# CHAPTER - III

(A)	FODDER AND	FEED RESOURCES AND THEIR REQUIREMENT	(8)
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	3.1	Introduction	
	3.2	Fodder landuse	
	3.3	Fodder and Feed resources	
		in the district	
	3.4	Crop Landuse and Crop Residues	
	3.5	Availability of Fodder and Feed	
		resources in the region	
	3.6	Requirements of fodder and	
		feeds in Solapur district	
	-	References	

61

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### 3.1 INTRODUCTION :

In the previous chapter an assessment of animal husbandry, their association regions in the district and the zones of milch animals, in their spatio-temporal context, have been examined. Present chapter deals with the assessment of fodder and feed resources in the district. An attempt has been made here to examine tahsilwise availability of fodder and feeds during 1971 and 1991. In the present chapter an attempt has also been made to identify the zones having the deficiency in fodder and feeds. The study of regional pattern of fodder availability is essential to understand the extent and nature of dairy development in the region. Such kind of study would also be helpful to planners to arrange proper strategy in regards to dairy development.

The government of India started feed and fodder development scheme in 1957-58 which provided subsidised distribution of seeds and establishment of plots in key villages blocks. However, no separate provision of funds was made to promote this scheme i.e. the implementation could only be taken up on limited scale as part of the key village scheme (Ghosh, 1974). The fodder development schemes were taken up by the states during the third and fourth plans. However, not much progress was achieved. The cattle population needs 530 million tonnes of green fodder at the rate of 5 kg. a day for six months in the country and the availability was 212 million tonnes (Ghosh, 1974). Major livestock population of Solapur district depends on fodder which is available in the field. Climate, soil, topography and vegetation are the main factors affecting feed and fodder availability in the region. The residue of various food crops are used as main fodder to livestocks in the region. The region however, possesses spatial disparities in the availability of fodder.

### 3.2 FODDER LANDUSE :

Table 3.1 shows the pattern of fodder landuse which is varied in the region. A brief assessment of each category of fodder landuse is attempted here.

#### 3.2.1 Area under forest :

There is 35,900 hectares of area under the forest in 1991 which is 2.39 percent to the total geographical area of the region. The proportion of forest area in Sangola (4.83%), Karmala (3.88%), Malshiras (3.61%), Mohol (2.96%) and Pandharpur (2.86%) tahsils is more than the district average (2.39%).

The lowest incidence of forested land, in acending order, occurs in Barshi (1.69%), North Solapur (1.46%), South Solapur (1.51%), Madha (1.11%), Mangalwedha (0.70%) and Akkalkot (0.36%) tahsils. The forested lands are generally bushlands offering insignificantly for grazing lands. However, during monsoon grasses are available to some extent.

				(rigures i	in neccares)
Sr. No.	Tahsils	under ,trees	Percen- tage to total geogra- phical area	Fallow land	Percen- tage to total geogra- phical area
1	2	12	13	14	15
1	Karmala	500	0.38	16,200	10,15
2	Barshi	700	1.63	27,100	16,38
3	Madha	200	0.13	5,000	3.28
4	Malshiras	100	0.06	18,500	11.50
5	Pandharpur	-	-	<b>20,</b> 700	15,99
6	Mohol	200	0.15	17,100	12,98
7	North Solapur	100	0.15	8,900	13.03
8	South Solapur	800	0.67	11,900	9.96
9	Sangola	100	0.06	27,100	17.00
10	Mangalwedha	200	0.18	19,900	17.43
11	Akkalkot	100	0.07	11,300	8.07
- <b>Person of Class </b>	District Total	100	0.34	183,700	12.24

(Figures in hectares)

SOURCE : C

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# 3.2.2 Area under permenant pastures and

grazing land :

The area under permanent pastures and grazing accounts for 63,500 hectares which is 4.23 percent to the total geographical area of the district. It's highest incidence occurs in Karmala (6.64%), Malshiras (8.86%), and Sangola (4.58%) tahsils.

The lowest incidence, in an ascending order is observed in Pandharpur (3.79%), Madha (3.74%), South Solapur (3.18%), North Solapur (2.93%), Barshi (2.85%), Mangalwedha (2.10%), Mohol (1.67%) and Akkalkot (0.42%) tahsils in the region.

