

## An estimation of demand and supply of green fodder in Karnataka state

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### ABSTRACT

In present study an attempt has been made to analyze the changes in demand for green fodder crops in Karnataka. For demand projection of fodder requirement, the annual growth rate of production of green fodder for different districts of the state were estimated by using the linear regression model. The total demand for green fodder increased at an average rate of 1.91 per cent per annum over the years. The projected demand for green fodder will increase to 46210.60 metric tonnes by 2010-11 AD. The increasing trend was observed in all the districts. The demand for cultivated green fodder revealed a gap of about 92.27 per cent. The demand for green fodder in the state represents an increasing trend with a growth rate of 1.92 per cent. Hence, there is a need for gearing up the research and extension activities and to improve the productivity of green fodder crops to meet the demand of livestock industry. The wasteland development programmes for green fodder production also need to be strengthened.

### INTRODUCTION

India is home to 15 per cent world cattle population and 16 per cent of human population to be sustained and progressed on 2 per cent of total geographical areas. Due to ever increasing population pressure of human, arable land is mainly used for food and cash crops, thus there is little chance of having good quality arable land available for fodder production, and until milk production is remunerative to the farmers as compared to other crops. This has put tremendous pressure on the availability of fodder.

Fodder cultivation has been traditional in most parts of the country since farmers feel that the fodders crops have some factors, which keep the animals healthy and productive. Hence, generations farmers have marked out certain varieties and crops for fodder production and cultivate these, depending on availability of land and water. The green fodder crops are known to be cheaper source of nutrients as compared to concentrates and useful in bringing down the cost of feeding and reduce the need for purchase of feeds/ concentrates from the market.

In Karnataka, animals are mainly fed with crop residues of jowar, maize, bajra, ragi and paddy. A few dairy farmers grow cultivated fodders like, Napier hybrid bajra and maize, which provide fodder in *Kharif* and summer seasons only under irrigation. Practically, it is not possible to bring forage area under

irrigation. The only alternative is to have fodder crops that ensure supply of green fodder over a long period of time under rainfed situations on marginal and sub-marginal lands. Under these circumstances, it is essential to rejuvenate our pasture lands by introducing promising grasses and enhance production, productivity and economic returns over a long period of time.

Keeping in view, the importance of fodder crops the present study on estimating the demand for green fodder in Karnataka has been taken up.

### METHODOLOGY

The study was based on the secondary data on availability and requirement of green fodder for different districts and taluks collected for the period from 1989-90 to 1998-99 from the Animal Husbandry and Veterinary Department, Bangalore.

For projection of demand and supply of green fodder, the annual growth rate of production (supply) of green fodder for different districts of the state were estimated by using the following linear regression equation to the time series data on production of green fodder of the state from 1989-90 to 1998-99.

$$Y = a + b_1 + u$$

where,

### Key words :

Green fodder, Demand, Supply, Constraints, Problems, Production, Marketing management

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$Y = \text{Production/requirement of green fodder in year}$

't'

$a = \text{Intercept}$

$b = \text{Regression coefficient}$

$t = \text{Time period (t = 1, 2, \dots, n)}$

$u = \text{Error term.}$

Projections of requirement (demand) of green fodder was also worked out by using above linear regression equation.

Based on the estimates of linear growth rates, the production (supply) and requirement (demand) of green fodder for different districts of the state was projected for 2002-03 to 2010-11.

The gap between demand and supply of green fodder was estimated as below as percentage of demand (requirement).

$$\% \text{ gap} = \frac{\text{Demand} - \text{Supply}}{\text{Supply}} \times 100$$

The projection of demand, supply and gap was worked out for individual district and for the state as a whole.

## RESULTS AND DISCUSSION

The findings of the present study as well as relevant discussion have been summarized under following heads:

### Supply estimation of green fodder:

The simple linear regression method was used to estimate the demand and supply of green fodder in the state as whole. This method helps for forecasting or prediction of demand and supply of green fodder in the state. The results obtained by employing the simple linear regression functions for supply of green fodder in the state as a whole are presented in Table 1.

Both intercept and slope coefficients were statistically significant at one per cent. The overall significance of the estimated function was established by the F test. The supply of green fodder in Karnataka represented an increasing trend with a growth rate of 0.48 per cent annually. Kodagu district had a highest growth rate of 1.04 per cent, followed by Bellary district with a growth rate of 0.64 per cent. Bidar district showed a lowest growth with a growth rate of 0.34 per cent. All the districts showed positive and significant growth at one per cent in supply of green fodder in the state.

