

CHAPTER IV

AGRICULTURE AND IRRIGATION *

The Chikmagalur district is mainly an agricultural and horticultural district. Parts of the district are covered by plantation crops : The most important crops of the district are paddy and coffee. The other crops are arecanut, coconut, tea, cardamom, pepper, ragi, jola, etc. The district is also rich in forest resources.

In 1971, out of a total number of 2,54,921 workers, 96,628 (37.91 per cent) were cultivators, 47,832 (18.76 per cent) were agricultural labourers, 48,536 (19.04 per cent) were depending on livestock, forestry, etc., and the rest 61,925 (24.29 per cent) were other workers. Thus the number of persons engaged in agriculture and allied occupations constituted about 76.00 per cent of the total number of workers. The taluk-wise figures of cultivators, agricultural labourers and persons engaged in livestock, forestry, etc., according to the 1971 census were as follows.

<i>Taluk</i>	<i>Total No. of workers</i>	<i>No. of cultivators</i>	<i>No. of agricultural labourers</i>	<i>Persons engaged in livestock, forestry, etc.</i>
Chikmagalur	61,522	18,543	7,204	14,008
Kadur	56,451	36,544	6,652	2,406
Koppa	26,678	6,155	7,846	7,961
Mudigere	37,258	8,217	6,272	15,959
Narasimharajapura	15,531	4,330	4,778	3,561
Sringeri	8,521	2,883	1,796	1,075
Tarikere	48,960	19,956	13,284	3,566
District total	2,54,921	96,628	47,832	48,536

Sizes of land-holdings

The index of the size of the farm business and consequently the economic position of cultivators may be based on the size of the cultivated holdings. The pressure of the population on land and the area of cultivable land

*Besides agriculture and irrigation, this chapter includes also horticulture, animal husbandry and fisheries.

available are the factors that determine the size of holdings. The sizes of holdings in the district are small. On an average, the extent of land held by a land-holder was about 2.70 hectares as in 1970-71 and 2.54 hectares in 1976-77. The category-wise numbers of holdings according to the hectare-wise size-groups with the extents of land under each as in 1970-71 and 1976-77 along with percentage variation and average size of land holding are given in the General Appendices.

The average size of land holdings, in the district as in 1976-77, in respect of marginal holdings of below a hectare was 0.53 hectare, small holdings of one to two hectares being 1.43, semi-medium holdings of two to four hectares being 2.64 hectares, medium-holdings of four to ten hectares being 6.03, large-holdings of ten hectares and above being 21.49 hectares. The average size of holding for the district was 2.54 hectares. Such uneconomical small holdings constitute a serious obstacle to increasing the productivity of the cultivated area. Keeping this in view, the Karnataka Prevention of Fragmentation and Consolidation of Holdings Act, 1966, was adopted and it is in force since May 1, 1969. It seeks to put a check on all transfers of lands which result in fragments. The holders of such lands cannot dispose them off to any one other than the contiguous holder. The Act also provides for consolidation of the existing fragments of lands so as to form economic holdings.

Land utilisation

The total geographical area of the district is 7,199 sq km as computed by the Survey of India. The total cropped area as in 1978-79 was 2,56,281 hectares which formed about 35.6 per cent of the total geographical area. The sub-joined statement gives particulars of land utilisation in the district for the years 1971-72 and 1978-79.

Sl. No.	Category	(Area in hectares)	
		1971-72	1978-79
1	Geographical area (provisional figures as computed by the Survey of India)	7,25,210	7,22,115
2	Reporting area for land utilisation purposes as worked out by the State Survey Department and local bodies	7,11,867	7,22,072
3	Forests	1,75,129	1,78,125
4	Barren and uncultivable land	37,816	32,407
5	Area under non-agricultural use	29,718	35,468
6	Permanent pastures and other grazing lands	1,57,032	1,39,276
7	Cultivable waste	30,601	25,463
8	Land under miscellaneous tree crops and groves not included in the net area sown	11,387	26,776
9	Fallow lands other than current fallows	21,204	30,649
10	Current fallows	28,919	15,630
11	Net area sown	2,20,061	2,38,281
12	Total cropped area	2,35,416	2,56,281
13	Area sown more than once	15,355	18,000

The taluk-wise break-up of figures relating to land utilisation for the year 1978-79 is given in the General Appendices.

Fallow and waste lands

The district has considerable extent of fallow lands, and also lands which have gone out of cultivation owing to acidity, alkalinity or salinity and water-logging. In order to find out the extent of such fallow and uncultivable waste lands in the district, a survey was conducted by the State Department of Agriculture in 1966-67. It revealed that the extents of such lands under different categories during the year 1966-67 were as given hereunder.

<i>Taluk</i>	(Area in hectares)		
	<i>Acidity</i>	<i>Salinity</i>	<i>Water-logged</i>
Chikmagalur	7,500	100	20
Kadur	..	674	40
Koppa	8,025	..	..
Mudigere	10,276	..	..
Narashimarajapura	5,980	..	..
Sringeri	3,482	..	17
Tarikere	180	508	170
Total	35,443	1,182	247

The survey report put the waste and uncultivable lands under four categories, viz., A, B, C and D. The 'A' category lands were considered suitable for intensive cultivation without special treatment as these lands were level or nearly level, sloping upto 1.5 per cent having good soil depth, not subjected to erosion, well-drained with moderate soil permeability with a capacity to produce an average yield with usual cultivation practices. The lands under 'B' category were stated to be suitable for moderate and limited cultivation with a treatment of soil and by following moisture conservation methods. These lands may be level or nearly level. They may have eight per cent slope even with good soil depth, subjected to slight soil erosion and with moderate and slow soil permeability having a soil depth of six inches. It was thought that the hilly slopes suitable for plantation crops might be also grouped under 'B'.

The 'C' category lands were not found suited for the cultivation of food-crops, as they have steep slopes with a rough and rugged surface, highly eroded with gully development with slow or rapid permeability. Such lands could be utilised for afforestation and wild life. The lands coming under the 'D' category were not found useful for cultivation, but the need to cover them with permanent vegetation was stressed. Their soil being shallow and very severely eroded with very rapid permeability, it was found to be uneconomical for reclamation. These lands were considered good for producing grasses and for using as pasture lands with

restrictive use and wise management. The Department of Agriculture has recommended the following measures for bringing the various categories of land under cultivation: clearance and contour-bunding with outlets and terracing either level, ridge or bench for category 'B'; trenching, gully-plugging and afforestation for category 'C'; and, enclosure, furrowing, compartmental or rotational grazing and reseedling for category 'D'. Upto 1973-74, 531 hectares of land were reclaimed at a total cost of about Rs. 45,107.

Soils

The soils of the *malnad* parts of the district are nearly of poor acidic type. Though relatively poor, the soil is well-suited for the growth of plantation-crops like coffee, areca, cardamom, pepper, tea and rubber. Along the south of the Baba-Budan range, there is a rich tract of black-cotton soil, whose fertility, enhanced by the command of an unfailing supply of water from the hill streams, is said to have given the name 'Honjavanige-Seeme' (land flowing with gold) to that area. Black-cotton soil is again found in the neighbourhood of Ajjampura, together with red and gravelly soils. The western parts of Tarikere taluk contain sandy and gravelly soils. In the Yagati tract, the earth seems poor and has a chalky appearance. More to the north, the soil is adapted to the cultivation of coconut palms without irrigation, as in the adjoining parts of Tumkur and Chitradurga districts.

About 50 per cent of the soils in the district (mostly from the *malnad* parts) are acidic in nature. The remaining areas of the district are neutral in regard to soil reaction. A few patches of soils in Tarikere and Kadur taluks are said to be alkaline. The soluble-salt content is generally low and within safe limits. The soils in the *malnad* areas are well supplied with organic matter, and only about ten per cent of the soils confined to *maidan* taluks, are deficient in organic matter. Major portion of the soils in the district is poor in phosphorus and potash.

The lateritic soil, which is found in parts of Koppa, Mudigere and Sringeri taluks, is acidic in nature and deficient in nitrogen, potash, phosphorus and lime. The main crops grown in these areas are paddy, coffee, tea, sugarcane, areca, plantains, pepper and fruits. Red-loamy soils, which are acidic to neutral and deficient in nitrogen, phosphorus and potash, are found in and around Tarikere, Narasimharajapura and parts of Kadur taluks. The red sandy soil, which has the same characteristics as the red loamy soil, is present in Tarikere, Narasimharajapura and parts of Kadur taluks, where the principal crops are paddy, ragi, millets, pulses and oilseeds, sugarcane, areca, plantain and chillies. The black soil is fertile and rich in calcium and magnesium and carbonates, but deficient in nitrogen and phosphorus. This soil is found in parts of Tarikere and Kadur taluks. The principal crops grown in this soil are cotton, jowar, wheat, gram and millets.

Soil conservation

Soil is subject to natural erosive forces like wind and rains. In addition, unscientific cultivation methods, over-grazing of common pasture-lands and damage caused by floods have contributed to excessive run-off and consequent erosion of top soil and silting of river beds and tanks. In order to conserve the soil, the Karnataka Land Improvement Act, 1961, was brought into force throughout Karnataka. At present, the contour-bunding programme is confined to agricultural land in the dry tract of the State where the annual rainfall is less than 75 cm. The average cost of bunding per acre is worked out, and after allowing the subsidy admissible under the scheme the rest of the cost is recovered from the owners in fifteen annual instalments plus the rate of interest fixed by Government.

A separate Soil-conservation Sub-Division was started in the district in 1967. Under Section 37 (1) of the Karnataka Land Improvement Act of 1961, 586 villages (279 in Kadur taluk, 217 in Tarikere taluk and 80 in Chikmagalur taluk) have been declared as scarcity villages. Bunding work was also taken up in Kadur taluk under the Drought-Prone Area Programme in 1970-71. The expenditure incurred in this behalf was about Rs. 36,86,855 upto the end of 1978-79. Under famine relief works a sum of Rs 32,000 was spent in 1973. The following table gives the taluk-wise area available for bunding, area banded and the balance area to be banded and the expenditure incurred upto the end of March, 1979.

(Area in hectares)

<i>Taluk</i>	<i>Area avail- able for bunding</i>	<i>Area banded</i>	<i>Area to be banded</i>	<i>Expenditure Rs.</i>
Chikmagalur	3,770	1,158	2,612	1,76,992
Kadur	71,440	12,741	58,699	28,51,558
Tarikere	35,440	4,154	31,286	6,58,303
Total	1,10,650	18,053	92,597	36,86,853

Soil conservation research

A Soil Conservation Research Project was started in the district in 1972 on a small scale. The object of the project is to level the slopy lands by putting bunds across the slopes to prevent soil-erosion. There are large areas in the hilly parts of the district which are not fit for coffee cultivation. In order to make use of such cultivable waste-lands in the heavy rainfall areas, it was decided to take up research work, and the project was started near Aldur in an area of 27.135 hectares. The bunds are put on graded contours across the slopes with drop outlets at uniform intervals to remove excess water through the drains. An area of 8.505 hectares was banded under this project incurring an expenditure of Rs 2,597 upto the year 1975. Work relating to construction of farm ponds was also taken up under the Western Ghat Development scheme in Koppa and Mudigere taluks and a total expenditure of Rs 71,299 was incurred upto 1978-79.

Cropping seasons

The cropping seasons in the district are *kharif*, *rabi* and summer as prevalent in various other parts of the State. The *kharif* and summer seasons are the predominant ones and the *rabi* season is a minor one. The cropping seasons are mostly based on the source of water supply either rainfall or irrigation, climatic conditions, etc. The taluk-wise extents of area under different crops in the district as in 1978-79 were as given hereunder.

(Extent in hectares)

Crops	Chikmagalur	Kadur	Koppa	Mudigere	Narasimharajapura	Sringeri	Tarikere	Total
Paddy	12,337	3,284	8,095	11,154	6,030	3,734	9,154	53,788
Ragi	7,291	16,799	16	159	21	2	13,079	37,367
Jowar	1,743	13,558	..	2	1	2	4,413	19,719
Minor-millet	32	5,031	..	..	..	..	1,087	6,150
Coriander	525	2,559	..	..	..	..	2,749	5,833
Sugarcane	507	197	23	11	49	50	532	1,369
Cotton	240	691	..	..	9	..	206	1,146
Groundnut	431	5,466	..	..	5	..	1,755	7,957
Pulses	1,041	13,798	..	..	75	..	8,362	23,267
Area under high-yielding varieties	3,104	1,614	2,134	1,699	1,253	1,091	8,020	18,915

Cropping pattern

Because of the variety of soils and change in climatic conditions of the district, the cropping pattern tends to differ from place to place. In *malnad* tracts mostly one crop from rain-fed terraced paddy fields is in practice. Cultivation in these parts is a skilled one but by no means intensive. The farmer is able to grow not only a reliable subsistence crop, but also cash crops like cardamom, orange, coffee and pepper. Super-imposed on the traditional pattern of farming, generally prevalent in these parts, however, is the cultivation of coffee in plantations, and to a smaller extent other crops like tea and cardamom. The recorded acreages of oilseeds in these parts are very low. Double-cropping forms an important feature in irrigated tracts. The dry fields are mostly used for growing ragi as well as other commercial crops like groundnut, tobacco and cotton. Ragi is usually a mixed crop with lines of fodder-jowar, gingelly, pulse, *pundi* or castor. Sometimes irrigated ragi is also grown with much higher yield than the dry ragi. The wet lands are used for growing paddy or sugarcane.

Paddy

Paddy is an important food crop of the district. The area under paddy as in 1978-79 was 12,337 hectares in Chikmagalur, 11,154 hectares in Mudigere, 9,154 hectares in Tarikere, 8,095 hectares in Koppa, 6,030 hectares in Narasimharajapura, 3,734 hectares in Sringeri and 3,284 hectares in Kadur taluks. It is grown under rainfed and irrigated conditions both in *kharif*

and summer seasons. The rainfed crop is generally sown direct whereas the irrigated crop is transplanted. Seeds are sown from May to June for rainfed crop and from July to August for irrigated crop and from December to February for summer crop. The seed rate is from 65 to 90 kg per hectare. The yield rate is $1\frac{1}{2}$ to $2\frac{1}{2}$ tonnes per hectare under rainfed conditions, $2\frac{1}{2}$ to 3 tonnes under irrigated condition and 4 to $4\frac{1}{2}$ tonnes during summer season. The old varieties of paddy grown in the district have been gradually replaced by high-yielding varieties, some of the popular varieties being S.701, S.749, S.1092, S.661, S.337, and J.192 and other high-yielding varieties.

