



Traditional Knowledge and Innovative Practices for Water Management and Conservation in Indian Cold Desert, Leh Ladakh

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Abstract: The Leh district of Ladakh region in Jammu and Kashmir state is located in the Trans-Himalayan ranges. This region has unique and rich ecological knowledge. The objective of the current study is to document the rich traditional methods for water conservation and management system in this district. The data was collected through extensive survey, interview, open-ended questionnaire, group discussion and Participatory Rural Appraisal (PRA) methods. The indigenous technologies like complex irrigation canals systems and traditional water storage ponds (*Zing*) are in use for water storage and distribution. The traditional watermills (*Rantak*) are also in use for grinding barley, wheat and pea. A total of 57 canals and 50 storage ponds were recorded in the study area. Also, a total of 150 *Rantaks*, which were functional before ten years, now decreases to 72 functional *Rantaks* were recorded in the study area. There is very strong community bond among the villagers, all work together for maintaining the canals and storage ponds. They have developed a ways of life and community institutions that facilitate them to minimize conflicts, optimize their use and maintain their water security. They are very spiritual and strongly believe in co-existence with the nature. Anthropogenic activities like construction without proper rituals consider pollution and believes it disturbs the earth bound numen called *Lhu*. The untimely melting of glacier and unseasonal snow in the region added much pressure on the scare water resource for irrigation. Introducing the novel innovation like artificial glacier, they are trying to minimize the water shortage mainly in the Spring season. To tackle the current situation of water shortage, there is need of strengthening and amalgamation of traditional knowledge with the new innovation to overcome the water scarcity and also to bring the large cultivable barren land of Ladakh under plantation.

Keywords: Leh Ladakh, Traditional ecological knowledge, Water conservation, Water security

Traditional Ecological Knowledge (TEK) is a pool of knowledge and beliefs, passed down through generations by cultural transmission, about the relationship of living beings with one another and with their surrounding environment. Further, TEK is an attribute of societies with historical continuity in resource use practices. These are non-industrial or less technologically advanced societies most of them are indigenous or tribal (Grenier 1998). Traditional resource management is the use of local ecological knowledge for the unbiased utilization, sharing and regulation of natural resources through social norms, customs and rituals. In this, the communities put more emphasize on the interactions and co-existence of all the shareholders, rather than control over the resources and stress on their spiritual and personal relationships with one another and their environment (Gadgil 1998). Management of scarce water resources in the drylands for the people dwelling there is a major challenge. Over the centuries, through traditional methods of water harvesting and management, dryland dwellers have overcome this challenge, which have ensured long-term sustainability of water resources through demand management and adequate resource replenishment (Adeel 2009). The indigenous knowledge was also acknowledged in

"Agenda 21" of the 'Earth Summit' in Rio de Janeiro in 1992. 'Agenda 21' is a non-binding action plan of the United Nations with regard to sustainable development. The Leh district of Ladakh, a cold desert, is located in the trans-Himalayan ranges has rich traditional ecological knowledge. Indigenous ecological knowledge of this region is very rich. Thus, there is a need to document the vanishing indigenous wisdom of the people. Until the 1960s, the region was unknown and somewhat isolated, with little or no influence of industrial technology. The traditional way of living and organization, based on the doctrine of Buddhism, devised to support the population with the available finite resource base and the limited capacity of the environment. According to economic review of Leh district (2014-15), more than 70 per cent of the populations were engaged in agriculture (DSEO Leh, 2014-2015). Agriculture and its allied sectors were primary sources of living in Ladakh. The water for all the cultivated area was through irrigation channels. The indigenous population sustain in the region for centuries despite having only short period of growing season and almost no effective rain. Largely the traditional society is self sufficient agrarian economy. Before the silk route was closed surplus grain was traded for the few excess requirements like salt, tea and