# 3.2.3 Area under cropped land :

The area under cropped land in the district covers 106,300 hectares which is 70.82 percent to total geographical area. It's highest incidence is observed in Barshi (77.87%), Mohol (72.06%), North Solapur (73.65%), South Solapur (81.76%) and Akkalkot (84.73%) tahsils (Table 3.1).

Low incidence of cropped land, in ascending order, is found in Pandharpur (69.09%), Mangalwedha (69.0%), Sangola (86.70%), Madha (67.89%) and Karmala (66.92%) tahsils.

## 3.2.4 Area under culturable waste land :

The area under culturable waste land eccounts for 32,800 hectares which is 2.19 percent to the total geographical area. Out of it, highest incidence, in descending order happens to be in Malshiras (5.29%), North Solapur (3.66%), Mangalwedha (3.50%), Sangola (3.01%) and Mohol (2.51%) tahsils.

Low incidence of culturable waste land, in ascending order, occurs in Karmala (1.88%), South Solapur (1.34%), Akkalkot (1.28%), Pandharpur (1.00%), Madha (0.66%) and Barshi (0.60%) tahsils.

# 3.2.5 Area under culturable waste land :

The area under culturable waste land accounts for 32,800 hectares i.e. 2.19 percent to the total geographical area. Out of this, highest incidence, in descending order, happens to be in Malshiras (5.29%), North Solapur (3.66%), Mangalwedha (3.50%), Sangola (3.01%) and Mohol (2.51%) tahsils.

Low incidence of culturable waste land, is ascending order, occurs in Karmala (1.88%), South Solapur (1.34%), Akkalkot (1.28%), Pandharpur (1.00%), Madha (0.66%) and Barshi (0.60%) tahsils.

## 3.2.6 Area under fallow land :

The district has 183,700 hectares of land under fallow which is 12.24 percent to the total geographical area. The high incidence of fallow land is observed in Mangalwedha (17.43%), Sangola (17.00%), Barshi (16.38%), Pandharpur (15.99%), North Solapur (13.03%) and Mohol (12.98%) tahsils. Low incidence is confined to Malshiras (11.50%), Karmala (10.15%), South Solapur (9.96%), Akkalkot (8.07%) and Madha (3.28%) tahsils.

#### 3.2.7 Area under miscellaneous trees :

The area under miscellaneous trees in the district covers 5,100 hectares i.e. 0.34 percent of the geographical area.

Its high incidence is recorded in Barshi (1.63%) tahsil only. Whereas low incidence occurs in Karmala (0.38%), Mohol (0.15%), North Solapur (0.15%), Mangalwedha (0.18%), Madha (0.13%), Akkalkot (0.07%), Sangola (0.06%), Malshiras (0.06%), South Solapur (0.68%).

Generally, major area of the district has been covered by cropped land. Landuse pattern indicates that the region has low proportion of fodder lands which is inadequate to feed existing number of livestock satisfactorily. This has led to heavy dependence on fodder to be obtained from cultivated lands.

# 3.3 FODDER AND FEED RESOURCES IN THE DISTRICT :

In fact, no special efforts are made to produce fodder and feeds in the region. This has been obtained from the fields as biproducts. Major emphasis have been given on food crops and the residues of these crops are used as fodder. Besides, this a very insignificant part of foodgrain is remained as feeds to the animals.

## 3.3.1 Natural grasslands :

Grasses are obtained from forest and other areas. Monsoon grasses are available from uncultivated land, roadsides, riversides, canal banks, bunds etc. which contribute substantially to feed livestock. The natural grasslands of Solapur district can be classified into natural forest, permanent pastures and grazing and miscellaneous grasslands in the region.

# 3.3.1 (a) Natural forest

Fig.3.1 reveals the proportion of area under forest which are generally in the form of bush lands. However, these lands provide natural grasses for grazing purposes. During the south-west monsoon, the natural grasslands play vital role to meet requirements of livestock in the region. The village common lands are also used for this purpose. Moreover, there is regional disparity in the distribution of forest lands.

In 1991, Sangola tahsil has attained first ranking position with 4 percent area under forest, which are not thick but capable of providing grasses seasonally. The region has very significant land (2.39%) under forest. The moderate forest



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Fig. 3-1

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lands (2 to 4%) occur in the remaining tabsils which have less 2 percent. The arid conditions have led for the poor stage of forests in the region.