Ragi

The next food crop, Ragi is grown in 37,367 hectares as in 1978-79. It is largely confined to *maidan* taluks of the district. The Kadur taluk has the largest area of 13,558 hectares followed by Tarikere taluk with 13,079 hectares and Chikmagalur taluk with 1,743 hectares. It is mostly grown as a rainfed crop and sometimes as an irrigated crop during summer. The cultivation processes consist of ploughing, harrowing, clod-crushing and, sometimes, transplantation of seedlings. The popular varieties of ragi grown in the district are Poorna, Annapoorna (irrigated), H.22, Indaf-1, Indaf-3, ROH.2 and Pr.202 and also other local varieties. The average yield per hectare is put at 8 quintals in the case of general cropping and 12 quintals where intensive agricultural area programme is in operation.

Jowar

Jowar, another food crop of the district, is cultivated in about 19,720 hectares, Kadur taluk having the largest area of 13,558 hectares, followed by Tarikere taluk with 4,413 hectares and Chikmagalur taluk with 1,743 hectares. The popular hybrid varieties of jowar are CSH 1 and CSH 5, and these are grown during the *kharif* season under rainfed conditions. The crop requires one or two ploughings and 15 to 20 cartloads of farmyard manure per hectare. Sowing is done at a distance of eighteen inches. The crop comes to harvest in about $3\frac{1}{2}$ months in the case of hybrid jowar, 4 to $4\frac{1}{2}$ months in respect of other varieties. The average yield of hybrid jowar is put at 25 quintals per hectare, 12 quintals under intensive agricultural area programme and 8 quintals under normal conditions.

Pulses

Bengalgram, *aware*, *tur* or *togari*, horsegram, greengram, cowpea and blackgram are the important pulses grown in the district. The area under pulses is significant as the total area comes to about 23,276 hectares as in 1978-79, Kadur taluk had a vast area of 13,798 hectares, followed by Tarikere with 8,362 hectares, Mudigere with 75 hectares. Most of the crops are grown as *akkadi* crops while the main crop may be ragi or jowar or groundnut or millets like *save*, *navane*, etc. The average yield of pulses is put at 6 quintals per hectare in respect of improved varieties and 4 quintals in

the case of local varieties. The Pulse Development Programme is in operation in the district since 1978-79.

Manure

The manures that are in common use in the district are farmyard manure, green manure, compost and fertilisers. The farmyard manure is conserved by sectional filling method or by dumping it in one place till it is carried to the fields. Green manure is prepared either by growing in *situ* and mixing it in the soil or by bringing green leaves from forests and mixing the same in the soil. In *malnad* parts the owners of areca garden have access to adjacent areas where certain plants suitable for green manure are allowed to grow, and the area is generally called *soppinabetta*. Green leaves are procured from these areas in the evening and are spread over in the cattle shed and lifted to compost pits after 3-4 days. The common varieties of green manure crops grown in the district are sesbania, sannhemp, glyricidia, diancha and pulses. Honge leaves and other succulent green leaves are also used in the district. Seeds and seedlings of green manure are being supplied by the Department of Agriculture every year. During the year 1978-79, the Department supplied 3,81,000 seedlings and cuttings of green manure. Demonstration plots are also being raised on experimental basis for purpose of popularising the use of green manures and also help to tide over the shortage of organic manures.

Compost

The rural compost consists of waste materials from the cattle-yards and green vegetation which is available in plenty. Demonstration pits are being laid out for purpose of educating the farmers in the preparation of quality compost. District, taluk and circle-level training programmes are being carried out and a compost week is also observed. In urban areas compost pits are filled with the waste materials thrown in the dust bins. In recent years, efforts are being made to produce quality compost out of waste material by sieving the materials before dumping, using systematic pits for filling, utilising superphosphate, and also night soil, etc., if available. The local bodies are also making efforts to prepare compost in places where *shandies* are held. A Local Manurial Resources Scheme has been put into operation in the district for this purpose. Under this scheme compost training camps, village leaders programmes, compost weeks etc., are being organised to popularise compost making and growing of green manure crops. The village panchayats and youth clubs are also taking up digging of mass compost pits. As a measure of encouragement, prizes are awarded to village panchayats and municipalities doing outstanding work. During 1978-79, 28 compost training camps, four in each taluk, were organised, 1,160 village leaders and women were trained. During the same year, 3,51,170 tonnes of rural compost and 10,822 tonnes of urban compost were prepared.

Fertilisers

Fertilisers have been in greater use in recent years and are gaining popularity among farmers. The quantity of fertilisers being utilised is on the increase. The common fertilisers used in the district are urea, ammonium sulphate, calcium ammonium nitrate, super phosphate, muriate of potash and complex fertilisers. The total supply of fertilisers is far below the demand for them. Hence, fertiliser allotment committees, both at the district and taluk-levels, were formed in 1972 for distributing the fertilisers in an equitable manner. Various co-operative institutions also have taken up the sale of fertilisers, seeds and plant protection materials. Demonstration plots in the use of fertilisers were laid out by the Department of Agriculture and private firms supplying fertilisers. During 1974, card system of distribution was introduced in the district for purpose of equitable distribution of nitrogenous fertilisers as there was an acute scarcity of fertilisers. Foliar application of urea is in practice in the district for the past fifteen years. But it gained popularity only during recent years. The idea of recommending foliar application particularly in *malnad* taluks where the rainfall is heavy, is mainly to avoid leeching of fertilisers from the soil. It is being advocated from the nursery stage upto the flowering stage at different intervals. The use of biological fertilisers for pulse crops in particular has gained popularity in recent years. The total extent covered in the district in 1972 was 40 hectares, 105 hectares in 1973, 238 in 1974 and 386 in 1975. The quantity of fertilisers used in the district during some recent years was as follows.

(Quantity in tonnes)

Type of fertiliser	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76
Nitrogen	2,454	2,495	3,365	2,297	1,582	1,399
Phosphorus	838	1,670	2,195	1,192	620	694
Potash	691	1,806	3,000	1,385	625	917

Implements

The important old implement is the wooden plough which is still in use, though several modern implements have been introduced. Sometimes, the wooden plough is also used to remove *hariyali*, nut grass, etc. A pair of bullocks is used to draw this implement. In heavy soils, two-to-three pairs of bullocks are also used to draw the plough. In some *malnad* parts of the district, he-buffaloes are made use of, instead of bullocks. The modern ploughs generally used are the mould board ploughs. The Kolar Mission ploughs, bar point ploughs, ureca ploughs and Kirloskar ploughs are also used according to the necessity. *Halube* an old implement is used for clod crushing, mixing of manures, removal of weeds, levelling the field, etc. In its place, grubbers and cultivators with iron bars in case of heavy soils and with wooden bars in case of light soils have come into use. The blade harrows are used for clod-crushing, removal of weeds and also covering

seeds. They are of two types, light long blade harrow and short or heavy blade harrow. For purposes of sowing a light wooden plough or seed drill is used. The seed drills are like grubbers fixed either with iron bars or with bamboo staffs called coulter. A long harrow with a length of five to seven feet, made of wood, is used for clod-crushing. Slit-hoes are used for interculturing purposes. Hand-rakes and *kurpies* are also in use. Threshing is done with stone-rollers, besides by hands with long bamboo staffs, and trampling by bullocks. Now-a-days the implements in use are (1) seed-cum-fertiliser drill, (2) fertiliser placement implement, (3) top-dressing fertiliser implement, (4) ridger, (5) bundformer, (6) puddler, (7) paddy weeder, (8) clod crusher, (9) disc harrow, (10) seed-dressing drum, (11) duster, (12) sprayer, (13) maize sheller and (14) sugarcane crushers for which bullocks or sometimes power is used. In irrigated areas and in sufficiently big holdings of dry areas, tractors and power-tillers have come into use. Bulldozers are obtained on hire basis. Power-sprayers have been also introduced. Sprinkler irrigation sets are also commonly used in plantation areas. The table given below shows the number of implements in use in the district, as in 1978-79.

<i>Implement</i>	<i>Chikmagalur</i>	<i>Kadur</i>	<i>Koppa</i>	<i>Mudigere</i>	<i>Narasimharajapur</i>	<i>Sringeri</i>	<i>Tarikere</i>
Inter-culturing implements.	17,240	..	..	400	237	255	22,151
Carts	2 650	1,680	..	185	..	741	9,630

Improved Seeds

Improved varieties of seeds and hybrid seeds are being supplied to farmers to step up production. The nucleus seeds are received from the University of Agricultural Sciences and the foundation seeds are multiplied at the seed-farms and also at the cultivators' fields. The parent materials of hybrid seeds are secured from the National Seeds Corporation and further seeds are produced on cultivators' fields and also at the seed farms. The produce is processed, certified and distributed to the agriculturists through the taluk development boards, marketing co-operative societies, *agro-kendras* and private dealers. In respect of other improved varieties and high-yielding varieties, the seeds are multiplied for covering one-fourth of the area of a particular crop. In case of tobacco (V.F.C.), seedlings raised on cultivators' fields and at the seed-farms are supplied. The seed material for sugarcane is supplied by the sugarcane research stations or by sugar factories. The Sea-Island Cotton seeds are supplied by the Department of Agriculture or through the Sea-Island Cotton Growers' Societies.

Seed-farms

There are three seed-farms in the district as in 1979. Nucleus seeds are obtained from the research stations and are multiplied at these seed-

farms and then distributed through taluk development boards to registered seed-growers for further multiplication. The seed-farm at Kademadakal in Mudigere taluk has an area of 10.500 hectares of dry land 9.720 hectares of wet land. At present, the wet lands are being brought under cultivation. The paddy seeds that are multiplied here are Intan, Jaya, IR. 20, M.R. 272, and also U.P. 301 wheat in rabi. The seed-farm at Lingadahalli in Tarikere taluk has an area of 40.500 hectares of dry land and 16.200 hectares as in 1978-79. The seeds that are multiplied here are ragi, pulses, oil seeds, cotton, Bengalgram, Safflower, etc. The Experimental-cum-Demonstration Farm at Rangenahalli in Tarikere taluk has an area of 151.470 hectares of dry land and 5.670 hectares of wet land. The seeds that are multiplied in this farm are paddy, ragi, pulses and groundnut. This farm has programmes like educating farmers in the project area in respect of the economic use of water, laying out demonstration plots in irrigated crops and conducting experiments on different methods of irrigation, sowing, digging, use of improved implements in addition to seed multiplication, high-yielding varieties programme, etc.

Intensive Agricultural Area Programme

The Intensive Agricultural Area Programme with the main object of introducing intensive farming methods in the area under oilseeds and pulses was started in the district during 1973-74. The crops that were covered under this programme during 1978-79 and the areas under each crops are given in the table below.

(Area in hectares)			
<i>Crop</i>	<i>Extent</i>	<i>Crop</i>	<i>Extent</i>
Jowar	4,549	Greengram	2,624
Groundnut	8,545	Blackgram	1,114
Sunflower	2,702	Avare	2,320
Sesamum	3,933	Castor	1,222
Bengalgram	2,410	Sea Island Cotton	93
Safflower	292	Varalaxmi Cotton	323
Horsegram	10,404	Laxmi Cotton	778
Cowpea	4,513	Tur	1,067
My-14 Cotton	1,382	V.F.C. Tobacco	454

Soil-Testing Laboratory

The Soil-Testing Laboratory, Chikmagalur, was commissioned during 1971-72. In addition to soil sample analysis, water, fertiliser, compost and micro-nutrients analysis are also taken up in the laboratory. The farmers are appraised of the results of the analysis of soil samples and are also

guided about the deficiencies that are to be made up. In 1978-79, the number of samples collected and analysed at the Laboratory is as follows.

<i>Taluk</i>	<i>Samples Collected</i>	<i>Samples analysed</i>
Chikmagalur	3,434	3,434
Kadur	5,997	5,997
Koppa	1,386	1,386
Mudigere	326	326
Narasimharajapura	1,676	1,676
Sringeri	148	148
Tarikere	2,774	2,774
Special scheme at Tarikere	774	774
Total	16,515	16,515

Block Demonstration

The Block Demonstration was introduced in the district during 1974-75 with the object of educating the farmers in following the improved packages of practices and involving more and more number of farmers in its programmes, popularising high-yielding variety of crops, increasing the yield from the land and adopting crop strategy at all stages. About 50 to 100 acres of compact block is selected for the purpose and farmers of that area are made to get themselves involved in the programme. It takes up (a) Bench mark survey to assess the yield of the previous crop and package of practices followed, (b) conducting of series of night meetings to educate the farmers about the new technology and crop strategy to be adopted, (c) analysis of soil samples, (d) selection of crop and arrangement of financial assistance through societies and other institutions, (e) guiding the farmers in crop strategy at different stages of crop growth. During 1974-75, six such demonstrations were conducted, whereas in 1978-79 the number had gone upto 18, under the compact demonstration scheme 100 demonstrations were conducted during 1978-79.

Farm Management Scheme

A Farm Management Scheme is also being implemented in the district since 1976. The expenditure incurred during 1977-78 was Rs 27,202 and it was nearly Rs 0.290 lakhs during 1978-79.

Tribal Development Scheme

A Tribal Development scheme is in operation in the district since 1978-79 to help the tribal people in agricultural pursuits. It was first introduced in Koppa, Mudigere, Narasimharajapura and Sringeri taluks covering an area of 36, 90, 26, and 30 families in each taluk respectively. The inputs supplied were 63 quintals of seed, 210 quintals of Sampurna, 105 quintal of urea, 105 quintals of Rockphosphate, 52.50 quintals of muriate of potash, 63 quintals of insecticides, 42 quintals of fungicides and 210 ploughs.

Integrated Development of Western Ghats

The Integrated Development of Western Ghat Scheme is in operation in the district since 1973-74. The object is to improve the *malnad* tracts which have vast potential for development and the scheme covered the taluks of Koppa, Mudigere and Sringeri. In 1978-79 rockphosphate was supplied to cover 47.5 hectares of paddy, 27.5 hectares of pulse crop and 28 hectares of groundnut. Six Training programmes were held in each taluk and thirteen circle level programmes were conducted incurring an expenditure of Rs 2,675.

