

CHAPTER IV

AGRICULTURE AND IRRIGATION*

Belgaum is an agriculturally advanced district in Karnataka, served with moderate rainfall. One-fifth of its cultivable land is provided with irrigational facilities. Its soil is also comparatively rich. There were good number of tanks, their number being over 1,500 fifty years ago, and even for the present there are 688 tanks watering over 29,000 hectares of land.

The district took advantage of the cotton boom of 1860s (of the American Civil War days) and there are spinning units too taking advantage of its cotton crop. Other agro-based industries like sugar have provided fillip to sugarcane cultivation. Tobacco and chillies, introduced by the Portuguese into India are grown in considerable tracts of the north-western parts of the district, Nipani being the marketing centre for the former and Sankeshwar for the latter. Rice, jowar, wheat, pulses and oil seeds were raised in major parts of the district in the past, and groundnut has been an addition to this list in recent centuries and soyabeans and sunflower in recent decades. Horticulture also flourished and continues to flourish, and the district is famous for its vegetable crops, especially the exotics like tomato, cabbage and knolkol. Brinjals from the Krishna banks and from Gorabal are known for their special taste. Raybag has its banana gardens and Belgaum and Khanapur taluks their mango groves. Italian traveller Careri in 1695 speaks of grapes as tasty as those grown in Europe, raised at Kalliguddi in Gokak taluk. The British soldiers and Captains during the 18th century report that "country round Murgod was as rich as the best garden mould" and

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

they also make a mention of mango groves at Arabhavi and Yedur. The rich flower gardens at Raybag are also spoken by them. The avenue of mango trees leading from Athani to the Krishna, 10 miles in length, raised by Raste of Anantpur is also mentioned by them. But the vagaries of monsoon has been causing drought and famines too and major parts of the district fall in the drought-prone belt.

Even in historical times Belgaum district was renowned for its agricultural progress. Raybag was called Huvinabage, famous for its flower gardens and Persian record of the Muslim period speaks of a particular fruit garden exempted from tax. Hukeri was the flower town of the Adilshahi times, supplying rose and other fragrant flowers to Bijapur daily. The description of the Gavan's army passing through the district in the 1470's speaks of the rich cane gardens, and the town Belgaum is called Ikshugrama or cane town in some records. Modern Kabbur in Chikodi taluk, Karmburu of the inscriptions, must have been a centre of sugarcane cultivation. The name Yelemunoli in Hukeri taluk speaks of its betel leaf gardens and a record from Khangaon (Kannagave) speaks of the flower garden of the place. Places like Manoli had also betel leaf gardens during the Kalyana Chalukyan times and the people who plucked the betel leaves had their own guild called *ugura munnurwar* (Uguru-300). Two records from Manoli dated 1222 and 1252 speak of plantations of coconut, cloves and betelnut and also of orchards of mango, jackfruit, lime, *madala*, orange, *nerilu*, grapes and other fruits and also gardens of betel leaves, sugarcane and of flowers like *parijata*, *ashoka*, *punnaga*, etc. The gardens of the place are described as famous. The records also speak of the guilds of gatherers of fruits called *gale munnurwar* (Gale-300), *gale* standing for the bamboo stick used to reach and pluck the fruit. Flower gardens were also attached to temples and *bastis* and devotees also donated flower gardens to such institutions. Garden of the *basti* at Konnur (1171), the temple at Ramateertha (1167), Badli (1246) and many other places are spoken of by records. A record from Kokatnur (1235) speaks of Siddhanathadevara *tonta*. The Belgaum *basti* record of 1204 speaks of flower garden of two *mattars* and 276 *kammas*. There are many more such instances. The Krishna valley is famous for its milk-yielding cattle and curds from the region is in great demand in Maharashtra. Sheep breeding is equally popular, especially in Athani taluk. The irrigation projects of the Malaprabha and the Ghataprabha have been a boon to the district. The

industrious agriculturists of Belgaum have been very quick in adopting modern methods and ideas in agriculture.

Agricultural Population

As per 1981 census, the total population of Belgaum District was 29,80,440 and the main workers numbered 10,74,785, of which 4,84,851 (45.11 per cent) were cultivators and 2,79,867 (26.04 per cent) were agricultural labourers. Among the male workers 48.76 per cent were cultivators and 19.13 per cent were agricultural labourers. Among female workers 31.94 per cent are participating as cultivators and 63.77 per cent were agricultural labourers. In addition the district has 1,56,785 marginal workers, being 5.26% of the total population and they work only for less than 183 days in a year. The net area sown per agricultural worker in the district was 1.20 hectares in 1981 and 1.48 hectares in 1971. The taluk-wise figures of total number of workers, agricultural labourers and their percentage are given in the following table.

<i>Taluk</i>	<i>Total Main workers</i>	<i>Cultivators</i>	<i>Agricultural labourers</i>
Athani	1,17,744	58,670 (49.83)*	38,638 (32.82)**
Belgaum	1,82,780	60,793 (33.26)	17,983 (9.84)
Chikodi	1,47,666	78,654 (53.26)	29,163 (19.75)
Gokak	1,27,509	53,167 (41.70)	38,268 (30.01)
Hukeri	96,487	50,992 (52.85)	19,544 (20.26)
Khanapur	69,869	40,617 (58.13)	13,955 (19.97)
Parasgad	90,877	36,617 (40.29)	36,561 (40.23)
Ramdurg	69,530	25,895 (37.24)	22,736 (32.70)
Raybag	76,218	40,274 (52.84)	25,263 (33.15)
Sampgaon	96,105	39,172 (40.76)	37,756 (39.29)
Total	10,74,785	4,84,851 (45.11)	2,79,867 (26.04)

*Percentage of cultivators to main workers given in brackets.

**Percentage of agricultural labourers to main workers given in brackets.

Land Utilisation

The total geographical area of the district was 13,45,026 hectares as computed by the Survey of India. The total cropped area

as in 1982-83 was 9,49,055 hectares which formed about 70.5 per cent of the total geographical area. The percentage of net area sown to total geographical area was 70.1 in 1960-61, 70.9 in 1968-69, 67.3 in 1979-80 and 67 in 1983-84. The following table gives particulars of land utilisation in the district for the years 1955-56, 1970-71 and 1982-83 in hectares.

Land utilisation in Belgaum District (Area in '000 hectares)

Category	1955-56	1970-71	1982-83
Geographical area as per professional survey	1337.9	1346.4	1345.0
Reporting area	1338.6 (100)	1346.4 (100)	1345.0 (100)
Area under forests	188.3 (14)	192.1 (14.27)	191.5 (14.24)
Land put to non-agricultural uses	1.7 (0.1)	43.3 (3.29)	67.7 (5.03)
Area under barren and un-cultivable land	66.1 (4.9)	50.5 (3.75)	44.4 (3.30)
Area under permanent pastures and grazing land	46.2 (3.4)	35.0 (2.6)	25.0 (1.86)
Area under miscellaneous tree crops and groves	1.0 (0.1)	2.1 (0.16)	1.5 (0.11)
Area under cultivable waste	19.9 (1.5)	18.6 (1.38)	13.5 (1.0)
Area under current fallows	9.0 (0.6)	65.8 (4.88)	79.0 (5.87)
Area under other fallow land	73.0 (5.6)	26.1 (1.94)	13.8 (1.03)
Net sown area	933.4 (69.8)	912.0 (67.73)	908.6 (67.56)
Total cropped area	954.8	926.4	949.1

(Figures in the brackets indicate the percentage distribution of the areas under different land use to total geographical area)

The taluk-wise break-up of total cropped area in hectares with area sown more than once given in brackets for the year 1983-84 is as follows: Athani 1,60,060 (560), Belgaum 64,617 (4,148), Chikodi 1,02,618 (2,291), Gokak 1,21,000 (5,872), Hukeri 66,192 (1,642), Khanapur 52,560 (90), Parasgad 1,12,262 (8,776), Ramdurg 91,903 (5,077), Raybag 72,539 (4,653), and Sampgaon 94,320 (4,677). District's total: 9,38,071 (37,786).

Land holdings

According to 1980-81 agricultural census, the average size of land holdings of below one hectare was 0.49 hectare, small holdings of one to two hectares being 1.44 hectare, semi-medium holdings of two to four hectares being 2.80 hectares, medium holdings of four to ten hectares being 6.02 hectares, large holdings of ten hectares and above being 15.54 hectares. The average size of land holdings in Belgaum district is 2.88 hectares. The total number of land holdings and the total area (in hectares) of land holdings taluk-wise are, Athani 49,021 and 1,99,555; Belgaum 42,003 and 70,595; Sampgaon 34,840 and 90,453; Chikodi 46,781 and 1,08,463; Gokak 44,087 and 1,21,076; Hukeri 32,726 and 68,238; Khanapur 25,172 and 63,929; Raybag 24,241 and 83,156; Ramdurg 21,932 and 90,975; and Parasgad 30,533 and 1,15,519. The number of agricultural individual holdings, agricultural joint holdings and agricultural institutional holdings in the district are 2,25,469, 1,24,848 and 1,019 respectively, the area held by them is 6,32,977, 3,72,796 and 6,186 hectares respectively. The number of holdings and the area operated (in hectares) in Belgaum district during 1970-71 was 2,98,345 and 9,79,679 and in 1980-81 was 3,51,336 and 10,11,959 respectively. During 1980-81, Belgaum district had 8.15 per cent of number of holdings and 8.62 per cent of area operated in the State. The table in p 267 gives the number, area and average size of operational holdings during 1976-77 and 1980-81 in Belgaum district.

Agricultural Zones and Soils

According to the agro-climatic conditions, the district can be classified into three regions namely, North Dry Zone, Northern Transitional Zone and Hilly Zone.

North Dry Zone: It consists of five taluks viz., Athani, Raybag, Ramdurg, Gokak and Parasgad which occupies about 54.25 per cent of the total area of the district. The rainfall is most

Category	Size class in hectares	Number of holdings		Percentage variation	Area of holdings		Percentage variation	Average size	
		1976-77	1980-81		1976-77	1980-81		1976-77	1980-81
	Below 0.5	56,083	54,204	-3.35	14,107	15,014	6.43	0.25	0.28
	0.5—1.0	47,475	50,935	7.29	34,950	36,957	5.74	0.74	0.73
Marginal	Below 1.0	1,03,558	1,05,139	1.53	49,057	51,971	5.94	0.47	0.49
Small	1.0—2.0	71,676	86,521	20.71	1,04,417	1,24,778	19.50	1.46	1.44
	2.0—3.0	44,303	51,562	16.38	1,07,622	1,24,720	15.89	2.43	2.42
	3.0—4.0	28,618	31,205	9.04	97,834	1,06,713	9.08	3.42	3.42
Semi-med	2.0—4.0	72,921	82,767	13.50	2,05,456	2,31,433	12.64	2.82	2.80
	4.0—5.0	19,264	20,713	7.52	86,263	91,816	6.44	4.48	4.43
	5.0—7.5	26,139	28,328	8.37	1,57,864	1,70,054	7.72	6.04	6.00
	7.5—10.0	13,380	13,050	-2.17	1,15,034	1,11,671	-2.92	8.60	8.56
Medium	4.0—10.0	58,783	62,091	5.63	3,59,161	3,73,541	4.00	6.11	6.02
	10.0—20.0	13,759	12,938	-5.97	1,81,976	1,68,347	-7.49	13.23	13.01
	20.0—30.0	1,705	1,396	-18.12	39,368	31,939	-18.87	23.09	22.88
	30.0—40.0	347	241	-30.55	11,752	8,160	-30.57	33.87	33.86
	40.0—50.0	107	95	-11.21	4,734	4,116	-13.05	44.24	43.32
	50.0 & above	176	148	-15.91	23,758	17,674	-25.61	133.99	119.42
Large	10.0 & above	16,094	14,818	-7.93	2,61,588	2,30,236	-11.99	16.25	15.54
	Total	3,23,032	3,51,336	8.76	9,79,679	10,11,959	3.29	3.03	2.88

Source : Agricultural Census, 1980-81, issued by State Agricultural Commissioner, Bangalore.

variable at Athani and least variable at Paragad. Athani has moderate or severe droughts with annual rainfall deficiency exceeding 25 per cent to 20 per cent of the years, Raybag and Ramdurg is 15 per cent of the years and Paragad is 12 per cent of the years. The lowest rainfall recorded in the area was 198 mm at Raybag in 1965. The annual average rainfall of the region is 500 to 620 mm. Nearly 80 per cent of the rainfall occurs from June to October. Shallow to medium black soils and deep to very deep black soils are found in Athani, Raybag, Gokak and Ramdurg taluks. Deep to very deep black soils are found mainly in Ramdurg, Paragad and parts of Gokak taluks. Nitrogen status is medium, the available phosphorous content is low, the available potash content is high, the availability of total soluble salts are normal and the soils are normal to alkaline in this region. This region is predominantly a rabi area in which the major crops grown are jowar, bajra, wheat, cotton, sugarcane, etc.

Northern Transitional Zone: It consists of four taluks namely Chikodi, Hukeri, Sampgaon and Belgaum taluks forming 32.88 per cent of the total area of the district. The annual average rainfall of the region is 632 to 1,303 mm. Nearly 60 per cent of the rainfall occurs during April to October. Shallow to medium black soils are found in Chikodi, Hukeri, Sampgaon and Belgaum, deep to very deep black soils in Sampgaon, red sandy loams in Hukeri, Sampgaon and Belgaum, and red laterites in Chikodi and Belgaum taluks. Nitrogen content is high in Belgaum and moderate in Chikodi, Hukeri and Sampgaon taluks, available phosphorous is low, available potash is high, the availability of total soluble salts are normal and the soils are normal in Hukeri, Chikodi, Sampgaon and Belgaum taluks. Acidic soils are also noticed in parts of Belgaum taluk. This area is mainly a kharif area and the main crops grown are paddy, jowar, groundnut, sugarcane, tobacco and chillies.

Hilly Zone: It comprises of Khanapur taluk covering 12.87 per cent of the total area of the district. The annual average rainfall of this region is 1,686 mm and 75 per cent of the total rainfall occurs mainly during Kharif well distributed from June to October. Soils are acidic, total soluble salts are normal, nitrogen content is high, available phosphorous is low and the available potash is moderate in this region. This region is mainly a kharif area and major crops grown are paddy and sugarcane.

Lateritic soils, occurring in Khanapur and parts of Belgaum

taluks, are red to pale yellow in colour due to predominance of hydrated oxides of iron and aluminium. These soils are friable and easy to cultivate when moist. They are acidic in nature and are deficient in lime and other nutrients. Red loamy soils are poor in retaining soil moisture but possess good internal drainage and are easy to cultivate. The depth of these soils varies from few inches to several feet and these soils are noticed in Ramdurg, Parasgad, parts of Gokak, Hukeri, Sampgaon, Belgaum and Khanapur taluks. Mixed red and black soils are found in association with each other. Usually red soils occur on uplands and black soils predominate in low lands. Both the soils are productive under favourable management practices.

Shallow black soils are severely eroded soils with dark brown to dark reddish in colour and the depth of these soils is less than 23 cm. These soils are well drained with moderate permeability. Medium black soils are found on gently sloping lands, retentive and well supplied with bases. They are moderately well drained with slow permeability. These soils are noticed in Athani, Raybag, Gokak, Ramdurg, Chikodi, Hukeri, Sampgaon and Belgaum taluks. Black soils are slaty black to dark brown in colour and contract to an unusual degree on drying. These soils are seen to exist in uniform extensive areas or inter-mixed with patches of red soils. The depth of black soils is highly variable and are deep extending upto six metres. They are highly retentive, fertile and moderately well drained to somewhat imperfectly drained with slow permeability. These soils are noticed in Athani, Raybag, Ramdurg, Gokak, Parasgad and Sampgaon taluks.

