). Within a few centuries of their origin, these tanks expanded significantly in size, and many of them became interconnected, forming intricate cascade systems. Tank cascades are connected series of tanks organized within a micro-catchment of the dry zone landscape, storing, conveying, and utilizing water from an ephemeral rivulet (Madduma Bandara, 1994).

Multiple invasions from South India into Sri Lanka compelled the kingdom to relocate further into the southwestern region of the island. This initiated the abundance of the Rajarata as the dominant political, economic, and agricultural hub of Sri Lanka. Insufficient attention resulted in a proliferation of ancient tanks throughout the region. Sri Lanka was under colonial rule from 1505, with the Portuguese making no attempts to reconstruct irrigation works. The Dutch restored some maritime irrigation works, and while the early British period saw neglect and destruction of these systems, significant attention was given to irrigation

improvement from 1855 onwards, culminating in the establishment of the Irrigation Department in 1900 to repair and maintain ancient reservoirs and networks. Later, during the era of D. S. Senanayake, irrigation became central to agriculture, with the goals of increasing paddy production and relocating people from the wet zone to the dry zone (Weerasinghe & Navarathne, 2003).

By examining the ruins of tank bunds from some ancient tanks, it becomes evident that these tanks were once significantly larger than they are today. Although the remaining tanks and irrigation systems reveal how the historical irrigation landscape functioned in the Anuradhapura kingdom, parts of this sophisticated tank network have either been abandoned or modified. Therefore, it is difficult to determine the inundated area of a tank during the ancient time. However, interdisciplinary approaches like GIS and remote sensing techniques are capable of recreating these historical environments and gaining insights into the engineering and hydrological prowess of ancient civilization in Sri Lanka.

Determining the inundated area of a tank involves analyzing the length and height of the tank bund as well as the morphology of the associated surface. Khojiakbar et al. (2019) employed Remote Sensing and GIS technologies to assess the area and volume of the Tashtepa water reservoir. Tools such as Google Earth and Global Mapper were utilized to delineate dam alignments, create Digital Elevation Models (DEM), and quantify both the surface area and volume of the reservoir. Similarly, Taşkin & Irvem. (2014) utilized DEM to identify suitable reservoir sites and estimate their water surface area and volume, facilitating efficient surveying and future capacity analysis of reservoirs in the watershed in Turkey. Bhat et al. (2015) utilized multispectral images from sources like Landsat, IRS LISS III, and ASTER, along with DEMs to accurately assess reservoir water levels, calculate water volume based on empirical models, and convert water spread area into vector polygons. Nevertheless, all of these studies are based on modern reservoirs or those in the planning stages. None of these studies were focused on recreating the historical landscape by determining the inundation area of a historical reservoir.

The Mihinthale Tank, also known as Bulankulama, originally featured a much longer tank bund, whereas its present-day structure has a considerably shorter bund. Situated at a site of profound significance for Sri Lankan Buddhism, Mihinthale has been revered since the time of Mahinda Thero, whose presence solidified its status as a crucial Buddhist center. Over time, Mihinthale and its environs evolved into a prominent Buddhist monastic enclave, with the Mihinthale tank likely serving as a vital water source for daily activities. Hence, comprehending the extent of the Mihinthale tank during the Anuradhapura period is essential for unraveling the role of the Mihinthale landscape as a Buddhist monastery.

As mentioned above, utilizing GIS and remote sensing techniques to recreate the ancient landscape is not a highly explored area in the field of Archaeology in Sri Lanka. This research gap leads to the formulation of the following research question: How can modern GIS and remote sensing techniques be utilized to determine the inundation area of the Mihinthale tank during its prime stage in the Anuradhapura era?

Building upon this background, this research aims to delineate the inundation area of the Mihinthale tank during its peak period, possibly within the Anuradhapura era, by employing contemporary GIS and remote sensing methodologies. By doing so, it seeks to provide a detailed understanding of the tank's historical extent and its role in the ancient landscape.

2. Materials and Methodology

2.1 Research Area

This research focuses on the Mihinthale Tank (also known as Bulankumala), believed to have been built during the King Devanampiyatissa era (306 BC – 266 BC) (Wijayawardene, K., 2022), located in the Mihinthale DS division of the Anuradhapura district in Sri Lanka's dry zone (Fig 02).

Figure 01: *Remaining part of the old tank bund from the Mihinthale side*

There is a local saying that a monk could walk from Wasammale to the Mihinthale monastery along the Tank bund (Wijayawardene, K., 2022), indicating the historical length and significance of the tank bund. Today, the existing tank bund measures approximately 720 meters in length, with heights ranging from approximately between 02 to 08 meters. Despite its reduced length, remnants of the ancient bund can still be observed within the premises of Rajarata University to the north and near the Mihinthale Monastery to the south (Fig. 01). These remnants suggest that the original tank bund likely spanned between the Wasammale and Mihinthale mountains, creating a significant hydraulic structure.

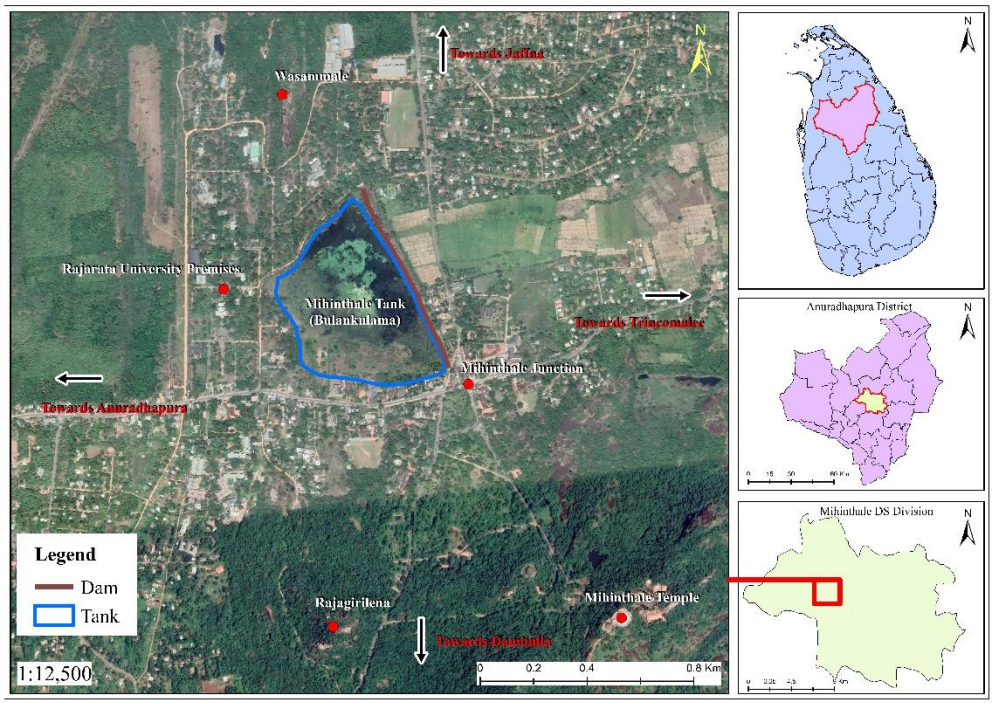

Figure 02: *Location of the Mihinthale Tank (Image source: Google Earth)*

The Mihinthale Tank is situated at the coordinates 8°21'44.21"N latitude and 80°30'29.56"E longitude. Currently, the tank supports the cultivation of approximately 42 acres of paddy fields (De Silva & Ranjith, 2017), covering a water area of about 0.25 square kilometers (km^2).

Materials

To accurately determine the inundation area of the Mihinthale Tank, a Digital Elevation Model (DEM) is essential. DEMs provide detailed information on the terrain elevation, which is critical for understanding the topography and hydrology of the area.

For this research, the Advanced Land Observing Satellite (ALOS) data was utilized. The ALOS satellite provides terrain-corrected DEM with a spatial resolution of 12.5 meters (ESA, n.d.), offering a more detailed and accurate representation of the terrain

compared to other freely available DEM products. Although the Shuttle Radar Topography Mission (SRTM) DEM, with a 30-meter spatial resolution (EOS, n.d.), is commonly used, but its resolution was insufficient for this study. Furthermore, the Survey Department of Sri Lanka does not provide maps of the study area with sufficiently small contour intervals. Therefore, the ALOS satellite data was chosen to ensure a higher precision in terrain modeling. Table 01 shows the details of the used ALOS image.

Satellite and Instrument	Acquired date	Image ID
ALOS PALSAR	26.01.2007	ALPSRP05363015

Table 01: *Details of the ALOS image used*

Google Earth images were employed as base images to assist in visualizing the study area. These images also facilitated the acquisition of locational data for various features, including the current extent of the Mihinthale Tank. Additionally, the locational data for the remnants of the old tank bund was collected using the CTDroid Sri Lanka mobile app. This application allows for the precise gathering of GPS coordinates, which is crucial for mapping the historical extent of the tank bund.

Methodology

The methodology for determining the inundation area of the Mihinthale Tank during its prime stage in the Anuradhapura era involves several steps, incorporating GIS and remote sensing technologies (See Fig.03). ALOS DEM data was downloaded from the “Alaska Satellite Facility” website to create detailed topographic maps and analyze the historical landscape of the Mihinthale Tank area.

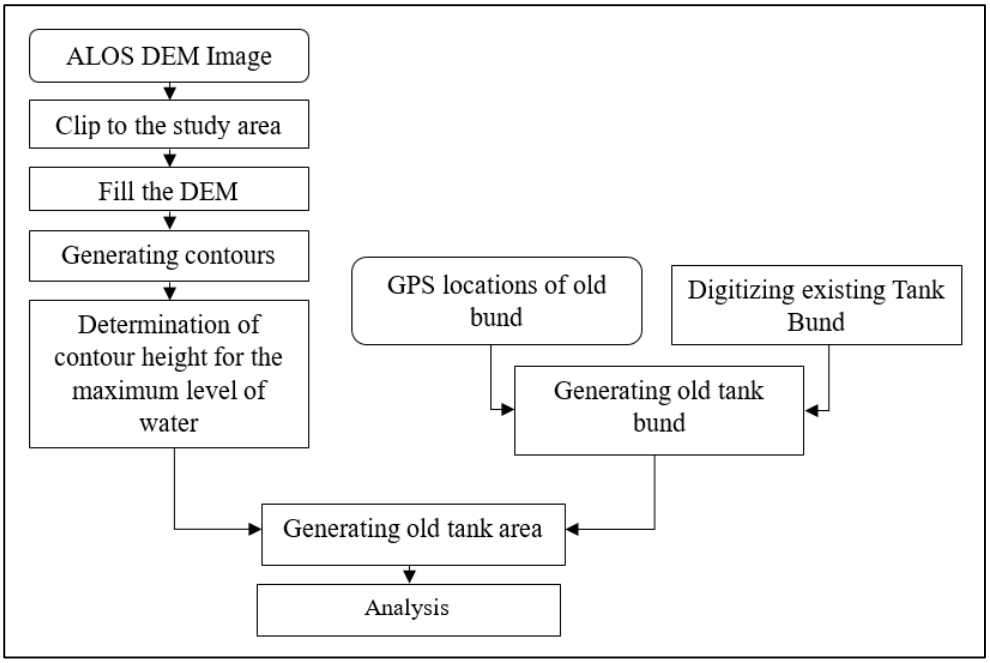

Figure 03: *Methodology*

The preprocessing phase began by clipping the ALOS DEM image to the study area using ArcGIS to focus on the relevant geographical region. The DEM was then processed with the Fill tool in ArcGIS to eliminate any sinks or depressions, ensuring a smooth surface for accurate hydrological analysis. Contours were generated from the DEM with a 10-meter interval, providing a detailed representation of the area's topography. The maximum height of the water level was determined by examining the elevations at both ends of the old tank bund, near Wasammale to the north and Mihinthale to the south, which were approximately 23 meters.

GPS locations of the old tank bund and the digitized existing tank bund were imported into ArcGIS for the reconstruction of the old tank bund. Using the imported data, the old tank bund was reconstructed by connecting the identified fragments and the existing bund segments, forming a continuous polyline that represents the presumed original tank bund. A contour line was then generated at the determined maximum water height of 23 meters. This contour was combined with the reconstructed old tank

bund to delineate the potential inundation area of the Mihinthale Tank during its prime.

ArcGIS 10.8 was used to conduct this study including the area and volume calculation of the tank.

Results and Discussion

Fig.04 illustrates the results of this study, the reconstructed possible inundation area of the Mihinthale Tank during its prime stage in the Anuradhapura era. The results reveal two distinct sections of the ancient tank: a larger inundation zone towards the top and a smaller section near the Mihinthale mountain. Consequently, there is a dry area between these two zones, despite the presence of the potential old bund. This could be attributed to modifications of the terrain through human activity, possibly an infill.

A comparison between the ancient and present-day extends of the Mihinthale tank reveals significant differences in their dimensions and capacities.

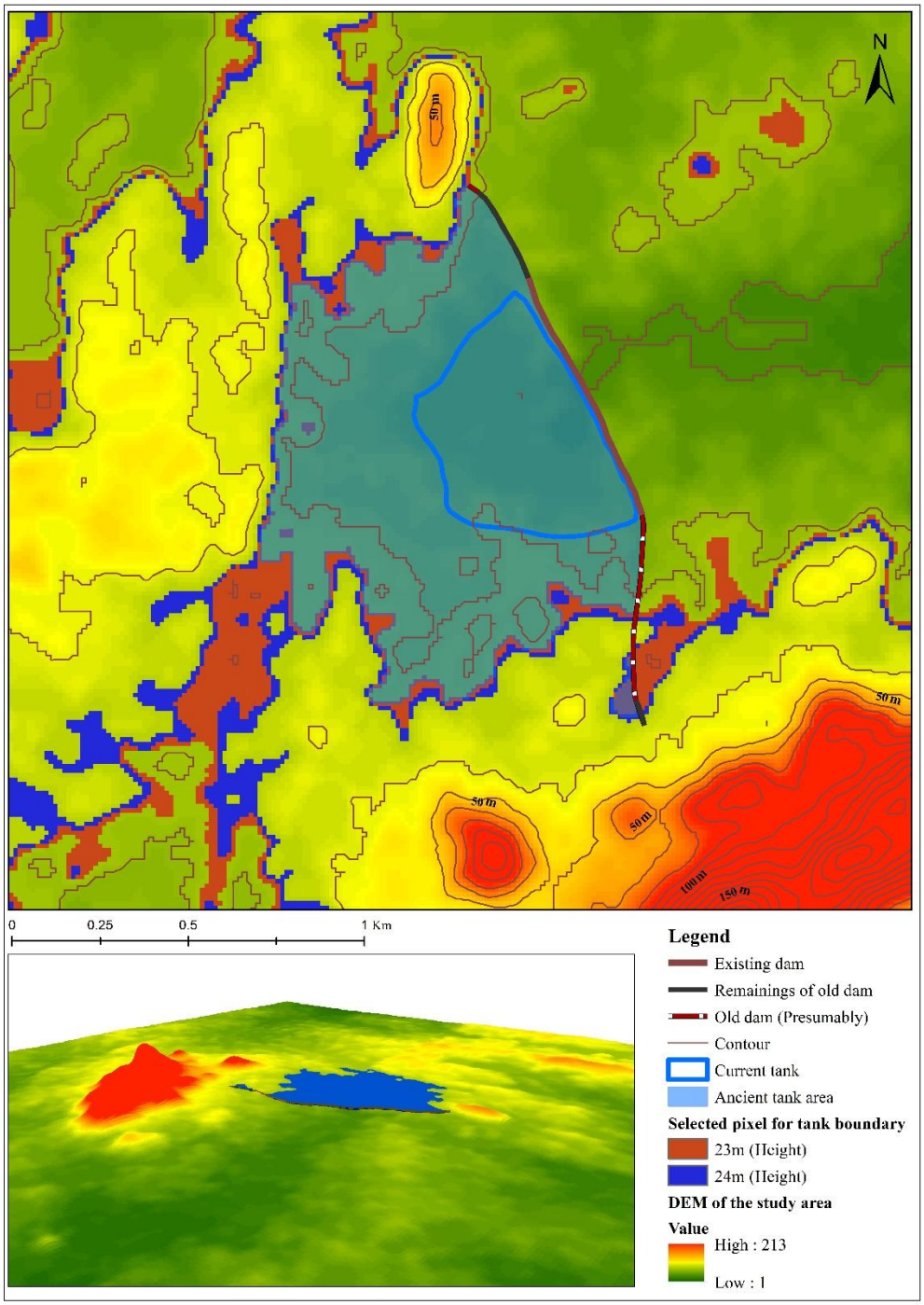

Figure 04: Up: *Possible ancient Mihinthale Tank,* ***down:*** *3D representation of the area with the possible ancient tank.*

The current tank bund stretches approximately 720m, whereas the potential length of the ancient bund was about 1700m making the ancient bund 980 meters longer than the current one. The height of the current bund varies approximately between 2 to 8 meters. In contrast, remnants of the old bund range from about 1 to 3 meters in height. Given that the ancient tank was constructed using the 23 - 24 meter height contours, with the lowest part of the tank at around 12 meters in height, it can be inferred that the maximum height of the ancient tank bund was around 10 meters. The current tank covers an area of about 0.25 km^2, while the ancient tank extended over approximately 0.98 km^2, indicating that the ancient tank was 0.73 km^2 larger than the current tank. The approximate surface volume of the present tank is around 1,024,000 cubic meters (m^3), whereas the ancient tank possibly had a volume of about 5,033,000 m^3 (See Table 02).

