PRACTISING ENVIRONMENTAL RITUALS IN INTERGENERATIONAL BENGAL KNOWLEDGE SYSTEM: COMMUNITY RESILIENCE, ECOLOGICAL STEWARDSHIP, AND ADAPTIVE MODEL OF INCLUSIVE FUTURES

PRACTICAREA RITUALURILOR DE MEDIU ÎN SISTEMUL DE CUNOAȘTERE INTERGENERAȚIONAL DIN BENGALA: REZILIENȚA COMUNITĂȚII, GESTIONAREA ECOLOGICĂ ȘI MODELUL ADAPTIV AL VIITORULUI INCLUZIV

CZU: 23:502.1(540.33) **https://doi.org/10.59295/spd2025e.79**

Tapas PAL
ORCID: 0000-0001-6278-0418
E-mail: geo.drtapaspal.in@gmail.com
Raiganj University, India

Dorin LOZOVANU
ORCID: 0000-0003-0999-8041
E-mail: dorinlozovanu@yahoo.com
Moldova State University, Chisinau, Republic of Moldova

Sumar. *Acest studiu examinează practica ritualurilor ecologice în cadrul sistemelor de cunoaștere intergeneraționale din Bengal, evidențiind rolul lor în reziliența comunității, menținerea ecologică și imaginarea unui viitor adaptiv și incluziv. Înrădăcinate într-un amestec de tradiții agricole, cosmologie populară și respect spiritual pentru natură, aceste ritualuri, de la festivalurile recoltei și cultul râurilor, până la sfințirea copacilor și ritualurile sezoniere, funcționează nu doar ca expresii culturale, ci și ca practici ecologice intrinseci. Transmise de-a lungul generațiilor prin tradiție orală, participare comunitară și învățare întrupată, aceste ritualuri promovează relații durabile cu ecosistemele locale, în special în zonele vulnerabile precum Sundarbans, Câmpia Gangetică și zonele tribale din Bengalul de Vest. Prin analiza calitativă și implicarea la nivel comunitar, studiul a constatat că aceste practici contribuie la conservarea biodiversității, adaptarea la schimbările climatice și gestionarea resurselor, în special în perioadele de stres socio-ecologic. Cu toate acestea, erodarea cunoștințelor tradiționale din cauza urbanizării, neglijării politicilor și comodificării culturale amenință continuitatea lor. Această lucrare pledează pentru recunoașterea acestor practici drept cadre socio-ecologice adaptive, capabile să informeze dezvoltarea incluzivă, educația de mediu și intervențiile politice care sunt în concordanță cu contextele locale și experiențele trăite.*

Cuvinte-cheie: *Participare comunitară, Adaptare la schimbările climatice, Dezvoltare incluzivă, Ecosisteme locale, Tradiție orală.*

INTRODUCTION

This study explores the practice of environmental rituals within intergenerational Bengal Knowledge Systems (BKS), highlighting their role in fostering Bengal community resilience**,** ecological stewardship [1], and adaptive models for inclusive healthy futures. Rituals such as *Manasa Puja*, *Sondhey dewa*, and *Kantha* embroidery embed ecological values through intergenerational transmission, community participation, and stewardship of local biodiversity [2]. The research underlines the significance of indigenous ecological knowledge for managing resources sustainably and fostering resilience among Bengal communities in a swiftly shifting earth [3]. Recently, natural and climate change has been found. The durability problem has been raised in recent times [4], and therefore alternative environmental management has become more important. In the West Bengal, there are several environmental practices that have been nutrition since the days of civilization. Now we need a durable way to protect nature. There are many worshipers in religion that have direct and indirect connection with behavior [5], and when these conducts protect nature, they are called environmental rituals. Environmental philosophy has evolved through environmental behavior. Various environmental materials are used to maintain rituals [6]. A reverse image was found in men and women, rural and urban in maintaining environmental conduct [7]. Water-based worship, tribal conduct, agriculture-ritual and religion-based conducts are all discussed here with examples. Attacks of modern culture and globalization in the rituals of West Bengal raised questions the durability of the environment [8] because historical rituals protect nature.

