

Participatory pasture development in hot arid region of India

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Introduction

Livestock production is one of the main occupations of resource-poor and resource-rich people living in India's arid regions, and common grazing lands have always played a major role in livestock based livelihood systems, as around 50% of animals depend on grazing (Misra *et al.*, 2015). According to the National Sample Survey Organization, common property land resources constitute about 15% of the total geographical area of India, of which 23% is community pasture and grazing lands and 16% have been classified as village forests and woodlots (NSSO, 1999). At another level, India has the largest livestock population in the world, with 512 million head of livestock, many of them raised by small and marginal farmers who depend on grazing land to meet the fodder requirements of their animals (Anonymous, 2012).

Traditionally, close link exists between livestock and common property resources (CPRs), as grazing is predominate feeding practice among the livestock keepers in hot arid region of India. This complex inter-relationship between CPRs, livestock and crops in arid and semi-arid production systems has contributed to the sustainability of dryland agriculture for generations (Misra *et al.*, 2009). However, the typical scenario of community grazing lands has been one of gradually declining productivity due to overexploitation, and declining area due to privatization. Keeping this in view, Livestock Production Systems & Range Management Division and Krishi Vigyan Kendra (KVK) of Central arid Zone Research Institute (CAZRI), Jodhpur identified pasture development as a major thrust area for the hot arid zone of India. The interventions related to pasture development was carried out on a total of 88 ha common/private land in ten *gram panchayat* in two districts (Jodhpur and Nagaur) of western Rajasthan during 2010-14 in collaboration with local farming communities, NGOs and Goushala.

Materials and Methods

To improve the availability of good quality forage, pasture grasses such as *Cenchrus ciliaris* and *Cenchrus setigerus* were sown at village commons, fields and bunds of farmers' land spreading in ten villages of Jodhpur (7) and Nagaur (3) districts of Rajasthan during 2010 to 2014 covering an area of 88 ha. Technical backstopping and improved seed of range grasses were provided by the KVK, CAZRI and field implementation was facilitated by the local NGO and village committees in the respective villages. Improved varieties of grasses were sown after soil works with the onset of rainy season with recommended practices of cultivation.

Results and Discussion

The dry matter production of *Cenchrus ciliaris* and *Cenchrus setigerus* ranged from 13-15 q/ha and 14-18 q/ha in the shallow soils, respectively under the protected conditions. The productivity of sown pasture under such conditions was very high as compared to natural pastures without protection (2-5 q/ha). The respective average dry matter production of these grasses over the sites were 18.57 and 17.19 q/ha, respectively under protected conditions, which were considerably higher than the biomass yield of natural pastures (5.8 q/ha). The lower dry matter production of grasses under natural conditions was attributed to higher grazing pressure. Since local grazing pressures are surpassing the recommended stocking rates of the rangelands at an enormous pace. The pressure was 0.87 ACU/ha in 1981 which increased to 1.02 ACU /ha in 2001 and 1.55 in 2012 against the optimum desirable density of 0.2 ACU/ha (Tiwari and Arya, 2006). According to livestock census (2012), the number of animals in the hot arid zone increased by 41 % between 1951 and 1961 and by 15 % between 1995 and 2012. After three years of establishment, productivity of common lands improved significantly (2.7 t/ha dry fodder from Ketu Kallan, 2.4 t/ha from Bhalu Ratangarh, 2.3 t/ha from Begaria and 1.5 t/ha from Govindpura) compared to natural pasture (< 0.5 t/ha). Farmers collected 6500 kg grass seed of *Cenchrus ciliaris* and *Cenchrus setigerus* from developed pasture and provided to another farmers and NGOs for community pasture development. Harvested biomass was stored after chopping at the respective sites as 'fodder bank' and made available to

the weaker section of the society during stress period. The feedback from farmers in those areas revealed that the productivity of animals increased due to availability of quality fodder during dry months. Thus the preference for rearing milking animals of better quality become evident against the prevailing practices of keeping large number of animals of less productivity.

Conclusion

Grazing based livestock production plays an important role in the rural economy of hot arid region of India. Restoration and improvement of the deteriorated grazing lands and their proper management is, therefore, extremely important from the environmental view points, and also for meeting adequate fodder requirement for the large livestock population. Thus, the present study has demonstrated the benefits of pasture development to the farmer.

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