

# Management of Grasslands in India: A Policy Perspective

Mahendra Singh<sup>1\*</sup>, Vikas Kumar<sup>2</sup>, S.K. Singh<sup>3</sup> and Sanjiv A. Kochewad<sup>4</sup>

<sup>1&2</sup>ICAR-National Institute of Agricultural Economics and Policy Research, New Delhi, India

<sup>3</sup>Bundelkhand University, Jhansi, Uttar Pradesh, India

<sup>4</sup>National Institute of Abiotic Stress Management, Baramati, Maharashtra, India

\*Corresponding author: mahendra.singh8@icar.gov.in

Received: 10-07-2019

Revised: 20-10-2019

Accepted: 23-11-2019

## ABSTRACT

Compound annual growth rate of various grazing resources and livestock population in India during 1950-51 to 2011-12 shows that area under grazing resources is continuously decreasing and livestock population is increasing at national level. It is observed that per livestock total grazing-land availability (including protected forest and unclassified forest) was only 0.20 ha/livestock in the year 2012, it implies that the stocking rate was five livestock against carrying capacity (0.20 to 1.47 adult cattle units (ACU/ha), IGFR, 2014) during 2012 at all India level. The CAGR in availability of grazing-land is found about two percent in decelerating rate while livestock population over half percent in accelerating rate, which implies that grazing resources declining about four times of livestock population during last decade. The carrying capacity of grazing resources is over utilized. Grazing resources are declining continuously while livestock population increasing since last six decades. To sustain the grazing resources it is imperative that economic analysis based on societal perspective, intergeneration equity and valuation of grassland ecosystems services and its incorporation into planning process is necessary condition rather than only consideration of financial and profitability criteria.

**Keywords:** Ecosystem services, grassland, policy, sustainability, valuation

Livestock is a largest non-land asset in rural household and important component of the agricultural sector in countries all over the world. The rapidly growing demand for livestock products in developing countries reinforces the value of livestock in household asset and its potential to reduce poverty (World Development Report, 2008). Livestock sector plays an important role in socio-economic development and provides gainful employment and supplementary family income in Indian economy. Livestock sector contributed 3.5 percent of the total gross domestic product (GDP) and 24.8 percent of GDP from total agriculture and allied activities in India during 2012-13 at factor

cost and constant (2004-05) prices (GoI, 2014). The annual compound growth rate (ACGR) was estimated 6.34 percent and 3.78 percent of GDP from livestock sector and total agricultural and allied sector respectively during Eleventh Five Year Plan and livestock sector provided cushion for agriculture sector to achieve targeted growth rate. The ownership of livestock is much more egalitarian since poor farmer families mostly own cattle, buffalo, sheep and goats (NSSO, 2014). The livestock sector in India faces the major challenges such as shortage of feed and fodder, low productivity, livestock health, livestock and environment and Knowledge Gap. While the livestock population is increasing,

the gap between the requirement and availability of feed and fodder is increasing primarily due to decreasing/stagnation area under fodder cultivation and reduced availability of crop residues as fodder and continuous shrinkage of common property resources leading to over grazing in the existing grasslands. (NSSO, 1999; Livestock Policy, Govt. of India, 2013). It is reported that out of total green fodder consumed by livestock, about 40 percent contribution from grazing, 27 percent from cultivated fodder crops and 33 percent from grasses, weeds, and tree leaves collected from cultivated fields and uncultivated lands such as pastures, public lands, wastelands, fallows and forests (MoSPI, Government of India, 2015). Therefore, it is imperative to manage grazing resources in such a way that able to provide green fodder on sustainable basis in India. The present study is an attempt to provide insights into the policy measures for sustainability of grassland resources in India. The specific objectives of the study were to analyse the status and availability of grazing resources in relation to livestock population and to assess the impact of various existing policies for common property resources including grasslands in order to suggest priority research areas and policy measures for sustainable use of grassland resources in India.