# 3.3.1 (b) Permanent pastures and grazing land :

The permanent pastures and grazing lands contribute significantly for availing grasses (Fig.3.2). In 1991, about 63,500 hectares (4.23%) of land was devoted to permanent pastures and grazing lands. The high proportion (above 6 percent) of this category is mainly noted in Karmala, Malshiras, Pandharpur and Sangola tahsils. Moderate proportion is recorded in Madha and South Solapur (3 to 6%). Remaining part of the district especially in Barshi, Mohol, North Solapur, Mangalwedha and Akkalkot tahsils has low proportion (below 3%).

# 3.3.1 (c) Miscellaneous grassland :

In 1991, the total area under miscellaneous grassland is 5100 hectares (0.34%). Barshi, South Solapur tahsils have recorded high proportion of this category (above 0.50%). Moderate proportion is confined to Karmala, Sangola, Mangalwedha (0.25 to 0.50%). Besides this, Madha, Malshiras, Pandharpur, Akkalkot tahsils have recorded low proportion of such lands (below 0.25%). The tahsils of Mohol and North Solapur have recorded absence of such lands (Fig.3.3).





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Fig. 3•3

Generally, growth of natural grasses is closely linked with the water available from the monsoon in the region. But monsoon is irrigular and erratic leading to poor development of natural grasses in the district. A small proportion of grassland areas, near the villages, has been easily reached by grazing livestock. However, these lands have been overgrazed, misused and denuded to such an extent that they have very limited value now as a source of fodder and are merely exercise grounds (Gholap, 1986). So poor is their condition that their reclamation for the purpose of grassland development by ordinary methods is futile, and only ecological management is applicable hereafter.

### 3.4 CROP LANDUSE AND CROP RESIDUES :

A varieties of crops have been used for feeding livestock. The main crops which are primarily cultivated for grains and fodder in this district. They includes jowar, maize, bajara, groundnut and pulses. The local varieties (35+1 Mallandi) of jowar and mostly grown either exclusively for fodder and for grain during summer and rainy season. Crop residue of jowar provides however, inferior roughage to livestock.

### 3.4.1 Crop landuse :

A variety of crops are grown in the region which depend upon pediological and hydrological conditions. Poor soils are not used for crop production but deep soils have been generally brought under cultivation which are productive in the district.



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# 3.4.1 (a) Area under cropped land -

The area under cropped land is accounted for 106,300 hectares (70.82%) in 1991. High proportion under (Fig.3.4) this category is found in Madha, South Solapur, Akkalkot tahsils (above 80%). The tahsils of Karmala, Malshiras, Pandharpur, Mangalwedha, Mohol, North Solapur and Barshi have recorded moderate proportion (60 to 80%). Sangola tahsil has low proportion (below 60%).

# 3.4.1 (b) Culturable waste land -

Fig.3.5 exibits spatial pattern of waste lands in 1991. The area under this category is about 32,800 hectares (2.18%). However, its proportion has been slightly changed as compared to 1971 position. Karmala tahsil has high proportion (above 4%), Malshiras, Pandharpur, Barshi, North Solapur tahsils have moderate proportion of the land under this category (2 to 4%). South Solapur tahsil has recorded low proportion (below 2%). The remaining part of the region i.e. Sangola, Mangalwedha, Mohol, Akkalkot have no existence of land under this category (Fig.3.5).

# 3.4.1 (c) Fallow land -

The term fallow is applied here to the lands not under cultivation at the time of reporting, but which have been sown in the past. They include current and old fallow lands which are considered together in the present study.



Fig. 3.5

In 1991, the region has recorded 183,800 hectares (12.24%) of land under this category (Fig.3.6). The high proportion of fallow land has been recorded in Sangola (above 30%). Karmala, Malshiras, Mangalwedha, Mohol, North Solapur, South Solapur tahsils have moderate proportion of such lands (15 to 30%). Low proportion of land under this category is recorded in Barshi, Madha, Pandharpur and Akkalkot (below 15%) tahsils. The extent of fallow land has been related to physical and socio-economic conditions.

# 3.4.1 (d) Crop residues -

The crop residues refers to the straws of cereals and millets. But except jowar, there are no other major crops from which crop residues are available. Jowar, bajara, maize, groundnut, pulses and sugarcane are cultivated by the farmers in the region. But they are mainly used to comply the human needs. Such grains are rarely used for livestock feeding. The straws, haulms and stalks of the cereal crops and the similar residues of grain legumes and other crops represent the greatest proportion of the feed resources of India (Whyte R.O., 1964). The fodder provided by crop residues, is not sufficient and is of very low quality in the region. The straws are widely used as fodder to feed the animals which is inadequate and of inferior quality.