	Current Tank	**Ancient Tank**
Height of the bund (Approx.)	2 to 8 m	Max. 10m
Length of the bund (Approx.)	720m	1700m
Inundation area (Approx.)	0.25 km^2	0.98 km^2
Surface Volume (Approx.)	1,024,000 m^3	5,033,000 m^3

Table 02: *Past and present comparison of Tank characteristics*

The ancient tank encompassed much of the eastern and southwestern parts of the present-day Mihinthale town area, including the Mihinthale Divisional Secretariat, Pradeshiya Sabha, Mihinthale Maha Vidyalaya, the northern part of the Rajarata University premises, and the Mihinthale railway station (Fig.05). Although not explicitly shown in the results, it is likely that the area where the present-day Mihinthale hospital is located was also within the inundation zone of the ancient tank, as the ancient bund was situated in front of this area.

Based on current tank classifications (Murray & Little, 2000), the present Mihinthale tank can be considered a small-scale village tank, with a typical water spread ranging from 4 to 50 hectares (0.04 to 0.5 km^2). However, with an area of 0.98 km^2, the ancient tank could be classified as a medium-scale tank.

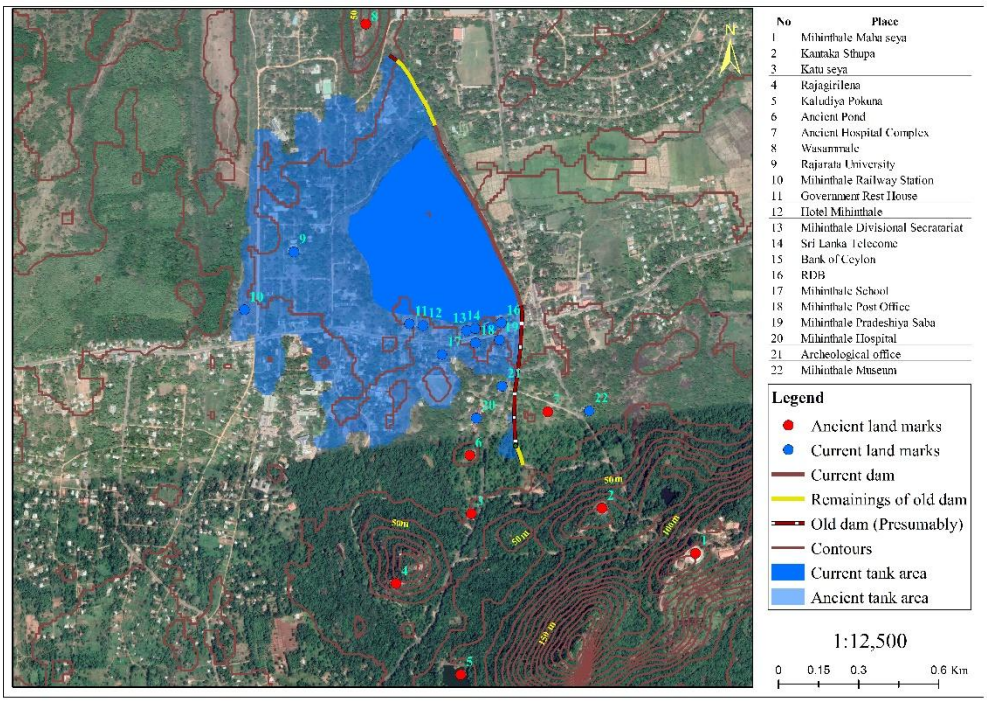

Figure 05: *Inundation area of ancient Mihinthale tank overlayed on current satellite image (Image source: Google Earth)*

Unlike tanks in a cascade system, the Mihinthale tank is not part of such a system, with surplus water directly flowing to the Mahakanadarawa tank located to its east. Currently, the Mihinthale tank is a small-scale tank situated between two large-scale tanks: Mahakanadarawa to the east and Nuwarawewa to the west. However, the ancient Mihinthale tank was significantly larger and could have been the most important tank between these large-scale tanks (Fig.06).

Figure 06: *Ancient Mihinthale tank with comparison to Mahakanadarawa and Nuwarawewa (Image source: Google Earth)*

Historical records, such as those by Fa-Hien, indicate that by 410 AD, 2000 monks were residing in Mihinthale (Legge, 1886). While several small tanks and ponds are located near the Mihinthale monastery, they would not have sufficed to meet the daily water needs of such a large population. However, the vast ancient tank would have been capable of fulfilling their water requirements.

The reliability of the research findings can be assessed by examining the distribution of ancient landmarks around the area. No ancient landmarks were located within the reconstructed ancient tank area (Fig.05). The closest historical site is the large pond at the Indikatuseya premises. Therefore, the reconstructed tank area is likely accurate, and the local saying that "a Monk can come to Mihinthale monastery via tank bund from Wasammale," which supports the hypothesis of a longer tank bund, is validated.

Mihinthale Tank GIS**Conclusion**

This research successfully reconstructed the ancient Mihinthale Tank using GIS and remote sensing techniques, providing a clearer understanding of its historical extent and significance. The study demonstrates the advantages of combining DEM data with modern GIS tools to recreate ancient landscapes, offering a detailed view of the tank's past structure and capacity. One of the key findings is the substantial difference between the ancient and present-day tank dimensions, highlighting the potential scale and importance of the tank in historical times.

The reconstructed ancient tank was significantly larger, with a bund length of approximately 1700 meters compared to the current 720 meters, and a surface area of 0.98 square kilometers versus the present 0.25 square kilometers. This indicates the ancient tank was almost four times larger in area and held nearly five times the water volume of the current tank. These findings suggest that the Mihinthale Tank played a crucial role in supporting the local population, particularly the large monastic community in the region during its prime.

However, the study has some limitations. The accuracy of the reconstruction is dependent on the quality and resolution of the available DEM data and the precision of the GPS coordinates used to map the remnants of the old bund. Furthermore, the study assumes the tank's maximum height based on existing topographical features, which might not account for all historical modifications to the landscape.

Despite these limitations, the methodology demonstrated in this research has broad applications for archaeological studies, particularly in regions with rich historical landscapes. By employing similar techniques, other ancient irrigation systems and landscapes can be reconstructed, offering valuable insights into the engineering and hydrological practices of ancient Sri Lanka.

Exploring the social and economic impacts of such large-scale water management systems on ancient communities would provide a more comprehensive understanding of their significance. This study not only underscores the value of GIS and remote sensing in archaeology but also emphasizes the importance of preserving and

studying ancient infrastructures to appreciate their contributions to historical and modern societies.

Recommendations

Further investigation could broaden this study by integrating supplementary data sources, such as historical sources, while utilizing high-resolution contours, such as those derived from field measurements or drone surveys, to improve the precision of the reconstruction.

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Navigating Identity: Cultural Impact on the Demographic Behaviors of migrant *Hela* community of West Bengal

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Abstract

This study examines the demographic behaviors of the migrant Hela community residing in Kolkata, West Bengal, with a focus on how ancestral cultural attachment influence fertility, mortality, and marriage patterns. Traditionally marginalized and identified as Dalits, the Hela migrated from Uttar Pradesh to Kolkata to escape socio-economic discrimination. Based on data from 134 ever-married women, the study analyzes the community's marriage practices, reproductive behavior, and adaptive fitness. Results indicate a strong adherence to endogamous and consanguineous marriages within the group, which underscores their cultural solidarity amid a host environment of distinct social dynamics. The Hela's fertility and mortality pattern surpasses that of their Bengali neighbors, closely aligning with their ancestral demographic patterns in Uttar Pradesh, likely as a means of preserving cultural continuity in a new setting. The selection intensity index shows the population is undergoing selection processes. This research emphasizes the importance of social and cultural cohesion in shaping the demographic profile of migrant communities.

Keyword: *Culture, migration, fertility, mortality, marital distance, identity, Hela, India*

Introduction

The basic structure in demography is formed by its population composition, fertility and mortality patterns and migration. Fertility and mortality are the basic indicators of population dynamics and there are a number of factors determine these two variables for a population (Dreze *et al.* 2001; Bhahsin *et al.* 2002; Skirbekk, 2008; Majelantle, 2013; Asghar, 2014). Cultural beliefs and practices often play an important role in understanding the demographic phenomenon (Basu, 1992; Bhatt, 1998; Branson, 2010; Ghosh & Begum, 2015). For example, the cultural practice of *Mukhagni* (last cremation ceremony among Hindus) forced to have at least one male more child in family (Kalam et al. 2020). Caldwell's Wealth Flows Theory marks a crucial shift in demography by suggesting that high fertility rates in Third World countries are economically rational which also highlights the role of culture in influencing demographic stability and change (Caldwell 1977).

On the other hand, the pattern and practice of marriage is often an indicator of cultural homogeneity, especially among the migrants. A community member tried to get married within the same community member, relatively nearer and/or the places from where they migrated (Kalam and Roy 2015; Kalam et al 2020). Ceroni-Long (1985) observed that migrant groups prefer to marry within their own group due to the survival risks posed by the native majority group. Marital preference is another cultural process that signifies a community's cultural identity (Fox, 1983; Murdock, 1947). It is believed that the practice of endogamy plays a significant role in the survival of the social organization of the community by maintaining behavioural isolation from other such communities (Fox, 1983; Chagnon, 2000; Bittles & Black, 2010). For example, the age-set marriage system among the *Rendile* population of North Kenya (Douglas, 1966) and the marriage pattern among the *Mokogodo* population of Kenya (Cronk, 2000) yielded examples of mate selection that depend on their social organization. Another example of maintaining cultural identity through endogamous marriage is the marriage patterns among the *Khotta* population of West Bengal (Kalam & Roy, 2015).

Endogamous marriage patterns may increase the frequency of cousin marriages in a population, leading to a higher probability of marriage within blood relatives i.e., consanguineous marriage (Billtes 2012). In India, the prevalence of consanguineous marriage was around 10.0%, depending on the region of residence (Sharma et al. 2021). Local community level variation in the prevalence has been observed such as the prevalence ranges from 35.5% among the migrant Telgu-speaking population living in West Bengal (Das, 2003) while 34.78% among migrant *Darbhangia Khotta* population (Kalam, 2021). The prevalence of consanguineous marriage varies with socioeconomic condition, educational attainment, geographical region, religious belief and cultural practices (Krishnamoorthy & Audinarayana, 2001; Iyer, 2002). The higher rate of cousin marriage in a population can leads to inbreeding depression and the natural selection of a population fall in a critical situation (Wright, 1922). Differential fertility and mortality are impediment not only in studying the structure and trends of a population but also in measuring the adaptive fitness of a population (Barua 1976). Selection intensity of human population is a measure of adaptive fitness and it has noted variation regarding factors like differential cultural practices (Sphuler, 1962; Mukhopadhyay, 1981), education and social status (Reddy et al. 1990) and environmental condition (Roy et al. 2014; Kalam et al. 2023), etc.

Thus, understanding the importance of ancestral culture is crucial for explaining the dynamics of demographic phenomena in populations. This study specifically aimed to examine the demographic composition, marriage patterns, and adaptive fitness of the migrant *Hela* community residing in the Kolkata district of West Bengal.

Materials and methods

The study population

The '*Hela*' population were referred to under the generic term '*Methar'*. The *Hela* are mainly found in the districts of Varanasi, Ghazipur, and Mirzapur. Majority of the *Hela* are known for being scavengers, some are agriculture labourer, small business, trade, and government services in the sector of scavenging (Singh et al 2010). According to Census of India (2011), in Uttar Pradesh the *Hela* population

was 52,314. They belonged to the Scheduled Castes in India, mostly regarded as *Dalits*. It was reported that the *Hela* wore typical ornaments as well as tattoo markers as their identification. They consume pork and occasionally the meat of "*Bhains*" or '*Beef*', a typical character for a lower caste people. It has also been found that consanguineous marriage was common among them (Singh et al 2010). They prefer to communicate within themselves in *Hindi*.

The *Hela'* community in the present study were living in Kolkata Municipality Corporation (KMC), ward number 79 of the state West Bengal. They were migrated to Kolkata from Uttar Pradesh (Varanasi and Mirzapur district) due to many socio-economic obstacles mostly due to discrimination and untouchability faced in Uttar Pradesh. The demolition of *Babri* mosque in Uttar Pradesh catalysed the rate of migration. The group of *Hela* people shifted their abode from different districts of Uttar Pradesh to Kolkata and settled in *ghetto* in Kolkata Municipal Corporation ward number 79 at Ballygunge region of Kolkata, West Bengal, the residencial area of elite class of Kolkata. This *ghetto* was called as *Hela Basti* by the nearby native Bengali population. They were now able to understand and speak Bengali language due to their living and job opportunities in Kolkata, surrounded by Bengali natives.

For the present study purpose, 125 households of the *Hela* community have been surveyed. Among them, 134 ever married women were interviewed.

Data types and collection techniques

The data for the present study have been collected by using pretested household schedule and pregnancy history form. The household schedule includes age, sex, relationships, monthly household expenditures, marital status, education, occupation, marital distance and marriage preference, age at first marriage of the participants to get an idea of the population. Data on the fertility, mortality, age at first pregnancy, age at last pregnancy have been collected by using pregnancy record form. Pedigree has been drawn to know the family composition, marriage alliance. The data on marital distance were calculated by estimating the distance between husbands and wives birth places. The marital distance was also used to get the data on different

forms of migrations. The schedules were also crosschecked with the pedigree. An in-depth interviews and case studies were conducted to collect data on communities' perception regarding marriage preference, age of marriage, education, migration, job opportunities, and other social issues after migration.

Adaptive fitness or the Index of opportunity for selection of the *Hela* population was calculated based on differential fertility and differential mortality using Crow (1958). The formula for Crow's index was computed using the following steps-

$$\text{Crow's index: } I_t = I_m + I_f / P_s$$

where, $I_m = P_d / P_s$, $P_s = (1 - P_d)$, $I_f = V_f / X^2$; I_t = index of total selection intensity, I_m= index of selection due to mortality, I_f = index of selection due to fertility, P_d = probability of deaths up to pre-reproductive age, P_s= probability of survival up to reproductive age, V_f = variance due to fertility, and X = mean number of live births.

