

CHAPTER IV

AGRICULTURE AND IRRIGATION *

THE Shimoga district is mainly an agricultural district like its contiguous districts. It is considered a granary of paddy in Karnataka. The three broad natural regions, namely, *malnad*, *semi-malnad* and *maidan* enable the cultivation of different types of crops. The most important crops of the district are paddy and arecanut. This district is also rich in forest and irrigational resources. The total income of the district in 1970-71 was Rs. 8,623.21 lakhs, out of which, income from agriculture, livestock, forests and fisheries was Rs. 5,961.32 lakhs, forming about 70 per cent of the total income; about 55.24 per cent of the district's income is derived from agriculture alone. (*see* Chapter IX).

Agricultural population

The economy of the district is based primarily on agriculture which is the chief occupation of the people. In 1971, the district had a population of 13,01,485, the rural and urban population being 9,94,172 (76.39 per cent) and 3,07,313 (23.61 per cent) respectively. Of the total population, only 4,16,663 were workers forming its 32.01 per cent. Out of the 4,16,663 workers, 1,60,788 were cultivators forming about 38.59 per cent, 1,32,519 were agricultural labourers forming about 31.80 per cent and 1,23,356 were other workers forming 29.60 per cent. Thus, the number of persons engaged in agriculture was 2,93,307 constituting about 70 per cent of the total number of workers.

Land-owners are the actual tillers in a large majority of cases in the district and tenants form only a small percentage of cultivators. Normally, there is no scarcity of agricultural labour in the district except in *malnad* parts. The taluk-wise figures of cultivators and agricultural labourers according to the 1971 census were as follows :—

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

Taluk	Total No. of workers	No. of cultivators	No. of agricultural labourers	Percentages for	
				Column 3 to 2	Column 4 to 2
Bhadravati ..	61,847	14,267	18,733	23.07	30.29
Channagiri ..	54,372	28,646	18,501	52.69	34.03
Honnali ..	43,970	19,580	17,049	44.53	38.77
Hosanagar ..	24,939	10,363	9,573	41.55	38.39
Sagar ..	42,629	15,248	9,906	35.77	23.24
Shikaripur ..	42,004	19,209	14,121	45.73	33.62
Shimoga ..	69,207	16,148	20,905	23.33	30.21
Sorab ..	38,002	21,021	9,468	55.32	24.91
Tirthahalli ..	39,693	16,306	14,263	41.08	35.93
District Total ..	4,16,663	1,60,788	1,32,519	38.59	31.80

It can be seen from this table that the percentage of agricultural workers (including cultivators and agricultural labourers) to the total number of workers was highest in Channagiri taluk followed by Honnali, Sorab, Hosanagar, Shikaripur and Tirthahalli taluks; this percentage was lowest in the industrially better developed taluks of Bhadravati and Shimoga.

The size of cultivated holdings may be taken as an index of the size of farm business and consequently the economic position of cultivators. The two factors that determine the size of holdings are the pressure of population on land and the area of cultivable land available. By and large, the sizes of the land-holdings are small. On an average, the extent of land held by a land-holder was about 2.29 hectares. The following table gives the number of holdings according to the size-groups with the extent of lands under each size-group as in 1970-71 :—

(Area in hectares)

Sl. No.	Hectare-wise size-groups	No. of holdings		Total area		Average area per holding
		Number	Percentage	Area	Percentage	
1.	Below 0.5	17,778	12.07	5,521	1.69	0.31
2.	0.5— 1.0	31,559	21.43	23,769	7.28	0.73
3.	1.0— 2.0	44,900	30.50	64,069	19.62	1.43
4.	2.0— 3.0	22,248	15.11	53,243	16.30	2.39
5.	3.0— 4.0	11,093	7.53	37,870	11.59	2.52
6.	4.0— 5.0	6,728	4.57	29,653	9.08	4.41
7.	5.0—10.0	10,028	6.82	66,806	20.45	6.66
8.	10.0—20.0	2,408	1.64	31,359	9.60	13.03
9.	20.0—30.0	336	0.23	7,970	2.44	23.72
10.	30.0—40.0	108	0.07	3,671	1.13	33.99
11.	40.0—50.0	27	0.02	1,186	0.36	43.93
12.	50.0 and above	21	0.01	1,497	0.46	71.29
Total		1,47,234	100.00	3,26,614	100.00	2.29

(Source : The World Agricultural Census, 1971).

The statement given above discloses that the largest single extent of land was held by the seventh category (5 to 10 hectares) with an average holding of 6.66 hectares, while the next largest extent pertained to the third category (1 to 2 hectares) with an average holding of 1.43 hectares. But by far the largest number of holdings belonged to the smallest size-groups (upto 3 hectares). The State Agricultural Census Commissioner, Bangalore, has also classified the total number of holdings under different size-groups and the area held by tenure under each such group as in 1971. A table showing details of such classification of holdings is given in the General Appendices.

Consolidation of holdings

In wet-land holdings, the size of land-holdings ranged from less than 0.5 hectare to 25 hectares, whereas that of dry land-holdings varied from one hectare to 50 hectares as in 1971. The size of about sixty per cent of the land-holdings ranges from less than 0.5 hectare to five hectares. Such uneconomical small holdings and fragmentations of lands constitute a serious obstacle to increasing the productivity of the cultivated area. Keeping this in view, the Karnataka Prevention of Fragmentation and Consolidation 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 (provisional) geographical area of the district is 10,548 sq. kms. according to the Survey of India. The area under cultivation as in 1972-73 was 3,259.62 sq. kms. (3,25,962 hectares), i.e., 30.8 per cent of the total geographical area. The subjoined statement gives particulars of land utilisation in the district for the years 1961-62, 1967-68 and 1972-73 :—

(Area in hectares)

Category	1961-62	1967-68	1972-73
Forests ..	1,42,004	1,45,268	2,12,215
Barren and uncultivable lands ..	1,50,032	58,782	34,144
Lands put to non-agricultural use ..	N.A.	92,280	82,158
Cultivable waste ..	49,861	45,273	47,785
Permanent pastures and grazing lands	2,49,644	2,35,727	2,57,139
Lands under miscellaneous tree crops	78,623	78,630	22,048
Current fallows ..	51,705	40,021	33,234
Other fallow lands ..	44,290	58,355	56,302
Area sown more than once ..	11,167	9,162	N.A.
Total cropped area ..	2,80,529	3,00,814	3,25,962

Note : N.A. = Not available. (Source : District Statistical Officer, Shimoga)

The taluk-wise break-up of figures relating to land utilisation for the year 1972-73 is given at the end of the chapter.

The district has got a vast area of fallow lands and also lands which have gone out of cultivation owing to acidity or alkalinity, salinity or 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 Department of Agriculture, Karnataka, in 1966-67. It revealed that the extents of such lands under different categories during the year 1966-67 were as given below :—

(Area in hectares)

Taluk	Salinity	Alkalinity	Acidity	Water logged	Waste land	Total
Bhadravati ..	958	985	842	1,670	1,200	5,655
Channagiri ..	..	756	..	541	2,000	3,297
Honnali ..	109	4,098	..	330	820	5,357
Hosanagar ..	..	..	8,000	2,500	25,014	35,514
Sagar ..	..	..	14,300	1,800	16,700	32,800
Shimoga ..	250	1,000	300	150	7,500	9,200
Shikaripur ..	206	191	..	227	24,830	25,454
Sorab ..	..	..	18,000	..	15,150	33,150
Tirthahalli ..	..	..	16,000	..	28,510	44,510
Total ..	1,523	7,030	57,442	7,218	1,21,724	1,94,937

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 treatments 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. For the soil having a slope of more than eight per cent upto 15 per cent, the depth of the soil should be more. 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 slow or 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 lands under cultivation: Clearance and contour cultivation, strip-cropping rotation, etc., for category 'A'; 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'. The progress of work of reclamation since inception of the scheme (1966-67) upto 1973-74 was 679.19 hectares of waste land and 257.99 hectares of alkaline land with a subsidy of Rs. 57,425, and 879.66 hectares of waste land and 269.33 hectares of alkaline land without any subsidy. The subsidy is 25 per cent of the estimated cost limiting it to Rs. 50 per acre and this is allowed upto a maximum of five acres in individual cases. Soil-amelioration work is also in progress since 1968-69 in the district. For correcting the soil pH, gypsum and lime are used in the demonstration blocks of 50 acres and 100 acres free of cost, in addition to the supply of lime and gypsum at 50 per cent and 25 per cent subsidised cost, respectively.

Reconditioning of land

A special scheme for reconditioning of lands under the Bhadra Irrigation Project which covers the Bhadravati, Channagiri, Honnali and Shimoga taluks, is being implemented since 1966, with the following works: (1) Field survey and planning for contour border strip-irrigation, (2) execution of work according to the survey and plan for contour border strip-irrigation, (3) development of area for irrigation by cultivators as per technical guidance, (4) adoption of drainage, (5) localisation of crops, (6) intensive agricultural practices, (7) supply of improved implements suited to irrigation conditions, (8) educating the farmers by organising field days, training programmes, extension meetings, supply of literature on irrigation practices, importance of growing light-irrigated crops except in low-lying areas, follow-up of rotations, economic use of water, use of green manure crop, maintenance of soil fertility status, soil tests, follow-up of soil test results, etc; (9) to conduct demonstrations on contour border strip-irrigation methods; (10) hill-field demonstrations; (11) on use of new high yielding varieties; (12) providing incentives to farmers, (13) drainage demonstrations by using open drains, tile drains, underground drains, etc; and (14) use of soil ameliorants like gypsum, etc.

Soils

It is of interest to note that various types of soils are found in this district. The soil-forming rocks of Shimoga district are laterites, schists, granites and gneisses. As they are varied, the

soils are also different according to the climate of the particular areas.

Bhadravati taluk : The soil in this taluk is red loamy ; 55 per cent of the soil in the taluk is acidic and 44 per cent neutral, while one per cent is water-logged and saline. Even the one per cent salinity under wet conditions is found to be detrimental to the crops and even to the germination of seeds. In dry lands, the nitrogen level is normal, whereas it is deficit in wet lands, potash being normal and phosphorus being highly deficient in both wet and dry lands.

Channagiri taluk : The richest black cotton soil is found to the north-west of Shantisagara. Sandy soil is found to the north-west of the taluk. In the southern portion of the taluk, red and black cotton soils are found. About 16 per cent of the soils in this taluk are acidic, 75 per cent being neutral and nine per cent being water-logged and saline or alkaline. The salinity is three per cent in dry lands and 23 per cent in wet lands.

Honnali taluk : The soils in this taluk are loamy, sandy loam, sandy red and red admixture with sand, and medium black cotton soils. About 20 per cent of the soils of this taluk are acidic, 63 per cent being neutral and 17 per cent being water-logged and saline or alkaline. The alkalinity or salinity is five per cent in dry lands and six per cent in wet lands. Soils, both dry and wet, are deficient in nitrogen, highly deficient in phosphorus and normal in potash.

Hosanagar taluk : The soils of this taluk are lateritic which are acidic and deficit in calcium and other major plant nutrients. In general, they appear to be pulverised laterite mixed with sand. About 76 per cent of the soils are acidic and the rest are neutral. The nitrogen and potash contents are satisfactory, but phosphorus content is deficient.

Sagar taluk : The soils are lateritic in origin which is reddish throughout except in garden and wet lands lying in low valleys. The soils in low valleys are soft and sandy, whereas in other parts, they are hard and rocky and not fertile. About 94 per cent of the soils are acidic and only six per cent are normal, nitrogen and potash contents being more with a very low content of phosphorus in all the types of lands.

Sorab taluk : Soils are lateritic and red loamy in the taluk. About 75 per cent of the soils are acidic, 25 per cent being neutral. Nitrogen content is high and potash content is low, phosphorus content being very low.

Shikaripur taluk : This taluk consists of *malnad* and semi-*malnad* areas containing soils of lateritic origin and red loam with

a lot of sand. About 63 per cent of the soils are acidic and 34 per cent are normal, the remaining three per cent being water-logged and saline. In dry lands, the nitrogen content is more and in wet lands, it is normal. Potash content is high, phosphorus being highly deficient in both wet and dry lands.

Shimoga taluk : The soils of Shimoga taluk, which comprises *malnad* and semi-*malnad* parts, are composed of laterite and red loam. The soils of the taluk may be broadly classified as black loamy, red-sandy and red-lateritic soils. About 61 per cent of the soils are acidic, 36 per cent neutral and three per cent are water-logged and saline, salinity being about one per cent in dry lands and two per cent in wet lands. Dry land soils are deficient in nitrogen and the wet land soils are normal. In potash content, both dry and wet lands are normal, phosphorus being highly deficient.

Tirthahalli taluk : This is a completely *malnad* taluk and its soil is more of lateritic origin on the covered hills and rich red sedimentary one with forest loam in the jungles. About 93 per cent of the soils are acidic, the remaining seven per cent being normal. The nitrogen content is high, potash being medium and phosphorus very low.

IRRIGATION

As the district comprises three broad natural regions, the sources of irrigation vary. There are five important rivers, a number of streams, tanks and wells in the district, which are utilised for irrigational purposes. There is an assured supply of water, particularly for the main season crops, which has enabled the district to become a granary of Karnataka. According to the figures of 1972-73 made available by the State Bureau of Economics and Statistics, the district, with an area of 58,429 hectares under government canals, ranked third in the State in this respect, the first and second being Raichur and Mandya districts respectively. With 61,619 hectares under tanks, the district occupied the first place in this respect in the State, the second being Dharwar district. An extent of 2,762 hectares was under wells and 4,140 hectares under other sources in the district, the total area under all sources being 1,26,950 hectares, ranking first in the State, the second being Raichur district.

