

CHAPTER 4

AGRICULTURE AND IRRIGATION*

Agriculture plays a crucial role in sustaining the economic development of a region which is largely dependent on it. Sarvagna, poet and philosopher, indicated that amongst different types of crafts, 'agriculture' craft is the supreme. He emphasized the key role that agriculture plays in shaping an economy of a country in his proverb in Kannada, "Among a plentiful crafts, the knowledge of agriculture is the best". About 65 per cent of the working population in Karnataka depends on agriculture and allied activities in shaping the economic development. In recent times, agriculture is moving from sustenance to commercial farming. The complementary activities inter alia Animal Husbandry and Veterinary Services, Horticulture, Dairying and Sericulture have widened the network of agriculture. The synergies between agriculture and rainfall have been largely responsible for determining the production and productivity. As a major portion of agricultural land is dependent on the monsoons, the quantum and distribution of rainfall play a vital role in determining production and productivity. In the recent years, agriculture has been resilient to vagaries in monsoon including drought. This chapter deals succinctly with the role of agriculture and allied activities in the the district.

During 1995-96, the total geographical area of the district was 16,10,208 hectares, of which forest area was 68,759 hectares, land not available for cultivation was 1,21,850 hectares, uncultivable and other fallow land was 51,248 hectares and fallow land was 1,74,365 hectares. The net sown area was 11,93,982 hectares. Around 80 per cent of the geographical area of the district amounts to the area sown, which is about 11 per cent of State's net sown area. The talukwise statistics of land use for the year 1995-96 are given in tables 4.1 and 4.2.

* This Chapter also includes Horticulture, Animal Husbandry and Veterinary Services and Fisheries.

Table 4.1: Statistics of land use in the district for selected years
(in thousand hectares)

Particulars	1955-56	1980-81	1990-91	1995-96
Geographical area	1,567	1,610	1,610	1,610
Forest area	35	70	68	69
Land not available for cultivation				
a) Barren and uncultivable	67	69	64	59
b) Land put to non-agricultural use	33	46	54	62
Other uncultivated land including fallow land				
a) Culturable waste	37	15	12	12
b) Permanent pasture	15	47	41	38
c) Tree crops and groves	4	1	2	2
Fallow land				
a) Current fallow	68	128	192	152
b) Other fallow	31	60	20	21
Sown area				
a) Net sown area	1,277	1,178	1,158	1,194
b) Area sown more than once	-	90	162	193

Source: 1) Development of Agriculture in Karnataka, Agriculture Department, Bangalore.

2) Directorate of Economics and Statistics, Bangalore.

Table 4.2 : Talukwise statistics of land use in the district for the year 1995-96
(in hectares)

Taluk	Geographical area	Land not available for cultivation	Other uncultivated land including fallow land	Fallow land	Net sown area
Afzalpur	1,30,479	6,906	1,784	23,279	1,02,996
Aland	1,73,417	6,350	4,498	15,132	1,68,475
Chincholi	1,55,854	15,814	9,895	3,818	1,29,631
Chitapur	1,76,447	12,833	5,250	26,890	1,39,755
Gulbarga	1,73,165	11,880	4,439	22,808	1,43,420
Jevargi	1,82,313	6,488	6,840	1,371	1,78,156
Sedam	1,02,445	9,807	3,638	15,362	75,939
Shahapur	1,59,492	14,726	4,828	19,566	1,35,857
Shorapur	1,85,523	20,438	6,990	29,267	1,82,044
Yadgir	1,71,073	16,608	3,086	16,872	1,30,594
Total	16,10,208	1,21,850	51,248	1,74,365	13,86,867

Source: Gulbarga district Statistics at a glance 1995-96, DES No: 74:1996.

Agricultural land holdings

Details of agriculture land holdings according to the Agricultural census are furnished below:

Census year	Land holdings		Average size (hectares)
	Number	Area (hectares)	
1955-56	2,14,780	14,535	6.75
1970-71	2,12,682	12,63,243	5.94
1976-77	2,43,265	13,19,885	5.43
1980-81	2,82,680	13,55,215	4.79
1985-86	3,41,571	13,23,305	3.87
1990-91	4,24,480	13,93,351	3.28

According to the 1990-91 Agricultural census, Gulbarga district has the second largest number of land holdings in the state (7.4 per cent), next to the Mysore district (7.6 per cent). With regard to the area of land holdings also, Gulbarga district (with 11.3 per cent of state's area of holdings) is next to Bijapur district (with 12.2 per cent of the state's area). Considering the entire agricultural censuses till now, the average size of holdings in Gulbarga district is more than the state's average. Details of land holdings in the district are outlined below.

Sl. No.	Particulars	Numbers (in thousands)	Area (in thousand hectares.)
1	Individual holdings	423	1,388
2	Joint holdings	1	3
3	Institutional holdings	negligible	2

The size class of holdings and their area are given in table 4.3. The details of talukwise holdings are given in table 4.4 and the details of agricultural labourers according to the 1991 census are provided in table 4.5.

Table 4.3 : Agricultural land holdings and their area in ha in the district

Particulars	Marginal	Small	Semi medium	Medium	Large	Total
I. Schedule Caste						
1. Number of land holdings						
1985-86	12,876	16,820	15,424	8,384	1,529	55,033
1990-91	16,333	26,151	19,608	8,254	1,152	71,497
2. Area of land holdings (in hectares.)						
1985-86	7,132	25,006	42,834	49,634	22,252	1,46,858
1990-91	9,279	38,769	53,727	48,106	15,785	1,65,666
3. Average holding area (in hectares)						
1985-86	0.55	1.49	2.78	5.92	14.55	2.67
1990-91	0.57	1.48	2.74	5.83	13.70	2.32

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Particulars	Marginal	Small	Semi medium	Medium	Large	Total
II. Scheduled Tribe						
1. Number of land holdings						
1985-86	929	1,632	1,772	1,213	311	5,857
1990-91	3,452	5,417	4,522	2,574	353	16,318
2. Area of land holdings (in hectares.)						
1985-86	526	2,451	4,989	7,363	4,388	19,717
1990-91	2,022	8,059	12,793	15,053	5,285	43,212
3. Average holding area (in hectares.)						
1985-86	0.57	1.50	2.82	6.07	14.11	3.37
1990-91	0.59	1.49	2.83	5.85	14.97	2.65
III. Other Classes						
1. Number of land holdings						
1985-86	34,653	66,989	84,813	70,854	23,372	2,80,681
1990-91	42,420	1,00,240	1,03,678	70,761	19,566	3,36,665
2. Area of land holdings (in hectares.)						
1985-86	19,382	1,01,356	2,43,061	4,39,035	3,53,896	11,56,730
1990-91	23,990	1,51,180	2,92,368	4,31,008	2,85,927	11,84,473
3. Average holding area (in hectares.)						
1985-86	0.56	1.51	2.87	6.20	15.14	4.12
1990-91	0.57	1.51	2.82	6.09	14.61	3.52
IV. Total of All Classes						
1. Number of land holdings						
1985-86	48,458	85,441	1,02,009	80,451	25,212	3,41,571
1990-91	62,205	1,31,808	1,27,808	81,588	21,071	4,24,480
2. Area of land holdings (in hectares.)						
1985-86	27,040	1,28,813	2,90,884	4,96,032	3,80,536	13,23,305
1990-91	35,291	1,98,008	3,58,888	4,94,167	3,06,997	13,93,351
3. Average holding area (in hectares.)						
1985-86	0.56	1.51	2.85	6.17	15.09	3.87
1990-91	0.57	1.50	2.81	6.06	14.57	3.28

Source: Report on Census of Agricultural Holdings 1990-91, part-I, State Agricultural Census Commissioner, Bangalore.

Table 4.4 : Talukwise number of land holdings and their area (in hectares) in the district.

Taluk	Marginal (< 1ha.)		Small (1-2 hectares.)		Semi medium (2-4 hectares)		Medium (4-10 hectares)		Large (>10 hectares.)	
	Number	Area	Number	Area	Number	Area	Number	Area	Number	Area
Afzalpur	1,098	1,314	9,657	14,157	10,283	28,744	7,452	45,168	2,212	33,402
Aland	4,407	2,734	15,650	24,012	14,619	41,210	9,655	57,342	2,578	36,216
Chincholi	4,845	2,909	11,064	16,392	9,593	26,981	6,546	39,591	1,890	28,631
Chitrapur	5,703	3,115	12,465	18,905	12,246	37,436	8,929	54,751	2,683	39,571
Gulbarga	3,727	2,368	11,387	17,119	12,028	34,026	9,334	58,071	2,823	41,448
Jevargi	3,468	2,219	12,814	19,730	15,387	43,331	10,465	64,222	2,700	37,433
Sedam	6,787	3,632	8,601	12,648	7,468	20,830	4,982	30,007	1,272	19,180
Shahapur	7,691	4,287	15,638	23,436	16,112	44,804	7,759	46,712	1,910	27,022
Shorapur	7,135	4,486	17,456	26,592	15,693	44,188	9,353	55,962	1,742	25,864
Yadgir	16,464	8,227	17,086	25,017	13,379	37,338	7,113	42,341	1,261	18,230
Total	61,325	35,291	131,818	198,008	126,808	358,888	81,588	494,167	21,071	306,997

Source: District Statistical office, Gulbarga.

Table 4.5 : Details of Agricultural Labourers as per 1991 Census in the district.

Sl. No	Taluk	Main workers			Cultivators			Agricultural labourers		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
1	Afzalpur	39,818	22,040	61,858	14,987	2,674	17,661	17,482	18,135	35,617
2	Aland	68,530	45,006	113,536	27,903	6,923	34,826	25,763	34,610	60,373
3	Chincholi	50,794	35,543	86,337	20,817	6,784	27,601	17,828	25,769	43,597
4	Chitapur	78,789	37,334	116,123	22,904	5,189	28,093	20,905	24,905	45,199
5	Gulbarga	120,522	43,906	164,428	24,730	7,332	32,062	20,669	26,287	46,956
6	Jevargi	50,048	32,789	82,837	21,255	5,256	26,511	18,944	25,843	44,787
7	Sedam	45,129	25,977	71,106	17,510	4,940	22,450	11,310	16,405	27,715
8	Shahapur	65,376	34,623	99,999	29,217	7,280	36,497	20,266	23,382	43,648
9	Shorapur	76,368	42,493	118,861	33,501	8,420	41,921	20,358	29,043	49,401
10	Yadgir	75,052	49,785	124,837	38,138	10,732	48,870	16,801	31,352	48,153
District Total		670,426	369,496	1,039,922	250,962	65,530	316,492	190,326	255,731	445,446

Source: 1991 Census report, Census Directorate, Bangalore.