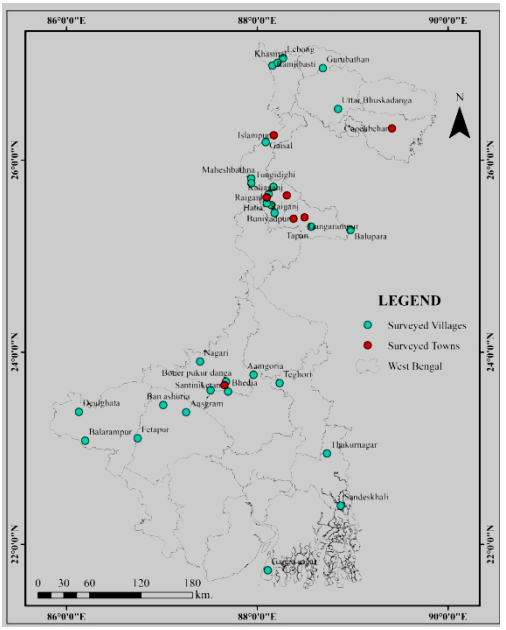
MATERIALS AND METHODS

This research is a mixed approach [9] to field research [10] and document research [11]. The researcher used monitoring techniques to get information about the environmental ritual of West Bengal and observed [12] natural material and standard items used during worship as part of the ritual. The researcher used photography techniques [13] to collect pictures of environmental rituals. In order to find out the effects of urban mind rituals, the relationship with indigenous rituals, various agricultural rituals and even river-based environmental rituals, the researcher visited 44 different villages in 13 different districts (Birbhum, East Bardhaman, North Dinajpur, South Dinajpur, Jalpaiguri, Cooch Behar, Bankura, Nadia, Purulia, Alipurduar, North 24 Parganas and South 24 Parganas), total selected rituals were 50 of West Bengal. The researcher has applied descriptive statistics [14] to analyze the results obtained from the study. Independent sample t-test formula [15] has been used to find the relationship between ritual-event and environmental durability. QGIS software [16] has been used to create map. The researcher collected navigation information from articles based on strict observations of various online sources, books (ritual-forms, religions and rural West Bengal), websites, journals and literary reviews [17] of different work.

Table 1. Environmental rituals of West Bengal [18].

Rituals	Sample Villages/Towns	Districts
Baha Parab	Jorkadanga	Birbhum
Sarhul	Boner Pukur Danga	
Sorhai Parab	Ghosaldanga& Bishnubati	
Nuakhai	Santiniketan	
Brahmyadaitya	Naguri	
Holi	Santiniketan	
Kankalitala temple	Kankalitala	
Pous Sankranti	Aushgram	Purba Bardhaman
Nabanna	Bhedia	
Kali (Jhupo Maa/Vijaya Kali/Brikshakali)	Katoa	
Surangakali worshipping	Teghori, Boroandulia	Nadia
Gachibuna	Hatia	Uttar Dinajpur
Amati	Hatia	
Kheti Lakshmi/ Bhumi Laxmi	Khoksa	
Paakhi Pakhali ritual	Bhattadighi	
Pirbaba Mazar	Raiganj	
Chhat Puja	Kaliaganj	
Tulsi Puja	Raiganj	
Vaisakhi Ritual	Maheshbathna	
Durga Puja and Kala-bou	Durgapur	
Vasant Panchami/Saraswati Puja & Kulgacha	Ranipur	
Hanuman Jayanti	Islampur	
Salhesh	Gaishal	
Manasa Puja and Nag Panchami	Kaliyaganj	
Pirbaba than	Raiganj	
Annakut ritual	Siliguri	
Sraddha	Raiganj	
Merriage Ceremony	Bogram	
Jamai Sasti	Buniyadpur	Dakshin Dinajpur
Maha Shiva Ratri	Gangarampur	
Shitala Puja	Balupara-Hili	
Nabanna	Tapan	
Aaitabarey Puja of Limbu tribe	Ramjibasti	Darjeeling
Death ritual of Magar tribe	Lebong	
Nayapo Puja ofMagar tribe	Khasmal Ghum	
Chula Dunga of Rai community	Ramji Basti	
Sansari Puja, Aaitabarey Puja, Nayapo Puja	Ramji Basti	

Asar Pandra of Newar tribe	Gurubatha	Kalimpong
Kamana Sagar & Baruni	Thakurnagar	N. 24 Parganas
Banabibi, Dakshina Rai, Purbasha	Gosaba	S. 24 Parganas
Ritual of Sundari and Garan Tree Plantation	Chargheri	
Vastu Puja (fig.12)	Gangasagar	
Lakshmi Puja	Cooch Behar	Cooch Behar
Karam	Balarampur	Purulia
Tusu Parab	Deulghata-Arrha	
Bandna Parab	Ban Ashuria	Bankura
Borkonia Parab	Fetapur-Hirbandh	
Bat-PakurTree Worshiping	Jayanti, Rajabhatkhawa More	Alipurduar
Jalpeswar utsav & ritual	Uttar Bhuskadanga	Jalpaiguri