Results and Discussion

Population composition and socio-economic characterises

Table 1 shows the age-sex wise population composition of the *Hela* community in the study area. It shows majority of the population, especially females were belonging the reproductive age group i.e., 15-44 years. Population pyramid (Figure 1) also showed that the base of the population was thick compared to the old age population. The sex ratio and child sex ratio of the studied population was 1207.0 and 1631.0 respectively which were higher compared to the state of their ancestral residence as well as state of migration and the nation. The ancestral place i.e., Varanasi and Mirzapur showed sex ratio of 887 and 900 and child sex ratio of 873 and 902 respectively (CoI, 2011). The demographic situation is changing and improving among the *Hela* people living in Kolkata. It may possible that the *Hela* people believe that having more number of girls in community helps them survival by producing a greater number of children in new environment. Kolkata was one of the first cities where enlightenment began earlier due to the British influence (Ghosh, 2016). Having more females in a population can have a psychological impact, as it helps to produce

more children in migrant places, thereby increasing numerical power while living near the native population.

In Table 3, the occupational status of the population is presented. The data shows that most of the working population (17.83%) was employed as sweepers/scavengers in the Kolkata Municipal Corporation (KMC), with male participation at 27.63% and female participation at 9.71%. Additionally, around 31.22% of females were employed as housemaids, working in others' houses as child caretakers or doing cleaning work monthly. A few people who gain more education joined in higher level of government jobs (2.01%). It was found that working in KMC as sweeper or scavenger did not need high level of educational attainments, completing secondary level of education is enough for this job.

The results revealed that approximately 31.22% of females are employed as domestic helpers for cooking and cleaning in households. The participants recognize that this is mainly possible in Kolkata, where discrimination based on caste is uncommon. As members of lower castes, they can work in households of upper castes, even as cooking assistants.

> A 38-year-old female respondent said, *"in our ancestral place, you wouldn't find a situation where a person from a lower caste works in an upper caste family. However, in Kolkata, it's very normal. At least in my experience, there has been no discrimination based on caste. The people of Kolkata invite us and allow us to work with them.*"

Table 4 showed that 42.27% population were educated up to secondary level. During the interviews, it was clear that the candidates were not interested in pursuing higher education. Their rationale was that higher education often leads to better job opportunities, which can be difficult to attain. On the other hand, they believed that obtaining a lower or secondary level of education would enable them to enter government jobs at an earlier stage, even though these were perceived as lower-level positions.

42 years male respondents share that, '*...After studying so much, what will happen? Yet we have to do the cleaning and sweeping related work. You can't get a good job by studying higher, and you can't be interested in doing cleaning work then. So, minimum secondary level of education is enough*.'

Age group (in years)	**Males**	**Females**	**Total**
0-4	12(5.4)	20(7.46)	32(6.53)
5-9	21(9.45)	22(8.21)	43(8.77)
10-14	15(6.75)	26(9.7)	41(8.36)
15-20	23(10.36)	20(7.46)	43(8.77)
20-24	21(9.48)	33(12.33)	54(11.02)
25-29	29(13.06)	32(11.94)	61(12.44)
30-34	25(11.3)	23(8.59)	48((9.79)
35-39	17(7.65)	19(7.08)	36(7.34)
40-44	11(4.95)	17(6.34)	28(5.71)
45-49	16(7.2)	21(7.83)	37(7.55)
50-54	13(5.85)	10(3.73)	23(4.69)
55-59	5(2.25)	7(2.62)	12(2.44)
60-64	9(4.05)	11(4.10)	32(6.53)
65+	5(2.25)	7(2.61)	12(2.45)
Total	222(100.00)	268(100.00)	490(100.00)

Table 1: *Age and sex wise distribution of the population*

Figures in parentheses indicate percentage

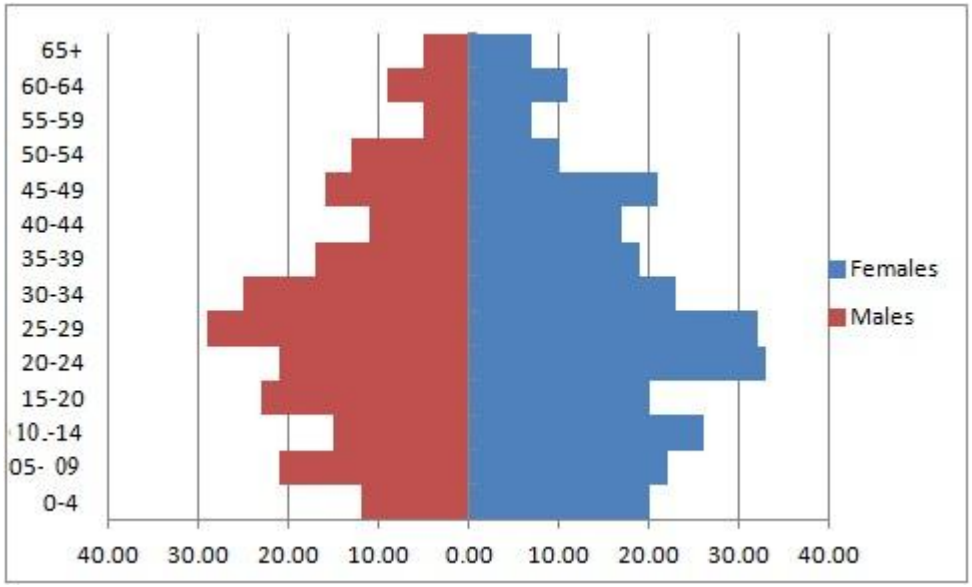

Figure 1: *Population pyramid showing age-sex wise distribution of the Hela population of Ballygunge area of Kolkata*

Types of sex ratio	**Sex Ratio**	**Kolkata**	**Mirzaur, Varanasi**	**Census of India (2011), India**
Total sex ratio	1207	899	903, 918	943
Child sex ratio (0-6 y)	1631	955	899,841	919

Table 2: *Sex ration among the studied population*

Occupation	**Males**	**Females**	**Total**
Kolkata Municipal Corporation sweeper/scavenger	55(27.63)	23(9.71)	78(17.83)
Daily labour	61(28.14)	6(2.53)	67(13.93)
Job seeker	26(13.06)	47(19.84)	73(16.40)
Govt. job	4(2.01)	0(0.00)	4(0.89)
Housemaids	-	74(31.22)	74(16.62)
Homemaker	-	29(12.24)	29(6.51)
Students	48(24.14)	53(22.36)	101(22.69)
Retired	5(2.51)	5(2.10)	10(2.24)
Total	199(100)	237(100)	446(100)

Table 3: *Working status of the population*

Figures in parentheses indicate percentage

Education	Male	Female	Total
Cannot sign(illiterate)	46(22.33)	132(55.23)	178(40.00)
Nursery to 4th standard	30(14.56)	45(18.82)	75(16.85)
Secondary	137(66.50)	52(21.75)	189(42.47)
Higher secondary	6(2.91)	4(1.69)	10(2.24)
Graduated	6(2.91)	6(2.91)	12(2.69)
Total	206(100)	239(100)	445(100)

Table 4: *Educational attainments of the study participants*

Figures in parentheses indicate percentage

Marital preferences

In Table 5, the marriage preferences of the *Hela* population were presented, reflecting their choices of marriage. It was observed that approximately 91% of the respondents married within the same group. The table also indicates that all marriages within the same group were consanguineous, with 97.7% being first-cousin marriages and 3.3%

being second-cousin marriages. Table 6 reveals that about 40.0% of marriages took place within the study area i.e., within zero kilometres distance, and 56.0% of marriages were contracted between ancestral places in Uttar Pradesh. It has raised a question why they marry within the same group and cousins. During interviews, it was observed that due to migration, they were minority Kolkata surrounded by native Bengali people. According to Cerroni-long (1985), migrant groups always prefer to marry within the same group due to the fear of social and cultural agony by the native group. Similarly, it was also observed that the *Hela* group prefers to marry within same group and with cousins to maintain social solidarity within them which corroborates with the study by Kalam et al. (2020). Kalam and Roy (2015) found similar patterns among *Khotta* Muslims, who marry within the group to maintain social solidarity due to their migrant minority status. It seems that ancestral cultural practices encourage the *Hela* community to marry within their own group to preserve cultural integrity, ensuring that their unique heritage remains intact and resilient. This tradition not only reinforces their shared values but also aids in adapting and thriving within new environmental settings, fostering a strong communal identity that endures through generations.

A participant of the age 40 shares her views as, '*marrying with another group may create familial hindrance which will further weaken the group solidarity. We are the migrants here. Thus, we must be careful in this regard.*'

On the other hand, it has been revealed in interviews that individuals from other groups are unwilling to marry the *Hela* participants due to their lower social status. The nearby Bengali group prefers to marry within their own community, matching their castes. Consequently, if someone from the community was not interested in marrying here in the *ghetto* of Kolkata, they went to the ancestral places and marry within the same group, belonging to the same caste. As a result, the marital distance was higher for those who marry in ancestral places (Table 6). Marrying within the same caste group for a long time ultimately leads to marriage within close relatives (NewScience, 2009).

A 39-year-old participant responded, "*We belong to a lower caste. None of the other caste group members in the neighboring Bengali community were interested in marrying us. They often avoid us, saying we are migrant Biharis*."

The migrant status was attached to them because they migrated from Uttar Pradesh. The *Hela* community members were living there in some kind of fear in their back. Their earlier experiences remind them to understand that if any kind of riot-like situation occurred here, they will be bound to leave the place. However, maintaining social cohesion through culture can be challenging in rapidly changing societies, where external influences and modernization may shift cultural values. Balancing cultural preservation with adaptation becomes essential to sustaining cohesion while embracing progress. Thus, group cohesion is much needed to survive in the 'others place'. Marriage within the same group can be one process through which outside influences can be reduced.

A.	Marriage Within the same Group (*Hela-Hela*)		122(91.04)
	Marriage Outside the group (*Hela-Others*)		12(8.96)
B.	Consanguineous marriage		122(91.04)
		a. First cousin marriage	118(97.7)
		i. Father's Brother's Daughter (FBD)	50(42.4)
		ii. Mother's Brother's Daughter (MBD)	68(57.6)
		b. Second cousin marriage	4(3.3)
	Non consanguineous marriage		12(8.96)
Total			134(100.0)

Table 5: *Marital preference of the studied population*

Figures in parentheses indicate percentage

Distance among	Number of marriages	Distance (K.m)
Within the study area	53(39.55)	0.0
Study area to Uttar Pradesh	75(55.97)	724.0
Study area to other parts of Kolkata	6(4.48)	5.0
Total	134(100.0)	

Table 6: *Marital Distance*

Figures in parentheses indicate percentage

Reproductive behaviour

We assessed the reproductive behavior of the study population by considering fertility, age-specific fertility rate, and infant mortality rate. Table 7 shows the fertility rate of the studied *Hela* population was 2.3, which was higher compared to the neighboring native *Bengali* population. However, it showed similar fertility trends to their ancestral places i.e., Mirzapur and Varanasi. Kolkata shows lowest level of fertility in India (Ghosh, 2016). Surrounded by an urban population in Kolkata's elite region in Bullygunge, the *Hela* community maintained the fertility pattern with their ancestral places. It reflects their demographic affinity with their ancestral place in Uttar Pradesh. An increasing number of members in a population is one kind of strategy to survive in new places. As a result, several studies show higher fertility among the migrant group (Stonawski et al. 2015; Kalam and Roy, 2015). Another important finding was that having male child in a family was very important because of ritualistic performance after death (which is called *Mukhagni* in Hindu ritual). The families among *Hela* continue to have three or four girl children to have at least one child (Kalam et al. 2020). It results into higher sex ratio found (Table 2) among them as well as high fertility.

Table 7 illustrates the mortality pattern within the *Hela* community, which shows similar trends in mortality to their ancestral places despite living alongside urban elite Bengali neighbours. The elite Bengali population exhibited a lower mortality rate.

This raises the question of why fertility and mortality trends still mirror those of their ancestral places, even while living among neighbours with low fertility and low mortality rates. The answer likely lies in their social and cultural ties to their ancestral places, which help maintain similar trends. Living in a close-kin community, the *Hela* people primarily interact with each other before engaging with their neighbours. Consequently, cultural influences compel them to adhere to ancestral patterns.

Table 8 shows the age-specific fertility rate of the *Hela* community. It shows *Hela* women had the highest fertility rate at 24 years of age, with a decline in fertility after 25 years of age (Figure 2). The median age of last pregnancy was 29.9 years, suggesting that *Hela* women typically completed their fertility by the age of thirty. After turning thirty, the women in this community focused on earning money through household work and other tasks. Their ability to earn a living daily may have been hindered by pregnancy and childcare responsibilities. The women strongly believed that completing their fertility at a young age was crucial from both a social and economic perspective. Being pregnant at an older age reduced their social prestige because it was not socially and mentally acceptable within the community.

> A participant of age 34 years said, '*My husband is a daily labourer, and I work as a maid in our neighbour house who are Bengali doctor. When I was pregnant and had to stop working, they stopped paying me, which affected my life and health*.'
>
> Another women of same age group said, '*Pregnancy after thirty years of age is discouraged in our community. It can negatively impact our work as homemaids. Therefore, it is important to avoid pregnancy as early as possible*.'

Among the *Hela*, pregnancy at and/or after thirty years of age was often seen as shameful act. There is a prevailing belief that such a pregnancy represents a diversion from societal norms or expected life paths. This belief reinforces a negative social stigma, making women who become pregnant after thirty feel isolated or judged. The shame is not only internal but also manifests in their interactions with their peer group, where maintaining eye contact may feel uncomfortable, as it can be perceived as a reflection of their non-conformity to social expectations.

