CHAPTER IV

AGRICULTURE AND IRRIGATION*

Though major portions of the district of Uttara Kannada are under forests, it is mainly an agricultural district as the majority of the people live on agriculture and its allied occupations. It has depended on agriculture even from ancient times as testified by inscriptions and travelogues. Pietro Della Valle, while speaking of the Kannada coast states that people here for the "most part live by sowing rice" (1623). While speaking of Kannada coast Francis Buchanan (1801) says that rice grounds were "more neatly cultivated than those in Malabar". He also states that great attention was paid to manuring the soil, and leaves of various wild trees were also used as manure and fish and bone manure are also spoken of by him. The district was also renowned for its areca plantations, raised mainly by Havik Brahmanas, who appear to be experts in raising them. Together with areca, cardamom and pepper were also raised. John Fryer (1670s) speaks of cashew trees being already raised in the area and paddy and ragi, turmeric, ginger, potato (sweet potato) being grown in the district. Linschoten (1583) mentions the coconut palms of the region of which Della Valle also speaks, as grown in abundance on the banks of the Sharavati. Linschoten also speaks of rice being packed into 'mudis' of straw called 'forden' by the Portuguese.

The plough that was in use was almost the same as it is today. So it is with regard to many other agricultural implements. Astrologers were consulted to ascertain rainfall *nakshatras* before sowing. The contact with the Portuguese and Indian Christians from Goa who migrated to Uttara Kannada and other regions very much helped to

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

popularise new techniques in various aspects of agriculture and animal husbandry. Vegetable and fruit varieties introduced by the Portuguese like sweet potato, pineapple, papaya, groundnuts, cashew, etc., came to be raised.

Even today the economy of the district revolves around agriculture and plantations, and an over whelmingly large majority of the people derive their subsistence from this sector. Agriculture is also the major source of the district's revenue and it is estimated by the planners that nearly half of the district's income is derived from this sector. The *per capita* income is quite above the State average, ranking third, next only to Chikmagalur and Kodagu districts. With the introduction of high-yielding variety seeds, expansion of irrigation facilities, use of fertilisers, pesticides and the modern agricultural implements and the implementation of special development schemes, the agricultural economy of the district is undergoing significant changes during the recent years.

Buchanan's Accounts

Dr. Francis Buchanan gives a detailed account of how crops were cultivated in the area. He entered this district through Bhatkal. The area around Bhatkal, although not level, had been formed into a better land for cultivation of paddy. Round about Shirali, there was much paddy land and good plantations of coconut. From Shirali to Bailur "the land is plain between the sea and the low hills and the soil is generally good and paddy is grown and in few parts two crops are raised". At Bailur, the paddy lands near the sea were not sandy and paddy was grown. Between Bailur and Casarkod the land, he says, was almost barren. It consisted of low hills of laterite. At Kasarkod, the soil was very poor, but it was well suited to grow coconut. At Haldipur, most of the cultivated lands were private property. The proprietors were called *mulgars*. Most of them cultivated their lands but some let it out to *genigars*. Those who kept twenty ploughs were considered wealthy, those who possessed four to six were considered moderate and large number possessed only one plough. The entire expenses of harvest and weeding amounted to 20 *muras* of rough rice and he sowed 20 *muras* on low land 2 *koragas* on hill land and had a coconut garden containing 200 trees. In the neighbourhood of Haldipur, there were three kinds of paddy land, *makhe, bailu,* and *karu*. The first was the higher ground giving only one crop in the year, the *bailu* gave either two crops of rice or one of rice and one of pulse. The *karu* in the rainy season was so deeply inundated that it

could not be cultivated and in the dry season it gave one crop. The crop produced in the rainy season was called *kontike* and the dry season was called *suggi*. The paddy grown on *makhe* lands was of an inferior quality to that raised on low fields. In *makhe* land sprouted seeds were used. In summer the field was ploughed five times in fifteen days. Then, it was manured with cowdung, with *nolihalige* it was smoothed, then narrowed with *halige* and the roots and weeds were pulled out by hand. Water was then allowed to run off and the sprouted seeds were sown broadcast. After a month and a half weeding was done. Then the straw was cut with grain and thrashed. The *kantike* or *bailu* crop was mostly with sprouted seed. Five ploughings were given and manured and ploughed again twice. Then, the land was smoothened with rake. Later the method of cultivation was the same as *makhe*. The *suggi* crop on *bailu* land was also sown with sprouted seeds. The land was ploughed eight times, manured and then smoothened with rake. In the month preceding the winter solstice the seed was sown and on the ninth day a little water was given and gradually it was increased. By means of *yeta* water was supplied to the fields from small reservoirs and wells.