RESULTS AND DISCUSSIONS

Rituals teach our ancestors about traditional forms or habits and how we can form our own culture [20]. The community can be formed with different types of groups. They can be formed physically or virtually. The culture of the community can be formed between people, ethnic groups, society and civilization [21]. The cultures of this community are related to different types of cultures [22]. The elements of culture are various industries, garment, food, cuisine, literature, performing arts, visual arts, entertainment, games, sports, war sports, humanitarian, celebration, etc. Natural resources, trees, plants, animals and even insects are being protected for ritual practice [23]. For protecting nature, environmental rituals are important. Religion-based rituals, agricultural-based rituals-forms, river-based rituals and tribal rituals-forms are related to the *Panchaghth* [24], so this research is reasonable for sustainable development at this stage. According to SDG 3 (*Health and Well-being*), this study is very logical for welfare, nature and environment. According to SDG 13 (*Climate Action*) and SDG 15 (*Life in the land*) [25], rituals can protect biological diversity and climate. Environmental crisis, forest odor, climate turbulence and disasters have increased very frequently in our environment[26]. Flood, tsunami, dam broken, habitat lost, global warming,

greenhouse effects and river pollution all cause environmental degradation [27]. Now the United Nations is demanding solutions from the global table. Again we need to look at our traditional environmental rituals, which is beneficial for our environment [28]. Research spacing has also been found using various types of religion, rivers, agriculture and tribal rituals to develop environmental resilience philosophy. The rituals connected to religion [29], tribal culture [30], agro-festivals [31], and rivers [32] have importance in environmental conservation. For example *Nabanna* (conserving of different types of fruits with ritual and getting of new harvesting materials), *Vaisakhi* (in this festival, people are habituated to show their adoration of nature and also to their environment for protecting and nurturing the nature of all types of foods), *Bat Briksha Puja* (fig.4) (conservation of valuable banyan tree and increasing of sense of human beings about to nature), *Maha Shiva Ratri* (through this ritual animals like bull, snake and natural ingredients like bell fruits, *bael* leaves, *dhutura* flowers and fruits are conserved and protected), *Durga puja* (fig.5) and *Kala-bou* (different types of animals like peacock, lion, rat, owl, buffalo, duck and different types of fruits and flowers especially banana tree are conserved and protected as parts of respect and love for worshiping) [33], *Vasant Panchami* / *Saraswati puja Kulgacha* (special flowers like *Palash* and lotus are conserved through this ritual), *Hanuman Jayanti* (learning and respect comes from this rituals to the wild animals like monkey from this ritual), *Shitala puja* (the *neem* tree and the animal like donkey are conserved as the part of ritual for the biodiversity), *tulsitala* (fig.3) (pouring of water and showing of adoration to *tulsitala* as a n essential part of every house of Hindu ritual through which the *basil* tree is conserved [34] and worshiped as also as disinfectant of germs and different types of germs and bacteria's), *Manasa puja and Nag Panchami* (fig.7) (snake & *fanimanasa* plant conservation is done through this ritual), the *Chhath puja* (fig.8) (conservation of different types of fruits trees and water resources), *Salhesh* festival (conservation and protection of horses is done through this ritual for biodiversity), *Makar Sankranti* (*Pous Parban / Pous Sankranti/ Aauri-Bauri/ Tushu*) (different types of agricultural productions are being protected through this rituals like paddy, turmeric, sugarcane. etc.), *Nuakhai* (fig.10) (to maintain their respect and love to newly starting of agricultural production), *Banabibi, Dakshina Rai, Purbasha, Shah Jangoli puja* (fig.11) (to protect and to conserve the forest and its resources this type of ritual is observed), *Lakshmi puja* (different types of vow items are conserved and protected with love and respect with the birds like own through this ritual), marriage ceremony and ritual (different types of fruits and flowers are conserved through this ritual), *Kamana Sagar* & *Baruni* of *Matuaism* (water resources are conserved as sacred part of this ritual), *Pous Parban* (fig.9) (conservation different types of agro-produced seeds and biodiversity is also maintained with this festival), worshipping of *Pakur* tree during *sasti puja* (fig.6) (conservation and nourishment of every parts of *pakur* tree (fig.20) is done through this ritual as a sacred part of Hindu religion) [35], rituals of *Pirbaba* and environmental messages (through this ritual different types of medicinal values and trees are conserved because the locations of *Pirbabas* (fig.14) are generally under a tree) [36], *Nandibrikshya,* goddess *Surangakali* worshipping (fig.15) as

indicator of water conservation, and *Jainism* (through this ritual different types of trees are conserved as the sacred part of their religion because *Jains* generally continue their pursuit under this type of sacred tree).



















