

PERSONAL DETAILS



Dr. ANIL KUMAR POKHARIA

Department : Palaeoethnobotany (Archaeobotany)
 Current Designation : Scientist-F
 Date of First Joining : March 22, 2002
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Academic Qualifications

Degree	Board/University	Year of Passing	Division/Class/Grade	Subject/s
M.Sc.	Lucknow University	1992	I	Botany
Ph.D	Lucknow University	1998	Awarded	Botany (Palaeoethnobotany or Archaeobotany)

Service Record

S.No.	Post/Designation	Name of Employer	Date		Pay scale/Pay band and GP	Nature of Duties
			From	To		
1	Scientist "A"	BSIP	March 22, 2002	March 31, 2009	6500-200-13500	Investigation on ancient plant remains from pre and proto-historic sites & other duties assigned by the Director, BSIP
2	Scientist "C"	BSIP	April 1, 2009	March 31, 2013	15600-39100 + 6600do.....
3	Scientist "D"	BSIP	July 1, 2013	June 30, 2017	15600-39100 + 7600do.....
4	Scientist "E"	BSIP	July 1, 2017	June 30, 2022	37400-67000 + 8700 Level 13do.....

5	Scientist "F"	BSIP	July 1, 2022	Till date	37400-67000 +8900 (Pay fixed147,600/ = (Basic) Level 13 Ado.....
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Research Experience (in years) : 20.5
excluding years spent in Ph.D

Field of specialization under the : Palaeoethnobotany (Archaeobotany)
subject/ Discipline (if any)

PART-II: Academic Record

PUBLICATIONS: Research Papers Published/Submitted:

Citations 1040

h-index 19

i10-index 26

Total Impact Factor: 63.50

1. Dimri, A.P., Roxy M., Sharma, A., Pokharia, Anil K., Gayathri, Ch. R., Sanwal, J., Sharma, A., Tandon, S.K., Pattanaik, D.B., Mohanty, U.C. **2022**. Monsoon in history and present. *Journal of Palaeosciences*, 71(1): 45-74.
2. Melissa M. Ritchey, Yufeng Sun, Giedre Motuzaite Matuzeviciute, Shinya Shoda, **Anil K. Pokharia**, Michael Spate, Li Tang, Jixiang Song, Haiming Li, Guanghui Dong, Petra Vaiglova, Michael Frachetti, Xinyi Liu. **2022**. The Wind that Shakes the Barley: the role of East Asian cuisines on barley grain size. *World Archaeology*. DOI: 10.1080/00438243.2022.2030792
3. Michael Spate a, Mumtaz A. Yatoo, Hui Shen, **Anil K. Pokharia**, Mohammad Ajmal Shah, Alison Betts. **2022**. Cereal size, AMS and charcoal data from phase 1 of the Kashmir Prehistory Project. *Journal of Archaeological Science: Reports*, [https://doi.org/ 10.1016/j.jasrep.2022.103369](https://doi.org/10.1016/j.jasrep.2022.103369).
4. **Anil K. Pokharia**, Sadhan K. Basumatary, Biswajeet Thakur, Swati Tripathi, H. Gregory McDonald, Deepika Tripathi, Pooja Tiwari, Eline Van Asperen, Michael Spate, Gaurav Chauhan, Mahesh G Thakkar, Shailesh Agarwal. **2022**. Multiproxy analysis on Indian wild ass (*Equus hemionus khur*) dung from Rann of Kachchh Western India and its implications for the palaeoecology and archaeology of arid regions. *Review of Palaeobotany and Palynology*, (In Press).
5. Deepika Tripathi, **Anil K Pokharia**, Narender Parmar, Pankaj Kumar, Alka Srivastava, Rinku Sharma. **2022**. Tigrana: Insights on the Indus excavations in the palaeo-Saraswati Basin, Bhiwani District, Haryana. *Current Science*, 120(10): 1126-1128.

6. Himani Patel, Amrit Pal Singh Chaddha, Sachin Kumar, Preety A. Trivedi, Anupam Sharma, **Anil K. Pokharia**, Niraj Rai. Ancient DNA and geochemical study of a Megalithic human tooth remain and its associated filling from Central India. *Archaeometry*(Revised submitted).
7. Tripathi, D., Kingwell-Banham, E., **Pokharia, Anil K.**, Fuller, D. Q., Baghel, P., Pal, J. N. and Chauhan, D. K. **2022**. Understanding climate change and agriculture at Neolithic Tokwa, Central India: Integrating macro- and micro- botanical remains. *Archaeological and Anthropological Sciences* (Under revision).
8. Basumatary SK, RajibGogoi, Swati Tripathi, Ruby Ghosh, **Anil K. Pokharia**, H. Gregory McDonald, Norbu Sherpa, Eline N. van Asperen et al. **2021**. Red Panda feces from Eastern Himalaya as a modern analogue for palaeodietary and palaeoecological analyses. *Scientific Reports*, **11:18312**. doi.org/10.1038/s41598-021-97850-y(**IF: 4.379**)
9. **Pokharia Anil K**, Sharma S, Rawat YS, Srivastava A, BhushanDighe, Pande P. **2021**. Rice, beans and pulses at Vadnagar: an early historical site with a Buddhist Monastery in Gujarat, western India. *Geobios*, 64:77-99.doi.org/10.1016/j.geobios.2020.12.002(**IF: 1.529**).
10. Himani Patel, **Pokharia Anil K.**, Nihil Das, NirajRai, Rajeshwar P. Sinha. **2021**. RithiRanjana: reconstructing crop economy based on archaeobotanical evidence and radiocarbon dates from an Early Iron Age site in Vidarbha region, Maharashtra, India. *Current Science* 120 (11): 1728-1739 (**IF: 1.102**).
11. Nihildas N., **Pokharia Anil K.**, Himani Patel.**2021**. Rice production in the Early Iron Age of Vidarbha: Archaeological and Archaeobotanical Evidences from RithiRajana, Maharashtra. *Man and Environment* XLVI (1): 92-100.
12. **Pokharia Anil K.**, Anjali Trivedi, DeepikaTripathi, Chanchala Srivastava, D.P. Tewari, Jaya Menon, Varma S, Srivastava A, Vaishali. **2021**. Palaeodiet, Palaeoecology and Palaeoenvironment during 1200 BCE-300 CE in the Ganga Plain: A Palaeoethnobotanical and Palynological Approach. *The Palaeobotanist*, 69: 1-25.
13. Tripathi D, Kotlia BS, Tiwari M, **Pokharia Anil K**, Agrawal S, Kumar P, Long T, Morthekai P, Thakur B, Pal JN, Mahar KS and Chauhan D K. **2020**. New evidence of mid- to late- Holocene vegetation and climate change from a Neolithic settlement in western fringe of Central Ganga Plain: Implications for Neolithic to Historic phases. *The Holocene*. DOI: 10.1177/095968620972770. (**IF: 2.769**).
14. YattooMumtaz A., Michael Spate, Alison Betts, **PokhariaAnil K** and MohamadAjmal Shah. **2020**. New evidence from the Kashmir Valley indicates the adoption of East and West Asian crops in the western Himalayas by 4400 years ago. *Quaternary Science Advances*. DOI: <https://doi.org/10.1016/j.qsa.2020.100011>.
15. **Pokharia Anil K**, Jeewan Singh Kharakwal, Shalini Sharma, Michael Spate, DeepikaTripathi, Ashok PriyadarshanDimri, Xinyi Liu, Biswajeet Thakur, Sadhan Kumar Basumatary, Alka Srivastava, Kamlesh S Mahar and Krishna Pal Singh. **2020**. Variable monsoons and human adaptations: Archaeological and palaeoenvironmental records during the last 1400 years in north-western India. *The Holocene*, DOI: 10.1177/0959683620919976.(**IF: 2.769**).