Soil Conservation

Soil conservation work was started in the district as early as in 1942. About 4,23,572 hectares of land is estimated to require soil conservation measures. In order to conserve soil, the Karnataka Land Improvement Act 1961 was brought into force. The taluk-wise contour bunded area in hectares in Belgaum District as on 31-3-1985 is given below: Athani 65,799, Belgaum 7,667, Sampgaon 314, Chikodi 10,127, Gokak 29,337, Hukeri 8,348, Khanapur 2,202, Raybag 10,959, Ramdurg 37,746 and Parasgad 42,619. About 2,16,918 hectares are covered under contour bunding in the district. Under Rural Landless Labourers Employment Guarantee Scheme introduced in 1983-84 an area of 765 hectares has been covered under contour bunding,

incurring an expenditure of Rs 4.05 lakhs from 1983-84 to 1984-85 in Athani, Chikodi, Raybag and Parasgad taluks. Four farm ponds were also developed under this scheme. Under Western Ghats Development Programme started in the district from 1974-75 in Khanapur, Belgaum, Sampgaon, Hukeri and Parasgad taluks, an area of 760 hectares and 724 hectares has been covered under contour bunding and bench terracing respectively with an expenditure of Rs 12.63 lakhs upto 1983-84. Contour bunding and bench terracing works were undertaken in 273 and 30 hectares respectively under special component plan started in 1981-82, incurring an expenditure of Rs 7.54 lakhs from 1981-82 to 1984-85. An area of 1,591 hectares has been covered under contour bunding incurring an expenditure of Rs 2.46 lakhs under Employment Affirmation Scheme which was in operation in Belgaum district from 1979-80 to 1981-82. Under National Rural Employment Programme which started its operation in the district from 1982-83, an area of 4,034 hectares was brought under contour bunding upto 1984-85 with an expenditure of Rs 20.83 lakhs. Under Drought Prone Area Programme, an area of 34,768 hectares has been covered under contour bunding since inception upto 1984-85 incurring an expenditure of about Rs 99 lakhs. About 51 lakhs Subabul seedlings were raised and distributed to needy farmers to overcome the scarcity of fodder and fuel in Athani, Raybag, Ramdurg, Gokak and Parasgad taluks.

Dry Land Development Project

Dry Land Development Project aims to minimise the risk in rain-fed farming. This project envisages utilisation of rain water to the maximum extent through improved crop management, arable land development and non-arable land management for forage and forestry. Besides, it supports the activities in the area of farm forestry, forage production, livestock development, dairying, wool industry, sericulture, poultry and piggery. Considering the objective of this project, Hirehalla watershed in Athani taluk has been selected for overall development. The watershed is spread over in 12 villages covering an area of 34,340 hectares. This watershed is divided into ten sub-watersheds and their development is being taken up in a phased manner. During 1984-85 Rs 1.77 lakhs were spent for the development of Telsang mini watershed for contour bunding, *nala* bunding, gully plugging and land smoothing works. In order to demonstrate and disseminate Dry Farming Technology, Dry Land

Agricultural Development, Rain-fed Farming Project and Vertisol Management Project are in operation in the district.

Dry Land Development Project and Rain-fed Farming Project were started during the year 1982-83 in eight taluks, leaving Belgaum and Khanapur. In this project, about 500 hectares of contour bunded fields in each taluk were selected and all the improved and advanced dry farming techniques were advocated to farmers. This project was continued during 1983-84 and 1984-85, selecting about 1,000 hectares of land in all the ten taluks of the district. Five taluks, namely Athani, Raybag, Gokak, Chikodi and Ramdurg, were covered under Dry Land Agricultural Project and Belgaum, Hukeri, Sampgaon, Khanapur and Paragad taluks were covered under Rain-fed Farming Project. A few particulars are given below :

<i>Particulars</i>	<i>Achievement</i>		
	<i>1982-83</i>	<i>1983-84</i>	<i>1984-85</i>
Area selected (ha)	4143	10342	10171
Contour bunded area (ha)	4143	10342	10171
Inter-bund management (ha)	4143	10342	10171
Supply of seeds (quintals)	1335	1482	1894
Supply of fertilisers (tonnes)	312	460	695
Crops coverage (ha)	2410	9601	9923
Supply of Agricultural Implements (Nos)	1246	770	482

Under Vertisol Management Project 63 hectares were given land treatment (broad bed and furrows) by using iron plough in Athani, Hukeri, Sampgaon and Belgaum taluks in 1983-84.

Crops near Rain-gauge Stations

Crop production in dry lands mainly depends on quantity of rainfall received and its distribution. The various agricultural operations are timed as per the receipt of rainfall. In this project, depending on the rainfall probability charts, various agricultural programmes like land preparation, inter-bund management, sowing, inter-cultural operations, harvesting, etc., are programmed well

Area in hectares, Production in tonnes and yield in kgs/hectare of Principal Crops in Belgaum District

Crops	1960-61			1970-71			1982-83		
	Area	Production	Yield	Area	Production	Yield	Area	Production	Yield
Jowar	3,06,024	1,89,870	659	2,38,158	1,67,998	742	2,42,173	1,56,304	679
Paddy	67,827	85,438	1,326	59,206	66,579	1,183	61,914	77,539	1,318
Maize	8,551	10,812	1,264	22,052	73,196	3,494	50,354	1,05,328	2,202
Bajra	77,142	21,274	290	84,922	16,736	207	72,273	15,539	226
Ragi	14,892	6,216	439	12,739	10,782	891	10,809	8,009	780
Wheat	46,244	13,985	318	56,506	14,833	276	56,059	28,754	540
Bengalgram	15,142	7,529	523	15,199	5,934	411	17,989	7,844	459
Tur	24,539	10,870	466	18,124	10,176	591	12,705	6,229	576
Sesamum	561	49	92	378	122	341	490	96	207
Groundnut	1,41,337	99,177	739	1,33,568	77,149	608	1,12,124	62,577	587
Sugarcane	15,891	92,297	68	29,612	20,53,563	73	58,378	44,36,728	80
			tonnes			tonnes			tonnes
Cotton*	72,397	41,774	104	57,997	40,710	133	46,701	68,115	261
		Bales of 180 Kgs			Bales of 180 Kgs			Bales of 170 Kgs	
Tobacco	23,684	12,245	517	24,911	8,196	329	26,310	25,519	1,021

*Production of cotton is in terms of Lint Cotton

in advance so as to get maximum yields. This project was started during the year 1984-85. The station selected, the village proposed (in brackets) and the area covered are given hereunder : Athani M D (Athani) 103.94; Gokak (Maladinni) 105.91; Hukeri M D (Hukeri) 102.18; Khanapur (Manasapur) 100.15; Bailhongal (Bailhongal) 105.26; Belgaum City (Belgaum) 104.42; Saundatti Hospital (Saundatti) 100.00; Chikodi (Karoshi) 118.07; and Ramdurg (Kolachi) 101.88, total 941.81.

Cropping Pattern

Cropping activities go on all the year round in the district. There are three seasons viz, kharif (June to October), Rabi (November to February) and summer (March to May). The prevailing cropping systems are the cumulative results of past and present decisions taken by individuals, communities or government and their agencies. The main food crops are jowar, paddy and wheat among cereals, gram among pulses and groundnut, sugarcane and cotton are the chief non-food crops. The area, production and yield of important crops in the district are given in the table on p 272.

Jowar

Jowar, *Sorghum vulgars* is the most important food and fodder crop of the district. Area under jowar cultivation in Belgaum district is accounted to 2,41,631 hectares or 26.84 per cent of the net area sown during 1983-84, the district standing fourth in the State in this crop. The preparation of land with ploughs or blade harrows with least application of farm yard manure, line sowing with a seed drill in rows of 12"-18" apart and inter-culturing with bullock drawn implements continue to be practised. Kharif jowar is usually sown during May-June and rabi jowar during September-October. Irrigated crop is sown during January and continued upto May-June. The important varieties sown in Kharif season are CSH-1, CSH-2, CSH-5, CSH-6 (hybrid), SB 1079, SB 905 (improved) and in Rabi season CSH-8R, CSH-5 (hybrid) M 35-1, Muguti (5-4-1) and Annigeri-1. The duration of the crop is from 3½ to 4 months. An yield upto 60 q/hectares of grain and 12 t/hectares of fodder from an irrigated crop and 30 q/hectares of grain and 5 t/ha of fodder from rain-fed crop is expected. Hybrid jowar lends itself for ratooning and will be ready for harvest in about 3 months. Sequence cropping of greengram in kharif followed by rabi or kharif jowar followed by its ratoon or safflower, gram, etc., are also becoming

feasible particularly with the introduction of short duration varieties. Mixed cropping of jowar with pulses in kharif and with safflower during rabi is a common practice. Belgaum district is identified as an endemic area for earhead midge (*Contarinia sorghicola*) and plant protection measures are followed. Storing of grains in underground pits in streets and other places is in practice.

Paddy

Paddy (*Oryza sativa*) is the second important cereal crop of the district, covering an area of 61,062 hectares or 6.7 per cent of net sown area during 1983-84, and the district occupies the seventh place in the State in this crop. The chief areas raising paddy are Khanapur, Belgaum and Sampgaon taluks. Regular paddy fields are divided into level compartments varying in length and breadth according to the position of the ground. The slope of the ground is generally built-up into a series of terraces, each 30-60 cms high embankment forming part of the descending step. Mostly all paddy lands are ploughed just after harvesting of paddy crop and pulse is grown in low lying lands as a rabi crop. Many paddy varieties are in cultivation in the district. Jaya, Vani, Sona, IET-2254, IR 20, and Mangala are some of the high-yielding popular varieties.

Wheat

Wheat (*Triticum aestivum*) in 1983-84 covered 51,304 ha or 5.7 per cent of net sown area, the district standing third in the State in this crop. Wheat is chiefly grown in Paragad, Gokak, Athani, Sampgaon and Raybag taluks. Wheat is raised in alternate years, rotated by jowar. In some places, wheat alternates gram. Occasionally safflower is raised between the rows of wheat. Safflower does not ripen till a month after the wheat and does not interfere with its growth. The varieties grown in the district include Bijaga yellow, Kiran, U P 301, H D 2189, Keerthi and C C 464. A well managed irrigated crop produces about 25 quintals while a good rain-fed crop produces about 10 quintals per hectare.

Groundnut

Groundnut (*Arachis hypogaea*) is the most important oil seed crop of the district introduced during recent centuries. The area under groundnut cultivation during 1983-84 was 1,12,680 ha or 12.52 per cent of the net sown area, standing third in the State in this crop.

It is chiefly grown in Chikodi, Hukeri, Parasgad, Ramdurg and Sampgaon taluks. Among bunch varieties Spanish improved. TMV-2 and DH-3-30 and among spreading varieties Pondicherry-8 are in cultivation in the district. Monsoon crop is sown before the end of June and the other season for sowing is from the last week of December to the end of January. An yield upto 37 q/ha from an irrigated crop and 10 to 12 q/ha from rain-fed crop is expected.

Sugarcane

Sugarcane (*Saccharum officinarum*) is an important commercial crop of the district. In 1983-84 it covered 56,632 ha or 6.29 per cent of net area sown, the district standing first in this crop in the state. It is chiefly grown in Athani, Raybag, Chikodi and Hukeri taluks. The plots are deeply ploughed with heavy ploughs and farm yard manure applied in adequate quantities. Sheep are penned in the field for manurial purpose in some places. Furrows are made with suitable spacings using either ploughs or other devices and the setts (18"-24" length containing 2-3 eye buds) are placed length-wise on the ridges and pressed into earth by trampling. The planting of sugarcane commences in October-November for Co 740, Co 62175 and January-February for Co 6415. Co 740 variety is also grown as a rain-fed crop. During the sixth month onwards, dried leaves at the lower nodules are cut. The crop would be ready for harvest in 11-13 months. An yield upto 80 tonnes/ha is expected from Co 62175 variety and 45-49 tonnes/ha cane is expected from Co 740 and Co 6415 variety.

Cotton

East India Company encouraged the cultivation of improved cotton in Bombay Presidency to cope up the increasing demand for cotton which arose in Europe after the invention of steam engine and the labour saving machinery. In Belgaum district experiments for the introduction of New Orleans cotton were commenced in 1842 and after some reverses, the cultivation of cotton became fairly established and it has maintained its hold in the district upto the present day. *The Report of the Indian Cotton Committee* (1919) says that the most important variety of cotton grown in the "Kumpta-Dharwad tract" is *Gossypium herbaceum* ('Dharwar American') and that "it is at its best in Belgaum". The 'Cotton Boom' of the American Civil War days saw cotton being raised ("increased" according to Belgaum Gazetteer 1884) in 2,50,337 acres in 1860-61 and

2,85,583 acres in 1861-62 in the then Belgaum district (figures for 1862-63 and 1863-64 are not available. Some areas in Belgaum were transferred to Kaladgi district in 1864). Cotton crop covered 50,434 hectares in the district during 1983-84 and the district's rank is sixth in the State in this regard. The main cotton growing taluks are Parasgad, Ramdurg, Gokak, Athani and Sampgaon. The District receives the benefit of both the monsoons. The main varieties in cultivation include Mysore Vijaya and 170 Co-2, under irrigated conditions, Laxmi, Jayadhar and KDCD-1 under rain-fed conditions. Sea Island Cotton and Hybrid Cotton varieties (Varalaxmi and Jayalaxmi) are also cultivated in the district. The average normal yield of cotton per hectare works out to 261 kgs/hectare.

Tobacco

With tobacco (*Nicotiana tubaccum*) occupying 26,212 hectares in the district forming about 2.91 per cent of net area sown during 1983-84, Belgaum ranks first in Karnataka in tobacco mostly grown in Chikodi, Hukeri and Gokak taluks. Tobacco requires very careful treatment of the seed bed and the field. Tobacco stands in the field for about five months. It is both an irrigated and rain-fed crop. Harvesting, drying, heaping, stocking and curing require considerable skill and attention. Kari-baglani, Bhopli and Shendi-surte varieties were in cultivation during 1900. S-20 *bidi* tobacco variety released during 1957 is known for quality, NPN-190 variety released during 1979 and PL-5 (Sphoorty) variety released during 1984 are high yielding and good quality varieties of *bidi* tobacco. The out-turn of tobacco crop varies between 750 to 1000 kgs per hectare.

Research Stations

Agricultural Research Stations are established to develop agricultural technology and to demonstrate its practical utility to train the key functionaries of the development departments and in training of progressive farmers along with the Department of Agriculture. They undertake production of seeds and seedlings of improved varieties and distribute them. There are four Research Stations in Belgaum district at Nipani, Bailhongal, Sankeshwar and Arabhavi.

The Agricultural Research Station, Nipani was established in the year 1938 for the purpose of improvement of *bidi* tobacco and to find

out the possibilities of introducing cigarette tobacco in that area. The Station was shifted to Soundalga in the year 1942. Again in 1961, it was shifted back to the present site at Nipani. The Research Station has released S-20 variety in 1957, NPN-190 variety in 1979 and PL-5 (Sphoorty) variety in 1984. It is experimenting on variety, agronomy, entomology and pathology of *bidi* tobacco. It has also introduced Anand-2 and Anand-119 *bidi* tobacco in the district. It is also conducting field-days, seminars, training programmes and demonstrations regarding *bidi* tobacco. Seed production and distribution of improved varieties of jowar, maize, wheat, groundnut, tur, cotton and chillies are also undertaken. The total area of the farm is 22.50 hectares. Village Kodani (Chikodi taluk) was adopted under the Village Adoption Programme.

The Agricultural Research Station, Arabhavi was started in the year 1909 with the object of demonstrating improved methods of crop production under irrigated conditions, seed multiplication and distribution and to carry out the research work on water requirement of different crops. The total area of the farm is 26 ha. Since the soil and climatic conditions of the Station represent the area under Ghataprabha Left Bank Canal, the research programmes are oriented to solve the problems of the farmers of this region. Long duration and wilt resistant tur variety F-52 was developed at this station and released during 1948. In cotton, an early high-yielding and long linted variety Mysore Vijaya was developed and released during 1968. This Station has played an important role in developing and releasing of Maize hybrids 'Deccan' and 'Deccan 101' and wheat varieties DWR-39 and Keerti. A sub-centre of All India Co-ordinated Cotton Improvement Project (AICCIP) is functioning here since 1967 with the objective of evolving high-yielding superior quality cotton. Under Village Adoption Programme, Chigadolli near Gokak was adopted. Experiments are conducted on the agronomic practices on maize, cotton jowar, wheat and soyabean. Trials on multiple cropping are also conducted.

The Agricultural Research Station, Sankeshwar was established in 1959 which was initially known as Regional Sugarcane Research Station, to conduct research on sugarcane and to improve the yields of sugarcane by testing promising genotypes evolved at Coimbatore, Mandya and Padegaon Research Centres. This Station also studies problems of sugarcane cultivation and evolve suitable cultivation

practices to maximise yield. It has identified and released CO-740 variety in 1964, CO 62175 in 1974 and CO 6415 in 1977. Recently, it has evolved CO 7219 (*Sanjivini*), a sugar-rich variety. Work on chilli has also been undertaken and in 1979, DH-7-6-6 chilli variety was released. The total area of the farm is 13.25 hectares. Research on sugarcane, chilli and soyabean is carried out and extension work is being undertaken. There is a seed production programme of sugarcane, chilli, groundnut, maize, sunflower, jowar, wheat, cotton and tobacco.