Community Nursery Scheme

In order to inculcate in the minds of the farmers about the scientific methods adopted in raising nurseries, the Department of Agriculture has taken up a scheme to supervise the raising of nurseries in an area of 1.215 hectares on the farmers' fields. Subsidy at the rate of Rs 400 per 0.4 hectare of nursery raised is given to farmers. The farmer can utilise the seedlings so raised and sell the remaining seedlings to the other farmers. In 1978-79, Community nurseries for paddy and ragi were raised in an area, of 15.187 hectares and 27.450 hectares respectively incurring a total expenditure of Rs. 28,600.

Sugarcane Development Scheme

A Sugarcane Development Scheme is in operation in the district. It aims at increasing the acre-yield through intensive cultivation and improved agricultural practices. The scheme envisages the establishment of a seed nursery, conduct of demonstrations, crop competitions, distribution of fertilisers and plant protection chemicals. The scheme is presently in operation in the taluks of Chikmagalur, Kadur and Tarikere.

Tobacco development

Tobacco Development Scheme, a Centrally sponsored scheme, is in operation in the district. It has programmes for the development of virginia flue-cured tobacco. The variety taken up under the scheme is virginia gold. The average yield of tobacco is about a tonne of cured leaf per hectare. As in 1978-79, there were 66 barns in Chikmagalur taluk, 4 in Kadur and 2 in Tarikere taluks.

Multiple Cropping Scheme

A Multiple Cropping Scheme is in operation in the district since 1977-78. The objectives of this scheme are to accelerate intensive cropping, to develop village leadership to streamline input supplies and credit services to organise storage, marketing and allied activities, to develop communications and other infrastructure facilities in the area and to increase the existing cropping intensity. The two crop sequences potato—wheat and paddy—Bengalgram performed well under rainfed conditions during 1977-78. Eighteen demonstrations on two-crop sequences were laid out under rainfed

conditions at the rate of Rs. 300 per demonstration per hectare of plot. In addition, dry farming practices were also followed. About 20 per cent of the grants provided for these demonstrations are earmarked for the welfare of Scheduled Castes and Scheduled Tribes by conducting demonstrations in their fields.

Plant protection

Timely plant protection measures are being implemented in the district. Large-scale plant protection campaigns and plant protection trails to find out the suitability of newly introduced pesticides and fungicides, training courses to farmers in the use of pesticides and fungicides and distributing plant protection equipments and chemicals at subsidised rates have been taken up. The area covered under plant protection programmes for the year 1978-79 are detailed below.

<i>Programme</i>	<i>Area covered in hectares</i>
Seed treatment	31,160
Control of field rats	9,100
Control of soil and polyphagous pest	20,593
Intensive plant protection measure	29,800
Chemical weed control	113
Chemical samples collected for analysis	35

The efficiency of almost all the chemicals was found to be generally good. In 1978-79 a sum of Rs. 9,808.78 was spent to procure various types of plant protection equipments. In the same year 377 cultivators and Extension staff in the district were trained in general plant protection measures and 48 Extension Workers and 1,834 farmers were trained in maintenance of plant protection equipments.

Rodent Control

An Intensive Rodent Control scheme is in operation in the district since 1978-79. This is in addition to Rodent control programme in the irrigated tracts of Tarikere taluk. A scheme for the control of brownhoppers is in operation in Koppa, Narasimharajapura and Tarikere taluks.

Small Farmers Development Agency

A Small Farmers Development Agency was started at Chikmagalur in 1978. It aims at identifying small farmers, marginal farmers and agricultural labourers and their problems, for bettering the socio-economic conditions and to make potentially viable farmers as viable farmers. It arranges for the supply of inputs, credit and marketing facilities in order to help the people of these categories. The taluk-wise number of small farmers,

marginal farmers, agricultural labourers and rural artisans identified in the district as on 31st October 1979 is table below.

<i>Taluk</i>	<i>Small farmers</i>	<i>Marginal farmers</i>	<i>Agricultural labourers</i>	<i>Rural artisans</i>	<i>Total</i>
Chikmagalur	3,238	7,578	1,522	133	12,271
Kadur	6,210	5,887	2,751	433	15,281
Koppa	653	1 151	1,445	344	3,593
Mudigere	662	1,741	1,346	93	3,842
Narasimharajapura	929	716	1,399	121	3,165
Sringeri	520	902	832	134	2 388
Tarikere	2,970	5,175	4,758	55	13,67e
Total	15,182	22,950	14,053	2,033	54,218

The Agency is financing persons engaged in agriculture, horticulture, animal husbandry, irrigation, fisheries, sericulture, industries, bee-keeping, co-operation, etc. This Agency has been brought under the District Rural Development Society which came into being on 21st March 1979.

District Rural Development Society

The District Rural Development Society was established at Chikmagalur in March 1979. All the district level officers are members and the Deputy Commissioner of the district is the Chairman, the Project Director of the Small Farmers Development Agency (now merged with DRDS) is member-Secretary. This Society takes up various programmes under the Small Farmers Development Agency, the Drought Prone Area Programme and the Intensive Rural Development Programme, receives funds for implementation of such programmes as grants-in-aid from the Government.

The Society has so far identified 52,418 beneficiaries, drafted annual action plans under the SFDA, the DPAP and the IRD, adopted its bye-laws, devised rules of procedures and is implementing these programmes. The Schemes under these three programmes range from sub-soil moisture conservation and prevention of surface water run off in drought prone areas for popularising new and improved packages of agricultural and horticultural practices.

In subsidy-oriented programmes, the institutional finance is a significant component. Upto the end of November, 1979 the society got over Rs. 2.924 lakhs as long-term, Rs. 10 lakhs as medium-term and Rs. 15 lakhs as short-term agricultural operational loans for distribution among the farmers from the various credit institutions in the district.

Drought Prone Area Programme

The Drought Prone Area Programme, a Centrally sponsored scheme, is introduced in places where there is dry land farming, where the rainfall is uncertain and less than 100 cm and where less than a quarter of the total

sown area is under irrigation. It is in operation in Kadur taluk of the district since 1974-75. The soil conservation and dry land development programme taken up under this scheme consists of contour bunding at Rs. 250 per hectare, soil over-work at Rs. 50 per hectare, land reclamation at Rs. 100 per hectare, gully plugging at Rs. 500 per hectare. During 1979-80, under soil conservation and dry land development programmes the project has spent Rs 20,000.

Crop competitions

Crop competitions are organised in respect of a few crops at taluk, district, state and national levels, for purposes of creating a healthy competitive spirit among the farmers and instituted the award of prizes to those who could get highest yields from their lands. At the district-level competitions held during 1978-79, the maximum yield per acre was 4,067 kg of paddy, 1,381 kg of ragi, 64,280 tonnes of sugarcane. Those who could turn out outstanding work in this behalf also got prizes.

Krishik Samaj

A branch of the State Krishik Samaj is functioning in the district, with its branches in all the taluk headquarter places. *Inter-alia*, it procures and distributes new varieties of seeds to the farmers. The main objectives of the Samaj are to study the problems of the farmers, to help them to get protection against eventful calamities, to educate and train the agriculturists with the help of Government departments and other agencies, to bring about improvement in the living standards of farmers, and to induce them to strive for achieving financial, social and cultural improvements. As in 1975, there were seven life members and 342 ordinary members in the Samaj in the district.

IRRIGATION

As the district comprises two broad natural regions, the sources of irrigation vary. There are seven rivers and a number of streams, tanks and irrigation wells in the district. There is an assured supply of water, particularly for the main season crops in large parts of the district. According to the figures of 1978-79 made available by the State Bureau of Economics and Statistics, the district had 10,220 hectares under canals, 16,408 hectares under tanks, 1,938 hectares under irrigation wells and 2,078 hectares under other sources, the total area under the various sources being 30,644 hectares.

Bhadra Reservoir Project

The Bhadra Reservoir Project is located at Lakkavalli in the district. While the right bank of the reservoir is in the Tarikere taluk of this district, the left bank is in the Bhadravati taluk of Shimoga district. The idea of constructing a reservoir across the Bhadra river for providing irrigation facilities to the dry areas of Shimoga and Chitradurga districts was thought

of, first as early as 1856, and many alternative proposals were also considered. Later detailed investigations were taken up in 1927, and by 1939, a comprehensive scheme for the development of both power and irrigation from the Bhadra river was prepared. The catchment area, one of the best comprising mostly hilly and steeply sloping region is about 1,968.5 sq km mainly in Narasimharajapura taluk. The annual rainfall in the catchment area varies from 117 cm to 513 cm (46" to 202"). During the monsoon, the river carries heavy discharges. The average yield of rainfall at dam site is nearly 2,832 M.cmt in a year.

The project comprises a masonry dam 59.13 mtr. (194 ft.) high above the Bhadra river-bed to impound 2,205.87 M.cmt. of the Bhadra waters. The length of the dam is 440.5 mtr. (1,445 ft.) with a central ogee spillway to discharge nearly 3,031 c.mtr. per second of flood water. The right-bank and left-bank channels with their branches irrigate 99,010 hectares in Chikmagalur, Shimoga, Chitradurga and Bellary districts. The right-bank canal is 102.76 km in length upto the regulator point (near Shantisagara tank in Shimoga district) from where it branches off into Malebennur and Davanagere branch channels, which are 49.08 km and 90.20 km in length respectively. The right-bank canal irrigates 4,785.89 hectares of land in Tarikere taluk of the district and then goes on to Shimoga and Chitradurga districts.

Jambadahalla Reservoir

The Jambadahalla Reservoir is constructed across the Jambadahalla stream near Duglapura in Tarikere taluk of the district. The work of the dam was started in 1959 and completed in 1980 at a total cost of Rs. 118 lakhs. The length of the dam is 3.2 km. It is an earthen dam with masonry spillway. The catchment area of the reservoir is 156 sq km. The area irrigated is 1,539 hectares all in Tarikere taluk.

Lakhya Dam

The Lakhya dam is being constructed across the Lakhya stream, a tributary of the Bhadra river. The construction work was started in 1977. The level of the river-bed at dam-site is 790 metres (MSL), and the full reservoir level will be 850 metres (MSL). A spillway of approximately 70 metres in length and 35 metres in width is being provided. The catchment area is 20 sq. km. and the water-spread area is 2.70sq. km. The dam will have a storage capacity of 91 M. cmt. and will hold tailings (ore rejects) for ten years. It is designed to hold 13 million tonnes of tailings of the Kudremukh iron ores.

Tanks

There are 1,862 tanks in the district, with a total *atchkat* of about 35,755 hectares. The extent of area irrigated by important tanks was as under in 1979.

<i>Name of tank</i>	<i>Area irrigated (in hectares)</i>
Madagakere	6,039
Ayyanakere	1 575
Basavanahallikere	697
Doddakere of Kelavadi	449
Hiligundinakere of Indavara	186
Doddakere of Amble	12
Hirekolale tank	93

The number of minor tanks maintained by the Taluk Development Boards in 1979 was as follows :

<i>Name of Taluk Board</i>	<i>No. of minor tanks</i>
Chikmagalur	706
Kadur	20
Koppa	168
Mudigere	270
Narasimharajapura	62
Sringeri	200
Tarikere	120
Total	1,546

Madagakere

Madagakere is an old tank of the district. It is constructed across the Tayihalla stream. From it emerges the Avati river which joins the Veda near Kadur and forms the joint stream Vedavati. This tank provides irrigation facilities to about 2,039 hectares in Kadur taluk. The embankment is about 366 mtr. (1,200 ft.) long and 18.3 mtr. (60 ft.) in height. The storage capacity of the tank is 375 M.cft. (10.5 M. cubic meter).

Ayyanakere

Ayyanakere, which is one of the old tanks, is situated about seven km west of Sakrepatna and at the eastern base of the Baba-Budan range. It is formed by embanking Gourihalla stream at the foot of the Shakunagiri. Its overflowing waters are called the Veda, which unites at some distance, with the Avati near Kadur and forms the joint stream called the Vedavati. The construction of this tank is attributed to Rukmangada Raya, a legendary chieftain of Sakrepatna. The embankment, formed of earth and stone, is about 518.5 mtr. long and 91.5 mtr. high at the rear slope. The tank is very deep, and in several parts contains 10.68 mtr. of water. The contents of the bund have been estimated at 4,63,406 cubic mtr. and the quantity of water at 5,621 cubic mtr.

Irrigation wells

Though surface water is the major source of irrigation in the district, ground water is also tapped to a considerable extent for the purpose. The area irrigated by wells was 1,279 hectares in 1968-69 and 1,985 hectares in 1971-72. The number of wells used for irrigation was 1,655 in 1971-72. In 1978-79, the number of wells was 2,643 and the area irrigated was 1,938 hectares. The taluk-wise number of irrigation wells and the area irrigated by them in 1978-79 were as follows.

<i>Taluk</i>	<i>No. of wells</i>	<i>Area irrigated (in hectares)</i>
Chikmagalur	134	277
Kadur	447	415
Koppa	8	18
Mudigere	31	15
Narasimharajapura	37	210
Sringeri	6	6
Tarikere	1,990	997
Total	4 653	1,938

In many of the coffee-estates of the district, sprinkler irrigation is practised for aiding the blossoming and maturity of the crops. Unauthorised opening of canals, bunding-up of flow of water, diverting of water and cutting open the channels to feed water to lands are offences under the Irrigation Act of 1965. There are gangmen or *Sowdis* who are in charge of maintenance of the channels and distributaries and they regulate the supply of water as per the requirement in the *atchkat*.

Famines

Major parts of the Chikmagalur district are well favoured by nature. But the *maidan* parts of the district are sometimes subject to scarcity conditions. Especially the Kadur taluk and some adjacent areas of the district are drought-prone areas. The chances of a serious famine in the *malnad* parts are rare. Even the very severe famine of 1876-78, which affected the dry districts of the State, did not affect much the *malnad* areas of the district. Distress conditions prevailed in 1905-06, when the South-west monsoon commenced later than usual and ended earlier, and the north-east monsoon was also not satisfactory. The *malnad* taluks were not affected, but the dry crops in the *maidan* parts did not yield more than 50 per cent of the average yield. Especially in the Kadur area, the yield was still less and there was shortage of foodstuffs. But the situation changed with the favourable seasonal conditions in the following year. There was a distress condition in 1918-19 and 1919-20, partly due to failure of rains and after-effects of the First World War. The situation, which was acute in the middle of 1918, improved by the end of December, but again there

were difficulties for some months in 1919. Later, there were distress conditions during the years 1965-66 to 1968-69 and 1972-73 in the *maidan* parts of Chikmagalur, Kadur and Tarikere taluks. Various relief measures were undertaken. The number of villages affected and the amount of land revenue remitted and expenditure incurred on relief measures during those years are given hereunder.