16. Sharma S, Sanjay Kumar Manjul, Arvin Manjul, Puran Chand Pande, **Anil K Pokharia**. 2020. Dating adoption and intensification of food-crops: insights from 4MSR (Binjor), an Indus (Harappan) site in northwestern India. *Radiocarbon*. DOI:10.1017/RDC.2020.37.(IF: 1.975).
17. BasumatarySadhan K, Hukam Singh, Eline N.van Asperen, Swati Tripathi, H. Gregory McDonald and **Pokharia Anil K**. 2020. Coprophilous and non-coprophilous fungal spores of *Bosmutus* modern dung from the Indian Himalaya: Implications to temperate paleoherbivory and paleoecological analysis. *Review of Palaeobotany and Palynology*. <https://doi.org/10.1016/j.revpalbo.2020.104208>.(IF: 1.940).
18. DigheBhushan, Singh MR and **Pokharia Anil K**. 2020. Ancient Indian technique for sustainable and environmentally friendly decorative earthen plasters of Karle and Bhaja Caves, India. *Materials Today: Proceedings*. <https://doi.org/10.1016/j.matpr.2020.02.0402214-7853/2020.02.040>.
19. Sharma, S., Agnihotri, R., **Pokharia Anil K.**, Phartiyal, B., Bajpai, S., Pande, P.C., Manjul, S.K., Manzul, A., Maharana, C. and Ojha, S.N. 2020. Environmental magnetic, Geochemical and Sulfur isotopic imprints of an Indus archaeological site 4MSR from western India (Rajasthan): Implications to the Indus industrial (metallurgical) activities. *Quaternary International*.<https://doi.org/10.1016/j.quaint.2020.03.038>.(IF: 2.130).
20. Srivastava Alka and **Pokharia Anil K**. 2020. Pollen atlas of kitchen garden plants as an aid to archaeopalynology of ancient human settlement sites. In: Vatsyayan, K., Kumar, R. and Patil, C,B (Eds.)-Asian History and Indology: Asitayana (commemoration volume of Late Professor C. Mani), B.R. Publishing Corporation, Delhi. pp. 123-140.
21. **Pokharia Anil K**, Singh, PL, Mishra N, Kumar A, Singh U, Srivastava A, Trivedi A, Patel H, Shukla DK, Gupta CB and Md. Afroz2019. Plant macroremains from Sarethi: an Early Historic site in Saryu region of Ganga Plain, Uttar Pradesh. *The Palaeobotanist*, 68: 125–137.
22. Basumatary, Sadan, Singh, Hukum, Donald MC, Dixit, Swati, **Pokharia, Anil K**.2019. Modern botanical analogue of endangered Yak (*Bosmutus*) dung from India: Plausible linkage with extant and extinct megaherbivores. *PLoS ONE* 14(3): e0202723. <https://doi.org/10.1371/journal.pone.0202723>.(IF: 3.240)
23. Thakur, B., Seth, Priyanka, Sharma, A., **Pokharia, Anil K.**, Spate, M., Farooqui, S. 2019. Linking past cultural developments to palaeoenvironmental changes from 5000 yrs ago to present: A climate-culture reconstruction from Harshad estuary, Saurashtra, Gujarat, India. *Quaternary International* 507: 188-196.(IF: 2.130)
24. Spate, M., Betts, A., Yatoo, Mumtaz A., Kaloo, Z., Fraser, J., Rashid, Y., **Pokharia, Anil K.**, Zhang, G. 2019. The northern Neolithic of the western Himalayas: New research in the Kashmir Valley. *Archaeological Research in Asia* 18: 17-39.
25. Kaushal, R., Ghosh, P., and **Pokharia, Anil K.**, 2019. Rapid hydroclimatic shift during Harappan civilization affecting rice agriculture: evidence from stable isotopic measurements. *Quaternary International*,doi. <https://doi.org/10.1016/j.quaint.2019.04.017>.(IF: 2.130)
26. Srivastava, A., **Pokharia Anil K.**, 2019. Pollen photomicrographs of traditional herbal medicinal plants as an aid to archaeopalynology of archaeological sites. *Pragdhara* 26: 44-63.

27. Pokharia Anil K., Mani, B.R., Michael Spate, Betts, A., Srivastava, A. **2018**. Early Neolithic agriculture (2700-2000 BC) and Kushan period developments (AD 100-300): Macrobotanical evidence from Kanispor in Kashmir, India. ***Vegetation History and Archaeobotany***, 27 (3): 477-791.(IF: 2.375)
28. Nihildas, N., Pradhan, P.P., Mehar, R., Sonone, P., Kushwaha, A., Thakur, B., Batt, A., Arshad, Singh, S., **Pokharia, Anil K.**, Shete, G., Joglekar, P.P. **2018**. Preliminary report on excavation at RithiRanjana, Saoner Tehsil, Nagpur District, Maharashtra. ***Man and Environment***, XLIII (1): 44-47.
29. Chauhan, M.S., **Pokharia, Anil K.**, Bhandari, Y. **2018**. Quaternary vegetation, climate, farming and human habitation in the Ganga Plain, based on pollen and macro-botanical remains from lakes and archaeological sites. ***Indian Journal of Archaeology***, 3(2): 1-65.
30. LiuXinyi, Diane L. Lister, Zhijun Zhao, Cameron A. Petrie, Xing sheng Zeng, Penelope J. Jones, Richard A. Staff, **Pokharia Anil K.**, etc. **2017**. Journey to the East: diverse routes and variable flowering times for wheat and barley *en route* to prehistoric China. PLoS ONE.doi.org/10.1371/journal.pone.0187405 (IF: 3.240).
31. **Pokharia, Anil K.**, Agnihotri, R., Sharma, S., Bajpai, S., Nath, J., Kumaran, R. N., Negi, B. C. **2017**. Altered cropping pattern and cultural continuation with declined prosperity and extreme arid event at ~4.2ka BP: Evidence from an Indus archaeological site Khirsara, Gujarat, western India. ***PLoS ONE***. doi.org/10.1371/journal.pone.0185684 (IF: 3.240).
32. Tripathi, D., Chauhan, D.K., Farooqui, A., Kotlia, B.S., Thakur, B., Morthekai, P., Long, Tengwen, Chauhan, M.S., **Pokharia, Anil K.** **2017**. Late Quaternary climatic variability in the Central Ganga Plain: A multi-proxy record from Karela Jheel (Lake). ***Quaternary International***, 443: 70-85(IF: 2.130)
33. Chauhan, M.S., **Pokharia, Anil K.**, Bhandari, Y., Srivastava, R.K. **2017**. Late quaternary vegetation, climate change and human occupation in the Central Ganga Plain as inferred by pollen evidence from Karela Jheel, Uttar Pradesh. ***Indian Journal of Archaeology***, 2(1): 1-24.
34. **Pokharia, Anil K. et al.** **2016**. Neolithic-Early Historic (2500-200 BC) plant use: the archaeobotany of Ganga Plain. ***Quaternary International***, 443: 223-237.(IF: 2.130)
35. Liu, Xinyi, Lister, D.L., Zhao, Z., Staff, R.A., Jones, P., Zhou, L., **Pokharia, Anil K.**, Petrie, C.A., Pathak, A., Lu, H., Matuzeviciute, G. M., Bates, J., Pilgram, T.K., and Jones, M.K. **2016**. The virtues of small grain size: potential pathways to distinguishing feature of Asian wheats. ***Quaternary International***, 426: 107-119. (IF: 2.130)
36. Kharakwal, J.S., **Pokharia, Anil K.**, Sharma, K.K., Godhal, V., Paliwal, N., Singh, K.P., Menaria, R., and Garg, P. **2016**. Preliminary observations of excavation at Chandravati, Sirohi, Rajasthan. ***Sodh Patrika*** (266-269): 20-54.
37. **Pokharia, Anil K.** **2016**. Harappan plant economy and the role of millets in the peripheral zone of Indus civilization. ***Indian Journal of Archaeology***, 1(4): 66-76.
38. Chauhan, M.S., **Pokharia, Anil K.**, and Srivastava, R.K. **2015**. Late Quaternary vegetation history, climatic variability and human activity in the Central Ganga Plain, deduced by pollen proxy records from Karela Jheel, India. ***Quaternary International***, 371: 144-156. (IF: 2.130)