A participant who got pregnant at 32 years of age shared her experience as, '*I was stayed in my home for six months meeting no one. Only my family member knew that. They too were uncomfortable with me. I was sent to my parental home in Uttar Paradesh.After delivery of my son, when i came back i feel ashamed to talk with my peers. However, slowly the situation changed and other accepts it.*'

Variable	*Hela* population (Kolkata)	Kolkata West Bengal (RGI 2022)	In Mirzapur, Varanasi, UP
Fertility	2.3	1.2	2.6, 4.2
Mortality	96.7	41.0	80, 89.2

Table 7: *Fertility and mortality among the Hela community*

Age (in years)	Number of wedlock women	Number of live births							
		15 -19	20 -24	25 -29	30 -34	35 -39	40 - 44	45 $^{+}$	Total
15-19	13	0.77(10)							0.77(10)
20-24	22	0.50(11)	0.59 (13)						1.09(24)
25-29	17	0.70(12)	0.58(10)	0.52 (9)					1.82(31)
30-34	20	0.85(17)	0.85(17)	0.6 (12)	0.3 (6)	0.35(7)			2.95(59)
35-39	18	0.77(14)	1.00 (18)	0.65(11)	0.22 (4)	0.11(2)	0.11(2)		2.83(51)
40-44	16	1.00(16)	0.93 (15)	0.75(12)	0.68(11)	0.31(5)			3.68(59)
45^{+}	28	(0.35)10	0.64(18)	0.92(26)	0.46(13)	0.25(7)	0.07(2)	-	2.71(76)
Total	*134*	*0.67(90)*	*0.68 (91)*	*0.44(70)*	*0.25(34)*	*0.10(21)*	*0.01(4)*	-	*2.31(310)*

Table 8: *Age specific fertility structure of the population*

Figures in parentis indicates number of livebirths

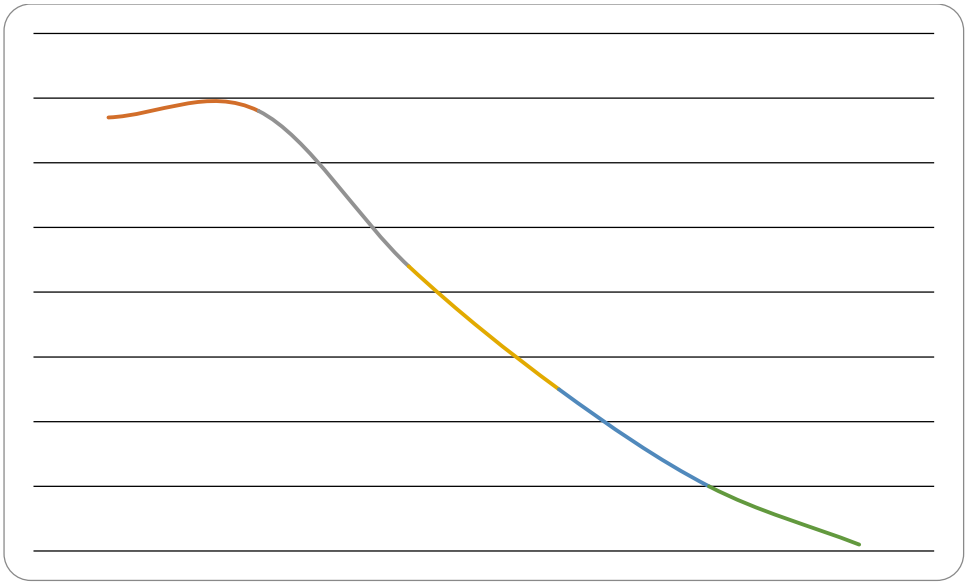

Figure 2: *Age-specific fertility among the Hela population of Kolkata*

Variables	Median age at first marriage(years)	Median age at first child Birth (years)	Median age at last pregnancy(year)	Mean differences in fist and last child birth
Females	18.01	18.9	29.9	9.9±2.3

Table 9: *Median ages at first and last pregnancies of the Hela female population in the study area*

Index of opportunity for selection

The selective fitness of a population depends upon the reproductive efficiency and fertility of the population member and the offspring's survivability (Barua 2007). J.F. Crow (1958) devised a selection intensity index to measure the maximum potential of selective fitness by using differential fertility and mortality (Equation I). In the present study, Table 10 shows that the fertility index (0.550) was higher than the mortality index (0.107). This suggests that improved living conditions and a better healthcare system may be responsible for a lower impact on mortality. Rajanikumari et al. (1985) found that in most Andhra caste populations, fertility has a greater impact

than mortality on selection. In this population as well, the trend was similar, with the lower impact of mortality on fertility being attributed to improved living conditions and healthcare systems after migrating from their ancestral place to urban areas of Kolkata. The total section intensity index was 0.716 which is comparatively lower compared to other population studied by Reddy and Chopra (1990) among *Palle* population (I_t=0.94), Sirajuddin (1984) among *Chenchu* population (I_t=1.45), and higher compared to study by Kalam et al. (2015) among *Darbhangia Khotta* (I_t=0.405), Sohkhlet (2013) among the Gowda population (It=0.470) This result highlights the importance of natural selection in shaping genetic variation. When the total selection intensity index is zero, there will be no genetic makeup change due to selection (Livingstone et al 1965). Further research will be helpful to shed more light on the connection between fertility and mortality indices and their contribution to the evolutionary pattern of this population through natural selection after migration.

Components of index opportunity for selection	Values of the components
Number of women	134
Number of live births	310
Mean live birth(X)	2.3
Variance live birth (V_f)	2.9
Pre reproductive mortality	30
Proportion of death before the age 15 years (P_d)	0.097
Proportion of survival after 15 years age (P_s)	0.903
Index of mortality ($I_m = P_d/P_s$)	0.107
Index of fertility ($I_f=V_f/X^2$)	0.550
Index of opportunity for selection ($I_t=I_m + I_f/P_s$)	0.716

Table 10: *Index of opportunity for selection*

Conclusion

Our research focuses on the anthropological demographic profile of the migrant *Hela* community, which lives in a ghetto near Ballygunge, an urban and elite area in Kolkata, West Bengal. The study revealed that the community members largely practice group endogamy, and all marital alliances were consanguineous. The recorded fertility was above the replacement level, with a high mortality rate, and the selection intensity calculated for this population was comparatively low. An ethnographic account of this community would help to understand the role of gender, culture, and economy in delineating the demographic profile of the *Hela* group. However, a small sample size might be a limitation of this study, but the study to understand culture and its effect on population might not depend on the sample size. Although, comparing this group with a sub-sample drawn from the ancestral population living in Mirzapur and Varanasi districts of Uttar Pradesh would provide a better picture of continuity and change in the demographic profile of the *Hela* population.

Acknowledgements: I am grateful to the participants for their extended support and help in completing the study.

Data availability: The study is a small part of demographic research on migrant communities of West Bengal.

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Opportunities and Challenges of Post-War Cultural Tourism in Northern Sri Lanka: A Case Study of Jaffna Peninsula

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Abstract

This research provides an in-depth analysis of the potential for developing cultural tourism in the Jaffna Peninsula, Northern Sri Lanka, within the context of post-war recovery and economic revitalization. The study explores the region's rich cultural and historical heritage, which includes significant sites such as the Jaffna Fort, Nallur Kandaswamy Kovil, Naguleswaram Temple, and the Jaffna Public Library, alongside its unique Tamil cultural identity and vibrant traditions. These landmarks, coupled with Jaffna's distinct cultural narrative, offer a platform for sustainable tourism that not only promotes economic growth but also aids in the healing process of a community once ravaged by civil conflict. By leveraging qualitative research methodologies, including semi-structured interviews with key stakeholders—such as local government officials, community leaders, cultural practitioners, and tourism professionals—the study gathers perspectives on the existing infrastructure, policies, and challenges. These findings are complemented by secondary data that contextualize tourism trends in post-conflict zones globally. The analysis addresses the evolving dynamics of post-war cultural tourism, focusing on the critical roles of community involvement, cultural sensitivity, and infrastructural development as catalysts for sustainable tourism. The research identifies key opportunities for Jaffna's cultural tourism sector, including the promotion of religious festivals, traditional arts, crafts, and the unique culinary heritage of the Northern Province. However, the study also acknowledges several persistent challenges. These include inadequate tourism infrastructure, limited professional training for local stakeholders, insufficient marketing strategies, and the ongoing social and political complexities related to war memories and identity politics. Furthermore, the study emphasizes the need for culturally sensitive tourism policies that preserve Jaffna's fragile heritage while promoting responsible tourism practices. It also underscores the importance of ensuring local community participation in decision-making processes to avoid the commodification of culture and prevent exploitation of local resources. In doing so, the research advocates for a balanced approach that integrates both economic development and cultural preservation, arguing that the long-term sustainability of tourism in the region depends on addressing these issues holistically. In conclusion, the research offers strategic policy recommendations to guide the development of a sustainable cultural tourism framework in Jaffna. These include enhancing local governance structures, improving access to and preservation of cultural sites, fostering private-public partnerships, and promoting inclusive tourism policies that cater to both international tourists and diaspora communities. The study also highlights the potential of digital media and strategic marketing in showcasing Jaffna's unique cultural offerings, which could position the region as a key destination for heritage tourism in South Asia. This research contributes to the broader discourse on post-war tourism, heritage management, and economic regeneration in conflict-affected regions, offering valuable insights for policymakers, tourism practitioners, and heritage conservationists.

Keywords *- Cultural Tourism, Jaffna Peninsula, Post-War Recovery, Sustainable Tourism Development*

Introduction

Sri Lanka has become one of the best tourist's destinations in South Asia with a bewildering variety of landscapes, customs and people from natural beauty to cultural history. Sri Lanka is known as pearl on Indian Ocean ranked 1st country for travel by lonely planet guide book past two years. The government has seen a phenomenal growth in its tourism industry, which is one of the main contributors to its economic revival after three decades civil war ended in 2009. The Northern Province, and in particular the Jaffna Peninsula is a focal point of post-war cultural tourism. With a rich mix of cultural and natural elements, such as the Jaffna Fort (built by Europeans in 1618), Nallur's Great Pagoda-like Kovil or temple, and the branded iconic library with its learning history over some seventy years -Jaffna too has been considered capable for establishing tourism. Yet, the region also confronts serious issues concerning reconciliation and cultural sensitivity as well infrastructure development. This study reimagines the main potentials and constraints in post-war cultural tourism development of Jaffna Peninsula, also exploring how sustainable developments linking with inclusiveness could respond to local-scale benefits. The main aim, is to identify key cultural and natural attractions in Jaffna that could provide potential for tourism development; evaluate the recent infrastructure improvements of these sites on tourism accessibility and growth; assess new ways to address challenges related to culturally sensitivity, community engagement practices linked with local economic benefits from sustainable forms of tourism particularly within recovery efforts after conflict periods are over; generate recommendations for policy makers/stakeholders interested in tourism promotion focused at taking into account both cultural sensitivities while balancing socio-economic viability aspects associated especially during nation building period as well.

Methodology

This case study employs a qualitative research methodology that draws on stakeholder interviews and secondary data from relevant literature and tourism statistics to analyze the tourism landscape in the Jaffna Peninsula. The primary stakeholders involved in this research include local community leaders, government officials, tourism industry professionals, and visitors, whose insights are essential for understanding the region's tourism dynamics. Interviews serve to collate varied opinions and perceptions, revealing the impact of market strategies, infrastructure developments, and government initiatives on tourism growth. In particular, the methodology emphasizes cultural tourism as a driver of economic reactivation and community involvement, while also assessing the significance of infrastructure improvements and professional training aimed at enriching domestic tourist experiences. Such a comprehensive approach ensures that the study addresses the multifaceted nature of tourism, providing deep insights into the local context and informing future tourism strategies.

2.1 Methodology with Data Representations

2.1.1. Research Design

This study adopts a mixed-methods approach integrating qualitative and quantitative techniques. The research wkflow is summarized in the following diagram:

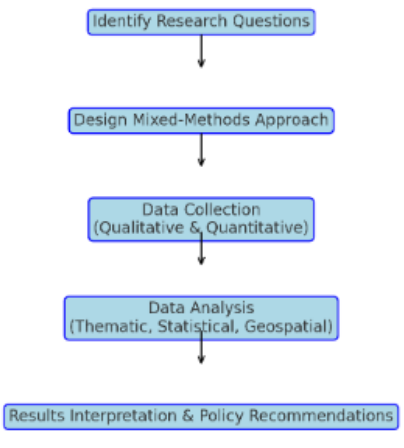

Figure 1: *Research Workflow*

2.1.2 Data Collection

The study utilized a robust data collection framework, combining both primary and secondary data sources to ensure a comprehensive understanding of cultural tourism dynamics in the Jaffna Peninsula. Primary data were gathered through semi-structured interviews with 20 key stakeholders, including government officials, tourism professionals, and community leaders. These interviews provided nuanced insights into the challenges and opportunities associated with post-war tourism development. Additionally, ethnographic observations documented 10 cultural events, such as the Nallur Kandaswamy Festival, to capture the vibrancy of local traditions and community practices in their natural settings. Complementing these qualitative methods, surveys were administered to 150 tourists, evenly split between domestic and international visitors, to evaluate satisfaction levels, preferences, and perceptions of the region's cultural offerings.

Data Source	**Method**	**Sample Size**	**Purpose**
Stakeholder Interviews	Semi-structured	20	Explore insights on opportunities/challenges
Ethnographic Observations	Field Notes	10 events	Capture cultural practices
Tourist Surveys	Structured Questionnaire	150	Evaluate satisfaction and preferences
Secondary Data	Literature Review	-	Contextualize findings

Table 1: *Summary of Data Sources and Sample Size*

The study also leveraged **secondary data sources**, including policy documents, academic publications, and tourism statistics, to contextualize findings within broader trends and frameworks. Advanced **GIS mapping** was employed to analyze the spatial distribution of cultural sites, infrastructure, and accessibility, offering a visual dimension to the data. This multi-layered approach ensured a rich dataset capable of addressing the complexities of post-war cultural tourism while highlighting actionable insights for sustainable development and policy-making.

2.1.3. Analytical Framework

The study employs a comprehensive three-pronged analytical framework to ensure a rigorous examination of cultural tourism in the Jaffna Peninsula. First, thematic analysis was conducted on qualitative data using NVivo software, identifying key themes such as "community involvement" and "cultural sensitivity" to explore stakeholder perspectives and cultural dynamics. Second, statistical analysis was applied to quantitative data using SPSS, where descriptive statistics (e.g., mean satisfaction ratings) and inferential methods (e.g., correlation tests) provided measurable insights into tourist behaviors and preferences. Third, geospatial analysis utilized GIS mapping to identify spatial patterns related to site accessibility and infrastructural gaps, offering a visual and spatial understanding of the region's tourism landscape. These methods were integrated to generate a holistic understanding of the research findings, as depicted in the analytical framework diagram, which illustrates the seamless interplay between qualitative, quantitative, and spatial analyses leading to integrated results. This robust framework ensures the reliability and applicability of the study's insights.

2.1.4. Ethical Considerations

- Informed Consent: Participants were briefed on confidentiality and study goals.
- Cultural Sensitivity: Engagements respected community traditions and ensured authenticity in data representation.

Practice	Description
Informed Consent	Written consent from participants
Data Anonymity	De-identified all interview and survey responses
Community Involvement	Local voices included in interpreting cultural data

Table 2: Ethical Practices

Limitations

The study faces certain limitations, including the relatively small sample size of stakeholders interviewed, which may not fully capture the diverse perspectives within the Jaffna Peninsula. Additionally, the evolving nature of post-war recovery in Jaffna means that the findings may not fully account for future developments or unforeseen challenges. The study's reliance on qualitative data also means that quantitative analysis, such as economic impact assessments, is limited.

1. Sample Bias: Stakeholder interviews may reflect political influences.
2. Temporal Constraints: Cultural tourism trends evolve rapidly; longitudinal studies could provide more depth.

Limitation	Mitigation Strategy
Sample Bias	Triangulation with diverse stakeholder groups
Temporal Constraints	Incorporation of trend analysis in future research

Table 3: *Limitations and Mitigation Strategies*

Results and Discussion

4.1 Cultural Tourism Potential in Northern Sri Lanka

One of the important aspects of tourism in post-war Northern Sri Lanka is the cultural and heritage tourism. Cultural and heritage tourism has clear potential due to its rich historical and cultural resources. Top cultural and heritage attractions include Jaffna Fort to learn about colonial history and the magnificent views from the ramparts, the Nallur Kandaswamy Kovil, a vibrant Hindu temple filled with intricate architecture and local rituals (Jayawardena, 2013), Jaffna Library, rebuilt after its destruction in the war to become an educational and cultural hub (Ranasinghe, 2015), Kantharodai Ruins, an archaeological site with ancient Buddhism origins (Buultjens, Ratnayake, & Gnanapala, 2016), and Delft Island, becoming popular with its unique natural and cultural heritage (Causevic & Lynch, 2013). These cultural and heritage attractions give a clear sign of post-war tourism potential through the opportunities it presents for the tourism industry to stimulate local economies and community development (Farmaki et al. 2015). Yet, remaining questions and challenges persist for ethical considerations, primarily of cultural sensitivity and for community involvement in tourism planning, to make sure that any tourism benefits respect local traditions and reconciliation between the diverse post-war communities in Northern Sri Lanka. The need for this potential to be careful of undermining local cultures through reinforcement of stereotypes and inauthentic experiences, and community involvement in tourism planning remains a challenge (Soini Birkeland, 2014).