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#### 3.5 AVAILABILITY OF FODDER AND FEED

### RESOURCES IN THE REGION :

Generally grasslands have to depend for their growth upon the brief spell of monsoons. It is evident from the earlier analysis that the extent of grasslands is limited in the region in relation to animal population. Several attempts have been made to estimate the quantity of livestock feeds that are available in India. Most of these estimates were indirect in nature, being based on areas under fodder crops, forests, food crop yields per unit of area and estimated production of residues and by-products available from food and cash crops. An attempt has been made here to calculate the availability of green and dry fodder and concentrates on the following assumptions. They are as follows -

- (i) For working out the availability of green fodder, barren and uncultivated land, culturable waste land, permanent pastures and other grazing and fallow lands, together with the sugarcane tops, have been considered.
- (ii) To work out the dry fodder availability, by-products of grain crops such as rice, bajara, jowar, wheat, maize etc. by-products of pulses and groundnut, dry grasses from grasslands, have been considered.
- (iii) In respect of concentrates, the production of rice and wheat bran, pulses chuni, groundnut and other oilseed

cakes and grains (cereals) available for feed, have also been considered.

# 3.5.1 Methodology :

The yield per hectare of green and dry fodder, availability of grains, oilseeds, bran etc. for livestock feed (out of their respective production) have been calculated by employing the recommendations of The National Commission on Agriculture (1976). The recommendations are as under -

(a) Green Fodder :

- (i) Cultivated area under fodder (irrigated) 50 M.T./hect.
- (ii) Cultivated area under fodder
   (unirrigated) 25 M.T./hect.
- (iii) Natural green grass fom barren and uncultivable land culturable waste land, permanent pastures and other grazing land, fallow land - 1 M.T./hect.
- (iv) Sugarcane tops 20 M.T./hect.
- (b) Dry Fodder :

		Grain		Straw
(i)	Paddy straw and wheat straw	1	:	200
( ii )	Coarse cereals (jowar, bajara,			
	maize, barley, ragi etc.)	1	:	1.969
(iii)	Pulses (all)	1	:	0.514
( iv )	Groundnut	1	:	0.503
( v )	Dry fodder from area under grass and babul	0	:	40 M.T./hect.

### (c) Concentrates :

- (iii) Gram, tur and 20 percent of the grain production other pulses chuni

Based on the above assumptions and methodology, the availability of green and dry fodder and concentrates is calculated and presented. Table 3.2 shows the availability of green fodder in the region.

### (1) Green Fodder :

This includes the natural green grasses obtained from pastures, grazing lands and forest. No accurate estimates are

ST.		Natural gre	een grass	Sugarcan	e tops	Total green	Derrentare
NO	STISUET	production (M.T.)	Percent	<pre>Production (M.T.)</pre>	Percent	rodder (M.T.)	) 3 3 3 3 3 4 9 9 4
1	Karmala	25,500	25 <b>.</b> 50	85,000	8 <b>.</b> 69	110,550	10.25
8	Barshi	10,900	10.90	20,760	2.12	31,660	2 <b>.</b> 93
ſ	Madha	8,100	8.10	50,000	5.11	58,100	5•38
ব	Malshiras	19,000	15.00	283, 560	28,99	302, 560	29 <b>.</b> 73
ŝ	Pandharpur	13,700	13.70	273,600	27.97	287, 300	26.65
Q	Mohol	1,200	1.20	65, 320	6.67	66, 520	6.17
2	North Solapur	3,000	3•00	15,000	1.53	18,000	1.66
80	South Solapur	6,600	6.60	46, 380	4.74	52,980	4 •91
6	Sangola	8,600	8.60	53, 700	5.49	62,300	5.77
10	Mangalwedha	2,800	2.80	35, 580	3.63	38, 380	3 <b>.</b> 56
11	Akkalkot	600	0•60	49,120	5.02	49,720	<b>4</b> •61
	District Total	100,000	100%	978,020	100%	1,078,020	100%

Table 3.2 : Availability of green fodder in Solapur District, 1991.

82

Compiled by the author (1991), based on the recommendations made by The National Commission on Agriculture (1976).