39. **Pokharia, Anil K. et al. 2015.** On the botanical findings from excavations at Ahichchhatra: A multi-cultural site in Upper Ganga Plain. *Current Science*, 109 (7): 1293-1304. (IF: 0.967)
40. **Pokharia, Anil K.,** Kharakwal, J.S., Srivastava, Alka. **2014.** Archaeobotanical evidence of millets in the Indian subcontinent with some observations on their role in the Indus civilization. *Journal of Archaeological Sciences*, **42**: 442-455. (IF: 3.256)
41. **Pokharia, Anil K. 2014.** Archaeobotanical evidence of kitchen gardening in ancient India. In: Mani, B.R., Arvind K. Singh and Ravindra Kumar (eds.) *Pratyabodha Indian Archaeology and Tradition (Professor T.P. Verma Festschrift)*. B.R. Publishing Corporation, Delhi. Vol. I: 206-212 + pl. 20.1 to 20.11.
42. **Pokharia, Anil K.,** and Chanchala Srivastava. **2013.** Current status of archaeobotanical studies in Harappan civilization: An Archaeological Perspective. *Heritage: Journal of Multidisciplinary Studies in Archaeology* **1**: 118-137.
43. Goyal Pankaj, **Pokharia, Anil K.,** Kharakwal, J.S., Joglekar, P., Rawat, Y.S., and Osada, T. **2013.** Subsistence system, palaeoecology and ¹⁴C chronology at Kanmer, a Harappan site in Gujarat, India. *Radiocarbon*, 55(1): 141-150. (IF: 1.975)
44. **Pokharia, Anil K.,** Jamir Tiatoshi, Testo David, Venuh Zokho. **2013.** Late first millennium BC to second millennium AD agriculture in Nagaland: A reconstruction based on archaeobotanical evidence and radiocarbon dates. *Current Science*, 104 (10): 1341-1353. (IF: 1.102)
45. **Pokharia Anil K. 2012.** On the record of plant remains at Harappan Kanmer: subsistence economy with a change. In: *Excavations at Kanmer 2005-06–2008-09* (eds. Kharakwal, J.S., Rawat, Y.S., Osada, T.), Indus Project, RHN, Kyoto, Japan, pp. 795-811.
46. **Pokharia Anil K,** Kharakwal JS, Rawat YS, Osada T, Nautiyal, CM and Srivastava A. **2011.** Archaeobotany and archaeology at Kanmer, a Harappan site in Kachchh, Gujarat: evidence for adaptation in response to climatic variability. *Current Science*, **100** (12): 1833-1846. (IF: 1.102)
47. **Pokharia Anil K. 2011.** Palaeoethnobotany at Lahuradewa: A contribution to the 2nd millennium BC agriculture of the Ganga Plain, India. *Current Science*, **101** (12): 1569-1578. (IF: 1.102).
48. **Pokharia Anil K,** Chanchala Srivastava and Pal JN. **2011.** Palaeoethnobotanical and Palaeoecological investigations based on carbonized botanical remains from Neolithic-Chalcolithic Tokwa, Uttar Pradesh. *The Palaeobotanist*, **60** (2): 237-250.
49. Sattar Mofarahu, Sharma SD and **Pokharia Anil K. 2010.** History of rice in South Asia (Up to 1947). In: Sharma SD (ed.)-*Rice: Origin, antiquity and history*. Science Publishers. Enfield, New Hampshire, USA. pp. 225-271.
50. **Pokharia Anil K,** Sekar B, Pal JN, and Srivastava A. **2009.** Possible evidence of pre-Columbian trans-oceanic voyages based on conventional LSC and AMS ¹⁴C dating of associated charcoal and a carbonized seed of custard-apple (*Annonasquamosa* L.). *Radiocarbon*, **51** (3): 923-930. (IF: 1.975)
51. **Pokharia Anil K,** Pal JN, and Srivastava A. **2009.** Plant macro-remains from Neolithic Jhusi in Ganga Plain: evidence for grain-based agriculture. *Current Science*, **97**(4): 564-571. (IF: 1.102)