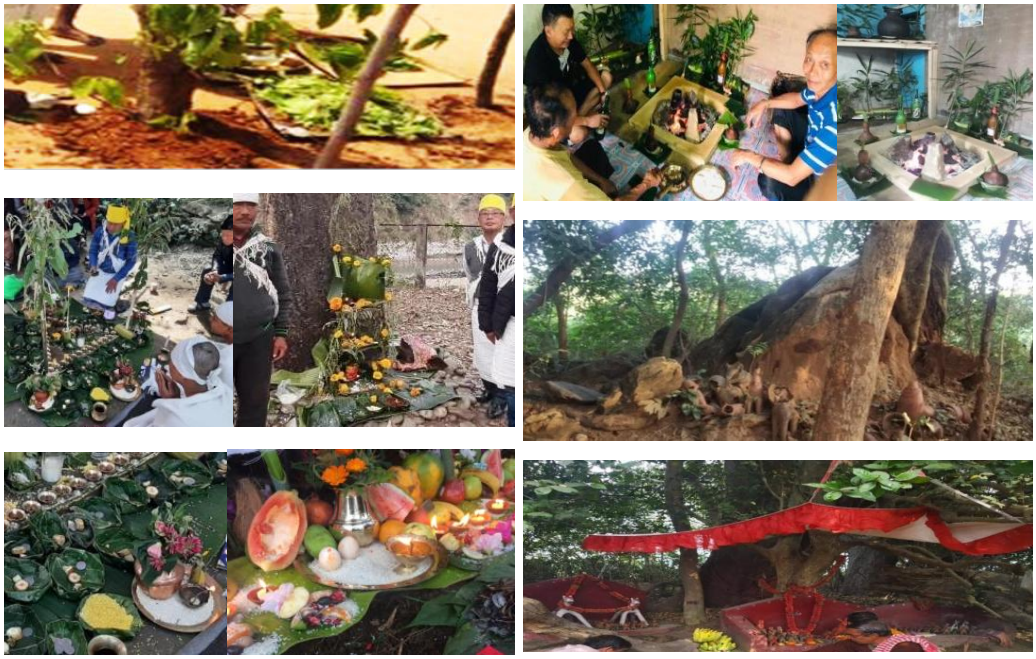






Tribal rituals of West Bengal have the importance of environmental sustainability [51]. For example: *Karam Parab* (through this ritual different types of fruits and flowers of trees are conserved and cultivated for agricultural production and also to show their respect to nature; fig.16), *Baha Parab (*through this ritual nourishment and respect to nature have been observed on different types of trees of fruits and flowers), *Sansari puja, Aaitabarey puja, Asar Pandra, Death* ritual of Magar tribe (fig. 17)*, Nayapo* puja (fig.18)*,* and *Chula Dunga* (through these rituals of tribes various types of love, respect and adoration have been observed to the nature and environment with their conservation; fig.19), *Sarhul utsav* (through the reflection of this ritual, quality of agricultural production can be observed and different types of trees are conserved) [52], *Bandna Parab (*different types of domestic animals and trees are conserved and protected through this rituals as their part of ritual), *Tusu Parab* (through this ritual, conservation of new paddy is celebrated and *Kumi* tribal people welcome natural agricultural production) [53], *Borkonia Para* (through this ritual tribal people worships different types of burnt idols of soils of different types of animal beside their deity and conserve their sacred animals with their environment; fig.20), *Brahmyadaitya utsav* (through this ritual, the *neem* tree is conserved [54] and the love and respect is seen by the human being to nature and environment; fig.21).

Agro-rituals have vital environmental importance in West Bengal [60]. For example*,* the *Gachibuna* ritual (different types of trees & fruits are used as part of the ritual) in Hatia village of Uttar Dinajpur (fig. 22), *Amati* (during thi festival farmer light the evening lamp in their house and the plowing is completely stopped; fig.23), *Kheti Lakshmi/ Bhumi Lakshmi* (worship agricultural land in July) in Khoksa village of Uttar Dinajpur, *Pakhi-Pakhali* (festival is started with the ritual of inviting birds to control the insects in the land before the booting stage of the paddy field) in Bhattadighi of Raiganj CD Block**,** *Nabanna in* Bhedia village of Purba Bardhaman district (tradition-



al festival to welcome newly agricultural production in house during October-November or early autumn; fig.24), *Bandana Parab* of the Santali tribe of Ghosaldanga and Bishnbati of Sattore of Birbhum district or *Sohra Parab* of *Kumri* tribe in Banashuria village of Bankura district (*Sohrai* is a type of grass that is placed on the roof for the food of cattle; fig.25), *Itu Puja* (paddy is conserved through this ritual), *Kakabali* (offering foods to the dead soul of the family through the crow), *Auri Bauni* (farmers bring some *aman* rice husks to the house) [61]. The crisis of ecosystem, nervous forest, climate accumulation, and disasters occur very frequently in our environment. [62]. The rituals have good space-time relevance and environmental connection. The rituals carry the idea of environmentalism. The urban mind has destroyed environmentalism in many cases [63].








River-based rituals in West Bengal have vital environmental sustainability [68]. For example, *Baruni Bathing* (pond conservation is done through this ritual), *Ganga puja* (fig.27) or *Ghat puja (*conservation of different types of fruits and flower trees is done, and respect and love for water is also maintained by this ritual; fig.26). The water of the holy pond is worshipped in different parts of West Bengal. Water is one of the five of *Panchabhuta* [69]. If the balance of the fifth is broken, the problem will arise in nature. Holy water and ponds are the basic part of the nature worship ceremony[70]. In each temple, holy water is used from the nearest river or pool; such as, the holy pond on the sites of *Bakreshwar* temple, *Kankalitala* temple, *Fulloratala* temple, & *Manasatala* (in *Koma* village) of Birbhum district [71], the holy pond on the *Biharinath* temple of Bankura district, the *Chandi* pond on the site of the *Chandi* temple of East Medinipur, and the *Pirtala* of Golgram of East Burdwan district [72].