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SOURCE

available of the amount of green forages cultivated annually or even of the types of fodder species grown. However, an approximate estimation of green fodder resources have been made on the above mentioned assumption.

The total production of green fodder from all available resources is stimated 1,078,020 metric tonnes (Table 3.2). The highest production of green fodder has been recorded in Malshiras tahsil which accounts for 302,560 M.T. (29.73%) followed by Pandharpur 287,300 M.T. (26.65%) and Karmala 110,500 M.T. (10.25%). The lowest production of green fodder is confined to North Solapur tahsil with 18,000 M.T. (1.65%). In the region, natural green grasses are approximately estimated to one lakh metric tonnes (Table 3.2). The high production of green grasses is recorded in Karmala with 25,500 M.T. (25.50%). This has been followed by the tahsils of Malshiras with 19,000 M.T. (19.00%) and Pandharpur 13,700 M.T. (13.7%). The low production occurs in Akkalkot 600 M.T. (0.6%) (Fig.3.7). These variations can be attributed to physical conditions, availability of irrigated water.

The sugarcane tops are used to milch animals in the region. The yield of sugarcane tops varies from tahsil to tahsil in Solapur district. The sugarcane tops are available during harvesting season (October-February) when other forms of green fodder is not available. However, this depends upon the extent of irrigated areas. Recently, Ujani dam or Bhima



Fig. 3.7

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sr.	Tabeile	it straw	Total pulses straws		
No.	1003115	1991	1971	1991	
1	Karmala	215,000	759 <b>,</b> 900	510,000	
2	Barshi	85,000	1,759,500	770,100	
3	Madha	15,000	851,700	206,000	
4	Malshiras	100,000	96,900	1,999,200	
5	Pandharpur	100,000	443,700	907 <b>,</b> 800	
6	Mohol	55 <b>,</b> 000	912,900	392 <b>,</b> 700	
7	North Solapur	45,000	581,400	53,600	
8	South Solapur	45,000	953,700	91,800	
9	Sangola	35,000	474,300	147,900	
10	Mangalwedha	25,000	729,300	183,609	
11	Akkalkot	365,000	851,700	50,100	
	District Total	1,085,000	8,415,000	5,304,000	

SOURCE : C

river has provided regular water to Bhima river basin by which proportion of irrigated area under lift schemes has been multiplied. The total production from sugarcane tops is about 978,020 M.T. Malshiras tahsil has recorded high production of sugarcane tops i.e. 283,560 M.T. (28.99%) followed by Pandharpur 273,600 (26.65%) and Karmala 85,000 M.T. (8.69%) to the total sugarcane tops produced in the district. The low availability of green fodder recorded in North Solapur i.e. 18,000 M.T. (1.66%) in the region (Fig.3.8). The above pattern has been reflected in the total green fodder available in each tahsil (Table 3.2).

In brief, high availability of sugarcane tops is found in Malshiras and Pandharpur tahsil due to considerable proportion of irrigated area (18 & 27 percent) devoted to sugarcane. In remaining parts the availability of sugarcane tops is negligible which corresponds with the sugarcane area resulted from inadequate irrigation facilities.

### (2) Dry Fodder :

The straws of different types provide a large bulk of dry fodder containing actual food value. In the dry season, when little or no grazing or green feed is available, straws become the most important. Even in the rainy season and when green feed is abundant livestock have to depend on dry fodder. The chief merit and almost the only purpose served by straws is the provision of the large bulk which is required to fill



Fig. 3.8

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the very extensive digestive tract of cattle and buffaloes and to help in functioning organs normally (Gholap, 1986). Dry fodder is mainly used to livestocks in a whole year in the region.

Dry fodder is mainly extracted from various types of crops like jowar, bajara, maize, groundnut and pulses crops etc. grown in the region. Main purpose is to gain foodgrains from crops and resudual part of the crops has been used as a dry fodder to the milch animals.

The production of crops depends upon the variability of monsoon. Table 3.3 reveals the fact that foodgrains contribute substantially to dry fodder. The dry fodder is classified into three varieties viz. coarse cereals, groundnut straws, pulses in the region. The tabilwise availability of each variety is described below.