The Agricultural Research Station, Bailhongal was started in the year 1947 and it was merged under the comprehensive scheme for Sorghum Research during 1963-64. Later, it was transferred to University of Agricultural Sciences in 1965. This Research Station undertakes research on genetical improvement and agronomical aspects of important crops like kharif jowar, groundnut, horsegram, wheat, bengalgram and safflower. The total area of the farm is 10.64 hectares. The varieties released from this station are as follows. Kharif jowar varieties - GM 2-3-1, GM 1-5, BH 4-1-4, Kalagonda and DSH-1, groundnut variety BH-8-18, horsegram varieties BGM 1-8-3 and Co 1-1-8-3, safflower varieties Bijamanal 1-5-3, Galagali 2-1-8-5 and Saundatti 2-2. This station has adopted Hosur and demonstration trial on Sharada Cotton was conducted here. Researches on agronomy, entomology, pathology, breeding, etc., are being conducted on various crops. There is also a programme to multiply and supply improved varieties of seeds.

Agricultural School: Agricultural School at Arabhavi was started in the year 1909 as an Agricultural Research Station. In 1947, it was converted into an Agricultural School with an objective to impart agricultural training to the sons of the farmers and 407 candidates were trained under the two-year training programme from 1947-48 to 1966-67, and 703 candidates were trained in the one-year training programme from 1966-67 to 1984-85. Trainees are paid a monthly stipend of Rs 150. The Seed Farm maintained by the school has an area of 37.44 hectares having irrigation facilities. Seed production of improved varieties, namely Hybrid Maize (Deccan), Cotton (DCH-32), Sunflower (BSH-1, Morden), Red gram (PT 221) are undertaken. It has also got a Dairy Section.

The Extension Education Unit, Dharwad covering some taluks

of Belgaum, started in 1969 to cater to the information needs of the farmers. It is an important link between local farmers, the research and the teaching staff. At present Paragad, Belgaum and Sampgaon taluks of Belgaum district are covered by this unit. The Extension Guides of this Unit are involved in conducting farm trials, whole farm demonstrations, field days, meetings, besides working in village adoption and lab-to-land programme in respective taluks.

The Soil Health Centre, Gokak, was started in the year 1971 at Belgaum as Soil Testing Laboratory, and shifted to Gokak during the year 1973. It was renamed as Soil Health Centre in 1983. The main purpose of Soil Health Centre is to collect and analyse soil samples, to recommend fertilizer doses for various crops, to know the suitability of water for irrigation and to test the purity of lime and gypsum, which are used as soil amendments. It also imparts training to field staff and farmers in collecting soil samples and implementing recommendations. So far, the total number of soil samples collected and analysed were 2,84,260 and 2,47,090 respectively. During 1984-85, 16,017 samples were collected and 12,269 samples were analysed. Based on soil test results, fertility maps of different taluks for irrigated as well as rain-fed areas have been developed by this centre.

Seeds and Seed Farms

Nine Seed Farms have been set up all over the district for multiplication and distribution of improved seeds to the farmers. The nucleus seeds obtained from agricultural research stations are multiplied in these farms and the foundation seeds so obtained are supplied to registered growers who in turn multiply the seed and supply them to the farmers for general cultivation. During 1982-83, about 33.6 quintals of foundation seeds of different crops were produced and distributed to farmers. Production of improved and hybrid seeds is being taken up by the Karnataka State Seeds Corporation (KSSC) and National Seeds Corporation (NSC) through the Department of Agriculture. In 1982-83, seed production was taken up in about 150 hectares by KSSC and NSC. In order to supply pure and certified seeds, seed samples are drawn from various seed supplying agencies and sent to laboratory to test their purity. During 1982-83, about 1,740 seeds samples were drawn and 1,101 samples were despatched to the laboratory. The Department of Agriculture has taken up a scheme to collect improved seeds grown by progressive

farmers and to distribute them to needy farmers. Under this scheme, about Rs 38,500 has been spent to collect 103 quintals of seeds of pulses and oilseeds during 1982-83. A few particulars about seed farms in the district are given hereunder.

Name of the Seed Farm	Year of starting	Total area	Area in hectares	
			Net area available	
			Dry	Irrigated
Athani	1960-61	10.50	8.25	4.00
Bailhongal	1957-58	20.52	19.31	—
Zadashapur (Belgaum taluk)	1961-62	9.67	7.09	1.60
Soundalga (Chikodi taluk)	1960-61	9.55	5.67	1.60
Kallolli (Gokak taluk)	1964-65	51.03	7.30	36.88
Agricultural School Farm, Arabhavi	1947-48	53.46	—	37.91
Hukeri	1967-68	21.83	17.60	0.80
K Chandargi (Ramdurg taluk)	1960-61	10.11	6.65	2.80
Saundatti	1960-61	20.68	18.80	—

The Karnataka Agro Industries Corporation Limited, (A Government of Karnataka Undertaking) is in operation in the district since 1969. It assists the farming community by supplying seeds, fertilizers, pesticides, plant protection equipments, etc., through Agro-kendras. In Belgaum district, the Corporation has opened Agro-kendras in each taluk except Khanapur taluk. Agro-kendras are started at Athani (1973), Harugeri (1982), Kudachi (1975), Raybag (1974), Hukeri (1974), Chikodi (1985), Gokak (1972), Bailhongal (1972), Saundatti (1972), Ramdurg (1972) and Mullur (1982). It has appointed 17 dealers in Athani, 27 in Sampgaon, 9 in Chikodi, 43 in Gokak, 16 in Hukeri, 22 in Raybag, 15 in Ramdurg and 47 in Paragad taluks for sale of agricultural inputs. A few particulars of the working of the Corporation in Belgaum district are given in the next page.

<i>Particulars</i>	1982-83	1983-84	1984-85
Sale of Nitrogen in tonnes	4,732.5	4,561.9	5,063.9
Sale of Phosphorous in tonnes	1,108.1	1,566.11	1,907.6
Sale of Potash in tonnes	1,510.6	1,679.8	2,068.9
Sale of seeds in quintals	1,086.18	967.9	162.1
Sale of Pesticides in '000 Rs	2,741.4	3,027.6	2,769.7

During 1984-85, the revenue was Rs 377.49 lakhs by sale of fertilisers, Rs 31.76 lakhs by sale of pesticides and Rs 1.42 lakhs by sale of seeds. The expenditure incurred during 1984-85 was Rs 1.61 lakhs.

Agricultural Engineering wing was established by the Department of Agriculture during 1966, for providing equipments for agricultural works. Later, it was merged into the Agro-Industries Corporation in 1972 and was renamed as Agricultural Engineering Service Division, Belgaum. It has a sub-centre at Saundatti to offer services of bulldozers, fast rings, tractors, crawling tractor, well master cranes, etc., on hire basis. During 1984-85, 5,550 hours of bulldozer works and 1,000 hours of tractor works were utilised. Land development works undertaken by the Command Area Development Authority, Belgaum is being assisted by this division.

Manures and Fertilizers

The manures that are in common use in the district are farm-yard manure, green manure, compost and chemical fertilisers. Special schemes have been implemented like production of urban compost and rural compost. Farmers are educated in preparing organic manures by organising training camps and other propaganda measures. In recent years efforts are being made to produce quality compost. The local bodies are also making efforts to prepare compost. Local Manurial Resources Scheme has been put into operation in the district for the purpose. The items of work undertaken are intensification of urban and rural compost production, intensification of green manuring in irrigated and assured rainfall areas, training village leaders in better composting, conservation of night-soil, improved cattle sheds and manure sheds, intensification of gobar gas and bio-gas plants, intensification of blue green algae and

azolla in wet lands, utilisation of sewage and sludge water and award of prizes to local bodies for preparation of good quality compost. Under this programme, compost training camps and compost weeks, are being organised to popularise compost making and growing of green manure crops. Under local manurial resources programme, 5,96,250 tonnes of rural compost and 55,010 tonnes of urban compost were prepared, 55,210 hectares were covered under green manuring crops, 2,845 tonnes of green manuring crop seeds were distributed in the district during 1984-85. About 60 compost training camps were organised. Fertilisers have been in greater use in recent years as the area under irrigation is increasing and due to the introduction of high-yielding varieties of crops. The common fertilisers used are Urea, Ammonium Sulphate, Calcium Ammonium Nitrate, Super Phosphate, Muriate of Potash and Complex fertilisers. A Fertiliser Promotion Programme was taken up in the district in 1973 with the objectives of educating the farmers. Under the 40 hectare scheme, fertilisers are being supplied to farmers in their own village. Villages having 40 hectares of irrigated area are selected and a temporary sale point is opened during the season. Total number of villages selected during 1983 was 97, 124 in 1984 and 251 in 1985. The fertilisers distributed under this programme during 1983 was 3,052 tonnes, 4,100 tonnes in 1984 and 12,068 tonnes in 1985.

Consumption of Chemical Fertilisers (in M tonnes)

<i>Year</i>	<i>Nitrogen</i>	<i>Phosphorous</i>	<i>Potash</i>	<i>Total</i>	<i>Percentage increase or decrease over previous year</i>
1975-76	10,165	3,566	3,467	17,198	+25.27
1980-81	22,546	4,879	4,606	32,031	+16.21
1981-82	26,834	8,147	8,314	43,295	+35.17
1982-83	26,918	9,457	8,163	44,538	+ 2.87
1983-84	34,218	14,828	10,577	59,623	+33.87
1984-85	33,764	12,928	6,794	43,486	-10.29

Bio-gas Development Programme: It was initiated during the Sixth Plan in the district. Under this programme, 15 masons were trained in the construction of Bio-gas plants during 1982-83 and about

84 Bio-gas plants were constructed. During 1984-85, 425 Bio-gas plants were constructed.

Plant Protection

Plant protection has gained special importance after the introduction of high-yielding varieties. Large number of chemicals developed are available in the market and these are recommended at different stages of the crop. During 1984-85, 2,80,000 hectares were covered under seed treatment and 2,800 hectares under chemical weed control. To control field rats, rodenticides are being supplied to farmers at 50 per cent subsidy. To control insect pests of stored grains, Ethylene Dibromide ampules are utilised and these ampules are supplied at 50 per cent subsidy. Under comprehensive Plant Protection Programme, plant protection equipments are supplied to the farmers on 25 per cent subsidy. Endemic pests in the district are noticed in jowar (Earhead midge), safflower (Aphids), groundnut (Redheaded hairy caterpillar) and paddy (Brown plant hopper). The Agro-Industries Corporation is supplying plant protection chemicals and equipments to Agro-Kendras, Service Societies and Private dealers. Technical assistance in handling chemicals, preparing solutions and adopting dosages are extended by the extension staff.

During 1984-85, under district sector plan, Rs 42,555 was spent to supply plant protection equipments at 25% subsidy, supply of plant protection chemicals at 50% subsidy to control pests of stored grains and pests of paddy. Under State sector scheme Rs 30,984 was spent to provide plant protection chemicals at 50% subsidy to control pests of pulses and groundnut and weedicides at 50% subsidy. Under Central Sector Scheme, Rs 2.41 lakhs was spent to supply plant protection chemicals at 50% subsidy to control red headed hairy caterpillar and paddy brown plant hopper, at 75% subsidy to control jowar earhead midge, groundnut leaf minor, and redgram pod borer. An amount of Rs 85, 690 was spent to provide plant protection chemicals to control redgram pod borer at the rate of Rs 75 per hectare under Drought Prone Area Programme.

Agricultural Implements

There are three kinds of ploughs in Belgaum, small plough is found in rice tract of Belgaum, medium sized ploughs called *rante* and the heavy plough called *negilu* mostly wooden. Heavy plough

requires 3 to 4 pairs of bullocks to work it while the small and medium sized ones are worked by one pair of bullocks. Heavy ploughs are generally used in stiff and deep soils while the lighter ones are used in loose and shallow tracts. The heavy harrow with a comparatively short blade is called *haraguva kunti* and is used for preparation of land in the hot and cold weather. The lighter harrow called *belesal kunte* has a narrow and long blade and is used for covering seed as well as for working the land after commencement of the rains. A small but rather heavy harrow called *kiru kunte* is used for stirring and removing jowar stubbles. Another harrow called *dodda kunte* is used for harvesting groundnut. Clod crushers are generally heavy pieces of wood, used to break the clods and make the soil finer by pulverising it. Seed drill (*koorige*) is intended for even distribution of seeds in lines and drops the seed to the same depth. Generally heavy drills are used for rabi crops and light ones for kharif. A small hand plough (*kai kunte*) with a tube attached is found in Belgaum and is worked by hand for filling up gaps. There is a special heavy hoe called *kabbina dumkunte* for sugarcane in Belgaum and there are also special hoes for crops like brinjals, chillies, tobacco, etc. Threshing is usually done by the bullocks and in some parts a stone roller is commonly used for threshing jowar heads.

Yeta or *piccota* is used for lifting water by a lever from shallow wells and tanks, operated manually. As per 1961 livestock census, there were 1,16,261 wooden ploughs, 28,763 iron ploughs, 74,632 animal carts, 873 animal operated and 914 power operated sugarcane crushers, 3,844 oil engine and 187 electric engine pumpsets, seven government owned and 68 private owned tractors in Belgaum district. During the 1983 livestock census, there were 1,15,727 wooden plough, 20,312 seed cum fertiliser drills, 1,438 animal operated and 1,135 power operated sugarcane crushers, 13,928 diesel engine pumpsets and 35,031 electric pumpsets, 1,093 power tillers, 3,977 tractors used for agricultural purpose in the district.

There are various kinds of water lifts and devices in the district according to the depth of water in the well, tank or canal. *Sundhio mhot* (*motte* or *matti*) is found in Belgaum and it has a self-discharging trunk. *Goode* is a triangular bamboo basket lined with leather in some places and it is swung by ropes. It is portable and it is used in shallow water tank irrigation. Persian wheel is also in use. Double yoke is used for harrow, 3 or 4 coultered seed drills and working hoes with a slit in between.

The Small Farmers Development Agency (SFDA) commenced its operation in Belgaum district in the year 1978-79 with the main object of developing the potential of and giving assistance to small farmers, marginal farmers and agricultural labourers. An amount of Rs 4.75 lakhs of subsidy was released to the Agency for the benefit of 2,600 persons during 1978-79 and Rs 35.16 lakhs of subsidy for the benefit of 4,875 persons during 1979-80. This Agency has been brought under District Rural Development Society which came into being on the 2nd October, 1980.

District Rural Development Society (DRDS) established in 1980, takes up various programmes under SFDA, DPAP, Integrated Rural Development Programme (IRDP) and any other special economic programmes that are sponsored by Central and State Governments. During the VIth Plan period, an amount of Rs 411.10 lakhs of subsidy and loan amount of Rs 910.12 lakhs was extended to 43,559 families. The total amount envisaged during the year 1985-86 was to a tune of Rs 1,522.59 lakhs of which, Rs 347.51 lakhs was subsidy component and the remaining amount was loan component, which had to flow from financial institutions.

Integrated Rural Development Programme

The Scheme of Integrated Rural Development (IRDP) for the development of an area has been introduced during the year 1978-79. This programme which has been taken up in six taluks viz, Sampgaon, Hukeri, Chikodi, Gokak, Ramdurg and Parasgad aimed at making the family economically viable and self-sufficient. An amount of Rs 30 lakhs was provided for the year 1979-80. Later, this scheme has been extended to all the taluks of Belgaum district from the year 1980-81. During the VI Plan, each taluk had a target of reaching 3,000 families with Rs 35 lakhs being the target amount of subsidy from each taluk under IRDP. The number of families benefited with amount of subsidy paid (given in brackets, Rs in lakhs) are as follows: Athani 3,818 (36.68), Sampgaon 3,955 (28.76), Belgaum 4,199 (43.69), Chikodi 6,130 (61.33), Gokak 5,740 (54.67), Hukeri 5,254 (41.39), Khanapur 3,402 (27.61), Raybag 3,967 (33.36), Ramdurg 3,774 (27.04) and Parasgad 3,320 (27.50). The total no. of families benefited are 43,559 and subsidy distributed Rs 382.03 lakhs as against the targeted amount of Rs 350.00 lakhs. Under agriculture sector, an amount of Rs 3.55 lakhs has been spent for land development, supply of improved agricultural implements, storage-bins

to 903 small and marginal farmers. During 1985-86, a sum of Rs 2.99 lakhs is provided as subsidy to assist 604 small and marginal farmers. Under irrigation sector, an amount of Rs 86.08 lakhs has been spent for different irrigation schemes such as opening of new wells, renovation of old wells, deepening of old wells, supply of irrigation pumpsets and diesel engines, nala bunding, community and lift irrigation projects etc., covering 4,593 small and marginal farmers. The total subsidy provided for this sector during 1985-86 is Rs 68.18 lakhs. A sum of Rs 210.16 lakhs has been spent under animal husbandry sector for supply of cross-bred cows, graded buffaloes, sheep and goat units, supply of plough bullocks, carts, poultry and pig units, etc., benefiting 14,385 small and marginal farmers. The total outlay for this sector during 1985-86 was 247.16 lakhs of which, Rs 66.86 lakhs was provided as subsidy. Fifty-nine families have been assisted under fisheries sector through supply of fishing nets to fishermen by spending an amount of Rs 0.20 lakhs.

