

## **Fodder Scenario in Karnataka**

### **Introduction**

Livestock is one of the important subsistence activities in Karnataka State adding to agricultural income irrespective of the land holdings. The progress and economy of livestock depends on the availability of quality fodder and adequate quantities. The gap between supply and demand of the good quality forage continues to enlarge due to constraints in land and resource inputs, the requirements of green and dry fodder for the state's livestock production of over 27.76 million at its optimum plan of nutrition has been estimated at 47,504 million tones indicating a huge deficit of more than 50% as compared to its requirement. Thus there is an urgent need to improve upon the present forage supply position in quantitative and qualitative terms through research based development programmes. The superior breeds, cross breeds and upgraded animals require adequate and balanced nutrition for realizing their optimum potential. Realizing the importance of quality green fodder production to boost livestock production, University of Agricultural Sciences Bangalore initiated research work on fodder crops in a small scale at Main Research Station, Hebbal, Bengaluru way back in 1910 with the support of Sri Krishnaraja Wodeyar, Maharaja of erstwhile Mysuru state. Initially three sections were established with Agricultural School in the year 1913 along with Veterinary Hospital and Hebbal Dairy for promotion of livestock farming. Hebbal was the main centre for all agricultural research including Dairy and fodder develop activities in the state. A herd of cross bred (Merino x Local) sheep was also kept in the farm. In the year 1920 a separate livestock section was created and Mr. Davison was appointed as livestock expert. A sheep farm was also opened at Yelachihalli in the Mysuru district. Mysuru Agricultural College was established in 1946 under the jurisdiction of University of Mysuru with initiative of Mr. Srinivasan as a Minister for Agriculture in the Mysuru state.

A land mark in Karnataka dairy development has been the establishment of the Karnataka dairy development corporation (KDDC) Ltd., in December 1974 with the financial assistance from the International Development Agency of World Bank, Geneva. One of the objectives of this programme entrusted to the university was on applied forage research and demonstration in the KDDC command area of southern Karnataka for increasing milk production by changing production potential of dairy cattle by organizing effective and improved management and feeding systems by educating farmers through applied research and demonstration on practical problems of forage crops. A number of field experiments were conducted on various forage species and genotypes, plant density, nutrient requirements, weed control, yield components and herbage yield. These experiments were mainly concentrated at MRS, Hebbal with attached fodder demonstration and Dairy farm. Some research works

were also conducted in other research stations of UAS, Bengaluru in order to evaluate forage crops in relation to the yield and yield components under different agro climatic conditions. They have also studied nutritional aspects of some fodder crops and fodder trees / shrubs and their requirement for different categories of livestock. This programme helped dairy farmer to get better level of nutritious green fodder yield resulted in the reduction of cost of milk production and also enhanced the milk yield and prolonged lactation period in their milch animals. The university also introduced high yielding Lucerne varieties “Wairau and Saranac” which were introduced from Australia, New-zea land and Hungary in to irrigated fertile soils in the command area. The University was entrusted with the responsibility of establishing forage demonstration farming at different milk unions in all the eight districts, these demonstration farms served as an extension education model tools for popularizing the forage technologies among dairy farmers.

Realizing the importance of dairy farming and providing sufficient quantity & quality fodder to dairy cattle in Karnataka, ICAR New Delhi sanctioned All India Coordinated Research Project on Forage Crops was established in the year 1987 at Tiptur (Zone 4) and shifted to Mandya (Zone 6) in the year 2004.

There is need to develop high yielding varieties with enhanced palatability and other quality traits, adaptability to different agro-ecological zones, suitability to diverse farming situations, and improved production techniques which needs to be made available for profitable dairying. Demonstration of these techniques on farmer’s field is needed to achieve the desired growth rate in agriculture in the state.

The AICRP centre is also extending the testing of varieties & delivering fodder technologies to other neighboring zones in the state. Eastern dry zone (Zone-5), Central dry zone (Zone-4) and southern transition zone (Zone-7) by establishing model fodder demonstration farms in Agriculture Research Stations, Krishi Vignana Kendras and Extension Education Units with the University supported Fodder research centers at Hebbal, Bengaluru & Kunigal, Tumkur district.