Environmental rituals have a link to sustainability. River worshipping and water ecosystems are interrelated. The water of *Ganga* is used as the sacred water for the purification of sin and also used as the pure water in different rituals or *Pujas* [76]. The goddess (sacred river) is worshipped to cleanse the sin of the people; that's why people don't throw any garbage in the river. In Hindu scriptures, Goddess *Durga* is recognised in the name of *Devi Shitala*. The *Shitala Puja* is related to *Nimgacha*. At this time, the women pour out water on the sacred *neem* trees and cover them with red clothing [77]. The *Puja* of this *Shitala* is practiced due to the

cure of their family members from *Basanta* diseases. As per the environmental point of view, this ritual of worshipping protects *neem* trees [78]. In this way, water and soil also are protected and conserved. In the month of *Jaistha*, the marriage between *Bot* and *Pakur* is done in many places in West Bengal. Through this ritual, we are protecting the trees. Even the leaves, grasses (fig. 28), and twigs of these trees are also needed to perform other rituals (e.g., Hindu marriage ceremony). In these ways, the flora (table 2) and fauna (table 3) are protected and conserved by the rituals [79]. The Phenoma tree is worshipped along with *Manasa* Puja. According to the local people, if anybody performs the adoration of *Manasa*, then the chance of a snake biting becomes less, and also the progress of the particular families becomes this ritual [80]. In these ways, the preservation of snakes and the plant *Phanimanosha* (fig. 7) is done in the entire West Bengal. Through *Shivaratri*, the bull & snake are conserved as sacred items. At the time of *Shivaratri*, people offer *baels*, *bael* leaves, and *dutura* to the lord Shiva. In this way, the preservation of bells and *dutura* trees is performed [81]. It is not known whether the hopes of the mind are fulfilled by pouring water on the *bael* tree or not, but the *bael* tree has survived for a long time. *Itu puja* is performed in the month of *Agrahayan*. [82]. The banana tree is used as a *kalabou* [83] during *Durga* Puja, and the fruit, the banana, is also needed to perform all types of rituals or holy works. As a result, everyone needs to plant bananas. As a result, the farmer gets income, gets a lot of oxygen in the environment, and also increases the fertility of the soil. The *tulsi (Ocimum sanctum)* is watered after bathing in Hindu houses every day [84]. As a result, the basil survives and produces oxygen both night and day, which protects our environment and also is used as a disinfectant for germs. In *Saraswati* Puja, *Palash* flowers are very necessary [85]. In that case, the urge to plant and preserve *Palash (Butea monosperma)* trees has increased. *Ganesha* is compared to an elephant. As a result, elephants are saved through the worship of *Ganesha* [86]. The importance of soil is done through *Bhumi puja* or *Bastu puja*. All these deities are situated on different animals [87].











Table 3. Hindu rituals are performed with respect for the fauna community (fig.31).

Worshipping of Hindu Gods/Goddess	*Vahana* (the mount / vehicle of a deity)
Durga	*Panthera leo*
Shiva	*Bos taurus*
Vishnu	*Garula* (legendary bird)
Vaishno Devi	*Panthera leo*
Yamuna Devi	*Testudo graeca*
Ganesha	*Mus musculus*
Indra	*Equus ferus caballus*
Kartik	*Pavo cristatus*
Bhairava	*Canis lupus familiaris*
Saraswati	*Cygnus olor*
Bhumi	*Elephas maximus*
Kam	*Psittacus erithacus*
Laxmi	*Bubo bubo*
Shashti	*Felis catus*
Shitala	*Equus africanus asinus*
Biswa karma	*Elephas maximus* (
Shani	*Corvus brachyrhynchos*
Manasa	*Naja naja*
Yamuna	*Testudo graeca*
Santoshi	*Panthera tigris*

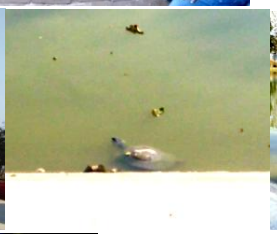
Source: Field Survey, 2025.













Trade Mark Registered
শ্রীমদন গুপ্তের
ফুল পঞ্জিকা
১৪৩২
১৪৩২

CONCLUSION

Rituals are directly and indirectly related to environmental sustainability. Hindu rituals are not only related to environmental protection, but also other religions protect the environment. For example, the *Pirbabar Thaan* of Raiganj protects a banyan tree. Based on the available information from 25 villages (25 women per village) and 625 women from 25 cities (25 women per city) in West Bengal, it has been observed that the importance of rural women to urban women is more in maintaining environmental sustainability. Therefore, independent sample t-testing has been applied, and the result is t = 7.478 (p value = 0.0000014) [97]. Therefore, it is said that rural women's rituals maintain their environmental rituals more than rural women's rituals. Based on surveys of 50 people from each of the selected tribal villages of Purulia, Darjeeling, Birbhum, and Bankura districts, it has been observed that in the place of tribal regions, both tribal men and women practice and maintain environmental rituals, compared to non-tribal regions. Therefore, independent sample t-testing has been applied, and the result is t = 6.699 (p value = 0.0000101) [98]. Rural women are more positive about practicing environmental rituals than urban women. Compared to rural men, rural women are more supportive of engaging in environmental rituals. Urban women are more positive about practicing environmental rituals than urban men [99].