Western Ghats Development Programme

The Western Ghats Development Programme was initiated in Belgaum District during 1975 covering five taluks, viz, Khanapur, Belgaum, Sampgaon, Parasgad and Hukeri. Schemes from various sectors like agriculture, animal husbandry, horticulture, minor irrigation, etc., were taken up for implementation. During 1982-83, Rs 1.47 lakhs have been spent for various programmes like laying out demonstrations, supply of agricultural implements, rock phosphate, plant protection equipments, pulses and oilseeds at 25% subsidy, etc., and 562 demonstrations have been laid out and 25 farmers were trained under this scheme during 1982-83.

Drought Prone Area Programme

The Drought Prone Area Programme (DPAP) is in operation in the district since 1974-75 with an object to create permanent remunerative assets in the drought-affected area. This programme at present covers five taluks namely, Athani, Gokak, Raybag, Ramdurg and Parasgad. Raybag was one of the DPAP taluks since 1974-75 under Central sector and deleted from Central sector from April 1982. However, it is covered under State sector DPAP from 1983-84 with full State finance. Since 1984-85, DPAP works in Raybag taluk have been undertaken with 50 per cent Central assistance. An amount of Rs 780.50 lakhs has been spent since inception i.e. from 1974-75

upto the end of 1984-85 for various developmental works in the district. An area of 34,768 hectares has been covered under contour bunding, gully plugging, etc. In addition, an area of 67,740 and 43,513 hectares have been covered under improved farm practices of irrigation and of dry land farming respectively. About 10,534 tonnes of fertilizers and 28 farm implements have been supplied; 46 field days were conducted; 407 demonstrations were laid out in the farmers' fields; as many as 1,165 farmers were trained and five *nala* bunding works were completed. About 54.2 lakhs of subabul seedlings were raised and distributed free of charge. An amount of Rs. 99 lakhs has been spent on all these schemes. Under minor irrigation, 78 minor irrigation works with an *achkat* area of 6,929 hectares by utilising Rs 318.6 lakhs were completed. In addition, loans were advanced to 1,438 irrigation wells and 832 irrigation pumpsets. Under horticulture sector, five horticultural farms were established, 2,912 field demonstrations were conducted, 4.3 lakhs of fruit plants and 25 lakhs of vegetable seedlings have been distributed incurring an expenditure of Rs 31 lakhs. Under animal husbandry sector, 12 rural veterinary dispensaries, four artificial insemination centres, one semen bank and 23 frozen semen centres were established, incurring an expenditure of Rs. 56.6 lakhs. Under fisheries sector, a fish farm at Hidkal was established, water-spread area of 479 hectares has been developed in taluk-level nurseries and 313 fishermen were trained. Upto 1984-85, an amount of Rs 27.75 lakhs has been spent under this scheme.

Command Area Development Authority

A single Command Area Development Authority (CADA) was constituted by the Government in the year 1973 for the comprehensive development of the command area of Malaprabha and Ghataprabha Projects irrigating about 5.2 lakh hectares in 19 taluks of Dharwad, Belgaum and Bijapur districts. The Authority undertakes comprehensive and systematic development of Command Area of Malaprabha and Ghataprabha Projects.

The taluk-wise details of the ultimate irrigation potential (UIP), area notified (AN) and area irrigated in hectares during 1983-84 is as in page 288.

Name of the taluk	Malaprabha Project			Ghataprabha Project		
	UIP	AN	AI	UIP	AN	AI
Athani	—	—	—	4,209	4,505	3,827
Chikodi	—	—	—	23,067	3,859	3,671
Gokak	—	—	—	75,158	35,519	35,510
Hukeri	—	—	—	10,042	1,859	2,492
Parasgad	40,633	27,473	11,260	1,140	—	—
Raybag	—	—	—	43,863	31,274	32,445
Ramdurg	13,196	15,279	8,324	2,687	—	—
Sampgaon	10,014	5,827	3,255	—	—	—
Total	63,843	48,579	22,889	1,60,766	77,016	77,945

The details of amount allotted and expenditure incurred on various schemes are as follows :

	Central Sector	State Sector	World Food Programme	Total Rs in lakhs
1981-82				
Allotment	145.63	67.42	—	213.05
Expenditure	86.95	27.76	—	114.71
1982-83				
Allotment	215.30	73.06	53.37	341.73
Expenditure	185.47	35.57	53.37	274.42
1983-84				
Allotment	458.65	81.09	60.96	600.70
Expenditure	433.12	51.41	60.96	545.49
1984-85				
Allotment	580.67	41.50	154.00	776.17
Expenditure	544.08	42.03	154.00	740.11

The existing topography of the command area under both the projects is uneven. The land slopes generally vary from 0.6 to 3.0 per cent and above. Land development upto 1978-79 was left to

individual farmers and was not compulsory. Afterwards, systematic land development was enforced as per CADA Act 1980, by preparing plans and estimates on outlet basis duly followed by necessary statutory requirements.

Intensive Agricultural Area Programme

The Intensive Agricultural Area Programme was introduced in the district in 1966-67 with an objective of increasing overall agricultural production by adopting improved agricultural practices. Taluk-wise area covered by crops under this programme during 1984-85 is as follows :

Taluk	Area in hectares					
	Jowar	Paddy	Wheat	Millets	Others	Total
Athani	63,510	175	4,760	7,930	17,010	93,385
Belgaum	5,499	9,653	891	614	1,831	18,618
Chikodi	9,257	1,700	998	798	68	12,821
Gokak	32,073	423	3,635	2,473	6,013	44,617
Hukeri	2,195	2,014	430	1,683	—	6,322
Khanapur	177	13,512	65	342	2,681	16,777
Parasgad	22,468	200	4,100	5,078	30	31,876
Ramdurg	26,983	80	4,766	2,559	—	34,388
Raybag	3,720	175	1,273	120	5,019	10,307
Sampgaon	10,462	6,208	6,065	5,484	474	28,693
Total	1,76,344	34,140	26,983	27,111	33,226	2,97,804

High Yielding Varieties Programme

The High Yielding Varieties Programme was commenced in the district during 1966-67 to maximise agricultural production. Introduction of high-yielding varieties resulted in the consumption of more chemical fertilisers and substantial increase in the crop yields. The table on p 290 shows the taluk-wise area covered under high-yielding varieties of crops during 1984-85.

Taluk	Hybrid Jowar	Hybrid Maize	Hybrid Bajra	Mexican Wheat	Others	Total
Athani	3,780	4,420	4,100	5,570	—	17,870
Belgaum	5,993	516	—	1,294	18,188	25,991
Chikodi	18,745	2,280	55	1,823	535	23,438
Gokak	3,564	22,983	395	9,056	2,719	35,998
Hukeri	18,863	1,953	230	1,728	12,566	25,971
Khanapur	778	150	—	280	889	14,185
Parasgad	7,617	3,315	1,760	7,100	—	19,792
Ramdurg	833	5,180	937	2,717	—	9,667
Raybag	1,047	22,519	110	4,500	—	28,176
Sampgaon	16,619	236	35	2,158	3,591	22,638
Total	77,839	63,551	7,622	36,226	38,488	2,23,726

The percentage of area under high yielding varieties to gross area sown during the years from 1971-72 to 1981-82 is as follows : 4.4 in 1971-72, 4.2 in 1972-73, 5.9 in 1973-74, 8.4 in 1974-75, 11.3 in 1975-76, 11.2 in 1976-77, 16.0 in 1977-78, 15.6 in 1978-79, 16.6 in 1979-80, 17.5 in 1980-81 and 19.0 in 1981-82. In 1981-82, 5.7% of paddy fields, 23.8% of jowar fields and 14.2% of wheat growing area were brought under the Programme.

Developmental Programmes

A scheme for development of pulses is in operation in the district. The crops covered were tur (17,601 ha), greengram (14,494 ha), blackgram (4,017 ha), cowpea (8,057 ha), horsegram (29,556 ha), field bean (3,407 ha), bengalgram (31,576 ha) and other pulses (8,943 ha). Procurement and distribution of pulse seeds, free supply of rhizobium culture, supply of plant protection chemicals and equipments on subsidy basis, organisation of field days and demonstrations, etc., are being undertaken for development of pulses. In 1984-85, total area covered under pulses accounted to 1,17,581 hectares and an amount of Rs 27,446 was spent under this programme.

An Intensive Oilseed Development Programme was introduced in the district with the objective of stepping up production of oilseeds

by adopting improved agronomic practices. The crops covered were groundnut (1,13,739 ha), safflower (33,919 ha), sesamum (9,250 ha), niger (1,482 ha) and others (3,936 ha). Under this programme supply of minikits, demonstrations, supply of plant protection chemicals on subsidy basis, supply of gypsum for groundnut, supply of improved agricultural implements, etc., are being taken up and Rs 11.60 lakhs was spent for programmes during 1984-85. A Centrally-sponsored scheme for the Development of sunflower is in operation in the district. An amount of Rs 2.34 lakhs was spent under this programme during 1984-85 for training programmes, demonstrations fields days, etc., and the area covered under sunflower cultivation accounted to 26,068 ha.

An Intensive Cotton Development Programme is in operation in the district. Under this programme Rs 4.29 lakhs were spent during 1984-85 for organising demonstrations, supply of plant protection chemicals and equipments on subsidy basis, multiplication and distribution of cotton seeds, trials on pre-released varieties, foliar spray of nutrients, delinting of cotton, etc. An area of 29,966 ha under irrigated conditions and 15,680 ha under rain-fed conditions was covered under the cotton cultivation during 1984-85.

The Sugarcane Development Scheme aims to increase the cane yield through intensive cultivation and improved agricultural practices. The Scheme envisages the establishment of seed nursery, conducting demonstrations, varietal trials and organising crop competitions. Rs 32,000 was spent under this Scheme during 1984-85 and the area brought under sugarcane cultivation during 1984-85 was 41,930 ha.

Tobacco Development Scheme incurred an expenditure of Rs 39,321 during 1984-85 for nursery and composite demonstrations, varietal trials, training to farmers, supply of seeds free of cost to farmers and the area covered under tobacco cultivation during 1984-85 was about 25,000 hectares.

Multiple Cropping Scheme is in operation in the district. The objective of the scheme is to accelerate intensive cropping through multiple cropping to maximise production per unit of land in a year. Demonstrations on two crop sequence and three crop sequence were laid out in the farmers' field to popularise this scheme. Rs 2,963 were spent for this scheme during 1984-85.

Karnataka Pradesh Krishika Samaj: A district branch of the Bharat Krishika Samaj and Karnataka Krishika Samaj is functioning in the district with its branches in all the taluks. The main objectives of the Samaj are to study the problems of the farmers, to educate and train the farmers with the help of Government Departments and other agencies and to bring about improvements in the living standards of the farmers. There were 720 life members and 285 active members of the Samaj in the district. It has sent 18 farmers to foreign countries and 142 farmers inside the country under study tour programme. It has so far organised 26 field days, 36 seminars, exhibitions and field visits in the district. The district branch of the Samaj has conducted a conference of sugarcane growers and sugar manufacturers at Belgaum, in 1984.

Syndicate Agricultural Foundation: The Syndicate Agricultural Foundation was promoted by Syndicate Bank in 1966 to spread the new farm technology. It is also implementing Farm Clinic Project, a novel venture in rural development which aims at bringing about all-round development of each family in its area of operation. There were four Farm Clinics in Belgaum district at Jatrat (Chikodi taluk), Banajawada (Athani taluk), Nallanatti (Gokak taluk) and Bachanakeri (Belgaum taluk) during 1985. Each farm clinic covers one or a few villages and is linked to the nearest branch of the Syndicate Bank. Farm Information Exchange Clubs assisted by the Syndicate Agricultural Foundation provide a common forum to the farmers to come together. There are eight Farm Information Exchange Clubs in Belgaum District at Ramdurg, Gokak, Shirahatti, Nallanatti, Kittur, Nanganur, Kothali and Rakaskop. Future Farmers Clubs are established by the foundation with the objective of preparing the young students as the future farmers. All the activities of the club aim at spreading scientific knowledge of agriculture and allied activities to the students. There are Future Farmers Clubs at Kabbur, Chikodi, Sampgaon, Raybag, Satti, Ramdurg, Kallolli, Bailhongal, Saundatti, Shiraguppi, Kagawad, Akol, Ainapur, Devgaon, Itagi, Degavi, Modage, Jatrat, Belgundi, Athani, Ambewadi, Kurli, Marihal, Salahalli, Bhiridi and Bhendwad in Belgaum District.

Agriculture Extension Services

A comprehensive agricultural extension programme is being implemented through a dynamic training and visit system, briefly

known as T & V system, introduced in the district from 1978-79 with the assistance of World Bank under a project known as Agricultural Extension Project (AEP) and continued upto 1984-85. From 1985 onwards, the second phase of the programme known as National Agricultural Extension Project—Phase II (NAEP II) is implemented. The main plank of the system consists of mechanisms through which new technologies developed in the laboratories of the Agricultural Universities and Research Institutions are transferred on to the land for achieving increased productivity and stability. The system aims at extending the area under high yielding varieties, rendering technical service, for scientific soil and water management, propagation of crop and agronomic innovations and providing extension service in respect of farm inputs and dry land farming.

IRRIGATION

Irrigation was an inseparable part of agriculture in Ancient Karnataka and Nagavarma II, in his Kannada dictionary *Abhidana Vastukosha* (1042) speaks of two types of agricultural lands, *devamatrika* and *nadimatrika*, the former depending only upon rain water and the latter on irrigation. Inscriptions from Karnataka speak of irrigational tanks such as *kere*, *katte*, *kola*, *kunte*, *samudra*, *done*, *hakkarane* (*pushkarani*), etc. The Sanskrit encyclopaedia, *Manasollasa* classifies wells as *kupa* (one without an outlet), *vapi* (with one outlet) and *puskarani* (with many outlets), and calls a reservoir created by raising a bund across a river or a stream as *takaka*. Canals are spoken of in inscriptions as *kalu*, *kaluve* or *baykal*, sluices as *tubu* and bunds as *setu*. Vijnyaneshwara in *Mitakshara* lays down severe penalties for those who despoil or destroy various means of irrigation like bunds or canals. Sinking of wells and tanks were considered a meritorious act. Kings, queens, royal officials and the rich built tanks and other such water storages with the same devotion with which they built temples. On the request of a lay women, Sorigavundi (from Shirsangi) to her three sons that they should do something which brings her merit (*punya*), the brothers repaired a tank says a record of 1148. "By repairing the tank you have secured the merit of making *udakadana*" (or gift of water), the lady was told, and one *mattar* of black soil (*kariya keyi*) was set aside for meeting the expenses of its upkeep.

Some of the villages of the district derived their names in view

of the existence of water sources in that village. The name of the village Arabhavi in Gokak taluk speaks of a stone well at the place. The Kalmada village in Ramdurg taluk derived its name from a stone ditch (*madu*) holding water. Kerur's original name was Kereyur (village with tank) and Chikodi and Hirekodi speak of the existence of *kodi* (tank bund or stream), Kannumbarage (Kanbargi, Belgaum taluk) had a *heggere* or huge tank (1204). Telsang (Tilasanga, Athani taluk) had a *kallakere* or stone tank built by one Ketanna (1122). Saundatti had a Nagarakere. At Gudikatti one Dasuga built a tank (1051) and made a gift of land for its upkeep. A 13th century record from Mannikatti (Parasgad taluk) speaks of a grant of 12 *mattars* of land for the maintenance of the Monagere of the place. Similarly, for the Devagere at Tallur, Kathari Saluvarasa, perhaps a Seuna commander had made a land grant. Such instances are numerous. At Hooli, a public piccota (*dharma eta*) was installed at the well Nagavavi of the place in 1162. There must have been over 2,000 irrigation tanks in the district prior to the advent of the British. In 1938 itself their number was over 1,500. There were many irrigation wells too, and in recent times, Athani taluk leads the State in their number. A cess called *neerakooli* or *katte* or *kere* or *kaluve* was also levied in certain places for the upkeep of the irrigation facility.