**Table 1: Estimated growth rate of supply for green fodder in Karnataka**

Districts	Intercept	Coefficient	R <sup>2</sup>	F	LGR
Bangalore (U)	1.994 (2475.82)	0.00220* (16.981)	0.97	288.36*	0.508*
Bangalore (R)	2.320 (5141.34)	0.00227* (31.307)	0.9	980.15*	0.526*
Belgaum	2.106 (2844.53)	0.00208* (17.500)	0.97	306.27*	0.482*
Bellary	1.630 (584.04)	0.00279* (6.199)	0.82	38.43*	0.644*
Bidar	1.619 810.86	0.00148* (4.618)	0.69	21.33*	0.342*
Bijapur	1.941 (1852.22)	0.00208* (12.318)	0.94	151.74*	0.480*
Chikmagalur	2.129 (3160.63)	0.00228* (21.004)	0.98	441.18*	0.526*
Chitradurga	2.034 (2321.73)	0.00210* (14.914)	0.96	221.44*	0.486*
Dakshina Kannada	1.922 (1474.81)	0.00240* (11.451)	0.94	131.13*	0.555*
Dharwad	2.172 (2992.92)	0.00191* (16.353)	0.97	267.42*	0.441*
Gulbarga	1.979 (1707.59)	0.00219* (11.738)	0.94	137.79*	0.506*
Hassan	2.447 (7719.86)	0.00215* (42.165)	0.99	1777.88*	0.407*
Kodagu	1.548 (441.07)	0.00453* (8.008)	0.88	64.12*	1.049*
Kolar	2.585 (3390.58)	0.00214* (17.440)	0.97	304.18*	0.494*
Mandya	2.100 (2778.83)	0.00180* (14.875)	0.96	221.28*	0.418*
Mysore	2.140 (2985.32)	0.00229* (19.840)	0.98	393.63*	0.529*
Raichur	2.021 (2490.12)	0.00244* (18.591)	0.97	345.65*	0.564*
Shimoga	2.399 (6439.88)	0.00119* (19.951)	0.98	398.04*	0.276*
Tumkur	2.478 (8573.84)	0.00218* (46.980)	0.99	2207.19*	0.505*
Uttar Kannada	2.191 (3598.58)	0.00222* (22.673)	0.98	514.08*	0.513*
State	3.470 (12918.76)	0.00211* 48905	0.99	2391.73*	0.488*

\* indicates significance of value at P=0.01

Figures in parentheses indicate 't' value and LGR – Linear growth rate.

**Table 2: Projected supply of green fodder in Karnataka**

Districts	2002-03	2003-04	2004-05	2005-06	2010-11
Bangalore (U)	105.88	106.39	106.91	107.42	110.00
Bangalore (R)	224.78	225.91	227.04	228.16	238.80
Belgaum	136.56	137.19	137.82	138.45	141.60
Bellary	46.72	47.01	47.29	47.58	49.00
Bidar	43.64	43.78	43.93	44.07	44.80
Bijapur	93.36	93.79	94.22	94.65	96.80
Chikmagalur	144.78	145.51	146.24	146.96	150.60
Chitradurga	115.68	116.22	116.76	117.30	120.00
Dakshina	90.37	90.85	91.33	91.81	94.20
Kannada					
Dharwad	158.22	158.89	159.56	160.24	163.60
Gulbarga	102.42	102.92	103.42	103.92	106.40
Hassan	300.36	301.79	303.22	304.65	311.80
Kodagu	40.85	41.24	41.64	42.03	44.00
Kolar	412.74	414.70	416.65	418.61	428.40
Mandya	133.68	134.22	134.76	135.30	138.00
Mysore	148.59	149.34	150.09	150.84	154.60
Raichur	116.21	116.83	117.45	118.09	121.20
Shimoga	260.78	261.48	262.18	262.88	266.40
Tumkur	322.24	323.90	325.45	327.01	344.80
Uttar Kannada	166.65	167.47	168.29	169.11	173.20
State	3159.14	3173.35	3187.56	3201.77	3258.62

**Supply projection of green fodder:**

The projections of the supply of green fodder are presented in Table 2. The total supply of cultivated green fodder in each district and its projections from 2002-03 to 2010-11 AD are also presented. The projections of green fodder were made using the value of intercept and slope given in Table 1.

Table 2 reveals that the availability of green fodder increased at an average of 0.48 per cent over a year. The availability of green fodder would be 3159.14, 3173.35, 3187.56, 3201.77 and 3258.62 thousand metric tonnes for the year 2002-03, 2003-04, 2004-05, 2005-06 and 2010-11, respectively. Similar results were observed by Singh and Singh (1972). In the year 2002-03, Kolar district was highest in the projected supply of 412.74 thousand metric tonnes, followed by Tumkur district with a supply of 322.34 thousand metric tonnes and Kodagu district showed the lowest supply of 40.85 thousand metric tonnes. In the year 2010-11, the total supply in the state will be 3258.62 thousand metric tonnes. This table clearly indicates that there is increasing trend in supply of green fodder over the year in all the districts. Similar results were observed by Rajagopal (1995).