The *karu* land was covered with water three to six feet deep in the rainy season. After the rains only the crops were grown as *bailu* land for the *suggi* crops. In some *bailu* land dry crops like sesamum, black gram and green gram were grown. Sugarcane was raised on *makhe* land but grown only once in four years. The types of sugarcane grown were *bili kabbu, mara kabbu* and *kari kabbu* or *patta-patty*. There was also *kumri* cultivation. Pepper, cardamom, arecanut and coconut were also grown. In Kumta, plantains, coconut, arecanut, betel leaf were grown. He has mentioned *gazni* lands in this area. On the *betta* lands no drainage was required but round the root of every palm a small bund was formed to hold water which was given once in two days. In such places, plantains were grown.

Modern Time Indicators

The Government of Karnataka through its Planning Department analysed the development that took place between 1960-61 to 1970-71 in all the districts, on the basis of certain indicators like agriculture, industry, infrastructural development. According to the classification made by the Planning Department, Uttara Kannada district has been considered as one of the agriculturally developed districts along with Shimoga, Mandya and Mysore. Table in the next page gives the

summary data relating to the selected indictors in comparison to the State.

Particulars	*1961*		*1971*	
	Uttara Kannada	*Karnataka*	*Uttara Kannada*	*Karnataka*
Net area sown (Percentage to total	12	55	10	54
Double cropped area (Percentage of net area sown)	84	37	11	58
Net area sown (Percentage to cultivable land)	78	84	79	85
Average yield per hectare (in kgs) cereals	1,342	513	1,330	918
Average yield per hectare (in kgs) pulses	250	271	500	357
Average yield per hectare (in kgs) oilseeds	—	418	1,000	589

Agricultural Population

In 1971, out of a total number of 2,85,939 workers, 1,07,105 were cultivators forming 37.46 per cent, 49,995 were agricultural labourers forming 17.48 per cent and 40,394 were depending on livestock, forestry, etc., forming 14.13 per cent. Thus the population depending on agriculture and allied professions amounts to about 69 per cent of the total workers. In 1981, out of the 3,64,681 total workers 1,35,226 were cultivators forming 37.08 per cent and 56,401 were agricultural labourers forming 15.4 per cent. The taluk-wise figures of total workers and agricultural labourers, are given below: Ankola 12,758 & 3,604. Bhatkal 9,776 & 2,878. Haliyal 14,893 & 6,178. Honavar 13,985 & 6,229. Karwar 10,593 & 3,280. Kumta 17,006 & 6,089. Mundgod 11,422 & 7,400. Siddapur 12,996 & 4,775. Sirsi 14,420 & 8,918. Supa 8,102 & 1,947. And Yellapur 92,750 & 5,103.

Land Utilisation

The total geographical area of the district is 10, 22, 713 hectares as per Survey of India. The taluk-wise land utilisation figures as in 1982–83 are given in next pages.

Soils

The soils of the district are derived variously from laterites, granites and gneisses shales and traps. In parts of coastal region

Land Utilisation

Taluk	*Total geographical area*		*Forest land available for cultivation*			*Uncultivated land (excluding fallow land & permanent pastures)*
	According to professional survey	*According to village papers*	*Land put to non-agricultural use*	*Barren and uncultivable land*	*Cultivable waste*	
1	2	3	4	5	6	7
Ankola	91,872	91,872	75,391	1,505	2,183	948
Bhatkal	34,892	34,892	25,456	907	541	408
Haliyal	84,745	84,745	59,847	363	2,176	1,304
Honavar	75,480	75,480	57,632	4,347	424	956
Karwar	73,210	73,210	55,427	382	4,497	559
Kumta	58,331	58,331	39,687	2,913	2,249	950
Mundgod	66,809	66,809	49,706	308	1,490	1,493
Siddapur	85,928	85,928	68,245	842	1,336	491
Sirsi	1,32,233	1,32,233	1,03,634	332	3,766	949
Supa	1,89,103	1,89,103	1,75,231	3,046	966	1,376
Yellapur	1,30,110	1,30,110	1,17,705	800	938	310
District total	10,22,713	10,22,713	8,23,961	15,745	20,566	9,744