Canal irrigation

Canal irrigation in the district is from rivers and streams. The taluk-wise extent of lands irrigated by canals, as in 1972-73, was 19,484 hectares in Bhadravati, 12,616 hectares in Channagiri, 8,903 hectares in Honnali, 8,939 hectares in Shikaripur and 8,487 hectares in Shimoga, and there is no canal irrigation in Hosanagar, Sagar, Sorab and Tirthahalli taluks. Anicuts and

reservoirs have been constructed for irrigation and for generating electricity. The more important among them are dealt with below.

The Tunga anicut is constructed near Sakrebylu (Gajanur) Tunga anicut across the river Tunga. At the anicut site, the average river-bed level is 571.88 metres. Several investigations were made for examining the possibilities of harnessing the waters of this river. The construction of a reservoir at the present site was estimated to cause submersion of valuable lands to a large extent and hence, instead, an anicut was constructed. The construction of the anicut at the present site involved submersion of a very limited stretch of land, due to its special configuration. The project provides for the utilisation of as much of water as could be utilised under the limitations of its commanded area, the rest of the water being allowed to flow in the river to the Tungabhadra Dam near Hospet in Bellary district. The main object of the construction of this anicut was to supply water to the dry areas of Honnali and Shimoga taluks. The catchment area of this river at this site is 2,240.35 sq. kms. and the rainfall varies from 83.82 cms. in Shimoga to 802.64 cms. in Agumbe. In 1924, when there were unprecedented floods in the district, the maximum flood discharge was 2,32,000 cusecs. Taking this as the guideline, a maximum discharge of 2,60,000 cusecs has been provided for in this project. The project consisted of an overflow dam of a height of 12.58 metres with high coefficient weir for a length of 305 metres with crest at R.L. 584.46 metres above the mean sea-level and broad-crested weir for a length of 48.8 metres. The spillage height was designed for 4.19 metres to allow a flood discharge of 2,60,000 cusecs. An upturned bucket of 3.05 metres in diameter constructed of stone masonry arch work provided on the rear side of the Ogee weir serves to throw out the falling jet away from the dam foundations, thereby preventing scour and retrogression at the foundation of the anicut.

The top of the anicut is parabolic for a length of 305 metres and the remaining length is broad-crested weir. The special advantages of this over the trapezoidal section in vogue are that the improved design gives greater discharge for a given depth of flow over the crest of the weir and eliminates costly protective works in the river below, and incidentally, provides a magnificent sight. The anicut is a composite dam consisting of 366 metres of a masonry wall and 176.9 metres of an earthen embankment, the height of which is 18.3 metres from the foundation level and 6.1 metres above the anicut crest. Three scouring sluices of 25.4 cms. by 38.1 cms. at the river-bed are provided at the left end of the Ogee weir. Beyond the scouring sluices, the masonry anicut and the earthen embankment are connected by suitable wing walls. Five vents of 25.4 cms. by 15.24 cms. with cill at R.L. 1910 are provided for the left-bank head sluice, while there

are three vents of 25.4 cms. by 10.16 cms. with cill at R.L. 1912 for the right-bank head sluice.

Left-Bank Channel: The head regulator with shutters is constructed at the left of the anicut for regulating and supplying water to the left-bank channel which takes off towards Honnali and the length of which is about 101.4 kms. The channel passes through Shimoga, Holealur, Chilur, Govinakovi and Honnali and terminates at Marehalla at a distance of about three kms. beyond Honnali. The straight distance from beginning to end of the channel is about 51.5 kms. and the winding contour length is about 101.4 kms. irrigating 6,682.5 hectares in Shimoga and Honnali taluks. The bed width of the channel is 10.07 metres and the full supply depth is 1.83 metres. The channel is taken in a deep saddle-cut of 15.25 metres for a length of about 488 metres near Shimoga town and hence a tunnel is provided for this channel for a length of 472.75 metres, which is of horse-shoe type and designed for a discharge of 480 cusecs of water.

There are nine aqueducts, viz., Kanchihalla, Janchehalla, Kanehalla, Mohrihalla, Kuruvahalla, Ganganakote-tank-valley-halla, Hirehalla, Basavanahalla and Harlahallihalla. The Hirehalla aqueduct is the biggest one built across the Sowlanga waste weir valley. At every mile, a sluice is provided to let out water from the main canal to the distributaries for irrigation. The distributary channel is aligned to run on the highest possible contour. Relieving weirs are constructed at all minor valleys in order to relieve catchment discharges as and when they are let into the channel. The channels run mostly in cuttings and embankments, and masonry walls are provided at all places where there are valley gaps and cuttings. There are eight cuts of 9.15 metres to 12.2 metres deep on the left-bank channel.

Right-Bank Channel: The right-bank channel takes off from the right-bank head regulator. Its length is 53.1 kms. and the discharging capacity is 135 cusecs, with a full supply depth of four feet. The area benefited under this channel is 2,025 hectares. There are two aqueducts at Kuskurhalla and Santhe-Kadur valley.

The gross commanded area is 19,075.5 hectares, the irrigated area being 8,707.5 hectares. The crops grown under this anicut are sugarcane and paddy in an area of 2,025 hectares and 6,682.05 hectares respectively. The total revised cost of the project was Rs. 320 lakhs. The potential created and the area developed under the project for the years 1960-61, 1965-66, 1970-71 and 1971-72 were as follows :—

(Area in hectares)

Year	Potential created	Area developed
1960-61 ..	7,877.25	6,784.56
1965-66 ..	8,707.50	8,315.87
1970-71 ..	8,707.50	8,681.58
1971-72 ..	8,707.50	8,108.51

Owing to the construction of this anicut, four villages were submerged affecting 61 families who were rehabilitated at Sakrebylu and Halalakkavalli. The extent of lands submerged was 1,339.44 hectares.

The Bhadra Reservoir Project is located at Lakkavalli in Chikmagalur district, but the left bank of the dam is situated in the Bhadravati taluk of Shimoga district. The idea of constructing a large 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 in 1856 and many alternative proposals were also considered. 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.

In 1947, the work of the project was started and it was originally proposed to complete it in ten years, but it had to be carried on upto 1972. The left-half portion of the masonry dam is in the Bhadravati taluk of this district. The left-bank power house and left-bank channel are also in the same taluk. The total catchment area of the project is 1968.4 sq. kms. Out of which 2.85 sq. kms. or 285 hectares are in the Bhadravati taluk. The right-bank channel also provides irrigation in this district. As in 1974, the total area irrigated under this project was 98,879.13 hectares, out of which an extent of 40,446.14 hectares was in Shimoga district. The taluk-wise details of the area irrigated under each channel is given below :

(Area in hectares)

Name of channel	Bhadravati	Channagiri	Honnali	Shimoga
Bhadra Reservoir Left-Bank Channel	2,517.08	..	..	4,519.40
Bhadra Reservoir Right-Bank Channel upto mile 42.	10,139.58	..	..	..
Bhadra Reservoir Right-Bank Channel from 43rd mile to 49th mile.	348.3	744.39	..	..
Anaveri	1,127.52	..	5,007.01	..
Malebennur	..	4,514.54	3,669.71	..
Davanagere	..	7,831.08	27.54	..
Total	14,132.48	13,090.00	8,704.26	4,519.40

The extents under different crops in Shimoga district irrigated by the project were sugarcane 11,614.19 hectares, paddy 14,601.06 hectares, gardens 7,439.00 hectares and semi-dry 6,791.85 hectares. A tunnel has been constructed in the Ubrani range of hills at the 51st mile of the right-bank channel, at a cost of Rs. 2,38,000, the length of the tunnel being 4,296.84 metres from the intake to the exit. An aqueduct is also constructed over the bunds of the Shantisagara (Sulekere) tank.

**Anjanapura
Reservoir**

The Anjanapura Reservoir was constructed across the Kumudvati river near Anjanapura in Shikaripur taluk. It started in 1928 and was completed in 1936. The bund is of earthen embankment with a length of 1,525 mts. and the top width is 6 mts. to 7.29 mts., top level of bund being 47 mts. in height. The waste weir is of sloping-apron type with a clear length of 246.5 mts. with a spillage of 1.21 mts. The water-spread area is 673.9 hectares. The maximum depth of water is 17.63 mts., the mean depth of water being 10.03 mts. There are two main sluices, one on the left bank and another on the right bank. The right-bank channel, which is 46.7 kms. in length, runs in Shikaripur taluk, while the left-bank channel, which also runs in the same taluk is only 13.70 kms. in length. The area commanded by this reservoir is 7,169 hectares.

**Ambligola
Reservoir**

The Ambligola Reservoir is constructed across the Salurhalla, a tributary of the Kumudvati river, and is situated near Ambligola at a distance of 1.6 kms. from the village on Shikaripur-Anandapuram road. The bund is of an earthen embankment with a length of 80.5 mts. The water-spread area is 445.5 hectares. There are two sluice channels, the right and the left. The length of the left-bank channel is 37 kms. and that of the right-bank channel is 5.6 kms. The area commanded by this reservoir is 772.74 hectares.

**Anicut near
Gondi**

An anicut near Gondi across the river Bhadra was constructed in the year 1923. As at present, the catchment area of this anicut is intercepted by the Bhadra Reservoir. The anicut commands an area of 4,748 hectares with two channels, the right-bank channel running to a length of 73.6 kms., the left-bank channel being 16.1 kms. long. The total cost of the construction of the anicut was Rs. 16 lakhs.

Tanks

The district has a large number of tanks. In 1927, there were 566 major tanks and 7,231 minor tanks, in all 7,797. Since then, the definitions of major and minor tanks have been changed. Whereas, formerly, a tank, which fetched a revenue of Rs. 300 and above, was called a major tank, now a major tank means that one which fetches a revenue of Rs. 500 and above. The other tanks are called minor ones. In 1972, there were 144 such major tanks and 5,646 minor tanks maintained by the Public Works Depart-

ment, and in addition, there were 3,138 tanks having an *atchkat* of less than ten acres each, which were maintained by the Taluk Development Boards in the district. This meant a grand total of 8,928 tanks. Some other tanks were submerged in the reservoirs constructed in the district in recent years. The taluk-wise number of tanks as in 1972 was as follows :—

Sl. No.	Taluk	Tanks maintained by the Public Works Department		Tanks maintained by Taluk Development Boards	
		Major	Minor		
1.	Bhadravati	..	1	136	162
2.	Channagiri	..	29	131	43
3.	Honnali	..	12	87	9
4.	Hosanagar	..	..	804	378
5.	Sagar	..	..	723	225
6.	Shikaripur	..	..	947	327
7.	Shimoga	..	58	485	203
8.	Sorab	..	..	1,116	1,181
9.	Tirthahalli	..	44	1,217	610
Total		..	144	5,646	3,138

The Shantisagara tank, which was formerly called the Sulekere tank, situated in the Channagiri taluk, is one of the largest and oldest tanks in Karnataka. It was constructed in about 11th or 12th century A.D. across the Hirehalla and Soppinahalla (streams). The maximum circumference of water-spread of the tank is 103.65 kms. and its *atchkat* is 1,792.53 hectares. There are two channels taking off from this tank, namely, Sidda-Nala and Basavana-Nala. **Shantisagara tank**

The Madaga tank built across the Kumudvati river is another old tank of the district and is situated about 11.3 kms. from Shikaripur, at the border of the Shimoga and Dharwar districts. This was built during the Vijayanagara times. The sluices of this tank were built on the same principle as other old local sluices, and a rectangular masonry channel through the dam was closed with a perforated stone fitted with a wooden stopper. But as the sluices of this tank had to be in proportion to the size of the lake, the supports were formed of single stones weighing about twenty tons each. This is considered an amazing feat of those days and many people visit the place to see this. The tank was restored in 1889-90 by closing a breach and construction of a drain outlet and left-bank and right-bank canals which facilitated irrigation. **Madagada Kere**

The catchment area of this tank is about 1,398.7 hectares and the area of the water-spread is about 195.21 hectares with a water-holding capacity of 54.63 m.cft. (about 1.577 m.cmts.),

The earthen dam is 563.8 metres in length with a maximum height of 43.9 metres having upstream slopes of $2\frac{1}{2}:1$ and downstream slopes of $2:1$. The top width of the dam ranges from 121.9 metres to 182.9 metres and that of the base varies from 243.8 metres to 365.9 metres. The waters of this tank are utilised entirely for areas in Dharwar district (*see also Dharwar District Gazetteer, 1959, pp. 831-34*).

Lift irrigation

Two lift irrigation schemes were completed in 1969, one at Shakunavalli and other at Kachavi in Sorab taluk, at a cost of Rs. 24,000 and Rs. 96,000 respectively. It is interesting to note that these two irrigation works are run on co-operative basis with the assistance of Government officers. Two Lift Irrigation Co-operative Societies were formed at Shakunavalli and Kachavi and registered on 30th June 1970. At present, their managing committee consists of the Executive Engineer, Sagar Division, Sagar, (Chairman), the Tahsildar of Sorab taluk (Member-Secretary), Assistant Registrar of Co-operative Societies, Sagar, Assistant Director of Agriculture, Sagar, and two non-officials elected by the members of the Co-operative Society (members). The lift irrigation at Shakunavalli is located on the left bank of the Varada river near Tuilkoppa and it is benefiting the villages of Shakunavalli and Tuilkoppa to the extent of 109.75 hectares and 52.25 hectares respectively. The lift irrigation at Kachavi is located on the left bank of the Varada river near Kachavi and the area benefited is about 81 hectares.