52. Chauhan MS, **Pokharia Anil K.**, and Singh, IB. **2009**. Pollen record of Holocene vegetation, climate change and Human habitation from Lahuradewa Lake, Sant Kabir Nagar District, Uttar Pradesh, India. *Man and Environment*, XXXIV(1):88-100.
53. **Pokharia Anil K. 2008**. Palaeoethnobotanical record of cultivated crops and associated weeds and wild taxa from Neolithic site, Tokwa, Uttar Pradesh, India. *Current Science*, **94** (2): 248-254. (IF: 1.102)
54. **Pokharia Anil K. 2008**. Record of macrobotanical remains from the Aravalli Hill, Ojiyana, Rajasthan: Evidence for agriculture-based subsistence economy. *Current Science*, **94** (5): 612-623. (IF: 1.102)
55. **Pokharia Anil K. 2008**. Early Agricultural Economy In North-Eastern Vindhyas: An Archaeological Perspective. *The Palaeobotanist*, **57** (1-2): 289-297.
56. Sekar B, **Pokharia Anil K.**, Prasad Ravi G.V., Choudhary R.K., Rajagopalan G., and Pal J.N. **2007**. Liquid scintillation counting and AMS ¹⁴C radiocarbon dating of associated charcoals and a carbonized seed of *Annonasquamosa* L. to analyse its antiquity in India. *Current Science*, **93** (10): 1354-1356. (IF: 1.102)
57. Tewari R, Srivastava RK, Singh KK, Saraswat KS, Singh IB, Chauhan MS, **Pokharia AK**, Saxena A, Prasad V, Sharma M. **2006**. Second preliminary report on excavation at Lahuradewa, Sant Kabir Nagar, Uttar Pradesh 2002-2003-2004 & 2005-2006. *Prāgdhārā*: **16**: 35-68.
58. Chauhan MS, **Pokharia Anil K** and Singh IB. **2004**. Preliminary results on the Palaeovegetation during Holocene from Lahuradewa Lake, District Sant Kabir Nagar, Uttar Pradesh. *Prāgdhārā*: **15**: 34-38.
59. Saraswat, KS, Tewari R, Singh YP and **Pokharia Anil K** (eds.). **2004**. *Souvenir: XXXI Joint Annual Conference of Indian Archaeological Society, Indian Soc. of Prehistoric & Quaternary Studies, Indian History & Culture Society & Folk and Tribal Arts and Culture Society*, Lucknow.
60. **Pokharia Anil K** and Saraswat KS. **2004**. Birbal Sahni Institute of Palaeobotany: A Window on the Archaeology. *Souvenir: XXXI Joint Annual Conference of Indian Archaeological Society, Indian Soc. of Prehistoric & Quaternary Studies, Indian History & Culture Society & Folk and Tribal Arts and Culture Society*, Lucknow. (General Article)
61. Saraswat KS and **Pokharia Anil K. 2003**. Palaeoethnobotanical Investigations at Early Harappan Kunal. *Prāgdhārā*, **13**: 105-139.
62. Saraswat KS and **Pokharia Anil K. 2002**. Harappan plant economy at ancient Balu, Haryana. *Prāgdhārā*, **12**: 151-175.
63. **Pokharia Anil K** and Saraswat KS. **2000**. Wood charcoal remains from ancient Sanghol, Punjab (ca. 100-300 AD). *Prāgdhārā*, **10**: 149-171.
64. **Pokharia Anil K** and Saraswat, KS. **1999**. Plant economy during Kushana period (100-300AD) at ancient Sanghol, Punjab. *Prāgdhārā*, **9**: 75-121.
65. Saraswat, KS and **Pokharia Anil K. 1998**. On the remains of botanical material used in fire-sacrifice ritualized during Kushana period at Sanghol, Punjab. *Prāgdhārā*, **8**: 149-181.

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67. **Pokharia Anil K.** An overview of Harappan plant economy and the role of millets in Kutch, Gujarat (*Proceeding of the International Seminar on Harappan sites in western India*, Pune) (Submitted).
68. **Pokharia, Anil K.** Crop husbandry at Kanmer (2800-1700 BC), Kachchh, Gujarat, NW India (*Proceeding of the International Conference on Gujarat Harappans and Chalcolithic sites, Bhuj, Gujarat*) (Submitted).
69. Sharma S, Agnihotri Rajesh, **Pokharia Anil K**, P.C. Pande, S.K. Manjul, Ranjan Bhattacharya Carbon and Nitrogen stable isotopes of archaeological seeds and soil organic matter: Implications to Indus agriculture and hydrology. *Frontiers in Earth Science* (under revision).

ABSTRACTS PUBLISHED

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2. Saraswat KS and **Pokharia Anil K.** 2003. An Archaeological Perspective of Herbal Medicines in the Middle Ganga Plain. XXX Joint Annual Conference of IAS, ISPQS & IHCS (Dec. 19-22), Tirupati, A.P., India: 35.
3. Saraswat KS and **Pokharia Anil K.** 2004. Plant Resources in the Neolithic Economy at Kanishpur, Kashmir. XXXI Joint Annual Conference of IAS, ISPQS & IHCS (Dec. 28-31) Lucknow, India: 7-8.
4. **Pokharia Anil K** and Saraswat KS. 2004. Ancient Crop Economy from Ojiyana, Bhilwara District, Rajasthan. XXXI Joint Annual Conference of IAS, ISPQS & IHCS (Dec. 28-31), Lucknow, India: 24.
5. Saraswat KS and **Pokharia Anil K.** 2004. Plant Economy at Lahuradewa: A Preliminary Contemplation. XXXI Joint Annual Conference of IAS, ISPQS & IHCS (Dec. 28-31) Lucknow, India: 46-47.
6. Chauhan MS, **Pokharia Anil K** and Singh IB. 2004. Pollen Record of Holocene Vegetation and Climate Change from Lahuradewa Lake. XXXI Joint Annual Conference of IAS, ISPQS & IHCS, Lucknow, India: 41.
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8. **Pokharia, Anil K.** 2005. Early Agricultural Economy in North-eastern Vindhya: An Archaeological Perspective. *Diamond Jubilee National Conference: Challenges in Indian*

Palaeobiology-Current status, Recent Developments and Future directions, BSIP, Lucknow, India: 92.

9. Chauhan, MS, **Pokharia, Anil K** and Singh, IB. 2006. Holocene environmental scenario and human subsistence strategies in the Middle Ganga Plain: A palynological assessment from Lahuradewa Lake. *International Seminar on First Farmers in Global Perspective*, Lucknow, India: 2-4.
10. Saraswat, KS and **Pokharia, Anil K**. 2006. The Emerging trends of Early Agricultural Economy in Middle Ganga Plain, with special reference to Lahuradewa in South Asian Context. *International Seminar on First Farmers in Global Perspective*, Lucknow, India: 17-19.
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12. **Pokharia, Anil K** & Chanchala Srivastava. 2007. Changing agricultural patterns during Harappan phases in relation to social and environmental changes at Kanmer, Kutch district, Gujarat. *XXI Indian Colloq. Micropalaeontol. Stratigr.*, BSIP, Lucknow, India: 131.
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14. **Pokharia, Anil K**. and Sekar, B. 2008. Pre-Columbian American Custard-apple in Indian subcontinent: evidence of trans-oceanic voyages between India and America. *Plant Life Through The Ages*, Lucknow, India: 115.
15. **Pokharia, Anil K**. 2010. Plant macroremains from the Harappan settlement at Kanmer: A preliminary contemplation. *International conference on Gujarat Harappans and Chalcolithic Cultures*, Bhuj, Gujarat, India: 21-22.
16. **Pokharia, Anil K**. 2010. Changing agricultural strategies in relation to social and environmental changes at Harappan Kanmer, Kachchh, Gujarat. International symposium on *Rethinking the impacts of climate change in the past*, Kyoto, Japan: 5.
17. **Pokharia, Anil K**. 2010. Archaeobotany at Kanmer: evidence for agricultural diversity in response to climatic change. *Joint Annual Conference of IAS, IHCS, ISPQS and Special Seminar on Recent Archaeological Achievements in India*. Lucknow, India: 62-63.
18. **Pokharia, Anil K**. 2012. Crops and climate: Implications for cropping strategies during 3rd-2nd millennium BC in Gujarat. *International Seminar on Harappan Sites in Western India (Gujarat)*: 12-13.
19. Deepika Tripathi, Chauhan, DK, **Pokharia, Anil K**, and Kharakwal, JS. 2013. Plant macroremains from a Harappan settlement in western India during Bronze Age. *16th Conference of the International Work Group for Palaeoethnobotany*, Thessaloniki, Greece (June 17-22): 65.
20. **Pokharia, Anil K**. 2013. Agriculture and agricultural systems of the early farming communities in northern and north-western India. *National Seminar on History and Traditional Technology of Storage and Agrarian Systems*, Udaipur, Rajasthan (Oct. 27-28).