#### ➤ **Livestock population in the state**

According to the 2012 Livestock census in the state, total Bovine population is 139.50 lakhs, among which the population of cattle is 99.59 lakhs and that of buffaloes is 39.91 lakhs respectively. Out of 99.59 lakhs cattle population, 79.39 lakhs are indigenous, 20.18 lakhs are cross bred and 0.02 lakhs are of Exotic breeds. The population of sheep is 72 lakhs and that of goats is 44 lakhs (*Source*: Directorate of Animal Husbandry and Veterinary Services, Bangalore). In the District (Mandya), where AICRP on Forage Crops Project is operating, the livestock population (census of 2012) revealed total Bovine population of 5.14 lakhs, among which the cattle population is 3.68 lakhs and 1.45 lakhs are buffalo. The population of sheep is 3.41 lakhs and goat is 2.61 lakhs (*Source*: Deputy Director, Department of Animal Husbandry and Veterinary Services, Mandya).

**Table-1: Area under different forage crops in Karnataka**

Season	Major crops	Varieties	Area (lakh ha)	
			Irrigated	Non irrigated
<i>Kharif</i>	Sorghum	Local	-	0.63
	Maize	African Tall/ Local	-	0.73
	Pearl millet	Local	-	0.31
	Cow pea	Local	-	0.16
	Napier Bajra Hybrid	NB-21, Co-3	0.20	-
<i>Rabi</i>	Sorghum	Local	-	0.30
	Lucerne	T-9	-	0.03
	Maize	African Tall/ Local	-	0.23
<b>Grand Total</b>			<b>2.59</b>	

**Table-2: Fodder and feed Scenario in state**

Sl. No	Particulars	Demand	Supply	Deficit (%)
1.	Green fodder	122 MT/Annum	<b>85</b>	<b>30.00</b>
2.	Dry Fodder (5Kg/Day/Animal)	25.4 MT/Annum	15	40.95
3.	Concentrates 1Kg for maintenance + I kg for every 3 Kg milk yield/Annum	29.50 MT/Annum	7.50	74.50
4.	Area to be cultivated (50 MT/Ha/each crop)	5.09 lakh Ha	2.59	49.11

**Table-3: Availability of crop residues production in State**

Sl No.	Crop	Crop residues production (Lakh tones)
1.	Ragi	20.74
2.	Sugarcane	3.60
3.	Maize	78.28
4.	Paddy	44.4
5.	Field Bean	0.45
6.	Horse gram	3.5
7.	Mulberry	1.60

➤ **Main Agricultural crops whose residues being used as forage in Karnataka**

- **Paddy:** Paddy is mainly grown in Cauvery command area and tank fed/bore well irrigation facilities to some extent covering an areas of more than 5.0 lakh ha in southern ten districts of Karnataka, the average paddy straw production of more than 5.56 lakh tons, apart from straw, the bi products of paddy milling are also used as valuable feed concentrates.
- **Ragi:** Ragi is another important staple crop growing in southern Karnataka especially under rainfed conditions with little area under irrigation, the quality of the Ragi straw as a dry fodder is in great demand and fetches higher prices in the market due to its superior quality as compared to paddy straw
- **Maize:** Maize is another important crop catching up larger area recently in the semi irrigated tract in the state. After the harvest of cob the semi dry stems and leaves are used as alternative source of fodder during lean period. Recently released stay green & disease tolerant hybrids (Hema & Nithyashree) & composites (NAC-6002 & 6004) from this centre are being grown for grain purpose apart from African tall fodder type in a significant area by large number of Farmers acquainted through technology demonstrations under Adhoc projects and AICRP FCU Programmes.
- **Field bean:** Field bean is mainly grown as a dual crop in intercropping with Ragi majority in rainfed areas is a valuable source of fodder in winter months during lean period. The green pods are harvested for human consumption and the remaining plant stubbles are used as a green fodder especially for mulching animals.