## MATERIALS AND METHODS

The study is based on secondary data published from various ministry of Government of India. Compound annual growth rate (CAGR) was used for trend analysis. CAGR is the mean annual growth rate of an investment over a specified period of time longer than one year. It helps in determining returns for individual assets, investment portfolios, and anything that can rise or fall in value over time.

$$CAGR = (EV/BV)^{1/n} - 1$$

Where,

*EV* = Ending Value

*BV* = Beginning Value

*n* = Number of years

## RESULTS AND DISCUSSION

The compound annual growth rate of various

grazing resources and livestock population in India during 1950-51 to 2011-12 is presented in Table 1. The negative trend observed in almost all the component of grazing resources while positive trend in growth of livestock population in India during last six decades. This implies that area under grazing resources is continuously decreasing and livestock population is increasing at national level.

**Table 1:** Growth and status of grazing resources in India (2011-12)

Particular	Area (million ha/ population (million number) TE2011-12 Compound annual growth rate (CAGR %) 1950-51 to 2011-12
Barren and unculturable land	17.20 -1.51
Current fallows	15.01 0.50
Culturable wasteland	12.74 -0.90
Fallow lands other than current fallows	10.61 -0.22
Permanent pastures and other grazing land	10.31 -0.25
Land under miscellaneous tree and groves	3.20 -1.17
Forest land	70.00 0.57
Livestock population	512.06 1.23

*Source:* Authors' estimates.

The growth in livestock population, grazing resources, per livestock grazing-land availability and gap between availability of grazing-land and livestock population in major states during TE 2003-2012 is presented in Table 2. The total grazing-land availability (including protected forest and unclassified forest) per livestock was only 0.20 ha/ livestock in the year 2012. This implies that the stocking rate was five livestock against carrying capacity (0.20 to 1.47 adult cattle units (ACU/ha), IGFRI, 2014) during 2012 at all India level.

Moreover, if we exclude the protected and unclassified forest area where forest department allow for grazing with certain restrictions from grazing resources the stocking rate increased up to eight livestock per ha of grazing lands.

**Table 2:** CAGR in livestock population, grazing land availability during 2003-2012

State	Grazing land available* (ha/livestock) TE2011-12	Grazing land available** (ha/livestock) TE2011-12	CAGR in grazing land during 2003-2012 (%)	CAGR in livestock population during 2003-2012 (%)	Gaps (%)
Andhra Pradesh	0.16	0.14	-0.53	1.64	-2.17
Arunachal Pradesh	3.08	0.19	0.09	1.24	-1.15
Assam	0.15	0.10	-0.31	3.80	-4.11
Bihar	0.07	0.05	1.49	2.13	-0.64
Chhattisgarh	0.36	0.14	-0.01	1.15	-1.16
Gujarat	0.28	0.21	1.00	2.53	-1.53
Haryana	0.05	0.03	-1.36	-0.07	-1.28
Himachal Pradesh	1.25	0.53	-0.02	-0.53	0.51
Jammu & Kashmir	0.11	0.08	-6.02	-0.71	-5.32
Jharkhand	0.32	0.21	0.94	1.41	-0.47
Karnataka	0.19	0.15	-1.16	0.81	-1.97
Kerala	0.09	0.09	0.47	-2.14	2.61
Madhya Pradesh	0.22	0.13	-1.13	0.20	-1.33
Maharashtra	0.24	0.21	-0.51	-1.16	0.65
Manipur	2.31	0.01	0.00	-2.83	2.84
Meghalaya	0.89	0.46	-0.32	2.62	-2.94
Mizoram	3.81	0.98	0.35	1.14	-0.79
Nagaland	1.34	0.34	0.33	-3.25	3.57
Odisha	0.34	0.18	1.33	-1.14	2.47
Punjab	0.05	0.01	0.01	-0.57	0.58
Rajasthan	0.24	0.20	-2.07	1.75	-3.82
Sikkim	0.20	0.07	0.09	-1.35	1.44
Tamil Nadu	0.18	0.17	-0.13	-0.89	0.76
Tripura	0.12	0.01	-2.22	3.28	-5.50
Uttarakhand	0.47	0.26	-0.51	-0.30	-0.21
Uttar Pradesh	0.05	0.04	-0.74	1.74	-2.48
West Bengal	0.03	0.02	0.67	-2.71	3.37
Andman & Nicobar	1.13	0.12	-6.28	-2.10	-4.17
All India	0.20	0.13	-1.91	0.56	-2.47