Soil

The soils in the district can be classified into three types: soils derived from basalt rock, medium black soil and deep black soil. In some areas, sandy clayey soil and lateritic soil are also seen.

Soils derived from Basalt rock: This soil is derived from the Deccan traps and black igneous rocks. This commonly occurs as step like formation in undulating areas. The soil colour ranges from light green to dark red brown. Ancient alluvial gravels and limestone formations, sometimes of considerable thickness, occur along the valleys of the Krishna and Bhima rivers. Soil quality is excellent in some places and in some other places has saline traces. Soil has the capacity to hold different quantities of clay particles, with good drainage potential. This soil contains the montmorillonite mineral and is prone for erosion. Major crops of the area are Jowar, Bajra, other millets, Horse-gram and other pulses. Under irrigated conditions, Paddy, Jowar, Chillies and other vegetables can be grown. As the soils are shallow, roots cannot go deep inside the soil. Consequently, the crop productivity on rain fed lands is moderate in these soils.

Medium black soil: This soil is also derived from the Deccan trap, the black igneous rocks and the molten magma and has sedimentary rocks and lime stone. The soil is medium deep and black to brown in colour. It contains lime stones mixed with clay. In dry conditions, the soils crack. It is fertile and has a potential for good yield with low water. Crops such as Jowar, Wheat, other millets, Cotton, Safflower, Groundnut, Sesame, Chillies, Tur, Bengal gram and other pulses are grown in these soils. Under irrigation, Paddy, Sugarcane, Vegetables, Cotton, Tobacco, Banana are the main crops.

Deep Black soil: This soil is formed from gneiss and sedimentary rocks. Colour of these soils range from brown mixed with black, blackish brown mixed with ash colour, dark black to dark brown or black. The Clay content is higher in these soils. These soils are subject to erosion to a small extent. The rain fed and irrigated crops that are cultivated on Basalt rock soils are also cultivated in these soils.

In the district, other soil types that can be found are clayey, red sandy loamy and lateritic soils. The colour of red sandy loam soils ranges from red to pale brown which are shallow to medium deep, well drained and sandy to sandy loam in texture. This type of soil can be seen in some areas of Yadgir taluk and in parts of Shorapur. Aland and Afzalpur taluks. Alluvial or Clayey soil can be seen on both the banks of the Bhima and Krishna rivers in Yadgir and Shorapur taluks. Under rain fed conditions, in clayey soil, Chillies, Jowar, Cotton and pulses can be grown. In the northern part of Gulbarga district and in Chincholi taluks, soils are bright red to pale red, sandy to sandy loam in texture. They are poor in water holding capacity and in bases. In these soils, under irrigation, Paddy, Chillies, Onion, and vegetables and under rain fed condition, Jowar, millets, pulses and Groundnut can be cultivated.

In Gulbarga, Yadgir and Jevargi taluks black soils that are shallow to medium depth can be found. They are deep black in colour, clay to clay loam in texture with lime nodules. They have high base content and water holding capacity. Irrigated or rain fed Jowar, Gram, Safflower, Cotton and Linseed crops are grown in these soils.

Deep black soils can be found in parts of Gulbarga taluk and in Chitapur, Sedam, and Chincholi and Shorapur taluks. These soils are deep black in colour with concretionary trap stones. Lime nodules are present. They have high base content and clayey texture. Irrigated or rain fed Jowar, Cotton, Wheat, Pulses, Gram, Safflower, Linseed and Paddy. In upland areas, light sandy soils are found, while in valleys and in plains, deep black soils can be found.

Considering the rainfall pattern, quantity and distributions, soil type, mean sea level, geographical features, main crops and vegetation, Karnataka state is classified into 10 agro climatic zones. Areas of Gulbarga district is classified under two agro climatic zones: the North Eastern Transition Zone and the Northern Dry Zone.

North Eastern Transition Zone: Aland and Chincholi taluks of Gulbarga district are classified under this zone. Kharif is the main crop season in this zone. A major portion of this zone has medium black soils. The annual average rainfall in the zone is between 830 mm and 890 mm.

Northern Eastern Dry Zone: The Northern Eastern Dry Zone comprises the remaining eight taluks of the district. The annual average rainfall ranges between 633 mm and 806 mm. Around 55 per cent of this rainfall is received during September and December (post monsoon). Thus, the Rabi crop is the main crop in this zone. These areas are at a height of 300 to 450 metres. above the mean sea level. Deep black soils are a common soil type.

Cropping Pattern

Crops are chosen for cultivation depending on the intensity of rainfall, soil moisture and other agro-climatic conditions. Depending on the weather conditions, keeping the crop pattern, varieties can be changed. The University of Agricultural Sciences, Dharwad and the Department of Agriculture have suggested the crops listed below for the district depending on the soil pattern and sowing period.

Generally, rabi crops are sown at the end of September or during October. It is economical

Sowing Period	Shallow black soil	Medium deep black soil	Deep black soil
June	Hybrid Bajra, Tur, Sugarcane, Ground nut	Jowar, Hybrid Bajra, Tur, Green-gram, Black-gram	
July	Hybrid Bajra, Tur, Sugarcane, Ground nut, Sun flower, Gingelly, Caster, Horse-gram	Hybrid Bajra, Sugarcane, Ground nut, Tur, Sun flower, Navane	
August	Sunflower, Castor, Horse-gram and Sesame	Cotton, Sun flower Sun flower Safflower, Rabi Jowar Rabi Jowar	Cotton, Sun flower Sun flower Rabi flower
October	Sun flower	Rabi Jowar	Wheat and Gram

to take up sowing two to three weeks earlier. In deep black soils, gram and rabi Jowar, Safflower, Wheat crops have to be rotated. In medium deep black soil, crop rotations such as rabi Jowar and Safflower and Safflower and gram (in the ratio 1:3) would be economical. Mixed crop would be more economical than a single crop. In addition, mixed crop would reduce the loss that can take place by growing a single crop.

The major systems of mixed crop for the region according to technical experts are as under: Hybrid Bajra and Tur (2: 1 rows), Hybrid Bajra and gutti groundnut (2: 4 rows), gutti Ground nut and Tur (3: 1 rows), Kharif Jowar and Tur (2: 1 rows), Safflower and Gram (1: 3 or 2: 4 rows) Safflower and coriander (1: 3 or 2: 4 rows). The season wise and talukwise major agricultural crops, area and productivity in the district are detailed in table 4.6 to table 4.8 for selected years.

Table : 4.6 Area (hectares), Production (tonnes), and Productivity (kg/hectares) of Major Agricultural Crops in the district 1993-94.

Sl. No.	Crop name	Season	Area	Production	Productivity
1	2	3	4	5	6
1	Paddy	Kharif	9,945	17,648	1,868
		Rabi	2,073	6,262	3,180
		Summer	2,124	9,140	4,530
		Total	14,142	33,050	9,578
		Irrigation	7,569	24,537	3,412
2	Jowar	Kharif	7,951	9,606	1,272
		Rabi	344,088	293,239	897
		Total	352,039	302,845	906
		Irrigation	5,641	10,819	2,019
3	Bajra	Kharif	59,663	47,362	836
		Rabi	14,183	12,819	911
4	Maize	Kharif	1,175	2,594	2,394
		Rabi	79	180	2,394
		Summer	153	408	2,810
		Total	1,407	3,182	2,381
		Irrigation	973	2,595	2,807
5	Ragi	Kharif	33	31	1,000

Continued...

1	2	3	4	5	6
6	Wheat	Rabi	21,113	13,677	682
		Summer	6,102	6,588	1,136
7	Total Cereals	Kharif	78,767	71,364	954
		Rabi	3,67,353	311,272	892
		Summer	2,277	6,505	3,007
		Total	4,48,397	389,141	914
		Irrigation	35,098	49,187	1,475
8	Millets				
	1. Navane	Kharif	2,311	1,425	649
	2. Same	Kharif	1,651	585	373
	3. Haraka	Kharif	175	93	557
	4. Badluvari (Baragu)	Kharif	121	15	122
		Total	4,258	2,118	524
9	Total Cereals and Millets		452,655	391,259	910
10	Pulses				
	1. Tur	Kharif	166,954	56,940	359
	2. Black-gram	Kharif	19,547	15,190	818
	3. Horse-gram	Kharif	4,560	1,308	302
		Rabi	2,180	708	342
		Total	6,740	2,016	315
	4. Green-gram	Kharif	24,644	9,435	403
	5. Bengal gram	Kharif	217,071	47,832	489
	Total Pulses	Kharif	217,071	73,082	403
		Rabi/summer	1,05,848	48,614	483
		Total	3,22,919	1,31,696	429
11.	Total Food crops	Kharif	3,00,096	1,56,664	649
		Rabi/summer	4,75,674	3,66,391	811
		Total	7,75,574	5,22,955	710
12	Groundnut	Kharif	56,758	38,472	714
		Rabi/summer	58,541	62,733	1,128
		Total	1,15,299	1,01,205	924
		Irrigation	71,578	73,917	1,087

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1	2	3	4	5	6
13	Oil seeds				
	1. Castor	Kharif	17	10	624
	2. Safflower	Kharif	27,584	9,486	362
	3. Linseed	Kharif	2,383	403	178
	4. Sunflower	Kharif	281,654	107,293	401
		Rabi	40,440	11,668	304
		Summer	12,750	5,148	425
		Total	334,844	124,109	390
		Irrigation	48,997	20,055	431
	5. Safflower	Rabi	67,719	41,880	651
	6. Niger	Kharif	2,595	457	176
	Total Oil seeds		551,809	277750	530
14	Cotton	Annual	2,600	5,581	348
		Irrigation	1,763	5,024	510
15	Sugarcane	Annual	4,918	369,096	79
16	Mesta	Annual	6,912	12,807	333

Note: Cotton production is in bales of 170 kg lint. Sugarcane production in tonnes per hectare.

Source: Revised Estimates of major crops of Karnataka for the Year 1993-94. DES publication No. 39, 1995, Director for Economics and Statistics, Bangalore 1995.

