



Indigenous technical knowledge (ITKs) for successful animal husbandry in cold deserts of Ladakh valley in Indian Himalayas

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The 'Cold Deserts' in India are located in Ladakh (Leh and Kargil districts of Jammu and Kashmir) and in some parts of Himachal Pradesh. These are ecologically varied and biologically diverse systems being characterized by subzero winter temperature ranging from -40° to 20°C and annual precipitation less than 30 cm that too in the form of snow. This area is inhabited by small and marginal farmers. Agriculture is the pre-dominant occupation of the inhabitants. The primary source of economy is agriculture. The cultivation is done in narrow strips of land which is irrigated (100%), as most of the precipitation is in the form of snow that too during winter. Agricultural operations begins in April and ends in September. Animal husbandry is practiced by all the agriculturists. Nomadic and semi nomadic grazing with sheep, goats and yaks is followed. The cold desert of Ladakh has huge barren lands where even agriculture is uncertain, therefore, people mainly depend on livestock resources. The total livestock population of Ladakh region during 2014 was 6.406 lakh.

The inhabitants of the area have acquired rich traditional knowledge concerning animal husbandry being developed and adapted as a result of years of practical experience for sustained livelihoods. The adaptation practices and mechanisms flexible to the needs of the natives have coexisted in the natural system till date in spite of such hostile conditions. The documentation of indigenous technologies on animal husbandry will help in understanding, refining and assessing for economic rehabilitation of this otherwise fragile region (Bhanotra and Gupta 2016). It will open the scope for scientific investigation of many technologies which are in vogue for the prosperity of the region and for which scientific explanations are not available till date (Lakshminarayana

and Rao 2013). It will further help in conservation of rich traditional knowledge hitherto practiced but now the most threatened resource of dry temperate region (Punjani and Pandey 2015).

Participatory rural appraisal tools were used for the documentation of appropriate farm technologies in Leh district of Ladakh valley. Major emphasis was put on semi-structural interviewing, focus group discussion, analysis group discussion and transect walk. In few cases, village meetings were also arranged. A detailed survey of the valley was made and 50 graziers were consulted through intensive touring and repeat surveys during the summers of 2016–17 as during winters there is no accessibility and area is inhospitable. Appropriate scientific explanation have been given wherever possible, for the use of ITKs with the consultation of experts.

The following ITKS for animal husbandry are widely adopted.

Grazing pattern, appropriate stocking rate and management of grazing lands (doksas) for fertilizer needs and ecological challenges: Due to presence of the large stretches of pastures in the alpine areas of the region, livestock constitute the important component of rural life. Its management for draught energy and milk production being life line of the people speaks of the age old wisdom sustaining the rural life in cold deserts. The grazing cycle evolved over the years is not only compatible with the carrying capacity of the pastures but also ensures their ecological rejuvenation. No aberration is made and rules are rigidly followed by all.

Village grazing lands varying in size and number (from one to four) are called *doksas*. The lower *doksas* have permanent huts, walled and roofed with stone, and with stone walled yards and pens for the stock while the remaining have circular stone walls for temporary shelter. These *doksas* are grazed by rotation depending upon their distance from the village. The management of *doksas* is compatible with the ecological conditions of the area. These *doksas* serve as the buffering zones for grazing during early spring and late autumn when the higher grazing lands are snow covered. Rotational grazing is a common practice for

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sequential recovery of vegetation. These *doksas* also serve as the source for organic manure. Grazing for different animals has been regulated for balanced and appropriate grazing pressure. Sheep, goats, cows and *dzos* spend their summer at *Yimaling* (high alpine pastures) in different specified zones.

The scientific explanation for this ITK lies in the maintenance of environmentally and resource suited supreme cycle of migration from high alpine to foot hills. The maintenance of traditional grazing rights through cordial relationships between local institutions speaks of their long vision. The animal movement down in the valleys is governed by their urge for mineral consumption. This type of grazing management helps in dispersing the grazing pressure to a larger area and providing sufficient time for recouping of vegetation. This also helps in natural resource management as the distant fodder resources are properly harnessed which otherwise would have gone waste.

Grazing in cold reaches for quality Pashmina wool: The *pashmina* goat herds in Ladakh valley are mainly reared in the Changthang area at an elevation of 4,000–5,500 m amsl. The vast areas are barren and devoid of any vegetation. The goat flock owners called *Changpas* as a practice, graze goats in deeper gorges and severely cold *nallahs* in upper reaches for quality production of *Pashmina* wool.

As a scientific explanation cold climatic conditions are highly suitable for good quality *pashmina* wool and good quality wool must have long and soft hair. The selection of deep gorges and *nallahs* near glacial points meets this requirement.