4.1.1 Opportunities for Cultural Tourism Development

A high quality focusing on some key features and rich cultural heritage of Jaffna, together with some important infrastructure improvements, has revealed as a platform for cultural tourism growth. In other words, with the opening of Jaffna International Airport, the tourists have gained much easier access, which is, of course, beneficial not only for the local but also for the foreign tourists as well. Rather than the previous time when the airport was closed, the new airport now offers direct flights from major cities, consequently, expanding Jaffna's reach as a viable destination (Buultjens, Ratnayake, & Gnanapala, 2016) has been the main factor. As sources claim, it is the operation of the airport that has been the main cause of the most significant rise in

tourist numbers, which in turn, helped the region's economy to be brought back and the local people to experience new cultures (Jayawardena, 2013).

Furthermore, the rehabilitation of the roadway infrastructure has made the city more accessible to the rest of the nation, which in turn has played a part in the increase in the number of those visiting tourist sites like the Jaffna Fort and Nallur Kandaswamy Kovil. These improvements in infrastructure not only give the traveler a more pleasant experience but also show the focus of the government on tourism as a primary driver of economic growth (Ranasinghe, 2015). Not to mention about the transportation sector, but investments in hospitality facilities-including both hotels and restaurants-have been the true protagonists that have driven the tourist influx. For example, Jetwing Jaffna, one of the key hotels in the area, has reported the highest rate of booking and occupied rooms, as the growing demand in Jaffna as a tourist destination is also reflected in these figures (Farmaki, Altinay, Botterill, & Hilke, 2015).

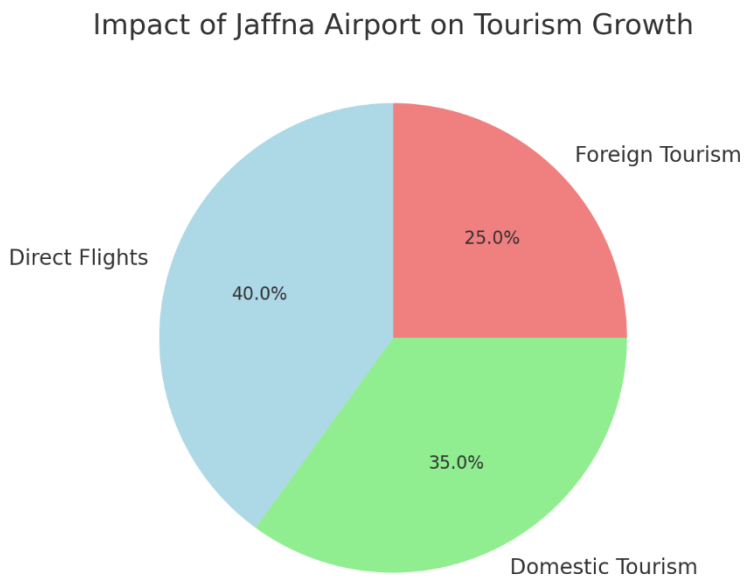

Chart 01: Impact of Jaffna Airport on Tourism Growth*: This chart shows the influence of direct flights and both domestic and foreign tourism.*

The local authorities and stakeholders are actively promoting cultural heritage tourism. They point out some of the main attractions along with their historical significance. The Jaffna Public Library, restored after its destruction during the civil conflict, is another key tourism asset that showcases the region's literary heritage and resilience (Soini & Dessein, 2016).

In recent years, the catchy phrase in the touristic industry 'experiential tourism' has come to the forefront of discussions. As a result, it is clear that it is not only the tourists who are the ultimate beneficiaries of tourism but the locals too, who can engage in the preservation of age-old wisdom and practices by way of additional businesses and job creation as a village or a city like Jaffna becomes the nation. Generally speaking, such modifications inspire advancement of Jaffna not merely as a growing destination in Sri Lanka's vast tourism sector but also as a wonderful cultural journey that gives travelers treasures in the form of age-old practices, past, and community life. Thorough fares, infrastructure development, and an emphasis on cultural heritage are the key ingredients of a sustainable tourist boom in the area.

4.1.2 Challenges in Infrastructure and Professional Training

Chart 02: Challenges in Infrastructure and Professional Training for Jaffna's Cultural Tourism. *Each bar represents the number of issues associated with each challenge category, giving a visual representation of the areas that require attention.*

While great strides have been made to develop Jaffna as a cultural tourism center, still, the area faces several central problems that need to be resolved to fully achieve its potential. Express infrastructure development is a key issue. Even if the initial improvements, for example, the setup of Jaffna International Airport and road renovations, have increased the excellence of accessibility, continuing investments are important to ensure that all things for the tourist, for example, transportation, accommodation, and attractions will be built according to international standards (Buultjens, Ratnayake, & Gnanapala, 2016). For instance, present choices of accommodation are not up to the same standard and fixing the existing facilities is part of what will put in place a tourist environment that will compete for higher-end international travelers (Farmaki, Altinay, Botterill, & Hilke, 2015).

Furthermore, the absence of specialist and skillful training in tourism for workers is one of the major challenges. High-quality specialized and culturally sensitive hospitality services are delivered through a well-trained workforce, which is especially the case in a post-conflict place like Jaffna. Where the cultural factors are of utmost importance to people (Soini & Dessein, 2016). Although we see that Jaffna's tourism industry is in its infancy, it is undeniable that the lack of proper training for hospitality and tourist services is a real problem. Indeed, the local labor force is very delicate in stating the exact issues without significantly affecting the overall tourist experience. The hospitality industry and services for tourists (Causevic & Lynch, 2013). An example of such a tool might be the programs that would deliberately fashion language skills, customer service, and operational standards courses for the local workforce as the values' driving force, and thus increase the overall satisfaction of the tourists. (Jayawardena, 2013).

Due to these faults, stakeholders realized that the improvement of the ability to use human resources and implementing full-fledged training programs were the first

priority for the tourism sector. Therefore, one of the possible solutions could be for an institute in the region to specify these educational experiences being made in collaboration with HEST and hospitality, tourism, and education organizations. Such interactions not only remind the local inhabitants of the importance of their participation in the sharing of cultural information but engage and give pride to the employees in this area

Moreover, the lack of training affects the capacity of local artisans and the cultural practitioners of the area to engage with tourists in meaningful ways. Community-based workshops or apprenticeships in traditional arts and crafts could serve to both preserve cultural heritage and provide locals with the tools necessary to engage effectively with visiting tourists. Therefore, improving the infrastructure and professional training problems is the main way to make Jaffna a sustainable cultural tourism destination in the period of post-war recovery.

4.2 Cultural Sensitivity in a Post-Conflict Setting

Cultural sensitivity can be nothing but a must in Jaffna's post-conflict context, the cultural identity of which is deeply affected by the civil war and its legacy (Buultjens, Ratnayake, & Gnanapala, 2016). The wrong way in the direction of tourism can lead to aggravated conflicts or misrepresenting of the local culture, which are the reasons for the community to face difficulties and attract fewer visitors (Causevic & Lynch, 2013). In order to create a positive atmosphere, tourism strategies must teach the visitors the significance of the historical and cultural places such as the Jaffna Fort and Nallur Kandaswamy Kovil (Farmaki, Altinay, Botterill, & Hilke, 2015). Building ties of trust and friendship with the community (cultural exchange programs and guided tours) can mutually teach respect and understanding to each other (Soini & Dessein, 2016). Including local stakeholders in the tourism planning process is the way to go as it makes the initiatives coincide with the needs and values of the community thereby boosting cultural sensitivity (Jayawardena, 2013). Sustainable tourism practices that respect both culture and environment are

vital for maintaining Jaffna's authenticity and supporting reconciliation (Soini & Birkeland, 2014).

4.3 The Role of Community Involvement

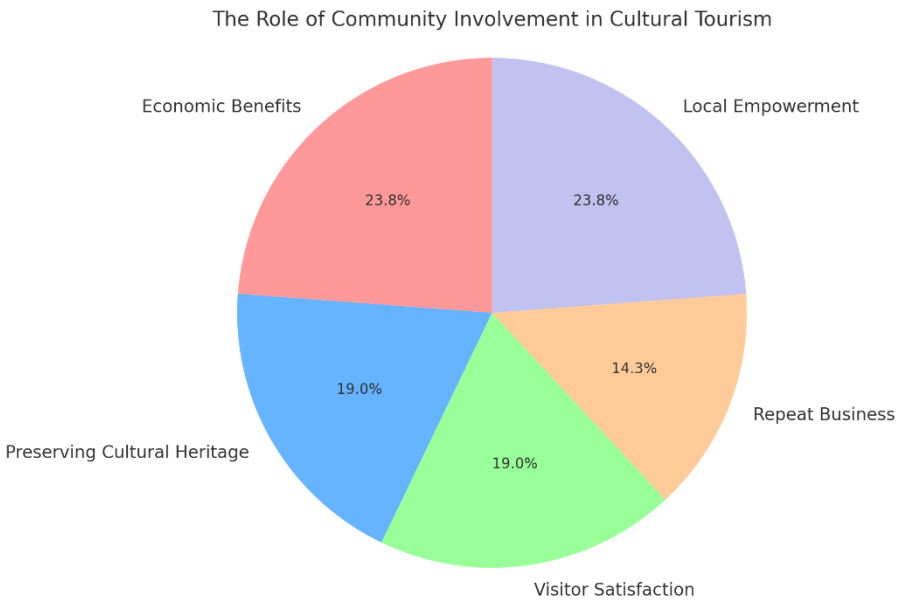

Chart 03: The Role of Community Involvement in Cultural Tourism.

Each slice highlights key aspects of community involvement, such as economic benefits, preserving cultural heritage, visitor satisfaction, repeat business, and local empowerment, with their respective importance in creating a sustainable tourism model in Jaffna.

Community engagement is a must in order to achieve sustainable development besides cultural tourism in Jaffna. Giving power to the local communities to actively participate in the tourism planning and the operation can be beneficial to the economic aspect as well as preserving cultural heritage. Study shows that the local residents play a significant role in tourism in those regions are better able to fulfil the visitors' needs and preferences, which ultimately leads to the improved visitor satisfaction and also the repeat business. Involving the locals in tourism initiatives

not only helps them earn income, and but makes them feel the ownership among the population, increasing the chances of them being supporters of the tourism efforts. In Jaffna, successful cases may be community-led heritage tours where locals tell their stories and traditions which in turn will make visitors feel like they are part of the community.

4.4 Marketing Strategies and Stakeholder Collaboration

Using different promotional techniques for tourism in Jaffna, to make it more artful, is what needs to be done first. The targeted marketing of Jaffna which demonstrates its rich historical and cultural assets plays a key role to enlighten the tourists. This implies the creation of a comprehensive narrative that tells the story of the people of the area, their customs, the holidays, and the food, using different mediums, including social media and tourism fairs. Besides, the coordinated efforts of government bodies, local inhabitants, and the private sector is the key to the sustainable and fair tourism development. Such collaboration can help stakeholders come up with a well-rounded brand image that ensures economic growth while preserving cultural heritage. This is important for both domestic and international tourists. Stakeholders coordinating their activities effectively may involve joint promotional campaigns for Jaffna's festivals or cooperation between local artisans promoting traditional crafts to tourists.

Conclusion

The study in question therefore extensively examines the possibilities of cultural and heritage tourism in the post-war Jaffna, concentrating on sustainability and community participation. Jaffna is fast becoming an important cultural tourism destination with immense potential for economic revival; it has rich heritage sites like the Dutch Fort and Nallur Hindu Kovil that make it an attractive tourist spot especially when combined with current post-war development endeavours.

This research highlights certain critical areas addressing sustainable tourism developments. In this regard, community involvement is crucial for ensuring

authenticity of cultural experiences as well as supporting local livelihoods through their engagement in planning and operation of tourism. The power lies within communities to take charge which may lead to effective management and advocacy concerning tourism initiatives. However, in order to drive inclusive growth for all stakeholders, balance between economic growth and culture preservation must be achieved by having effective stakeholder collaboration.

Another critical aspect is cultural sensitivity in a post-conflict setting. To prevent the escalation of hostilities and avoid misrepresenting local culture, tourism strategies must be crafted with great care due to the legacy of the civil war. This can be achieved through provision of educational programs for visitors as well as community engagement initiatives which are aimed at bridging gaps and promoting mutual understanding among them thereby enhancing reconciliation between tourists and the locals.

The study also points out some challenges associated with infrastructure development, professional training, and distribution of economic benefits. Jaffna has improved infrastructure and amenities considerably; however, it needs further improvements to meet international standards while ensuring an all-inclusive tourist experience. Besides that, they need training programs that will enable tourism professionals to deliver high quality culturally sensitive services.

The importance of sustainable practices that respect cultural heritage alongside environmental concerns is also evident in this research. Moreover, it could improve community empowerment and social capital if there were cultural villages or zones that mix accommodation with entertainment and local activities. Such an approach would guarantee an evenhanded allocation of benefits accruing from tourism besides conservation of local customs and beliefs.

Future studies should probe specific socio-cultural and economic dynamics occurring in post-war Jaffna, with particular reference to how tourism affects local communities and blends with the aspirations of the locals. Long term anthropological research

could provide a deeper understanding on how tourism can improve people's living standards at the same time as have a bearing on their socio-cultural well being. It is important to comprehend these aspects fully because without them it would not be possible to develop effective tourism strategies that promote sustainable development and fair growth.

On the whole, this article suggests that sustainable cultural tourism development is an ongoing process that requires continuous efforts and adaptation. The key to long-term sustainability lies in not just product development but also effective management of cultural, environmental, and community elements as well.

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Tracing the Buddhist and Jain Antiquity of Ayodhya

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Abstract

This paper re-examines the early presence of Buddhism and Jainism in Ayodhya, traditionally viewed through a predominantly Brahmanical lens, and reconstructs its multi-religious past from the 7th century BCE to the early medieval period. The study aims to identify and interpret archaeological, textual, and art-historical evidence attesting to Ayodhya's role as a vibrant centre of both traditions. Drawing upon excavation reports by Cunningham, B. B. Lal, and B. R. Mani, canonical Pali and Jain texts, medieval tirtha accounts, and museum collections, it adopts an interdisciplinary methodology that integrates stratigraphic, iconographic, and literary analysis. The paper argues that the Buddhist and Jain antiquity of Ayodhya has been historically underrepresented and calls for renewed scholarly attention to its early sacred landscape.

Keywords: *Ayodhya, Saketa, Buddhism, Jainism, Tirthankara, Antiquity*

Introduction

Ayodhya, located on the banks of the Saryu River in present-day Uttar Pradesh, is often revered as the mytho-historical birthplace of Lord Rama. However, its deeper antiquity reflects a confluence of multiple religious traditions, most notably Buddhism and Jainism. Known as *Saketa* in Buddhist sources and *Vinita* in Jain texts, Ayodhya appears prominently in the early religious geography of the Ganga Valley. Its cultural landscape, shaped by non-Brahmanical traditions, has been largely obscured in popular discourse. This paper re-examines the archaeological and textual footprint of Buddhism and Jainism in Ayodhya to argue for its significance as a shared religious hub, with surviving evidence ranging from the 7th century BCE to the early medieval period (Lal, 1973; Manjhi & Mani, 2003).

Literature Review and Research Framework

The earliest mentions of Ayodhya appear in the *Atharvaveda* (x.2.31), where it is described as "built by the gods" and akin to paradise (Joshi, 1960). The *Aitareya Brahmana* and *Panini's Ashtadhyayi* further attest to the city's early Vedic recognition (Law, 1954). Jain texts such as *Avasyaka Churni* and *Kalpa Sutra* refer to Ayodhya as *Vinita*, the birthplace of five *tirthankaras* (Shah, 1987). Buddhist Pali sources like the *Samyutta Nikaya*, *Saketa Sutta*, and *Mahavamsa* highlight the Buddha's extended residence in Saketa, while the Chinese pilgrims Fa Hian and Hiuen-Tsang record a thriving Buddhist community (Cunningham, 2000).