Irrigation under the British

In the early days of British Administration, no special irrigational activities were taken up. The Government spent small sums, only to prevent the utter dilapidation of the irrigation works, indispensable to life.

Gokak Canal : In 1852, Sir G Wingate drew the attention of the Government to the necessity of taking up irrigational works. He opined that an irrigation project with headworks on the river Ghataprabha, four km above the Gokak Falls was capable of yielding a large supply of water for irrigation to the benefit of Gokak and Bagalkot taluks and native states of Mudhol and Jamkhandi. The Government appointed Col Scott to look into the suggestions made by Sir G Wingate. By 1854, Scott had surveyed the area and reported that the Gokak Canal Project would benefit the native states, more than the Government lands under the British. Thus, the "Scott Project" was placed in abeyance. From 1865 to 1873 two more project plans for the implementation of Gokak Canal were prepared but they did not materialise.

During 1876-78, severe drought conditions prevailed in the Deccan region and as a relief measure the Government decided to take up the works of Gokak Canal Scheme. It consisted of a masonry weir across the river Ghataprabha at Dhupdal. The branches of the canal were planned to traverse through the native States of Mudhol and Jamkhandi and Bagalkot taluk of Bijapur (Kaladgi) Collectorate. A site in Nandi village was selected for a storage tank. The canal head was at a great height and this natural elevation of the canal gave a large command area. The dam site contained large layers of hard rock. The digging of the head portion of the canal at the dam-site was a tough task. Between the years 1878 to 1885, a 800 strong gang of convicts were employed throughout the year to cut the canal at four km length. By February 1884, a portion of the land in between Ghataprabha river and its tributary Pamaldinni which included one thousand hectares of arable land was brought under irrigation. The total area commanded was about 1,650 sq km of which 95 sq km was in British territory and the remaining in the native States. The canal had a discharge capacity of 33 cubic metres per second at the head of the canal. The total estimate of the work was Rs 13,89,985. The canal project was completed on 31st March 1897.

Under British rule, the construction of new tanks were rare, but small sums were spent on the existing tanks which were useful for ordinary village life. The extent of irrigation was small and no general rules with respect to the repairs of wells and tanks were being observed. The beneficiaries had to make their contribution in proportion to the advantage they got. When the entire village was benefited, a general subscription was levied. Monetary aid was given to individuals who repaired old tanks. If the tanks were large, an officer distributed the water and received his salary in grain. The farmers helped themselves under the guidance of the village patel if the tanks were small. The amount spent to maintain or repair these tanks were paltry when compared to the revenue realised by irrigation. In the Belgaum Collectorate in the five years ending 1850-51, a total amount of Rs 3,811 had been spent on tanks and wells that gave an yearly average of Rs 762, while the revenue realised was Rs 12.50 lakhs. In 1881-82, besides wells, there were 1,055 irrigation works which included 663 reservoirs, 146 stream dips and 246 water courses. The total area under irrigation was 6,480 hectares out of which, 6,425 hectares were garden land and 55 hectares were rice land. There were 11,818 irrigation wells during 1881-82 (Chikodi-4,214 Belgaum-3,073, Athani-1,832, Gokak-1,028, Sampgoan-

905, Parasgad-766). From 1878 to 1882, there was a decrease in the total area irrigated because the lands were mortgaged to the money lenders by the famine stricken farmers and the money lenders were unwilling to invest on irrigation. In 1895, the list of tanks from which irrigation revenue derived was scrutinised and the tanks that would require excessive expenditure were abandoned. The remaining tanks were repaired.

The Gadikeri Tank at Mugut Khan Hubli was one of the old tanks of the district. The work of this tank began during 1877 and completed in 1878. It had two waste weirs. The estimated cost was Rs 16,163. The command area was 180 hectares and the catchment area was 12 sq km. An irrigation cess of Rs 12 per hectare for rice lands and Rs 24 on garden land was levied. The total assessment amount was Rs 2,252.

There were 19,011 wells and 1,534 tanks in the Belgaum Collectorate during 1938-39. The total area under government canals was 4,314 hectares, private canals 987 hectares, wells 19,002 hectares, tanks 5,107 hectares and other sources 1,355 hectares during the year 1938-39.

Irrigation after Independence

During the successive Five Year Plans from 1951, the Ghataprabha stage I & II and Malaprabha projects were taken up. A number of minor irrigation projects were also taken up and completed. The percentage of net area irrigated to the net area sown in the district during 1956-57 was 4.88 whereas during 1983-84, it increased to 20.57. The percentage of net area irrigated by different sources of irrigation for the year 1983-84 was, canals 37.89, tanks 4.69, wells 35.5 and other sources 21.9 (total 20.57 of the net area sown).

Malaprabha Project

The Malaprabha Reservoir Project consists of a storage reservoir constructed across the river Malaprabha at Navilu Teertha near Manoli in Parasgad taluk with a canal system on both the banks to provide irrigation over an area of 2.18 lakh hectares in Dharwad, Belgaum and Bijapur districts. It has a gravity masonry dam with central spillway. The length of the dam is 155 metres and height is 44.8 metres. The gross storage capacity is 37.7 TMC and utilisation is 46 TMC. An area of 13,034 hectares was submerged. The

work of the project was started during 1963 and completed in 1974.

The Malaprabha left bank canal passes through tunnels at Katkol and Mudakavi and extends to a distance of 168 km. The Yergatti lift irrigation scheme and Manoli branch canal of the length of 23 km comes under left bank canal. The total irrigable command of Malaprabha left bank is 53,134 hectares. The Malaprabha right bank canal of the length of 138 km takes off from the head regulator constructed in the right bank fore-shore of reservoir and cuts through the Yellamma range of hills by a five km long tunnel. At its tenth km reach, Nargund branch canal of the length of 42 km takes off. The irrigable area under the right bank main canal and Nargund branch canal is 1,28,628 hectares. A right bank canal of the length of 64 km which takes off from the Kolachi weir lower down the Malaprabha dam-site had an irrigable area of 8,094 hectares. Apart from this, from the foreshore of the reservoir on both the banks, eight lift irrigation schemes have been constructed to irrigate an area of 23,359 hectares of land. These schemes provide irrigation facilities to the ryots affected by the project. The cost of project as per 1983-84 estimates was Rs 274.57 crores. The total cumulative potential created to the end of March 1986 was 1,34,810 ha.

The taluk-wise details of area actually irrigated during 1985-86 in the district of Belgaum, is as follows: Sampgaon 6,654 ha, Ramdurg 19,484 ha, and Parasgad 36,978 ha. Twenty-one villages of Parasgad taluk, 19 villages of Sampgaon taluk and two villages of Khanapur taluk were fully submerged and 30 villages (of Parasgad 13, Sampgaon 14, Khanapur taluk 3) were partly submerged. In all, 8,975 families have been rehabilitated upto the end of March 1984 in 33 centres (Parasgad taluk 12, Sampgaon taluk 18, Khanapur taluk 1 and Haliyal taluk 2). The displaced families of 35 villages have already been shifted to Rehabilitation Centres and families of seven villages are yet to be shifted.

Ghataprabha Project

The Ghataprabha Valley Development Scheme was approved in April 1949 by the former Bombay State Government. The entire scheme as conceived now consists of the following components to provide irrigation over an area of 3.18 lakh hectares in Bijapur and Belgaum districts.

Stage I: A storage dam at Hidkal with a storage capacity of 51.16 TMC. *Stage II:* Construction of Left Bank Canal taking off from Dhupdal weir for a length of 116 km to command an irrigable area of 1.62 lakh hectares ultimately when lining is completed. *Stage III:* Ghataprabha Right Bank Canal for a length of 202 km and Chikodi branch canal of 86 km length and to provide foreshore lift irrigation from the Chikodi branch canal. The storage reservoir has been formed by construction of 4,480 metres long and 53.34 metres high composite dam with masonry spillway and non-spillway section rockfill dam and earth dam on either banks. In addition, two dykes of 5,184 metres and 518.16 meters length have been plugged with the dam. The gross storage capacity is 51 TMC and utilisation is 78.27 TMC. The total area of submersion is 6,337 hectares. The overall cost of the Ghataprabha Valley Development Scheme is Rs 157.90 crores. The cost of irrigation per hectare works out to Rs 7,783. The Hidkal storage dam was officially commissioned on 11-2-1984.

The Ghataprabha left bank canal taking off from Dhupdal weir runs for a length of 116 km. This canal when lining is completed will bring an area of 1.62 lakh hectares under irrigation. The Ghataprabha right bank canal takes off from the right bank of Hidkal dam and runs for a length of 202 km. It negotiates six km long tunnel at Kodabatti and through an aqueduct above the Markandeya river. The Chikodi branch canal is the first branch on the Ghataprabha right bank canal. It takes off from the link canal down-stream of Hidkal dam and crosses Ghataprabha river through an aqueduct. Further, it crosses Hiranyakeshi through an aqueduct and negotiates a ridge near Kabbur village through 3.2 km long tunnel. The total length of Chikodi branch canal is 86 km. Lift irrigation schemes are under various stages of completion under the Chikodi branch canal. Ghataprabha right bank including Chikodi branch canal commands an overall irrigable area of 1.56 lakh hectares. The cumulative irrigation potential created under the Ghataprabha as on 31-3-1986 was 1,61,563 ha incurring an expenditure of Rs 134.10 crores. The taluk-wise details of area (provisional) irrigated by the Ghataprabha Project during the year 1985-86 in the district is as follows: Athani 4,549 ha, Chikodi 7,763 ha, Gokak 32,945 ha, Hukeri 7,440 ha and Raybag 32,542 ha.

Nineteen villages of Hukeri taluk were fully submerged by the dam at Hidkal and three villages (Hukeri 2 and Belgaum 1) are

partially submerged. A total of 3,728 families have been rehabilitated in 22 centres, established in Hukeri (12), Belgaum (4), Khanapur (3), Gokak (2) and Dharwad (1) taluks.

Warabandi: Warabandi aims at equal distribution of water in proportion to their holdings. This principle leads to the adoption of more efficient practices by the farmers. Socially, it stands for equitable distribution of water to the largest number of farmers in the command area. Economically, this results in the greatest overall production per unit of the available water, though not necessarily to the highest per cent of land. In this system, a cultivator is the master of his water budget and is at liberty to decide his own cropping pattern so long as he can manage to remain within the constraints of the water-right allocated to his holdings. In a lean year, the hardship is shared by all and is not confined to those near the end or to those who are otherwise less influential. This system was first introduced during the year 1982-83 in the command area of Malaprabha and Ghataprabha projects, in an area of 6,300 hectares. During the year 1983-84, it was programmed to introduce *warabandi* in 8,000 hectares. It is implemented through outlet committees, consisting of farmers' representatives and one representative each from C A D A, Irrigation Department and Agricultural Department.

Proposed Projects

The Harinala Project (medium project), envisages construction of a storage reservoir across Harinala river, a tributary of Malaprabha at Tigadi village in Sampgaon taluk. It consists of an earthen dam with masonry waste weir on the flank. The length of the dam is 2,880 metres and height is 19.5 metres. The storage capacity is 15 million cubic metres. The area of submersion is 458 hectares. It has two canals on either side of the dam; the left bank canal runs for about 12 km and the right bank canal for about 16 km commanding a total area of 4,360 hectares. The cost of the project is Rs 243 lakhs. Only one village got submerged on completion of the reservoir.

The Dudhganga Project: It is an inter-state multi-purpose project between Maharashtra and Karnataka (estimated cost Rs 136 crores). When completed, it will irrigate 19,440 hectares of land in Chikodi taluk. Survey work has been completed.

Hippargi Barrage at Hippargi village in Jamkhandi taluk of Bijapur district, when completed irrigates part of Athani and Chikodi taluks of Belgaum district.

Minor Irrigation Works

Minor irrigation projects are taken up under three types of schemes viz, State Plan Schemes, Drought Prone Area Programme (DPAP) and Integrated Development of Western Ghat region. Assistance from the Centre is available at 50 per cent for DPAP and 100 per cent for the programmes under Integrated Development of Western Ghat Region. During 1969-70, nine minor irrigation projects with large command area existed in the district with their *atchkat* in hectares given in brackets: 1) Kaslatti bhandara near Ajur in Athani taluk (674), 2) Bhandara between Gajapati and Ankalgi (445) in Belgaum taluk, 3) Siddasamudra tank (608) in Sampgaon taluk, 4) Sadalga Bhandara across Dudhganga river (607) in Chikodi taluk, 5) Bhandara near Mamadapur (1,377) in Gokak, 6) Weir across Malaprabha river near Kudachi (1,275) in Raybag taluk, 7) Bhandaras at Chachadi (648) and 8) Hosur (474) in Parasgad taluk and 9) Bhandara between Bendigeri and Gajapati (993) in Belgaum taluk. During 1972-73, there were 585 tanks with an *atchkat* of 20,005 hectares and 106 other sources of irrigation with an *atchkat* of 13,400 hectares in the district. There were 686 tanks (*atchkat* 29,212 hectares), 20 lift irrigation schemes (*atchkat* 7,839 hectares), 116 bhandaras (*atchkat* 10,632 hectares) and 60 other minor irrigation works (*atchkat* 14,245 hectares) during 1983. In 1972-73, there were 361 small tanks maintained by the Taluk Development Boards and this number was reduced to 138 during 1985 (Belgaum 45, Khanapur 59, Sampgaon 34, and remaining taluks nil). A statement showing taluk-wise minor irrigation facilities available in the district during 1983 is appended on p 301.

At present, six World Bank Aid Projects have been taken up with total estimated cost of Rs 358.89 lakhs. The irrigation potential to be created is 176.3 hectares. They are 1) Bidi Tank Project and 2) Hebbal Tank Project in Khanapur taluk, 3) Kadasgatti Tank Project in Hukeri taluk, 4) Yellammawadi Tank and 5) Madabhavi Tank Project in Athani taluk. A sum of Rs 55.75 lakhs have already been spent on these projects upto March 1985. Also 35 minor irrigation schemes are under progress at a total estimated cost of Rs 2 crores. This includes six community irrigation

Taluk-wise Minor Irrigation facilities (capacity) in Belgaum district as on 1-4-1983 (Atchkat in hectares)

Taluk	Tanks		L I Schemes		Bhandaras		Other M I Works		All sources	
	No.	Atchkat	No.	Atchkat	No.	Atchkat	No.	Atchkat	No.	Atchkat
Athani	32	3,466	2	1,555	5	2,167	8	6,600	47	13,788
Belgaum	143	4,203	4	930	41	2,474	8	818	194	8,425
Chikodi	28	1,604	3	1,075	17	448	20	4,149	68	7,276
Gokak	12	663	4	1,508	9	2,855	2	89	27	5,115
Hukeri	17	2,295	1	402	19	1,061	6	1,509	43	5,325
Khanapur	231	6,887	2	981	14	777	10	843	257	9,488
Parasgad	14	1,819	—	—	3	387	—	—	17	2,278
Ramdurg	20	2,002	3	1,109	4	417	—	—	27	3,528
Raybag	32	1,610	—	—	—	—	—	—	32	1,610
Samppgaon	159	4,591	1	219	4	46	6	239	170	5,095
Total	688	29,212	20	7,839	116	10,632	60	14,245	884	61,928

Note :—Bhandaras are included under other Minor Irrigation works.

Statement showing the taluk-wise gross area actually irrigated by different sources for the year 1983-84

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(in hectares)

<i>Taluk</i>	<i>By Govt canals</i>	<i>By tanks</i>	<i>By wells</i>	<i>By borewells</i>	<i>By lift irrigation</i>	<i>Any other sources (including Bhandaras)</i>
Athani	999	678	15,416	3	5,233	7,341
Belgaum	—	1,689	3,685	17	195	1,240
Chikodi	1,728	90	12,088	4	307	5,602
Gokak	24,737	—	9,785	2	652	3,440
Hukeri	728	89	6,413	67	304	871
Khanapur	—	3,355	1,514	—	198	2,988
Parasgad	17,252	387	1,839	40	6,633	—
Ramdurg	10,751	383	3,371	16	640	1,260
Raybag	24,752	251	13,463	9	2,447	1,686
Sampgaon	—	2,087	4,252	374	3,938	837
Total	80,847	9,014	71,826	532	20,547	25,265

Source : District Statistical Officer, Belgaum.

wells taken up in the district under Ganga Kalyana Scheme (Athani 2, Belgaum 2, Gokak 1 and Parasgad 1). The irrigation wells census of 1972 revealed that there were 42,091 irrigational wells in the district and Athani taluk was having the highest number of irrigation wells among the taluks in the State. As on 1-1-84, there were 11,147 irrigation wells in Athani, 3,140 in Sampgaon, 4,313 in Belgaum, 9,403 in Chikodi, 7,380 in Gokak, 6,647 in Hukeri, 7,294 in Raybag, 477 in Khanapur, 1,308 in Parasgad and 1,620 in Ramdurg taluk. A statement showing the taluk-wise gross area irrigated by different sources of irrigation for the year 1983-84 is on p 302.