Taluk	Uncultivated land (excluding fallow land & permament pastures)	Classification of area					
		Miscellaneous tree crops and groves	Other fallow land	Net area sown	Total cropped area	Area sown more than once	Current fallow
1	8	9	10	11	12	13	14
Ankola	1,379	548	1,152	8,498	9,333	835	268
Bhatkal	1,291	799	228	5,221	6,566	1,345	41
Haliyal	644	658	1,358	17,913	18,671	758	482
Honavar	1,765	1,238	468	8,360	10,250	1,890	290
Karwar	114	377	1,062	10,060	10,630	570	732
Kumta	2,423	—	156	9,265	10,507	1,242	688
Mundgod	—	372	1,062	11,882	11,946	64	496
Siddapur	3,227	9	1,044	10,538	11,425	887	196
Sirsi	7,470	380	424	14,503	15,351	848	775
Supa	372	709	1,754	5,238	5,489	251	411
Yellapur	1,287	30	714	8,013	8,365	352	313
District total	19,972	5,120	9,422	1,09,491	1,18,533	9,042	4,692

patches of coastal alluvium are found. Two clear cut soil zones can be differentiated, based on elevation, namely the coastal taluks and the up-ghats. Soils in Kumta, Honavar, Bhatkal and Siddapur are derived from laterites while some soils derived from granites also occur in Ankola and Karwar taluks. Red loamy soils derived from mixed laterites and traps are found in parts of Supa, Haliyal and Mundgod taluks. In other parts of Mundgod, Haliyal and Supa taluks the soils found are patches of black soil derived from trap rocks. There are also *gazni* lands which are saline sandy soils along the coast. The types of soils may be derived into five groups.

Laterite soils: These are reddish brown highly leached, shallow to medium deep, usually underlined with lateritic substratum, loamy in texture with concretionary materials. This type of soil is found in Karwar, Kumta, Honavar, Bhatkal, Sirsi and Siddapur taluks. Under irrigated conditions the crop grown are areca, plantains, paddy and sugarcane. Under rainfed conditions the crops grown are paddy, coconut, pepper, cardamum and cashew. *Red loam:* The red loams are red to brownish in colour, shallow to medium deep with good water holding capacity. These are found in Supa, Mundgod and Haliyal taluks. The crops grown are paddy, areca, plantains and sugarcane under irrigated conditions and under rainfed conditions paddy, coconuts and ginger are grown. *Red sandy loam:* The red sandy loam is brownish to pale yellow in colour with poor water holding capacity. Coarser fractions are predominant. The soil is well drained and poor in bases. This is found in Sirsi, Yellapur, parts of Karwar and Ankola taluks. Under irrigated conditions paddy, areca, plantains and sugarcane are grown and under rainfed conditions paddy and coconut are grown. *Black soils:* The black soils are black to light grey in colour, clayey in texture with lime nodules. It has a good water holding capacity and it is rich in bases. This soil is found in parts of Supa, Haliyal and Mundgod taluks. The crops grown are paddy, fruit crops and chillies under irrigated conditions and jowar, pulses and groundnuts under rainfed conditions are grown. *Saline sandy soils:* The saline sandy soils also called *gazni* soils are light yellow to brown in colour, shallow to medium deep and sandy in texture with content of soluble salt. This type of soil is found in coastal region of Karwar, Ankola, Kumta, Honavar and Bhatkal taluks. Paddy and coconuts are grown both under irrigated and rainfed conditions.

Soil analysis has been conducted and it is found that 28% of

the soils in the district are acidic in reaction with pH ranging from five to six. The majority of soils are neutral with about four per cent on the alkaline side. The soluble salt content is high in about 13% of the soils chiefly confined to coastal areas. In the inland hill areas organic matter content is high in nearly 86% of the cases and deficient in only about six per cent of the soils and poor in available phosphorus except Bhatkal taluk where it is medium. The available potassium is medium in Honavar, Mundgod, Siddapur and Supa taluks and low in other taluks. The total soluble salts are normal in all the taluks except Karwar, where it is critical. In organic carbon it is high in all the taluks. The pH of the soils in all the taluks is acidic in nature.

Soil Survey

A survey of the waste and uncultivable lands has been conducted in 1966–67 and the lands have been classified 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 are level or nearly level. 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 method. These lands may be level or nearly level. The 'C' category lands are not found suitable 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. 'D' category were not found useful for cultivation. 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 reseeding for category 'D'.

Land Reclamation

Reclamation involves removal of trees, shrubs and other jungle trees and then levelling the lands and making plots for cultivation. Elevated lands are converted into bench terraces or small bunds are put for raising crops. A Land Reclamation Scheme was started in 1966-67 in the district in which farmers were provided with a subsidy for the development of such forest lands, the minimum subsidy

being Rs 50 and the maximum Rs 250 per farmer. This scheme was discontinued during the year 1974–75. In addition, demonstrations on application of lime organised and lime was supplied on subsidised rates for improvement of acidic soils. The Public Works Department undertook the development of *gazni* lands in the coastal taluks of the district. The area of these *gazni* lands as estimated is about 4,050 hectares and Ankola has about 607.5 hectares, Kumta 2,835 hectares, Honavar 648 hectares, and Bhatkal 405 hectares.

