

Pasture establishment and sustainability in arid region of Rajasthan, India: Prospects and constraints

Surendra Singh Shekhawat^{*}, S. M. Kumawat, S. L. Godara

S.K. Rajasthan Agricultural University, Bikaner, India

^{*}Corresponding author e-mail : surendrashekhawat884@gmail.com

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Rajasthan is the largest state of India and covers nearly 10.4 per cent (342.65 lakh ha) of total geographical area of the country. About 65 per cent of its population is dependent on agriculture. According to livestock census-2007, Rajasthan ranks at the third place (56.663 million) in the country for total livestock population after Uttar Pradesh (60.272 million) and Andhra Pradesh (60.175 million). The large livestock population of the state shows importance of fodder in the state. Western part of Rajasthan state covers the area of the state towards western side of Aravali range of hills, which divides the state almost in two parts viz., eastern and western. The western part of the state is important for animal husbandry and forage management point of view. The reason is that this region is characterized as arid region and at many places in this region annual rainfall is below 250 mm. Many times droughts occur in this region and crop production for grain purpose does not become successful. So, farmers remain more dependent on animals than crops. Important animals in this region are cattle, buffaloes, sheep, goats and camels.

The state has 10 agro-climatic zones and agriculture is mainly rainfed. Out of total geographical area of 342.65 lakh ha, 26.75 lakh ha is under forests, 42.62 lakh ha is not available for cultivation and 63.19 lakh ha is other uncultivable land (excluding fallow land). The total cultivable area is around 220.00 lakh ha. According to State Agriculture Policy (2013), the state has about 17.07 lakh ha of land under permanent pastures for grazing and this area under pasture is not able to meet total fodder requirement of present livestock population. So, fodder security for this increasing livestock population is required by promoting fodder crops and fodder and feed storage systems. Silvopastoral practice is also required to be promoted in the arid western Rajasthan.

Pasture development is important on a land area, where crops cannot be taken. Pasture can be developed by growing perennial grasses. Silvopasture and horti-pastoral systems are also important in which these grasses are also used. Perennial range grasses are important in western part of the state. They supply fodder at cheap cost and help in soil conservation. Perennial grass species like *Cenchrus ciliaris*, *Cenchrus setigerus*, *Lasiurus indicus*, *Dichanthium annulatum*, *Panicum antidotale* and *Sehima nervosum* give high forage yield under natural rainfed conditions. *D. annulatum* is adapted to heavy soils with annual rainfall above 380 mm. *P. antidotale* is suited to well-textured soils with annual rainfall of 250 mm and above. *S. nervosum* grows well on hilly terrain.

Sewan (Lasiurus indicus) grass is important in Bikaner and Jaisalmer districts of Rajasthan. *Dhaman (Cenchrus ciliaris)* and *Moda Dhaman (Cenchrus setigerus)* are important in other arid districts of the state. These two grasses require comparatively more fertile soil in comparison to *sewan* grass. Soil fertility of pastures can be improved by cultivation of legumes. Legume crops also improve nutritive value of the fodder. *Clitoria ternatea* is one such perennial range legume for the western Rajasthan. Other important legumes for pasture development are *Dolichos lablab*, *Stylosanthes hamata*, *Stylosanthes humilis*, *Stylosanthes guyanensis* etc.

Perennial fodder grasses are an important source of fodder in arid region of western Rajasthan and they act for soil conservation also. Such three important grasses of the region are *Lasiurus indicus*, *Cenchrus ciliaris* and *Cenchrus setigerus*. Soil erosion by high velocity winds is a severe problem in the region especially in summer season. The importance of these grasses is that they can be used for pasture development in the area and can be planted on wastelands of the region for soil conservation and fodder production.

Lasiurus indicus is an important perennial fodder grass in Jaisalmer and Bikaner districts. This grass has very low water requirement and continues to grow on an area for many years after its establishment by seed or root slips. This is a wonderful grass of the Thar desert for stabilization of sand dunes and fodder supply. When it gets water in soil, its growth starts and during drought period, its parts in the soil remain in dormant condition. Such property of survival during adverse weather situation is found in other perennial fodder grasses also. but water requirement of all perennial fodder grasses is not similar. *C. ciliaris* is important in other arid areas of the region. Its water requirement is more in comparison

to *Lasiurus indicus*. *C setigerus* is important in Jalore, Sirohi and Pali districts of the region. Its water requirement is comparatively more in comparison to two other grasses and it is more suited for semi-arid region.

With increase in irrigation facilities in the region due to canal water availability and other irrigation sources, the grasses like *Lasiurus indicus* are facing extinction due to mechanization of cultivation practices. This is resulting in increase of soil erosion in the region. So, at this time, there is necessity that these grasses are kept in the fields in certain rows after some space for cultivation of crops. Their presence in the fields at a particular distance in rows will help in checking of the soil erosion and fodder production also. There is need that the Government should take special efforts for establishment of such grasses in wastelands for rural employment and fodder supply from the neglected areas. Special efforts are needed for establishment of such grasses on sand dunes for their establishment and checking of soil erosion. There is lack of proper policy to grow pasture on community land and wasteland. Once pasture is established on such land, there should proper protection of the pasture and grazing policy.