Clues to Prehistoric Human - Plant Interaction

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Introduction

Among the many challenges encountered in science, there is a striking one, both in its scope and the epistemic difficulties it poses: the reconstruction of the past. The conditions of the past have been so varied that there is no stable baseline on which to base what 'the past' looked like. So, the development of every possible source of useful information for investigating human-environment interactions in the past is becoming increasingly important in recent years. The logic is simple: if we can't reverse the clock, how do we move forward in this altered world we have 'created'? Good science, in any discipline, must overcome these challenges. In this context, the science of archaeology has made it possible to draw general conclusions about the broader picture of the past. Such reconstructions provide the resources to successfully explain past human-plant relations in the ecosystem which were constituted in complex ways as manifested in the archaeological records. However, the records contain only scattered and incomplete clues to the scope and complexity of past human interactions with the plant world. Since most parts of plants are perishable, unlike more durable artifacts, floral evidence is low on the survival scale in India, in particular for Pleistocene archaeological sites. What endures through time is a differential assemblage based upon the prehistoric cultural pattern of disposal, the nature of the material and the geochemical history of the archaeological deposit.

The probability that uncharred material dropped on open soil will become part of the archaeological record is quite remote, owing to the decomposition and disaggregation processes of soil flora, fauna and physical/chemical actions. With the disappearance of soft organic tissues, perhaps resistant plant opal silica bodies, called phytoliths, may survive. Phytolith studies have been used significantly in the multiproxy reconstructions of past environments, human use of plants and the pathways of plant
domestication over the last few decades. However, lack of expertise in this domain in India necessitates training programmes, workshops and seminars for young people by experts in this field. Sharma Centre for Heritage Education (SCHE), Chennai and French Institute of Pondicherry (IFP) have jointly been conducting training workshops in this thrust domain since 2014 funded by INQUA-HaBCom (International Union for Quaternary Research - Humans and the Biosphere Commission). In continuation, the second training workshop and part of an ongoing project on ‘Palaeoanthropological perspectives on plant communities in South Asia’, was conducted to educate the trainees on phytoliths in the context of Quaternary paleoenvironments and archaeology. An overwhelming response was received and 11 trainees from different universities, academic and research institutions from India and Sri Lanka having diverse backgrounds of botany, archaeology, physical geography and marine geology participated in this training workshop.

After a simple inaugural of lighting of lamps by all participants and resource persons at the SCHE, on 18 January 2016, the training workshop was introduced by the project PIs Kumar Akhilesh (Director, SCHE), Shanti Pappu (Secretary, SCHE), R. Premathilake (PGIAR, University of Kelaniya, Srilanka) and K. Anupama (IFP). In their welcome speech, featuring the outline of the South Asian prehistory, S. Pappu and K. Akhilesh welcomed the participants (Fig. 1), situated the workshop in the context of the Sharma Centre’s ongoing research at the Palaeolithic site of Attirampakkam and other sites in Tamil Nadu, and briefed the participants on the workshop and its expected outcomes, stressing the importance of interdisciplinary approaches in interpreting the past. R. Premathilake, in his speech highlighted the overview of phytolith research at archaeological sites in Srilanka and India, highlighting the basics of phytolith research and underlining the importance of taphonomy. K. Anupama outlined the application of palynology in South Asian paleoecology after a brief introduction to the basics of pollen morphology by S. Prasad (IFP). She underlined the great importance of phytoliths owing to the poor preservation of pollen and other proxies in prehistoric sites. The main objective of this workshop was to motivate young researchers for initiating systematic studies of the reconstruction of palaeovegetation and hominin responses in South Asia. It was stressed that a multidisciplinary approach is needed for archaeological studies in order to understand the human-environment interaction, including biophysical realm-such as climate, environment, and the biology of cultivated plants and tended livestock as well as the social realm; viz. people and various facets of their practices, including cultures, societies, and technologies. Participants were given an opportunity to present their ongoing research in the form of poster presentations. These encompassed a variety of topics which included peat cores archives for paleoenvironmental reconstruction in Nilgiris; deciphering climate-eustasy and geomorphic responses based on luminescence dating in lower Ganga plains; microlithic research in Odisha; evolutionary history of floral diversity in Indian subcontinent; artefacts from Late Mature Harappan site, Gujarat and phytolith analysis to understand taphonomy at an archeologically sterile site in Srilanka. The mentors
were impressed by the quality and motivation of the students, and were pleased to mentor and interact with them.