A separate sub-division known as the Kharland Sub–Division was opened in the district in 1963 and concerted efforts are being made to reclaim the affected land by the construction of bunds, provided with sluice gates. Intensified reclamation activities will bring additional area under cultivation. Many schemes have been undertaken to reclaim *gazni* lands. The *gazni* lands are peculiar to this district only in the State.

Gazni lands or *khar* lands are posing a problem in the district on the beds of rivers which are under the influence of tidal water from the sea. The sea water diminishes the soil fertility of land which eventually makes the land unfit for cultivation, resulting in the cultivation of crops being uneconomic and less paying. This problem is being seen in the coastal taluks of the district. It is estimated that in these taluks an area of about 8,553 hectares has been affected and an area of about 6,639 hectares have been protected. During the rainy season, water flowing from the ghats is laden with silt which is deposited on the way. In course of years of continuous silting, the level is raised and such lands are utilised for cultivation. The word *gazni* means swampy lands. These lands are always under water unless prevented by bunding. For purposes of cultivation, the salt water during high tide has to be kept out by putting bunds on the extreme boundary. Sticky clay that is available in the land is used for this purpose. The land enclosed requires also main drains and side drains for the exit of excess water and for washing off salt contents. Since the water in the river gets sweet on account of layer flow of water from above during rains, these openings are kept open. The influence of tidal salt water begins to be felt in October. These openings are closed and made water tight to prevent salt water from getting into the lands. These bunds though built of mud last for about 10 years with current repairs every year.

There are two types of *gazni* lands, namely, 1) *gazni* lands which

are low lying and which are more or less saline and 2) high lying *gazni* lands which are called sweet lands (*sihimannina gazni*) when the level of the former is raised by annual deposits for many years. These salt lands loose their salinity and are cultivated as other paddy lands which are away and higher up. This type of *gazni* lands is generally provided with strong bunds and the openings are protected with necessary sluice gates which automatically close at high tides and open at low tides when the water from inside tries to get out. At no time, the salt water is allowed to get into these lands.

Soil Conservation

Soil is subject to erosive forces like wind and rain. In order to conserve the soil, the Karnataka Land Improvement Act, 1961 was brought into force throughout Karnataka. In the district, the lands are undulating with high-slope percentage in majority of the cases. These areas are often criss-crossed by gullies and streams. Such land is not suitable for contour bunding work, and therefore, bench terracing work is taken up in the district. Soil conservation work was started in this district in 1976–77 in Yellapur taluk. This work was taken up on 25 per cent subsidy basis and the progress under terracing work in this taluk during 1976–77 and 1977–78 was 50 and 85 acres and subsidy given was Rs 6,295–25 and Rs 15,439–50 respectively. A separate sub-division of soil conservation was transferred from Molakalmuru, Chitradurga district to Sirsi of Uttara Kannada district. The soil conservation work is attended under three schemes 1) Western Ghat Development, 2) Special Component Plan and 3) National Rural Employment Programme.

Under the Western Ghat Development Programme, the following items of work are contemplated 1) Terracing, 2) Drainage, 3) Levelling, 4) Construction of farm ponds, 5) Filling up valleys, 6) By constructing of diversion channels, 7) Amalgamation of paddy fields, 8) Construction of small bhandaras, 9) Desilting of tanks and ponds and 10) Making drainage channels in alkaline soils.

The scheme was operated in 1979-80 in Sirsi, Kumta, Mundgod and Yellapur taluks only. The total expenditure incurred was Rs 4,17,149-00, benefiting 148 farmers. During 1980-81, nine taluks were selected for soil conservation work. The progress achieved, the expenditure incurred and the number of beneficiaries under different schemes for the years from 1980-81 to 1982-83 are given in the next page.

Name of the Scheme	Bench terrace (in ha)	Construction of diversion channels (in ha)	Amalgamation (in ha)	Farm ponds (in no.)	Expenditure (in Rs.)	No. of beneficiaries (in no.)
1. Western Ghat Development Programme 1980–81	143.14	219.96	148.96	4	17,19,635	407
1981–82	54.16	198.56	81.58	9	13,27,939	223
1982–83	1.30	35.23	67.92	7	6,73,637	110
2. National Rural Employment Programme 1982–83	4.16	25.96	35.33	—	3,24,707	31
3. Special Component Plan 1982–83	12.44	71.59	145.99	10	10,44,085	169