Paddy

Paddy is cultivated in 14,000 hectares of which 7,500 hectares are irrigated and the rest, rain fed. Productivity is 2,460 kg per hectare, lower than the state's average of 3,650 kg per hectare. Paddy is mostly grown in Yadgir (4,855 hectares), Shorapur (1,710 hectares) and Aland (1460 hectares) taluks of the district. The varieties of paddy recommended for Kharif and Summer seasons with their duration in days are as follows: Gama - 318, Avinash 135-140; Jaya 140 - 145; Vani 140 - 145; Sona 140 - 145; Prakash 145 - 150; I.R.20 130 - 135; Pushpa 125 - 130; Madhu 120 - 125; Mangala 105 - 115; Pragathi 130 - 135; Mandavani 130 - 135; K.M.P 39 (Karna) 130 - 135; Sona Masuri 140 - 145 and Tella Hamsa 120 - 125.

An increase in the average yield per hectare, from 50 to 55 quintals may be expected by adopting the latest technology in farming methods. But the present average yield in the district is around 25 quintals per hectare. In order to improve productivity, many programmes incorporating the latest technology in farming are being implemented in the district.

Jowar

Jowar is grown in an area of 3.52 lakh hectares in the district and is the next highest after Bijapur district (5.21 lakh hectares) in Karnataka. It is grown in all the taluks of the district as a rain fed crop. Jowar is grown in large areas of Gulbarg, Jevargi, Yadgir, Aland and Shahapur taluks.

Table 4.7 : Talukwise area of principal agricultural crops in the district during the year 1995-96 (in hectares)

Sl.No.	Taluk	Paddy	Jowar	Bajra	Wheat	Total Cereals	Bengal gram	Tur	Total Pulses	Ground nut
1	Afzalpur	340	23,495	3,650	5,368	33,212	6,596	23,250	34,231	10,800
2	Aland	1,460	33,301	9,817	5,589	50,729	13,386	22,992	49,011	2,388
3	Chincholi	514	31,663	2,369	894	35,742	15,395	29,869	72,552	591
4	Chitapur	126	28,435	3,568	620	33,165	16,716	39,650	66,108	4,430
5	Gulbarga	661	40,035	9,492	2,124	52,614	6,478	30,958	45,230	2,656
6	Jevargi	180	40,830	10,198	3,456	54,853	9,734	24,634	42,394	15,683
7	Sedam	620	25,345	225	430	27,513	6,400	21,950	33,215	985
8	Shahapur	557	32,710	225	340	34,012	2,000	15,350	23,615	34,022
9	Shorapur	1,710	24,695	25,645	1,675	54,125	4,165	5,810	12,879	60,745
10	Yadgir	4,858	39,669	2,650	110	49,817	5,620	12,540	30,704	15,102
	Total	11,026	3,20,178	67,839	20,606	4,25,782	86,490	227,003	4,09,939	1,47,402

Source: Office of the District Statistical Officer, Gulbarga.

Out of the total Jowar area, 5,600 hectares are under irrigation. The average yield per hectare is 964 kg, which is below the State's average yield. Jowar is mainly grown as a rabi rain fed crop. The hybrid variety is yet to become popular. The three varieties namely M-35-1, Muguthi (5-4-1) and CSH - 12 R (SPH - 218) gets ready for harvest in 120 to 130 days. These varieties can be cultivated in all the areas where rabi jowar is grown. The varieties CSH -5, CSH - 8R and CSH - 12R hybrid varieties, M - 35 -1, 5-4-1 (Muguthi) and Annigeri -1 varieties are recommended under irrigation. Here, even though the expected yield is 12 to 15 quintals per hectare, the current yield is only 10 quintals. Appropriate steps are being taken to implement modern technology in farming to realize higher productivity.

Bajra

Gulbarga is the third largest district in Karnataka to grow Bajra (59,000 hectares) after Raichur (83,000 hectares) and Bijapur (75,000 hectares). Around 15,000 hectares of Bajra area are under irrigation. WCC 75 is the recommended variety both for irrigated and rain fed conditions. The productivity of Bajra in Gulbarga is eight quintals per hectare, which is higher than the state average of six quintals per hectare. Shorapur, Jevargi, Aland and Gulbarga taluks have larger areas under jowar crop. The duration is 90 to 100 days.

Wheat

Wheat is cultivated in Belgaum, Bijapur and Dharwad districts. A large area is devoted to Wheat in Gulbarga district also. The productivity is seven quintals per hectare, lower than the state average of 8.5 quintals. Area irrigated under this crop is 6,000 hectares. Afzalpur, Aland, Jevargi, Gulbarga and Shorapur taluks have larger area under Wheat the varieties H.D.2189, D.W.R. 16 (Kirti), D.W.R. 39 and H.D.4500 are under irrigation and Bijaga yellow and D.W.R. 137 (Kirana) are good varieties for Rabi crop. In Rabi season, five to eight quintals per hectare are expected.

Pulses

Around 52 per cent of state's pulse grown area is from the district. About 49 per cent of the state's production is from the district and referred as the 'Granary of Pulses' in Karnataka. The productivity of pulses(three years moving average) for selected years is given below:

Period	Area in hectares.	Yield in Kg per hectare	Production in tonnes
1962-63	1,79,709	238	41,700
1972-73	2,22,105	267	65,031
1982-83	3,21,568	345	1,09,974
1992-93	4,13,884	265	1,10,052
1993-94	3,81,477	285	1,04,885

Varieties in Pulses: The current varieties and those recommended in pulse crops are mentioned below. The varieties Gulyal local (red Tur), Sedam local, Chitapur local, Patarbada, Handabanda,

Table 4.8 : Details of important crops, area (in hectares), production (in tonnes), productivity (Kg/hectares) for selected years.

	1960-61			1970-71			1980-81			1990-91		
	Area	Production	Yield	Area	Production	Yield	Area	Production	Yield	Area	Production	Yield
Paddy	15,669	12,646	743	12,166	21,447	1,855	12,684	19,183	1,592	10,701	13,806	1,290
Jowar	645,465	184,027	300	338,122	183,140	570	345,195	239,579	731	411,790	351,188	898
Ragi	5,799	1,427	256	1,959	1,658	891	1,127	1,212	1,088	63	54	899
Maize	176	56	336	417	1,384	3,494	399	1,286	3,393	1,679	4,953	3,105
Bajra	87,967	25,665	307	98,532	71,992	769	143,330	63,060	463	69,117	45,764	692
Wheat	31,288	7,796	262	31,453	20,186	675	35,016	18,534	557	23,494	17,888	801
Total Cereals	8,43,179	2,39,306	284	5,30,094	3,11,566	619	5,76,697	3,53,382	645	516,844	429,054	824
Tur	78,030	23,929	323	140,782	63,528	475	176,002	42,804	256	236,066	5,382	24
Bengalgram	32,286	10,314	336	34,321	14,803	454	34,617	11,364	318	47,637	15,739	348
Total Pulses	177,642	43,261	243	271,484	106,426	413	312,178	87,017	293	383,809	51,367	141
Groundnut	97,064	55,192	599	156,442	127,399	857	77,982	25,624	350	90,128	47,449	554
Sesamum	14,711	2,068	148	16,419	5,069	325	25,553	8,909	367	26,559	6,106	242
Sunflower	0	0	0	0	0	0	7,385	3,136	447	180,031	60,113	351
Safflower	65,129	11,822	182	68,315	11,067	162	58,369	44,305	799	55,358	26,571	505
Total oilseeds	210,442	75,700	360	279,075	151,641	572	215,081	90,661	444	362,073	141,614	412
Cotton	46,852	12,626	48	127,090	85,184	127	123,618	54,574	79	4,776	6,949	260
Sugarcane	597	20,327	36	1,103	89,080	85	2,340	193,401	87	4,976	292,541	62

Source: Directorate of Economics and Statistics, Bangalore.

White Sotta and C - 28 local varieties were grown prior to the release of the latest Tur varieties. These varieties have slow period of maturity (of 200 to 210 days) and are low yielding. All these local varieties flower for a long period, which promotes the attack by pod boring pests. With the advent of the All India Pulse Development Programme in 1977, varieties like GS 1, GS 2, GS 33 etc, were selected from the local varieties and were tested. Among these, GS 1 variety matured in 180 days and was the first high yielding variety (with 1,013 kg /hectares), with bigger and white sized grains. Later, another white variety namely PT 221 was released which matured in 160 days and offered a higher yield of 880 kg per hectares. During 1985, a disease resistant variety - Maruthi (ICCL 8863) was released. This was red in colour and had small grains. Later, ICCL variety that matured early with bigger grain size, with disease resistance and yielding higher than Maruthi variety (1,260 kg per hectare) was released. This variety was drought resistant too. Among the varieties with medium period of maturity are TS 1 and TS 3 giving 1,600 to 1,700 kg per hectare, with white and big sized grains offering disease resistance. The varieties GS 1 and PT 221 were the two medium duration varieties released in 1979. The variety GS 1 was suitable for deep black soil and GS 221 variety for medium deep black soil. Later, these varieties were susceptible to the attack by sterility mosaic virus disease (pilodi disease) disease and began giving low yield.

Sl. No	Variety	Duration (days)	Productivity (Kg/hectares)
Tur			
1	GS 1	180	1000 to 1200
2	PT 221	160	1000 to 1200
3	ICP 8863 (Maruthi)	180	900 to 1100
Bengal Gram			
1	Annigeri-1	95	800 to 900
2	Bheema 2375	90	900 to 1100
3	Jhapha	95	700 to 800
Green Gram			
1	PS 16	60 to 65	600 to 700
2	Pusa Baisaki	60 to 65	600 to 700
Black Gram			
1	T 9	75 to 80	600 to 700
2	K 3	90 to 100	800 to 900
Cow Pea			
1	C 152	85 to 95	900 to 1000

Varieties that matured early and flowered at the same time were better from the point of pest attack. The variety ICPL 87 with this character, which matured in 130 days, was released. This variety is suitable in places where two crops could be cultivated or for mixed crop system. Under irrigation, the second crop can also be taken with the variety ICPL 87 (Pragathi). Among the other early maturing varieties, selection 23 and selection 31 varieties matured in 100 days with a productivity of 1,496 and 1,685 kg per hectare respectively.

During 1985, the Bhima variety with bigger sized grain was released. However the Annigeri -1 variety became popular. Sterility mosaic virus disease resistant varieties like A-1-1, ICCV-10, BBG-1 and BBG-2 are in experimentation stage. Pod bore resistant varieties such as ICC-73008-1-DP-BP, ICDC-4935 are also in experimentation stage.

Among Green-gram varieties, Pavana variety (TAP-7) which was performing better than China mung, Pusa baisaki, and PS-16 varieties have been released. This has small sized pods and has the ability to be cultivated as a Kharif and Summer crop.