Irrigation wells

Though surface irrigation is the major source of irrigation in the district, ground water is also tapped to a considerable extent for the purpose. The number of irrigation wells in 1968-69 was 2,605, irrigating an area of 2,084 hectares and by 1971-72, the number had gone upto 2,891 irrigating an area of 2,526 hectares. The taluk-wise number of wells and the area irrigated in 1968-69 and 1971-72 were as follows :—

Sl. No.	Taluk	No. of wells in		Area irrigated (in hectares)	
		1968-69	1971-72	1968-69	1971-72
1.	Bhadravati ..	115	270	140	79
2.	Channagiri ..	446	1,539	517	576
3.	Honnali ..	588	240	377	510
4.	Hosanagar ..	23	67	23	16
5.	Sagar ..	92	93	113	113
6.	Shikaripur ..	415	223	153	516
7.	Shimoga ..	471	298	463	348
8.	Sorab ..	432	138	237	350
9.	Tirthahalli ..	23	23	11	18
Total ..		2,605	2,891	2,034	2,526

The number of irrigation wells constructed according to the sources of finance as in 1968-69 was 1,471 by private sources, 255 by liberalised loan scheme, 582 by land development banks, 131 by local development works and community development funds, 18 by *taccavi* loans, 14 by co-operative societies and 134 by other sources. The number of irrigation wells according to the year of construction was 1,154 prior to 1960, 49 in 1960, 46 in 1961, 79 in 1962, 104 in 1963, 174 in 1964, 143 in 1965, 137 in 1966 and 232 in 1967. The number of wells fitted with different water-lifting devices in 1969 was 572 by manual labour, 192 by *kapile*, 17 by Persian wheel, 275 by oil engine pumpset and 529 by electric pumpset. In 1972, the taluk-wise number of electric pumpsets was 69 in Bhadravati, 1,547 in Channagiri, 268 in Honnali, 50 in Hosanagar, 78 in Sagar, 43 in Shikaripur, 183 in Shimoga, 72 in Sorab and 242 in Tirthahalli taluks, the district total being 2,552. The number of diesel pumpsets during the same year was 28 in Bhadravati, 35 in Channagiri, 48 in Honnali, 16 in Hosanagar, 17 in Sagar, 32 in Shikaripur, 97 in Shimoga, 11 in Sorab and 55 in Tirthahalli taluk, the total for the district being 339. The State Land Development Bank issued loans for sinking wells in Shimoga district to the tune of Rs. 8,19,287 in 1965-66, Rs. 9,93,029 in 1966-67, Rs. 19,78,823 in 1967-68 and Rs. 7,78,685 in 1968-69.

There is a sprinkler irrigation system working since 1966 in the farm attached to the Tunga Vidyapeetha at Gajanur. Its equipment was gifted by the Danish Volunteer Service. An area of 24.3 hectares is irrigated by this sprinkler system and the crops grown are sugarcane, maize, ragi and paddy. **Sprinkler irrigation**

In addition to the above irrigation sources, there are also natural springs in Sagar, Hosanagar and Tirthahalli taluks. A small area of lands is irrigated by this source by putting *bhandaras* across the flow of the stream.

Opening of canals, bunding-up of the flow of water and diverting of the water and cutting open the channel unauthorisedly to feed water to lands are offences under the Irrigation Act of 1965. There are gangmen or *Sowdies* 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*.

The Shimoga district is well favoured by nature and there had been a few failures of yearly rains. The chances of a serious famine in the *malnad* parts are rare. The famine conditions in the neighbouring *maidan* parts had a tendency to boost the prices of foodgrains in the district. Even the very severe famine of 1878 which affected the dry districts of the State did not have much effect on this district. Rains failed in some villages of Shikaripur taluk in 1961-62, 1964-65 and 1965-66. The crops failed due to paucity of rains in 45 villages in 1968-69 and 47 villages in **Famines**

1970-71 in Shimoga taluk. In 1964-65, 137 villages of Honnali taluk suffered on account of low rainfall. In all the above-mentioned cases, remissions or suspensions of the land revenue were granted depending upon the percentages of crop-yields under the Karnataka Land Revenue Act and Rules.

Floods

The district had faced calamities on account of floods in some of the rivers and streams. The worst and most disastrous floods experienced in recent times were in 1924, when Shimoga town and fifteen important villages on the banks of the Tunga and the Bhadra rivers were inundated and suffered badly; 735 houses in Shimoga town were under water, out of which 250 houses collapsed. The total number of houses which collapsed in the district was estimated at about 1,000. About 3,240 hectares of land were damaged and some portions were entirely washed away. Relief measures were undertaken to help the homeless and the destitutes. No lives were lost and much of the property that would have been otherwise lost was saved. A Central Flood Relief Committee was organised with the Yuvaraja of Mysore as the Chairman and the then Maharaja of Mysore donated Rs. 15,000 from his privy purse. The Servants of India Society collected subscriptions and materially helped in affording relief.

In 1956, there were floods in Channagiri taluk due to heavy overflow of water from some tanks and *hallas*. About 45 head of cattle and crops to an extent of 227 hectares were lost. The relief measures consisted of gratuitous relief to sufferers amounting to Rs. 1,375, interest free loans to the tune of Rs. 59,375, lift-irrigation loans to the extent of Rs. 9,150 and *taccavi* loans amounting to Rs. 16,500. In July 1959, there were heavy floods in the Tunga river in the taluks of Tirthahalli and Shimoga. As a result of this, communications between Tirthahalli and Shimoga were disrupted. A traffic of messages was, however, maintained by inserting a wireless station at Tirthahalli for receiving advance warnings of the rising floods. Hundreds of families had to be taken away to places of safety. There was considerable damage to properties.

The floods of 1961 in the Varada river in Sagar taluk were severe. Crops in an area of about 1,049.75 hectares worth Rs. 3,36,030 and 38 head of cattle were lost, and two houses were washed away. The relief measures provided were distribution of gratuitous relief amounting to about Rs. 15,352, interest-free loans to the tune of Rs. 52,800 and 40 *pallas* of seed paddy. In Shikari-pur taluk, the Gowrihalla was also in spate and crops in an area of about 405 hectares along with a few huts and houses were lost. Interest-free loans of Rs. 99,600 were distributed to the sufferers as a relief measure. There were floods in 1961 due to the overflow of some *hallas* and tanks in Channagiri taluk where crops were

lost in an area of 167.06 hectares. Gratuitous relief to the tune of Rs. 20,695 and lift-irrigation loans of Rs. 16,375 were given to the sufferers. During 1973-74, there were floods in Hosanagar taluk. Crops suffered in an area of 227.81 hectares, to the extent of Rs. 1,15,757. But the farmers, after the recession of floods, levelled the lands and seeds were sown. This helped to minimise the losses.

Because of the variety of soils and climate of the district, the cropping pattern differs from area to area. In those parts, which were provided with large-scale irrigation facilities in recent years from the Tunga and the Bhadra rivers, the cropping pattern has undergone a change from dry to wet cultivation and there is also rotation of crops. The farmers of these irrigated areas are more inclined to grow paddy than other dry-cum-wet crops. The lands, on which previously ragi and jowar were being grown, have been now converted into paddy fields. In recent years, after the price of sugarcane was enhanced, the area under sugarcane in rotation with paddy has increased, and now hardly any other commercial crop is being grown in such areas. The taluk-wise particulars of the cropping pattern are given below :—

**Cropping pattern
and rotation**

Taluk	Season		
	Kharif	Rabi	Summer
BHADRAVATI :			
Dry	Paddy	Fallow	Fallow
	Jowar	do	do
	Groundnut	Rabi Jowar	..
	do	Cotton	..
	Chillies	do	..
	Groundnut	Pulses	Fallow
	Ragi	Fallow	Fallow
	Hybrid jowar	Ratoon or Fallow	do
	Sea Island Cotton	..	do
	Irrigated	Paddy	Fallow	Paddy
do		do	Ragi
do		do	Groundnut
do		do	Jowar
do		Pulses	Fallow
Sea Island Cotton		..	do
Paddy		..	Sugarcane
CHANNAGIRI :			
Dry	Jowar	Ratoon jowar	..
	Paddy	Pulses	..
	Groundnut	Rabi jowar	..
	do	Pulses	..
	Chillies and Cotton	..	..
	Chillies and Cotton	..	Fallow

Taluk	Season		
	Khariif	Rabi	Summer
Channagiri Dry	Paddy	Pulses	..
	Paddy	Fallow	..
	Ragi	Fallow	..
	Tobacco (Virginia)	do	Fallow and fol- lowed by groundnut or jowar or ragi or cotton
Groundnut is grown with cotton as two rows or one row of groundnut with one row of cotton, chillies and cotton followed by millets or cereals.			
Irrigated	Paddy	Pulses	Fallow
	Paddy	Fallow	Paddy
	Paddy	do	Groundnut
	do	do	Hybrid jowar
	do	do	Ragi
	Hybrid jowar	Ratoon	Groundnut
	Ragi	Wheat	do
	Groundnut	do	..
Paddy after Sugarcane.	..	..
HONNALI :			
Dry	Jowar	..	Fallow
	Hybrid jowar	Ratoon	do
	do	Fallow	do
	Groundnut	Rabi jowar	do
	do	Pulses	do
	do	Wheat	do
	Tobacco (Virginia) and is followed by groundnut or chillies or cotton or hybrid jowar		
	Ragi	Fallow	Fallow
Chillies and cotton followed by millets like <i>save</i> or <i>navane</i> or hybrid jowar or ragi or groundnut.			
Irrigated	Hybrid jowar	Fallow	Groundnut
	do	Ratoon	do
	Ragi	Fallow	do
	Paddy	do	do
	do	do	Ragi
	do	do	Hybrid jowar
do	do	Paddy	
HOSANAGAR :			
Dry	Paddy	Fallow	Fallow
	Paddy and followed by paddy	Pulses	do
	Fallow	Pulses	do

Taluk	Season		
	Kharif	Rabi	Summer
Irrigated	Paddy followed by sugarcane	Fallow	Paddy
SAGAR :	Same as in Hosanagar taluk		
SHIKARIPUR :			
Dry	Paddy	Fallow	Fallow
	Paddy	Pulses	do
	Ragi	Fallow	do
	Fallow	Pulses	do
	Chillies and cotton followed by ragi or groundnut or hybrid jowar		
	Sea Island Cotton	..	Fallow
Irrigated	Paddy and followed by sugarcane or ginger	Fallow	Paddy
SHIMOGA :			
Dry	Paddy	Fallow	Fallow
	do	Pulses	do
	Fallow	Pulses	do
	Tobacco (Virginia) followed by pulses or ragi or hybrid jowar or chillies or groundnut or Sea Island Cotton	Fallow	do
	Ragi	Fallow	Fallow
	Hybrid jowar	Fallow or ratoon.	do
	Chillies and cotton followed by groundnut or ragi or hybrid jowar		
Irrigated	Paddy followed by sugarcane	Fallow	Paddy
	Paddy	Fallow	Ragi
	do	do	Hybrid jowar
	do	do	Groundnut
SORAB :			
Dry	Paddy followed by paddy	Fallow	Fallow
	Fallow	Pulses	Fallow
	Sea Island cotton followed by pulses or paddy	..	do
	Chillies	Pulses	Fallow
Irrigated	Paddy followed by sugarcane	Fallow	Paddy
TIRTHAHALLI :	Same as in Hosanagar and Sagar taluks.		

The percentages of extents of lands under various crops in the district as in the year 1973-74 are given below :

<i>Crop</i>	<i>Percentage of extent</i>	<i>Crop</i>	<i>Percentage of extent</i>
Paddy	54.02	Vegetables	0.30
Other cereals	22.02	Other food crops	0.61
Pulses	7.87	Chillies	3.20
Sugarcane	1.49	Oilseeds	4.89
Banana	0.32	Areca nut	2.20
Other fruits	0.28	Other non-food crops	2.80
		Total	100.00

The extents of area under different crops in the district were as given hereunder in 1973-74 :—

<i>Crop</i>	<i>Area in hectares</i>	<i>Crop</i>	<i>Area in hectares</i>
Paddy	1,47,681	Bengal gram	1,615
Ragi	36,385	Tur	3,285
Jowar	23,231	Horse-gram	14,388
Maize	1,190	Green gram	1,431
Wheat	126	Black gram	595
Chillies	13,459	Avare	1,281
Other cereals and millets	23,465	Castor	861
Groundnut	7,600	Linseed	26
Sugarcane	6,389	Sesamum	912
Laxmi and other cottons	8,675	Mustard	59
Sea Island Cotton	946	Niger	356
		Safflower	34

Cropping seasons The cropping seasons in the district are *kharif*, *rabi* and summer as in the case of 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 availability of water through rainfall or irrigation, climatic conditions, etc. The average rainfall of the district is 1,334.3 mms. It is highest in Tirthahalli taluk with 2,807 mms. and it is lowest, *i.e.*, 399.1 mms. in Honnali taluk.