Year	No. of villages affected	Land Revenue remission Rs.	Amount spent on relief works Rs.
1965-66	479	5,64,652	84,493
1966-67	475	3,79,056	1 99, 28
1967-68	455	3,58,996	1,05,721
1968-69	172	1,63 2 4	23,85,134
1972-73	372	2,49,951	35,53,625

Distress conditions were again experienced in 1976 in the *maidan* parts of which 116 villages of Chikmagalur taluk, 288 villages of Kadur taluk and 183 villages of Tarikere taluk were affected by drought. Relief was provided to the affected taking up 146 relief works at a cost of Rs 14,74,063, and also by deepening 147 wells, drilling 61 bore wells digging another 16 wells.

Cyclonic fury

Parts of Koppa and Sringeri taluks were hit by the fury of a cyclone on 2nd October 1972 causing heavy damage, the extent of which is indicated below.

(Amount in Rupees)

Taluk	No. of villages affected	Extent damaged (hect)	No. of persons affected	No. of areca trees uprooted	Total loss	Relief given	
						Loan	Gratuitous
Koppa	5	204	137	34,948	11,10,357	2,78,3 0	12,555
Sringeri	20	1,000	246	38,687	14,46,865	3,56,239	43,66
Total	25	1,204	383	73,631	25,57,222	6,34,609	55,915

Floods

Floods have sometimes caused loss of crops and animals in the district. In 1924, parts of the district experienced heavy rainfall for 20 days, and in some places it was as high as the annual average of the earlier ten years. At Kottigehara, there was an abnormally heavy rainfall of 21 cms. in one day. The Hemavati, the Bhadra and the Tunga valleys were the most affected. There were a few landslides also. Some cattle were lost and several roads and bridges suffered damage. There were floods in the district during 1961-62 and 1963-64 when totally about 2,290 persons were affected, three persons died and 241 houses collapsed. Relief in the form

of loans was provided to the sufferers to the tune of Rs 7,40,760 bearing interest, and another sum of Rs. 7,70,400 as loans free of interest.

HORTICULTURE

When the food situation became acute in the country in recent decades, more attention had to be paid to growing of fruits and vegetables. Steps were taken to encourage horticultural pursuits and to make the people realise the importance of horticulture. Various programmes of horticultural activities were extended to all the districts of Karnataka State after a separate full-fledged Department of Horticulture was brought into existence in 1963 with the aims of developing many horticultural crops with special and concentrated attention to each of them. The Chikmagalur district possesses congenial climate and soils for the cultivation of fruits, vegetables and plantation crops. A horticultural office was started at Chikmagalur in 1947 with a District Horticultural Inspector. Twenty years later, i.e., in 1967, after expansion of horticultural activities, a District Horticultural Officer was appointed.

The district is agro-climatically well-suited with varied types of soils favouring also the cultivation of citrus and other varieties of fruits like banana, sapota, mangoes, etc. Several kinds of vegetables like cabbage, cauliflower, knol-khol, carrot, beet-root, radish, brinjal, beans, peas, tomato, chillies, gourds and the like are grown well here. Such horticultural crops in the district are helpful as an economic balancing factor for a number of agriculturists whose lands are considerably used for growing horticultural crops. The area under horticulture has been gradually increasing. Brinjal, tomato, cucumber, gourds, cole crops, beet-root, radish, sweet potato, carrot and different kinds of beans are grown on a large scale and are exported to the neighbouring districts and also to the markets of Bangalore and Mangalore.

Farms and Nurseries

The Horticulture Department has opened farms and nurseries at several places in the district for providing the required quality seed-material for the various horticultural crops. The year of starting of such farms and nurseries, their area and the quantity of seedlings supplied are shown below.

<i>Name of Farm</i>	<i>Year of Starting</i>	<i>Extent in hectares</i>	<i>Seedlings supplied in 77-78</i>
District Horticultural Nursery and Farm, Dantramakki	1949	3.85	3,126
Horticultural Farm, Mudigere	1964	15.18	71,519
Horticultural Farm, Koppa	965	2.12	5,912
Horticultural Farm, Tarikere	1968	4.05	..
Horticultural Farm, Narasimharajapura	1972	4.05	13,085
Horticultural Farm, Sringeri	1972	1.20	300
Horticultural Farm, Sakrepatna	1975	4.05	1,40,642
Horticultural Farm, B. Kanabur	1976	14.15	..
District Horticultural Office Nursery, Chikmagalur	1969	0.61	..

Development Schemes

Several horticultural schemes are being implemented in the district for the development of horticultural crops. A Fruit Development Scheme was started in 1963-64 in all the taluks of the district. The total area under the scheme is 8,192.77 hectares for growing banana, citrus varieties, sapota, mango, guava, avocado, pineapple, pomegranate, etc. In 1963-64, an Areca Development Scheme was launched to raise and distribute quality seedlings on no-loss and no-profit basis. Areca nurseries have been established in Koppa, Mudigere, Sringeri and Tarikere taluks. A Pepper Development Scheme was initiated in 1965-66 for developing the area under pepper and to earn foreign exchange. In order to increase the production, work of raising and distribution of local as well as hybrid varieties of rooted pepper cuttings has been taken up, and demonstration plots in regard to package of practices are laid out to educate the farmers. About 50,000 rooted pepper cuttings are being distributed. A Cardamom Development Scheme was also started in 1965-66 to increase the area under this crop in the district.

A Cashew Development Scheme is in operation in the district since 1965-66, particularly in the Kadur and Tarikere taluks. Cashew nurseries have been started in the departmental farms, and the seedlings are supplied on no-profit and no-loss basis. In 1965-66, a Coconut Development Scheme also was taken up to extend the area under coconut cultivation. Procurement of seed-nuts and raising of seedlings for distribution are done and demonstration plots are also laid in Chikmagalur, Kadur and Tarikere taluks. An Areca Development Scheme was started in 1963-64 for the development of this crop, and nurseries have been raised in the horticultural farms at Koppa, Mudigere and Tarikere. In 1963-64, a Vegetable Development Scheme was started to provide vegetable seeds and seedlings. In addition, a crash programme and a Scheme for cultivation of vegetables and quick-growing fruits in big towns are also in operation. Kitchen Gardens, institute gardens and demonstration plots have been laid out. The crash programme is undertaken after the harvest of paddy crop in tank beds and paddy fields.

A Horticulture Scheme under the Western Ghat Development Scheme was taken up during the year 1974-75. Under this scheme, an area of 4.05 hectares has been planted with different varieties of fruits in the Horticultural Farm at Mudigere. During 1977-78, an expenditure of Rs 12,000 was incurred on this. A Bhadra Project Scheme was started during 1974-75 to develop the Bhadra Reservoir Project area with horticultural crops and to bring more area under vegetable and fruit crops. It benefits families belonging to the Scheduled Castes and Scheduled Tribes. During 1975-76, two demonstration plots were laid out and 360 fruit plants were distributed, and the expenditure incurred was Rs 15,000. A scheme under Drought-Prone Area Programme is in operation in the Kadur taluk. A dry Orchard Farm of 40 hectares has been established at Sakrepatna to

meet the demand of seed materials of horticultural crops. During 1977-78, 40 farmers were trained in growing horticultural crops. Demonstrations and school gardens were laid out and soil conservation work was also taken up. A scheme under a Tribal Sub-Plan was started in 1977-78 to train tribal people in horticulture and to develop kitchen gardens for improving their economic condition. A general sub-plan for the welfare of families of the Scheduled Castes and Scheduled Tribes was also commenced in 1978-79 for providing training in horticulture and to develop kitchen gardens. In 1976-77, a Centrally sponsored scheme was initiated in the district for the development of banana for export purposes. A Plant Protection Scheme is also in operation in the district.

A. R. D. C. Schemes

The Agricultural Refinance and Development Corporation, Bombay, has sanctioned loans for the development of orange, areca and coconut. An Orange Refinance Scheme was initiated in 1968 to give impetus to cultivators to take up orange cultivation intensively. Loans at the rate of Rs 2,000 per acre was sanctioned for 420 acres upto the year 1979. An areca Refinance Scheme was sanctioned during 1969-70 under which a loan of Rs 500 per acre is advanced repayable in seven annual instalments. Upto the year 1979, loans for 133.65 hectares were extended. The Coconut Refinance Scheme has three divisions viz., (1) *maidan*, (2) *malnad* acreage system and (3) *malnad* unit system. Under the *maidan* division, loans are advanced at Rs. 2,400 per acre, repayable in three annual instalments, and an area of 886.14 hectares was covered under this upto 1979; under the second division, a block has to consist of one acre or more, and the area covered was to the extent of 95.58 hectares; under the third division, a unit consists of 60 coconut plants all along the bunds, and under this, 38.88 hectares were covered.

Applied Nutrition Programme

An Applied Nutrition Programme is in operation in Kadur, Koppa, Mudigere and Narasimharajapura blocks. Its objectives are to establish an effective field service to improve the diet through education and demonstration among the village communities and to bring into vogue sound practices for production, preservation and use of protective and nutritious fruits and vegetables. The Kadur block has laid out six community gardens, 14 school gardens and 282 kitchen gardens. The Koppa block has one community garden, one school garden and 20 kitchen gardens. The Mudigere block has 105 kitchen gardens, five school gardens and three community gardens. The Narasimharajapura block has three community gardens, five school gardens and 95 kitchen gardens.

Horticultural training

There are horticultural training centres at Mudigere and Koppa in the district. During 1977-78, five persons were trained at Mudigere and four

at Koppa. The duration of the course is 12 months and a stipend of Rs 100 per month is given to each candidate and the minimum qualification for admission is a pass in S.S.L.C.

Horticultural Society

The Mysore Horticultural Society started its branch at Chikmagalur in 1957 with the main object of promoting and developing horticultural activities both in aesthetic and commercial aspects. Any person interested in horticulture may become a member by paying an annual subscription of Rs 19. There are 15 life members and 33 annual members in 1979-80. The members get plants and seeds, in addition, free technical guidance and publications of the Society.

Krishnarajendra Hill Station

In the Krishnarajendra Hill Station of Tarikere taluk, different kinds of trees, creepers and flowers are grown, and ornamental garden and lawns have been laid out. Its garden has an area of 30.38 hectares. A seed production programme has also been taken up at this place. Fruit plants of apple, plum, peaches, straw-berry, orange, guava, passion fruit, etc., have been planted. Production of potato-seeds is in progress. Vegetables like peas, beans, radish, carrot, beet-root and potato are also grown on the slopes of this hill station.

Garden crops

Coconut

Coconut is the most important garden crop in Kadur and Tarikere taluks, with an area of 8,041 and 2,245 hectares respectively. The coconut palm flourishes well in highly red soils, sandy loams, light alluvial soils, rock debris and low-lying areas and tank beds. It requires equable climate, bright sunshine and well-distributed rainfall. It cannot withstand heavy drought, and as such, it is irrigated during dry season. Coconut trees are usually propagated from nuts which have not been plucked, but have been allowed to ripen and fall from the tree. The trees begin to bear after three to twelve years depending upon the variety and the nature of the soil and continue to yield till they are about forty to sixty years. It is estimated that a tree yields 250 to 300 nuts a year. Rhinoceros beetle and red palm weevil are the two dangerous pests of coconut. They are controlled by picking or treating the plants with insecticides. Bud-rot disease may cause damage to young seedlings. Stem bleeding, another disease, can damage the trunk of the plants. *Anabe-roga* is a serious disease which proves fatal to these plants.

Arecanut and betel leaves

Arecanut is also an important crop in the district with an area of 13,973 hectares as in 1979. The Koppa taluk has the largest area under this crop with 5,662 hectares followed by Tarikere with 2 391 hectares,

Sringeri with 1,920 hectares, Kadur with 1,747 hectares, Mudigere with 1,377 hectares, Narasimharajapura with 515 hectares and Chikmagalur with 361 hectares. Arecanut is grown in places of heavy, well-distributed rainfall, but it also comes up well in the *maidan* parts under irrigated conditions. It flourishes well in black loamy, laterite and red loamy soils, tank-beds and deep valleys. Seed-nuts are usually selected from the second crop of mature trees. An areca palm begins to bear in about 8 to 12 years after planting. It takes eight to ten months for the flowers to mature into ripe nuts. *Kole-roga* and *Anabe-roga* are the more serious diseases of the crop. The yellow leaf disease (*Tonde-Roga*) is prevalent in Koppa, Sringeri and Narasimharajapura taluks for the past 20 to 30 years. The measures suggested to combat the disease are providing of deep drains, application of lime, organic manures and fertilisers and irrigation during the hot season. The practice of leasing out areca gardens is prevalent in Sringeri and Koppa taluks. The bunches of nuts have to be harvested by skilled labourers and the branches are to be lowered down to avoid damages to the nuts. Then they are carried to the curing yard. The curing process consists of four stages, viz., (i) husking, (ii) slicing, (iii) boiling and (iv) drying. After drying, the nuts are graded which is essential to get a good price. The gradation is done into 20 or more varieties as per their quality, shape etc.

Usually, betel leaves are raised as an inter-crop in areca gardens, the area of which was 218 hectares in the district in 1979. The three types of betel leaves grown in the district are white leaves, black leaves and *ambadi*. The betel leaves grown in 79 hectares in some of the areca gardens of Tarikere taluk are of a special nature with less pungency and they are well-known. The common diseases of betel leaves are leaf-spot, wilt, powdery mildew and downy mildew.

Pepper

Pepper, popularly called the "queen of spices", is also an important crop in the district, grown as an inter-crop in coffee and areca gardens. In 1979, the area of the crop was 159 hectares in Chikmagalur taluk, 237 in Koppa, 434 in Mudigere, 83 in Narasimharajapura, 62 in Sringeri and 42 in Tarikere taluks. Rooted cuttings at the rate of two per palm are planted at the base of each areca palm or under the shade trees in coffee gardens about 30 to 35 cm away from the base of the tree. Pepper-vine commences yielding from the third year. There are various schemes in operation for the development of this crop in the district.