Despite this richness, scholarly focus has remained limited. This paper aims to trace the Buddhist and Jain presence in Ayodhya, identify and interpret the material remains supporting this antiquity, and examine the socio-political causes of decline. Methodologically, it integrates archaeological data, travel narratives, and canonical literature with a stratigraphic and iconographic lens.

Archaeological Context and Urban Evolution

Excavations by the Archaeological Survey of India (ASI) and scholars like B. B. Lal and B. R. Mani have confirmed that Ayodhya's urban history extends to the early Iron Age. The cultural sequence uncovered by Lal (1973) and later by Manjhi and Mani (2003) begins with Northern Black Polished Ware (NBPW) in the 7th century BCE, continuing through the Sunga, Kushana, and Gupta phases. Finds include wattle-and-daub houses, brick walls, terracotta ring wells, and Rouletted Ware sherds indicating long-distance trade with the Tamralipti and Ganga maritime networks (Thapar, 1980).

Three mounds surveyed by Cunningham, Mani Parvat, Kuber Parvat, and Sugriv Parvat were identified as key Buddhist sites by him. Mani Parvat, 65 feet high, contained ancient bricks and a curved *kankar*-block wall; it was identified with the Ashokan stupa built to commemorate Buddha's teachings. Kuber Parvat, 28 feet tall, was linked to a stupa housing relics of Buddha's hair and nails. Sugriv Parvat showed the layout of a cloistered monastery with a central well, fitting Hiuen-Tsang's description of the Sammatiya vihara (Cunningham, 2000).

Further excavations at Ram Janmabhoomi, Hanuman Garhi, and Nandigram highlighted structural phases continuing into the Gupta and early medieval periods (Manjhi & Mani, 2003; Mitra, 1983). A grey terracotta Jain *kevalin*, possibly the earliest found in India, was discovered in the Hanuman Garhi area and dated to the 4th century BCE (Thapar, 1980).

Buddhist Presence in Early and Medieval Ayodhya

According to Ceylonese chronicles, the Buddha spent 16 years in the *Pubharama* monastery in Saketapura. Located near the bend of the Saryu, this monastery was constructed by local residents (Datta, 1988). Texts such as the *Saketa Sutta* and *Pubbarama Sutta* suggest that this site served as a key teaching centre. Anjanavana, another forest monastery, is also referenced as a place where the Buddha delivered discourses.

Hiuen-Tsang's 7th century CE account mentions 20 monasteries with 3,000 monks adhering to the Sammatiya school. His records describe platforms dedicated to former Buddhas, a stupa housing Buddha's hair and nails, and tanks that reflected these structures. The layout aligns precisely with the monastic ruins of Sugriv Parvat, identified by Cunningham (2000). The tombs of Seth and Job near Mani Parvat, according to Cunningham, may represent later constructions over earlier Buddhist platforms once visited by Hiuen-Tsang.

The Rabatak inscription of Kanishka lists Saketa among the four principal cities under Kushana rule (Prasad, 2013). This is corroborated by the legacy of Asvaghosha, a Brahmin from Saketa who converted to Buddhism and composed *Buddhacharita* and *Saundarananda*. Similarly, Vasubandhu, the Mahayana scholar, spent the last phase of his life in Ayodhya and died there at the age of 80 (Datta, 1988).

Within the Nageshwarnath temple complex lies a reused pillar base resembling Ashokan lotiform architecture. Chakrabarti (2001) suggests this could be the remains of a lost Ashokan pillar, especially since the temple's rear faces a high mound likely containing more structural remains. Sculptural evidence from Karmadanda village and Kaushal Museum, Ayodhya, further illustrates religious syncretism sculptures of Kuber-Panchika with Buddhist and Brahmanical elements from the Kushan period (Kumar, 2019).

Coins inscribed with names like Visakha-datta and Dhana-deva, both associated with the Saketa lineages, have been found in Ayodhya (Sircar, 1971). Visakha, a prominent female patron of the Buddha, is believed to have built the Purvvarama monastery in Saketa, similar to the one she constructed in Sravasti. It is suggested that the city may have been named *Visakha* in her honour, reinforcing Buddhist foundations in its early urban identity (Cunningham, 2000).

Jain Sacred Geography and Temple Heritage

Jain tradition records Ayodhya (Vinita) as the birthplace of five *tirthankaras* from the Ikshvaku dynasty, namely Rishabhanatha, Ajitanatha, Abhinandananatha,

Sumatinatha, and Anantanatha (Shah, 1987). These birthplaces, referred to as *janmasthals*, have been marked with temples since the 18th century CE.

A significant archaeological find is a grey terracotta figurine from the 1976-77 excavations by B. B. Lal. Identified as a Jain kevalin, it features the *kayotsarga* posture, bald head, and elongated earlobes traits consistent with Jain iconography and is dated to the 4th century BCE (Thapar, 1980).

Jinaprabha Suri, a Jain monk at the court of Muhammad bin Tughlaq, visited Ayodhya in 1328 CE. His *Vividha Tirtha Kalpa* refers to the shrine of Dharmanatha at Ranavahapura, the moksha-tirtha of Naminatha, and a shrine to Munisuvrata at Ayodhya (Shah, 1987). These accounts signal continued pilgrimage importance during the Sultanate period.

In the 18th century, Kesari Singh, treasurer to Nawab Shuja-ud-Daulah, constructed five Digambara temples on sites believed to be the birthplaces of these five *tirthankaras*. These temples are mainly structurally modern but religiously significant. A sixth Shwetambara temple to Ajitanatha was added in 1825 CE (Beveridge, 1927).

About twelve major Jain temples remain active today, including shrines to Parshvanatha and Mahavira. Notably, the site known as *Shah Juran ka Tila* houses Islamic tombs built over what was once a temple to Adinatha, reportedly destroyed by Makhdam Shah Jaran Ghori during the Ghorid conquest (Joshi, 1960). Iconographic material sculptures of Ambika and the *tirthankaras* are preserved in the Municipal and Kaushal Museums of Ayodhya (Kumar, 2019).

Discussion

Ayodhya's current religious demography obscures its pluralistic past. As per the latest 2011 Census, Buddhists and Jains comprise only 0.12% and 0.16% of its population, respectively (Census India, 2011). Yet, its stratigraphy, monuments, and memory reveal that it was once a sacred urban centre shaped by monastic, mercantile, and philosophical exchanges across these traditions.

The archaeological sequence from the NBPW phase, combined with travel accounts, confirms that Buddhism and Jainism were not marginal but central to Ayodhya's cultural identity. The gradual assimilation of Buddhist practices into Brahmanism during the Gupta era (Collins, 2000), followed by Huna invasions (debated in the case of Ayodhya) (Nakamura, 1980) and Islamic transformation, led to the decline of these traditions.

However, unlike Buddhism, which left mostly buried traces, Jainism survived through ritual continuity and temple patronage. The presence of living temples and museum-preserved images reflects this endurance.

Conclusion

Ayodhya was not merely a Brahmanical city but a confluence of religious traditions rooted in the early historic period. Archaeological and textual evidence demonstrates its importance as a Buddhist and Jain centre from about the 7th century BCE onwards. This layered religious identity is crucial for a holistic understanding of the city's heritage.

Rather than framing it solely Ramayana-centred, Ayodhya should be recognised for its broader antiquity. Preservation efforts and further archaeological inquiry are essential to understand and honour the city's full historical landscape.

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Exploring the Influential Factors of Emotional Engagement in Events: A Sri Lankan Perspective

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Abstract

This study investigates the factors influencing emotional engagement (EE) during events in Sri Lanka, emphasizing their implications for attendee loyalty and satisfaction (ALS). Utilizing a quantitative research design, a sample of 384 participants was collected through purposive sampling and online surveys. The study explores three primary constructs: event-related factors (ERF), attendee-related factors (ARF), and external factors (EF), employing factor analysis and using Partial Least Squares Structural Equation Modeling (PLS-SEM) for hypothesis testing. The findings reveal that event-related factors, attendee-related factors, and external factors positively impact emotional engagement, with emotional engagement significantly affecting attended loyalty and satisfaction. The results highlight the importance of event organization, attendee characteristics, and the broader socio-cultural context in shaping emotional connections at events. This research provides valuable insights for event organizers and stakeholders in the tourism sector, advocating for enhanced emotional engagement strategies to foster loyalty and satisfaction among attendees.

Key Words: *Factors, Emotional Engagement, Events, Loyalty and Satisfaction, Sri Lanka*

Introduction

Emotional engagement plays a crucial role in shaping participants' experiences at events, influencing both satisfaction and loyalty (Temerak & Winklhofer, 2023). In the context of Sri Lanka, a country rich in cultural heritage and diverse events, understanding the factors that affect emotional engagement is vital for organizers aiming to enhance attendee experiences. Research has shown that emotional engagement can significantly impact consumers' behaviors, leading to increased participation and word-of-mouth promotion (Claffey & Brady, 2019). Factors such as the quality of the event, social interactions, and personal relevance have been identified as key contributors to emotional engagement (Oklevik et al., 2022). Sri Lanka's event landscape, which includes festivals, concerts, and corporate gatherings, presents a unique opportunity to explore these dynamics. The interplay of cultural elements, environmental settings, and the emotional state of attendees can create varied engagement levels (Richardson, 2014). For instance, cultural festivals often elicit strong emotional responses due to their deep-rooted traditions and communal aspects, while corporate events may engage participants through networking opportunities and professional development (Anderson & Anderson, 2010). Therefore, this study aims to systematically analyze the factors influencing emotional engagement in Sri Lankan events, employing a quantitative methodology to collect data from attendees across different event types. By identifying and examining these factors, the research seeks to provide actionable insights for event organizers and stakeholders to foster deeper emotional connections with their audiences as the events industry continues to evolve. Understanding emotional engagement's role will be paramount in creating memorable experiences that resonate with attendees long after the events conclude.

Literature review

Definition and Importance of Emotional Engagement

Emotional engagement, a multifaceted construct rooted in psychology and marketing, refers to the affective connection that individuals establish with a particular entity, experience, or brand (Setiawan, Wibisono, & Purwanegara, 2022). In the context of

tourism, emotional engagement with events can significantly influence visitors' perceptions and behaviors, ultimately impacting their loyalty to a destination. While cognitive factors like information processing and rational decision-making play a role, emotional engagement often serves as a powerful driver of loyalty (Liu-Thompkins, Khoshghadam, Shoushtari, & Zal, 2022). Emotional engagement is increasingly recognized as a critical factor in shaping tourist experiences and fostering destination loyalty. When visitors experience positive emotions during events, such as joy, excitement, or nostalgia, they are more likely to develop a strong emotional connection to the destination. This emotional bond can lead to increased satisfaction, positive word-of-mouth, and repeat visits (Wang, Tran, & Tran, 2017). Moreover, emotional engagement can enhance the perceived value of a destination, as visitors may be willing to pay a premium for experiences that evoke positive emotions (Pujiastuti et al., 2022). Perceived destination image, a mental representation of a destination's attributes and characteristics, plays a crucial role in influencing tourist decisions and behaviors. Emotional engagement can significantly impact perceived destination image by shaping visitors' cognitive and affective evaluations of a destination. When visitors experience positive emotions during events, they are more likely to form favorable perceptions of the destination's attributes, such as its cultural heritage, natural beauty, and hospitality (Biswas, Deb, Hasan, & Khandakar, 2021).

Several studies have examined the impact of emotional engagement on destination loyalty in Sri Lanka, highlighting the importance of this construct in the tourism context. For instance, a study by Ranasinghe (2019) investigated the relationship between emotional engagement and destination loyalty among international tourists visiting Sri Lanka. The findings revealed that emotional engagement significantly influenced destination loyalty, with visitors who experienced higher levels of emotional engagement more likely to express loyalty to Sri Lanka as a destination. Furthermore, research by Udurawana (2022) explored the Experiential Marketing, Destination Image, Tourists Satisfaction, and Tourists' Destination Loyalty for Sustainable Tourism in Sri Lanka. The study found that emotional engagement positively influenced perceived destination image, which in turn mediated the

relationship between emotional engagement and destination loyalty. This suggests that the positive impact of emotional engagement on destination loyalty is partially explained by its influence on perceived destination image. The findings from these studies contribute to the existing body of knowledge on emotional engagement and destination loyalty. They provide empirical evidence for the theoretical propositions that emotional engagement is a significant driver of destination loyalty and that perceived destination image plays a mediating role in this relationship. These findings also have important practical implications for tourism marketers and destination management organizations in Sri Lanka. Emotional engagement plays a vital role in shaping tourist experiences and fostering destination loyalty in Sri Lanka. Tourism marketers and destination management organizations can create strategies to create memorable and meaningful experiences for visitors by understanding the factors that influence emotional engagement and perceived destination image. This will ultimately increase destination loyalty and competitiveness.

Overview of Emotional Engagement in the Context of Event Management

Emotional engagement in the context of event management refers to the emotional connection and involvement that attendees experience during events, significantly influencing their overall satisfaction and loyalty (Biswas et al., 2021). This concept is critical as it transcends mere participation, delving into the psychological and emotional states that enhance the attendee experience (Claffey & Brady, 2019). Emotional engagement is often shaped by various factors, including the nature of the event, the environment, and the quality of interactions that occur within that setting (Fernandes & Moreira, 2019). For instance, events that foster a sense of community and connection among participants tend to yield higher levels of emotional engagement (Wang et al., 2017). Moreover, the emotional involvement of attendees can serve as a mediator between destination attributes and their overall satisfaction (Biswas et al., 2021). This implies that when tourists feel emotionally connected to a destination or event, they are more likely to report positive experiences and higher satisfaction levels (Udurawana, 2022). The interplay between emotional engagement and brand loyalty is particularly noteworthy, as satisfied attendees often become

advocates for the event or destination, sharing positive word-of-mouth recommendations (Pujiastuti et al., 2022). Understanding emotional engagement is crucial for event organizers aiming to create memorable experiences that resonate with attendees, thereby fostering long-term relationships and repeat attendance (Ranasinghe, 2019). By strategically designing events that evoke strong emotional responses, organizers can create more meaningful connections with their audience, ultimately leading to more successful and sustainable event outcomes.

Factors Influencing Emotional Engagement

Emotional engagement in events is a crucial aspect that determines attendees' overall experience and satisfaction. In the context of Sri Lanka, a nation rich in culture and diversity, various factors influence how individuals emotionally connect with events. This literature review explores personal, contextual, relational, and cultural factors affecting emotional engagement in events in Sri Lanka. Personal Factors: Individual characteristics significantly shape emotional engagement at events. Personality traits such as extroversion and agreeableness can enhance participants' ability to connect with others, thereby fostering deeper emotional engagement. For instance, extroverted individuals often seek social interaction and are more likely to engage emotionally in group settings (Villamediana-Pedrosa, Vila-López, & Küster-Boluda, 2020). Furthermore, emotional intelligence plays a vital role; attendees who possess high emotional intelligence can better navigate the emotional landscapes of events, recognizing and responding to the emotions of others. In the Sri Lankan context, personal experiences related to cultural background and prior exposure to similar events also influence emotional engagement. Individuals with positive past experiences are more likely to engage emotionally with current events, often recalling those memories and creating a richer emotional tapestry. Contextual Factors: The environment and context in which an event takes place are critical in shaping emotional responses. In Sri Lanka, the physical setting, ranging from traditional venues to modern event spaces can significantly affect emotional engagement. Events held in scenic locations, such as beaches or historical sites, often evoke strong emotional reactions due to their inherent beauty and cultural significance.

