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Human–plant relationships during Dark Ages

Beginning of agriculture marks an important event in the history of mankind. Domestication of animals and cultivation of plants by man would not have been sudden; it could have gone through long process. Investigating human–plant relationships during Dark Ages, especially pertaining to food plants and agricultural activities is one of the central issue in palaeoethnobotany. A. K. Pokharia (**page 248**) attempts to reconstruct agriculture based subsistence economy during 3rd–2nd millennium BC at Neolithic Tokwa. Palaeoethnobotanical investigation in Vindhyan region is much recent. Earlier, archaeologists used to send a few incidentally recovered plant remains, generally much small in quantity and collected unsystematically, to botanists for identification. It is only due to some archaeologists, who realized the importance of botanical remains in shaping economic potential of cultural settlements, the development in palaeoethnobotanical data in this region has started coming up. As a result, the data from Neolithic Tokwa as well as some other sites in this region has contributed in understanding the ways in which pre- and protohistoric people of the region may have exploited useful plants in their environment and reconstruction of agricultural economy.

The puzzle of pre-Columbian introduction of American plants has evoked and still evokes contradictions in historical-linguistics documentations amassed during about last four decades, but the sculpturing of some of them in the pre-Christian stone architecture of temples and stupas has for some time offered potential possibilities of research concerning to the considerably earlier contacts between the Old World and the New World. Coincidentally, the factual and incontrovertible botanical evidence of American custard apple (*Annona squamosa*) from Tokwa, has led to favour Asian–American trans-oceanic contacts before 1498 AD.

Fluxes of CH_4 and N_2O

Human-induced climate change by the production of greenhouse gases [primarily methane (CH_4) and nitrous oxide (N_2O)] due to forestation/deforestation has emerged as an environmental issue related to the global warming problem because forests and especially mangrove wetlands are possible sinks/sources for carbon dioxide and other related greenhouse gases. An increase in atmospheric concentration of such gases warms the earth's surface and the lower atmosphere and is thought to be the largest anthropogenic factor contributing to global warming. Estimation of the balances and fluxes of CH_4 and N_2O, the two key anthropogenically altered gases, have become necessary, as these gases are normally released from wetlands, are important in order to evaluate the offsetting effects of these greenhouse gases against CO_2 sequestration by mangrove coastal ecosystems. The emission from mangrove sediments of the naturally occurring greenhouse gases, CH_4 and N_2O, seems to be highly variable from one site to another. Krithika *et al.* (**page 218**) estimate fluxes of CH_4 and N_2O from an Indian mangrove, where the cumulative burden of effluent disposal on fluxes is predominant. The study also reconfirms that mangroves are sources of CH_4 and N_2O and highlights the importance of mangrove roots as transport pathways for these gases to the atmosphere. Therefore, it is essential to consider the diverse vegetation and root types among mangroves in order to be able to predict the cumulative emissions from mangroves on a global scale. In addition, precise evaluation of carbon-based greenhouse gases in mangrove forests and sediments is essential to quantify carbon credits generated by 'carbon sink' enhancement forestation using the CDM (Clean Development Mechanism) framework of the Kyoto Protocol ratified in 2002.

Exploring planets

Expanding frontiers of robotic exploration and phenomenal improvement in remote sensing techniques have opened up new possibilities in exploration of the solar system. With more than six countries acquiring capabilities of undertaking mission to various bodies of the solar system and planning long-term exploration programmes, we stand at the threshold of making new discoveries in understanding origin of planets, their early evolution and search of life beyond earth. This century has begun with renewed efforts of exploring the

Moon and three missions, namely Europe's *SMART-1*, Japan's *Kaguya* and China's *Chang'E-1* have already gone to have a new look at the moon, soon to be followed by India's *Chandrayaan-1* and American *Lunar Reconnaissance Orbiter*. Likewise, several missions to Mars are finding new evidence pointing towards the possibility of fossil life there. Exploration of outer planets, their satellites, asteroids, comets and Kuiper belt objects has revealed that they are even more exciting laboratories in space, offering much to learn about physico-chemical processes occurring in different environments. Making appropriate priorities and coordinated missions are the best way to optimize science returns from different missions. With this objective, a quick survey of planets and basic questions related to some of them have been discussed (**page 189**). The arguments advanced in this article suggest that Moon, Mars and some satellites of Jupiter are the most exciting objects for exploration in the near future.