Soil health

Analysis of soil samples is being attended to. The soil samples are being collected from the fields and analysed in the laboratory to test their pH level, organic carbon (nitrogen status), phosphate and potash. In special cases, electric conductivity is also tested to measure the salt concentration. Based on these tests and the cropping patterns, recommendations are made to apply lime or gypsum as amendments and supply the required quantity of major nutrients. Corrections are also suggested in the case of acid soils. The soil testing laboratory in the district was started by the Kanara District Central Co-operative Bank Ltd., Sirsi in 1967. Later, in 1978 it was transferred to the Department of Agriculture. In 1984 it was renamed as Soil Health Centre. The number of soil samples analysed during the years 1979-80 to 1983-84 is 12,600 in 1979-80, 15,000 in 1980-81, 12,000 in 1981-82, 15,500 in 1982-83 and 14,100 in 1983-84.

Cropping Pattern

The total cropped area of the district is estimated at 12 per cent of the total area as against 55 per cent of the State. The percentage of area sown more than once is about 16 per cent of the net area sown as compared to 58 per cent of the State. The most important aspect of the district's cropping pattern is the predominance of food-grains, particularly paddy. Its share in the cropped area is slightly less than 72 per cent. Uttara Kannada is the fourth largest paddy growing district in the State, the first three in order being Dakshina Kannada, Shimoga and Dharwad. The district accounts for about eight per cent of the total area under paddy in the State. There is some diversion of land from this crop to high value crops like sugarcane and groundnut. Next to paddy, plantation crops like arecanut, cashew, coconut, pepper and cardamom occupy an important place. The area brought under all these crops has shown an upward trend during recent years. The cultivation of arecanut is confined to the taluks of Sirsi, Siddapur, Honavar, Kumta and Yellapur. In the coastal belt, coconut is the important cash crop. However, the area under coconut and arecanut remained almost constant. With the steady increase in the price of groundnut, it has emerged as an important crop. The area under groundnut has substantially increased by 68 per cent while under sugarcane it has shown only a marginal increase of there per cent. Of late, pineapple is assuming importance particularly in the taluks of Sirsi, Ankola,

Kumta, Yellapur and Supa. According to the available information, the agricultural production in the district has shown almost an upward trend, foodgrain output having increased by 62 per cent. Cash crops like arecanut, cardamom and pepper have added to the wealth of the district. The total production from these three crops is worth about Rs 10 crores. Of the total foodgrains production, rice alone accounts for about 91 per cent. Though the district is self-sufficient in respect of paddy, it is deficit in pulses, ragi and coconut. The area and production of different crops for 1973–74, 1977-78 and 1981–82 are given in page 311.

Manures

The manures that are in common use in the district are farmyard manure, green manure, compost and fertilisers. The farmyard manure is conserved by sectional filling method or by dumping it in one place till it is carried to the fields. Green manure is added by bringing green leaves from *soppinabettas* from forests. Green leaves are procured from these areas in the evening and are spread over in the cattle shed and lifted to compost pits after 3–4 days. In addition, raising of green manure crops like sannhemp, kolinji and glyricidia is also taken up. Greater stress has been laid on preparation and application of organic manures. Special schemes have been implemented like production of urban compost, rural compost and night soils and also conservation of cattle urine. Farmers are educated in preparing organic manures by organising training centres, method demonstration and other propaganda measures. Demonstration plots are being laid out for purpose of educating the farmers in the preparation of quality compost. District, taluk and circle-level training programmes are being carried out and a compost week is also observed. In urban areas compost pits are filled with waste materials thrown in the dustbins. The local bodies are also making efforts to prepare compost in places where shandies are held. A Local Manural Resource Scheme has been put into operation in the district for the purpose. The items of work undertaken are (1) intensification of urban and rural compost production, (3) intensification of green manuring in irrigated and assured rainfall areas, (3) training village leaders in better composting, (4) conservation of night soil, (5) improved cattle sheds and manure sheds, (6) intensification of *gobar* gas plants (7) setting up of mechanical compost plants, (8) intensification of blue algae in wet lands, (9) utilisation of

(Area in hectares, production in tonnes and yield in kg per hectare)