21. Govil, Pawan, Naidu, PD, **Pokharia, Anil K**, Chauhan, MS, and Prasad, V. 2013. Holocene climate variation and its impact on civilization. *National Conference on Recent Developments in Plant and Earth Sciences*, BSIP, Lucknow: 50.
22. Srivastava, A and **Pokharia, Anil K**. 2013. Pollen morphology of some kitchen garden plants as an aid to archaeopalynology of ancient human settlement sites. *National Conference on Recent Developments in Plant and Earth Sciences*, BSIP, Lucknow: 128.
23. Srivastava, C. and **Pokharia, Anil K**. 2013. Palaeoethnobotanical investigation at re-excavated ancient site Ahichhatra in Upper Ganga Plain. *National Conference on Recent Developments in Plant and Earth Sciences*, BSIP, Lucknow: 132.
24. Chanchala Srivastava, **Pokharia, Anil K**. and BhuvanVikram. **2014**. On the botanical findings from excavations at Ahichhatra: A multicultural site in Upper Ganga Plain, Uttar Pradesh. *Joint Annual Conference of IAS, ISPQS and IHCS*, Pune: 130-131.
25. **Pokharia, Anil K**. 2014. Human Adaptation and Plant Use in Coastal Western India during 5000 to 3700 Years Ago. *National Conference on Quaternary Climate Change: New Approaches and Emerging Challenges*, Lucknow: 90.
26. Vijay Sathe, Chauhan, M.S., **Pokharia, Anil K**. and Kulkarni, Kantimati. 2014. Quaternary fauna, vegetation and ecology of the Manjra Valley, District Latur, Maharashtra. *National Conference on Quaternary Climate Change: New Approaches and Emerging Challenges*, Lucknow: 104.
27. **Pokharia, Anil K**., Sharma, S., and Nath, J. 2016. Archaeobotany at Khirsara (2600-1900 BC): A Harappan site in Kachchh, Gujarat, India. *17th International Conference of International Work Group of Palaeoethnobotany*, Paris: 65.
28. Sharma, S., and **Pokharia Anil K**. 2016. Archaeobotanical data on farming practices during Neolithic (2500 BC) to Early Historic (200 BC) times in the Ganga Plain, India. *17th International Conference of International Work Group of Palaeoethnobotany*, Paris, France: 34-35.
29. **Pokharia, Anil K**. 2016. Palaeodiet in coastal western India during ~5–4ka: Evidence for human adaptation in response to climate change. *5th International Conference of Palaeoethnobotany of China*, Xian, China: 63.
30. Sharma, S., **Pokharia, Anil K**., Agnihotri, R., Pande, P.C. and Manjul, S.K. 2016. Preliminary ethnobotanical investigations to understand early to mature Harappan human settlement history from the vicinity of Ghaggar River channel (western Rajasthan, India). *Platinum Jubilee Seminar on Emergence of Language, Culture and Technologies*, Udaipur, Rajasthan: 8.
31. Mishra, N., **Pokharia Anil K**., Agnihotri, R., and Kharakwal, J.S. 2016. Subsistence patterns, climate variability and radiocarbon dates of archaeological site Chandravati (Rajasthan), India): A palaeoethnobotanical approach. *Platinum Jubilee Seminar on Emergence of Language, Culture and Technologies*, Udaipur, Rajasthan: 15.
32. **Anil K Pokharia**. Agriculture and agricultural systems in prehistory of northern India: An archaeobotanical approach, New Delhi: 45.

SCIENTIFIC REPORTS(On Archaeobotanical Remains):

1. Saraswat, K.S., Srivastava Chanchala and **Pokharia, AK**. 2000. *IndianArchaeology1993-94: AReview*, pp. 143-145: Photoplates XXXII, XXXIII. Archaeol. Survey of India, New Delhi.
2. Saraswat, K.S., Srivastava, Chanchala and **Pokharia, AK**. 2000. *IndianArchaeology1994-95: AReview*, pp. 96-97: Photoplates, XLII, XLIII, XLIV, XLV. Archaeol. Survey of India, New Delhi.
3. Saraswat, K.S., Srivastava, Chanchala and **Pokharia, AK**. 2002. *IndianArchaeology1995-96: AReview*, pp.136-137. Archaeol. Survey of India, New Delhi.
4. Saraswat, K.S., Srivastava, Chanchala and **Pokharia, AK**. 2002. *IndianArchaeology1996-97: AReview*, pp.198-203: Photoplates LIV, LV,LVI. Archaeol. Survey of India, New Delhi.
5. Saraswat, K.S., Srivastava, Chanchala and **Pokharia, AK**. 2008. *IndianArchaeology2001-02: AReview*, pp.339-340. Archaeol. Survey of India, New Delhi.
6. Saraswat, K.S., Srivastava, Chanchala and **Pokharia, AK**. 2009. *IndianArchaeology2002-03: AReview*, pp.365-367. Archaeol. Survey of India, New Delhi.
7. Srivastava, Chanchala and **Pokharia, AK**. 2014. *IndianArchaeology2003-04: AReview*, pp..... Archaeol. Survey of India, New Delhi.
8. Srivastava, Chanchala and **Pokharia, AK**. 2014. *IndianArchaeology2004-05: AReview*, pp.237-238. Archaeol. Survey of India, New Delhi.
9. **Pokharia, AK**&Saraswat, K.S 2004.BirbalSahni Institute of Palaeobotany: A window on the Archaeology. *Souvenir: Joint Annual Conference: Indian Archaeological Society XXXVIII, Indian Society for Prehistoric and Quaternary Studies XXXII and Indian History and Culture Society XXVIII and National Seminar on the Archaeology of the Ganga Plain*, Lucknow: 30-34.

FIELD WORK AND COLLABORATIONS:

- Palaeoethnobotany (Archaeobotany) of ancient Balu (Harappan Culture), Haryana, in collaboration with Kurukshetra University, Kurukshetra.
- Palaeoethnobotany (Archaeobotany) of ancient Kunal (Harappan Culture), Haryana, in collaboration with State Museum, Chandigarh.
- Palaeoethnobotany (Archaeobotany) of ancient Raja-Nal-Ka-Tila (Iron-Age Culture), Uttar Pradesh in collaboration with U.P. State Archaeology Dept.
- Palaeoethnobotany (Archaeobotany) of ancient Lahuradewa (Neolithic-Chalcolithic Culture), Uttar Pradesh, in collaboration with U.P. State Archaeology Dept.
- Palaeoethnobotany (Archaeobotany) of ancient Tokwa (Neolithic-Chalcolithic Culture), Mirzapur, in collaboration with Institute of Archaeology, Allahabad University, Allahabad.
- Palaeoethnobotany (Archaeobotany) of ancient Neolithic Jhusi, Allahabad, in collaboration with Institute of Archaeology, Allahabad University, Allahabad.