Cardamom

Cardamom, which is hailed as the "king of spices", was found in the remote past growing in a wild condition in the mountainous areas of this and other districts. Later it began to be cultivated with great care. As in 1979, the Mudigere Taluk accounts for the larger extent with 11,324 hectares, followed by 306 in Koppa, 156 in Chikmagalur and 34 and 15

in Narasimharajapura and Sringeri taluks respectively. Cardamom is a perennial plant, lasting for more than ten to fifteen years. It grows well in moist, elevated and shady places of forest-loams which contain plenty of organic matter. It requires a fairly distributed annual rainfall ranging from 2,500 mm to 5,000 mm. The cultivation of this crop demands considerable attention, skill and patience on the part of the growers. The cardamom plants begin to bear fruit in the fourth or fifth year of planting and thereafter annually. Their good economic life is put at 15 years; but they continue to bear some fruit for another 15 years if properly maintained. During the period of growth of these plants, in their initial stages and even afterwards, pests like stem-borer may enter into the stem of the cardamom plant, the hairy caterpillars may eat away the foliages and thrips may suck the juice from the tender capsules. The *katte* disease and the leaf-spot disease are the two fatal diseases affecting cardamom plants. The former disease is a virus disease spread by the pest called aphid. The yield of the affected cardamom plants would be much reduced and ultimately they cease to bear fruit. The Department of Horticulture has been implementing a Katte Disease Eradication Scheme.

Cardamom Board

The Central Cardamom Board, Cochin, set-up Katte Disease Control Unit at Mudigere in 1969. It is supplying cardamom seedlings free of cost to those growers who take up the work of uprooting the affected plants and planting healthy ones in their places. Incentive subsidy, in the form of plant-protection chemicals and manure, calculated at the rate of Rs. 150 for every 200 disease-stricken plants removed and healthy seedlings replanted, is also given by the Board. It is also assisting the cardamom-growers in following the improved methods of cultivation and processing of cardamom, in improving the marketing of cardamom in India and elsewhere. It undertakes or assists researches, etc. The Board advances loans to cardamom-planters for installing sprinkler irrigation equipments in their estates. Under the Katte Disease Eradication Scheme, the help rendered by the Board in this district from 1969-70 to 1976-77 is indicated below:

Year	Area in hectares	No. of Katte disease plants uprooted	No. of healthy seedlings supplied free of cost	Subsidy amount in Rs.
1969-70	468	66,627	64,276	49,970
1970-71	496	85,782	84,912	64,336
1971-72	287	52,260	51,725	39,195
1972-73	558	79,303	75,456	59,477
1973-74	770	86,752	83,059	65,064
1974-75	272	70,009	63,895	52,506
1975-76	143	8,718	76,644	..
1976-77	84	36,265	33,924	..

The Katte Control Scheme was discontinued from 1977-78.

Cardamom Research Station

A Regional Cardamom Research Station was started at Mudigere in 1957 by the State Department of Agriculture. In 1963, it was handed over to the Horticulture Department, and then transferred to the University of Agricultural Sciences in 1965. The area of its farm in 1957 was 30.375 hectares and it has been now extended to 60.750 hectares. A survey was conducted in Karnataka, Kerala and Tamil Nadu by the Station and 531 clonal and 1,207 seed selections were made and observed for some years, and 80 high-yielding clones, 80 early-bearing types and 13 leaf-rot resistant types were isolated. Investigations about diseases affecting the Cardamom plants and experiments about better growth and yield are being conducted by the Station. Under an all-India co-ordinated spices and cashewnut improvement project of the station, a survey was conducted in the Mudigere cardamom area, and selections were made. Some allied genera of cardamom were collected and planted for use in breeding. Yield trials were made and S. 1289-54, 1286-35, 1294-60 and 1294-57 were found to be promising. Inter-generic crosses have also been made. Studies on floral biology of Cardamom have been conducted.

Coffee

The Chikmagalur district was the first to grow coffee in India. The cultivation of coffee has an eventful back-ground. It is said that Arabica coffee was introduced about 1670 A.D. by one Baba Budan. He is reported to have brought seven seeds from Yemen, presumably *mocha* coffee, and raised seedlings on the hills near the Dattatreya Peetha village in Chikmagalur taluk. Later, coffee seedlings gradually came to be planted in the backyards and gardens in the neighbouring villages, particularly Attigundi. It was from these gardens that seedlings were supplied to Kodagu (Coorg) district of Karnataka and to the neighbouring State of Kerala. Nurseries around Attigundi village continued to supply seedlings for a number of years to various parts of south India. About 1800, Buchanan had recorded that coffee was being imported into India. It was only in the late 1820s that commercial plantations were opened in south India by British enterprise. Mr. Jolly of Parry and Company seems to have started the first coffee plantation in the State, in the neighbouring district of Shimoga in about 1823-25. In Chikmagalur district, the earliest large-scale plantation was established by Thomas Cannon in 1830 and it is called Mailimane Estate and is still in a good condition. A few years later, Mr. Strokes laid out a coffee garden in 1835. This caught the imagination of a few in the district who made sporadic attempts to follow suit. In 1843, Fred Meppen opened estates near Yemmedoddi of Kadur taluk.

The earliest coffee grown in Chikmagalur district was called Chic deriving it from the name Chikmagalur. Due to continuous failure of timely rains for three years, the chic variety was attacked by borer in 1865 and the vigour of coffee plants declined. It was stated in the report of

Surgeon George Bidie that the attack of borer was prevalent for thirty years from then it was severe during the last ten years of that period. When it was thought that the chic variety would get extinguished, Stanley Jupp brought coffee seeds from Kodagu (Coorg) in 1870. Encouraged by this, several planters in the district took to planting Coorg Coffee, and then the coffee estates revived. There was always a premium price for Mysore coffee. In 1869, leaf disease and pests appeared, and in a few years they destroyed many coffee plants. The coffee-growers in the 19th century thus struggled hard to see that coffee was not extinguished. The production declined and the cost of cultivation increased.

In 1911, Kent, owner of Doddanagudda Estate near Aldur of this district, found out a new variety of Arabica coffee. This was known as "Kent Coffee". Late Dr. Leslie Coleman made strenuous efforts for the development of coffee plantations with a keen interest and leadership in coffee research. He encouraged selection and breeding programmes which played a significant role in the remarkable achievements of the industry. He prepared guidelines of research on cultivation of coffee, especially in the problems of leaf rust control. He introduced, for the first time, large scale spraying of bordeaux mixture in coffee plantations as a protective measure against leaf rust, and caused imposition of quarantine measures to exclude entry of pests and diseases from other coffee-growing countries into India. He emphasized the need to evolve rust-resistant strains through breeding programmes. He was both a mycologist and entomologist, and did research on black rot of coffee. He did much work on the problem of green bug and white stem borer of coffee. The UPASI (United Planters Association of Southern India), which was formed in 1893, was stressing the need for research in coffee. Recognising this need, the then Maharaja's Government opened a research station at Balehonnur. Due to depression in 1930s, there was a slump. During the Second World War, the foreign markets were closed and the extent of area under coffee also decreased. In 1937, the Government of India appointed a Coffee Cess Committee with a view to helping marketing of coffee. The Central Government, realising that there should be control on the inland and foreign markets of coffee, formed in 1940, a Coffee Market Expansion Board which later became the Coffee Board in 1941.

The area of cultivation of coffee as also the number of coffee estates, have been gradually increasing in the district. The extents of area and production of coffee during the years from 1966-67 to 1977-78 are shown in the table given below :

(Area in hectares and production in tonnes)

Year	Arabica		Robusta		Total	
	Area	Production	Area	Production	Area	Production
1966-67	26,244	15,165	7,277	5,450	33,521	20,615
1967-68	26,474	14,189	7,239	4,288	33,716	18,417
1968-69	27,716	18,818	7,133	3,519	34,849	22,337
1969-70	25,038	13,089	7,621	4,765	32,659	17,854
1970-71	28,618	22,034	7,197	8,097	35,815	30,181
1971-72	28,43	17,381	7,316	4,609	35,751	21,990
1972-73	30,571	24,117	7,509	5,935	38,080	30,082
1973-74	30,828	15,151	7,477	7,216	38,305	22,367
1974-75	30,828	26,126	7,477	5,637	38,305	31,763
1975-76	32,539	16,145	9,566	4,984	42,105	21,129
1976-77	32,577	23,775	6,397	7,175	38,974	30,950
1977-78	34,157	20,375	8,067	12,240	42,224	32,165

Cultivation of Coffee

Care has to be taken in the selection of fields for coffee cultivation in order to obtain a tract well sheltered by nature from undue exposure either to the south-west or the east wind. The area should be in the zone that is favoured with as large a share as possible of the March and April showers and yet not visited by two heavy rains of the south-west monsoon. The coffee plant rejoices in a damp, warm temperature at elevations from 2,500 to 3,500 ft. above the sea level. But it can grow under certain circumstances at elevations both below and above those elevations also. A good loamy soil, of any colour, with a good deposit of vegetable matter on the surface and not much rock underlying it, is required.

There are varieties of land in Chikmagalur district in which coffee has been planted, such as the ordinary forests, the heavy ghat forests and village jungles or land the original timber of which was cut and then followed by a secondary growth of trees of a smaller type. Some of the finest coffee estates have been formed on lands of the first and third varieties of forests mentioned above which have the decided advantage, over all other descriptions, of possessing a rich deposit of decayed vegetable mould that has not been exposed to atmospheric influences and hence contains an almost inexhaustible store of organic and inorganic constituents available as food for coffee plant.

Large trees that have a thick foliage in the hot weather and little or none in the monsoon are kept as shade at regular distances, attention being paid to leave fewer trees on portions with a northern aspect than on those facing the south, all quarters exposed to the wind especially requiring protection. Lines of pegs generally 8'×8' are laid out and the land is pitted each pit being generally 1½'×1½'×1½'. This is done to remove obstacles to the roots of the young plants, and to make a nice loose bed

for their reception. For nurseries, convenient situations with facilities for irrigation or with river or tank frontage are selected and entirely cleared of trees, the soil being dug to the depth of two feet or more and every root and stone removed. This is then laid out into beds, generally about four feet wide, separated by paths and the whole field well-drained and put in order with the same care as needed for a flower garden. Manure is applied and the beds are then cut up into furrows six inches apart, into which the seeds are placed about one inch apart. The whole bed is then covered up with dry leaves or straw and watered by hand, care being taken to maintain a uniform rate of moisture which must not be excessive. The seed germinates in six weeks and from the bean which is raised on a slender green stem of about eight inches in height, burst forth into two small oval leaves. These two-leaved seedlings are pricked out into beds at either 4×4 or 6×6 inches. They require atleast eight to fourteen months, with constant attention and watering, to form into good plants.

Planting is done in the months of June, July and August. The plants, being carefully removed from the beds and the roots trimmed, are planted with a spade or planting staff by a regular team of experienced men. Under favourable conditions, the plants are ready for topping in the second year. A topping staff duly marked to the proper height, is placed alongside of the young tree and the top or head and one primary branch are removed, for directing the sap into the primary branches and making them throw out secondary shoots which comes from each eye along the branch. An abundance of vigour has the effect of forcing out a number of shoots under the junction of the upper primaries with the stem and also from the stem at various places. The first crop generally appears in the third year, and consists merely of a few berries on the primary branches aggregating about one maund per acre. In the fourth year, a return of one cwt per acre may be expected. It is not until the seventh or eighth year that the planter is rewarded by a full crop exceeding five or six cwts per acre. The crop begins to ripen in October and November. As soon as the berries are of a fine red colour, they are picked into baskets and brought to the pulper to be either measured or weighed and deposited in a vat made for their reception.

Drying process

The berries are passed through the pulper with a stream of water either the same day or early next morning. The outer skin being thus removed, the beans are allowed to ferment for twenty or twenty-four hours, without water to facilitate the removal of saccharin matter which surrounds them. After the mass has been washed and well stamped out, all light beans and skins being carefully separated, the beans are removed to the draining mats where they are constantly turned over and allowed to dry for a day or more until all water gets drained off. They are then spread out thickly on the drying ground in order to dry slowly. This is an operation requiring constant attention for six or eight days.

The beans should not be dried too thinly spread or too suddenly exposed to the rays of the Sun as they are apt to become bleached and bent. A drying ground protected by large trees is considered the best one as shade and sun are available. When the beans are sufficiently dried, they are put into bags and despatched outside. The yield of an estate that has been well maintained in cultivation may be put at six to ten cwts per acre. An accurately calculated estimate shows that in a series of years, the crop is more frequently below six cwts. But the yield varies in different places.

Central Coffee Research Institute

The Central Coffee Research Institute, formerly known as the Coffee Experimental Station, Balehonnur, was started in 1925 under the stewardship of the late Dr. Leslie C. Coleman. It had in the beginning 19 acres of land and had the primary objective of breeding rust-resistant selections and of conducting research on control of pests and diseases. Later the Coffee Board was providing periodical grants to the station for research relating to quality of Coffee, till 1945. Then the Board decided that it should set up a research station in the State and took over the Station in 1946 and started developing it as the Central Coffee Research Institute, with a separate Research Department under Director of Research. The present area of the Institute is 119.86 hectares, of which an area of 63.53 hectares is planted with coffee.

The Institute conducts research in increased production of quality coffee. The objectives of the Institute are to investigate into the influences of several cultural and soil management practices as well as nutrition on the yield of coffee; to improve coffee plants in vigour, resistance to leaf-disease; to investigate on nutrition of coffee plants as regards both major and minor nutrients, soil and moisture conservation and coffee processing technology; to under take research of the various pests and diseases of coffee including their control measures; and to render advisory services to the coffee-planters. The work of the Institute is divided into two wings; (i) Research and (ii) Extension. The Research Wing has the following scientific divisions: (a) Agronomy, (b) Botany (Plant breeding and plant improvement), (c) Entomology or Nematology, (d) Plant Physiology and (e) Plant Pathology. The Institute carried out experiments on various agronomical problems during several years and made practical recommendations on sprinkler irrigation, pruning, spacing and proper methods of raising healthy plants. Selection and breeding work carried out at the Institute for years have resulted in evolving three high-yielding strains resistant to leaf rust, a disease common to coffee. The Institute released leaf-disease-resistant varieties for commercial cultivation. A discovery of the existence of physiological races in coffee was made. This has helped rust-research work being carried out in other countries also. The rust-resistant Arabica strains evolved at the Institute are S. 288, S. 795 and S. 1934 which occupy about 80 per cent of the total area under Arabica coffee in the country.