Among Black-gram varieties, the Manikya variety can be grown in assured rainfall areas, which can give 69 per cent higher yield than the Kharagaon-3 variety. In the drought prone areas, Kharagaon-3 variety has proved its worth. The T-9 and Manikya varieties have also been released.

In Cowpea, V-118 variety is yielding 55 per cent higher than C-152 variety, with early ripening, with white and big sized grains resistant to leaf blast. The T.V.X-944-E and KBC-1 varieties have also been released. In Horse-gram, the variety HPK-6 has yielded higher than BGM-1 variety. This variety is yet to be released.

Tur (Red-gram)

In Gulbarga, Tur crop is grown on a larger area compared to the other districts of the state. During the three decades from 1962-63 to 1992-93, there is a remarkable increase in Red-gram grown area in the district. It is grown on a large area in Chincholi, Chitapur, Sedam, Gulbarga, Jevargi, Aland and Afzalpur taluks. Tur is grown as a pure crop and also as a mixed crop. The yield details of Red-gram grown in the district in selected years (three years moving average) are as given below:

Period	Area (hectares)	Yield (kg/hectares)	Production (tones)
1962-63	77,452	328	24,137
1972-73	1,11,015	297	35,490
1982-83	1,89,047	349	63,212
1992-93	2,55,637	220	54,648
1993-94	2,27,664	209	42,406

Prof Sathya Prema

Even though technological progress is under way in Red-gram varieties, a major threat for its improvement is from the pod-boring pest - *Heliothis*. Due to this pest, 20 to 30 per cent of the production is lost. During 1992-93, the loss was more than 70 per cent. In the recent times, due to reasons inter alia, increased production and fall in demand, there has been a falling trend in the prices. In order to assist farmers to face the predicament, there has been a demand for formation of Red-gram Development Board. During 1996, government has declared Rs. 1,500 per quintal as the support price for Red-gram.

Bengal-gram

Bengal-gram is an important pulse crop of the drought hit rain fed areas of Northern Karnataka. Bengal gram is cultivated in an area of 29,000 hectares in the district producing around 9,000 tonnes. Though the absolute production of the crop is large in the district, the productivity is lower compared to the total yield of state and the country. This crop is grown in large areas in Chitapur, Chincholi, Gulbarga, Sedam, Aland, Afzalpur and Shahapur taluks. It is grown as a main crop and as an alternate crop to Jowar, Bajra, Wheat, and Coriander. In case it is grown as a second crop in the same year, Sesame and Maize are sown during the Kharif.

Groundnut

Groundnut is grown in an area of about 1.15 lakh hectares in the district of which 71,000 hectares are irrigated. The productivity in the district is seven quintals per hectare while the state's average is 10 quintals per hectare. It is largely grown in Shorapur, Shahapur, Yadgir, Jevargi and Afzalpur taluks, as a major irrigated crop during summer and also during Rabi and Kharif to some extent. The recommended varieties under irrigation and their duration are as under: T.M.V.-2-100 to 120 days; S.206 - 100 to 115 days; K.R.G.-1 - 105 to 110 days; I.C.G.S.11 - 105 to 110 days; and Bharathi (JS - 24) - 90 to 95 days. Varieties recommended during the Rabi are T.M.V.-2; S.-206; Pondicherry-8 (135 to 140 days); S.230 (135 to 140 days); K.R.G.-1 Bharathi (J.L.-24) and ICJS-11-105 to 110 days. Depending on the variety, a productivity of 10 quintals per hectare in rain fed and 25 quintals per hectare under irrigation are expected. However, the current average productivity is 10 quintals per hectare. In order to improve the productivity, necessary measures are being taken to implement modern technology in farming.

Sunflower

Sunflower is grown in large areas of Gulbarga district (3.35 lakh hectares) next to Bijapur district (4.40 lakh hectares). The average productivity of sunflower in the district is 3.9 quintals per hectare, and is higher than the average state yield (3.49). Though Sunflower is a recently introduced crop it is popular among farmers. Even though the crop can be cultivated throughout the year, it is mainly cultivated during summer under irrigation to the extent of 50,000 hectares. The varieties EC - 68415 (Amravitsaki), Morden and B.S.H.-1 (Hybrid) varieties are recommended for irrigation. All these varieties can also be grown in rain fed conditions. This crop has the capacity to adjust to changes in weather conditions and hence be grown throughout the year. It can withstand dry climate and can be grown successfully in normal soils also. As the crop has low period for maturity, it can be included in the multiple cropping system.

Safflower

Safflower is an important crop among Rabi oil seed crops, grown mainly in black soil under rain fed conditions. The highest area of 68,000 hectares are in Safflower in Gulbarga district in the state. The varieties Annigeri-1 (115 to 120 days), A-300 (115 to 120 days) and N-144 (115 to 120 days) are the important Safflower varieties. Safflower can give better yield under irrigation and is responsive to fertilizers. At present, the area under irrigation in this crop is not very considerable.

Agricultural Input Supply

The success of agriculture depends on the timely supply of quality seeds, manure, pesticides, agricultural implements, agricultural machinery and credit. The Department of Agriculture with the cooperation of other departments and non-governmental organizations, is putting forth efforts to meet the required supply of agricultural inputs to farmers.

The success in crop production depends on the use of pure and healthy seeds. Department of Agriculture is striving for the production and supply of good quality seeds by establishing departmental seed production farms. The whole hearted participation of the National Seeds Corporation, Karnataka State Seeds Corporation, Karnataka Oil Seed Producers Federation and other non-Governmental organizations (NGO's) has helped in the growth of agriculture seed production as an important industry. After the implementation of the Seed Control Act of 1983, all seed marketing firms have been registered and the seeds sold by them are subjected to quality test. Even private seed producing units can also engage in selling seeds on a larger scale and maintain the quality of sowing seeds.

Foundation seed production is being taken up in the Departmental Agriculture Seed farms. For the production of Foundation seeds, the required Breeder seeds are obtained from the Agriculture Universities. After meeting the requirement of Foundation seeds, the remaining area is devoted to the production of certified seeds. The seed varieties produced in the departmental seed farms are handed over to the Karnataka State Seeds Corporation for further seed production and distribution.

To ensure the supply of good quality seeds to farmers, the Seed Act of 1966, the Seed Control Order of 1983, the Seed Regulation Act of 1988 are being enforced all over the state. Two seed testing laboratories have been established, one at Hebbal in Bangalore and the other at Dharwad, under the control of the Department of Agriculture.

The Foundation and certified seeds produced in the state are certified by the Karnataka State Seed Certifying Agency. Apart from this, it also decides the crop wise, season wise requirement of seeds and informs the seed distribution organizations and the Joint Director of Agriculture (seeds) in advance and facilitates the distribution of seeds. It will also identify the farmers who have good quality seeds, list them up and advertise the availability of seeds.

Fertilizers

In modern agriculture, fertilizers play a vital role in crop production. Fertilizers are beyond the reach of farmers in general and are increasingly becoming expensive. Since 1960, the annual utilization of fertilizers is increasing due to an increase in area under high yielding and hybrid varieties and increasing area under irrigation. During 1960-61, 495 tonnes of chemical fertilizers were used in the district and increased to 30,000 tonnes during 1992-93. According to research findings, the knowledge level of farmers regarding use of chemical fertilizers for irrigated crops of Paddy, Jowar, Groundnut, Maize, Cotton and Sugarcane increased from 82 per cent to 100 per cent. The development of dry land technology and demonstrations in watershed programmes,

have increased the demand for chemical fertilizers. Due to these developments, the adoption of soil and water conservation technologies has promoted the use of chemical fertilizers in areas where rainfall is certain and also in rain fed areas. Thus, there is scope for increasing the level of use of fertilizers by 60 to 70 per cent. In areas where agriculture is dominant, for achieving higher productivity, the provision of micro nutrients like Lead, Iron, Boron and Manganese are crucial for which suitable guidance and training are being given to farmers regarding their application.

In recent years, due to decontrol of phosphoric and potash fertilizers, there was a rise in the price of chemical fertilizers. Thereafter, the agriculture department has devised special schemes like organic farming, application of fertilizers based on soil testing, use of microbial fertilizers like *rhizobium* and *azatobacter*, integrated nutrient management and balanced use of fertilizers. Currently, only the nitrogenous fertilizer (Urea) is under control. Urea is distributed by the central government twice a year under the Essential Commodities Act. The required quantity of fertilizers for the state is being procured and distributed. Since the 6th July 1996, the Government of India has increased the rebate on decontrolled fertilizers. According to the Fertilizer Control Order 1985, Fertilizer quality control standards are being enforced all over the state. Currently two pesticide control laboratories are functioning, one at Bangalore and the other at Dharwad. These laboratories enforce the fertilizer quality control standards and prevent the sale of inferior and low quality pesticides.

Bio-Fertilizers: In the recent years, use of bio fertilizers is gaining importance. As their price is lower than the chemical fertilizers, farmers are using bio fertilizers as substitutes. The cost of production of bio fertilizer and their distribution from the Soil health centre, Gulbarga is being managed by the state government.

Organic Farming : In order to achieve sustainability of soil and to increase productivity, timely application of organic manures and mineral nutrients need to be ensured. This can be provided from biomass including the stubbles of crops. As the application of organic manure, crop stubbles, along with the preparation of compost have reduced, the soil fertility accordingly is being lost. In addition, due to indiscriminate use of chemical fertilizers and pesticides, life of the soil is threatened resulting in environmental damage and pollution of agricultural produce. Since 1993-94, with the intention of motivating farmers to adopt organic farming, the department of Agriculture, has launched a new programme called *Organic Farming*.

Plant Protection

Substantial losses in production and storage of grains occur due to pests and disease attack on different crops. In order to reduce these losses, uses of chemical methods of plant protection are essential. With the adoption of modern agricultural technology and with the use of high yielding varieties, along with increase in production, there has been an increase in pest and disease attack. Due to increase in the application of pesticides, several environmental problems are being faced. In order to resolve such problems, it is necessary to adopt integrated pest management methods. For this, the use of pest and disease resistant varieties, adoption of scientific farming methods and use of organic pesticides and organic farming are necessary. In Gulbarga, it has been

planned to offer training in use of *Parasites* in the *Parasite* laboratory from 1996-97. In order to improve the quality control of plant protection chemicals, the pesticide manufacturing units and pesticide distribution units are being organized systematically. In addition to the already existing pesticide control laboratories, steps have been taken to start another pesticide control laboratory during 1996-97 in Gulbarga.