Paddy In 1973, the taluk-wise area in hectares under paddy was : Bhadravati 16,976 ; Channagiri 10,543 ; Honnali 10,401 ; Hosanagar 13,394 ; Sagar 16,113 ; Shikaripur 20,359 ; Shimoga 16,983 ; Sorab 25,875 and Tirthahalli 17,037, the total area for the district being 1,47,681 hectares. With this, the district ranked first among the districts of the State in so far as paddy was concerned. It is grown under rainfed and irrigated conditions both in *kharif* and summer seasons. The rainfed crop is generally sown direct and the irrigated crop is transplanted. The seed rate is from 65 to 90

kgs. per hectare. 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 yield is $1\frac{1}{2}$ to $2\frac{1}{2}$ tonnes per hectare for rainfed crop, $2\frac{1}{2}$ to 3 tonnes for irrigated crop and 4 to $4\frac{1}{2}$ tonnes for summer crop. It is of interest to note that the old Mysore Gazetteer, Volume V, pp. 211-212 (published in 1930) has recorded that there were more than 60 varieties of paddy grown in the district in those days. Most of these were subsequently replaced by high-yielding varieties. The varieties grown as at present are S.R. 26 B, Jaya, I.R. 8, I.R. 20, Madhu, S. 705, S. 712, S. 701, S. 317, CH. 45, M-161, S. 749, S. 1092, CH. 2, A-200, P.T.B. selections, and local varieties.

The next crop covering a large extent of the sown area in the district is ragi. The Channagiri and Honnali taluks ranked first and second in the district in respect of area under ragi with 19,376 hectares and 7,545 hectares respectively, as in 1973-74. The extents of area in hectares under ragi during the year in the other taluks were : Shimoga 3,853, Shikaripur 2,874, Bhadravati 2,522, Hosanagar 124, Sorab 15, Tirthahalli 14 and Sagar 2. Sometimes, it is also grown as a rainfed or irrigated crop, the irrigated crop being grown in summer. The cultivation processes consist of ploughing once, harrowing twice and clod-crushing twice and sometimes transplantation of seedlings. The varieties grown are Poorna, Annapoorna, E.S. 11, H. 22 and Kaveri. The yield of rainfed crops is one tonne in case of sown crop, 1.5 tonnes in case of transplanted and 2 to 2.5 tonnes per hectare in case of irrigated crop.

The area under jowar in the district in 1973 was 23,231 hectares, Channagiri taluk standing first with an extent of 12,678 hectares and Honnali taluk taking the next place. The hybrid jowar CSH-1 is grown during the *kharif* season under rainfed conditions. The other varieties grown during *kharif* are Fulgar white, Fulgar yellow, Nandyal, D-340 and Kesari. During *rabi* season, M. 35-1, Mugati, local Yanigar or Bilijola are grown. One or two ploughings are given and 15 to 20 cartloads of farmyard manure per hectare are added, and sowing is done at a distance of eighteen inches. The crop comes to harvest in about $3\frac{1}{2}$ months in case of hybrid jowar, 4 to $4\frac{1}{2}$ months in respect of Kesari and $5\frac{1}{2}$ months in respect of other varieties.

The other cereals and millets grown in the district had a total extent of 26,781 hectares in 1973-74, out of which maize had an extent of 1,190 hectares and wheat 126 hectares only, in the district. The varieties of wheat grown are mostly Mexican varieties like Saffedlarma, Chotelarma, U.P. 301 under irrigated conditions. In respect of rainfed conditions Kalyan Sona, Amrut and Kenaphad, Bijga-yellow are grown in a small area and the yield

under such conditions is very poor of about 4 to 5 quintals per hectare. The average yield of wheat is 1.5 to 2 tonnes per hectare.

Pulses

In 1973, pulses occupied an area of 22,066 hectares forming about 7.87 per cent of the cultivated area of the district. They are grown in all the taluks except the Tirthahalli taluk. The largest area under pulses is in Channagiri taluk, followed by Honnali and Shikaripur taluks. The pulses grown in the district are bengalgram, *avare*, *tur* or *togari*, horse-gram, greengram and blackgram. Of these, horse-gram has the highest acreage followed by that of *tur* and bengalgram. Most of these crops are grown as *akkadi* crops while the main crop may be ragi or jowar or groundnut or millets like *save*, *navane*, etc. The following various measures have been taken for developing the cultivation of pulses in the district :—

(1) growing them as a rotational crop, (2) growing them in paddy fallows, (3) growing them as pure crop and mixture crops along with cereals and minor millets, (4) growing them as a *rabi* crop after the harvest of *kharif* crops or growing them as an early *kharif* crop followed by *rabi* crops like ragi, jowar, (5) application of super-phosphate as a must, (6) treating seeds with rhizobium culture, (7) adoption of timely plant protection measures, (8) adoption of package practices, and (9) supply of short-duration pulse varieties. For following these measures, *inter-alia*, the lands left after the *kharif* harvests are taken over as additional areas. Out of this, 25 per cent of the area is reserved for covering package practices. A number of demonstration plots of one hectare and one *are* each are laid out with the assistance of Central and State funds. Plant protection chemicals are being supplied free of cost or at 50 per cent subsidy to the farmers. Short duration and improved varieties of pulses like Baisaki-moong and China-moong are supplied for multiplication in addition to cowpea, *tur* and Bengal gram.

Groundnut

Groundnut is a cash crop grown in all the taluks of the district except the Tirthahalli taluk, with a total extent of 7,600 hectares as in 1973, out of which Honnali taluk had 3,107 hectares and Channagiri 2,736 hectares. The number of hectares in other taluks was as follows: Shikaripur 646, Shimoga 568, Bhadravati 363, Sorab 154, Hosanagar 18 and Sagar 8. The rainfed groundnut crop is grown from May-June to September-October, and the irrigated crop is grown from December-February to April-May. The varieties grown in both the seasons are T.M.V. 2, Spanish Improved and S. 206. Usually, two ploughings and two harrowings are given followed by manuring of 15 to 20 cartloads of farmyard manure per hectare. The yield per hectare would be from one to two-and-a-half tonnes. A Centrally sponsored scheme

for maximisation of groundnut production in assured rainfall areas and irrigated areas was introduced in 1969 in Bhadravati, Channagiri, Honnali and Shimoga taluks of the district.

In addition to groundnut, other oilseeds grown in the district are castor, linseed, sunflower, niger, safflower and sesamum. The areas under castor, linseed, sunflower and sesamum were 861, 26, 746 and 912 hectares respectively in 1972-73. A comprehensive scheme for development of oilseeds is being implemented in the district since 1961. The oilseeds are grown under rainfed and irrigated conditions. Castor varieties like Aruna, N.P.H. 1 (*akkadi*), S.A. 2 and Rosy castor are being grown both as a mixture crop and *akkadi* crop and to a very small extent as a pure crop.

Development of sunflower was initiated in the district in 1971-72 by introducing the high yielding Russian variety EC 68415 and the Bulgarian variety EC 68414. The area covered during 1971-72 and 1972-73 was 611 and 746 hectares respectively. In order to popularise this crop, about 2,850 kgs. of seeds were distributed free of cost to agriculturists in 1971-72. During 1972-73, a quantity of 38 quintals of seeds was distributed to the growers at a subsidised rate through the *panchayats* and taluk development boards.

Sugarcane is another important commercial crop of the district, which had an area of 6,389 hectares in 1973. The Bhadravati taluk had the largest area with 2,732 hectares, followed by Shimoga taluk which had 1,391 hectares. The extent of hectares under sugarcane in other taluks was : Sorab 515, Tirthahalli 382, Sagar 325, Hosanagar 307, Channagiri 283, Shikaripur 280 and Honnali 174. The planting seasons are November and December for the one-year crop known as *eksali*, and June and July for the one-and-a-half year crop called *adsali*. Preparatory cultivation consists of three to four ploughings and two harrowings with clod-crushings. Planting of 25,000 to 30,000 sets per hectare is done along rows at a distance of 0.91 metre to 1.07 metres. Interculturing and earthing up are done four times. The average yield is about 100 tons per hectare for *eksali* crop and about 120 tons per hectare for *adsali* crop. The varieties of sugarcane grown in the district are CO 419, CO 720, H.M. 320 and CO 449 in addition to the local varieties like Rasadali, Patta-patti, etc. A Sugarcane Development Scheme was introduced in the district in 1958 with the objectives of increasing the per-hectare yield by following intensive methods and educating the farmers, and of improving the quality of jaggery and recovery of sugar. The work of the scheme is concentrated in the taluks of Shimoga, Bhadravati, Honnali and Shikaripur. There is a sugar factory in the district and another is being established (*see* Chapter V).

Cotton

Among the fibre crops, cotton is the most important one in the district. This cash crop, especially the new variety called the Sea Island Cotton (Andrews), brings a good return to the farmers. Cotton-seeds are a valuable cattle feed. The area under cotton other than the Sea Island Cotton was 8,675 hectares in 1973. The Channagiri taluk accounted for the largest area with 7,384 hectares, followed by Honnali taluk with 1,024 hectares, Bhadravati taluk with 208 hectares and Shimoga taluk with 59 hectares. The extent of area under Sea Island Cotton in the district was 946 hectares, of which Shikaripur taluk had the largest area with 666 hectares. The extent of hectares under this crop in other taluks was Sorab 45 ; Shimoga 42 ; Honnali 32 and Sagar 10.

Cotton is grown as an independent crop by itself or as a subordinate crop. The preparatory cultivation consists of two ploughings and two harrowings with an application of 10 to 15 cartloads of farmyard manure per hectare. Sowing is done from June to August, the seed-rate being about seven to eight kgs. per hectare. The average yield is two to four tonnes per hectare. The varieties grown are Laxmi, H-4 (Hybrid-4), M.A. 5, Jayadhar and Hampi. The Varalakshmi variety was also introduced during 1974-75 and the seed production of this variety is undertaken in the district. The Sea Island Cotton (Andrews) is grown both as a rainfed crop and as an irrigated crop. In the case of this variety, the seeds are dibbled at a distance of two feet by one foot, the seed-rate being 10 to 12 kgs. per hectare. It comes to harvest in six to seven months, the average yield being one-and-a-half to two-and-a-half tonnes per hectare in case of rainfed crop and two to three tonnes in case of irrigated crop. There are three schemes in operation for cotton development in this district, namely, Laxmi Cotton Scheme, H-4 Cotton Scheme and Sea Island Cotton Scheme. Under the Laxmi Cotton Scheme, which was introduced in the district in 1952-53, the fourth and fifth generation seeds are supplied to farmers every year through the Gadag Co-operative Cotton Sales Society. The Hybrid-4 Cotton Development Scheme was started in 1971-72. There is a slow progress in the cultivation of this variety. The Sea Island Cotton Development Scheme was begun in the district in 1958. For this purpose, the district was divided into three zones, viz., Shiralkoppa, Shimoga and Anavatti zones formed under the State Plan and the non-plan schemes ; the Bhadra Project Area constitutes a centrally sponsored scheme under irrigation. For the intensive development of this type of cotton, for timely provision of inputs to growers and for assisting in pooling and marketing of the produce, three Sea Island Cotton Growers Co-operative Societies have been organised at Shimoga, Shiralkoppa and Anavatti.

Tobacco is also grown in the district. A scheme was introduced in the district in 1967-68 for the development of Virginia flue-cured tobacco, first in Shimoga taluk, and later it was extended to Bhadravati, Channagiri, Honnali and Shikaripur taluks. The extent under this crop in 1967-68 was 110 hectares which had increased to 378 hectares by 1972-73. The variety grown here is Virginia Gold. The nursery is raised in the months of March and April and planting is done in May and June. The preparatory cultivation consists of two ploughings and two harrowings with an application of about 15 cartloads of farmyard manure. The seed-rate is about 25 gms. per hectare and planting is done at a distance of 3½ feet by 1½ feet. Top-dressing of 50 kgs. of nitrogen in the form of nitrate, 80 kgs. of phosphate and 60 kgs. of potash in the form of sulphate of potash is given. The average yield is about one tonne cured leaf per hectare. As in 1972-73, there were three small barns and 87 medium barns for curing the tobacco leaves in the district.

Tobacco

The manures that are in common use in the district are farmyard manure, green manure, compost and fertilisers. The farmyard manure available in the cattle-sheds is conserved by using sectional filling method or by the usual method of dumping it in one place till it is carried for use. As there is sufficiently available grazing area, the farmers are owning a considerable number of cattle. Efforts are being made by the Department of Agriculture to popularise efficient methods like sectional filling so that the manure does not lose its manurial content. There are two types of green manuring followed in the district, (1) growing *in situ* and incorporating in the soil and (2) bringing green leaves from nearby forests and incorporating the same in the soil. Farmers are planting glyricidia and *honge* (*Pongamia glabra*) on the border of their fields and use the loppings as green manure. Sannhemp is also grown in between the interval of two crops, applying superphosphate and then incorporating it into the soil. A mixture crop of sannhemp and diancha is also grown. Some quantities of seeds and seedlings of green manure are supplied every year by the Department of Agriculture. Demonstrations are also being conducted to popularise the growing of green manures for helping to tide over the shortage of organic manures.

Manure

The rural compost consists of waste materials from the cattle-yards and green vegetation which is available in plenty. Demonstrations are conducted for 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. The urban compost consists of the waste materials available in the municipal areas. Formerly, a transport subsidy was being given to the cultivators for carrying urban compost to the fields. In recent years, efforts are being made to produce

Compost

quality composts out of town waste by sieving the materials before dumping, using systematic pits for filling, utilising super-phosphate, and also night soil, if available, etc. The local bodies are also making efforts to prepare compost where *shandies* are held.