- Palaeoethnobotany (Archaeobotany) of ancient Jogna-khera (Bara Culture), Haryana, in collaboration with Haryana State Archaeology Department.
- Palaeoethnobotany (Archaeobotany) of ancient Hetapatti (Neolithic Culture), Allahabad, in collaboration with Institute of Archaeology, Allahabad University, Allahabad.
- Palaeoethnobotany (Archaeobotany) of ancient Kanmer (Harappan Culture), Rajasthan, in collaboration with Institute of Rajasthan Studies, Udaipur and Research Institute for Humanity and Nature, Kyoto, Japan.
- Palaeoethnobotany (Archaeobotany) of ancient Ahichchhatra (PGW and NBPW), Bareilly, UP, in collaboration with ASI, Agra Circle.
- Palaeoethnobotany (Archaeobotany) of ancient Khirsara (Harappan Culture), Kachchh, Gujarat in collaboration with ASI Excavation Branch-V, Baroda, Gujarat.
- Palaeoethnobotany (Archaeobotany) of ancient Kotada-Badli (Harappan Culture), Kachchh, Gujarat in collaboration with Deccan College and Post Graduate Research Institute, Pune.
- Palaeoethnobotany (Archaeobotany) of ancient Chandravati (Early Historic-Medieval Period), Sirohi, Rajasthan in collaboration with Rajasthan State Archaeology Department and Institute of Rajasthan Studies, Udaipur, Rajasthan.
- Palaeoethnobotany (Archaeobotany) of ancient 4MSR (Harappan culture), Sri Ganga Nagar, Rajasthan, in collaboration with ASI, New Delhi.
- Palaeoethnobotany (Archaeobotany) of ancient Vadnagar (Buddhist), Mehsana, Gujarat, in collaboration with ASI, Vadodara.
- Palaeoethnobotany (Archaeobotany) of ancient Nadol (Medieval), Pali, Rajasthan, in collaboration with Rajasthan State Archaeology Department.
- Palaeoethnobotany (Archaeobotany) of ancient Agaibir (Neolithic-Iron Age), Mirzapur, Uttar Pradesh, in collaboration with Banaras Hindu University, Varanasi, U.P.
- Palaeoethnobotany (Archaeobotany) of ancient RithiRajana (Iron Age), Nagpur, Maharashtra, in collaboration with ASI, Nagpur Excavation Branch.
- Palaeoethnobotany (Archaeobotany) of ancient Uren (Early-Historic), Lakhisarai, Bihar, in collaboration with ASI, Patna Excavation Branch.
- Palaeoethnobotany (Archaeobotany) of ancient Khapura (NBPW), Ambedkarnagar, U.P., in collaboration with Banaras Hindu University, Varanasi.
- Palaeoethnobotany (Archaeobotany) of ancient Sarethi (NBPW-Historic), Faizabad, U.P, in collaboration with Banaras Hindu University, Varanasi.
- Palaeoethnobotany (Archaeobotany) of ancient Rajdhani (Historic), Gorakhpur, U.P, in collaboration with State Archaeology Department, U.P.
- Palaeoethnobotany (Archaeobotany) of ancient Tigrana (Indus/Harappan), Bhiwani, Haryana, in collaboration with Central University of Haryana.

CONFERENCE/SEMINARS ATTENDED

NATIONAL

1. 83rd Indian Science Congress, Punjabi Univ., Punjab, India (Jan. 3-8, 1996).

2. XXIV Joint Annual Conference of Indian Society for Prehistory and Quaternary Studies, New Delhi, India (Nov. 24-26, 1996).
3. XXX Joint Annual Conference of Indian Society for Prehistory and Quaternary Studies, Ernakulam, Kerala, India (Dec. 19-22, 2002).
4. XXXI Joint Annual Conference of Indian Society for Prehistory and Quaternary Studies, Tirupati, Andhra Pradesh, India (Dec. 19-22, 2003).
5. XXXII Joint Annual Conference of Indian Society for Prehistory and Quaternary Studies, Lucknow, India (Dec. 28-31, 2004).
6. International Conference on First Farmers, Lucknow, India (Jan. 2005).
7. Diamond Jubilee National Conference, Lucknow, India (Nov. 15-16, 2005).
8. Diamond Jubilee International Conference, Lucknow, India (Nov. 15-17, 2006).
9. *XXI Indian Colloquium on Micropalaeontology and Stratigraphy* BSIP, Lucknow (Nov. 16-17, 2007).
10. *National Conference on Plant Life Through The Ages*, BSIP, Lucknow, (Nov. 16-17, 2008).
11. *Joint Annual Conference of IAS, IHCS, ISPQS and Special Seminar on Recent Archaeological Achievements in India*. Lucknow, India (Dec. 28-30, 2010).
12. *International Seminar on Harappan Sites in Western India (Gujarat)*, Pune, India (March 22-24, 2012).
13. *Workshop on Application of Sciences in Archaeology, Calcutta, India (August 6-8, 2013)*.
14. *National Seminar on History and Traditional Technology of Storage and Agrarian Systems*, Udaipur, Rajasthan, India (Oct. 27-28, 2013).
15. *National Conference on Recent Developments in Plant and Earth Sciences*, BSIP, Lucknow, India (Nov. 28-29, 2013).
16. *National Conference on Quaternary Climate Change: New Approaches and Emerging Challenges*, BSIP, Lucknow (Dec. 15-16, 2014).
17. *Joint Annual Conference of IAS, IHCS, ISPQS* Hyderabad, India (Dec. 17-21, 2015).
18. *Seminar on Antiquity, Continuity and Development of Civilization and Culture in Bharat (India) up to 1st millennium BC*, ICHR, New Delhi, from March 27-29, 2017.

INTERNATIONAL

19. International symposium on Rethinking the impacts of climate change in the past, RIHN, Kyoto, Japan, (August 20-21, 2010).
20. 17th International Conference of International Work Group of Palaeoethnobotany, Paris, France (July 3-9, 2016).
21. 5th International Conference of Palaeoethnobotany of China, Xian, China (September 10-14, 2016).
22. International Symposium of Palaeoethnobotanical Discoveries and Studies on the Tibetan Plateau and Surrounding Areas, Xian, China (December 16-19, 2019)

SPONSORED PROJECTS:

National

1. Principal Investigator (PI) *"Subsistence pattern, vegetation dynamics and climate change during Harappan (Indus) and subsequent cultures in north-western India: A palaeoethnobotanical approach"* (SERB-DST No.: EMR/2015/000881). Completed (February, 2019), Total cost 46.03 lacs

2. Submitted (Co-PI): *"Beginning of indigenous Metal Technology and Agriculture (BiMTA) in The Aravallis"* Under Science and Heritage Research Initiative (SHRI) scheme, DST, New Delhi

ACHIEVEMENTS:

Palaeoethnobotany (Archaeobotany) in recent times has emerged as one of the advanced and increasingly popular subjects in the multidisciplinary researches to understand the human past in Dark Ages. The BSIP, Lucknow has in recent years played a very vital role as a helpmate to the archaeologists, ethnologists, prehistorians and anthropologists. Studies carried out have been quite rewarding with objectives to sketch the perspectives of early beginning of plant domestication, subsistence complexes of value in evolutionary and ecological potentials, exploitation of plants in their respective natural and cultural environments in different cultural settlements and diffusionary trends of early agriculture in diverse cultural zones in Indian subcontinent. A few noteworthy achievements are itemized as under:

CONTINUITY, ADAPTABILITY AND RESILIENCE: NEW PARADIGM IN INDUS VALLEY:

- i) Systematization of work on Harappan Civilization in ancient Punjab, Haryana, Rajasthan and Gujarat, has brought to light the convincing evidence of the vast array of data to suggest the cultivation of 29 types of crops of indigenous, West Asian, Eurasian and African origins, characterized by rotation of crops, during 3rd millennium BC (**Saraswat and Pokharia, 2002, 2003; Pokharia et al., 2011**)
- ii) Rice was not known to be a Harappan crop. However, archaeobotanical evidence of rice (direct dated...2400 BC) cultivation in Indus Valley, outside the zone of its natural habitats in Ganga Valley, seems in consequence of its dispersal from Ganga valley region at an early date, owing to the suitable moist conditions in this region (**Sharma et al., 2020**).
- iii) The Indus archaeological sites (Gujarat, western India) provides compelling evidence for a major change in cropping pattern from large grained cereals to small-grained millet crops at ~4,200 yrs BP, suggesting that it was probably the human response to prevailing monsoonal dryness (**Pokharia et al., 2011, 2014, 2017**). This could help in developing pragmatic socio-economic models in the wake of increasing warming, monsoonal dryness, and change in rainfall patterns.