Sl. No.	Name of the crop	1973–74			1977–78			1981–81		
		Area	Production	Yield	Area	Production	Yield	Area	Production	Yeild
1.	Paddy	88,948	2,26,650	2,548	90,559	2,78,950	3,080	92,816	3,03,006	3,264
2.	Hybrid Jowar	427	468	1,096	463	960	2,073	371	403	3,000
3.	Hybrid Maize	543	1,290	2,209	1,022	2,310	2,260	450	351	3,002
4.	Ragi	772	698	892	831	1,650	1,985	508	508	1,000
5.	Mexican Wheat	—	—	—	37	75	2,027	19	28	1,473
6.	Pulses	7,835	3,968	506	6,247	3,200	512	8,271	8,271	1,000
7.	Groundnut	4,888	4,702	961	5,861	6,370	1,086	8,256	12,384	1,500
8.	Other Oilseeds	143	169	1,181	32	40	1,250	—	—	—
9.	Sugarcane	2,200	1,98,000	90 tonnes	2,400	1,80,000	75 tonnes	2,075	93,375	45 tonnes

sewage or sullage water and (10) award of prizes to local bodies for preparation of good quality and quantity compost. Under this scheme compost training camps, village leaders programme, compost weeks, etc., are being organised to popularise compost making and growing of green manure crops. The Village Panchayats and youth clubs are also taking up digging of mass compost pits. As a measure of encouragement, prizes are awarded to Village Panchayats and municipalities doing outstanding work. In recent years, night soil is being made use of, for manuring.

Fertilisers

As paddy is the most important crop of the district, fertilisers have been in greater use in recent years. Year by year, the quantity of fertilisers 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 fertiliser. Various co-operative societies 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. Foliar application of urea has gained popularity only during recent years. The use of biological fertilisers for pulse crops in particular has gained popularity in recent years. 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, 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, wheat, etc. Training programmes were also organised through the taluk development boards, youth clubs, *mahila mandals,* etc.

The table in the next page gives the percentage increase (+) or decrease (—) over previous years of fertilisers collectively, nitrogen, phosphatic and potash fertilisers individually from 1972-73 to 1981-82.

Year	Percentage increase or decrease over previous years of application			
	Fertilisers (total of N.P.K.)	*Nitrogen fertilisers*	*Phosphorus fertilisers*	*Potash fertilisers*
1972–73	+65.6	+80.4	+84.8	−15.4
1973–74	+44.7	+ 2.1	+110.4	+230.6
1974–75	−11.0	+21.4	−54.4	−22.3
1975–76	−37.3	−36.7	−31.0	−46.0
1976–77	+45.4	+16.9	+114.4	+94.6
1977–78	−15.6	+ 0.0	−38.8	−27.8
1978–79	+37.2	+16.8	+86.9	+59.8
1979–80	+ 9.7	+16.4	− 6.1	+11.7
1980–81	+22.1	− 5.3	+24.5	+101.4
1981–82	−12.5	+ 4.4	− 7.9	−39.4

Agricultural Research Stations

There are three Agricultural Research Stations in the District at Sirsi (two stations) and Ankola. *The Agricultural Research Stations* at Sirsi (paddy) was started in 1949-50 at Jagalbet in Supa taluk for the improvement of rice cultivation. It was shifted to Sirsi in 1955 and it was taken over by the University of Agricultural Sciences on 1-10-1965. The main objective of the station is to evolve suitable varieties of paddy for the local conditions of soil, season, rainfall etc., The total area of the farm is 13.25 hectares. Different research programmes on agronomy, entomology, pathology, breeding, etc., are being conducted. An all India Co-ordinated Research Project on experiments in cultivators fields are also being conducted. A village by name Karasully was also adopted under the new Twenty Point Economic Programme.

The Agricultural Research Station, Sirsi (Pepper) was started in 1961 by the Department of Horticulture to conduct research related to pepper cultivation. In 1965 the farm was transferred to the University of Agricultural Sciences. The main objectives of the station are evaluation of different varieties of pepper for the local conditions and to study the cultural requirements of crops such as pepper, areca, plantain and other spices. The area of the farm is 7.1 hectares. Agronomical, entomological, pathological, breeding etc , research programmes are conducted in the farm. Panniyur-1 of pepper and Mangala variety of areca have been introduced. There

are also All India Co-ordinated Research Projects on cashewnut and spices and betelvine diseases. The research station has adopted Jarakanahalli for demonstrating improved pepper cultivation. Rooted cuttings of Panniyur-1, Local Uddakere, Bilimalligesara and Karimalligesara are prepared at the farm and distributed to the farmers.

The Agricultural Research Station, Ankola was established in 1948 by the erstwhile Bombay Government at Kagal in Kumta taluk. It was transferred to Ankola in 1959 and in 1965 it was transferred to the University of Agricultural Sciences. The main objectives of the farm are : 1) To evolve salt tolerant high-yielding paddy varieties and 2) to evolve and prescribe suitable agronomic practices for salt land paddy cultivation. The total area of the farm is 5.68 hectares. Research Programmes on agronomy, entomology, pathology, breeding etc., are being conducted in the farm. Six varieties of paddy were released to the farmers for better yield in salt lands namely Karikagga–12, Karikagga-126. Bilikagga-146, Bilikagga-75, Arya-33 and Arya-75. New varieties like Intan, KMP-98, KMP-152, KMP-77 and IET-3626, 6639 and 6148 have been introduced. Research work on brackish water fish is also being conducted.