Fertilisers

As paddy is the most important crop of the district and there are considerable irrigational facilities, fertilisers have been in greater use in recent years. Year by year, the quantity of fertilisers being utilised is increasing. The common fertilisers are urea, ammonium sulphate, calcium ammonium nitrate and complex fertilisers. The total supply of fertilisers falls much short of the demand and 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 handle the sale of fertilisers, seeds and plant protection materials. Many demonstration plots were laid out in respect of high-yielding varieties of crops by the Department of Agriculture and private firms supplying fertilisers. During 1974, a card system was introduced in the district for the supply of nitrogenous fertilisers as there was an acute scarcity of fertilisers.

The Madras Fertilisers Ltd. has adopted the Aralehalli village in Bhadravati taluk, under its "Village Adoption Program". The objects of the programme are to educate the farmers on the conservation of fertilizers, avoiding losses of applied fertilizers and optimising other cultivation practices. A total of 241 out of 292 farming families and 487.2 hectares out of 750.9 hectares of land in this village is listed, enumerated and adopted in this village for the purpose.

A Fertiliser Promotion Programme was taken up in the district in 1973, with the objectives of educating the farmers in the judicious use of chemical manures and local manurial resources. Under this scheme, 200 demonstration plots were laid out on cultivators' fields (based on soil-test recommendations) with a subsidy of Rs. 150 per demonstration plot on paddy, hybrid jowar, hybrid maize, groundnut, sunflower, sugarcane, hybrid bajra, wheat, etc. Training programmes were also organised through the taluk development boards, *panchayats*, youth clubs, *mahila mandals*, etc.

Implements

The most important old implement is the wooden plough which is still in use, though several modern implements have been introduced. Sometimes, the wooden plough is used to remove *hariyali*, nut grass, etc. The power being used to draw this implement is usually a pair of bullocks, but in heavy soils, two-to-three pairs of bullocks are also used. 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 and

the common ploughs in use in the district are the Kolar Mission plough, bar point plough, ureca plough and Kirloskar plough No. 9 and No. 100. *Halube* is an old-type implement 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 covering seeds. They are of two types, light long blade harrow and short or heavy blade harrow. Sowing is done with a light wooden plough or seed drill. 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, which is made of wood, is used for clod-crushing. Slit-hoes are used for inter-culturing 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 fertilizer implement, (4) ridger, (5) bund-former, (6) wet-land puddler, (7) paddy-weeder, (8) clod-crusher, (9) disc-harrow, (10) seed-dressing drum, (11) duster, (12) sprayer (hand-operated), (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.

Improved varieties of seeds and hybrid seeds are being supplied to the 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 that is to be renewed, once in four years, taluk-wise and variety-wise. In case of tobacco (V.F.C.), seedlings are supplied (though not for the full area) by raising nurseries on cultivators' fields or at the seed-farms. The seed material of sugarcane after the hot-water treatment is brought from the sugarcane research stations or from sugar factories. The Sea-Island Cotton seeds are supplied by the Department of Agriculture or through the Sea-Island Cotton Growers' Societies. The fourth and fifth generation seeds of Laxmi and Jayadhar cotton varieties are obtained from the neighbouring cotton-growing districts through co-operative societies.

Improved seeds

Seed-farms

In the early years of this century, an agricultural farm was established at Mathur in Sagar taluk and it was closed later on. A seed-farm was opened at Garaga in Channagiri taluk during 1962-63 and was later handed over to the Horticulture Department. In 1973, there were four seed-farms in the district meant for seed-multiplication. 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 subjoined statement gives some particulars of the seed-farms :—

<i>Sl. No.</i>	<i>Place of seed-farm</i>	<i>Taluk</i>	<i>Year of starting</i>	<i>Area (in hectares)</i>
1.	Hallikere ..	Bhadravati ..	1958	26.45
2.	Hosahalli ..	Channagiri ..	1959	29.16
3.	Haralahalli ..	Honnali ..	1958	12.87
4.	Kutrahalli ..	Shikaripur ..	1962	13.77

Prior to 1964, the registered seed-growers of paddy, ragi and jowar were getting subsidy for growing, stocking and distributing registered seeds. In 1973, only the registered growers of oilseeds were getting subsidy as follows:—(1) a premium of Rs. two to the farmer who produces 40 kgs. of registered seeds; (ii) subsidy at Re. 0-50 per 40 kgs. of seeds for storage and handling charges and (iii) at the rate of Re. 0.50 per 40 kgs. of seeds of transport and contingencies.

Intensive Agricultural Area Programme

The Intensive Agricultural Area Programme was introduced in the district during the year 1966-67. The crops selected under this programme are paddy, ragi, jowar and groundnut. Stress was laid persuading the farmers to adopt package of practices for getting the higher yields and for improving the economic condition of the farmers. The area under the selected crops, as in 1966-67, were : paddy 9,751.59 hectares; ragi 4,153.68 hectares; jowar 1,159.51 hectares; and groundnut 3,669.3 hectares. By 1972-73, these extents had risen to 40,619.07 hectares under paddy, 10,265.94 hectares under ragi, 2,833.79 hectares under jowar and 4,485.37 hectares under groundnut.

High-Yielding Variety Programme

Another important scheme called the High-Yielding Variety Programme was also taken up in 1966-67. The hybrid varieties introduced were hybrid jowar, hybrid maize, hybrid-4-cotton, high-yielding paddy, Mexican wheat and hybrid bajra. In 1972-73, the extents (in hectares) under these varieties were : high-yielding paddy 27,369; hybrid jowar 25,259; hybrid maize 578; Mexican wheat 20; and hybrid bajra 87. Timely supply of seeds, fertilisers and plant-protection chemicals is made to the farmers, and propaganda lectures, field-days, demonstrations, crop competitions, etc., are also conducted.

During the year 1972-73, IET-1991, IET-1039 and MR-136 varieties of paddy, ROH2 variety of ragi, EC 68415 variety of sunflower and Hira variety of wheat were introduced and trials were conducted and demonstration plots were also laid out for them.

The Soil-Testing Laboratory, Shimoga, was commissioned during 1971. In 1972-73, about 21,190 samples of soils collected from farmers' fields were analysed in this laboratory (out of them, 8,034 samples were from the Chikmagalur district). The farmers are appraised of the results of the analysis of soil samples and are guided about the deficiencies that are to be made up.

**Soil-Testing
Laboratory**

In recent years, more attention is being paid to counteract and control the many pests and diseases which attack the various crops. Timely plant-protection measures are very essential for minimising the damages. At present, there are some 84 pesticides in use. In 1960-61, 432 litres of liquid chemicals, 2,976 kgs. of dusts and 569 plant-protection appliances were supplied to the farmers by the Department of Agriculture, whereas in 1972-73, about 28,500 litres of liquid chemicals, 57,300 kgs. of dusts and 185 plant-protection appliances were provided. The following schemes for subsidised supply of plant-protection equipment and chemicals were in force in the district during 1973-74: (1) *Under the Centrally Sponsored Scheme for the development of Sea Island Cotton under the Bhadra Project*:—(a) plant-protection chemicals at 50 per cent subsidy, (b) plant-protection equipment at 50 per cent subsidy and (2) plant-protection chemicals at 50 per cent subsidy for pulses, (3) *Under the Centrally Sponsored Scheme for the development of pulses*:—free supply of plant-protection chemicals of Rs. 25 per hectare; (4) *Under the Centrally Sponsored Scheme for groundnut*—(a) plant-protection chemicals at 25 per cent subsidy and (b) plant-protection equipment at 25 per cent subsidy; (5) *Under the State Scheme for groundnut*:—Plant-protection chemicals at 25 per cent subsidy; (6) *Under the Tobacco Development Scheme*:—plant-protection equipment at 25 per cent subsidy limited to Rs. 50 per sprayer.

Plant protection

In 1974, there was a severe attack by red-headed hairy caterpillars (*Amsacta albistriga*) in the district, particularly in Honnali taluk. The total area affected by this was 917.73 hectares and crops of an area of 90.37 hectares were severely damaged causing a loss of Rs. 1,26,500, the important crops thus affected being chillies, late-sown jowar, groundnut and cotton. The menace was brought under control by catching and killing the hairy caterpillars with the help of about 600 to 800 school children for about four days and also by spraying 5 per cent Malathion at 10 kgs. per acre.

Experiment-cum-Demonstration Farm

An Experiment-cum-Demonstration Farm was started at Tyavanige in 1971, under the Bhadra Project, with the objectives of carrying out experiments on irrigation, fertiliser schedule, crop rotation and soil management and also for conducting trials and demonstrations on the crops grown under irrigated conditions. Multiplication of seeds is also done here for distribution in the *atchkat* area. The area of the farm is 102.26 hectares. In 1973, hybrid jowar was sown in this farm in an area of 12.15 hectares.

Agricultural Refinance Corporation

A Loan Scheme of the Agricultural Refinance Corporation is in operation in the Bhadra Project area of the district for providing long-term loans for reclamation and development of land in a phased manner. Loans are granted through the primary land development banks at the rate of Rs. 300 for one per cent slope, Rs. 400 for one-to-two per cent slope and Rs. 500 for more than two per cent slope. In the first stage, 60 per cent of the loan is being disbursed and the rest is paid after production of an utilisation certificate. In 1972-73, the extent of area for which loans were sanctioned was 5,760.32 hectares.

Multiple Cropping Scheme

A Multiple Cropping Scheme is in operation in Honnali taluk of the district since 1971. The objectives of this scheme are:— (1) to accelerate intensive cropping through multiple cropping in the selected villages and to expand the activities to the entire taluk, (2) to develop village leadership for taking up intensive farming through multiple cropping, (3) to streamline input supplies and credit services for the farmers in the selected areas, (4) to organise storage, marketing and allied activities, (5) to develop communications and other infrastructure facilities in the area, and (6) to increase the existing cropping intensity from 115 per cent to 150 per cent.

Farm Management Scheme

A Farm Management Scheme is also being implemented in Honnali taluk since 1971 with the following aims: (1) to study the cost of cultivation of different crops like paddy, jowar, sugarcane, groundnut and sunflower, (2) to work out the economics of different high-yielding and hybrid varieties of crops grown in the area, (3) to study the economics of different crop sequences adopted on 60 demonstration plots organised under the Multiple Cropping Scheme, (4) to study the economics of different crop sequences adopted on national agricultural demonstration plots, (5) to study the cost of cultivation of newly introduced crops like H-4 cotton, sunflower, etc. Ten villages and 100 cultivators at the rate of ten cultivators per village were selected for the purpose.

Farmers' Training and Education Centre

A Farmers' Training and Education Centre was started at Bhadravati in 1969. Its aims are (1) to impart training in cultivation of hybrid and high-yielding varieties to farmers (including farm-women), (2) to provide the technical know-how to farmers in regard to seeds, fertilisers, pesticides, implements, water use,

etc., to enable them to keep pace with the new developments, (3) to encourage farmers to participate in national agriculture demonstrations, and (4) to keep the farmers informed of the latest information on farming, storage of grains and house-management through printed materials, visual aids and radio broadcasts. The trainees are selected from Shimoga and Chikmagalur districts and Harihar and Davanagere taluks of Chitradurga district. This centre is imparting institutional and peripatetic training for periods of one day, three or five days. During the one-day camps, production-cum-demonstration training is given to farm-men and farm-women on high yielding variety programme, use of pesticides, fertilisers, cooking, etc. The training for three days is an institutional training programme for conveners of *Charcha mandals*; the subjects discussed are the role played by conveners, sources of agricultural information and such other agricultural subjects. The five-day training includes training on high-yielding varieties of crops, poultry farming, livestock, preparation of various recipes, balance diet and other subjects allied to agriculture. In 1972-73, ten camps of five days for 243 farmers, seven camps of five days for 245 farm-women and eight camps of three days for 107 conveners of *Charcha mandals* and 100 camps of production-cum-demonstration training for 3,872 farmers and farm-women were conducted. Discussion groups or *Charcha mandals* for farmers and farm-women are organised to serve as a forum for exchange of views on demonstration of crops and field problems faced by the farmers in adopting improved practices. In 1973-74, there were 300 *Charcha mandals* in the district. Prizes to the extent of Rs. 500 to each farmer and farm-woman are being awarded by the Centre annually in order to encourage healthy competition among *Charcha mandals*. Farmers are taken on study tours to farms, research stations, plantations, holdings of progressive farmers, etc.

Crop competitions are organised in respect of paddy, ragi, jowar, groundnut and sugarcane at taluk, district, State and national levels, for encouraging a healthy competitive spirit among the farmers. Prizes are awarded to those who obtain highest yields. In 1972-73, Shri D. R. Prafulla Chandra of the district secured the III prize at the all-India level for growing 62 quintals of paddy per acre and II prize for growing 142 quintals of paddy per hectare in 1974-75. The Community Development Blocks were also awarded prizes for coverage of large areas under high-yielding varieties. Among the irrigated taluks, viz., Shimoga, Bhadravati, Honnali and Channagiri, the Honnali C.D. Block got the first prize for covering 18,009 hectares and among other taluks, the Tirthahalli C.D. Block was awarded the first prize for covering 2,413 hectares, in 1972-73.