DATING ADOPTION AND INTENSIFICATION OF FOOD-CROPS:

- iv) Direct dating of barley grains has pushed the antiquity of west Asian crop back to 2900 BCE (5000 yrs BP) so far in the Harappan context. Rice was not known to be

Harappan crop, however, the direct date from 4MSR, Anupgarh, Rajasthan (~2340–2210 BCE) surmise rice cultivation during the Mature phase of the Indus civilization (**Sharma et al., 2020**), outside the zone of its natural habitats in Ganga Valley, seems in consequence of its dispersal from Ganga Valley region, owing to the suitable moist conditions in this region.

AHAR/BANAS VALLEY, RAJASTHAN

- v) The “first” record of a rich and varied crop economy of the indigenous Ahar/Banas Valley Culture in the hilly terrains of Aravalli region, Rajasthan reflects on the skilled farming even in the hilly tracts. The impact of Harappans in the economy is apparent as the area lies south of the main Indus Valley zone. Evidence of rice, which is main crop of the Ganga Valley, deserves special mention. It is difficult to assess at present whether this crop spread in the Aravalli hills either through the Harappan zone in Haryana and Punjab or through some remote cultural contacts with other cultures. The information would significantly contribute to the development and expansion of agriculture, further to the south in the Chalcolithic zone of Malwa region, in MP (**Pokharia, 2008**).

GANGA VALLEY: NEOLITHIC TO EARLY HISTORIC CROP ECONOMY

- vi) Affluent information has been built up regarding the plant economy of early Mid-Ganga Valley cultures, with consistent chronologies based on radiocarbon dates. Now, it is no longer necessary to hesitate regarding the dispersal of food grains from the north-western Harappan area to Gangetic plains and vice-versa, at much earlier dates during 3rd and earlier half of 2nd millennia BC, undoubtedly as a result of the direct or indirect contacts (**Pokharia 2012; Pokharia et al., 2009, 2017**).

ASIAN-AMERICAN CONTACTS IN PRE-COLUMBIAN TIMES (TRANS-OCEANIC VOYAGES)

- vii) The most important find of the South American fruit of custard-apple (*Annonasquamosa*), from Neolithic, Iron-Age and Early Historic times, regarded to have been introduced in India by Portuguese in 16th century, and has pushed back the antiquity of custard-apple to 1600 BC on Indian soil. The evidence supports the Asian-American contacts, before the discovery of America by Columbus in 1498 (**Pokharia et al., 2007, 2009**).

BOTANICAL EVIDENCE OF RITUALIZATION IN ANCIENT INDIA

- viii) Studies on the botanical material used in offerings to sacred fire, during the ritualization of fire-sacrifice, in Kushana period (100-300 AD) at Sanghol, district Ludhiana, Punjab, has linked ritualistic and religious aspects with archaeology. From the fire-altars (hawan-kundas) mixture of seven types of food grains (rice, barley, wheat, mung, urad, masur and til), fruit remains of jujube, date, almond, raisin, chilgoza, pistachio nut and gular-fig, and herbal medicines evidenced by the fruit and seed remains of anwala, harra, jaiphal, tulsi, black-pepper, and khanda or asmania (*Ephedra*) have been found. The woods of pipal, gular, palash,

kaitha, tamal, deodar and chandan were used for lighting the fire (Samidha)(Saraswat and Pokharia 1998).

FIRST RECORD OF ARCHAEOBOTANICAL REMAINS FROM NORTH-EASTERN INDIA

- ix) The information on the origin of agriculture in eastern India is obscure till date. However, the current study from six archaeological sites in Nagaland has revealed rice-millet cultivation during pre- and post-metallic phases and the potential for future research to study the antiquity of rice in India (Pokharia et al., 2013).

EARLY AGRICULTURE (2700–2000 BCE) IN NEOLITHIC KASHMIR, INDIA

- x) Botanical evidence from the Ceramic Neolithic phase reflects a nascent agriculture based on cold tolerant crops (barley, wheats, lentil, field pea and grass pea) related to farming patterns of adjacent cultures and possibly evidence for the earliest cultivation in the valley. The Kushan period is characterized by a double-cropping pattern, suggesting a change in agricultural practices associated with a population recovery following a post-Neolithic decline. Finds of *Juglans regia*, and *Prunus cf. amygdalus* shells in ceramic Neolithic levels, and *Vitis cf. vinifera*, *Emblica officinalis* and *Ziziphus cf. nummularia* in addition to *J. regia*, and *P. cf. amygdalus* during Kushan times suggest that horticulture and foraging played an important role in the diet of the occupants. The dataset provides new absolute dates (AMS) for the subsistence economy of the Ceramic Neolithic population in the Kashmir Valley. The directly dated wheat and barley provides the oldest dated cereals in Kashmir till date.

MONSOON VARIABILITY *vis-à-vis* HUMAN ADAPTATION DURING LAST 2000 YRS:

- xi) The rarity of Medieval sites, systematic excavations and multi-disciplinary work in the subcontinent, obscure the impact of two distinct climate anomalies– the Medieval Warm Period (MWP), followed by the Little Ice Age (LIA). The finds from the archaeological site located in the foothill zone of Mt. Abu, in Rajasthan indicate warm and mild humid during pre-Medieval period (600–800 CE). During Medieval times (between ~800–1300 CE), a diversification in crop-assemblage and associated weeds suggest that the region was under warm and humid climate, corresponding to the Medieval Warm Period (MWP), known between 740 and 1150 CE worldwide. However, during post-Medieval period (~1300–1850 CE) dominance of drought-resistant millets along with meager large grained cereals and pulses indicate the region probably experienced weak SW monsoon, coinciding with globally recognized Little Ice Age (LIA). The changing cropping pattern, vegetation and cultural development, during aforementioned climate (monsoonal) contrast period provide clues for past human response to climate change and important lessons for modern societies in exploring possible strategies to future climate change (Pokharia et al., 2020).

BUDDHISM IN WESTERN INDIA AND CROP ECONOMY:

- xii) The first systematic evaluation on the subsistence economy during Buddhism (100 BCE-400 CE) from the site of Vадnagar, in western India is to be reckoned with. The spread of rice along with westward spread of Buddhism from its epicentre in Central India may have relied on seasonal rainfall (rain-fed cultivation) and not supported by irrigation as this region lacks major perennial rivers. Monsoonal variability would have caused an increase in rainfall for significant non-irrigated wet-rice agriculture. The study of the plant remains from Vадnagar Monastery site has proved to be informative and highlights the potential for research into the plant diversity during Buddhism in the subcontinent (Pokharia et al., 2021).