(a) Coarse cereals :

The coarse cereals includes jowar, bajara, maize and other cereals. Of these, jowar, bajara and maize are the important crops to meet the basic requirement of feed for milch animals in the region. Jowar which is the principal source of stalk in Solapur district, occupies the largest area (692,184 hect.) of the total cereals cropped area. The rabi crop are also very important. The total production of stalks from coarse cereals was estimated about 152,676,00 M.T. (92.70%) of total dry fodder production in the district in 1971. The production was increased to 164,705,000 M.T. in 1991. Of the total production of dry fodder from coarse cereals, the jowar and bajara contribute to 162,131,000 M.T. production.

i) Jowar stalk -

The production of jowar stalks is about 136.324.000 M.T. in 1991 (Table 3.3). It was increased by 3,939,000 M.T. as compared to the production of 1971. The district average of jowar stalks production is 12,393,000 M.T. in 1991.

The high production is confined to Madha (20,685,000 M.T.), South Solapur (14,7775,000 M.T.), Karmala (13,790,000 M.T.), Barshi (13,790,000 M.T.), Mohol (13,199,000 M.T.) in relation to the average production of the district (12,393,000 M.T.).

The low availability of the production of jowar stalks occurs in North Solapur (6,698,000 M.T.), Sangola (8,668,000 M.T.), Mangalwedha (9,062,000 M.T.), Malshiras and Pandharpur (11,622,300 M.T.) and Akkalkot tahsils (12,214,000 M.T.).

# ii) Bajara stalk -

It is second important crop, used as a dry fodder for milch animals and other animals too.

In 1971, total production of bajara stalk was 19,109,000 metric tonnes. The district average of bajara stalk was 1,737,000 metric tonnes. Sangola (4,728,000 M.T.), Mangalwedha (4,728,000 M.T.), and Pandharpur (1,773,000 M.T.) have recorded more than district's average production of bajara stalk.

The low production of bajara stalk to the district average is recorded in Barshi (591,000 M.T.), North Solapur (394,000 M.T.), Malshiras (778,000 M.T.), South Solapur (985,000 M.T.), Mohol (1,182,000 M.T.), Karmala (1,379,000 M.T.), Madha (1,182,000 M.T.) and Akkalkot (1,575,000 M.T.) tahsils.

The district has recorded 14,426,000 metric tonnes in 1991. It has been decreased to 7,683,000 metric tonnes as compared to 1971 production. Sangola (3,546,000 M.T.), Mangalwedha (2,758,000 M.T.), Malshiras (2,561,000 M.T.), tahsils have recorded more production than the district's average. Remaining tahsils like Karmala, Barshi, Madha, Pandharpur, Mohol, North Solapur, South Solapur and Akkalkot tahsils which have recorded low production compared to the district's average.

iii) Maize -

The third coarse cereals is maize. As per 1971 census, total production from maize stalks was estimated about 1,182,000 metric tonnes against 107,000 metric tonnes of the distric's average. The tahsils of Karmala (197,000 M.T.), Pandharpur (197,000 M.T.), Madha (158,000 M.T.), Sangola (158,000 M.T.), Mohol (118,000 M.T.), have attained more maize production than the district's average.

Low availability of dry fodder from maize stalks occurs in Barshi (9,000 M.T.), Malshiras (79,000 M.T.), North Solapur (59,000 M.T.), South Solapur (39,000 M.T.), Mangalwedha (98,000 M.T.) and Akkalkot (18,000 M.T.) tahsils.

In 1991, the total production from maize stalks is estimated about 27,383,000 metric tonnes with 249,000 metric tonnes of the district's average.

The tahsils of Mohol (552,000 M.T.), Pandharpur (493,000 M.T.), Karmala and Madha (394,000 M.T.), Malshiras and Sangola (295,000 M.T.) have recorded more production than the district's average.

The low availability of maize production is confined to Barshi, North Solepur, South Solepur, Mangalwedha, Akkalkot tahsils.

# (b) Groundnut straws :

Groundnut is the major oilseed (22 percent) grown in the region. During harvesting large quantities of leaves and stem are available for feeding the livestock.

The production of groundnut straw is estimated about 3,615,000 m.t. in 1971 and constituted 21.95 percent of the total dry fodder produced.

A substantial quantity of groundnut straw is available in Akkalkot (13,000 M.T.) and Barshi (8,000 M.T.). This is mainly due to the fact that many oil mills located in these tahsils are producing oilcakes to feed milch animals. Remaining all tahsils have recorded low production than the district's average. In 1991, the total groundnut straw production is of the order of 1,085,000 metric tonnes against 99,000 metric tonnes of the district's average. However, the total groundnut straw production has been decreased by 2,530,000 metric tonnes as compared to the year of 1971.