Soil Testing

Agriculture is an organic combination of soil, water and crop system. Among these, soil is a natural resource that can be further enriched. In the modern farming, soil testing is a crucial aspect. There is a soil health centre with a mobile unit functioning at Kotnur in the district. During 1992-93, according to *Bhuguna scheme*, the soil analysis of farmers in Gulbarga district, are made with the intention of distributing the right dose of chemical fertilizers through *soil fertility slips*.

The Micro Nutrient Laboratory situated in the Directorate of Agriculture in Bangalore, is analyzing the soil samples received from different parts of the state, and offering recommendations on the dose of micro nutrients. During 1995-96, the Kotnur Soil Health Centre was strengthened to analyze the micro nutrients. In addition, these centres, at the request of the farmers, are also giving recommendations regarding the suitability of water for agriculture, from the newly drilled wells and dug wells.

Agricultural Implements: According to the 1956 Live Stock Census, there were 83,305 wooden ploughs, 9,172 iron ploughs, 32,838 bullock carts, 59 tractors, 144 sugarcane crushers, 292 diesel pump sets and 324 electrical pump sets. According to the 1990 live stock census the following are the details of the number of agricultural implements:

- 1) 11,598 seed drills, 16,923 seed cum fertilizer drills, 38,209 chaff cutters, 18,901 sprayers and dusters and 1,483 Paddy transplanting machines.
- 2) Animal drawn wooden ploughs 77,729, including 29,395 Soil stirring ploughs and 25,967 soil turning ploughs. There were 66,316 inter-culture tools, 27,089 disk harrows, 14,959 seed cum fertilizer drills, 63,247 seed drills, 5,465 levelling equipments, 5,042 wet land ploughs, 65,608 bullock carts and 1,508 sugarcane crushing units.
- 3) Power operated tools were: 10,590 sprayers and dusters, 6,635 diesel pump sets, 12,469 electrical pump sets, 1,025 tractors, 669 power tillers, 799 Mould Board ploughs and 382 disk harrows.

Agriculture Extension

The agriculture related industries are on the rise in Karnataka. The technologies of production of different crops are also being made available. Farmers are exposed to various economic opportunities inter alia fisheries, poultry, dairy, agriculture, forestry, sericulture and dry land farming. In order to support diversity in agricultural production, the department of Agriculture

has suitably modified the agriculture extension and training programmes. In order to meet these needs, training centres and schools are being strengthened.

Training programmes are being designed and offered to train agricultural extension officers, farm women and young farmers in different training centres. In Kotnur, an Agriculture school is functioning where training is given for three months to children of farmers. Under the WYTEP programme, with financial assistance of Danida, farm women and young farmers are involved in agricultural development activities through the farm training and extension centre at Kotnur. Under this programme, a 10 day training in modern agricultural technologies and other vocations like animal husbandry, horticulture, sericulture, is being offered for farmwomen and 14 days training is being offered for young farmers. Apart from this, training for farm women, and for extension workers, village oriented training camps and farmwomen conferences are also being conducted.

Crop Insurance Programme

Crops grown are subject to pests, diseases and natural disasters like drought, flood and excessive rainfall. These factors reduce crop productivity and result in heavy losses for farmers. In order to indemnify farmers for losses beyond their control, Crop Insurance Programme is devised which will enable insured farmers to avail crop loan in the ensuing season. The Government of India introduced the Crop Insurance Programme during 1985 with the assistance of the State government and the Central Governments in the contributory ratio of 1:2. The crop insurance premium is fixed at two per cent of the insured amount for food crops like Paddy, Jowar, Wheat, Bajra, and Maize and one per cent of the insured amount for pulses. As this scheme is applicable for farmers who have borrowed crop loan, the insurance premium will be included in the sanctioned crop loan.

The Agriculture Research Station, Gulbarga: This Research station was started in 1974. Research work in pulses is being undertaken in this station since inception. The station acquired an area of 134 acres (54 hectares) during 1984 for the purpose of conducting research. During 1986, the Station was annexed with a separate building to support research work. In addition to research, production of foundation seeds, tips to solve the problems of farmers and training for agricultural extension personnel are the other activities of the station.

The details of the varieties recommended by this research station, the duration in days and the productivity are provided underneath:

Research on millets and development of Rabi Jowar are being focused here. Demonstrations in Bengal-gram are initiated in Kharif season during 1993 under national pulses development programme.

Farm Information

Agricultural information services play a crucial role in diffusing information on agricultural research. The Agricultural information Unit in Gulbarga is providing agricultural news for farmers

in Gulbarga and Bidar districts. These agricultural programmes and monthly seminars have been of great benefit for farmers. The state government has introduced *Krishi Prashasthi* (Award of Excellence in Agriculture) to identify, and recognize farmers who have made great achievements in their fields, and in order to encourage farmers to enhance agricultural production. The farmers thus identified will receive cash prize and *Krishi prashasthi patra* (certificates).

IRRIGATION

The major sources of irrigation in the district are wells, tanks and rivers (streams). Though there are many tanks in the district, water dries up quickly after rainy season due to high rate of evaporation. Net irrigated area from all sources in the district is 1,22,568 hectares (1993-94) of which a major area is irrigated by canals (84,197 hectares) and wells (29,404 hectares). About 6,900 hectares are irrigated by tanks. The talukwise details of net irrigated area as in 1993-94 are given hereunder.

Net irrigated area (hectares)				
Taluks	Canals	Tanks	Wells	All sources
Afzalpur	-	49	6,668	6,830
Aland	-	-	8,387	8,387
Chincholi	651	569	716	2,087
Chitapur	-	522	982	1,593
Gulbarga	-	40	3,650	3,690
Jevargi	-	37	829	1,339
Sedam	-	194	986	1,216
Shahapur	20,415	272	2,120	22,857
Shorapur	60,539	1,515	537	62,787
Yadgir	2,592	3,743	4,529	11,782
Total	84,197	6,941	29,404	1,22,568*

* Also includes 2026 hectares of area irrigated by all sources.

Before independence, farmers used to construct wells from their own sources of income. In order to lift groundwater from these wells, farmers used traditional lifts like *yetha*, *kapile*, *mattebhavi* or Persian Wheel (bucket machine). Accordingly, the potential area irrigated was lower and farmers did not show adequate interest in improving irrigated area under wells. After independence, greater emphasis was laid on construction of irrigation wells and assistance was channelled through financial institutions. The farmers desiring to construct irrigation wells and use pump sets were offered free technical guidance by the department of Mines and Geology.

The details of statistics regarding the number of wells and the area irrigated in Gulbarga district from 1968 to 1984 are given hereunder.

Number of wells and area irrigated in Gulbarga district

Year	Number of Wells	Irrigated area (ha.)
1968-69	14,372 (5.1)	17,747 (4.7)
1975-76	14,835 (4.2)	14,744 (4.4)
1984-85	22,115 (4.1)	22,115 (4.1)

Note: The figures in the parentheses indicate the percentage to the state total.

In the recent years, due to the use of electrical irrigation pump sets, the traditional lifts as well as diesel irrigation pump sets have drastically reduced and the importance of electrical pump sets is increasing. In Gulbarga district, many of the tanks are being used as main source of irrigation. During 1964-65, nearly 6,500 hectares of land was irrigated from 210 tanks. Out of this, in Yadgir taluk, a substantial area is irrigated by tanks. The details regarding major tanks and the area irrigated in the district are as under:

Kalur tank - 50 hectares., Nidagunda tank - 48 hectares., Oora kere in Itagalli - 52 hectares., Oora kere in Mudhol - 74 hectares., Ramakere - 46 hectares., Nala katta - 44 hectares., Hundaraki kere - 50 hectares., Buthapura kere - 48 hectares and Amul sani cheru - 60 hectares.

Prior to 1970, the village patels and the local water consumers' associations were taking care of the distribution system. This system has been stopped since 1970 and the *Neerugantis* have been removed since then. Because of this, the associations of Command Area farmers in the state have not become strong. Later, the task of water distribution to *atchkat* farmers was handed over to Public Works Department. In order to release water to the distributaries, the employees have been hired on daily wages in the place of the *Neerugantis*. The difference between the irrigation potential and the actual area irrigated is increasing due to various reasons. Since 1985, the civil works regarding tank construction have been receiving due attention and the repairs of tanks and their desiltation is receiving greater importance.

Completed Irrigation Projects:

Chandrapalli Irrigation Project: Saranala river, a tributary of Mullamari river originates near Talawadi village, and flows a distance of 35 km. in Gulbarga district and joins Mullamari river near Chincholi. Mullamari river is a tributary of the river Kagina. The Chandrapalli reservoir is constructed near Chandrapalli across the Saranala river at a distance of 15 km from Chincholi. This project irrigates an area of 5,223 hectares in Chincholi taluk. The construction of Chandrapalli project began during 1966 and was completed in 1973. In all, 356 hectares of land was submerged in this project. No village got submerged.

Salient features :

1. Name of the Project : Chandrapalli project
2. Name of the river : Saranala
3. Location of the dam : Near Chandrapalli, Chincholi taluk
4. Catchment area : 440.38 sq.km

5. Average annual rainfall : 29.38 inches
 6. Quantity of yield available : 34.21 Mm³ (1.209 tmcft.)
 7. Live storage capacity : 31.42 Mm³ (1.109 tmcft.)
 (Mm³ = Million cubic metre, tmcft. = Thousand Million cubic feet)

Details of Reservoir:

1. Type : Earthen dam
 2. Length : 927 m
 3. Maximum height of the dam : 28.65 m
 4. Top width of the dam : 7.5 m
 5. Expected maximum flood : 864.8m³
 6. Area of submersion : 356.52 hectares.

Details of Canals:

Canal	Left bank	Right bank
Total length	21 km	14 km
Discharge capacity (cumecs)	2.74	1.28
Area irrigated (hectares)	3,482	1,741

Utilizing the available water, an area of 5,223 hectares of land can be irrigated and the semi dry crops on 8,446 hectares can be irrigated. Under the National Water Management Project, the canals have been modernized and the entire atchkat is irrigated.

Hattikoni Project

Hattikoni halla is a tributary of the Bhima river. A reservoir has been constructed across Hatikonihalla, near Hattikoni village in Yadgir taluk. The construction of the project began during 1960 and was completed in 1973. The project irrigates an area of 2,145 hectares. About 121.2 hectares of land was submerged under this project and no village was submerged.