A recent evolution of "San Ramon Hybrid", a dwarf strain, resistant to most of the rust races, made at the Institute can accommodate double the number of plants in an area. The severe rust-incidence of the old rust-susceptible varieties has been controlled by standardised fungicide spray-schedule. Before the 1960, the white stem-borer was bringing down the yield by about 20 per cent of the yielding plants in a unit area. This was controlled by effective integrated pesticidal and mechanised methods of of the Research Department. The Institute adopted pesticidal and mechanical methods for the control of pests. The rust disease has also been controlled by spray schedules. The grafting of Arabica scion on Robusta stock at the nursery level has controlled nematodes. Studies have been undertaken on coffee nutrition. Standards have been formulated for spraying, application of fertilisers and nutritional sprays for minor elements. The cause of "die-back" disease was investigated, and proper shade-management and soil-moisture conservation were suggested as remedial measures. The Extension Wing of the Reserach Department was started in 1949 to disseminate and demonstrate technical know-how to planters and transmit their problems to the Research Department. Its main functions are of an advisory nature. High-yielding disease-resistant selections are also demonstrated and popularised.

Development work by Coffee Board

The Coffee Board launched a development plan in 1956 to encourage and actively foster higher productivity as the average yield of coffee was found to be as low as 325 kg per hectare which was half the world average at that time. In addition, it was intended to help improvement of the economic condition of coffee-growers in general and of the small coffee-growers in particular. In 1968-69, a sub-committee was appointed to study the problems and difficulties of small coffee-growers who form a major section of the total number of registered coffee-growers. The schemes currently under implementation in Chichmagalur district are the following.

(i) *Intensive Cultivation Loan Scheme.*—This scheme was introduced in 1957-58. The Coffee-growers are given loan assistance to adopt improved methods of cultivation as recommended by the Research Department of the Board. Loan is granted to registered owners of coffee estates of not more than 50 acres (20.25 hectares) at the rate of Rs 3750 per hectare of Robusta and Rs. 5000 per hectare of Arabica. This loan is being disbursed in three annual instalments subject to repayment in six annual instalments commencing from the sixth year. The Board takes the loanee's estate and its produce as security. The amount disbursed as loan was Rs. 35.78 lakhs during the years from 1969-70 to 1978-79 in this district.

(ii) *Hire-purchase Loan Scheme.*—Under a Hire-Purchase Loan Scheme, which was introduced in 1960-61, equipment and machinery are

supplied on hire-purchase terms with the object of making available to registered coffee-growers essential items of estate equipments and machinery. The equipments available under this scheme are different types of sprayers and their accessories, pulping machinery and accessories, sprinkler irrigation equipment, coffee-hullers for small growers only, power-tiller and accessories and platform-weighing scales. The supply of coffee-hullers, power-tillers and accessories and platform weighing scale is restricted to those coffee-growers who own upto 20.25 hectares of coffee area. Initial deposit of 10 per cent of the estimated value has to be made which will be converted to an initial payment after the equipment is delivered. The loan amount in the form of equipment disbursed in the district was of the order of Rs 113.89 lakhs for the period from 1969-70 to 1978-79.

(iii) *Crop Hypothecation Loan Scheme.*—A Crop Hypothecation Loan scheme was introduced in 1962-63. Under this scheme, annual short-term loans are offered to serve as annual working capital to registered coffee-growers owning not more than 40.50 hectares under coffee. The loans are sanctioned on the quantity of coffee delivered to the pool of the Board during the preceding three years at the rate of 70 per cent to small growers and 60 per cent to large growers. The loan has to be repaid within 18 months. If the loan exceeds Rs 10,000, it is disbursed in instalments. In addition to the crop hypothecation loan, small growers, who have an area not exceeding 10.125 hectares are eligible for a maximum crop loan of Rs 15,000. In Chikmagalur district, the loan amounts disbursed under this scheme during the years from 1969-70 to 1978-79 was Rs 79.30 lakhs.

(iv) *Replanting Loan Scheme.*—A Replanting Loan Scheme was brought into effect during 1968-69 for offering long term loans to coffee-growers to replant aged and uneconomic coffee plants with high-yielding disease-resistant varieties. The Scheme is open to all registered growers irrespective of the acreage under coffee. The amount of loan advanced is Rs 3,000 per acre in four instalments, and the repayment is to be made in seven annual instalments commencing from the fifth year. The loan advanced under this scheme in the district during the years from 1969-70 to 1978-79 was Rs 30.26 lakhs.

(v) *Special Purpose Loan Scheme.*—A Special Purpose Loan Scheme was introduced in 1972-73 to help especially the small growers. A maximum loan of Rs 15,000 per holding is given to them for sinking tube-wells, bore-wells or ordinary wells, building dams or development of tanks, soil-conservation measures and construction of drying yards and barbecues. From the year 1979, loans are also granted for construction or improvement of stores or godowns. These loans are disbursed in two instalments and recovered in three equal annual instalments commencing from the first anniversary of the disbursement of the second instalment of the loan. In Chikmagalur district, loans to the tune of Rs 3.41 lakhs were given under this scheme during the years from 1972-73 to 1978-79.

(vi) *Replanting Loan-cum-Subsidy Scheme.*—A Replanting Loan-cum-Subsidy Scheme was initiated during the year 1973-74 for the benefit of small growers who want to replant their areas under uneconomic circumstances. The financial assistance offered is in the form of loan of Rs 2,000, and a subsidy of Rs 1,000 per acre, at the rate of Rs 1,000 in the first year as loan and Rs 500 loan and Rs 500 subsidy during the second year, Rs 500 loan in the third year and Rs 500 subsidy in the fourth year. The loan of Rs 2,000 per acre has to be repaid in seven annual instalments commencing from the fifth year and ending in the eleventh year. The amount of loans given under this scheme in Chikmagalur district from 1973-74 to 1978-79 was Rs 3.41 lakhs.

(vii) *Extensive Cultivation Loan Scheme.*—An Extensive Cultivation Loan Scheme was started in the year 1975-76 for providing loan assistance to small growers who intend to extend their acreage under coffee upto 20.250 hectares. Loans for extensive cultivation are granted at Rs 3,000 per acre of the area accepted for extension and are disbursed in four annual instalments. The repayment of the loan commences from the fifth year and extends upto the eleventh year by graded instalments. In Chikmagalur district, the amount of loans disbursed under this scheme was Rs 1.58 lakhs from the year 1975-76 to 1978-79.

Census of Coffee Estates

The traditional coffee growing areas in the country are Karnataka, Tamil Nadu and Kerala. The two principal species of coffee grown are Arabica and Robusta. The major portion of the area under coffee in Karnataka is in Chikmagalur, Hassan and Kodagu districts. India, as a participant country of the International Coffee Organisation, submitted a National Coffee Policy Plan in 1970 to the Organisation about the need for assembling information on the extent of the area brought under high-yielding varieties of coffee. A detailed project to conduct a country-wide census was approved and an amount of Rs. 11.50 lakhs required for the project was also provided. Accordingly, a census of coffee estates was conducted in the country between 1972 and 1975. The census revealed that Chikmagalur district stood second in Karnataka in respect of the number of estates having 7,917 estates or 27.6 per cent of the total area, the first one being Kodagu with 16,880 estates or 58.8 per cent of total area under coffee. Of these 5,568 estates were registered, 1,739 were unregistered and 610 had applied for registration. Registration of coffee estates is compulsory under the Coffee Act which enables the pooling system of marketing of coffee. The registration is the primary responsibility of the revenue authorities. Considerable changes take place in ownership of coffee estates due to partition and sale of holdings, additional plantings, etc. The following table indicates size-categories, etc., of coffee estates in the district.

<i>Size category (in acres)</i>	<i>No. of estates</i>	<i>Extent of area</i>	<i>Percentage in Karnataka</i>
0 - 5	4,552	5,942	23.7
5 - 10	1,368	6,982	29.9
10 - 15	559	5,447	32.8
15 - 20	335	4,542	32.8
20 - 25	255	4,924	35.7
25 - 50	431	11,816	50.5
50 - 100	240	14,805	62.5
100 - 150	81	8,105	62.8
150 - 200	43	7,355	53.1
200 - 250	17	3,273	47.2
250 and above	56	20,287	50.0
Total	7,917	93,478	

The Chikmagalur district stands first in Karnataka and also in India in the extent of area under coffee as per the registration certificates. The district occupies also the first place in respect of acreage from the group 25—50 acres (10.25 to 20.250 hectares) and above. Thus it has the advantage of relatively large-scale farming. Of the 7,917 estates, 7,630 estates were proprietary, 67 company-owned and 20 were partnership concerns. The district has the second place in the State in respect of the total coffee area planted (1,04,044 acres or 42,137.82 hectares), the percentage being 41.4. It gets the first place in the case of Arabica plantings with 80,406 acres or 32,564.43 hectares forming 47.2 per cent of Arabica plantings in the State, the next being Kodagu District. In the case of Robusta, it has the second place with 23,638 acres or 9,573.39 hectares with a percentage of 29.2 in Karnataka. The break-up of planted area according to the size is as follows :

<i>Size Category</i>	<i>(area in acres*)</i>		
	<i>Arabica</i>	<i>Robusta</i>	<i>Total</i>
0 - 5	5,493	2,038	7,531
5 - 10	6,715	1,970	8,685
10 - 15	5,109	1,275	6,394
15 - 20	4,484	1,055	5,539
20 - 25	4,774	867	5,641
25 - 50	12,071	2,424	14,495
50 - 100	13,690	2,902	16,592
150 - 200	4,794	2,194	6,988
200 - 250	1,743	1,752	3,495
250 and above	13,775	5,817	19,592
Total	80,406	23,638	104,044

*1 acre—.405 hectare.

In regard to the bearing area, the district stands first in Karnataka with 67,931 acres (27,512.055 hectares) of Arabica (47.9 percent) and under Robusta it gets the second place with 17,851 acres (7,229.66 hectares) forming 30.7 percent, in the State. In respect of total bearing area, the district is placed first in Karnataka with 85,782 acres (34,741.71 hectares), the percentage being 42.9 of the total such area in the State. Under Arabica, the planted area is 80,406 acres (32,564.43 hectares) and the bearing area is 67,931 acres (27,512.055 hectares) forming 84.5 per cent of the total planted area of Arabica in Karnataka. Under Robusta, the planted area is 23,638 acres (9,573.39 hectares) the bearing area being 17,851 acres (7,229.655 hectares) with a percentage of 75.5 in Karnataka. The total planted area is 1,04,044 acres (42,137.82 hectares) the bearing area is the highest in the State with 85,872 acres (34,741.71 hectares) the percentage being 82.4. The bearing area in the district, according to size categories, is tabled below.—

(area in acres*)

<i>Size category</i>	<i>Arabica</i>	<i>Robusta</i>	<i>Total</i>
0 — 5	4,382	1,277	5,659
5 — 10	5,339	1,013	6,352
10 — 15	4,077	709	4,786
15 — 20	3,651	516	4,167
20 — 25	4,027	578	4,605
25 — 50	10,338	1,818	12,156
50 — 100	11,679	2,367	14,046
100 — 150	6,560	1,181	7,741
150 — 200	4,181	2,032	6,213
200 — 250	1,340	1,388	2,728
50 and above	12,357	4,972	17,329
Total	67,931	17,851	85,782

*1 acre—.405 hectare.

In the census period of 1972-1975, the district accounted for the highest number of coffee plants numbering 11,31,11,033 of which Arabica plants were 9,69,18,318 and Robusta 1,61,95,715. It was reported that an extent of 16,058 acres (6,503.49 hectares) in 2,515 estates was available for further expansion of cultivation of coffee. Of the 7,917 estates, 40 were ideal, 7,790 satisfactory and 87 marginal. Out of the total number of estates, 840 were having pulpers, 1,751 sprayers, 242 sprinklers, 747 pucca pulper vats, 238 cement drying yards, 552 tiled yards and 5,226 earth yards.

Karnataka Planters' Association

The Karnataka Planters' Association was started in 1958 with the object of protecting plantation interests in Karnataka and to educate its members about the internal and external problems faced by them, and

to find out solutions for them. The membership of the Association is open to owners of coffee, tea, rubber, pepper and cardamom estates in Karnataka. The affairs of the Association are managed by an executive committee elected each year. The Committee is headed by a Chairman who is elected by the General Body every year. (See also Ch. VI).

ANIMAL HUSBANDRY

The primary objectives of the animal husbandry sector have now been well defined. This sector is to produce improved bullocks for agriculture, to increase *per capita* availability of milk, to make available good poultry, to increase *per capita* availability of eggs, to provide better veterinary aid and to increase the nutritional level of livestock by stepping up production of fodder.

The district of Chickmagalur is considered to be backward in livestock resources. The cattle of the district are generally poor in size and of inferior breed. As a result, the farmers of the *malnad* area have had perforce to replenish their stock often. The breed improved from west to east and the better cattle in the district can be seen in the *maidan* parts of Tarikere and Kadur taluks. In the plains, the she-buffalo is tended with even more care than the cow, as apart a large yield of milk, the sale of her male calves to purchasers from the *malnad* is found to be profitable. Though grazing is abundant in the hilly areas, it is of a coarse description. For three months June to August, cattle can hardly move in the open for grazing in the *malnad* because of heavy rains and confined to sheds where they are fed with paddy straw, spear grass and small quantities of green grass. From September to December, grazing is available in plenty. Therefore, this period is the happiest months for these animals. After December, luxuriant growth of grass disappears and till the onset of the monsoon, the feed for cattle is generally poor and this leads to their deterioration. Hardly any fodder crops are grown. The hill grass, *nuli*, is not properly utilised by ensilaging it for fodder. In monsoon season, cattle are mostly confined to sheds in *malnad* parts. During this season, a thick layer of green leaves is spread on the floor of these ill-ventilated cattle sheds and over which the cattle are let loose so that the excretion and the leaves get thoroughly mixed up and fermented. The animals live and feed under such conditions during the period. Although numerically the cattle population is large in the district, the milk yield is the lowest. A smaller number of well-bred and healthy cattle would be more economical to keep and would contribute in a greater measure to the diet of the people and to agricultural efficiency. Malnutrition and indiscriminate breeding have also been responsible for the degeneration. Recent years, however, have witnessed an increasing awareness of the necessity of improving conditions

Breeds of cattle

The district has different breeds of cattle in different areas.. In the *malnad* areas, there are non-descript cattle called the *Malnad Giddas*. These cows and bulls are diminutive in size with stunted growth and have no definite breed characteristics. In general, they are dark haired. Though small in size, they are sprightly animals with an extraordinary power of endurance and resistance to diseases. These animals have for centuries been playing an important role in the rural economy of the district. They form about 70 per cent of the total cattle population of the district. Due to the low quality of the cattle, their lactative period is 6 to 7 months and the dry period 7 to 8 months. In the rural parts, the farmers spend practically nothing towards their feed. They use them for cultivation, milk and manure. It is stated that on the whole the maintenance of these animals is not economical.