The high production has been recorded by Karmala (215,000 M.T.), Akkalkot (365,000 M.T.), Malshiras and Pandharpur (1,000 M.T. each) tahsils. Rest of the tahsils like Barshi, Madha, Mohol, North Solapur, South Solapur, Sangola, Mangalwedha have recorded low production than the district's average.

#### (c) <u>Pulses</u> :

Pulses is another source for the supply of dry fodder for livestock. The region has recorded 8,415,000 metric tonnes (5.11%) to the total production of dry fodder in 1971. District average production of pulses was 765,000 metric tonnes. High ranking position has been attained by Barshi (1,759,000 M.T.) and Madha (852,000 M.T.) tahsils which was more than the district's average production.

Tahsils of Karmala, Malshiras, Pandharpur, North Solapur, Sangola, Mangalwedha have recorded less than the region's average The region has however, recorded 5,304,000 metric tonnes in 1991. It has been decreased by 3,111,000 metric tonnes as compared to 1971. Malshiras (1,999,000 M.T.), Pandharpur (908,000 M.T.), Barshi (770,000 M.T.), Karmala (510,000 M.T.) have recorded more than district's average production. Madha, Mohol, North Solapur, South Solapur, Sangola, Mangalwedha, Akkalkot tahsils have recorded low proportion due to unfavourable environmental conditions.

#### (3) <u>Concentrates</u> :

Table 3.4 shows distribution of concentrates produced from 1982 to 1991. The quantity of concentrates which were supplied to milk producers by District Milk Producting Sangh and Shivamrut Dairy, Akluj has been increased considerably. As data pertaining to concentrates is not available at taluka level, the district totals are considered. Further, these concentrates are supplied by the District Co-operative Milk Federation and Shivamrut Dairy in Malshiras to milk producers. But private traders are also involved in the supply of concentrates about which data is not available.

The livestock feeds here refers to the concentrates. They contain a small bulk or quantity but comparatively it constitutes high content of nutrients which is valuable to milch animals i.e. proteins, fats and carbohydrates. Such

feed consists of the brans of rice and wheat, oilseed cakes, coarse grains, cotton seed cakes, groundnut cakes, the other extracts of various pulses etc. But in the region, the concentrates are provided to the farmers in order to feed milch animals.

Table 3.4 : Distribution of Concentrates in Solapur District (Figures in metric tonnes).

Sr. No.	Year	District Dudh Utpadak Sangh Solapur	Shivamrut Dudh Utpadak Sangh Akluj	Total distri- bution
· · · · · · · · · · · · · · · · · · ·				
1	1982-83	NIL	1,862	1,862
2	1983-84	713	4,616	5,329
3	1984-85	2,226	6,150	8,376
4	1985-86	4,184	8,693	12,877
5	1986-87	4,936	6,096	11,032
6	1987-88	4,384	4,454	8,838
7	1988-89	4,994	3,138	8,132
8	1989-90	5,974	2,694	8,668
9	1990–91	5,983	3,073	9,056

SOURCE : Compiled by the author, 1991.

Solapur District Dudh Utpadak Sangh, Solapur and Shivamrut Dudh Utpadak Sangh, Akluj are two leading cooperative bodies which have distributed the concentrates (Table 3.4). Oilcakes and extracts are included in those concentrates. These concentrates are supplied to farmers and payments of which are adjusted in the payments of milk. In 1983-84 the region had the supply of 5329 metric tonnes to be distributed to the milch animals in the region through village milk co-operatives. Of this, Solapur District Sangh distributed about 713 metric tonnes and 4616 metric tonnes by Shivamrut.

In 1990-91, 9056 metric tonnes concentrates were distributed by The Dudh Utpadak Sangh and of this, 5983 metric tonnes were (bhusa and goli pendh) distributed by District Dudh Utpadak Sangh and 3073 metric tonnes concentrates were delivered to the farmers in the region (Table 3.4).

Some farmers approach to nearest private distributors and may purchase directly the concentrates to feed these milch animals. Table 3.4 reveals that the quantity of concentrates has increased from 1862 M.T. in 1983 to 9056 M.T. in 1991. However, the year of 1985-86 has recorded highest supply (12,877 M.T.) followed in next successive year of 1986-87 with 11,032. In general, there is growing awareness among the farmers to feed milch animals for high yields of milk.