Salient features of the Project:

1. Name of the Project : Hattikoni project
 2. Name of the river : Hattikoni nala
 3. Location of the dam : Near Hattikoni halla, Yadgir taluk
 4. Catchment area : 106 sq.km
 5. Average annual rainfall : 600 mm
 6. Quantity of yield available : 26.26 Mm³
 7. Gross storage capacity : 9.9 Mm³
 8. Live storage capacity : 7.9 Mm³ (Mm³ = Million cubic metre,)

Details of Reservoir:

1. Type : Earthen dam
2. Length : 923.5 m
3. Maximum height of the dam : 21.75 m
4. Top width of the dam : 4 m
5. Expected maximum flood : 376.8 m³
6. Area of submersion : 121.2 hectares.

Details of Canals:

Canal	Total length (km)	Capacity (cumecs)	Irrigated area (hectares) Yadgir taluk
Left bank	13	141	2,145 hectares

Soudhagar Anicut Project:

Soudhagarnala (canal) is a sub nala of the Hattikoni halla. A dam is constructed near Shamanapur village in Yadgir taluk. The construction of the project began during 1973 and completed in 1987. The project irrigates 1,417 hectares.

Salient features of the Project:

1. Name of the Project : Soudhagar project
2. Name of the river : Soudhagar nala
3. Location of the dam : Near Shamanapur village, Yadgir taluk
4. Catchment area : 55 sq.km
5. Average annual rainfall : 625 mm
6. Quantity of yield available : 7.4 Mm³
7. Gross storage capacity : 8.12 Mm³
8. Live storage capacity : 7.41 Mm³ (Mm³ = Million cubic metre,)

Details of Reservoir:

1. Type : Earthen dam
2. Length : 600 m
3. Maximum height of the dam : 27 m
4. Top width of the dam : 3.6 m
5. Expected maximum flood : 191 cumecs.
6. Area of submersion : 124 hectares.

Details of Canals:

Canal	Total length (km)	Capacity (cumecs)	Irrigated area (hectares) Yadgir taluk
Right bank	11	0.75	1,417 hectares

On going Projects:**Bennithore Project:**

The construction of the Bennithore dam across the Bennithore river in Herur village, began during 1973. The storage capacity of the dam is 5.5 tmc and irrigates an area of 20,234 hectares.

Salient features of the Project:

1. Name of the Project	:	Bennithore major irrigation Project
2. Name of the river	:	Bennithore river
3. Location of the dam	:	Near Herur village, Chitapur taluk
4. Catchment area	:	2,204 sq.km
5. Average annual rainfall	:	629 mm
6. Quantity of yield available	:	172.4 Mm ³
7. Gross storage capacity	:	149.9 Mm ³
8. Live storage capacity	:	140.7 Mm ³

Details of Reservoir:

1. Type	:	Earthen dam with central concrete spillway
2. Length	:	2,340 m
3. Maximum height of the dam:	:	31.4 m
4. Top width of the dam	:	4 m
5. Expected maximum flood	:	12,176 cum / sec
6. Area of submersion	:	3,055 hectares.
7. Villages submerged	:	10
		1) Savathe Khed, 2) Kannadagi, 3) Nagur, 4) Yankanchi, 5) Harakanchi,
		6) Kadabur, 7) Thwandakal, 8) Ankalaga, 9) Siragapur, 10) Herur.

Details of Canals:

(a) Right Bank		
1) Total length (km)	:	82
2) Capacity (cumecs)	:	6.2
3) Irrigated area (hectares)	:	13,435
(b) Left Bank		
1) Total length (km)	:	66
2) Capacity (cumecs)	:	3.5
3) Irrigated area (hectares)	:	6,799

Stage of the Project:

The left and right banks have been constructed. Construction of the earthen embankment

on the right side of the waste weir is in progress. The left bank canal is 66 km long and civil work up to 17 km has been taken up. The right bank canal is 82 km long and civil work up to 25 km has been taken up. In the process, about 5,439 acres of land would be submerged and compensation has been paid for 2,595 acres of land. In this project, 10 villages will be submerged and 1,993 families need to be rehabilitated. Rehabilitation centres have been identified for the affected people and the rehabilitation work is in progress. The estimated cost of the project is Rs. 8,250 lakhs as per the rates of 1992-93. The expenditure incurred up to the end of March 1995 was Rs. 4,475 lakhs.

Amarja Medium Irrigation Project:

The Amarja is a tributary of the Bhima river and a reservoir is constructed across this river near Sangoligi village in Aland taluk of Gulbarga district. The project was started during 1975. It has left bank and right bank canals and irrigates Afzalpur and Aland taluks to an extent of 8,903 hectares. It is planned to utilize 53.93 Mcum (1.9 TMC) of water for irrigation and provide 15 Mcuft. of water domestic water supply for Aland city.

Salient features of the Project:

- | | | |
|--------------------------------|---|----------------------------------|
| 1. Name of the Project | : | Amarja medium irrigation Project |
| 2. Name of the river | : | Amarja river |
| 3. Location of the dam | : | Aangli village, Aland taluk |
| 4. Catchment area | : | 530.9 sq.km |
| 5. Average annual rainfall | : | 693 mm |
| 6. Quantity of yield available | : | 86 Mm ³ |
| 7. Gross storage capacity | : | 44 Mm ³ |
| 8. Live storage capacity | : | 40 Mm ³ |

Details of Reservoir:

- | | | |
|------------------------------|---|------------------------------------|
| 1. Type | : | Earthen dam with concrete spillway |
| 2. Length | : | 960 m |
| 3. Maximum height of the dam | : | 28.3 m |
| 4. Top width of the dam | : | 8 m |
| 5. Expected maximum flood | : | 2,832 cum / sec |
| 6. Area of submersion | : | 640 hectares. |
| 7. Villages submerged | : | 3 |
| 8. Rehabilitated population | : | 4,500 |

Details of Canals:

- | | |
|------------------------------|---------|
| (a) Right Bank | |
| 1) Total length (km) | : 45 |
| 2) Capacity (cumecs) | : 1.8 |
| 3) Irrigated area (hectares) | : 4,047 |

(b) Left Bank

- | | | |
|------------------------------|---|-------|
| 1) Total length (km) | : | 55 |
| 2) Capacity (cumecs) | : | 2.3 |
| 3) Irrigated area (hectares) | : | 4,856 |

Stage of the Project :

Construction of the anicut, upto three km of left bank canal and upto 18 km of right Bank canal are in progress. The work on spillway up to crest level is complete. Three villages would be submerged under this project and rehabilitation of Sangli village has been taken up. The potential created up to the end of March 1995 is 2,000 hectares and the expenditure incurred on the project is Rs. 3,242 lakhs.

Lower Mullamari Medium Irrigation Project:

The anicut is constructed near Nagarahal in Chincholi taluk across Mullamari river. The construction of the project began during 1975.

Salient features of the Project:

- | | | |
|--------------------------------|---|---|
| 1. Name of the Project | : | Lower Mullamari Project |
| 2. Name of the river | : | Mullamari river |
| 3. Location of the dam | : | Near Nagarahal village, Chincholi taluk |
| 4. Catchment area | : | 635 sq.km |
| 5. Average annual rainfall | : | 922 mm |
| 6. Quantity of yield available | : | 69.8 Mm ³ |
| 7. Gross storage capacity | : | 49 Mm ³ |
| 8. Live storage capacity | : | 43 Mm ³ |

Details of Reservoir:

- | | | |
|-------------------------------|---|--------------------------------|
| 1. Type spillway | : | Earthen dam with left concrete |
| 2. Length | : | 1,546 m |
| 3. Maximum height of the dam: | : | 24.5 m |
| 4. Top width of the dam | : | 4 m |
| 5. Expected maximum flood | : | 3,189 cumecs |
| 6. Area of submersion | : | 845 hectares. |
| 7. Villages submerged | : | one (Elmamadi village) |
| 8. Rehabilitated population | : | 2,500 |

Details of Canals:

(a) Right Bank

- | | | |
|------------------------------|---|-------|
| 1) Total length (km) | : | 80 |
| 2) Capacity (cumecs) | : | 8.5 |
| 3) Irrigated area (hectares) | : | 8,100 |

Stage of the Project:

Work on the right bank of the anicut is complete. Work on the right bank canal up to 32 km. is under progress. The Elmamadi village would be submerged. Gadi Lingadahalli and Chennur villages would be partially submerged. Rehabilitation work is in progress. The expenditure incurred on the project since inception up to March 1995 is Rs. 3,445 lakhs.

Gandorinala Irrigation project:

This project began during 1975. Gandorinala is a tributary of the Bennithore river. Gandorinala takes its birth in the hills of Humnabad taluk and joins Bennithore river near Mahagaon village. An earthen dam is constructed across Gandorinala near Belakota village. The project irrigates an area of 8,094 hectares in Gulbarga and Chitapur taluks.

- | | | |
|---------------------------|---|--------------------------------|
| 1. Gross storage capacity | : | 53.4 Mm ³ (1.9 tmc) |
| 2. Live storage capacity | : | 43 Mm ³ (1.7 tmc) |
| 3. Bed level of the river | : | 445.7 m |
| 4. Full reservoir level | : | 454 m |
| 5. Maximum water level | : | 467 m |
| 6. Top level of the dam | : | 470 m |
| 7. Submersion area | : | 664 hectares (1,640 acres) |

Details of Reservoir:

- | | | |
|------------------------------|---|-------------|
| 1. Type | : | Earthen dam |
| 2. Length | : | 1,720 m |
| 3. Maximum height of the dam | : | 24.3 m |
| 4. Top width of the dam | : | 6 m |

Details of Canals:

- | | | |
|------------------------------------|---|-----------------------------------|
| (1) Length of the left bank canal | : | 94 km., with capacity 4.7 cumecs |
| (2) Length of the right bank canal | : | 7.6 km., with capacity 0.5 cumecs |

Stage of the Project:

In this project, Belakota and Dammara villages would be submerged. The expenditure incurred up to March 1995 is Rs. 613 lakhs.

Bhima Lift Irrigation Project (Major Irrigation Project):

It is proposed to construct a Lift Irrigation Project near Sonna village in Afzalpur taluk in Gulbarga district across Bhima river under this project. The expenditure incurred up to March 1995 is Rs. 122 lakhs.

Details of the Project:

It is proposed to construct an earthen bund of 2,187 metres length and 18.4 metres height across the river Bhima. A central spillway which is 402 metres long is constructed to discharge 10 lakh cusecs of water. It is proposed to install 27 crest gates of dimension 12 m x 8 m. Irrigation will be provided by lifting water from the reservoir near Balundagi and Algi (B) to a height of 29.5 m using 900 H.P. pumps. The Balundagi canal is 61 km long and irrigates an area of 16,721 hectares. Algi canal is 35 km long and irrigates 7,571 hectares.