In the *maidan* parts, the two well-known breeds of cattle are Amrit Mahal and Hallikar. Particular attention is being paid to conserving and improving these breeds of cattle. The Amrit Mahal cattle are fiery and active and are noted for their power of endurance, trotting and quick transport.

They were much used in the military campaigns of Haider Ali and Tipu Sultan in the 18th century. Some representative specimens of this breed are being reared at the Cattle Breeding Station at Ajjampura. The colour of this breed is generally grey, but instances of cattle having white colour is not rare. It possesses a well-shaped narrow head with a deeply furrowed forehead, bright and blood-shot eyes, well-proportioned legs of medium length and hard but small teeth. They are, however, generally poor in milk yields. They are estimated to form 29.4 per cent of the cattle population of the district.

The Hallikar cattle, which are an excellent general purpose breed, are suited both for transporting goods on the roads and for ploughing in the fields. A typical Hallikar animal possesses long head with a bulging forehead, close horns, taking off perpendicularly from the head, bulging slightly backwards in a graceful sweep and terminating in sharp points, long but compact body and light legs. The colour of the animal is generally dark or light grey with white patches round the face and dewlap. The rest of the cattle are cross-breed animals of Jersey, Holstein, etc.

Livestock Population

In 1923-24, the livestock of the district consisted of 3,85,887 cows, buffaloes and bullocks, 4,052 horses, ponies and donkeys and 1,14,564 sheep and goats. Their population according to censuses of 1961, 1966, 1972 and 1977 was as given below :

Type of livestock	Live stock Census of			
	1961	1966	1972	1977
Cows	4,02,526	4,00,216	4,54,298	4,83,239
Buffaloes	77,475	68,397	76,232	77,438
Sheep	73,021	75,131	78,376	80,507
Goats	49,004	53,362	71,847	59,710
Pigs	11,255	13,336	18,709	19,399
Other livestock	1,793	2,048	844	1,108
Total livestock	6,15,074	6,12,490	7,00,306	7,21,401
Poultry	3,69,658	2,91,603	3,45,881	3 34,897

The district gets the sixteenth place in the State in this respect, with 3.35 per cent of the total livestock population of the State. In regard to poultry, it holds the thirteenth place, with 3.5 per cent of the total poultry population of the State. The taluk-wise livestock population and its percentages to the district total according to the 1977 livestock census were as furnished below.

Taluk	Cattle	Buffaloes	Sheep	Goats	Pigs	Other livestock	Total livestock	Percentage
Chikmagalur	95,419	10,414	9,662	12,284	4,700	398	1,32,917	8.0
Kadur	1,13,500	24,188	58,408	46,042	1,054	286	2,23,278	30.9
Koppa	50,661	8,779	1,058	1,811	2,480	28	64,817	8.9
Mudigere	53,187	10,226	4,937	2,304	6,925	30	77,636	10.8
Narasimharajapura	46,023	3,654	757	3,021	2,757	10	56,192	7.8
Sringeri	25,178	2,919	8	323	780	..	29,208	4.2
Tarikere	99,471	17,258	5,677	19,925	666	356	1,37,353	19.0
District total	4,83,239	77,438	80,507	59,710	19,399	1,108	7 21,401	100.0

The cattle constituted 66.79 per cent, buffaloes 10.73 per cent, sheep 11.16 per cent, goats 8.28 per cent, pigs 2.7 per cent and other livestock 0.15 per cent of the total livestock of the district. There were 96 livestock for every 100 persons, 98 for every sq km and 34 per 100 hectares of cultivated area in the district as in 1977.

Veterinary Institutions

The first Veterinary Dispensary in the District was started at Tarikere in 1918, followed by Mudigere in 1924, Koppa in 1928 and Chikmagalur in 1937. In 1956-57, there were 21 Veterinary Institutions and their number had increased to 26 by 1960-61. In 1976-77, there were one Veterinary Hospital at Chikmagalur, 18 Veterinary Dispensaries at various places, 32 Rural Veterinary Dispensaries, one artificial insemination centre, five artificial insemination sub-centres and one key village scheme. In 1979, there were one Veterinary Hospital, 20 Veterinary Dispensaries, 33

Rural Veterinary Dispensaries, one key village scheme centre, five key village scheme sub-centres, one artificial insemination centre and six artificial insemination sub-centres. In 1977, on an average, each veterinary institution was serving 13,360 livestock, each key village centre 1,20,234 and each artificial insemination institution 1,03,057. If only the bovine population was taken into consideration, each veterinary institution was serving 10,504, each key village scheme centre 93,891 and each artificial insemination centre 80,085 as in 1977. The percentage of veterinary institutions in the district was 4.42 to the State as in 1979.

Cattle Breeding Station, Ajjampura

A Cattle Breeding Station was started at Ajjampura in 1929 with the object of meeting the needs of the Amrit Mahal breed of cattle known for its draught quality, disease-resistance and hardiness. The area of the farm is now 651 acres (263.655 hectares). While in the beginning there were 40 animals, in 1979, there were 295. A key village scheme block has been also attached to this farm with five sub-centres in a radius of five miles for upgrading the local cattle and buffaloes with the Amrit Mahal cattle and Murrah buffaloes respectively. During the period from 1952 to 1976, 23,278 cows and 10,475 buffaloes were inseminated with quality semen at this Station. In addition, preventive vaccinations against rinderpest, anthrax, black-quarter, haemorrhagic septicaemia are also done here. Milk from Amrit Mahal cows to the extent of about 400 litres is produced here daily. This cattle breeding station has, under its control, (1) Cattle breeding sub-station at Basur near Yagati of Kadur taluk with an area of 1909 acres (773.145 hectares) of land, and (2) Economic Cattle Farm at Birur with an area of 861 acres (348.705 hectares) and (3) a *Gosadan* at Yemmedoddi in Kadur taluk with an area of 3,000 acres (1,215 hectares) and (4) a Bull-calf Rearing Centre at the Birur farm for purpose of maintaining and supplying crossbred bull calves and buffalo calves. It is maintaining also an Economic Cattle Farm each at Hebbanaghatta in Hassan district, at ullartha in Challekere taluk and at Kainadu in Hosadurga taluk of Chitradurga district. The objective of these sub-stations is to breed and maintain the Amrit Mahal cattle in good condition. At the *Gosadan* at Yemmedoddi, the aged animals brought from the various centres are left for natural grazing till their death. Fodder production is also undertaken in all the above-mentioned centres. The total number of animals cared for in them was 1,073 as in 1979. The Station is maintaining *gomals* (grazing yards for animals) of about 52,180 acres (21,132.9 hectares) for grazing of the farm animals in different seasons in six districts, the extent in Chikmagalur district being 13,043 acres (5,282.415 hectares) as in 1979. A scheme was initiated to start a Cattle-Breeding Farm at Birur in 1977-78 with the object of rearing cross-breed bulls upto the breeding age and to sell the

same to the farmers in order to increase milk productivity of the local cows. During 1977-78, a sum of Rs. 1.5 lakhs was spent on this scheme.

Development Schemes

A Drought-Prone Area Programme under animal husbandry is in operation in the Kadur taluk of the district. Some of the important activities under this scheme are supply of dairy animals and sheep to the small and marginal farmers, supply of poultry to farmers, training of small and marginal farmers in dairying and sheep and poultry-rearing, health coverage, fodder development and supply of bullocks on subsidy-basis to the small and marginal farmers. During 1977-78, a sum of Rs 1.4 lakhs was spent for the implementation of this programme.

A Tribal Sub-plan has been initiated in the district to help the tribal people. The programmes in operation are (i) establishment of five piggery units each in Koppa and Mudigere taluks (one unit consists of one boar and two sows), (ii) setting-up of five poultry units each in Koppa and Mudigere taluks (100 birds in each unit), (iii) health coverage, and (iv) training of 200 farmers from tribal block in dairying, piggery and poultry.

A Western Ghat Development Scheme started with the object of improving the *Malnad gidda* cattle with Jersey and Holstein breeds, 33 bulls were distributed to 33 persons (15 in Mudigere taluk, 8 in Koppa taluk and 10 in Sringeri taluk), to improve the breed at a cost of Rs. 0.541 lakh in 1977-78. During the next year, 20 bulls were supplied at a cost of Rs 0.246 lakh.

A scheme of Sheep Development Assistance to weaker sections was initiated in 1973-74. Upto 1979, 22 families were given 22 rams and 110 ewes at a cost of Rs. 14,500. Under another scheme of supply of piglets started in 1971-72, 23 families have been provided with 18 sows and 23 boars.

A Pasture Development Scheme was commenced in 1974-75 with the object of providing nutritive fodder and to better the general condition of animals, to improve milk production and to save expenditure on concentrates. During 1976-77, 61,000 root slips of different types of grass were supplied in Kadur taluk at an expenditure of Rs 1,500 under this scheme.

A Dairy Development Scheme was initiated in 1974-75 to improve milk production, to upgrade local cattle, to provide market facilities for milk and milk products, to improve economic condition of small and marginal farmers and to supply quality milk to the public. Under this programme 24 cross-bred cows and 19 improved buffaloes were purchased at a cost of Rs 88,500 in 1975-76. Jersey, Red-Dane, Holstein and Freisian breeds of cattle are being used to improve the local breed.

A Sheep Development Scheme was introduced in 1974-75 to improve (i) the local sheep by cross-breed, (ii) the quality and quantity of wool production, (iii) the nutrition content of mutton and (iv) the economic condition

of small and marginal farmers. The Deccani and Hassan types of sheep were introduced. During 1975-76, 59 rams and 600 ewes were supplied to 59 persons and in 1976-77, 50 persons were provided with 50 rams and 1,000 ewes. There are three sheep-breeders Co-operative Societies in Kadur taluk.

An Applied Nutrition Programme has been introduced in Mudigere, Kadur, Narasimharajapura and Koppa taluks. There are four poultry units in Kadur, six in Mundigere and two in Narasimharajapura taluks with 100 birds each.

A Poultry Extension Centre is functioning at Chikmagalur from 1962 to educate the farmers on the practical methods of poultry-rearing and to distribute grown-up chicks to the farmers who have no brooding facilities. It has a capacity of 1,000 chicks and gets day-old chicks from big poultry farms and rears upto 12 weeks and supplies to Government farms and youth clubs. The commercial banks are providing credit facilities for starting poultry-farms.

Cattle Fairs

The main source of supply of cattle are the annual fairs and weekly shandies. The cattle fairs are usually held between January and March every year. The types of cattle that are brought for sale are Amrit Mahal, Hallikar and *Malnad Gidda*. The following statement gives particulars of important fairs that take place in the district.

<i>Place of fair</i>	<i>About the month of</i>	<i>Approximate No. of cattle</i>
Ajjampura	February	8,000
Antharaghatta	February	8,000
Doddapattanagera	February	8,000
Keresanthe	January	10,000
Singatagera	February	8,000
Sringeri	February	8,000
Tarikere	March	8,000

Animal diseases

The common diseases of cattle in the district are black-quarter, haemorrhagic septicaemia, anthrax, parasitic diarrhoea, sheep-pox, etc., whereas the main ailment of poultry is ranikhet. A few particulars in regard to such diseases are given hereunder.

<i>Name of disease</i>	<i>No. of inoculations</i>		
	<i>1972-73</i>	<i>1975-76</i>	<i>1979-80</i>
Haemorrhagic Septicaemia	63,441	1,01,323	1,16,753
Black Quarter	4,16,151	55,478	89,454
Ranikhet	37,400	42,611	42,009
Enterotonaemia	16,031	23,488	8,146

The numbers of cases treated in various veterinary institutions in the district during 1972-73, 1974-75 and 1975-76 were as follows.

(in number)

<i>Particulars</i>	1972-73	1975-76	1979-80
Inpatients and out-patients treated	4,44,254	2,54,513	1,88,961
Cases treated on tours	6,1 2	10,152	12,707
Castrations done	9,464	10,672	17,148
Artificial inseminations done	1,939	2,721	8,506
Calves born due to artificial insemination	295	475	2,079
Surgical operations done	1,428	1,722	1,682

FISHERIES

Fishes are abundant in the rivers, tanks and reservoirs of this inland district. The finest fish are found in the Tunga and Bhadra rivers and in the Madagakere, Ayyanakere and Keresantheke. The *mahsheer*, probably the best fresh-water fish in India, is sometimes caught in the rivers of the district. It reaches to the weight of 20 lbs. At Sringeri and other sacred places situated on the banks of the rivers, fishes are fed by the pilgrims. A little food thrown into the water brings a number of them to the surface. Fishing is not done in such places. The feeding helps them to grow to enormous sizes, and the security has made them tame. A few of the fish there are even adorned by pilgrims with nose-rings or ear-rings and other ornaments fastened to their tails, for fun.

The important rivers (from the fishery point of view) are the Tunga, the Bhadra and the Veda which flow to a total length of about 173 km in the district. The Tunga runs to a length of about 32 km each in Koppa and Sringeri taluks, the Bhadra to an extent of about 32 km in Mudigere taluk and 13 km in Narasimharajapura taluk and the Veda has a flow of 64 km in Kadur taluk. The channels run to a length of about 40 km in Tarikere taluk. The Bhadra reservoir has a water-spread area of 108.78 sq km in Narasimharajapura taluk and the Jambadahalla reservoir has an area of 38.35 sq km in Tarikere taluk. The extent of culturable water under tanks is about 5,593.46 hectares under 144 major tanks and 5,108.67 hectares under 2,480 minor tanks. The taluk-wise figures of major tanks and minor tanks and their water-spread area in hectares where pisciculture is followed, are given below.

(area in hectares)

<i>Taluk</i>	<i>No. of major tanks</i>	<i>Water-spread area</i>	<i>No. of minor tanks</i>	<i>Water-spread area</i>
Chikmagalur	27	972.00	719	1,218.24
Kadur	70	3,461.54	34	163.62
Koppa	4	60.35	745	1,124.28
Mudigere	1	47.39	225	876.83
Narasimharajapura	3	42.12	345	759.38
Sringeri	3	31.59	609	246.65
Tarikere	36	978.48	221	719.85
Total	144	5,593.46	2,480	5,108.67

In addition, there are 993 irrigation wells and ponds where fishing is done. With all these water resources, the district has good potentialities for development and exploitation of fish-culture. The Fisheries Department is helping development and exploitation of the fishery wealth. It is also providing grants to renovate the tanks and to construct cement cisterns and other items. It imparts training to fishermen in fish culture.