Irrigation Act and Rules : The Karnataka Irrigation Act 1965 and the Irrigation Rules framed thereunder in 1965 are comprehensive and highlight State control over irrigation management. The State Government has the power to order that no irrigation work shall be constructed, controlled or maintained by a person without the previous sanction of the State Government. Most offences in connection with irrigation works are cognisable.

HORTICULTURE

Horticulture crops occupied an area of about 33,000 ha in the district covering 2.45% of the total geographical area (1983-84). The soil and climatic conditions are well suited for horticultural crops in the district. In the Malnad tract comprising of Belgaum, Khanapur and the western parts of Hukeri and Sampgaon taluks, the main horticultural crops like pineapple, banana, mango and vegetable crops like cole crops, potato, sweet potato, etc., are grown. The Gadinad tract comprises of eastern portion of Sampgaon and Hukeri taluks, Chikodi and western parts of Gokak and Raybag taluks. Horticultural crops viz., chillies, banana, mango, sapota, lime, grapes and other vegetables are grown. The Yerenad belt comprises of eastern parts of Gokak, Raybag, Athani, Parasgad and Ramdurg taluks. Principle horticultural crops like banana, lime, mango, grapes, etc., and vegetables like chillies, onion, sweet potato, etc., are grown.

Office of the Department of Horticulture in the district commenced during 1960. The Department has established 20 horticultural farms and eight nurseries covering all the taluks to educate the cultivators in the cultivation of horticultural crops. There are two

societies which are taking up the marketing of horticultural crops namely, Gardeners Co-operative Society, Belgaum and District Horticultural Produce Growers Marketing and Processing Society Limited, Belgaum. There is one preservation centre established at Hudali, Belgaum taluk for processing and preservation of horticultural produce on a co-operative basis and one more Preservation Centre at Belgundi in Belgaum taluk is established under private sector which undertakes preservation of mango. The area under different horticultural crops grown in the district as in 1983-84 are given in hectare: Mango 1,692, Banana 1,663, Sapota 853, Citrus 725, Pineapple 494, Guava 467, Papaya 442, Potato 3,040, Tomato 1,959, Brinjal 1,704, Cole crops 2,072, Beans 986, Leafy vegetables 1,107, Gourd varieties 875, Chrysanthemum 45, Bhendi 614, Radish 460, Carrot 538, Sweet potato 533, Capsicum 580, Coriander 394, Coconut 2,416, Cashewnut 1,912, Chillies 8,147, Onion 1,557, Garlic 357, Tamarind 826, Roses 67 and Marigold 69. Area in hectares and production in tonnes in the district, taluk-wise is in table on p 305.

Agricultural Refinance and Development Corporation

Most of the horticultural crops are perennial in nature with long gestation periods and begin bearing usually after 8-10 years. So, growers have to invest without returns for such long periods on horticultural crops. In order to overcome this problem, long term refinance facilities from Agricultural Refinance and Development Corporation have been made available to growers and channelled through State Co-operative Agriculture and Rural Development Bank for crops like coconut, betelvine and grapes in Belgaum district since 1973. The amount of loan disbursed from 1973 to 1985 for coconut was Rs 11.48 lakhs, betel-vine about Rs 8 lakhs and grape about Rs 26.32 lakhs. The area covered in hectares and the number of beneficiaries are 292.18 hectares and 271 under the Coconut Refinance Scheme, 35.89 hectares and 115 in the Betelvine Refinance Scheme and 58.47 hectares and 144 in Grape Refinance Scheme since 1973.

Farms and Nurseries: The multipurpose horticultural farms are started to create awareness in horticultural crops, to educate the nutritive value of horticultural products, to ease out food situation, to identify mother plants suitable to the district, to propagate the genuine planting materials of all horticultural crops, to cater to the needs of cultivators and to serve as visual demonstration plots

Area and Production of Horticultural Crops - (Area in hectares and Production in tonnes) - 1984-85

BDG-20

Name of the taluk	Fruit crops		Vegetable crops		Commercial flowers		Plantation & spices		Total	
	Area	Prod.	Area	Prod.	Area	Prod.	Area	Prod.	Area	Prod.
Athani	644	10,200	345	3,450	18	55	920	4,560	1,947	18,265
Belgaum	857	10,070	6,745	67,450	75	225	1,850	3,750	9,507	81,495
Chikodi	384	6,950	565	5,650	4	12	2,778	4,370	3,731	16,982
Gokak	994	21,800	1,120	11,200	50	150	1,450	5,125	3,614	38,275
Hukeri	570	10,125	1,050	10,500	28	84	2,150	5,640	3,798	26,349
Khanapur	1,054	4,850	675	6,750	28	84	2,125	2,275	3,882	13,959
Parasgad	928	12,400	625	6,250	21	63	870	3,580	2,444	22,293
Ramdurg	719	17,100	915	9,150	26	60	1,659	8,460	3,304	34,770
Raybag	313	11,750	510	5,100	2	6	2,200	6,500	3,015	23,356
Sampgaon	718	12,720	2,020	20,200	34	102	2,510	6,570	5,282	39,592
Total	7,181	1,17,965	14,570	1,45,700	286	841	18,512	50,830	40,524	3,15,336

BELGAUM DISTRICT

to educate the cultivators regarding improved cultivation practices. The list of horticultural farms and nurseries with their year of starting, extent in hectares and important crops are given here under.

Horticultural Farms and Nurseries in the District

<i>Horticultural farm at</i>	<i>Year of starting</i>	<i>Area in hectares</i>	<i>Important crops</i>
1	2	3	4
Gundewadi	1968-69	30-00	Mango, Sapota, Coconut, Lime, Pomegranate
Murughendra Park Athani	1971-72	00-83	Coconut, Passion fruit, Sapota
Chikodi	1969-70	01-60	Guava, Lime, Papaya, Sapota, Mango
Office Nursery Hukeri	1973-74	00-10	Coconut
Coconut Progeny Orchard, Hidkal*	1971-72	26-00	Coconut
Hidkal*	1967-68	01-60	Guava, Sapota, Coconut, Pomegranate
Dyke II, Hidkal*	1973-74	11-20	Guava, Sapota, Mango, Coconut, Pomegranate
Dyke I, Hidkal*	1976-77	16-00	Cashew
T C Labour Camp, Hidkal	1977-78	64-00	Grapes
Mekali, Raybag taluk	1977-78	18-21	Mango, Custard-apple, Fig, Sapota, Pomegranate
Naslapur	1977-78	07-60	
Kittur, Bailhongal	1966-67	03-20	Guava, Coconut, Sapota, Mango, Champak
Horticultural Nursery, Bailhongal	1967-68	00-01	Coconut, Ornamental plants
Dhupdal Farm, Gokak*	1974-75	23-60	Custard-apple, Guava, Sapota, Mango, Coconut, Cashew, Jambuline

1	2	3	4
Horticultural Nursery, Gokak	1973-74	00-20	Coconut, Mango, Sapota
Office Nursery, Ramdurg	1968-69	00-95	Coconut, Tube rose
Shivapeth	1975-76	04-60	Coconut
Yakkeri	1968-69	06-00	Mango, Coconut, Lime, Sapota, Guava
Office Nursery, Saundatti	1969-70	00-10	Coconut, Sapota, Guava
Ugargol*	1973-74	02-60	Grapes, Coconut, Lime, Sapota, Pomegranate
Kurvinkoppa*	1973-74	12-00	Coconut, Guava, Pomegranate, Papaya, Lime
Manoli*	1976-77	12-00	Mango, Sapota, Coconut
Laxmithek Farm, Belgaum	1962-63	05-20	Mango, Guava, Coconut, Sapota, Pomegranate
Hulme Park, Belgaum	1976-77	00-80	Ornamental plants
District Nursery, Belgaum	NA	00-40	Mango, Lime
Office Nursery, Khanapur	NA	00-01	Ornamental plants
Ramanagar, Khanapur taluk	1977-78	10-00	Cacao, Pepper, Nutmeg, Cinnamon
Shedagalli, Khanapur taluk	1963-64	13-60	Mango, Sapota, Cashew, Guava, Orange, Lime

*Maintained by the CADA

Development Programmes

The Coconut Development Scheme, started in the district during 1966-67 has an object to produce and distribute quality coconut seedlings to the needy cultivators by raising them in departmental nurseries. During 1984-85, about 57,000 seedlings were distributed to needy farmers. There is a scheme for development of Banana and

Pineapple in the district to increase the area under these crops by laying out demonstrations, trial plots, etc. *The Scheme for Development of Fruits* was started in the district in the year 1956 with an object of increasing the area under fruit crops by providing the recommended varieties of fruit crops and rendering technical know-how to the needy cultivators. Under this scheme, 36,000 quality fruit seedlings were distributed to the needy farmers during 1984-85. There is also a scheme for package programme on mango. The Department of Horticulture is implementing the scheme for processing, preservation and utilisation of fruits and vegetables with an objective of rendering training to the public including housewives on various methods of fruit and vegetable preservation. *The Scheme for Development of Vegetables* initiated during 1963-64 aims to increase the area under different vegetable crops and to create marketing facilities and educate the farmers. The scheme for cultivation of vegetable crops in the river beds, tank beds and after paddy harvest was sanctioned in 1964-65. There is also a scheme for intensive cultivation of vegetables and quick growing fruits in Belgaum city started in 1964-65. Under this programme, many kitchen gardens and institutional gardens have come up in the district. For the production of genuine vegetable seeds in sufficient quantity, vegetable seed farms are established wherein vegetable seed production is being taken up in a scientific manner. During 1984-85, 550 kg of different vegetable seeds were produced. With the objective of popularising the cultivation of commercial flowers, there is a scheme for cultivation of commercial flowers, in Belgaum. Demonstrations of crossandra, tube rose, aster and chrysanthemum flowers are being organised under this scheme. *The Scheme for Package of Practices on Cashew* was introduced during 1968-69 for encouraging the public to increase the area under cashew. The Department is raising quality cashew seedlings that are sold later. There is a Centrally-sponsored scheme for package programme for development of cashewnut. During 1983-84, 25 manurial demonstrations in cashewnut were laid out and continued during 1984-85 also. There is also a scheme for environmental improvement in hospital gardens and other places. *The Drought Prone Area Programme* was introduced in the district in 1974-75 and five horticulture farms were started accordingly.

Gardens and Parks : Department of Horticulture has maintained two parks, one at Belgaum and other at Athani. Hulme Park is located at Divisional Commissioner's Bungalow in Belgaum and

has an area of 0.8 guntas (1976). The Murugendra Park (1971) is located near Athani, KSRTC Bus Stand and has an area of 0.83 guntas.

ANIMAL HUSBANDRY

The livestock of Belgaum district is considerable. The livestock population excluding poultry works out to about 1,800 per 1,000 hectares of net sown area and pastures and grazing land (1983). Dairy development is gradually gathering momentum in the district. Fodder development needs particular attention. The large livestock population also offers ample scope for setting up of tanneries and bonemeal units. Belgaum is well suited for commercial exploitation of poultry. The main objectives of the Department of Animal Husbandry and Veterinary Services are health coverage of domestic animals against contagious and non-contagious diseases, management, nutrition and breeding of livestock for better production, dairy development for the production, procurement and marketing of milk and socio-economic programmes to help the poorest of the poor to cross the poverty line.

Breeds

Important breeds of cows in the district are the Khillari, Amritmahal and the Krishna valley. Other breeds like the cross Khillari, cross Hallikar, cross-bred Holstein and the Jersey cross and local breeds are also noticed in the district. The Khillari breed is a derivative of Amritmahal but is not so compact or fine in quality. It is a well known draught breed, very hardy and enduring, suitable for field and fast road work. The cows are poor milkers. This breed is mostly noticed in Athani, parts of Raybag and Gokak taluks. The Krishna valley breed bullocks are very powerful animals, useful for slow draught or heavy plough in black cotton soil and the cows are fair milkers. They have a long massive frame with deep broad chest, the short powerful neck and straight limbs. The Amritmahal breed is very active, well-known for its endurance. They are found in Sampgaon and Paragad taluks. Bullocks are specially suited for trotting and quick transport. This breed is generally poor in milk yields. The graded buffalo breeds, namely, Surti and Pandharpuri are existing in the district. Surti breed is medium sized well shaped with straight back, sickle shaped horns and are economic milk producers.

Livestock population

There is a fairly good number of livestock population in the district. The bovine population in the district per sq km was 70 in 1972, 74 in 1977 and 79 in 1983. The number of working bovines in rural area per 100 hectares of gross area sown was 29 in 1972, 30 in 1977 and 28.7 in 1983. The bovine population per 1,000 human population was 378 in 1972, 355 in 1977 and 354 in 1983. The number of cows in milk per lakh of human population was 2,825 in 1972, 2,624 in 1977 and 2,510 in 1983. The number of she-buffaloes in milk per lakh of human population was 6,338 in 1972, 5,695 in 1977 and 5,740 in 1983. Belgaum stands first in Karnataka in buffaloes population, the total being 5,30,836 in 1983. The number of sheep per lakh of human population was 16,927 in 1972, 15,985 in 1977 and 15,368 in 1983. The number of goats per lakh of human population was 14,346 in 1972, 13,215 in 1977 and 13,446 in 1983. The number of pigs per lakh of human population was 586 in 1972, 570 in 1977 and 537 in 1983. The number of fowls per lakh of human population was 25,680 in 1972, 21,305 in 1977 and 21,069 in 1983. The table in p 311 gives the taluk-wise livestock population as per 1983 livestock census.

The percentage increase or decrease in cattle, buffaloes, sheep, goat and poultry is shown below :

	1956 over 1951	1961 over 1956	1966 over 1961	1972 over 1966	1977 over 1972	1983 over 1977
Cattle	+ 6.98	+ 13.09	- 4.38	+ 5.81	+ 4.89	+ 2.4
Buffaloes	+ 8.99	+ 17.12	+ 1.30	+ 18.39	+ 7.89	+ 9.6
Sheep	+ 5.77	+ 17.14	+ 21.29	+ 7.18	+ 0.66	+ 1.9
Goats	- 3.69	+ 35.06	+ 0.55	+ 45.66	+ 4.03	+ 7.9
Poultry	+ 39.95	+ 21.89	+ 28.57	+ 21.55	- 6.06	+ 4.53

Veterinary Institutions

The first veterinary dispensary in the district was started at Belgaum in 1892 and it was upgraded as Hospital in 1909. Bailhongal had a dispensary in 1909 followed by Athani in 1910, Saundatti in 1914 and Gokak in 1921. During 1985, there were one veterinary hospital at Belgaum and 28 veterinary dispensaries at Athani, Shedbal,

Livestock Census 1983

<i>Name of the taluk</i>	<i>Cattle</i>	<i>Buffaloes</i>	<i>Sheep</i>	<i>Goats</i>	<i>Pigs</i>	<i>Other* livestock</i>	<i>Total livestock</i>	<i>Total poultry</i>
Athani	68,814	58,179	35,333	62,968	1,245	15,650	2,42,189	66,340
Belgaum	57,342	63,742	26,085	18,070	744	10,186	1,76,169	84,458
Chikodi	41,829	80,277	1,30,459	51,381	2,699	15,499	3,22,144	53,799
Gokak	61,699	58,313	52,347	64,606	4,698	12,784	2,54,447	94,169
Hukeri	35,736	57,971	38,889	40,067	1,961	9,183	1,83,807	47,642
Khanapur	67,197	27,243	1,238	14,977	844	7,220	1,18,719	71,868
Parasgad	74,862	37,667	55,666	41,720	1,565	5,660	2,19,986	57,194
Ramdurg	48,867	21,377	44,826	41,068	913	13,939	1,62,711	35,498
Raybag	42,384	48,202	55,636	45,870	982	8,506	2,07,013	68,256
Sampgaon	55,444	48,528	17,502	19,967	340	5,915	1,47,696	48,645
Total	5,54,174	5,01,499	4,57,981	4,00,694	15,991	1,04,542	20,34,881	6,27,869

*Included dogs, horses and asses.