Seed Farms

There are two seed farms situated at Haliyal and Malgankoppa of Mundgod taluk in the district. Nucleus seeds are obtained from the Research Stations of the University of Agricultural Sciences. Improved varities of D-6-2-2, PTB-9, M-81, M-141, M-161, A-67, A-90, A-200, T-141, SM-79 and high–yielding varieties of IR-8, IR-20, Jaya, Jagannath, Pankaja, IET-1959, Madhu, etc., of paddy are obtained and multiplied. The Seeds procured from registered seed growers are further distributed to the farmers for further multiplication and cultivation. The Seed Farm at Haliyal was started on 28–5–1958 in an area of 15.56 hectares. The area under cultivation is 9.96 hectares. The average foundation seeds produced is about 200 quintals. The Seed Farm at Malgankoppa in Mundgod taluk was commissioned on 8–3–1966. The area of the farm is 40.5 hectares and the area cultivated is 8.1 hectares and the average seed production per year is about 150 quintals.

Paddy

The staple produce of the district is rice or *bhatta* or *nellu* which on some lands is grown as a later or cold weather as well as an early or rain crop. Paddy is grown all over the district, the earliest grown

area being near Karwar ; in the rest of the low land coast harvest is a little later, then comes the upland crop and last of all the eastern areas. The coast paddy lands are divided into *gazni, honda, aremakki* and *makki* lands. *Gazni* lands are along the coast, yielding one crop in the year. *Honda* lands are the good rice plots in the lower portions or valleys which are being watered by small streams and yielding every year two crops of rice or one of rice and another of pulse. The first or rain crop is called 'Kartika' because it is harvested in the month of 'Kartika' (Nov-Dec) and the second or dry season crop is called Suggi in Kannada and Vaingan in Konkani or Marathi, both words meaning harvest. *Khar* lands are the low fields along the rivers and salt water inlets which are flooded during the height of the rains so that paddy cannot be sown till the water falls. *Makki* lands are higher lands entirely depending on monsoon rains and apt to loose the crop if the later rains fail. Above the Sahyadris most rice plots lie in the valleys on the eastern flank of the Sahyadris. From then, the rice lands stretch east a little beyond the boundary of the low wood lands as far as the heavy rain reaches which supplies many small reservoirs with water enough to last till January or February. All the rice fields are in the form of terrace surrounded by small banks to pond the water when the fields are flooded. The terraces vary from 1/4 hectare to a patch of 1/20th of an hectare according to the steepness of the ground. Coconut palms are sometimes grown along the bunds of the fields, their thick matted roots forming a valuable support to the embankments.

There are three types of paddy cultivation in the district, viz., drilling in the eastern parts of Sirsi, Siddapur and in Haliyal and Mundgod taluks, broadcasting in the coastal belt where the soil is sandy and also in salt land paddy areas in the below-ghat taluks and transplanting method in the rest of the tract. In few places the direct broadcasting with germinated seeds is done. Soon after the harvest of paddy the fields are ploughed and harrowed and planks are passed for levelling. When pre-monsoon showers are received preparatory operations are completed including application of organic manures like farm-yard manure and compost. In a few places green manuring is practised and also dry and green leaves are incorporated into the soil. In taluks of Haliyal and Mundgod drill sowing is done in dry condition. Sowings commence during the second fortnight of May and continue upto June. But transplanting commences from June and continues upto middle of August. In up-ghat taluks of Haliyal, Mundgod, parts of Sirsi and Yellapur, "hodata" operation

is done. In this operation when the crop is 2 to 2½ months old, under wet condition, wooden planks are passed over the crop. This helps to injure the crop (stem region) and stimulates tillering in paddy seedlings. In up-ghat, threshing is done by passing bullocks over the paddy straw, but in coastal taluks only manual labour is used for threshing. Power tillers and tractors have also come into use in the district. Whenever ample irrigation facilities are available second summer crop is being raised. Soon after the harvest of kharif paddy, the lands are prepared and transplanting is done in the main fields. Short duration and mid-late varieties are planted.