Use of draught power as per the soil texture: Ploughing is generally carried out by *Dzos*, however, in sandy situations horses are employed for its speedy completion. In Turtuk area of Nubra valley, ploughing is done by a single horse. This practice speaks of land, labour and time management for large and scattered holdings. All types of available animals are put to use for draught purposes for speedy completion of work in the limited growing period.

Health management in yaks and dzos: Yaks and *dzos* are not allowed to drink water after heavy works by tiding their mouths during their back journey from fields. Similarly, during summer grazing when these animals return back to *doksas* for recouping salt requirement, the animals are tied for 24 h for checking their water urge.

As per the farmers, the intake of water after heavy exercise in fields leads to formation of tumors in the neck region. As per the scientific explanation, this may be due to some physiological disturbances with sudden contraction and expansion of muscular tissue by sudden changes in body temperatures caused by intake of cold water in summer months. Fodder consumption by yaks and *dzos* increases their urge for salt which ultimately leads their desire to consume more water from frequently available glacial streams resulting in inflation of stomach and eventual death in many cases. Heavy water consumption immediately after salt intake also leads to the loss of sodium and chloride ions and the fear of losing the animal may be the simple

mean of continuing this scientific message.

Treatment for dysentery in animals: For treating dysentery, a red hot iron is brought near the nose of the animals. It is claimed to be most effective treatment against dysentery. Its application requires research input from veterinary point of view.

Animal paralysis treatment through locally available stone (Chaggar): Indigenous treatment for paralysis is the use of locally available white stone, called *Chaggar*, which is first heated and then directly contacted with the head of the animals. Scientific study and analysis is required to know the chemistry of this white stone. May be any clotting in brain or any nervous deform is sensitized by this hot stone, resulting in recovery from paralysis.

Traditional animal breeding: The breeding of *dzo*, a cross between yak and cow is one of the biggest success stories of traditional technologies. Traditionally cows are crossed with yak followed by back crossing with yak in subsequent generations. For most of the summer, yak and *dzo* are sent to separate valleys to feed them but in July one or more selected yaks are brought back to run with the females. *Dzo* is highly adaptive to the area for ploughing and threshing. The reference of these animals in folk songs is indicative of their importance in socio-cultural and economic life of people. At lower altitude during July, the selected yaks and cows are allowed to graze together for attaining higher milk yield and animal vigour through cross fertilization. The calving from these crosses has higher survival percentage. *Dzos* are preferred over yaks due to their size, strength and vigour for ploughing and threshing of crops. Their role in threshing is significant as the crops are mostly threshed by animal tramlings. *Dzos* can also be easily trained to move in a circle as compared to yaks. *Dzos* once left in the threshing ground, continue to rotate in a sorrel, trampling thereby the harvested crop.

Feeding of Capsion wood and castration of male sheep for improved sheep wool production: A locally available shrub called capsion (stem of 20–25 cm diameter) is fed to sheep along with bark. It is claimed to enhance wool production. Castration of male sheep for increased wool production is another traditional practice. The capsion wood due to its pertinacious nature may be improving the wool quality and production. It requires further scientific investigation.

Animal treatment for different ailments: Local methods are developed for treating animal diseases. These measures are quite effective and are still in use. Long grasses found in fields are boiled and are fed to animals suffering from stomach problems. The problem of falling woolen sheep is overcome by massaging a mix of sulphur and sarson oil. *Khurda* disease (insect attack on sheep feet) is cured by wrapping the crushed leaves of locally available *karnu* tree on the infected feet which is earlier washed with lukewarm water. A hot soup of *zira* and garlic is fed to animals suffering from simple temperature and cold.

The scientific explanation behind these locally developed treatments of animals claiming to be highly effective require

further critical appraisal/analysis for broad basing this indigenous knowledge.

Use of goat and yak hair for blankets: Changspas use goat and yak hair for preparing blankets (*Chali*). Goat and yak hair are very warm and their transformation into blanket helps the shepherds in meeting the challenges of harsh and cool climatic condition.

SUMMARY

The sustained livelihood of the inhabitants of cold deserts area have heavy dependence on animal husbandry which is traditionally practiced through the adoption of rich traditional knowledge concerning animal husbandry. This Indigenous Technical Knowledge (ITK) is widely used since generations and has shown its usefulness through successful animal husbandry in these harsh region of the country. There is need for proper documentation of ITKs for proper understanding, assessing and refining on scientific principles. It will also help in conservation of rich traditional knowledge hitherto practiced but now the most threatened resource of dry temperate region. The present study

therefore aimed at the documentation and possible scientific explanation for the most practiced ITKs in cold deserts of Ladakh region. Participatory Rural Appraisal tools were used for the present study.

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