A Soil Conservation Sub-division was formed in Shimoga district with its headquarters at Channagiri in 1970, for preventing

soil erosion and conserving the fertile top soil and the soil moisture in order to increase the fertility of the soil. The work of soil conservation is being attended to in the taluks of Channagiri, Honnali, Shikaripur and Shimoga. Till 1972-73, about 8,910 hectares were bunded incurring an expenditure of Rs. 10 lakhs, and benefiting about 11,000 cultivators by this scheme. The total expenditure incurred on bunding works is treated as loan to be recovered in fifteen annual instalments after allowing a 25 per cent subsidy. During *vanamahotsava*, seedlings are planted in the forests and also elsewhere in the district. This also incidentally helps soil conservation.

A Soil Conservation and Rural Man-power Programme was implemented in Channagiri taluk of the district from 1963-64 to 1969-70. The objectives of the programme were, (i) to generate man-power in the rural areas of the taluk, (ii) to improve communications by taking up road-works, etc., and (iii) to supply improved seeds, implements, etc., and to take up minor irrigation works and soil conservation works, and (iv) to do land reclamation work. During the period, 41 tanks were restored, seven approach roads were made, five community irrigation wells were constructed and also soil conservation work was done in 12 blocks, involving a total expenditure of Rs. 3,04,662. The scheme was wound up in 1969-70.

Help to farmers

There are many co-operatives, associations and banks helping the agriculturists, like the Agricultural Produce Marketing Co-operative Society, Regulated Markets, Service Co-operative Societies, Malnad Area Marketing Co-operative Society, District Marketing Federation, Sea Island Cotton Growers Co-operative Society, Horticultural Society, Land Development Banks, and branches of nationalised banks and other commercial banks, Youth Clubs and Farmers Forums.

Sugarcane Growers Association

The Sugarcane Growers Association, which was started in the year 1962, is functioning at Shimoga and Bhadravati. The objective of the association is to help the sugarcane growers by supplying inputs, rendering help in getting financial assistance from various sources and to get remunerative prices for the crops. The number of members enrolled is about 450, each of whom has to pay an annual membership of Rs. six. The Association also helps in solving disputes, if any, between the growers and the Sugar Factory. It is managed by a Board of Directors.

Agro-Industries Corporation

It is envisaged that the Agro-Industries Corporation should meet 60 per cent of the requirements of the agricultural inputs like seeds, fertilisers and pesticides, and the rest of the needs are to be supplied by co-operatives, private dealers, etc. With this object in view, a Regional Office of the Karnataka State Agro-Industries Corporation was started in Shimoga in 1969. It supplied

about 1,939.400 tonnes of fertilisers in 1969 and 5,496.892 tonnes of fertilisers in 1972-73, 74.555 tonnes of seeds and plant-protection chemicals worth Rs. 1,93,820 in 1972-73. It had 46 selling points in the district. During the year 1972, the Corporation started six Agro-Kendras at Bhadravati, Channagiri, Holehonnur, Honnali, Shikaripur and Shimoga to cater to the needs of medium and small farmers. Under the auspices of the Corporation, Agro-Service Centres were also opened by unemployed engineers at Bhadravati and Kothlagere in the district to repair the agricultural implements, etc. The Agro-Engineering Services Division, Shimoga, is also a part of the Agro-Industries Corporation. It places orders for heavy agricultural machinery like bulldozers, tractors and power-tillers for land development, rigs for the construction of drinking water wells, tube wells, etc., and rock-blasting units for revitalizing the existing wells, and also renders assistance to obtain loans from financial institutions for agricultural development. There is a workshop at Shimoga, attached to this division, which undertakes repairs of agricultural machinery and implements.

A district branch of the State Krishika Samaj and Bharat Krishika Samaj is functioning in the district, with its branches

in all the taluks. *Inter alia*, it procures and distributes new varieties of seeds to the farmers. In 1972-73, there were 70 life members and 196 active members of the Samaj in the district.

A branch of the Karnataka Pradesh Krishik Samaj was started at Shimoga in 1957-58. The main objectives of the Samaj are to study the problems of farmers, to help them to get protection from eventual calamities, to educate and train the agriculturists with the help of the 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 December 1973, there were 960 life members and 4,600 active members of the Samaj in the district. Meetings of the members of the Samaj are held periodically for discussing the problems of agriculture and cultivators and to suggest solutions.

HORTICULTURE

Horticulture, though a part of agriculture in general, began to receive separate and special attention, a few years back, as a part of the drive launched for stepping up production of food-stuffs of every kind. The growing of fruits and vegetables was encouraged and efforts were made to drive home to the people the high importance of horticultural products. In order to develop all aspects of horticulture, a separate Department of Horticulture was created in the State in 1963 and its district office was opened at Shimoga during the same year.

The most important horticultural crop of the district is arecanut which has a prominent place in the markets of several trade centres of the district. Other crops are coconut, mango, cashew, pineapple and other fruits, vegetables and flowers. The area of horticultural crops has been gradually increasing. The common vegetables grown in the district are tomato, brinjal, cole crops, beans, *bende*, baby vegetables and others. The taluk-wise acreages under different horticultural crops grown in the district, as in 1973-74, are given hereunder :—

(area in acres)

<i>Sl. No.</i>	<i>Taluk</i>	<i>Arecanut</i>	<i>Coconut</i>	<i>Cashew</i>	<i>Fruits</i>	<i>Vegetables</i>	<i>Others</i>
1.	Bhadravati ..	450	1,560	5	610	2,160	200
2.	Channagiri ..	54	1,050	165	80	520	..
3.	Honnali ..	..	143	160	288	980	80
4.	Hosanagar ..	2,480	325	145	2,340	40	20
5.	Sagar ..	6,350	680	2,760	3,620	60	60
6.	Shikaripur ..	10	85	30	320	615	1,300
7.	Shimoga ..	380	1,840	5	560	2,010	400
8.	Sorab ..	2,660	350	230	2,630	50	120
9.	Tirthahalli ..	9,200	1,120	1,812	5,467	50	30
District total ..		21,584	7,153	5,312	15,915	6,485	2,210

2.47 acres = one hectare

The fruits grown in the district are mango, citrus, guava, sapota, pineapple, jack, papaya and others. The extents of area under fruit trees and quantities of production of the different fruits as in 1973-74 are given below :—

<i>Sl. No.</i>	<i>Fruits</i>	<i>Extent in hectares</i>	<i>Production in tons</i>
1.	Mango ..	942.03	13,506
2.	Banana ..	3,866.94	99,650
3.	Citrus ..	75.80	156
4.	Guava ..	171.72	2,020
5.	Sapota ..	180.22	1,604
6.	Pineapple ..	27.14	1,340
7.	Jack ..	858.60	40,360
8.	Papaya ..	377.06	1,642
9.	Others ..	6.08	..

Arecanut

Arecanut (*Areca catechu*), also called betel-nut, is a widely used article of consumption. The chewing of betel-nut along with betel leaves and a little lime is a habit prevalent among all classes of people. In 1973, the total production of arecanut in the district was about 1,33,000 quintals. The climate and rainfall play a great role in respect of extent of acreage and production of arecanut. Areca is grown in all the taluks except Honnali taluk of the district. It is grown in the narrow valleys. At the head of

valleys, small tanks are dug and used for irrigating during the summer months. The soils generally found in the area are lateritic. After a suitable area of the valley is selected, drainage and irrigation channels are dug. As a shade to areca, plantain-suckers are planted in pits of 2' deep and 1½' square and filled with a mixture of cattle manure and fresh earth. The areca pits are dug 2' x 2' x 2' at a distance of about nine feet from pit to pit and seedlings of two-and-a-half-to-three years old are planted. About 400 to 500 plants are planted in an acre which has been the standard in fixing revenue assessment from the days of old. Before planting the areca seedlings, farmyard manure is applied.

The annual cultivation process comprises digging round the base of the trees, application of manure, covering it up with leafy twigs and then the addition of fresh earth. The leaves required for the purpose are got from the forest nearby. These four operations, being costly, are sometimes confined to one-third of the garden a year in view of convenience and economy. Thus, in any one year, one-third of the garden gets the full four-fold cultivation, another one-third getting only leaves, manure and earth and there being no such treatment for the remaining one-third. But in recent years, the cultivation of the gardens is more scientific and the required dosages of manure are applied. Manuring is done generally in the months of September and October when heavy showers do not usually occur. About 100 grams of nitrogen, 40 grams of phosphorus and 140 grams of potash or 650 to 800 grams of areca mixture are to be applied, in addition to farmyard manure and later the trees are mulched with green leaves. The fresh earth is applied once in 6 to 8 years and the old drains are replaced by fresh ones. The drains are to be cleared every year. The plants have to be regularly sprayed against diseases, particularly against *koleroga*, the deadliest of the diseases of this crop. In recent times, there is root grub damage to areca plantations. The palm comes to bearing in about 10-12 years. The nuts when they are properly ripe are harvested and then cured before they are marketed.

Curing.—The bunches of nuts have to be harvested by skilled labourers and the bunches are to be lowered down to avoid damages to the nuts. Then they are carried to the curing yard for further processing. The raw nuts have to be cured before they are sent to the market. The cured nuts have a good keeping quality. The curing process consists of four stages, (1) husking, (2) slicing, (3) boiling and (4) drying. The husking is the removing of the outer layer of the nut by means of a curved knife blade which has a sharp pointed tip and generally, this work is entrusted to women labourers. Then the nuts are sliced into two halves or more according to the grade for which they are required. The sliced nuts are boiled in a copper pot with water mixed with

chogaru to make the nuts soft and tender for chewing and for removing large portion of tannic acid present in it. *Chogaru* is prepared with the barks of *nerale* (*Eugenia jambolana*), *rathnahonne* (*Pterocarpus santalius*), *manjathi* root (*Adenanthera pavonia*), pipul stems (*Ficus religiosa*) and a few betel leaves and by boiling them in a large pot of water. The exact stage at which the boiling of the nuts is to be stopped is indicated by the loosening of the germ from the kernels for which they are tested every now and then in the course of boiling. When the nuts are sufficiently boiled to get the required colour, they are spread out on platforms for drying. It takes about 5 or 6 days of good sunshine for drying them properly. When there is no sufficient sunlight owing to cloudiness, the drying is done by kindling fire which is called *hogethatti*. The nuts dried in the latter way are stated to be inferior to the sun-dried nuts. After drying, the nuts are graded which is essential to get a good price. They are graded into 20 or more varieties as per their quality, shape, etc., and the price varies according to quality.

**Areca Research
Station**

The Areca Research Station, Tirthahalli, was started in 1952 with the collaboration of the then Central Arecanut Committee on the basis of equal expenditure between the State and the Central Arecanut Committee. This procedure continued upto 31st March 1966 and since then, it is being completely financed by the Department of Horticulture of the State. The objectives of this Research Station are to improve the yield, quality of arecanut and to educate the growers round about this Station about areca cultivation. These aims are carried out by raising and distributing quality seedlings, evolving suitable manurial, cultural and irrigational schedules, taking up control measures against pests and diseases and investigating remedies for new horticultural problems in the region. Experiments were conducted on standardisation of areca, nursery techniques, manure, green manures, inter crops, cover crops, introduction and maintenance of indigenous and exotic species, floral biology, pests and diseases and harvesting. There are three farms attached to this Research Station. The main farm at Yadehalli was started in 1952 with an area of 17.4 hectares and the Kushavati farm in 1963-64 with an area of 7.41 hectares and the Kuruvalli farm in 1964-65 with an area of 11.34 hectares.

Koleroga : There are many pests and diseases which infest horticultural crops in the district. The farmers are advised to adopt prophylactic and curative measures for minimising damages to crops. *Koleroga* is the most serious disease of areca. It is caused by the fungus (*Phytophthora arecae*) which develops on the wet surface of the nuts during the rainy season and causes shedding of the nuts which then become useless. The tissues begin to rot and when the attachment of the nut to the stock

withers shedding commences. The disease progresses continuously from July to October. If no remedy is applied, the disease attacks the crown of trees causing the death of the trees. The disease is carried from year to year in the remains of the diseased materials roots. When the anchorage roots and feeding roots are attacked by spraying Bordeaux mixture.

Root grub: During recent years, areca palm was attacked by a root grub which, after hatching, lodges itself in the soil. It feeds on the cortical layer of the anchorage roots as also feeding roots. When the anchorage roots and feeding roots are attacked by the grub, the roots are weakened, the result being the falling of the palms. When the feeding roots are attacked, the flow of nutrients from the soil is reduced. The general symptoms noticed are drooping of the fronds, poor bearing and generally poor appearance of the palm. The remedial measure is to prepare a solution of Heptachlor 20 EC (28 ml.) and Malathion 50 per cent EC (14 ml.) in 4.5 litres of water or Heptachlor 20 EC (28 ml.) in 4.5 litres of water and pour it into the basin of the palm at the rate of 4.5 litres per palm after slightly loosening the surface soil, preferably before the onset of the monsoon. This is to be repeated once a year.