Ainapur and Aigali (Athani taluk), Bailhongal, Kittur, Nesargi and Sampgaon (Sampgaon taluk), Sambre and Hirebagewadi (Belgaum taluk), Chikodi, Nipani, Galatga and Ankali (Chikodi taluk), Gokak, Mudalgi and Yadwad (Gokak taluk), Hukeri and Sankeswar (Hukeri taluk), Khanapur and Nandgad (Khanapur taluk), Raybag (Raybag taluk), Ramdurg and Katakol (Ramdurg taluk), Saundatti, Murgod, Manoli and Hirekumbi (Parasgad taluk), 37 Rural Veterinary Dispensaries at Shirguppi, Sambaragi, Telsang, Gundewadi and Kakmari (Athani taluk), Belwadi, Neginhal, Dodwad and Hunshikatti (Sampgaon taluk), Nandihalli, Hudali and Santibastwad (Belgaum taluk), Sadalga, Kurli and Borgaon (Chikodi taluk), Ankalgi, Mamadapur, Konnur, Sunadhali, Tavag, Kallolli, Ghataprabha, Makkageri and Kuligod (Gokak taluk), Mugalkhod, Bhendwad and Mekhali (Raybag taluk), Sureban, Hosakoti, Hulkund and Mudakavi (Ramdurg taluk), Yaragatti, Chachadi, Chikkumbi, Yakkundi, Kadabi and Akkisagar (Parasgad taluk), 14 Veterinary Aid Centres at Satti, Ananthapur and Madabhavi (Athani taluk), Koujalagi and Khanagaon (Gokak taluk), Bellada Bagewadi, Pachapur, Yamakanmardi and Daddi (Hukeri taluk), Harugeri (Raybag taluk), Khodanpur (Sampgaon taluk), Bhatakurki (Ramdurg taluk), Itagi and Jamboti (Khanapur taluk) and 11 Artificial Insemination Sub-Centres at Bidi, Parishwad, Halashi, Londa and Kakkeri (Khanapur taluk), Chinchali, Kankanwadi and Raybag (Raybag taluk), Mullur and Chandargi (Ramdurg taluk), Belgaum (Belgaum taluk). There are also five Mobile Veterinary Clinics at Athani, Gokak, Khanapur, Ramdurg and Saundatti, six Key Village Scheme Sub-Centres at Kanagale, Kochari, Hebbal, Gudas, Yadgud and Hattargi (Hukeri taluk) with Key Village Scheme main Centre at Hukeri. The number of heads of livestock per veterinary institution were 35,837 in 1966, 31,563 in 1972, 26,301 in 1977 and 13,314 in 1983. There were 37 veterinary institutions in 1961, 46 in 1970, 70 in 1977 and 103 veterinary institutions during 1985.

Animal Diseases

The common diseases of livestock in the district are haemorrhagic septicaemia, black quarter, rinder pest, foot and mouth disease, sheep pox and other contagious diseases. The number of outbreaks of haemorrhagic septicaemia was 35 in 1982-83, 53 in 1983-84 and 27 in 1984-85; black quarter was 41 in 1982-83, 62 in 1983-84 and 18 in 1984-85; foot and mouth is 38 in 1983-84 and 136 in 1984-85. The number of cases treated in various veterinary institutions in

the district during 1981-82, 1982-83, 1983-84 and 1984-85 were as follows.

<i>Treatment</i>	<i>1981-82</i>	<i>1982-83</i>	<i>1983-84</i>	<i>1984-85</i>
<i>Disease-wise treatment</i>				
Digestive	1,38,844	1,09,629	1,09,332	NA
Respiratory	2,995	2,436	2,429	NA
Reproductive	14,982	12,181	12,148	NA
Circulatory	56,932	46,288	46,163	NA
Urinary	2,996	2,436	2,429	NA
General	86,896	70,650	70,459	NA
<i>Animal-wise treatment</i>				
Bovine	2,45,772	1,98,666	1,95,088	NA
Equine	914	724	790	NA
Others	53,169	44,235	46,919	NA
Number of In-patients & Out-patients treated	2,99,647	2,81,779	2,84,042	3,21,101
Castrations	23,232	24,461	21,347	24,323
Artificial inseminations	38,842	46,479	50,158	51,038
Surgical operations	1,126	991	984	1,215
Inoculations	4,14,018	3,50,887	3,96,931	5,14,430
Births due to artificial inseminations	3,220	5,950	9,694	6,557

<i>Diseases</i>	<i>Number of Inoculations</i>		
	<i>1982-82</i>	<i>1983-84</i>	<i>1984-85</i>
1	2	3	4
Black quarter	94,776	78,668	74,779
Haemorrhagic septicaemia	1,06,896	1,31,304	1,00,088
Fowl pox	1,566	—	—
Sheep pox	1,590	630	139

1	2	3	4
Rani khet	14,886	17,704	56,844
Rinder pest	72,499	1,38,749	3,16,375
Rabies	512	704	622
Foot and mouth	7,771	10,869	18,282
Enterotoxamia	49,601	34,106	47,301
No. of sheep dosing	97,738	78,300	83,185

Rinderpest is a very serious contagious disease. Rinderpest eradication scheme constitutes a normal programme organised on All-India basis in order to wipe out this disease. The Department is having one check post at Kagwad since 1976 and one vigilance unit at Belgaum. Now, this scheme has been remodelled to control the outbreaks of Rinderpest. Prophylactic mass vaccination campaign against the disease is taken up vigorously and 12,049 vaccinations are done against Rinderpest at Kagwad since 1976, which is situated on the boundary line between Karnataka and Maharashtra. The Clinical Laboratory (veterinary), Belgaum aims to assist field officers in the timely and efficient investigation and diagnosis of livestock and to suggest the effective remedial measure to control such diseases and to undertake veterinary research covering the jurisdiction of Belgaum, Bijapur and Uttara Kannada districts.

Key Village Scheme

The key village scheme introduced during 1961-62 provides multi-faceted approach to the problems by simultaneously attending to breeding, feeding, disease control, marketing and education. Cattle shows and cattle rallies are periodically conducted to encourage cross breeding and sale of livestock. The key village scheme at Hukeri has six sub-centres comprising 52 villages at Kanagala, Kochari, Hebbal, Gudas, Yadgud and Hattargi. In the beginning, each key village block maintained upto maximum of eight breeding bulls depending on the requirement. During 1978, with the coming into being of semen banks, bulls were disposed off. The number of artificial inseminations performed were 93,235, the number of calves born due to artificial inseminations were 15,947 and the number of preventive vaccinations done were 2,08,471 from 1961-62

to 1984-85. The semen collection centre at Belgaum was established during 1975 to collect and supply semen to clinics of Belgaum, Sampgaon, Chikodi, Hukeri, Khanapur and Raybag taluks. This centre has maintained one Holstein Friesian, four Jersey, and seven Surti bulls. The performance of this centre upto 1984-85 since inception is as follows. Number of artificial inseminations performed were 1,50,660. The number of calves born due to artificial inseminations were 15,788 and this centre has prepared 4,12,472 ml of semen. The artificial insemination with frozen semen is being carried out at 28 centres in Paragad, Athani, Gokak and Ramdurg taluks of Belgaum district. The number of artificial inseminations performed using frozen semen and the number of calves born due to artificial inseminations from 1981-82 to 1984-85 were 16,126 and 1,351 respectively. The semen collection centre at Gokak was started in the year 1955-56 under Community Development Block as artificial insemination centre and was upgraded to Semen Bank in the year 1975-76 to expand cattle breeding programme to the neighbouring DPAP taluks of Belgaum district. This centre has maintained one Holstein Friesian, four Jersey, one Khillar and four Surti bulls. The number of artificial inseminations performed and the number of calves born due to artificial insemination from 1975-76 to 1984-85 were 76,390 and 13,966 respectively.

Poultry Farming

Intensive Poultry Development Project (IPDP) is functioning in the district from 1977 to increase total poultry population by improving the breed of local poultry and progressively substituting them by exotic varieties and to encourage poultry keeping as a subsidiary occupation. It will provide guidance in the formation of co-operative societies for sale of poultry feed and purchase of egg from producers. At present, there are four societies viz, Poultry and Dairy Co-operative Society, Belgaum, Sri Ramalingeshwar Poultry Farmers and Milk Producers Co-operative Society, Bailhongal, Malaprabha Poultry Farmers Co-operative Society, Wakkund and Mallasarja Poultry Farmers Co-operative Society, Kittur. Under IPDP Programme, rural unemployed youth graduates are trained in poultry farming, and 1,677 poultry units were established, and 3,782 persons were trained in poultry farming from 1977 to 1984-85. The Poultry Extension Centre at Belgaum was established in 1975 to educate the farmers. Under Applied Nutrition Programme, which was in operation in Athani block (1974-75 to 1978-79), Chikodi block

(1975-76 to 1978-79) and Gokak (1974-75 to 1978-79), out of allotted Rs 6.33 lakhs, Rs 4.3 lakhs have been spent.

Sheep rearing

Belgaum with its vast tract of low rainfall and drought affected land is very well suited for sheep husbandry. There is a Sheep Breeders Association in Belgaum. There are 27 Sheep Breeders Co-operative Societies functioning in Belgaum district. There is one Sheep Breeding Station at Suttatti in Athani taluk which was started by the erstwhile Bombay Government during 1947 to evolve a suitable strain by crossing local Deccani with Merino, Corridale and Rambouillet Rams. Merino, 'the golden footed sheep' with its ancestral home in Spain yields finest fleece. Deccani sheep has coloured fleece in which black and grey are predominant, the latter colour being a phase of the aging of sheep. This Station is producing rams of proven capacity and are supplying them to farmers for intensive sheep breeding. The cross-bred sheep with Merino are distributed among the flocks of the shepherds. The area of the farm at Suttatti Sheep Breeding Station is 73.7 hectares and the herd strength was 366 as on 31-12-1984.

Karnataka Co-operative Milk Producers Federation

Belgaum district has been known for its milk production since long time. The State Government with the assistance of the World Bank and under the technical guidance of National Dairy Development Board (NDDB) started Karnataka Dairy Development Corporation. The KMF started functioning in Belgaum district from October 1983. The KMF has three-tier system wherein milk producers in the village level will organise themselves to form Dairy Co-operative Societies (DCS) at the village level, Union at the district level and the Federation at the State level. The KMF owns and operates Dairy Plants, cattle feed plants, market the milk and milk products and also provide technical guidance. The DCS aims to involve farmers to form milk societies and manage them by themselves. DCS helps them to market their milk efficiently avoiding the depredations of traditional middlemen. In every village, surplus milk will be collected through DCS twice a day; the producers are paid for their milk on the basis of fat content in the milk. Upto 1984-85, the number of DCS registered was 117, the total number of members enrolled was 11,714. Total quantity of milk procured since inception was 26,20,039 kg and 2,30.650 kg of cattle

feed was sold to the farmers upto 1984-85. The KMF under Animal Health Care Programme will provide health care facility to all animals of the farmers who are the members of DCS through their weekly Mobile Veterinary Clinics and also provide emergency veterinary aid round the clock. Cross-breeding programme is taken up on a large scale by KMF to improve the existing indigenous breeds to produce more milk. The farmers will be induced to grow green fodder by supplying seed material free of cost and also provide technical know-how through the qualified officer.

Belgaum Dairy

The Government Dairy, Belgaum was started as pilot scheme in 1966. The objective of starting the Dairy is to procure milk from the Milk Producers Co-operative Societies and *bona fide* dairy farmers to improve the economic conditions by paying them a fair price. The Government Dairy was handed over to KMF with effect from 1985 and since called Belgaum Dairy. Average procurement per day was 7,400 LPD in 1984-85. Whenever, milk supply was found surplus, the same was converted into casine and ghee. It is proposed to supply milk to Milk Dairy, Dharwad for milk powder manufacture.

District Rural Development Society (DRDS) has given financial assistance to six Bharatiya Agro Industries Foundation (BAIF) centres located at Athani, Raybag, Konnur, Mudalgi, Sureban and Yaragatti to improve the cattle breed by frozen semen technology. All these six centres are old centres established in the district during 1980-81. Under Drought Prone Area Programme (DPAP), Rs 13.8 lakhs has been spent for the expansion of Milk Dairy at Belgaum to increase the capacity of handling 10,000 LPD to 20,000 LPD. Two chilling plants at Athani and Gokak were established. Another at Ramdurg is in progress and one more chilling plant at Saundatti will be established with Saundatti Taluk Agricultural Produce Co-operative Marketing Society's (TAPCMS) co-operation. Financial assistance has been extended for establishment of Hubli-Dharwad Milk Powder Plant and Belgaum Dairy Development. Amount spent since the inception of DPAP was of the order of Rs 13.8 lakhs.

Special Programmes : Special Component Plan is in operation in the district from 1980-81 to assist Scheduled Caste population by supplying milch cattles, milch buffaloes, sheep, goat, piggery and poultry. Assistance for construction of house shed and feed of

animals is also made available. The assistance is by way of subsidy to the extent of 60 per cent and the remaining 40 per cent is by way of loan from commercial banks. A total of 78 cattle units, 109 goat units, 121 buffalo units, 66 poultry units, one pig unit and 17 sheep units were distributed under this scheme, incurring an expenditure of about Rs 21 lakhs upto 1984-85. Under the *Integrated Development of Western Ghats Programme*, introduced during 1974-75, five artificial insemination centres at Parishwad, Halshi, Bidi, Kakkeri and Londa and one mobile veterinary clinic at Khanapur were established. Rs 2.73 lakhs has been spent under this programme upto 1984-85 to supply 82 breeding bulls, for maintenance of five artificial insemination centres and one mobile veterinary clinic, for organising demonstrations in fodder development and rearing of calves born due to artificial insemination.

Drought Prone Area Programme under animal husbandry is in operation in Belgaum district since 1974-75. Under this programme, 12 rural veterinary dispensaries, five artificial insemination centres, 28 frozen semen centres and four mobile veterinary clinics were established. About 1,910 milch animals and 210 sheep units are distributed to small and marginal farmers on subsidy basis and 520 farmers were trained in animal husbandry and about Rs 56.6 lakhs has been spent upto 1984-85. Under *Integrated Rural Development Programme*, a sum of Rs 210.16 lakhs has been spent from 1980-81 to 1984-85 for supply of cross-bred cows, graded buffaloes, sheep and goat units, supply of plough bullocks, carts, poultry units and piggery units benefiting 5,532 small farmers, 8,853 marginal farmers and 13,669 agricultural labourers. The total families benefited under the programme were 29,481 out of which, 7,190 families belong to Scheduled Caste and Scheduled Tribe. Under Scarcity Relief works covering Athani, Chikodi, Gokak, Hukeri, Ramdurg, Raybag and Parasgad taluks, supply of nutritious food to cattle belonging to small farmers, Scheduled Castes and Scheduled Tribes farmers and animal health programmes are being taken up in the district. Out of the allotted amount of Rs 5.39 lakhs, Rs 5.25 lakhs has been spent during 1984-85 and 1985-86. Various programmes like fodder development, supply of mineral mixtures to calves born due to artificial insemination, demonstrations in poultry keeping, training of farmers, etc. are taken up under *Command Area Development Authority Programme*. Upto 1984-85, Rs 3.39 lakhs have been spent under this programme since 1975. Nine artificial insemination centres were established and 458 farmers were trained in agriculture and allied activities. *Special*

Livestock Production Programme implemented in the district during 1975 provides assistance to small and marginal farmers and landless agricultural labourers to establish sheep units. Upto 1984-85 about 6,333 sheep units were established since inception of this programme.

FISHERIES

The development of fisheries in the district is confined only to an inland area with availability of resources from three reservoirs viz., the Ghataprabha, the Malaprabha and the Rakaskop besides a number of tanks. The main objectives of the Department of Fisheries in the district are utilisation of all potentialities towards the intensive development of fisheries. After the completion of construction of fish farms at Hidkal and Kurvinkoppa, these farms are producing sufficient quantity of fish seeds to meet the requirements of the district. In addition, assistance is being extended to the fishermen members through Fisheries Co-operative Societies. Assistance is also being given for the construction of fish market by municipalities and other local bodies.