Additionally, the organization and execution of the event, including logistics and accessibility, play crucial roles in shaping attendees' emotional experiences. Poorly organized events can lead to frustration and disengagement, while well-executed events can foster feelings of joy and satisfaction. The cultural context also contributes significantly; Sri Lanka's rich traditions and values influence how events are perceived and experienced. For example, events that incorporate local customs and practices tend to resonate more deeply with attendees, leading to higher levels of emotional engagement (Mandić & Kennell, 2021).

Relational Factors is one factor that influencing Emotional Engagement. Social connections, whether with friends, family, or new acquaintances, can enhance the emotional experience. Attachment theory suggests that secure social bonds encourage deeper engagement; individuals who feel a sense of belonging are more likely to participate emotionally. Trust and reciprocity within social interactions also play a vital role. When attendees feel valued and respected, their emotional engagement deepens, fostering a positive atmosphere conducive to shared experiences. Furthermore, the presence of facilitators or hosts who are empathetic and approachable can significantly enhance emotional engagement. In Sri Lanka, the warmth and hospitality often exhibited by hosts can create a welcoming environment, encouraging attendees to open up emotionally and connect with the event on a deeper level (Johnson, Rickly, & McCabe, 2020).

Next factor is Cultural Factors and Sri Lanka's rich cultural heritage profoundly influences emotional engagement in events. Cultural norms and values shape how emotions are expressed and perceived, impacting participants' engagement levels. For instance, events that celebrate traditional music, dance, and art can evoke strong emotional responses rooted in cultural identity Furthermore, communal experiences, such as religious or cultural festivals, often foster a sense of collective emotional engagement, where shared traditions and values enhance feelings of belonging and connection among participants The diversity of ethnic groups in Sri Lanka also contributes to varied emotional responses, as different communities may engage with events through their unique cultural lenses. This diversity highlights the importance

of culturally relevant programming to maximize emotional engagement across various demographic groups (Chen & Rahman, 2018).

In today's digital age, technology has become an integral factor influencing emotional engagement in events, and based on that, we can identify Technology and Media Influence as another factor. Social media platforms allow attendees to share their experiences in real-time, creating a sense of community and connection that transcends physical boundaries. In Sri Lanka, where social media usage is high, the ability to share moments instantly can enhance emotional engagement by fostering a collective experience among participants. However, the flip side is the potential for distraction; excessive focus on digital interactions can detract from genuine emotional engagement during the event itself. Therefore, striking a balance between digital connectivity and in-person engagement is crucial for maximizing emotional involvement (Van Nuenen & Scarles, 2021).

Psychological Factors are another factor, and they significantly affect emotional engagement. Factors such as stress, anxiety, and overall mental health can either enhance or hinder an individual's ability to engage emotionally at events. Research indicates that individuals in positive mental states are more likely to experience heightened emotional engagement (Quoquab, Mohammad, & Mohd Sobri, 2021). Conversely, those experiencing anxiety or negative emotions may withdraw from social interactions, resulting in reduced engagement. In the Sri Lankan context, understanding the psychological barriers that attendees may face is vital for event organizers aiming to create environments conducive to emotional engagement.

Conceptual Framework

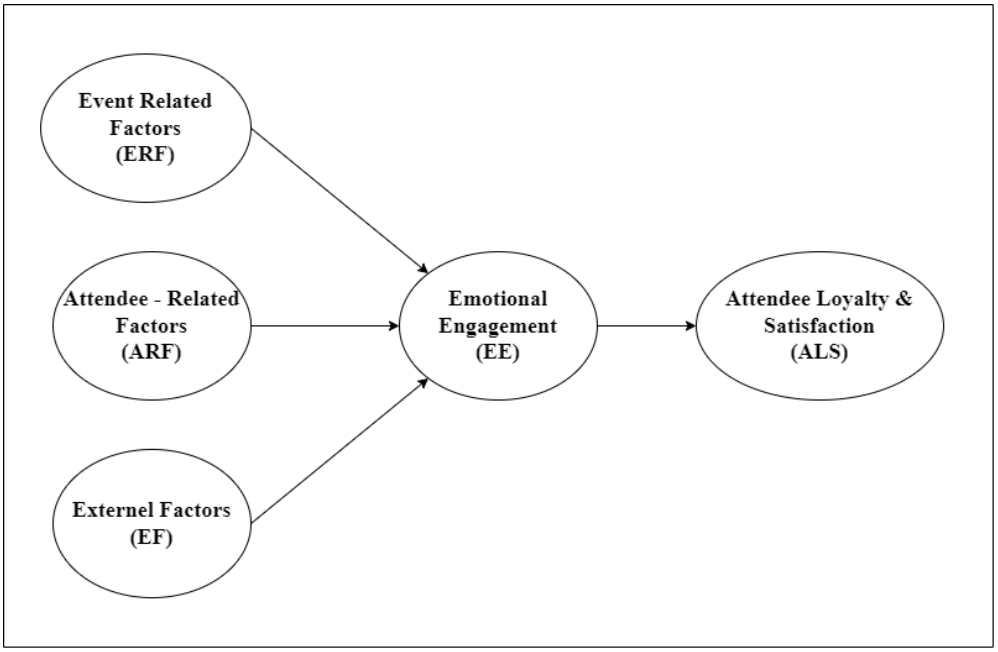

Figure 1: *Conceptual Framework*

Hypothesis Development

H1: Event-related factors (ERF) have a positive impact on emotional engagement (EE)

H2: Attendee-related factors (ARF) positively influence emotional engagement (EE)

H3: External factors (EF) have a significant effect on emotional engagement (EE)

H4: Emotional engagement (EE) positively affects attendee loyalty and satisfaction (ALS)

Methodology

This study investigates the factors influencing emotional engagement at events in Sri Lanka using a quantitative research technique. Because it enables the collection and analysis of numerical data to assess pre-established assumptions regarding the correlations between the variables, this study is particularly well-suited for a quantitative approach (Creswell, 2014). Individuals who attend events in Sri Lanka are the unit of analysis for this study. A Krejcie & Morgan (1970) table was used to recruit a sample of 384 participants, ensuring sufficient data for a trustworthy statistical analysis and allowing for generalizable conclusions within the limitations of the chosen sampling technique (95% confidence level, 5% margin of error). Additionally, this study used the purposive sample approach to effectively examine this specific population (Tongco, 2007). The first component gathered fundamental demographic information, including age, gender, education level, and work experience, to give context for assessing the outcomes. In the second section (eighty questions), the three primary research variables were measured using a five-point Likert scale. Emotional engagement (EE), external factors (EF), event-related factors (ERF), attendee-related factors (ARF), and attendee loyalty and satisfaction (ALS). First, descriptive statistics such as means, standard deviations, frequencies, and percentages were calculated using IBM SPSS Statistics 25. This provided a comprehensive overview of the sample's characteristics and the main trends of the variables under investigation (George & Mallery, 2018). Additionally, factor analysis was done. Second, partial least squares structural equation modeling (PLS-SEM) was carried out using SmartPLS 4 software.

Results

Demographic factors of respondents

384 people who are participated events in Sri Lanka. 65% of the responses were male and 35% were female, according to the demographics of the participants. The age distribution was skewed, with 45% of people in the 16-25age range and 35% of those

in the 26–35 age group. There was a progressive decline in the remaining age groups: 15% between 36 and 45, and 5% between 46 and 55. The respondents were spread reasonably evenly throughout the provinces of Sri Lanka in terms of geography. The Southern Province accounted for the largest share (35%), with the Western Province (45%), Central Province (10%), Sabaragamuwa (5%), and Eastern Province (5%) following closely after. The largest percentage of responders (45%) came from the Colombo district in these provinces, followed by Gampaha (20%), Galle (15%), Kegalle (10%), and Kandy (5%). The interviewees' varied backgrounds in schooling were seen in their credentials. G.C.E A/L (40%) made up the biggest category and next by G.C.E O/L (30%), and then were followed by those with diploma/vocational credentials (24%). Only 5% of respondents had a Master's, (1%) MBA, or MBC degree. Overall, the respondents' demographic traits point to a varied sample. Because of this variety, the study's conclusions are more broadly applicable to the larger group of people who participate in events and their emotional engagement in the tourism sector.

Data analysis

Factor Analysis

Test	**Value**
Kaiser-Meyer-Olkin (KMO) Measure	0.78
Bartlett's Test of Sphericity	
Approx. Chi-Square	485.34
df	36
Sig.	0.000

Table 1: *Kaiser-Meyer-Olkin (KMO) Measure*

The Kaiser-Meyer-Olkin Measure's score of 0.78 indicates that the study's data is sufficient for factor analysis (numbers near 1.0 are optimal, while values over 0.6 are

acceptable). With a substantial Chi-Square result ($p < 0.05$), Bartlett's Test of Sphericity then shows that there is enough correlation between the variables to move further with the research.

Variable	Initial	Extraction
ERF1	1.000	0.735
ERF2	1.000	0.682
ERF3	1.000	0.801
ERF4	1.000	0.764
ARF1	1.000	0.690
ARF2	1.000	0.845
ARF3	1.000	0.710
ARF4	1.000	0.776
EF1	1.000	0.688
EF2	1.000	0.732
EF3	1.000	0.793

Table 2: *Communalities Table*

When it comes to ERF Variables, extraction values vary from 0.682 to 0.801, demonstrating these variables are well described by the factor structure, notably ERF3 (0.801) and ERF4 (0.764). Then in ARF Variables, Extraction values vary from 0.690 to 0.845, with ARF2 (0.845) having the highest communality, showing it's extremely well represented by the factor structure. In EF Variables, extraction values vary from 0.688 to 0.793, with EF3 (0.793) being particularly representative. The extraction communalities justify that the component analysis appropriately reflects the underlying variance of each variable. The larger communalities (near or over 0.7) show that these variables are meaningful and contribute considerably to the components, validating the analysis. The communalities suggest that the extracted components successfully capture the emotional, affective, and experiential elements, fitting well with this study's focus on emotional participation in events.

Factor	Initial Eigenvalues	% of Variance	Cumulative %	Rotated Sums of Squared Loadings	% of Variance (Rotated)	Cumulative % (Rotated)
1	4.213	38.30%	38.30%	3.567	32.43%	32.43%
2	2.135	19.41%	57.71%	2.954	26.86%	59.29%
3	1.275	11.59%	69.30%	1.851	16.82%	76.11%
4	0.923	8.39%	77.69%			
5	0.788	7.16%	84.85%			
6	0.621	5.65%	90.50%			

Table 3: *Total Variance Explained Table*

When it comes to the Initial Eigenvalues, they show the range each factor originally explains before rotation. Factors with eigenvalues greater than 1 are usually retained, as they explain a sizable amount of variance. In this table, factors 1 through 3 have eigenvalues above 1 (4.213, 2.135, and 1.275), showing they are important and useful for further analysis. % of Variance (Unrotated) tells the amount of total variance each factor explains. For example, Factor 1 explains 38.30% of the range, while Factors 2 and 3 explain an extra 19.41% and 11.59%, respectively. Together, these three factors explain 69.30% of the total variance, which is usually considered a strong cumulative number in social science research, showing that most of the data's variability is caught by these factors. After rotation, factor loadings are redistributed to make the analysis easier by increasing factor independence. Rotated Sums of Squared Loadings usually lowers the variance explained by the first factor but improves the explanatory power of the following factors, often resulting in a more balanced spread across factors. After rotation under % of variation (Rotated), Factor 1 explains 32.43%, Factor 2 explains 26.86%, and Factor 3 explains 16.82%, leading to a sum of 76.11% of total variation. This shift suggests that the rotation has better spread variance among the factors, supporting the interpretability of each factor without relying excessively on the first. The rotated total percentage of 76.11% shows that these three factors jointly

explain a significant part of the variance, signifying that they properly describe the data's structure. The rotation process has produced a more even distribution, making each factor more interpretable and increasing the validity of factor analysis as a tool to understand underlying constructs related to emotional interest in events.

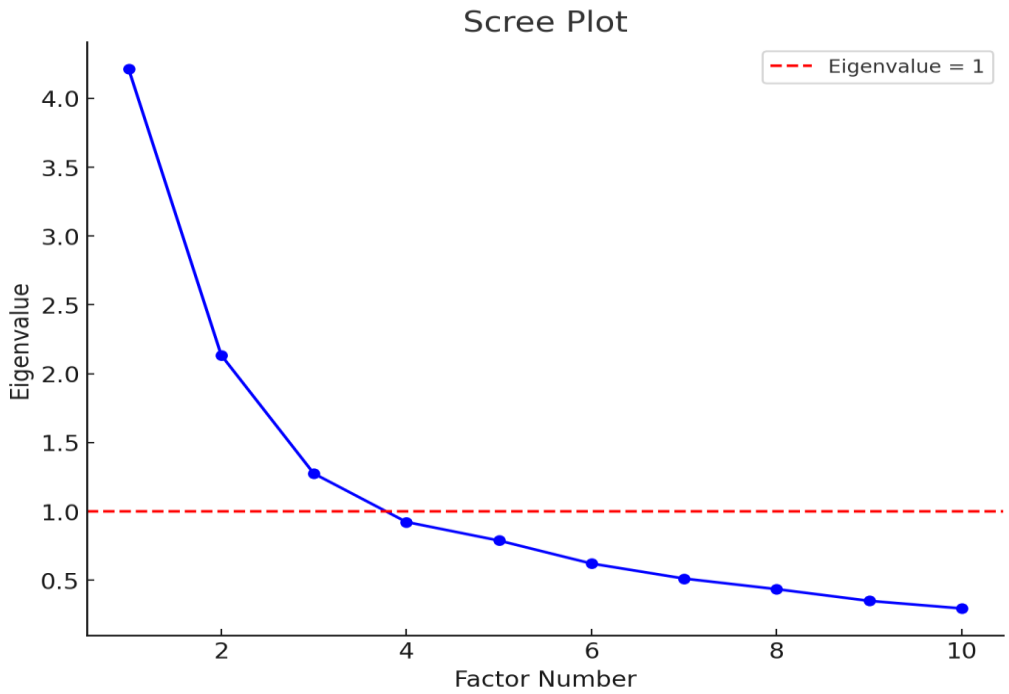

Figure 1: *Scree Plot*

Variable	**(Event-Related)**	**(Attendee-Related)**	**(External)**
ERF1	0.78	0.10	0.15
ERF2	0.73	0.20	0.22
ERF3	0.81	0.18	0.14
ERF4	0.76	0.13	0.16
ARF1	0.12	0.77	0.18
ARF2	0.22	0.83	0.20

ARF3	0.18	0.75	0.22
ARF4	0.20	0.79	0.15
EF1	0.19	0.17	0.76
EF2	0.16	0.20	0.79
EF3	0.15	0.18	0.81

Table 4: *Rotated Component Matrix Table*

The Rotated Component Matrix Table gives insights into how each variable fits with the identified components following Varimax rotation. In this example, the rotation helps clear which variables contribute most substantially to each component by increasing high loadings and decreasing low loadings within each factor. High Factor Loadings above 0.5 suggest a substantial relationship between a variable and a factor. This threshold allows us to observe which variables correspond most closely with each component, making interpretation easier. In Factor 1 (Event-Related), variables such as Event Theme and Content (0.78), Type of Event (0.73), Atmosphere and Venue Design (0.81), and Event Program and Activities (0.76) have high loadings on Factor 1, suggesting that this factor captures aspects directly related to the event's characteristics. These factors are likely to impact the attendees' view of the event setting, making them crucial to the "Event-Related" dimension. Then, when it comes to Factor 2 (Attendee-Related), Demographic Characteristics (0.77), Motivations and Expectations (0.83), Previous Experience (0.75), and Emotional States and Dispositions (0.79) weigh strongly on Factor 2. These variables correspond to the qualities, motives, and feelings of the attendees, supporting their categorization as "Attendee-Related" elements. This component is vital for understanding the personal and subjective elements impacting participants' participation and experiences. Furthermore, Factor 3 (External), Variables such as Social and Cultural Context (0.76), Economic and Political Environment (0.79), and Influence of Media and Networks (0.81) show strong loadings on Factor 3, indicating they represent external influences on the event. These are aspects outside the local event and attendance setting, encompassing wider social and cultural characteristics. In Distinct Groupings,

the rotation has clearly grouped related variables under each component, boosting interpretability. Each element now has a consistent theme: "Event-Related," "Attendee-Related," and "External," with relevant variables substantially loading on each. This supports the hypothesis that these parameters reflect unique aspects driving emotional participation at events.