![Figure 1: Group photo of participants at INQUA - HaBCom Workshop on "Prehistory, Plants and People" - 2016](image)

The seven day program constituted 22 lectures and 6 practical sessions commenced in SCHE and concluded at the IFP and included a field demonstration and a one day field excursion. The thrust of the lectures were mainly on holistic perspective on phytoliths, ecology and subsistence, in the context of Quaternary geoarchaeology and on new proxies such as diatoms. Most of the days, forenoon session was devoted to lectures and afternoon session to practicals. Reputed faculties from different institutions and universities discussed different scientific approaches for understanding paleoenvironmental reconstruction. Prakash Sinha (University of Allahabad) covered several topics in his lectures, which included cognitive aspects of prehistoric lithic technology, vegetal signature on stone tools and introductory micro-wear analysis. Lectures by R. K. Mohanty (Deccan College) on Neolithic-Chalcolithic cultural evolution and V. Prasad (BSIP, Lucknow) on the paleoenvironmental and archaeological significance of phytoliths, drew examples from various sites in India, Karthick Balasubramaniam (ARI, Pune) spoke on the applications of diatoms in palaeoecology and archaeology, Satish Naik (Deccan College, Pune) provided an overview of archaeobotanical studies in India, while M.L.K. Murthy (Hyderabad) introduced participants to ethnoarchaeology. K. Rajan (Pondicherry University (PU)) spoke on the context of the Iron-Age to Early Historic transition in South India while Y.
Subbarayalu’s (IFP) lecture introduced how information on plants and people could be obtained from epigraphical inscriptions. D. Narasimhan (MCC, Chennai) introduced herbs and their importance to people both as food and in traditional medicinal systems such as Siddha medicine which was also covered by B. Sebastia (IFP). S. Balakrishnan (PU) provided a geological outline of southern India and Pramod Singh (PU) introduced the Quaternary period with special reference to the Cauvery delta.

Three practical sessions at SCHE introduced the fundamentals of stone tool manufacture and use, with practicals and video demos under the direction of Kumar Akhilesh, an expert in prehistoric lithic technology, where participants were taught to make simple flake tools. Lab sessions at IFP provided a hands-on demonstration of the chemical and other laboratory procedures to extract phytoliths from plants as well as sediments under the guidance of R. Premathilake, S. Prasad and G. Orukaimani. Exercises to observe phytoliths microscopically were also provided. In addition, participants examined polish and striations on tool edges following their use on plant material using polarising incident light microscopes, at Pondicherry University under the guidance of P. Sinha. A field trip to Aranya forest and Project Ecolake, Ousteri, Pondicherry, under the guidance of P. Ravichandran (Manonmaniam Sundaranar University, Tirunelveli) D. Saravanan (Aranya Forest), S. Aravajy (IFP), P. Patel (SAICE, Pondicherry) and L. Das (SAICE, Pondicherry); introduced participants to the identification of trees, grasses and other herbs. P. Ravichandran, J-P Puyravaud (Sigur Nature Trust) and V. Manimekalai (Sri Parasakthi Women’s College, Courtallam) gave lectures on the use of plants, especially grasses, and traditional dyes, by people through time, from past tribal to present modern contexts. Besides, the participants also got an opportunity to attend a Skype lecture by Doris Barboni (CEREGE, CNRS, France) on phytolith from modern plants and soils for understanding past vegetation and prehistoric use of plant resources in Plio-Pleistocene hominin sites in east and central Africa. The workshop ended on 24 January 2016 with valedictory session held in IFP, Pondicherry and a talk on research opportunities in prehistory and geoarchaeology in South Asia by S. Pappu. In the concluding session, all the participants expressed their satisfaction on the course content, sequencing of the topics, delivery of the topics by mentors and the logistics provided at SCHE, Chennai and IFP, Pondicherry. The feedback from the participants clearly indicates that the workshop was highly beneficial to all the participants, as it was very useful, informative, skill building, knowledge sharing and interactive. It was agreed that: (i) despite the good information available for many archaeological sites, it was important to look at the modern approaches to explore the prehistoric human-plant interaction; (ii) create better geochronological and other state-of-the art analytical facilities for palaeolithic studies supported by financial aid (iii) specialized short courses and workshops should be held on different topics of archaeological sciences each year to aid young scientists in India.

In the end, the workshop provided an introduction to the importance of phytolith studies at archaeological sites in South Asia. It has also given opportunity to interact with renowned workers, having an exchange of opinions/suggestions about theoretical
and methodological issues in the study of archaeology and phytoliths. Informal discussion and good interaction with resource persons and participants developed a motive to work in the inter-disciplinary area to solve specific problems on prehistory and Quaternary paleoecology. It not only exposed the participants to a wide variety of expert lectures but also included the screening of documentaries and visit to different laboratories. So, this kind of course is always supportive to the participants for motivation, re-energize and expose to uses of phytolith proxy in various other disciplines and solve the problems through a multi-disciplinary approach and to gain an understanding of the archaeological context for non-archaeologists. In addition, the aforementioned workshop provided an opportunity to the beginners to interact with some of the eminent workers from the scientific community. The organizers have been successful in achieving their mission of spreading knowledge and bringing the young generation of researchers together.