**Table 3: Estimated growth rate of demand for green fodder in Karnataka**

Districts	Intercept	Coefficient	R <sup>2</sup>	F	LGR
Bangalore (U)	2.913 (1158.03)	0.01478* (36.449)	0.99	1328.55*	3.462*
Bangalore (R)	2.894 (987.47)	0.01508* (31.935)	0.98	1019.88*	3.535*
Belgaum	3.467 (2921.38)	0.00474* (24.793)	0.98	614.70*	1.097*
Bellary	3.182 (1614.90)	0.00862* (27.165)	0.98	737.96*	2.006*
Bidar	2.921 (1056.69)	0.01457* (32.708)	0.99	1069.83*	3.412*
Bijapur	3.282 (1943.57)	0.00707* (25.980)	0.98	675.00*	1.641*
Chikmagalur	3.024 (448.37)	0.01073* (9.871)	0.92	97.43*	2.501*
Chitradurga	3.158 (1651.76)	0.00909* (29516)	0.99	871.25*	2.116*
Dakshina Kannada	3.276 (2169.93)	0.00713* (29.298)	0.99	858.41*	1.656*
Dharwad	3.271 (582.85)	0.00602* (6.661)	0.84	44.37*	1.397*
Gulbarga	3.281 (1930.11)	0.00709* (25.896)	0.98	670.62*	1.647*
Hassan	3.267 (1924.21)	0.00720* (26.316)	0.98	692.57*	1.671*
Kodagu	2.341 (524.82)	0.03980* (55.360)	0.99	3064.82*	9.598*
Kolar	3.220 (1682.85)	0.00797* (25.846)	0.98	668.02*	1.852*
Mandya	3.258 (1974.21)	0.00733* (27.560)	0.98	759.58*	1.702*
Mysore	3.288 (2088.18)	0.00688* (27.111)	0.98	735.05*	1.597*
Raichur	3.255 (1888.15)	0.00728* (26.207)	0.98	686.83*	1.691*
Shimoga	3.333 (2478.04)	0.00626* (28.872)	0.9	833.60*	1.451*
Tumkur	3.355 (2220.89)	0.00602* (24.723)	0.98	611.27*	1.395*
Uttar Kannada	2.990 (1224.17)	0.01281* (32.558)	0.99	1060.00*	2.995*
State	4.500 (2355.65)	0.00822* (26.720)	0.98	713.96*	1.912*

\*indicates significance of value at P=0.01

Figures in parentheses indicate 't' value

LGR – Linear growth rate

### Demand estimation of green fodder:

The results of simple linear regression analysis for requirement of green fodder throughout the state are presented in Table 3. The table reveals that the estimated intercept and slope coefficient of the function were statistically significant. 'F' value was high in all the districts and indicated overall significance of the function. The demand for green fodder in the state represents an increasing trend with a growth rate of 1.91 per cent. Kodagu district had highest growth rate of 9.59 per cent, followed by Bangalore rural district with a growth rate of 3.54 per cent. Belgaum district showed lowest growth rate of 1.09 per cent. All the districts showed positive and significant growth at one per cent in requirement of green fodder. The variation in the trend in requirement over the districts was due to livestock composition and growth trends in their population. Similar results were observed by Nadkarni (1973).

### Demand projection of green fodder:

The projection of demand for green fodder in each district from 2002-03 to 2010-11 AD is presented in Table 4. The projections were made using the value of intercept and slope given in Table 3. The table clearly indicates that the total demand for green fodder increased at an

average of 1.91 per cent per annum over the years. The projected demand for green fodder in the state were 40859.23, 41528.15, 42197.07, 42865.99 and 46210.60 thousand metric tonnes for the year 2002-03, 2003-04, 2004-05, 2005-06 and 2010-11, respectively. The demand in different districts differed according to size and composition of livestock species.

The increasing trend was observed in all the districts. The highest being in Belgaum with the projected demand in the year 2002-03 was 3405.33 to 3678.20 thousand metric tonnes in 2010-11 AD. It increased at annual growth rate of 1.09 per cent, followed by Tumkur district with a demand of 2737.61, 2771.66, 2805.71, 2839.75 and 3010.00 thousand metric tonnes for the year 2002-03, 2003-04, 2004-05, 2005-06 and 2010-11, respectively. Kodagu district showed the lowest demand of 664.58 thousand metric tonnes in 2002-03 and it increased to 936 thousand metric tonnes in the year 2010-11. The variation in the trend in requirements over the districts was due to the composition of livestock population.