The Department of Horticulture has opened ten farms and nurseries at several places in the district for providing the required quality seed material for the various horticultural crops. The area, quantity of different seedlings and seeds supplied to different farms and nurseries are given below :

Sl. No.	Name of the farm	Year of starting	Extent in hectares
1.	Multipurpose Horticultural Farm, Shimoga	1954-55	3.8
2.	Horticultural Farm, Sagar	1968-69	44.6
3.	Horticultural Farm, Sorab	1970-71	40.5
4.	Horticultural Farm, Hosanagar	1972-73	13.4
5.	Horticultural Farm, B.R. Project	1970-71	24.3
6.	Horticultural Farm, Bhadravati	1967-68	1.0
7.	Horticultural Farm, Channagiri	1967-68	30.4
8.	Horticultural Farm, Honnali	1968-69	10.1
9.	Horticultural Farm, Shikaripur	1958-59	15.24
10.	Horticultural Farm, Tirahalli	1952-53	36.17

Sl. No.	Seedlings of						Vegetable seeds in Kgs.
	Areca	Coconut	Fruits	Cashew	Pepper	Cardamom	
1	1,20,000	18,000	16,000	8,000			220
2			4,000	60,000			60
3			1,000	10,000			30
4			1,000	10,000			30
5	50,000	22,000	14,000	2,000			180
6		14,000	8,000	3,000			80
7			3,000	12,000			60
8		8,500	2,000	5,000			55
9		22,000	5,000	8,000			85
10	1,20,000		6,000	12,000	30,000	25,000	70

Cashew Development Farm

A Cashew Development Farm was started in 1968-69 near Kargal in order to raise cashew plantations to serve as progeny orchards, and also to check soil erosion on the downside portions of the dams near Kargal, Linganamakki, Iduvani, Talakalale, etc., in Sagar taluk. The area covered in 1968-69 was 50 acres, 63 acres in 1972-73, 78 acres in 1973-74 and 81 acres in 1974-75. The expenditure incurred upto the end of September 1974 since inception was Rs. 8,259-50.

Development Schemes

Several horticultural development 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 and the area covered under this scheme upto the end of 1973-74 was 5,090 hectares. In 1964-65, an Areca Development Scheme was launched and an area of 2,146.5 hectares was covered upto the end of 1973-74, in all the taluks except Honnali. A Pepper Development Scheme was also started in 1964-65 covering an area of 147.42 hectares in all the taluks except Honnali and Shikaripur upto end of 1973-74. During 1965-66, a Cashew Development Scheme was taken up and a total area of 1,844.78 hectares was covered in all the taluks upto the end of 1973-74. A Coconut Development Scheme was begun in 1965-66 and upto the end of 1973-74, the total coverage was of 2,470.5 hectares. A Vegetable Development Scheme was started in 1963-64 bringing a total area of 2,389.5 hectares under it upto the end of 1973-74 in the various taluks. A Subsidiary Food Crops Scheme was also commenced in all the taluks in 1964-65 and it had an area of 106.11 hectares upto the end of 1973-74. The Bhadra Project Horticultural Scheme in Bhadravati, Channagiri, Honnali and Shimoga taluks covered an area of 228.82 hectares upto the end of 1973-74.

There are two Centrally sponsored schemes for the development of cashew in the district both taken up in 1968-70. One of them is for laying out demonstration plots for improved practices of cashew plantations. Upto 1972-73, 81 plots of two acres each were laid out, supplying manures and pesticides free of cost. The second one of the schemes is for adopting plant-protection measures for cashew in about 81 hectares each year. Under this scheme, plant-protection materials were supplied free of cost and the total area covered was 332.1 hectares upto the end of 1972-73.

There was a dry cold wave in the district in the third week of December 1970 affecting crops, particularly areca palms. The areca palms in the border areas of gardens and exposed portions of the palms turned yellow and were looking scorched. The leaf sheaths on the outer side of the palms had turned black and the leaves were prematurely shedding, exposing the undeveloped inflorescence. Subsequently, these palms lost their vigour and became susceptible to the attack of pests and diseases. The market value of the produce also went down considerably. The area of arecanut that suffered was 487.22 hectares in Sorab taluk, 11.14 hectares in Hosanagar taluk, 1,673.46 hectares in Sagar taluk, 405 hectares in Channagiri taluk, 93.15 hectares in Shimoga taluk, 1,678.32 hectares in Tirthahalli taluk and 79.18 hectares in Shikaripur taluk. The Government of Karnataka took immediate relief measures and sanctioned a scheme to rejuvenate the areca palms. The area which suffered was rejuvenated from 1970 to 1973 and the scheme was discontinued thereafter. The Department of Horticulture spent a sum of Rs. 1,87,320 for this purpose.

The Applied Nutrition Programme is in operation in the taluks of Hosanagar, Shikaripur and Honnali. Its objectives are to establish an effective field service to improve the local diet through education and demonstrations among the village communities and to establish sound practices for production, preservation and use of protective and nutritious fruits and vegetables. The Hosanagar Block (IV Phase) was selected during 1968-69. It laid out 14 school gardens, six community gardens and 240 home gardens. The period of operation was to expire in 1972-73, but it has been extended. Under a special Central assistance, this Block organised 15 school gardens. The Shikaripur Block was selected in 1969-70 under the scheme. The period of operation of this was also to end in March 1974, and it is also being continued. Under State assistance, this Block has established 15 school gardens, six community gardens and 200 home gardens. Under a special Central assistance, this Block organised 15 school gardens. The Honnali Block was selected during 1970 and the period of operation was to expire in 1974-75. It has organised six school gardens, six community gardens and 150 home gardens under State assistance, and 12 school gardens under a special Central assistance.

**Applied
Nutrition
Programme**

A.R.C. Schemes

The Agricultural Refinance Corporation has launched two schemes, one for arecanut and another for coconut development in the district. These schemes are being operated under the joint efforts of the Department of Horticulture and the Land Development Banks, the loans being sanctioned by the Agricultural Refinance Corporation. The A.R.C. Scheme for arecanut was started in 1966-67 in the taluks of Channagiri, Hosanagar, Sagar, Shimoga and Sorab, with a target of 364.5 hectares. The area developed under the scheme upto 1972-73 was 230.14 hectares. The A.R.C. Scheme for coconut was commenced in 1971-72 in all the taluks of the district with a total target of 820.13 hectares. The area covered under this scheme was 212.93 hectares for the years 1971-72 and 1972-73.

Mahatma Gandhi Park

The Mahatma Gandhi Park is an ornamental garden situated in the heart of Shimoga city, its area is about 10.94 hectares. It was originally a municipal park and was later on handed over to the Department of Horticulture. It consists of a park proper, flower beds, a rosery, a plot of bougainvillea, palms, etc.

Horticultural Training Centre

A Horticultural Training Centre was opened at Sagar in 1971-72 with a view to disseminate knowledge of the theories and practices of horticulture among the farmers. A curriculum has been standardised to cover a period of one year. During this period, the trainees are imparted training in horticultural aspects and also in the scientific use of products. The intake capacity is 50 trainees per year. The candidates are selected usually from among the cultivators' families. The minimum qualification for admission is a pass in S.S.L.C. They are given a stipend of Rs. 50 per month. During 1971-72, 35 trainees and in 1972-73, 27 trainees were given training at this centre.

Horticultural Marketing Society

A District Horticultural Produce Co-operative Marketing Society Ltd., was established at Shimoga in 1968 with the objects of pooling horticultural produce and disposing of the produce to the best advantage of its members. As in 1972, there were 104 members and the total share capital amounted to Rs. 2,630, and the annual turnover was about Rs. 43,000.

Horticultural Societies

The Mysore Horticultural Society has opened its branches at Bhadravati, Channagiri, Sagar, Shikaripur, Shimoga, Sorab and Tirthahalli. They cater to the needs of its members. Horticulture shows are also arranged to encourage a healthy competition among the growers. There are about 417 members.

ANIMAL HUSBANDRY

Since time immemorial, bullocks, cows, sheep, goats and poultry have formed important possessions of the farmers. The plough animal is still the bullock which continues to be the main

source of power for cultivation, supply of manure to the fields, lifting of water and transportation of the produce to the market, as the district has not yet made much headway in respect of mechanical agriculture. The district has no distinct breed of cattle of its own. The cows and bulls in the district are, by and large, diminutive in size with stunted growth and have no definite breed characteristics. They are known as "Non-descript *Malnad Giddas*". The majority of the cattle are dark-haired. Though small in size, they are sprightly animals with an extra-ordinary power of endurance and resistance to diseases. As per the 1972 livestock census, there were 7,78,733 cattle, 1,98,882 buffaloes, 46,618 sheep, 1,27,530 goats, 4,220 pigs, 4,261 other livestock and 6,15,912 poultry in the district (for further details see General Appendices).

There were, as in 1972, two veterinary hospitals, 16 veterinary dispensaries, 40 rural veterinary dispensaries, 28 artificial insemination units and three hill cattle development units in the district. The following table gives taluk-wise number of veterinary institutions, total livestock population and livestock population per veterinary institution as in 1972 :—

**Veterinary
institutions**

<i>Taluk</i>	<i>No. of veterinary institutions</i>	<i>Livestock population</i>	<i>Livestock population per veterinary institution</i>
Bhadravati ..	4	97,934	24,484
Channagiri ..	8	1,58,498	19,812
Honnali ..	8	1,13,210	14,151
Hosanagar ..	6	1,23,193	20,532
Sagar ..	5	1,25,017	21,003
Shikaripur ..	4	1,21,762	30,441
Shimoga ..	6	1,11,274	18,546
Sorab ..	5	1,36,187	27,237
Tirthahalli ..	12	1,48,617	12,385

A Hill Cattle Development Scheme is in operation in the district since 1963 for upgrading the non-descript and unproductive cattle of the district. Under this scheme, the scrub bulls are castrated to prevent breeding by them and artificial insemination of cows is done with proven bull's semen. These two activities are carried on through the main centre at Shimoga and the other two subsidiary units at Gajanur and Nidige villages.

**Hill Cattle
Development
Scheme**

The Artificial Insemination Centre, Shimoga supplies semen to 34 centres in the district. Two Murrah buffalo bulls, a Jersey and a Holstein bulls are maintained at this Centre. The semen

**Artificial
insemination**

is collected thrice a week and processed so as to keep it in a dormant condition. During 1969-70, 5,749 inseminations were done and the recorded number of calves born was 242, and in 1972-73, 6,120 inseminations were done and the recorded number of calves born was 1,016.

Key-Village Scheme

A Key-Village Scheme was started in Honnali taluk. It works on the same lines as the Hill Cattle Development Scheme. There were, as in 1973, ten units attached to this scheme. They receive semen from the Artificial Insemination Centre, Shimoga, three times a week. During 1972-73, about 1,190 animals were inseminated and 169 calves were born.

Bhadra Project Scheme

A Bhadra Project Scheme formulated by the Revenue Department for the benefit of the cattle population is being implemented since 1966, along the course of the Bhadra Canal in the district in the taluks of Bhadravati, Channagiri, Honnali and Shimoga. During 1971-72, 21 breeding bulls and 3,27,000 root-slips of hybrid napier grass were supplied free of cost to farmers and three silos were constructed. (In addition the Tirthahalli Taluk Development Board also distributed about 50,000 root-slips of hybrid napier grass, free of cost).

Cattle Fairs

The main sources of supply of cattle are the annual cattle 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 Amritmahal, Hallikar and *Malnad Gidda*. The following statement gives particulars of important cattle fairs that are held in the district :—

<i>Place of fair</i>	<i>About the month of</i>	<i>Approximate No. of cattle</i>
Halaswamy Cattle Fair, Ramapura	.. March	20,000
Tirthahalli	.. .. January	5,000
Sagar	.. .. do	3,000
Guddekal Siddheshwara Jatra, Shimoga	.. .. do	10,000
Holelingeswaraswamy Jatra, Bankasana village.	February	10,000
Mallikarjunaswamy Fair, Togarsi	.. March	5,000

Piggery Development Scheme

There is a Piggery Development Scheme in the district which is intended to help certain weaker sections of the area. Under it, pure-bred boars and sows are supplied for upgrading the local breeds. During 1971-72, six trios were distributed in Shikaripur taluk and in 1972-73, one trio and five boars were supplied.

Development of Poultry

A Poultry Extension Centre is functioning at Shimoga with a capacity of 1,000 chicks. It gets day-old chicks from big poultry-

farms and rears them upto 12 weeks and supplies them to Government farms and *yuvak mandals* in the district. While during 1971-72, 3,096 birds were reared and 2,806 birds were supplied, in 1972-73, 2,882 birds were reared and 1,744 birds were supplied. The commercial banks are providing credit facilities for starting poultry-farms. There are 20 private poultry-farms in the district with a total of about 5,000 birds. During the period from 1958 to 1972 there were two volunteers of the American Peace Corps working in the district. They were giving technical advice for rearing of poultry.

An Applied Nutrition Programme has been introduced in the taluks of Hosanagar, Shikaripur and Honnali. It is in the fourth, fifth and sixth phases respectively. There are nine poultry units in Shikaripur Block, three in Honnali Block and four in Hosanagar Block, with 100 birds each. Under the Weaker Section Scheme, during 1970-71, five beneficiaries were given assistance in raising poultry at a total cost of Rs. 5,000.

A Milk Supply Scheme was started in 1963 in the district as a pilot scheme for developing dairying in rural areas and for supplying pure milk to hospitals, hotels, etc. Milk is pooled at the dairy at Machenahalli near Bhadravati by procuring it from among 950 individual producers in a radius of about 48 kms. Some of the producers are "Kachche gowlies" who are living in groups in the forests of Channanakere, Umblebyle, Chorady and Bandigudda and are supplying about 3,000 litres of milk a day. The milk so collected is pasteurised and supplied to Shimoga, Bhadravati and Davanagere towns. There are 28 Milk Producers Co-operative Societies and about 30 private dairies which are functioning in the district and there is also a co-operative dairy at Shikaripur.