- **Horse gram:** Horse gram is also grown as an important subsistence crop in the low rainfall areas which is mainly harvested for green and dry fodder after seed is separated for human & animal consumption, the seeds are mainly used for draught & milch animals along with feed concentrates.
- **Sugarcane:** Sugarcane is also an imported crop in command area in the region. The sugarcane tops are used as fodder after harvesting the cane.
- **Mulberry:** Silkworm rearing with mulberry is an important commercial activity in the region with more than 10,000 ha under mulberry cultivation. The left out stubbles stems & leaves of the mulberry crop are used as alternative fodder to the animals.

➤ **Augmenting forage production**

**A. Irrigated Ecosystem:**

- Cultivation of perennial grasses like Bajra Napier hybrid, Guinea grass and Para grasses on Rice field bunds.
- Introduction of short duration forage crops in rice fallows during limited water available situation (Fodder maize, Sorghum, Pearl millet and Fodder cowpea).
- Cultivation of short duration forage crops as intercrops in Sugarcane (Fodder maize, Sorghum, Pearl millet and Fodder cowpea).
- Utilization of marshy area for fodder Cultivation(Para grass)

**B. Rainfed Ecosystem:**

➤ **Introduction of forage crops in cropping system:**

**1. Double cropping system:**

Fodder maize/ Sorghum/ Pearl millet/ cowpea in pre-monsoon season followed by food grain in Kharif / Rabi season (Finger millet, Sunflower, Maize, Ground nut etc.,)

**2. Mixed cropping:**

- a. Sesame mixed with fodder sorghum/ Pearl millet/ cowpea
- b. Pulses mixed with fodder sorghum or pearl millet.

**3. Intercropping in Field crops:**

- Cotton + Fodder Maize/Pearl millet/Sorghum (2:1)
- Sesame + Fodder Sorghum/Pearl millet (4:1)
- Maize + Fodder Cowpea (2:1)
- Finger Millet + Fodder Cowpea (4:1)
- Ground nut + Fodder Sorghum / Pearl millet (4:1)
- Pigeon pea + Fodder Sorghum / Pearl millet (2:1)
- Safflower + Fodder Sorghum (2:1)
- Bengal gram + Fodder Sorghum (4:1)

#### **4. Intercropping in Orchards:**

Intercropping of Annual forages like Fodder Maize, Sorghum, Pearl millet, Cowpea and Horse gram and perennial grasses like Napier Bajra Hybrid, Guinea, Rhodes, Signal grass & Fodder legumes like Lucerne, *Stylo*, *Sirratro*, *centrocema* and velvet bean *etc.*,

#### **C. Cultivation of forages in waste land**

Anjan grass and stylo (3:1) to be cultivated in waste land.

#### **D. Cultivation of fodder trees on farm bunds.**

Cultivation of Subabul, Sesbania sp. Drumstic, Hariwana, *Melia Sp.*, Acacia and mulberry *etc.*, on farm bunds and to be utilized during lean season.

#### **E. Agro-forestry system.**

Inter cultivation of annual forages like fodder Sorghum/Pearl millet/Cowpea/Horse gram and perennial forages like Anjan grass + Stylo as Intercrop in Subabul, Acacia, *Casuarina*, *Melia Sp.*, Neem and Eucalyptus trees.

#### **F. Problematic Soil**

Utilization of alkali soil for cultivation of Congosignal, green panic grass, oats and Fodder Sorghum. In acid soils can be utilized for cultivation of Napier Bajra Hybrid, Guinea grass and Signal grass etc,

### **G. Preservation & Storage**

- Excess Forage can be stored in the form of Hay, Blocks & Silage & it can be used during lean period.
- Enrichment of dry fodder with mineral mixtures.

### **➤ Efficient Cultural Practices for higher productivity**

- Selection of Efficient Forage crops based on situation
- Use of high yielding varieties/Hybrids
- Timely Sowing
- Seed Materials from reliable source
- Proper seed rate and plant population
- Mixed Cropping System (Grass + Legumes)
- Weed Control
- Integrated Nutrient Management
- Scientific Irrigation Management (Micro Irrigation, Drip Irrigation/Sprinkler, Alternative Furrows irrigation etc.)
- Need based Plant Protection Measures
- Timely Harvest
- Scientific method of preservation(Hay/Silage/Blocks)