REFERENCES:

1. DATTA, R. (2024). Relationality in Indigenous climate change education research: A learning journey from Indigenous communities in Bangladesh. *Australian Journal of Environmental Education*, 40(1), 127-145. https://doi.org/10.1017/aee.2024.13
2. MUKHERJEE, S. (2024). Deconstructing the Universal through Rituals of Bengal. *IHE International Conference Proceedings*, 8, 95-108.
3. GHOSH, S. ET AL. (2024). Some common plants used in the rituals of Sundarban areas, West Bengal, India: A source of conservation practices and sustainable use. *Zenodo*. https://doi.org/10.5281/zenodo.6821733
4. KULSHESTHA, U. C. (2018). *The Social Rituals and Environmental Degradation*. Current World Environment. Pp. 1-3.
5. BRANDON, S. G. F. (1973). *Religious Ritual. P. Wiener (ed.). Dictionary of the History of Ideas.* New York: Scribners. P. 99.
6. SHANKAR, SUGANDHA. (2001). *Rituals and Environmental Conservation: A Sustainable Approach.* Publisher: Lap Lambert Academic Publishing. ISBN-10: 9783659131233. ISBN-13: 978-3659131233. ASIN: 3659131237.
7. SHIVHARE, P., & RASTOGI, D. (2016). *Environmental Impact Assessment Due To Festivals.* International Journal of Engineering Technology Science and Research. Pp. 166-172.

8. AHLBACK, TORE. (1991). *The Problem of Ritual.* Published by The Donner Institute for Research in Religious and Cultural History, Åbo. Finland.
9. SHARMA, L. R. (2023). Exploring the mixed methods research design. *GA-JLL, 5*(1), 3-12.
10. SMITH, J. A. (2023). *Observing community rituals: An ethnographic field study*. Journal of Social Inquiry, 15(2), 121–134. https://doi.org/10.1234/jsi.2023.01502
11. LEE, K. T. (2022). *Analyzing governmental archives: A documentary approach to policy change.* Policy Review, 28(3), 200–215.
12. KUMAR, ANKIT. (2022). *Observation Method*. International Journal of Scientific Research. 13. 1-14.
13. GLAW, X., INDER, K., KABLE, A., AND HAZELTON, M. (2017). *Visual Methodologies in Qualitative Research: Autophotography and Photo Elicitation Applied to Mental Health Research.* International Journal of Qualitative Methods. Volume 16: 1–8.
14. *JHANGIANI, R. S., CHIANG, I.-C. A., CUTTLER, C., & LEIGHTON, D. C. (2019). Research methods in psychology (4th ed., pp. 161–165). Open Educational Resources Collection.*
15. GRAVETTER, F. J., & WALLNAU, L. B. (2021). *Statistics for the behavioral sciences* (11th ed., p. 317). Cengage Learning.
16. *QGIS DEVELOPMENT TEAM. (2024). QGIS Geographic Information System (Version 3.34) [Computer software]. QGIS Association. http://qgis.org*
17. MCKINLEY, A. (2018). Thoughtful reflections on narrative dynamics [Review of the book *Story Worlds: The Power of Narrative*, by L. M. Smith]. *Literary Review Quarterly*, 34(2), 82–84.
18. 19. 37. 38. 39. 40. 41. 43. 45. 47. 56. 57. 58. 60. 64. 65. 66. 67. 73. 75. 88. 89. 90. 91. 95. 98. 99. SARKAR, A. (2021). *Rituals and Environmental Sustainability: A geographical study in West Bengal*. Doctoral thesis in Geography, Raiganj University.
20. CLARK, J. (2006). *Rituals and Tradition: A Comparative Essay on the Use of Ritual in Christian, Jewish, and Hindu Practice.* Denison Journal of Religious. Pp. (2-8).
21. HORNBORG, A.-C. (2008). *Protecting Earth? Rappaport's Vision of Rituals as Environmental Practices.* Journal of Human Ecology. P. 281.
22. RAI, S. (2007). *Traditional ecological knowledge and community-based natural resource management in northeast India.* Journal of Mountain Science.
23. HUXLEY, J. (ed.) (1966). *A Discussion on Ritualization of Behaviour in Animals and Man.* Philosophical Transactions of the Royal Society of London, Series B, p. 251.
24. MARY D. MAHAPATRA. (2001). *Tribal Religion and Rituals (Accounts of Superstition, Sorcery, and Spirits).* Published by Dominant. ISBN 10: 8187336692. ISBN 13: 9788187336693.