\*including protected forest and unclassified forest; \*\*excluding protected forest and unclassified forest.

**Source:** Authors' estimates.

The CAGR in availability of grazing-land was about two percent in decelerating rate while livestock population over half percent in accelerating rate, which implies that grazing resources declining about four times of livestock population during last decade. The gap between CAGR in availability of grazing-land and livestock population during 2003-2012 was 2.47 percent at all India level. The gap was observed

in majority of states and highest gap was observed in the state of Tripura followed by Jammu & Kashmir, Andman& Nicobar, Assam, Rajasthan and Uttar Pradesh. It implies that situation is alarming for all stakeholders and policy planners related to livestock and food security and natural resource (common property resources) management in India.

It is well documented that the main drivers for conversion of grazing resources into agricultural and non-agricultural uses are population pressure, urbanization along with agricultural support policies and ultimately profitability, which discourage the sustainability of grazing resources (Singh, 2012).

The sustainability of any system depends on four dimensions such as environmental, economic, social and governance (FAO, 2013). Environmental sustainability with respect to grassland ecosystems covers the biodiversity, carbon sequestration, soil and water conservation and improvement in soil health, which provides grassland ecosystem services such as generate and preserve soil fertility, mitigation from drought and floods, protect soil from erosion, water conservation etc.

One of the major challenges is valuation of grassland ecosystem services and their incorporation into policy making process. Socio-economic sustainability covers the building of social capital along with valuation of grassland ecosystem services. The integration of environmental, economic and social sustainability comes under the governance sustainability. Hence, good governance is critical to support other dimensions of the sustainability.

Government of India has taken certain initiatives for sustaining the grazing resources since Eleventh Five Year Plan under the scheme titled Area Oriented Fuel and Fodder Project Scheme under National Afforestation and Eco Development Board. However, most of these efforts have been to close the areas and plant up these with trees, resulting depletion of area under free grazing. The stepping up public investments for revitalizing common land and water resources under convergence with Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) under current Twelfth Five Year Plan (2012-17).

## CONCLUSION

The carrying capacity of grazing resources was over-utilized. Grazing resources are declining continuously while livestock population increasing since last six decades. To sustain the grazing resources it is imperative that economic analysis based on societal perspective, intergeneration equity and valuation of grassland ecosystems services and its incorporation into planning process is necessary condition rather than only consideration of financial and profitability criteria.

## REFERENCES

- GoI. 2013. National Livestock Policy. Department of Animal Husbandry, Dairying and Fisheries, Ministry of Agriculture and Farmers Welfare.
- GoI. 2014. Basic Animal Husbandry and Fisheries Statistics. Department of Animal Husbandry, Dairying and Fisheries, Ministry of Agriculture and Farmers Welfare.
- NSSO. 1999. Common Property Resources in India. NSS 54<sup>th</sup> Round. National Sample Survey Office, Ministry of Statistics and Programme Implementation, Government of India.
- NSSO. 2014. Key Indicators of Land and Livestock Holdings in India. National Sample Survey Office, Ministry of Statistics and Programme Implementation, Government of India.
- Singh, M. 2012. Projection of Land Utilization Pattern in Eastern Uttar Pradesh, India: A Markov Chain Approach. The Indian Journal of Economics. Vol. XIII, No. 369, Part II. P. 341-369.
- World Bank. 2007. World Development Report-2008: Agriculture for Development. The World Bank, Washington, DC.