Table 1. Area and distribution of dry lands in Karnataka (m ha)

<b>Agro-climatic Zone</b>	<b>Total Geo-graphical area</b>	<b>Forest</b>	<b>Land put to non-agri. uses</b>	<b>Barren &amp; Un-cultivable land</b>	<b>Cultivable waste</b>	<b>Pastures &amp; other grazing land</b>	<b>Tree crops, groves</b>	<b>Current fallows</b>	<b>Other Fallow land</b>	<b>Net Area Sown</b>	<b>Total Cropped Area</b>
North Eastern Dry Zone	1.763	0.055	0.071	0.054	0.014	0.040	0.009	0.225	0.043	1.252	1.527
Northern Dry Zone	4.784	0.316	0.237	0.178	0.049	0.055	0.012	0.434	0.070	3.432	4.479
Central Dry Zone	1.944	0.142	0.128	0.096	0.079	0.161	0.036	0.111	0.062	1.129	1.254
Eastern Dry Zone	1.808	0.168	0.281	0.113	0.027	0.144	0.044	0.153	0.076	0.802	0.861
Southern Dry Zone	1.739	0.319	0.168	0.074	0.069	0.095	0.011	0.086	0.102	0.813	1.033
Total	12.038	0.999	0.885	0.516	0.238	0.495	0.113	1.009	0.354	7.429	9.153
State Total	19.050	3.072	1.369	0.788	0.415	0.930	0.290	1.262	0.505	10.419	12.893
% of Total	63.2	32.5	64.7	65.5	57.4	53.2	38.9	79.9	70.0	71.3	71.0

Table 2. Salient agro-climatic conditions of dry lands in Karnataka

Agro-climatic zone	Mean annual rainfall (mm)	Elevation (m)	Soil types
North Eastern Dry Zone (11 taluks)	633.2 to 806.6	300-450 in all taluks	Deep to very deep black clay soils in major areas. Shallow to medium black soils in minor pockets.
Northern Dry Zone (35 taluks)	464.5 to 785.7	450-800 in 26 taluks, in remaining taluks 800 to 900.	Black clay medium and deep in major areas, sand loams in remaining areas.
Central Dry Zone (17 taluks)	455.5 to 717.4	800-900 in major areas, in remaining areas 450-800.	Red Sandy loams in major areas, shallow to deep black soil in remaining areas.
Eastern Dry Zone (24 taluks)	679.1 to 888.9	800-900 in major areas, in remaining areas 900-1500.	Red loamy soils in major areas, clay lateritic soils in remaining areas.
Southern Dry Zone (18 taluks)	670.6 to 888.6	800-900 in major areas, 450-800 in remaining areas.	Red sandy loams in major areas and in remaining areas, pockets of black soils.

Table 3. Fodder scenario in selected districts in agro-climatically dry zones in Karnataka

Agro-climatic zone	District	Demand	Supply ('000 t)	Deficit ('000 t)	Deficit (%)
North Eastern Dry Zone	Gulbarga	1824.4	807.8	1016.6	-55.72
	Raichur	1715.0	2728.0	1013	59.01
Northern Dry Zone	Belgaum	2195.4	1637.6	557.8	-25.41
	Bijapur	1649.2	2768.0	1118.8	67.88
	Dharwad	1752.0	1855.0	103	5.88

	Bellary	1472.6	1399.0	73.6	-9.05
Central Dry Zone	Chickmagalur	1067.4	508.2	559.2	-52.39
	Chitradurga	1323.0	905.2	417.8	-31.58
Southern Dry Zone	Hassan	1520.8	1009.2	511.6	-33.64
	Mandya	1366.4	898.0	468.4	-34.34
	Tumkur	1816.0	939.2	876.8	-47.18
	Mysore	1767.8	2002.4	234.6	13.21
Eastern Dry Zone	Kolar	1378.0	991.6	386.4	-28.04
	Bengaluru (U)	729.4	264.4	465.0	-63.75
	Bengaluru (R)	1151.4	783.6	367.8	-31.94
<b>Karnataka state</b>		<b>28491.2</b>	<b>22324.0</b>	<b>-6167.2</b>	<b>-21.68</b>