The common contagious diseases of cattle in the district are black-quarter, haemorrhagic septicaemia, anthrax, parasitic diarrhoea, sheep-pox and rinderpest. The poultry is affected with the ranikhet disease. A few particulars in regard to such diseases are given in the following statement :—

<i>Name of disease</i>	<i>No. of villages affected</i>	<i>No. of deaths</i>	<i>No. of inoculations</i>
Black-quarter	127	135	46,353
Haemorrhagic Septicaemia	260	418	87,868
Anthrax	23	30	7,067
Parasitic Diarrhoea	17	10	5,855
Rinderpest .. ..	..	..	16,048
Sheep-pox	3	5	1,535
Ranikhet	29	5	28,757

The number of cases treated, etc., in various veterinary institutions in the district as in 1972-73 was as follows :—

Cases treated in hospitals and dispensaries	..	2,50,018
Cases treated on tour by officials	.. ..	8,363
No. of castrations done in hospitals and dispensaries		15,412
No. of castrations done on tour	.. ..	7,533

**Rinderpest
Eradication
Scheme**

Rinderpest is a deadly virus infection affecting all cloven-footed animals, particularly the cattle. This disease has been responsible for great loss of valuable livestock. The after-effects of the disease on the animals, which survive the attack, are also very grave in such animals as they become unfit for production of milk or for work. The Central Government launched a country-wide drive for eradication of this disease by immunising the livestock population against it. The Government of Karnataka opened a regional headquarters at Shimoga for the purpose of doing vaccinations *en masse*. The indigenous cattle are protected with goat tissue vaccine, and the exotic and cross-bred cattle with tissue culture vaccine as the exotic breeds do not withstand goat tissue vaccine. But the limitation in inoculating the tissue vaccine is that the immunity is only short-lived, say about six months, and revaccination becomes necessary at the end of every six months or at least as soon as there is an outbreak, whereas the goat tissue vaccine confers long-lived immunity for 10 to 15 years. Till 1972-73, 7,34,752 animals were protected in the district. In addition, an immunity belt has been created all along the borders by vaccinating the incoming and outgoing animals.

FISHERIES

The Shimoga district, which is an inland district, has six important rivers, namely, the Tunga, the Bhadra, the Tungabhadra, the Sharavati, the Varada and the Dandavati, many streams and irrigation channels, five reservoirs *viz.*, Tunga, Sharavati, Shantisagar, Anjanapura and Ambligola and about 8,928 tanks (includes major tanks, minor tanks and tanks maintained by the Taluk Development Boards) which form the major water bodies of the district in so far as fish culture is concerned. With these water resources this district has the highest potentialities in respect of fish culture among the inland districts of the State. The total water-spread area of the district is stated to be about 1.01 lakh hectares (excluding rivers and channels), for the purposes of fisheries. The water-spread areas of the more important reservoirs in the district are ; the Sharavati Reservoir—40,500 hectares ; the Bhadra Reservoir—8,019 hectares ; Shantisagar tank—2,430 hectares, Anjanapur Reservoir—507.87 hectares and Ambligola Reservoir—445.50 hectares. The break-up figures pertaining to other water-spread areas are as follows :—major tanks—6,480

hectares; minor tanks—4,455 hectares; channels—322 kms; and rivers—402.5 kms.

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

Fish Fauna

<i>Name</i>	<i>Scientific Name</i>
Carps (Gangetic Carps)	
Catla	Catla catla
Rohu	Labeo rohita
Mrigal	Cirrhinus mrigala
Exotic Carps	
Mirror Carp	Cyprus carpio var specularis
Scale carp	Cyprus carpio var communis
Local Carps	
Haragi	Puntius pulchellus
Koracha	Puntius kolus
Ylalu	Puntius neilli
Bilimeenu	Puntius tor
Gende	Puntius chrysopoma
Kemmeenu	Labeo fimbriatus
Kagameenu	Labeo calbasu
Kagameenu	Labeo nukta
Beliharagi	Barbus neilli
Gende	Barbus sarana
Gende	Barbus carnaticus
Cat Fishes	
Haddu	Mystus aor
Haddu	Mystus cavasius
Thuragi	Mystus vittatus
Halathi	Mystus seenghala
Bale	Wallago attu
Kuldi	Bagarius bagarius
Chadavi	Pseudeutropius taakree
Godle	Callichrous species
Usugumottu	Glossogobius species
Murrels	
Hoomeenu	Ophiocephalus marulius
Kuchhu	Ophiocephalus striatus
Korava	Ophiocephalus gachuva
Andakorava	Ophiocephalus punctatus
Eels	
Havumeenu	Mastocembelus species
Malagameenu	Anguilla bengalensis

<i>Name</i>	<i>Scientific Name</i>
Minor Carps	
Garaja	Cirrhinus reba
Do	Cirrhinus fulungee
Do	Cirrhinus cirrhosa
Other varieties	
Murugodu	Clarias magur
Chappalimeenu	Notopterus species
Bilachi	Chela species
Sasalu	Rasbora species
Bidarayele	Danio species
Gambusiameenu	Gambusia species
Gajinameenu	Ambassis species

Generally, people of the following castes and communities do fishing in the district: Killekyatha (Burudebesta), Gangematha, Tamil Bestas, Muslims, Christians, Lambanis, Bovies, Harijans and Talavaras. The Killekyatha fishermen, who have been semi-nomadic tribes, are now residing at Gondichatnahalli (Shimoga taluk) and at Shantisagar (Channagiri taluk). They are generally very poor. The 1971 census recorded that there were about 2,600 males and 2,000 females in the fishermen community.

The traditional methods of fishing followed are angling with rod and line, country rods and line, cast net and gill nets. Leather coracles are mainly used. The Department of Fisheries is using motor boats for fishing in reservoirs. The Fisheries Department is helping development and exploitation of the fishery wealth. The fish production of the district for the year 1971-72, 1972-73 and 1973-74 and their values were estimated as follows:

<i>Year</i>	<i>Quantity in tonnes</i>	<i>Value in Rs.</i>
1971-72 ..	1,000	20,00,000
1972-73 ..	1,250	25,00,000
1973-74 ..	1,500	30,00,000

In addition, about half a tonne of marine fishes is imported daily from South Kanara and North Kanara districts, and about 200 to 300 kgs. of inland fishes are exported from this district daily to Chitradurga and Dharwar districts.

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.

<i>Particulars</i>	1969-70	1970-71	1971-72	1972-73	1973-74
Quantity of fish caught (in Kgs.)	688½	600½	363	1,073¼	2,65 5¼
Amount realised (in Rs.)	989.12	917.38	513.80	1,742.70	3,696.98
No. of licences issued	865	789	1,036	1,090	1,201
Amount realised (in Rs.)	9,238.00	8,692.00	10,510.00	10,895.00	12,940.00
No. of tanks auctioned	90	134	125	134	140
Amount realised	1,239.64	5,453.22	6,737.97	8,960.23	10,704.92
Mileage of channels auctioned (in mls.)	14	12	..	3	2
Amount realised (in Rs.)	168.00	125.00	..	32.50	99.84
Sale proceeds of fish fingerlings (in Rs.)	6,800.00	8,833.00	9,335.00	12,661.00	14,813.00
Total Rs.	21,438.76	24,020.00	27,046.27	34,290.93	42,255.19

The district requires about two crores of fish seeds annually ; **Fish seeds** only a part of that quantity is produced in the district and about 30 to 35 lakhs of fish seeds per annum are being imported. There are four fish farms in the district, namely, Bhadra Fish Farm in B. R. Project, Shantisagar Fish Farm, Anjanapur Fish Farm and Gajanur Fish Farm. The Bhadra Fish Farm has a gross area of 52.25 hectares and the net water area is 2.39 hectares. It is producing about 50 lakhs of fish seeds annually and it is yet to be fully developed. It is stated that when this farm is fully developed, it would become the biggest fish farm in Karnataka producing five to six crores of fish seeds every year. The Shantisagar Fish Farm has a gross area of 4.20 hectares and the net water-spread area is 1.02 hectars, producing about 25 lakhs of fish seeds annually. The Anjanapur Fish Farm has a gross area of 1.02 hectares with a net water-spread area of 0.42 hectares, while the Gajanur Fish Farm is having a gross area of 0.81 hectare with a net water spread area of 0.28 hectare.

The four important centres for marketing of fishes are Bhadravati, Sagar, Shimoga and Tirthahalli where fresh as well as dry fishes are sold regularly in a market place. **Marketing of fish** In other places, fishes are disposed of in the open yards. There is a heavy demand for fresh fish. The prices of fish for major carps and common carps range from Rs. 2.50 to Rs. 4.00 per kg. and for murrels and other varieties from Rs. 1.50 to Rs. 3.00 per kg. There are three Fishermen Co-operative Societies, one each at Shantisagar of Channagiri taluk, Gondichatnahalli of Shimoga taluk and Venkatapura of Sorab taluk, which are also helping the fishermen community in marketing the fish. There is one cold storage at Bhadravati maintained by the Fisheries Corporation.

Applied Nutrition Programme

The Applied Nutrition Programme is in operation in Hosanagar, Shikaripur and Honnali taluks from 1968-69, 1970-71 and 1970-71 respectively. It aims at producing protective food like fish, eggs, vegetables and fruits and supplying them to vulnerable sections of the people like children and expectant and nursing mothers. Under this programme, the work relating to fish culture was taken up in about 150 acres of water-spread area in order to help operating of 12 feeding centres and for training 60 villages in fish culture.

Intensive Fisheries Development Scheme

Under an Intensive Fisheries Development Scheme, the work of developing the fisheries on an intensive scale has been taken up in the three Community Development Blocks of Tirthahalli, Sorab and Bhadravati. It envisages stocking of fast-growing culturable varieties of fish seeds in all minor tanks and ponds, assessment of fish potential in rural areas by undertaking 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. The scheme is in operation in the Tirthahalli Block since 1962-63, and in the Sorab Block since 1966-67 and in the Bhadravati Block since 1971-72. Under the same programme, the Bhadravati, Channagiri, Sagar, Shikaripur, Shimoga, Sorab and Tirthahalli Taluk Development Boards have taken up fish culture in 11 major tanks on lease basis. Fish-culturing has also been taken up by 14 village *panchayats* in major tanks and 25 village *panchayats* in minor tanks. Twenty youth clubs have been guided and encouraged to do fish-culturing.

All-India Co-ordinated Project

An All-India Co-ordinated Project on Air-breathing Fishes has been started in the Bhadra Reservoir Project, under a 'Crash Programme', by the Indian Council of Agricultural Research with the co-operation of the Department of Fisheries in the State. This is one of the three sub-centres in India, the other two being in Bihar and Assam States. The object of this project is to evolve a scientific know-how for the propagation and culture of the air-breathing fishes in the swamps and other derelict water masses which are not suitable for carp culture. In Shimoga district, such an area is of over 8,971 hectares. There are only four types of important fishes belonging to the murrel variety, namely, *Channa leucopunctatus*, *Channa marullius*, *Channa striatus* and *Channa punctatus*; the former three species have excellent growth potential in swamps and attain a weight of eight kgs. when they are nine years old. These species feed on prawns, crabs, aquatic insects, gastropods, fishes and frogs and their tadpoles. The centre at the Bhadra Reservoir Project is doing research on various other aspects of the air-breathing fishes also.

Statement Showing Land Utilisation Figures for the Year 1972-73 in Shimoga district

(area in hectares)

Sl. No.	Taluk	Total geographical area	Forests	Lands put to non-agricultural uses	Barren and uncultivable lands	Cultivable waste lands	Land under miscellaneous tree crops			Other fallow lands	Net area sown	Area sown more than once
							Permanent pastures and grazing lands	and grooves not included in the net area sown	Current fallows			
1	2	3	4	5	6	7	8	9	10	11	12	13
1	Bhadravati	68,673	4,113	5,517	789	3,805	23,922	75	2,083	1,127	27,215	9,525
2	Channagiri	1,20,837	17,514	7,552	2,570	1,740	11,575	..	3,527	5,043	71,319	11,586
3	Honnali	89,449	9,388	5,366	5,596	3,238	11,186	..	4,796	1,282	48,596	4,966
4	Hosanagar	1,42,173	25,437	13,315	6,357	4,627	65,790	3,946	2,838	4,508	15,332	391
5	Shikaripur	90,593	17,417	4,897	6,137	9,432	13,776	31	123	10,564	21,864	925
6	Sagar	1,93,999	50,595	28,027	921	4,875	61,752	15,227	906	6,685	31,525	845
7	Shimoga	99,257	15,425	5,708	6,706	6,445	28,426	396	6,920	3,549	25,682	2,182
8	Sorab	1,10,345	24,646	5,751	3,522	6,131	14,963	2,333	8,893	12,808	31,309	203
9	Tirthahalli	1,23,670	47,680	6,025	1,546	7,492	25,749	..	3,150	10,736	21,293	1,174
District total		10,38,996*	2,12,215	82,158	34,144	47,785	2,57,139	22,008	33,236	56,302	2,94,165	31,797

*The area of the district as worked out by the Survey of India provisionally is 10,548 sq. kms. (10,54,800 hectares).
(Source : The State Bureau of Economics and Statistics).