25. RAO, A. (2023). Review of the book *Sustainable Development: Pathways for a Green Future*, by J. Smith. *Environmental Reviews*, 15(2), 112–115.
26. TALWAR, SABANA. (2012). *Economics of Sustainable Development.* Publisher: Global Research Publications. ISBN-10: 8189630377. ISBN-13: 978-8189630379.
27. Singh, R. B., & Kumar, P. (2021). Urbanization, environmental degradation, and climate resilience in developing cities. *Journal of Urban and Environmental Research*, *12*(3), 210–225. https://doi.org/10.1016/j.juer.2021.05.006
28. RAJNI. (2024). Ecological sustainability through Vrat rituals in Indian culture: A critical study. *International Journal of Creative Research Thoughts, 12*(2), 156–161.
29. RAPPAPORT, R. A. (1999). *Ritual and Religion in the Making of Humanity*. Cambridge: Cambridge.
30. PAL, TAPAS. (2017). *Mawphlang, India's Largest Sacred Ecology: An Output of Tribe and Practicing Environmental Culture.* North Asian International Research Journal of Social Science & Humanities. P. 24.
31. WTE Infra. (2021, January 14). *Harvest Festivals in India: A Sustainable Farming Perspective* (para. 9-15). Retrieved from https://www.linkedin.com/pulse/harvest-festivals-india-sustainable-farming-perspective-wte-infra-21upf
32. Mondal, A. (2024). Indigenous Festivals and Climate Sustainability in India. *Rupkatha Journal on Interdisciplinary Studies in Humanities*, 16(1), 1-15 (see p. 5 for environmental significance).
33. ROBIN RINEHART. (July 21, 2004). *Contemporary Hinduism: Ritual, Culture, and Practice.* Publisher: ABC-CLIO. ISBN-13: 978-1576079058. ISBN-10: 1576079058.
34. 36. PAL, TAPAS. (2013). *Geo-environmental appraisal of sacred groves and their related traditional practices in West Bengal*. (Ph.D. thesis). Visva-Bharati: Santiniketan. p. 63.
35. KRISHNA, N., & AMIRTHALINGAM, M. (2014). *Sacred Plants of India.* Penguin Books Limited. Krishna, N., & Amrithalingam, M. (March 22, 2015). *Tree worship is the result of our reverence for a creation of nature that provides us food and fodder*. The Speaking Tree.
42. PAL, TAPAS (2012). *Folk-Worshipping In West Bengal: Lore Of Folk Geography***.** Laplambert Publication, Germany, ISBN 978-3-659-16226-8. P. 39.
44. 46. 49. 74. PAL, TAPAS. (2012). *Folk-Worshipping In West Bengal: Lore Of Folk Geography.* Laplambert Publication, Germany, ISBN 978-3-659-16226-8
48. BHOUMIK, MAYUKH (2020). *Bastu Puja –Purba Banglar Pous Sankrantir Annyatama Loko Utsav* from Bangali.Koulal.com.
50. 59. THAKUR, SWAPAN (2020). *Bichitra Devdevi Barkonia.* Koulal Patrika: Purba Burdwan.
51. LAUDINE, CATHERINE. (2016). *Aboriginal Environmental Knowledge: Ra-*

tional Reverence and Vitality of Indigenous Religions. Routledge Publication.

52. DROESCH, SCHULTE, LEA. (10th September 2018). *Making Place through Ritual: Land, Environment, and Region among the Santal of Central India (Religion and Society).* Publisher: De Gruyter. ISBN-10: 311053973X. ISBN-13: 978-3110539738.
53. PARK, C., Chris. (1994). *Sacred Worlds: An Introduction to Geography and Religion*. Rutledge. London and New York.
54. AMIRTHALINGAM, M. (2016). *Sacred Groves of India—An Overview.* International Journal of Current Research in Biosciences and Plant Biology, 64-74. doi:http://dx.doi.org/10.20546/ijcrbp.2016.304.011
55. *ALLEVENTS.IN* retrived from SHOMIK (Sep 04, 2020) https://www.whatshot.in/kolkata/purulia-land-of-tribal-festivals-west-bengal-c-14264.
60. BAIN, W. K. (2022). Ecology, folk tradition, and ethnic adaptive belief systems: Sustainability practices among the ethnic communities in West Bengal, India. *[Conference presentation]*. Scribd. https://www.scribd.com/document/841833957/t10
61. CHOUDHURY, S. (2013). Between nature worship and the preservation of environment in some parts of West Bengal in India. *International Journal of Social Sciences*, 2(2), 123–133. New Delhi Publishers. https://ndpublisher.in/admin/issues/IJSSV2N2b.pdf
62. KAPOOR, V. (2023). Promoting sustainable development in festivals through ritual revisions. *Journal of Sustainable Tourism*. https://doi.org/10.1080/09669582.2024.2315497
63. POHL, R. (2024). Rituals as Nature-Based Governance of reciprocity between people and nature. *Zenodo*. https://zenodo.org/records/13762005
68. CHATTARAJ, A. (2021). Sacred water and cultures of worship: Some observations on the river in India. *Humanidades & Bioética*, 11(2), 168–182.
69. ISHA FOUNDATION. *(2024, May 6). What are the five elements or Pancha Bhutas? In Sadhguru wisdom. https://isha.sadhguru.org/en/wisdom/article/five-elements-pancha-bhuta*
70. PAL, TAPAS. (2012). *Folk-Beliefs and Environmental Nourishment the Nano-Culture and Folk-Mathematics.* Laplambert Publication, Germany, ISBN 978-659-20784-6
71. PAL, TAPAS (2012). *Supervision Of Sacred Groves On Environment Management: Diagrammatically Explained.* International Journal of Applied Science & Engineering Research. Vol.1.No.2. Integrated Research Publication, China.364-371. ISSN 2277-9442. Vol1.No.1 2012. 54-63. ISSN 2167-1141
72. PAL, TAPAS (2012). *A 'SACRED-BOURN' OF 2500 YEARS: The Culture Of 'Do Ecology'***.** International Journal of Traditional & Natural Medicines. Vol1.No.1. Modern Scientific Press, Florida, USA. pp. 54-63. ISSN 2167-1141