In this project, 1,098 hectares of land would be submerged and eight villages (1) Balandagi, (2) Algi, (3) Hiriyala, (4) Algikhurde, (5) Nagara, (6) Bidagihal, (7) Madanahalli and (8) Tarapur need to be rehabilitated. From this project, 44 villages of Gulbarga district would receive irrigation benefits.

Salient features of the Project:

- | | | |
|---------------------------|---|--|
| 1) Catchment area | : | 47,760 sq.km (in Maharashtra State) 5,568 sq.km (in Karnataka State) |
| 2) Availability of water: | | |
| i) at 75% dependability | : | 13.70 tmc |
| ii) at 50% dependability | : | 18.90 tmc |
| 3) Length of the dam | : | 2,255 m |
| 4) Maximum Water Level | : | 412 m |
| 5) Full tank level | : | 409 m |
| 6) Gross storage capacity | : | 2,504 Mcft. |
| 7) Height of the dam | : | 18.4 m |

Lift Details:

- | | | | |
|-----------------------------|---|--------------------|----------------|
| 1) Location of lift | : | (a) Bulandagi lift | (b) Algi lift |
| 2) Length of intake channel | : | 1,260 m | 960 m |
| 3) Head | : | 29.5 m | 29.5 m |
| 4) Maximum flood | : | 267 cusecs | 121 cusecs |
| 5) Raising main length | : | 61 m | 61 m |
| 6) Capacity of pump | : | 900 HP | 900 HP |
| 7) Number of pumps | : | 5 3 | |
| 8) Canal length | : | 61 km | 35 km |
| 9) Irrigated area | : | 16,721 hectares | 7,571 hectares |

Proposed Projects:**1) Bhima Irrigation Project (Flow) (Major irrigation project)**

This will be located in Sonthi /village, Chitapur taluk benefiting Yadir, Chitapur and Shahapur taluks of Gulbarga district. The project irrigates 42,186 hectares. About 15 villages would be submerged and 12,227 people need to be rehabilitated. Currently, the project is in the

preliminary stage of construction. The expenditure incurred on the project up to March 1995 is Rs. 5 lakhs.

2) Kagina irrigation Project:

This project is to be located near Yadahalli village in Sedam taluk benefiting Sedam and Chitapur taluks. The area irrigated by the left bank canal (60 km) is 4,920 hectares, and by the right bank canal (23 km) is 1,580 hectares. The gross storage capacity is 21.63 Mcum. The live storage capacity is 14.54 Mcum. The length of the dam is 2,520m (including spillway). The maximum height of the dam is 12.9 m. The area to be submerged is 1,550 hectares. The villages - Tellakur, Lohar and Sanganahalli will be submerged, while the villages Habali and Yedahalli would be partially submerged. This project is in the investigation stage.

3) Kamalavathi Nala Irrigation Project:

It is proposed to construct the Kamalavathi Nala at Madhwara in Sedam taluk in Gulbarga district. It is proposed to utilize 1.8 tmc of water to irrigate 5,706 hectares. This project is under investigation in the office of the Engineer-in-Chief, Water Resources Development Organisation.

Upper Krishna Project (U.K.P.):

The Krishna is the perennial river of Northern Karnataka. The then Nizam Government planned to construct the Lower Krishna Project by utilizing the water flowing abundantly in the river Krishna in Gulbarga and Bijapur districts. In addition, the then Bombay Government also proposed a project during 1950, to irrigate parts of Bijapur district by lift irrigation. After re-organization of the states in 1956, the proposal was re-examined and the site of the dam was shifted to Alamatti.

Upper Krishna Project constitutes construction of two anicuts across the river Krishna and a network of canals and distributaries. The construction of Alamatti reservoir (in Bagewadi taluk of Bijapur district), which is a few km from the confluence of the Krishna and the Ghataprabha is in full swing and is the main component of the Upper Krishna Project. Another anicut near Narayanpur in Muddebihal taluk in Bijapur district after the confluence of rivers Krishna and Malaprabha is already completed and it is a diversion scheme. It is proposed to construct the Upper Krishna Project in different stages under different phases with which is proposed to irrigate Shahapur, Shorapur and Jevargi taluks of Gulbarga district.

The main intention of the Command Area Development Authority (CADA) is to reduce the difference between the irrigation potential created and the actual area irrigated. The CADA was formed for UKP on 1.12.1979, in Gulbarga. During April 1981, the Administrative Offices of the CADA were shifted from Gulbarga to Bheemaranagudi (BM Gudi) in Shahapur taluk.

Krishna Bhagya Jala Nigama

In order to complete the Upper Krishna Project by 2000, the state government under the Indian Company's Act 1956, constituted the *Krishna Bhagya Jala Nigama* (Ltd.) during August 1999 to mobilize funds for completion of the project. The Nigama has the task of planning,

surveying, estimating, constructing and maintenance of the Upper Krishna Project. It is the responsibility of the Nigama to get clearance from the Government of India for all components of the project.

This Project consists of Narayanpur left bank canal (78 km), Shahapur branch canal (76 km), Mudbal branch canal (50 km) and Jevargi branch canal (85 km). The talukwise extent of planned irrigable areas are: Shorapur 93,117 hectares; Shahapur 93,117 hectares and Jevargi 1,02,426 hectares. The details of existing minor irrigation schemes, open and bore wells are given in tables 4.9 and 4.10.

Table 4.9 : Talukwise open wells and bore wells in the district during 1986-87

Taluk	Total	Not in use	Open-wells			Bore-wells in use	
			Irrigable Area in hectares.	With electric pump sets	With diesel pump sets.	Shallow wells	Deep wells
Afzalpur	3,671	1,740	7,033	2,077	311	0	8
Aland	5,675	1,113	11,513	3,550	1,390	20	0
Chincholi	1,518	411	3,421	865	268	0	0
Chitapur	858	178	1,816	388	223	0	0
Gulbarga	3,267	421	5,942	2,242	460	0	0
Jevargi	1,341	312	3,102	396	527	0	4
Sedam	839	212	1,341	322	224	2	0
Shahapur	1,511	485	1,516	258	350	10	0
Shorapur	1,431	638	1,976	292	439	6	0
Yadgir	2,948	432	3,149	790	724	141	3
Total	23,059	5,942	40,809	11,180	4,916	179	15

Table 4.10 : Number of minor irrigation schemes and their Atchkat in hectares in the district as on 1-4-1999

Particulars	Schemes in Minor Irrigation Department	Schemes in Zilla Panchayat	Total
Tanks			
Number	133	320	453
Atchkat	22,711	4,878	27,589
Anicuts, Pickups, Weirs			
Number	21	150	171
Atchkat	1,478	2,778	4,256
Bhandaras, Barrages			
Number	1	2	3
Atchkat	67	40	107
Other Minor Irrigation Schemes			
Number	1	3	4
Atchkat	375	65	440

Continued...

Lift Irrigation Schemes			
Number	33	0	33
Atchkat	9,684	0	9,684
Total Schemes			
Number	189	475	664
Atchkat	34,315	7,761	42,076

HORTICULTURE

There is good scope for development of horticulture in the district under irrigation. The total cultivable area in the district is 12.00 lakh hectares of which 1.23 lakh hectares are irrigated. Fruit crops are already being cultivated in 5,974 hectares. Vegetables are being grown in 8,128 hectares. In about 227 hectares of land, commercial floriculture has been taken up. Apart from these, garden crops like coconut, beetle nut and others are being cultivated in 8,464 hectares.

Horticulture farms and total nurseries

In order to educate people and train farmers regarding horticulture crops, multipurpose horticultural farms have been opened. The objective of these farms is to educate people about the food problems that we are facing and to encourage them to cultivate more nutritious alternative crops like fruits and vegetables. The important aims of horticulture farms are to identify seedlings suitable to a particular soil condition, provide seedlings to cultivators, train children of farmers in horticulture, conduct exhibitions about improved methods of horticulture and provide education through these farms. Details of talukwise horticulture farms opened during 1994-95 are as follows:

Sl. No.	Taluk	Number of Horticultural farms hectares	Area of Horticultural farms in hectares	Number of Horticultural nurseries	Area of nurseries in hectares.
1	Afzalpur	1	2.62	1	0.10
2	Aland	1	5.76	1	0.25
3	Chincholi	1	43.2	1	0.40
4	Chitapur	1	10.52	1	0.30
5	Gulbarga	2	10.57	2	3.40
6	Jevargi	-	-	1	0.10
7	Sedam	1	4.53	1	0.80
8	Shahapur	-	-	1	0.40
9	Shorapur	1	37.84	1	0.25
10	Yadgir	1	17.00	1	0.25
Total		9	132.04	11	6.25

Talukwise area irrigated in the district under horticultural crops is given in table 4.9 and the area of selected plantation crops and other horticultural crops and their productivity are given in table 4.11.

Table 4.11 : Area under major horticultural crops in the district during 1994-95

Sl. No.	Taluk	Mango	Banana	Lime	Grapes	Vegetables	Chillies	Onion	Coconut
1	Afzalpur	91	565	30	22	383	488	123	50
2	Aland	169	598	217	50	1,192	520	401	149
3	Chincholi	247	196	66	1	313	608	338	86
4	Chitapur	227	110	86	3	283	300	375	52
5	Gulbarga	130	225	96	26	2,293	470	540	137
6	Jevargi	75	20	62	0	558	242	120	40
7	Sedam	204	8	51	3	906	273	129	61
8	Shahapur	86	5	151	1	880	150	500	120
9	Shorapur	250	7	200	1	721	155	400	200
10	Yadgir	115	12	75	0	600	125	220	90
Total		1,594	1,746	1,034	107	8,129	3,331	3,146	985

Source: District Horticulture Office, Gulbarga.