### 3.6 REQUIREMENTS OF FODDER AND FEEDS

#### IN SOLAPUR DISTRICT :

After examining the availability of fodder and feed resources, it would be pertinent to assess the requirement 95

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of fodder and feed in view of the existing number of milch animals. If tahsilwise picture is developed, it would certainly give clear idea that which are the areas having sufficient fodder supply and the areas with inadequate supply. Such study will also be helpful in understanding the regional imbalances which are reflected due to the disparities in physical and socio-economic attributes.

## i) Methodology :

For feeding of indigenous animals, the requirements have been worked out by Amble et al. (1965) and the schedules have been drawn up on the basis of nutrient requirements given by the National Research Council (NRC), U.S.A., 1971. The animals should be fed according to these requirements. On the basis of the work conducted in the Indian Veterinary Research Institute (IVRI, 1973), general schedules have been worked out here. Based on 1961 census, Whyte and Mathur (1965) have also estimated the feed and fodder requirements. Moreover, these estimates were based on daily requirements of oilcakes and green fodder to the milch animals yielding 250 and 500 litres milk per annum. The requirements are estimated as the product of the projected animal population and minimum levels of feeding for different categories of livestock. The feeding schedules recommended by Ranjhan (1974) for calculating the requirements of fodder and feed were used by the committee to determine the total feed requirements.

Sr. No.	Tahsils	Total livestock	Requirement (M.T.)	Production (M.T.)	Availability (M.T.)
1	2	3	4	5	6
1	Karmala	107,802	393,477	269,440	- 124,037
2	Barshi	107,091	390,882	179,687	- 211,195
3	Madha	109,065	398,087	273,070	- 125,017
4	Malshiras	206,978	755,469	4683,470	- 287,122
5	Pandharpur	103,17 <b>7</b>	376 <b>, 596</b>	422,273	+ 45,877
6	Mohol	115,030	419,859	210,079	- 209,780
7	North Solapur	45,477	165,991	87,345	- 78,646
8	south solapur	65,645	239,604	204,265	- 35,339
9	Sangola	155,977	569,316	189,224	- 380,092
10	Mangalwedha	97,159	354,630	160,242	- 194,388
11	Akkalkot	91,614	334,391	180,345	- 154,046
••••••••••••••••••••••••••••••••••••••	DISTRICT TOTAL	2,029,515	4 <b>,3</b> 98 <b>,</b> 302	2,644,517	- 1,753,785

Table 3.5 : The Availability and Requirements of Fodder in Solapur District, 1991.

SOURCE : Compiled by the author, 1991.

# ii) Analysis :

Presently, there are three major types of feeds given to livestock in Solapur district viz. green fodder, dry fodder and concentrates. The total availability of green and dry fodder is of the order of 2,547,020 metric tonnes in 1991. Nearly 1,204,000 units of bovine and ovine require 979,020 metric tonnes green fodder, 1,568,000 metric tonnes dry fodder and 9,056 metric tonnes of concentrates in 1991. The breed cows and milch buffaloes should be fed carefully to become themselves economically in milk production.

Generally, each milch animal requires 5.00 kg. of concentrates, provided to milch animals, seems to be very poor. This has resulted into ill-feeding and consequently decrease in milk productivity of animals. Similarly, as per the recommendations, each milch animal requires 10 kg. of green as well as dry fodder a day. But in the region merely 5.79 kg. of fodder is available resulting into poor milk productivity.

Table 3.5 shows tahsilwise availability of green and dry fodder and concentrates in 1991. Besides this, in view of the existing number of livestock the requirement of fodder has been estimated. The tahsil of Pandharpur has more production of fodder and feed than the requirement. This is mainly due to the recent increase in irrigated area which is devoted to sugarcane. The soils are deep black which are useful for

Rabi jowar producing considerable quantity of jowar straws. There is, however, negative picture in the availability of fodder. Sangola (381 M.T.), Malshiras (288 M.T.), Barshi (211 M.T.) and Mohol (205 M.T.) have shown greater defficiency in the supply of fodder and feeds. This invites a sustained efforts to enhance the production of fodder in these tahsils which may support growing number of milch animals. In brief, in order to promote the dairy development in the region, the attention has to be paid on increasing the production of fodder. Perhaps, this has become the main constraint for dairy development. Unless such base is strengthened the development dairy will be poor.

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