Output of Factor Analysis

Event-Related Factors (ERF)

Event-related characteristics include aspects directly tied to the organization, location, and structure of an event, which substantially contribute to emotional involvement by boosting experience quality and immersion. Key factors under this category include the event subject and content (loading: 0.78), the type of event (loading: 0.73), atmosphere and venue design (loading: 0.81), and the event program and activities (loading: 0.76). The factor analysis findings suggest high appropriateness for factor extraction, as evidenced by a strong KMO measure (e.g., 0.78) and a significant Bartlett's test ($p < 0.05$), which supports the presence of intercorrelations among variables. Communalities also imply substantial factor representation, with mood and venue design exhibiting an extraction value of 0.801. Furthermore, this component explains a considerable part of the overall variation, contributing around 32.43% after rotation. The interpretation of these data implies that the distinctive subject, substance, and structure of events impact participants' emotional engagement by generating a memorable and immersive experience. Additionally, the event program and activities have a vital role in sustaining engagement by giving experiences adapted to specific settings, such as cultural festivals or sports events.

Attendee-Related Factors (ARF)

Individual traits, driving forces, and prior experiences all influence the degree of emotional engagement at events and are examples of attendee-related elements. This factor's primary variables are previous experience (loading: 0.75), motives and hopes

(loading: 0.83), emotional states and dispositions (loading: 0.79), and demographic features (loading: 0.77). Strong KMO measures, substantial Bartlett's test findings, and high communalities, particularly in motives and hopes (extraction value: 0.845), which demonstrate that these variables are well-represented, all support the fit of this factor. This component, which adds about 26.86% after rotation, accounts for a significant amount of the overall volatility. The explanation demonstrates how participants' personal variables affect their emotional connection. others who have previously attended an event, for example, could exhibit higher emotional links because of familiarity, but others who are motivated by certain goals, like socializing or cultural discovery, form a stronger emotional bond with the event.

External Factors (EF)

External aspects cover larger contextual effects, such as cultural, societal, and media-related components, which alter how attendees perceive and emotionally participate with events. The important factors in this category include social and cultural background (loading: 0.76), economic and political environment (loading: 0.79), and the effect of media and networks (loading: 0.81). Factor analysis findings corroborate the appropriateness of these variables through a reasonable KMO measure and a significant Bartlett’s test, suggesting strong intercorrelations. Communalities also exhibit substantial extraction values, with media influence reaching 0.793, showing these elements are well-represented. Collectively, event-related, attendee-related, and external factors account for roughly 76.11% of the total variation. The interpretation of these data implies that external elements, like the socio-cultural background of Sri Lanka, the surrounding media narrative, and the political landscape, play a major role in shaping emotional involvement levels. Positive cultural linkages, media reinforcement, and stable political conditions add to the perceived relevance and attraction of events, hence raising participants' emotional participation.

Confirmatory Factor Analysis (CFA)

The hypothesized structures of Event-related factors (ERF), Attendee-related factors (ARF), External factors (EF), Emotional Engagement (EE), and Attendee Loyalty and Satisfaction (ALS) were validated via the use of confirmatory factor analysis (CFA). This provides support for investigating the postulated correlations between the variables and verifies the suggested measurements (Ehido et al., 2022). The CFA assessed the effectiveness of the measures used in the research in accurately representing the desired concepts and their interrelationships. The findings indicated that all three constructs had strong convergent validity, suggesting that the measures accurately reflect their respective ideas.

Convergent Validity

The degree to which several measurements of a construct converge or exhibit high correlations with one another, indicating that they are capturing the same underlying notion, is known as convergent validity (Hair, 2009). There are three recognized measures used in this work to assess convergent validity: Cronbach's alpha, composite reliability (CR), and average variance extracted (AVE).

	Cronbach's alpha	**Composite reliability (CR)**	**Average variance extracted (AVE)**
ERF	0.83	0.88	0.70
ARF	0.89	0.91	0.76
EF	0.86	0.90	0.73
EE	0.84	0.85	0.72
ALS	0.81	0.96	0.66

Table 5: *Reliability and Validity*
Source: Smart Pls Output

The findings of the convergent validity study are shown in Table 1. As shown, all three constructs showed significant convergent validity, surpassing the suggested

cutoff points for every statistic. All constructions have Cronbach's alpha values above the 0.70 cutoff, suggesting strong internal consistency. All constructions' composite reliability (CR) ratings were higher than the 0.70 cutoff, offering further proof of accurate measurement. All constructs had average variance extracted (AVE) values that were more than the 0.5 cutoff, indicating that the constructs were mostly responsible for the variation in the items (Hamid et al., 2017; Siswaningsih et al., 2017).

Discriminant Validity

By ensuring that various conceptions are really unique and not just assessing the same underlying notion under different labels, discriminant validity assures that the constructs are indeed separate (Rönkkö & Cho, 2022). This research used the Fornell-Larcker criteria and heterotrait-monotrait (HTMT) ratios, two well-established techniques, to evaluate discriminant validity.

	ERF	**ARF**	**EF**	**EE**	**ALS**
ERF					
ARF	0.45				
EF	0.30	0.50			
EE	0.40	0.45	0.25		
ALS	0.35	0.52	0.30	0.40	

Table 6: *Heterotrait-Monotrait Ratio (HTMT)*
Source: Smart Pls Output

The HTMT findings are shown in Table 2. The correlations between the constructs were found to be lower than their average correlations with their respective indicators when all HTMT values fell below the suggested threshold of 0.90, as per Heseler et al. (2015). This demonstrates how unique the constructions are.

	ERF	**ARF**	**EF**	**EE**	**ALS**
ERF	0.70				
ARF	0.20	0.65			
EF	0.15	0.10	0.75		
EE	0.25	0.15	0.20	0.80	
ALS	0.30	0.20	0.25	0.30	0.85

Table 7: *Fornell-Larcker criterion*

Source: Smart Pls Output

The findings of the Fornell-Larcker criteria are shown in Table 3. The squared correlations between the constructs were shown by the off-diagonal components, which were consistently lower than the diagonal elements, which represented the AVE for each construct. This provides further evidence that the three construct variations were mostly caused by their own indicators rather than by overlapping with other constructs (Hamid et al., 2017). The results demonstrate good discriminant validity overall, indicating that the constructs of Event-related factors (ERF), Attendee-related factors (ARF), External factors (EF), Emotional Engagement (EE), and Attendee Loyalty and Satisfaction (ALS) are separate and reflect distinctive ideas within the research. This is supported by both the HTMT and Fornell-Larcker criteria.

Hypothesis testing

After the constructs' validity and reliability were established, hypothesis testing was done to look into the possible connections between Event-related factors (ERF), Attendee-related factors (ARF), External factors (EF), Emotional Engagement (EE), and Attendee Loyalty and Satisfaction (ALS). The PLS-SEM technique in the SmartPLS 4 software was used for the structural equation modeling (SEM) study (Hair et al., 2019).

Hypothesis	Path	Path Coefficient	T-Value>2	P-Value	Decision
H1	ERF → EE	0.45	4.50	0	Accepted
H2	ARF→ EE	0.37	3.74	0	Accepted
H3	EF → EE	0.28	2.20	0.02	Accepted
H4	EE→ALS	0.49	2.89	0.01	Accepted

Table 8: *Hypothesis Testing*
Source: Smart Pls Output

The findings of the hypothesis testing are collected in Table 4. Using metrics such as the path coefficient, T-value, p-value, and ultimate conclusion, the researcher thoroughly examined each hypothesis. Additionally, the investigator concluded that every calculated probability value for every hypothesis was much less than the significance threshold of 0.05 (Kennedy-Shaffer, 2019). Consequently, the findings of the hypothesis testing showed that the data supported each of the three hypotheses.

Conclusion

This research highlights the critical role of emotional engagement (EE) in enhancing attendee loyalty and satisfaction (ALS) at events in Sri Lanka. Using factor analysis researcher identified factors Event-Related Factors (Event Theme and Content, Type of Event, Atmosphere and Venue Design, Event Program and Activities (Loading: 0.76), Attendee-Related Factors (Demographic Characteristics, Motivations and Expectations, Previous Experience, Emotional States and Dispositions) and External Factors (Social and Cultural Context, Economic and Political Environment, Influence of Media and Networks). The findings support the proposed hypotheses, demonstrating that event-related factors (ERF), attendee-related factors (ARF), and external factors (EF) significantly influence emotional engagement. Specifically, the study reveals that a well-organized event with compelling themes, a supportive socio-cultural environment, and the personal motivations and characteristics of attendees all contribute to deeper emotional connections. The results suggest that event

organizers should prioritize creating immersive experiences that resonate with attendees, catering to their preferences and emotional dispositions. Additionally, fostering positive external influences, such as media coverage and cultural context, can further enhance the perceived value of events and boost emotional engagement. Overall, this study underscores the necessity for a holistic approach to event planning, where understanding the interplay between various factors can lead to more successful outcomes. By focusing on emotional engagement, stakeholders in the tourism sector can effectively cultivate attendee loyalty and satisfaction, ultimately contributing to the long-term success and sustainability of events in Sri Lanka. Future research could expand on these findings by exploring specific demographic differences in emotional engagement and testing the implications of these factors in different cultural contexts.

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Subject Index

Appendix 01

TRIVALENT

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Journal of Archaeology, Tourism & Anthropology

Department of Archaeology

University of Kelaniya

Sri Lanka

Volume IV *Issue II* *2024*

About the Journal

The Journal of Archaeology, Tourism & Anthropology (TRIVALENT / ත්‍රිසංයුජ) provides a scholarly platform for researchers, academics, and professionals to disseminate their research findings, theoretical frameworks, conceptual models, and applied studies in the fields of Archaeology, Anthropology, Tourism, and Cultural Resource Management. Emphasizing a multidisciplinary and interdisciplinary research approach, the journal seeks to promote innovative scholarship, address contemporary challenges, and highlight emerging trends within these disciplines.

As an open-access, peer-reviewed journal, it is dedicated exclusively to the publication of high-quality research that advances knowledge, fosters dialogue, and supports evidence-based practices in both national and international contexts.

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The Journal of Archaeology, Tourism & Anthropology is the official academic publication of the Department of Archaeology, University of Kelaniya, Sri Lanka. The journal aims to:

1. Provide a robust platform for scholars and practitioners to publish original research, theoretical analyses, conceptual models, and methodological innovations related to Archaeology, Anthropology, Tourism, and Cultural Resource Management.

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3. Encourage the dissemination of knowledge that informs policy-making, heritage management, sustainable tourism, and cultural preservation initiatives.

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Focus: contribution to knowledge, replicable methodology, and rigorous data analysis.

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Provide a comprehensive evaluation of existing literature on a specific topic.

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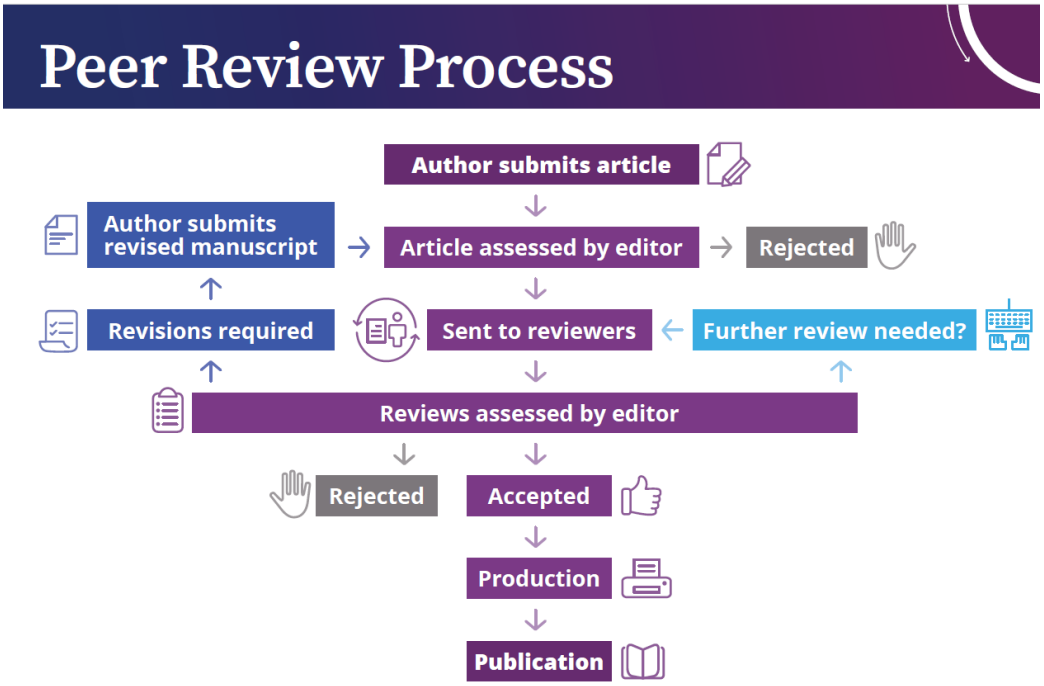

The Journal of Archaeology, Tourism & Anthropology (TRIVALENT / ත්‍රිසංයුජ) follows a rigorous peer-review process to ensure the quality, originality, and relevance of all published articles. The steps are as follows:

1. Submission of Manuscript

The corresponding author submits the manuscript through the journal's online submission system (e.g., ScholarOne Manuscripts) or, in exceptional cases, via email.

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The EIC evaluates the manuscript for scope, originality, and overall relevance. Manuscripts deemed unsuitable may be rejected without further review.

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5. Response to Review Invitations

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1. Statement of the problem or purpose
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3. Importance and contribution to the literature
4. Appropriateness of research methodology
5. Organization and clarity of content
6. Quality of discussion and interpretation
7. Soundness of conclusions
8. Writing quality, grammar, and mechanics
9. Additional comments or suggestions

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8. Decision Communication

The editor communicates the decision to the author, including reviewer comments. The nature of reviewer anonymity depends on the journal's peer-review policy.

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Authors are responsible for ensuring that the submitted manuscript is complete, grammatically correct, and free of typographical errors.

Proofs are not supplied prior to publication, so the submitted version is considered definitive.

Before submission, authors should verify the manuscript's completeness using the journal's Article Submission Checklist.

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Authors are advised to prepare their manuscripts before submission, using the following guidelines

Section	Requirements	Details & Guidelines
File Format	MS Word compatible	- Submit all manuscripts in MS Word format.- Single-column layout.- B5 paper size.
Font & Spacing	Text formatting	- **Times New Roman**.- 12-point font for main text.- 1.5 line spacing throughout.- Italics for emphasis and scientific names.
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		Discussion5. Conclusion and Recommendations6. Acknowledgements (optional)7. References
Text Formatting	Units, figures & tables	- Use **SI/metric system** for units.- Embed all **figures, illustrations, and tables** within text at relevant positions.- Figures and tables should have **clear captions** and be numbered consecutively.
References	Style & format	- **APA (6th Edition)** style.- References **1.5 line spaced**, with **1.5 cm hanging indent** for second line onward.- Listed **alphabetically** at the end.- Consult APA Style and APA Blog.
Submission Checklist	Final checks	- Manuscript is **complete, grammatically correct, and free of typographical errors**.- No proofs are supplied; the submitted manuscript is considered **definitive**.- Authors should verify submission against **Article Submission Checklist** before final submission.