

Abstract

Western Rajasthan is an arid arid landscape with rural societies living in complete harmony with the prevailing ecological niche, conditions and resources. There are examples of human being rearing animals such as the Equus species which are specific to this region. Due to the high temperature prevailing in the desert people used cruse for cooling drinking water before the advent of new amenities such as refrigerators. More than 70% of the population still uses this device. Hence, sustaining the livelihood of the people who make and use these devices.

Therefore, the question arises “Are technological innovations embedded within these traditional devices, practices and materials of daily use in rural India?” This question also tries to find answers to the sustenance of these traditional knowledge, materials and practices in the twenty-first century of manufacturing, construction and processing.

In rural houses of various parts of India animal dung finds its regular use as an additive to mud or clay in floor finishing and wall constructions. Marwar region of Rajasthan state in India defines the ecological habitat for its Equus breeds. That is the reason of abundant availability horse dung in this region and thus still finds its use in construction of load bearing material (to construct a wall in rural homes). The study and experimental results in this thesis report that horse dung composite strength properties are at par or better than concrete with a comparatively faster curing rate. This construction method uses an equal volume of horse dung and pond soil (*Meth Mitti* in Marwari dialect). This technology basically is inherited by *Marwari* women (*santhi* or *sansi*) who construct aesthetic indoor shelves. Structural integrity is an embedded technological advantage in mixture composites containing equal volumes of soils and organic materials. The study also acknowledges these composite constructions to provide environmental conditioning including prevention of microbial growth within closed spaces.

Another material of sustained importance in this region is the off-white cruse or earthen pots. The baked ceramic off-white color cruse is manufactured from a mix of soil and organic material (such as sawdust). Off-white water cruse has prescriptive acceptance in this region through ages compared to red colored water cruse from the neighbor state. Better resistance to load and cooling capacity were found to be the technological advantages responsible for age-old sustenance of these pots. The off-white color of the cruse of western Rajasthan is due to presence of salt. Apart from these technical aspects, cultural reasoning (ethnographic) has also reported sustenance of using an off-white colored pot for drinking water. It also reiterates that use of these pots in different cultural events round the year by societies helps to preserve and sustain the technological innovations.

An equal amount of sawdust and clayey soil is mixed for manufacturing clay ceramic water filters in several parts of the globe. Is there a connection between the use of equal volume ratios of soil and organic matter for household construction as well as ceramic water filters? Does the structural correlations and material interdependences (which permeates through the load bearing functional materials discussed here) defines the connection? If there exists such a connection, can a decentralized approach to the manufacture of low-cost ceramic water filters be designed to preserve the livelihood of traditional rural artisanal potters in Rajasthan? Therefore, this thesis will retrace the basic manufacturing management practices of composites used in pottery practices of local rustic western Rajasthan in order to investigate possibilities of such a connection.

Further, the other quest of this document is to search baking strategies within the local potter's traditional knowledge which can be utilized to manufacture ceramics with structural quality, micro-structural functionality (at par with international procedures) and efficiency to treat water to drinking water qualities. Thus, this document provides scientific explanation to traditional technologies for production of soil-based functional material shows the harmonization between new techniques and sustained traditional manufacturing methodologies. Therefore, the discussion with this thesis provides empirical and theoretical explanations for the hidden engineering within systems and devices which made them sustainable.

...