Table 4.12 : Area, production and productivity of Plantation and Horticulture Crops in the district during 1993-94

Sl.No.	Crop	Area (ha.)	Production (Tonnes)	Productivity (Kg./ha)
1	Potato	21	253	12,058
2	Onion	2,576	32,349	12,558
3	Tomato	694	8,488	12,231
4	Banana	1,860	46,876	25,202
5	Sweet Potato	64	464	7,252
6	Grapes	78	2,038	26,125
7	Mango	736	2,532	4,799
8	Papaya	7	15	2,210
9	Guava	47	293	6,242
10	Chillies	2,357	1,403	491
11	Turmeric	446	7,177	16,093
12	Ginger	3	39	1,313
13	Garlic	19	58	3,039
14	Coriander	98	15	154
15	Coconuts	815	4,142	5,082

Horticulture Development Programmes:

In order to increase the production of coconuts in the district, the department of Horticulture is gathering good quality seed coconuts from different districts where quality seeds are available. The coconut seedlings are being produced at Odeyapura nursery of Gulbarga taluk. In Gulbarga city, under the auspices of Horticulture Growers' Association, customer outlets have been functioning, in order to provide remunerative prices to farmers for their products. Under the Farmers' Training Programme, the farmers of Gulbarga, Chincholi, Jevargi, Sedam, Shorapur and

Yadgir taluks are being trained in horticulture. In this training, a scholarship of Rs. 500 is provided for each participating farmer. In order to train farmers in the cultivation of fruit and vegetable hybrid crops, they are given the hybrid seeds, fertilizers and plant protection chemicals free of cost, to enable them to take up demonstrations in their fields. In order to undertake plant protection measures for horticulture crops, farmers are supplied with plant protection chemicals at a discount. Subsidy is being given to farmers to encourage them to undertake drip irrigation for horticulture crops.

ANIMAL HUSBANDRY AND VETERINARY SERVICES

Livestock and Animal Husbandry department in the district is playing a crucial role in the social and economic well being of the farmers of the district. Protection of health of the cattle is the responsibility of the department. In addition to improving the breed of the cattle with the latest technologies, the department has taken up the responsibility of providing the infrastructure necessary for cattle development. During 1992-93, 89 livestock inspectors have received one year training in the district. In veterinary hospital, Yadgir, 60 livestock inspectors have been trained.

Health upkeep of livestock and improvement of the veterinary services have been the main activities of the department, with an objective to reduce the mortality among livestock by taking precautionary measures like controlling livestock diseases, clinically treating the affected livestock and undertaking veterinary extension through veterinary institutions. In addition, steps are undertaken to control the epidemics in livestock and to reduce the economic losses to farmers due to death of livestock. The table 4.14 highlights the details of veterinary health centres in each taluk. In tables 4.13 to 4.15 details pertaining to other livestock are given.

Table 4.13 : Particulars of Live stock Census from 1951 to 1990 (Number in Lakhs)

Sl. No.	Live stock	1951	1956	1961	1966	1972	1977	1983	1990
1	Cattle	6.25	6.14	6.59	6.64	6.26	5.80	8.03	7.69
2	Buffaloes	1.47	1.40	1.66	1.66	1.37	1.26	1.70	1.94
3	Sheep	2.44	2.00	2.79	2.60	2.48	2.51	3.21	3.08
4	Goats	2.05	1.60	2.17	1.92	2.78	3.24	4.02	3.15
5	Pigs	0.06	0.05	0.07	0.07	0.10	0.12	0.20	0.24
6	Other Live stock	0.19	0.14	0.14	0.15	0.10	0.08	0.90	0.90
7	Total Live stock	12.46	11.33	13.42	13.04	13.06	13.00	18.05	17.00
8	Poultry	1.55	2.80	3.26	3.34	3.69	4.81	4.57	5.37

Source: Handbook of Veterinary Statistics, 1987-88 to 1994-95, Veterinary Health Service Department.

Disease investigation in livestock is a vital activity in the livestock health programme. This has the main objectives of (1) statistical documentation of livestock diseases, their compilation and analysis and (2) identification of season-wise changes in livestock diseases. The contagious diseases in cattle are Haemorrhagic septicaemia, Clostridiosis, Anthrax, Foot and Mouth disease, Rinder Pest attack and Black Quarter disease. The contagious diseases in poultry are Chicken pox and *Ranikhet* disease. The contagious disease in sheep is Sheep Pox and in goat is Goat Pox.

In the programme for livestock development, the objective is to improve and develop the quality of livestock to meet the different needs. In order to achieve these goals, programmes have been designed through genetics and animal breeding by using the foreign livestock breeds in the domestic breed development. This in turn would lead to excellent pedigree cattle. In this endeavour, well known cattle breeds *inter alia*, Jersey, HF, and others have been used to upgrade the local cattle breeds. In the intensive breed development programmes, breeds are being developed to sustain extreme drought and excessive temperature. The livestock field units under the Animal Husbandry department are helping farmers by providing the right bull breeds and also fodder seeds and in addition to offering training to farmers in these fields.

Poultry development

Poultry development has been an important programme in the district. Under this programme, rearing poultry birds using scientific principles, providing good quality poultry breeds to farmers for both eggs and meat, providing comprehensive information for new poultry birds to develop poultry farms have been the major tasks of the poultry and egg development centre in Gulbarga. Training of poultry farmers, distribution of poultry birds, and examination of poultry birds for diseases, guidance and marketing functions are offered through cooperative societies.

Gulbarga cooperative Milk Producers' Federation, Ltd., Gulbarga

The Karnataka Milk Producers Federation began its activities in Gulbarga and Bidar districts during 1984. Till the end of March 1997, an investment of Rs. 23.15 lakhs has been made. Around 371 societies based on the Amul model have been registered in the Federation. Currently out of the 224 cooperative societies, 68 societies are located in the district. There are 22 milk procurement routes in the federation and around 18,500 kg of milk is collected every day. There are 144 registered societies in the district. In these societies, which are members of the Federation, there are 6,916 small farmers, 4,863 marginal farmers, 4,752 agricultural labourers and 5,642 other members. Around 4,116 kg of milk is being collected and 22,500 kg of milk is being sold every day and there are 12 artificial insemination centres in the district.

The Gulbarga milk dairy has the capacity to process and market 30,000 litres of milk per day. The National Dairy Development Board and Karnataka Milk Producers' Federation have made joint efforts to increase the Gulbarga dairy's daily capacity from 30,000 litres to 60,000 litres. The dairy extension work is in progress and the infrastructure facility has been created. The Gulbarga milk federation is currently supplying pasteurized milk to consumers in the taluks of Gulbarga and Bidar districts.

Shahapura Milk Chilling Centre: This centre belongs to the Gulbarga Milk Federation and is located on Shahapur-Yadgir road, five kilometres from Shahapur, where the Fodder seed production and demonstration centre, a 10,000 litres milk-processing centre are being established at a cost of Rs 50 lakhs. For the civil works here, the National Dairy Development Board and for the equipments, the Gulbarga Zilla Panchayat are offering funding.

Table 4.14 : Details of talukwise livestock census in the district as per the 1990 Livestock Census.

Sl. No.	Taluk	Hybrid cattle	Local Cattle	Total Cattle	Buffaloes	Sheep	Goats	Pigs	Dogs	Total Poultry
1	Afzalpur	525	39,144	39,669	12,306	14,876	29,580	1,231	8,194	42,953
2	Aland	1,502	77,712	79,214	24,813	15,302	30,742	2,162	10,312	51,494
3	Chincholi	155	61,494	61,649	11,085	13,926	27,852	1,529	5,979	40,141
4	Chitapur	716	89,984	90,700	17,109	14,450	33,586	7,518	9,677	63,418
5	Gulbarga	1,818	77,282	79,100	17,281	21,238	30,042	1,515	9,503	61,983
6	Jevargi	-	63,990	63,990	17,260	8,075	10,432	1,197	3,497	19,362
7	Sedam	76	56,924	57,000	10,064	19,748	22,400	1,098	4,705	48,446
8	Shahapur	89	87,142	87,231	18,946	47,957	43,075	2,548	8,407	66,484
9	Shorapur	1,218	109,925	111,143	40,882	77,026	53,483	3,037	14,088	77,981
10	Yadgir	2,641	94,315	96,956	21,956	74,617	33,697	1,650	7,879	57,916
11	Gulbarga Corporation	370	2,389	2,759	2,793	651	594	264	1,703	7,156
Total		9,110	760,301	769,411	194,495	307,866	315,483	23,749	83,944	537,334

Source: Handbook of Veterinary Statistics, 1987-88 to 1994-95, Veterinary care and Veterinary Health Services Department.

Table 4.15 : Talukwise Livestock in the district as per 1990 Livestock Census

Sl. No.	Year	Cattle				Buffaloes				Poultry	
		Hybrid		Local		Dry	Milching	Dry	Local	Local	Improved
		Milching	Dry	Milching	Dry						
1	1987-88	660	1,186	124,617	241,045	75,960	144,457	263,985	15,703		
2	1988-89	1,448	2,528	127,884	246,221	59,303	98,580	270,694	16,002		
3	1989-90	1,466	2,590	130,164	242,715	50,336	93,362	267,552	16,301		
4	1990-91	1,870	2,903	125,467	231,499	56,825	93,737	264,830	22,450		
5	1991-92	1,440	2,515	128,326	250,933	49,371	65,021	255,996	22,450		
6	1992-93	1,440	2,515	133,502	255,952	60,388	69,927	266,817	24,718		
7	1993-94	1,774	2,515	147,173	261,116	59,359	101,427	263,655	25,856		
8	1994-95	1,874	2,244	175,839	270,883	39,668	119,925	247,127	26,988		

Table 4.16 : Details of talukwise Veterinary Centres in the district as on 31-3-1995

Sl. No.	Taluk	Veterinary Hospitals	Primary Veterinary Dispensaries Centres	Mobile Veterinary Dispensary Centres	Artificial Veterinary Dispensary Centres	insemination centre-Sub	Total
1	Afzalpur	1	2	12	1	-	16
2	Aland	1	5	11	1	11	29
3	Chincholi	1	4	12	1	-	18
4	Chitapur	1	5	14	1	-	21
5	Gulbarga	2	1	12	1	10	26
6	Jevargi	1	3	11	1	-	16
7	Sedam	1	2	9	1	-	13
8	Shahapur	1	1	10	1	-	13
9	Shorapur	1	3	12	1	1	18
10	Yadgir	1	8	11	1	-	21
Total		11	34	114	10	22	191

FISHERIES

In fisheries water resources in Gulbarga district has 104 large tanks with water spread area of 6,599 hectares , 10 small tanks with with water spread area of 79 hectares and 451 hectares of area (including Hatthikuni 120 hectares and Chandrampalli 331 hectares) from reservoirs, totalling 7,129 hectares. During 1990-91, 1,830 tonnes of fish were produced and during 1991-92, 1,450 tonnes of fish were produced. Under the Fishery department, Hatthikuni Fish Nursery unit has ponds of 0.8 hectare area where fish fingerlings are being produced. In order to encourage the production of fish fingerlings in the private sector, a subsidy scheme is in operation since 1990-91. There are three ice production units in the district. There were in the district 2,778 active fishermen. Under the National Fisherman Development Fund, dwelling houses and community hall are being constructed in the Anesugur village.