### Gap between demand and supply of green fodder:

The gap between projected demand and supply of green fodder are presented in Table 5.

A perusal of demand for green fodder and supply of

**Table 4: Projected demand of green fodder in Karnataka**

Districts	2002-03	2003-04	2004-05	2005-06	2010-11
Bangalore (U)	1282.19	1316.14	1350.09	1384.04	1553.80
Bangalore (R)	1238.28	1271.59	1304.91	1338.22	1504.80
Belgaum	3405.33	3439.44	3473.54	3507.65	3678.20
Bellary	1987.78	2021.68	2055.58	2089.48	2259.00
Bidar	1296.54	1330.48	1364.45	1398.41	1568.20
Bijapur	2387.01	2421.26	2445.51	2489.76	2661.00
Chikmagalur	1472.08	1502.22	1532.36	1562.50	1713.20
Chitradurga	1906.80	1940.80	1974.80	2008.20	2178.80
Dakshina Kannada	2362.84	2396.98	2431.13	2465.27	2636.00
Dharwad	2259.66	2287.90	2316.14	2344.39	2485.60
Gulbarga	2386.84	2421.18	2455.53	2489.87	2661.60
Hassan	2315.34	2349.10	2382.85	2416.61	2585.40
Kodagu	664.58	698.51	732.44	766.36	936.00
Kolar	2130.59	2164.54	2198.50	2232.44	2402.20
Mandya	2281.54	2315.33	2349.11	2382.89	2551.80
Mysore	2411.49	2445.25	2479.01	2512.78	2681.60
Raichur	2262.68	2295.99	2329.31	2362.62	2529.20
Shimoga	2623.39	2657.17	2690.94	2724.72	2893.60
Tumkur	2737.61	2771.66	2805.71	2839.75	3010.00
Uttar Kannada	1446.66	1480.14	1515.14	1549.38	1720.60
State	40859.23	41528.15	42197.07	42865.99	46210.60

**Table 5: Projected gap between demand and supply of green fodder in Karnataka (In percentage)**

Districts	2002-03	2003-04	2004-05	2005-06	2010-11
Bangalore (U)	91.74	91.92	92.08	82.24	92.92
Bangalore (R)	81.85	82.23	82.60	82.95	84.46
Belgaum	95.99	96.01	96.03	96.05	96.15
Bellary	97.65	97.61	97.70	97.72	97.83
Bidar	96.63	96.71	96.78	96.85	97.14
Bijapur	96.09	96.13	96.16	96.20	96.36
Chikmagalur	90.16	90.31	90.46	90.59	91.21
Chitradurga	93.93	94.01	94.09	94.16	94.49
Dakshina	96.18	96.21	96.24	96.28	96.43
Kannada					
Dharwad	93.00	93.06	93.11	93.13	93.42
Gulbarga	95.71	95.75	95.79	95.83	96.00
Hassan	87.03	87.15	87.27	87.39	87.94
Kodagu	83.85	94.10	94.31	94.52	95.30
Kolar	80.63	80.84	81.05	81.25	82.17
Mandya	94.14	94.20	94.26	94.32	94.59
Mysore	93.8	93.89	93.95	94.00	94.23
Raichur	94.86	94.91	94.96	95.00	95.21
Shimoga	90.06	90.16	90.26	90.35	90.79
Tumkur	88.23	88.31	88.40	88.48	88.88
Uttar Kannada	88.48	88.69	88.89	89.09	89.93
State	92.27	92.36	92.45	92.53	92.95

cultivated green fodder reveals a gap of about 92.27 per cent in 2002-03 and in the year 2010-11 a gap of about 92.95 per cent in the state. This is assumed on the basis that the management system, which is exploitative, is not further deteriorated leading to serious degradation. This is clearly indicated that there is an increasing trend in gap of demand and supply of green fodder over the years.

Among the districts, the gap was observed in Bellary district in 2002-03 (97.65%) and in the year 2010-11 (97.83%). The lowest gap was observed in Kolar (80.63%) in 2002-03 and in the year 2010-11 it was (82.17%) with a small fraction of increasing trend. Thus, it can be seen from the table that the cultivated green fodder can meet only a small fraction of the demand.

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## REFERENCES

**Nadkarni, M.V.** (1973). Agricultural prices and development with stability. National Publishing Home, Daryaganj, New Delhi, p 23.

**Rajagopal** (1995). Economics of fodder marketing-A case study of Malwa region in Madhya Pradesh. *Agric. Market*, **38**(3): 12-16.

**Singh, A. and Singh, H.** (1972). Demand projections of consumer expenditure in Punjab. *Indian J. Economics*, **53** : 208.

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