Resources: Belgaum district, which is an inland district, has eight river stretches, viz., the Krishna, the Malaprabha, the Markandeya, the Doodhganga, the Vedganga, the Panchganga, the Ghataprabha and the Hiranyakeshi with a length of 475 km, many streams, irrigation channels, three reservoirs and about 471 major and minor tanks found fit for fisheries. The waterspread area of the three reservoirs in the district are the Rakaskop reservoir-350 hectares, the Malaprabha reservoir-13,574 hectares and the Ghataprabha reservoir-7,800 hectares. The break-up figures pertaining to other waterspread areas are as follows : 46 major tanks-1,002 hectares ; 425 minor tanks-901 hectares ; 52,195 wells and 310 km long rivers.

Fish Fauna

The fish *fauna* of the district consists of the following indigenous and exotic varieties. The local names and scientific names of fishes available in the district are as follows : Indigenous varieties *Puntius chola* (Kolara), *Puntius sarana* (Kanaga, Parke), *Puntius curmuca* (Koracha), *Puntius reba* (Arja), *Labeo calbasu* (Tambri, Kemminu), *Labeo calbasu* (Karimeenu, Kemma), *Osteobrama vigorsii* (Parake meenu), *Wallogo attu* (Bale/Bahle meenu), *Ompok binaculatus*

(Gojale Godla), *Clarias batrachus* (Murugodu meenu, Marpa), *Bagarius bagarius* (Kurdi meenu), *Labistes reticulatus* (Gappi), *Channa striatus* (Kucchu, Owl), *Channa leucopunctatus* (Bili Kucchu), *Ambassis ranga* (Bachanige meenu), *Notopterus notopterus* (Chacchi), *Rasbora daniconius* (Sasla meenu, Dande), *Danio acqipinnatus* (Arashinapatte), *Glossogobius giuris* (Hajamde), *Mastocembalus armata* (Hawu meenu), *Noemachilus botia* (Murangi meenu), *Garra mulya* (Kalagav), *Silonia childrenii* (Chidave), *Mystus vittatus* (Girlu) and *Puntius jerdoni* (Harigi meenu). The introduced varieties comprise of *Catla catla* (Catla meenu), *Labeo rohita* (Rohu meenu), *Cirrhina mrigal* Hamilton (Mrigala meenu), *Hypophthalmichthys molitrix* (Belli meenu), *Ctenopharyngodon idella* (Hullu meenu), *Cyprinus carpio* Var. *Communis* (Samanya gende) and *Cyprinus carpio* Var. *specularis* (Kannadi meenu).

The gill nets are cast in the smaller water bodies while swimming. *Shigadi* is a device made of empty, sealed, waterproof kerosene tins tied together with a piece of worn-out gillnet. It is usually used in the bigger tanks and in the periphery of reservoirs. In long line fishing, a long line to which are attached 50 to 100 hooks baited with shredded fishes or frogs and the waste fishes are set in the water to catch the fish. In Gill net fishing, the fish get caught in the mesh of the net. The webbing made of knotted nylon twisting with two to four inches mesh size are commonly used. The floats used are the small empty sealed tins, bulbs, glass bottles, etc. and the sinkers are invariably the stones. The cast net fishing called *beesubale* is universally employed and the meshes in the net are usually small. In hand line fishing with or without pole, a single hook is normally used and the baits employed are the earthworms and small fishes. Fishes get hooked while trying to swallow the bait. Basket traps are of different sizes and shapes. Drag nets are small nets which are used to drag in the drying up ponds to collect the small and miscellaneous fish left over in the tank. *Murangi bale* is a crude and diminished version of trawl net used mainly to collect the live weed fishes.

The fishermen in the district belong to the communities of Bhovi, Killiketa, Dasar, Bhojagar (Muslims), Bagadi and Gondhali. There were 1,846 fishermen in the district during 1983. Of these, 238 were full time, 145 were part time, 367 were occasional fishermen and the rest were engaged in various miscellaneous fishery occupations.

These fishermen are scattered in all the taluks of the district. The following table shows the revenue realised from departmental catches, auctions, issue of licences by the Department of Fisheries, etc.

Particulars	1980-81	1981-82	1982-83	1983-84	1984-85
Quantity of fish caught (in kg)	2,107	897	1,585	892	808
Amount realised (in Rs)	5,998	3,396	4,125	2,964	3,313
Number of licences issued	365	222	446	596	313
Amount realised (in Rs)	5,575	3,845	6,925	8,231	7,170
Number of tanks auctioned	3	13	19	28	24
Amount realised (in Rs)	630	2,377	7,940	12,452	8,850
Mileage of canals auctioned (in km)	310	310	310	310	310
Amount realised (in Rs)	12,611	12,394	9,772	19,378	12,029
Sale of fish seed (in nos)	2,96,490	1,77,250	1,65,000	3,26,500	3,97,070
Amount realised (in Rs)	22,644	16,480	20,643	35,517	30,421

Co-operative Societies and Marketing : There were 18 Fishermen Co-operative Societies in 1985 in the district with a total membership of 1,067. (See also chapter VI)

Applied Nutrition Programme : The Applied Nutrition Programme was in operation in Ramdurg, Belgaum, Paragad, Gokak, Athani and Chikodi taluks from 1966-67, 1968-69, 1971-72, 1973-74, 1974-75 and 1975-76 respectively. It aims to popularise protein rich diet of fish among people. Under the programme, selected waters in the area of operation are taken up for fish culture through village panchayat and stock it with fish fingerlings. The exploited fish was distributed among feeding centres. The operational period of the

programme was five years after which the activities were expected to be continued on self generating basis. This was a UNICEF supported programme.

Fish Farms : Fish farms are raised 'ponds' or 'nurseries' for production and rearing of fish. The functions performed by fish farms are collection of indigenous fish seeds, production of seeds, rearing of young ones, distribution and stocking of fingerlings for rearing, patrolling of tanks and survey of inland waters to locate breeding centres.

Under the Drought Prone Area Programme a fish farm was established at Hidkal (1974-75). There are 130 ponds in this farm with a water spread area of 1.48 hectares. The hatchlings (seed) production during 1983-84 was 21 lakhs and during 1984-85 was 23 lakhs. About 27 lakhs were spent under DPAP for the development of fisheries in the district. There are four taluk-level nurseries, each one at Athani, Raybag, Ramdurg and Saundatti. These are used to rear the hatchlings and fry upto fingerlings before distributing to the fish culturists. The rearing capacity of each nursery is about 1.5 lakhs per crop and three crops are raised in a year. CADA Malaprabha and Ghataprabha Projects, is assisting the Department of Fisheries in augmenting its departmental resources on a modest scale with a view to encourage the fishermen of the Command Area to supplement their income by gainfully employing their families on development of fisheries. The construction of fish nurseries and development of fishery in reservoirs are the main schemes and 27.3 lakhs fish seeds were produced at Kurvinkoppa during 1984-85 under this programme. The Kurvinkoppa fish farm is being developed since 1972-73. There are 58 ponds in the farm.

Famines

Eastern part of Belgaum is more prone to failure of crops due to uncertain rainfall. The earliest recorded failure of crops is during the great Durga Devi Famine which is said to have persisted for nearly two decades from 1378 due to failure of seasonal rains. Though periodical rains returned, the whole district was almost entirely depopulated. There is no record of any measures adopted to relieve the distress. In 1419, there was a grievous famine throughout the district resulting in the death of many cattle. Ahmed Shah Bahmani (1422-36) opened public stores of grain for the use of the poor.

In 1420, there was again a failure of rain. In 1472 and 1473, there was severe distress as no crops were sown for two years, many people died and many left the area. In consequence of continued drought and great swarms of locusts, there was a gradual failure of crops which began from 1787-88 and continued upto 1795-96 causing great distress. In 1790, the march of the Marathas through Belgaum and Dharwad to Mysore was accompanied by such devastation that on its return from Mysore, the victorious army almost perished for want of food. In 1791-92, there was total absence of seasonal rain with the results that farm operations remained suspended and drought conditions spread over the whole district. The famine was so severe that half the inhabitants of many villages in the district died. A story narrates that a woman at Gokak under the pangs of hunger ate her own child and in punishment was dragged along, chained to the foot of a buffalo till she died. From the numbers of uncared for dead, this famine is still remembered as the "*Dongi-bara*" or "*Skull Famine*". During this famine, some Hindus unable to get grain and rejecting animal food, poisoned themselves while the poor classes found a scanty living on roots, herbs, dead animals and even human corpses. Many peasants fell into the clutches of professional money lenders in order to save themselves from starvation and death.

It is noteworthy however that famines became rather frequent since the advent of British rule in Bombay Presidency and most of them particularly affected Belgaum district. Increased transport facilities brought merchants to the doors of the peasants enticing them to sell all their stocks. In 1802-03, Belgaum suffered severely from famines. In Gokak taluk, about 15,000 people are said to have died of famine. The monsoon again failed during 1832-33 in the east of the district. This famine affected the cattle population of the district and some people are said to have sold their children for want of food. Again in 1853, the eastern part of the district experienced a severe drought. The situations worsened when crowds of destitutes arrived from Sholapur (where conditions proved to be much worse). The government granted some revenue remissions. The major famines which ravaged the district occurred during the years 1876-77, 1880 and 1899-00. In 1876, scanty and irregular rainfall led to famine over nearly half of the district. September and October also passed with only a few showers and except on river banks, little or no cold weather crops were sown. The prices of food grains soared very high and jowar was sold at 14 instead of 43 maunds

per rupee. Early in November there was scarcity of grain and distress increased. In the hot months, with rising prices, distress worsened and the scanty rainfall in July and August caused much anxiety and suffering. The timely and plentiful rainfall of the next two months saved the growing crops and the condition of the people gradually improved. Twenty relief-houses or camps were opened in the district. The total cost of the famine relief worked out to Rs 11,53,960 of which about Rs 9,98,650 were spent on public and civil works (including laying of railways) and Rs 1,55,310 on charitable relief. Soon after these calamities, there occurred the rat plague in 1878. In October 1878, rats swarmed in the northern and eastern subdivisions of Gokak, Athani and Paragad and to a little extent in Chikodi. The most destructive variety of rat is said to be *Golunda mettada* a large eared field rat. They did much damage by scraping and eating the sown seed. Some fields had to be sown thrice. In June and July 1879, rats were again found in great numbers in the north and east of the district. The Government offered a reward of one rupee for every hundred rats killed. The Vaddars proved excellent rat-catchers, digging the burrows and killing the rats in large numbers. Between August and October about 1,35,000 rats were destroyed. Large number of rats were destroyed by the heavy rain and cold towards the year-end. The relief works started by the Government and certain private bodies could not grapple fully with the worsening situation. According to the Famine Commission report, 1901, "relief was to a large extent insufficient and imperfectly organised". It was estimated that the loss of population due to death and migration in Belgaum district was around 1,47,000 and loss of cattle population was estimated to be 1,12,367.

The nineties of the nineteenth century were almost difficult years. As per the report of Famine Commission, 1898, "the failure of the south-west monsoon of 1891 led to distress in the Athani, Gokak and Paragad taluks of Belgaum district. There were practically no crops at all in these affected taluks". Again disasters set a pace by 1896-97, grew in tempo and the last few years of the turn of the century left behind a tale of woe and unparalleled ruin. In 1896-97 heavy monsoon (so irregular that many stations recorded the total of their annual average rainfall in one month) washed away crops. Closely on the heels of this disaster followed even worst years of horror beginning in 1898 and ending in 1902. The causes of the famine in 1899-1900 were the failure of crops. The resources of the people had been depleted by the severe famine of 1896-97 and a single

intervening year of fair harvest in 1898-99 was insufficient for recovery. The damage done by shortage of rain was intensified by a severe plague of rats and locusts, grasshoppers and other insects. Total famine expenditure accounted to Rs 5,09,511 (1898-1902) and the disbursements under the Land Improvement Loans Act and Agriculturists Loans Act was Rs 5,47,600 and Rs 3,21,931 respectively. Remission of land revenue accounted to Rs 1,53,288. The principle measures taken for the relief of cattle were importation of fodder into affected areas, establishment of cattle relief camps and deportation of cattle to distant grazing grounds. The percentage decrease in the total cattle when compared to 1896-97 was 10.83 in 1900 and 11.72 in 1901. The Famine Commission of 1880 stated that "About one third of the land holding classes were deeply and inextricably in debt and atleast an equal proportion were in debt though not beyond the power of recovering themselves". In order to redress the grievances of peasants and save them from the clutches of money lenders, the Deccan Agriculturists Relief Act 1879, was enforced. It tried to prevent the alienation of lands. But, this Act did not offer any relief to the poor agriculturists.

In the 1905-06 famine, about 4,16,000 people were affected and Rs 2,18,630 was spent for relief measures. About Rs 1,96,976 loan was disbursed. Due to widespread scarcity of fodder, Famine Fodder Centre was opened in Belgaum. About 3,000 tonnes of grass was supplied to Belgaum from Poona at the cost of Rs 12,013. About 2,07,000 people were affected during the famine of 1911-12 in which rain practically ceased in Kharif season and loan amounting Rs 1,24,000 was distributed in the district. The suspensions and remissions of land revenue granted during this famine accounted to Rs 2.91 lakhs and Rs 9,769 respectively. In 1941 the rainfall in August and September was both irregular and insufficient and so the crops were not satisfactory. In September 1942 rains failed again and 280 villages in Athani, Gokak and Parasgad taluks were effected. Tagavi for fodder was issued free of interest. Fodder was imported. In 1945, the early rains were erratic and insufficient and in September there was a complete failure. So both kharif and rabi crops were affected. In addition to usual measures of relief, the All India Spinners Association opened spinning and weaving centres. The Bombay Humanitarian League operated cattle camps and free kitchens were run by the relief committees. During 1971-72, famine occurred again in the district and 272 villages in Athani, Chikodi, Ramdurg, Raybag, Parasgad, Gokak and Sampgaon taluks were affected in-

volving a population of 3.42 lakhs. About 145 famine relief works were taken up in the district with an expenditure of 14.61 lakhs. There was an acute scarcity condition in the district due to erratic monsoons from 1981-82 to 1985-86. Population of 12 lakhs and a cattle population of five lakhs were involved. The State Government took up prompt measures to provide immediate relief to the affected population, to ensure employment of persons who offered themselves for work, supply of drinking water, supply of fodder to cattle and supply of adequate food-grains through special economic programmes like NREP, RLEGP, DPAP and Scarcity Relief Programme. *Goshalas* were established at Kokatnur in Athani taluk, Panchagaon, Salapur and Shabarikolla in Ramdurg taluk and Goravan Kolla in Parasgad taluk by State Government. Two more cattle farms were started by the Sugar factories at Gokak and Raybag. About 4,494 cattle were taken care of at these farms.

Locust Plague : The Bombay locusts and the migratory locusts are found scattered in the district. They mainly feed on plants of the grass family and occasionally when they become gregarious, do considerable damage to jowar, bajra and other millets. They rarely form swarms. In Belgaum district, locust plague occurred during the following years. From 1925-26 to 1937-38, some villages in Chikodi taluk were attacked by locusts causing damage to standing crops of the value of Rs 20,000. Preventive and relief measures were taken. In 1939-40, 14 villages in Chikodi taluk were affected causing damage to standing crops worth Rs 41,400. From 1941-42, 19 villages in Chikodi taluk and few villages in Gokak taluk were affected causing loss of standing crops worth Rs 48,400. From 1945-46 to 1947-48, 27 villages in Chikodi taluk and some villages in Gokak taluk were affected. The estimated loss was about Rs 52,000.

Floods

Floods are a constant phenomenon in the rivers of the district. In 1962, there were heavy floods, followed by similar developments later. During 1980, damage caused by floods amounted to Rs 9.14 lakhs affecting 20,000 families of 59 villages in Belgaum district. Rs four lakhs were spent as a cash relief at the rate of Rs 400 to 800 per family and Rs 600 worth building materials in cases of damage to buildings. As per available records, between 27th-30th June 1983 there appeared unprecedented heavy rainfall in Belgaum, Hukeri,

Chikodi and Gokak taluks leading to flash floods in the Ghataprabha and its tributaries of the area and caused considerable damage in the lower reaches. Total rainfall received from 27th to 29th June 1983 in Belgaum was 508 mm, Chikodi 208 mm, Gokak 140 mm and Hukeri 252.4 mm as against the normal June rainfall of 190.7, 80.8, 68.3 and 82.5 mm respectively. In some places where bridges were submerged, very heavy jam of traffic was evidenced on the national highway. As many as 3,386 families in 105 villages were affected and five persons lost their lives in these floods. About 556 houses completely collapsed and 2,374 cattle were lost. The estimated loss of private property was about 168.87 lakhs. Timely relief was extended to the victims of the flood of 27-29th June 1983 in the taluks of Belgaum, Chikodi, Gokak and Hukeri.