Fish fauna

The fish fauna of the district consists of carps (exotic carps and local and minor carps), cat fishes, murrels, eels and other varieties. The local names and their scientific names of fishes available in the district are given below.

<i>Local name</i>	<i>Scientific name</i>
Kolasa	<i>Barbus Kolus</i>
Bale meenu	<i>Wallago attu</i>
Havu meenu	<i>Mastacemaellus armatus</i>
Chapalu meenu	<i>Notopterus notopterus</i>
Malaga meenu	<i>Arguilea bengalensis</i>
Khilee meenu	<i>Barbus tor</i>
Kemmachhalu	<i>Labeo calbasu</i>
Arja	<i>Cirrhinus fulungee</i>
Agasaragitti meenu	<i>Berelus borila</i>
Khilachi meenu	<i>Chela horai</i>
Handi meenu	<i>Botia striota</i>
Korava meenu	<i>Channa (cophiscephalus) Punctatus</i>
Kuchhu meenu	<i>Channa (cophiscephalus) Striatus</i>
Bugi meenu	<i>Glossogobius (Gobius) giuris</i>
Ane meenu	<i>Clarius batrachus (magur)</i>
Goddale meenu	<i>Grupok (callichrous) bimaculatus</i>
Haragi meenu	<i>Puntitus (Barbus) pulchellus</i>
Katla meenu	<i>Catla catla</i>
Rohu meenu	<i>Labeo rohita</i>
Marigal meenu	<i>Cirrhinus mrigala</i>
Hende meenu	<i>Cyprinus Carpio Var Communis</i>

Burude-Bestas and Gangamatastaru are generally professional fishermen in the district. There are about 750 professional fishermen in Narasimharajapura taluk, 500 in Kadur taluk, 300 in Chikmagalur, 200 in Tarikere, 100 each in Koppa and Sringeri and 50 in Mudigere taluks as in 1979. In addition, there are about 3,000 persons who do fishing only during certain months and do not entirely depend on fishing for their livelihood.

The traditional methods of fishing followed are angling with rod and line, country rods and line, cast net, gill net and drag nets. Leather coracles are mainly used. Plunge baskets are also utilised. The fish production of the district for the years from 1971-72 to 1978-79 and their values were estimated as follows :

<i>Year</i>	<i>Quantity in tonnes</i>	<i>Value in rupees</i>
1971-72	350	8,75,000
1972-73	370	9,25,000
1973-74	420	12,60,000
1974-75	160	4,80,000
1975-76	295	7,85,000
1976-77	243	9,72,000
1977-78	174	6,96,000
1978-79	105	4,20,676

The Department of Fisheries is issuing licences for catching fish in respect of certain categories of water-sheets, while a few others are auctioned. The following table shows the revenue realised from departmental catches, auctions, issue of licences, etc., during some recent years.

<i>Particulars</i>	<i>1972-73</i>	<i>1976-77</i>	<i>1977-78</i>	<i>1978-79</i>
1. Quantity of fish caught (in kg.)	833	1,500	1,047	1,096
2. Amount realised (in Rs.)	1,388	5,992	3,472	2,509
3. No. of licences issued.	560	732	559	714
4. Amount realised (in Rs.)	5,460	7,035	5,515	7,275
5. No. of tanks auctioned and leased.	53	30	17	652
6. Amount realised (in Rs.)	4,97	3,431	2,670	9,016
7. Other sources of revenue (Sale of fish seeds, etc.) (in Rs.)	3,120	9,385	34,135	23,682
8. Total revenue realised (in Rs.)	14,943	24,796	51,842	41,735

Fish seeds

The annual requirement of fish seed of the district is about one crore, but the production is only about six to seven lakhs in tanks and reservoirs of the district. There is one fish farm in the district, namely, Agasarakatte Fish Farm which is situated at a distance of about five km from Chikmagalur on the Chikmagalur—Kadur Road. This fish farm started functioning in 1965, but the actual handing over by the Public Work authorities was in 1970 after completing the required constructions. The farm consists of one earthen stocking pond, four rearing ponds, three stocking ponds of a bigger size and three others of a smaller size. It is proposed to convert this farm into a small scale production farm for producing common carp fish seed by a controlled breeding method.

Under the Drought-Prone Area Programme, a Regional Fish Farm has been established at Ayyanakere in Kadur taluk at a cost of about Rs. 5 lakhs. During 1978-79, Fish seed of 15 lakhs of common carp was raised and about six to eight lakh seeds were procured from outside. It has a target of producing one crore of fish-seed annually. A scheme of fish-seed production, rearing and distribution was started in 1977-78 with the objective of bringing all available water-resources of the district for stocking fast-growing

culturable variety of fish seed. During 1978-79, 12.4 lakh fish seeds were reared and distributed to departmental tanks, needy village panchayats and private persons.

Taluk-level nurseries

Several cement cisterns have been constructed under a scheme of construction of taluk-level nurseries with a view to rearing small fish fry for 2 to 3 months and to supply fish fingerlings to village panchayats, taluk development boards, co-operative societies, etc. These nurseries will serve as a granary of fish seed. In the premises of the office of the Taluk Development Board, Kadur, a set of cement cisterns has been constructed at a cost of Rs 20,000 for supplying fish-seeds to farmers and village panchayats of the Kadur taluk. In a period of five years about 1,50,000 fish-seeds were reared here. Another set of cement cisterns is constructed at Narasimharajapura. This facility will be extended to the other taluks of the district in due course. The fish-seed requirement is met also by importing fish seeds from the Bhadra, Tungabhadra and Vanivilas Sagar fish farms and also from Calcutta. The quantity of fish-seed supplied and the revenue realised in some recent years is as follows.

<i>Year</i>	<i>Total fish-seed stocked</i>	<i>Revenue realised by licensing (in Rs)</i>
1973-74	61,850	3,000
1974-75	61,833	2,800
1975-76	60,000	3,556
1976-77	4,88,000	3,340
1977-78	9,20,000	2,000
1978-79	2,75,000	2,000

Marketing of fish

A fish-marketing scheme is in operation in the district. Its objectives are to help marketing of fresh fish hygienically in a preserved condition from the time of catch till it is consumed and to assist construction of fish markets on loan-cum-subsidy basis by municipal councils, fisheries co-operative Societies, etc. The Chikmagalur Town Municipal Council has constructed a fish market with three stalls on loan-cum-subsidy basis at a cost of Rs 13,200. A fish market is being constructed at Narasimharajapura under the same scheme. This facility will be extended to other taluks in stages.

The marketing of fish in the district is done largely at the places of catch. If any quantity remains unsold, it is taken to and sold in the specified area meant for selling fish. The Fisheries Department has estimated that about 3,000 to 4,000 tonnes of fish are caught every year and marketed in the district. It provides full time employment for about five to six months in a year for about 2,000 fishermen. The earnings vary from Rs 150 to Rs. 300 per month per family. With the intensification of stocking programme, it is expected that the production will be about 6,000 to 8,000 tonnes a year.

Applied Nutrition Programme

The Applied Nutrition Programme aims at educating rural folk about nutrition, inculcating the habit of taking balanced diet and self-production and consumption. It is in operation in Kadur, Mudigere, Narasimharajapura and Koppa taluks. Efforts are made to help production of protective food like fish, eggs, vegetables and fruits and to supply them to vulnerable sections of the people like children and expectant and nursing mothers. This programme was started in Kadur block in the year 1968-69. From 1969-70 to 1975-76, it stocked about 3,53,300 fish, brought a water spread area of 850.5 hectares under fish culture, supplied about 150 kg. of fish under the feeding programme, supplied about 4,776 kg. of fish to Village panchayats and realised a revenue of about Rs 8,300. Again, the programme in the Mudigere Block was inaugurated in 1972-73. During the three years from 1972-73 to 1975-76, it stocked about 1,27,700 fish, brought a water-spread area of about 34.43 hectares under fish culture, supplied about 120 kg. of fish under the feeding programme. In the Narasimharajapura Block it was started in the year 1974-75. During the years 1974-75 and 1975-76 about 46,500 fish were stocked, and a water-spread area of 36.45 hectares was brought under fish culture here. During 1976-77, about 10,200 fish were stocked and an area of 8.5 hectares was brought under fish culture, about 21 kg of fish were provided under the feeding programme and about 71 kg of fish were supplied to the village panchayats and an income of Rs. 306 was realised by this block. In the Koppa Block, the programme was started in 1976-77 and stocked about 15,500 fish and a water-spread area of about 19 acres (7.69 hectares) was brought under fish culture. Under this programme, 90 pre-school children are being fed in the block.

Intensive Fisheries Development Scheme

Under an Intensive Scheme of Fisheries Development, the work of developing the fisheries on an intensive scale has been taken up in the Community Development Blocks. It envisages stocking of fast-growing culturable varieties of fish seeds in all the minor tanks and ponds, assessment of fish potential in rural areas by under taking a regular survey, holding of demonstrations on the modern methods of fishing and tackling problems of fishing, supplying of nylon yarn, coracle and rare varieties of fish seeds at subsidised rates and imparting of training to the villagers in fish-culture for improving the economic condition of small farmers, village panchayats, taluk development boards and fisheries co-operative societies. The scheme is in operation in the district since 1970-71. Three village panchayats in Chikmagalur taluk have been developed intensively and they are getting about Rs 1,500 per annum by fish culture.

Drought-Prone Area Programme

A Drought-Prone Area Programme is in operation in Kadur taluk since 1974-75 for developing fisheries intensively by production of fish, marketing, creating employment opportunities and for providing nutritive food at a

cheaper cost. During the year of commencement, a sum of Rs 53,200 was spent on stocking fish-seed, civil works and training. Fish-seeds to the tune of 6.60 lakhs were stocked in Ayyanakere and several other tanks of the taluk. This has provided employment to 50 fishermen for a period of six months in a year and the monthly income is about Rs 300 per individual. During 1975-76 and 1976-77, a sum of Rs 1.59 lakhs, Rs 70,807.80 were expended on the same programme. The income during 1976-77 was Rs 6,137. Major carp and common carp are the varieties of fish reared in the tanks of the taluk. A fish farm has been also started at Ayyanakere in the taluk under this programme.

Bhadra Command Area Development Scheme

A scheme for developing fisheries in the Bhadra Command Area is in operation in the district since 1971-72. It is confined to the Bhadra and the Jambadahalla reservoirs and their water-sheets in Tarikere and Narasimharajapura taluks. It is intended to help production and supply of fish at a cheaper cost and also to provide employment opportunities to the poorer section of the fisher folk. The reservoirs and their water sheets have been stocked with about three lakh fingerlings. The revenue realised by the Department from this is about Rs 2,500 to Rs 3,000 per year. About 100 fishermen who are actively engaged in fishing in this area are earning on an average of about Rs 250 to Rs 300 per month, for a period of six months in a year. A Bhadra Reservoir Development Scheme for developing fisheries in the Bhadra Reservoir was also sanctioned in 1979-80. During this year, a sum of Rs 40,000 was spent on the scheme to help about 50 to 60 fisherman families in and around Narasimharajapura taluk. It is estimated that about 100 tonnes of fish will be caught and a revenue of Rs 3,000 will be realised in a year under this scheme.

Inland Fisheries Development Scheme

An Inland Fisheries Development Scheme is in operation in the district since 1971-72. Its aims are intensive development of fisheries in all water sheets by stocking fast-growing culturable varieties of fish-seed and exploitation of the same by modern methods. Issue of licences to poor fishermen, auction-sale of tanks and lease of tanks to the village panchayats, taluk development boards, fishing co-operative societies and others are some of the activities being done under this scheme. More than 50 tanks are being tackled intensively every year under this scheme, and about 20 tanks are being leased to village panchayats. On an average, 25 tanks are subjected to licensing and 40 tanks are auctioned in a year. The revenue realised from these is about Rs 15,000 per annum. The seasonal tanks yield a revenue of Rs 2,000 to Rs 12,000 annually which is utilised by village panchayats.

Small-Water Development Scheme

A Small-Water Development Scheme is being implemented in the district since 1976-77. Its aim is to renovate tanks and ponds and make them

fit for fish culture. A grant of Rs 1,000 is allowed for each tank or pond. Mailimane and Hirekolale village panchayats in the district are availing the benefit and they have stocked about 5,000 fish-seeds in each tank of the panchayat.

Trout Fishery

Trout, a cold-water fish, was found to be conducive for the development of sport in the district. A survey of cold-water fisheries conducted in Baba-Budangiri hill range in 1973 revealed that the trout fish can survive in these areas and held out the hope of development of cold-water fishery on an intensive scale for the purpose of tourist attraction. As a preliminary step, more than 1,000 seed fish of trout were obtained from Ooty in Tamil Nadu and were introduced in the Shankar falls and Honnammanahalla of Baba-Budangiri hill range in the district.

Tribal Sub-Plan

A Tribal sub-plan Programme is being implemented in the district since 1979-80. The main aim of this scheme is to train the tribals in fish culture for providing them additional occupational opportunities. Under the scheme, 20 Candidates will be trained and ten groups will be supplied with fishery requisities, and a tribal co-operative society will be assisted for development of tank fisheries. The training programme is being carried out at the Bhadra Reservoir project for which an out-lay of Rs 35,400 were provided. The duration of the training is three months and a stipend of Rs 150 per month. A subsistence allowance of Rs 100 per month and an equipment allowance of Rs 100 are given to each candidate. A batch of two trainees was given Rs 1,200 for the purchase of nylon nets and a leather coracle. The tribal co-operative societies are given an assistance of Rs 200 per acre of water-spread area for development of tank fisheries with inputs like fish-seed and feed.

Fisheries Co-operative Societies

There are three fisheries co-operative societies in the district, one each at Chikmagalur, Narasimharajapura and Kadur. The society at Chikmagalur was started during 1971-72 with 65 members. The Narasimharajapura society commenced working in 1972-73 with 62 members, while the other one at Kadur was organised in 1973-74 with 57 members. The total share capital of these three societies amounts to Rs 2,770. However, they are not functioning well, and the Fisheries Department is making efforts to rejuvenate them by leasing out some major tanks. There is one Nomadic Tribe Co-operative Society at Thandrebore Kaval in Kadur Taluk. Burude vestas, whose traditional occupation is fishing are its members.