EARLY IRON AGE ECONOMY IN VIDHARBA, MAHARASHTRA:

- xiii). Rithi Rajana archaeological site excavated by Nagpur Excavation Branch, Archaeological Survey of India revealed that the founder elements of Chalcolithic subsistence in the region continued to exist in the crop economy of Early Iron Age settlers. Thus the present study provides useful insights regarding sequential agricultural history in the semi-arid Vidarbha region of Maharashtra.

PLANT ECONOMY DURING LAST 2500 Yrs AT VADNAGAR, GUJARAT:

- xiv). The plant remains from Historical site Vадnagar have revealed the presence of winter and summer crops, suggesting the region was likely warm and mild humid during Historic period (200 BCE-500 CE; RWP). The diversification in crop assemblage during Medieval period (500-1300 CE; MWP), suggest that the region witnessed intense monsoon precipitation whereas, the record of large number of drought-resistant millets during post Medieval period (1300-1900 CE; LIA) indicates a shift in agricultural pattern owing to weak SW monsoon thus, suggesting human adaptation in response to climate variability during last two millennia.

PLANT REMAINS FROM EARLY HISTORIC SITE ALAGANKULAM, CHENNAI:

- xv). Seeds of African origin *Adansoniadigitata* (Baobab tress) which is regarded to have been introduced in 327 BC in Indian subcontinent along with *Tamarindus indica*, *Citrus* sp., and *Ziziphus* sp. were recorded Alagankulam archaeological site, Excavated by Department of Archaeology, Govt. of Tamilnadu, Chennai.

PLANT ECONOMY OF CAVE DWELLERS, NAGALAND:

- xvi). Records of pseudocereals (*Fagopyrum* sp., *Coix* sp., and *Amaranthus/Chenopodium* sp.) and one pulse crop *Vigna* sp. which may have been gathered for consumption were made. The *Fagopyrum* genus is native to the Indian subcontinent, much of Indochina, and central and southeastern China. Buckwheat (*Fagopyrum* sp.) is an important crop in the high-altitude regions of Northeast Indian Himalaya. It is used as food crop

(pseudocereal). *Coix* sp. (Job's tear). It is native to South-East Asia. Job's tear grains are widely eaten as a cereal, and sometimes used as folk medicine. There are two main varieties of the species, one wild and one cultivated. The wild variety, *Coix lachryma-jobi* var. *lachryma-jobi*, has hard-shelled pseudo carps very hard, pearly white, oval structures used as beads for making rosaries, necklaces, and other objects. The cultivated variety *Coix lachryma-jobi* var. *ma-yuenis* harvested as a cereal crop. *Amaranthus/Chenopodium* genus of numerous species of perennial or annual herbaceous flowering plants known to occur almost anywhere in the world. These are also used as food crops (pseudocereals). A small endocarp of fruit was also recorded in the assemblage resembling dicotyledonous fruit. Based on these plant remains, it can be inferred that prehistoric man inhabited these caves during the mid to late Holocene and consumed these plants by gathering.

The information generated from the above mentioned sites and region are considerable significance to agricultural historians, archaeologists, anthropologists, ecologists, palaeoclimatologists, economic botanists, geneticists etc.

COLLABORATION (s)/LINKAGES

NATIONAL

- i) Archaeological Survey of India, New Delhi
- ii) AIHC and Archaeology Departments of various Universities
- iii) Rajasthan State Archaeology Department, Jaipur, Rajasthan
- iv) Uttar Pradesh State Archaeology Department, Lucknow, U.P.
- v) Tamil Nadu State Archaeology Department, Chennai
- vi) Rajasthan Vidyapeeth, Udaipur, Rajasthan
- vii) Gujarat State Archaeology Department, Gandhinagar, Gujarat

INTERNATIONAL

- viii) McDonald Archaeological Research Institute, Cambridge, UK
- ix) University College, London, UK
- x) Universitat Pompeu Fabra, Barcelona, Spain
- xi) Washington State University, St. Louis, USA
- xii) Research Institute for Humanity and Nature, Kyoto, Japan
- xiii) Sydney University, Sydney, Australia

VISIT(s) ABROAD

S.No.	Province/ Institute	Purpose	Duration	Year
1	Kyoto, Japan, Research Institute for Humanity and Nature	Visiting Research Fellow	July 1- September 30	2010
2	Paris, France	To attend 17 th IWGP conference	July 3-9	2016

3	Northwest University, Xian, China	To attend 5 th International conference of Palaeoethnobotany of China	September 10-14	2016
4	Northwest University, Xian, China	International Symposium of Palaeoethnobotanical Discoveries and Studies on the Tibetan Plateau and Surrounding Areas	December 16-19	2019

AS PEER REVIEWER:

- i) Scientific Reports
- ii) Vegetation History and Archaeobotany
- iii) Quaternary International
- iv) PINSA
- v) Current Science
- vi) Journal of Ethnobotany
- vii) Archaeometry
- viii) Man and Environment
- ix) Archaeological Research in Asia
- x) SodhPatrika

NATIONAL AND INTERNATIONAL STUDENTS OR EARLY CAREER RESEARCHERS HELPED/TRAINED IN ANYWAYS:

- i) Alexandra Slucky, Michael Spate of Australia
- ii) Melissa Ritchey, Xinyi Liu of USA
- iii) Kingwell-Benham, U.K.
- iv) Carla Lanceollitti, Spain
- v) Liya Tang, Qin S of China
- vi) DeepikaTripathi, Shalini Sharma, Himani Patel, Neelam Mishra, Anjali Sharma, AnubhaPathak, UmraoVaishali, K.S. Mahar, K.P. Singh of India
- vii) Trained more than sixty PG Diploma students of Institute of Archaeology, ASI, New Delhi.

SUPERVISION

Doctoral

Shalini Sharma (Awarded in 2021), Kumaon University, Nainital, Uttarakhand and BSIP, Lucknow, U.P.

Post-Doctoral

DeepikaTripathi (2019-2022)

Masters

Himani Patel, Neelam Mishra, Anjali Sharma, Anubha Pathak, UmraoVaishali,
K.P. Singh, PankajGoyal , BhushanDighe, Shalini Singh

RECOGNITION:

- a. Nominated-Member, Internal Research Advisory Committee, National Research and Laboratory for Conservation of Cultural Property (NRLC), Lucknow, Govt. of India, Ministry of Culture.
- b. Nominated-Member, Board of Studies for Department of Science in Archaeology, Archaeological Survey of India (ASI), New Delhi
- c. Member, Executive Committee, Indian Society for Prehistoric and Quaternary Studies, Pune
- d. Member, Executive Committee, The Palaeobotanical Society, Lucknow
- e. Paper of the Month Award-March 2019

PERSONAL DETAILS

Date of Birth	:	December 24, 1969
Gender	:	Male
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Address for correspondence	:	Birbal Sahni Institute Of Palaeosciences 53 University Road Lucknow-226007, Uttar Pradesh
Permanent Address	:	Vishakha 405, Sunrise Apartment LDA Colony, Sector-P, Kanpur Road Lucknow-226012, Uttar Pradesh