76. CHOUDHURY, S. (2014). *An empirical study on the relationship between nature worship and the preservation of environment in some parts of West Bengal in India. International Journal of Social Science, 2(2), 93–103.*
77. MUKHERJEE, S. (2015). *Indigenous knowledge and environmental ethics: A study of sacred groves and traditional water management in West Bengal, India. International Journal of Social Science and Humanity, 5(4), 370–374. https://doi.org/10.7763/IJSSH.2015.V5.485*
78. NARAYAN, R. (1997). *Folk rituals and health care: A study of Sitala worship in India. Indian Anthropologist, 27(2), 13–24. https://www.jstor.org/stable/41919976*
79. BANDYOPADHYAY, S., & MUKHERJEE, A. (2011). *Religious beliefs and conservation of plant biodiversity: A study from Bankura district of West Bengal, India. Journal of Economic and Taxonomic Botany, 35(3), 602–613.*
80. MAITY, S. (2024). Interrelation between Manasa Puja, plant worship, and snake conservation in West Bengal. *Journal of Historical Studies and Research*, 4(2), 234-245.
81. SARKAR, S. (2022). Sacred groves and ritualistic plant conservation: A study on religious environmentalism in India. *International Journal of Social Ecology and Sustainable Development, 13*(3), 45–57. https://doi.org/10.4018/IJSESD.20220701.oa3
82. SHARMA, K. (2023, November 15). *Significance and rituals of Itu Puja in Agrahayan*. Culture and Tradition of Bengal. https://www.bengalculture.org/itu-puja-agrahayan
83. MY INDIA MY GLORY. (2018, October 18). *Kola Bou: Ritual of Banana Bride, worshipped during Durga Puja in Bengal*. https://www.myindiamyglory.com/2018/10/18/kola-bou-ritual-of-banana-bride-worshipped-during-durga-puja-in-bengal/
84. INDIAN CULTURE. (2024, January 1). *Tulsi: The Elixir of Life*. https://indianculture.gov.in/food-and-culture/spices-herbs/tulsi-elixir-life
85. KAPOOR, S. (2002). *Encyclopaedia of Indian traditions, rituals, and festivals* (Vol. 2, p. 546). New Delhi, India: Cosmo Publications.
86. LOCKWOOD, J. (2007). *The Ganesha Connection: Elephants in Indian Culture*. In *Imagining India: Essays on Indian History and Culture* (p. 121). Oxford University Press.
87. CHOUDHURY, B., & CHOUDHURY, A. K. (2023). Environmental consciousness as reflected in Indian literature since Vedic era. *International Journal for Multidisciplinary Research (IJFMR), 5*(5), 1–10.
92. RGYAN. (2021). *Pitru Paksha Puja vidhi, Rituals, Legends and Significance* from https://rgyan.com/en/festival-detail/pitru-paksha-puja-vidhi
93. RADHE SUNNA PHOTOGRAPHY. (2020). *Jimutavahana Puja in Janmashtami* [Photograph]. Bankura Page, Tara, Purulia.

94. PAL, TAPAS (2012).*Folk-Worshipping In West Bengal: Lore Of Folk Geography.* Laplambert Publication, Germany, ISBN 978-3-659-16226-8
96. UTTAR BANGA SAMBAD. (2020, July 22). Villagers perform frogs' marriage to invoke rain. Malda edition, p. 5
97. GUPTA, M. (2025). *Sri Madan Gupter Full Panjika 1432 (2025–26)* (pp. xx). Rajendra Library: Kolkata.

Acknowledgements *Author is thankful to his own scholar Dr. A. Sarkar & all other local village dwellers for supporting information and gratitude to Perplexity AI in identifying the scientific names related to the article.*