Sugarcane

Sugarcane is grown as a secondary crop in the district. It is mostly grown for preparing jaggery for home consumption. Recently sugarcane grown in Supa, Haliyal and Mundgod taluks is being sent to sugar factories. The land for planting sugarcane is well ploughed, left open to the sun for several days and then heavily manured and planting is done from December onwards and it may extend upto April or May. There are three local varieties of sugarcane planted namely *rasal* or spotted (Deo *kabbu*), *kare* or black (Morish) and *bili* or white. Now improved varieties like Co–419 and Co–470 are planted. The local varieties are good for jaggery preparation. Farmers apply complex fertilisers which include NPK as per accepted recommendations. The extent of area grown in the district is 2,500 hectares (1983). Of late, owing to the increase in prices the area is increasing.

Groundnut

Groundnut was grown on a small scale in the transitional belt of the district in the kharif season. But in recent years, the area is on the increase during kharif season. It is also grown on uplands and *makki* lands where water does not stagnate. It has been introduced as a second crop in paddy fallows in the coastal taluks. The area covered is about 4,000 hectares, during rabi or summer season. Groundnut is grown under residual moisture condition. The yield is about 4 to 5 quintals per acre. The varieties grown are TMV–2, Spanish Improved and recently S–206 is being tried.

Ragi

Ragi is grown both during kharif and summer seasons. During kharif the seeds are either drilled or seedlings transplanted. Usually

ragi is grown on poor soils which are less fertile. Four to five week old seedlings are planted and transplanting is done in pouring rain. Hand weeding and inter-culturing is also attended. The crop matures in three to four months.

Pulses

Pulses like horsegram and *togari* are sown during late kharif season. *Togari* is grown as a mixed and border crop along the paddy fields. In the uplands it is mixed with paddy and ragi crops. In low lying areas after the harvest of kharif paddy, blackgram, greengram, *avare* and bengal gram are grown under residual soil moisture conditions. The improved varieties of bengal gram, Annigeri-1 and Chinamung are being introduced. As a second crop the extent of area grown under pulses is about 7,500 hectares.

Developmental activities

A number of developmental schemes were introduced in the district to increase the agricultural production. The developmental efforts are broadly intended to bring more land under cultivation, to increase intensity of cropping and to diversify the cropping pattern. Major portion of the total plan outlay is devoted to agricultural development programmes like high-yielding variety programme, intensive agricultural area programme, land reclamation, plant protection measures, improved agricultural practices, etc. Besides this there is sizeable non-plan expenditure also on these activities. A brief description of the various schemes in operation in the district is given in the following pages.

Grow more food campaign: Increasing the food production was the main object of this grow more food campaign. In early years of Independence, the food production was not sufficient to feed the population. There were famines and there was impact of the Second World War. The grow more food scheme was launched in the wake of these difficulties. After the implementation of grow more food campaigns, for the all-round development, community development projects were implemented. After the commencement of the National Extension Service all other development programmes were implemented.

Japanese method of cultivation: Paddy is grown adopting different methods of sowings such as drill sowings, broadcasting, sowing behind the plough and transplanting. In Japan, paddy is grown only as a

transplanted crop. Right from seed bed preparation, selection of seeds, salt water treatment, seed treatment, use of optimum seed rate and raising of nurseries are adopted systematically and seedlings are planted in rows of optimum distance. This has been popularised in all the taluks except Mundgod and Haliyal taluks. During the kharif and summer seasons paddy is transplanted and the high-yielding varieties and improved strains are also transplanted in the district. Now this scheme of Japanese method of paddy cultivation has been discontinued. But the transplanting is done almost on the same lines.

Community Development and National Extension: For all round development Community Development Programme was started in the year 1952. The main object was to increase the agricultural production and improvement of villages and the response from the villagers was good. For expansion of area with similar comprehensive principle National Extension Service was launched. These NES Blocks were subsequently converted into Community Development Blocks. Multi-purpose activities were launched for the uplift of the rural people. Considerable improvement and achievements have been made in agriculture by the National Extension Service Agency.

High-Yielding Varieties Scheme: The high-yielding varieties scheme was introduced in the district in 1966-67, with paddy as the main crop. The varieties introduced were Thaichung Native and Thaichung-65. In later years with continuous research more varieties of outstanding performance were released. The H.Y.V. Paddy varieties grown in the district are IR-8, IR-20, Pankaja, Jagannath, MR-136, Jaya, IET-1991, Suma, Kusuma and GMR. Out of these Jaya, MR-136, and IR-20 have been found to perform well under drill sown conditions in Haliyal and Mundgod taluks. Sona and Jagannath varieties are popular for grain quality. An account of the higher level of fertilisers, short duration varieties are becoming very popular. But most of these varieties are susceptible to gall fly (*kane*). Recently a new variety has been introduced known as Vikram (GMR-2). The area under high-yielding varieties is on the increase.

In addition to paddy, hybrid jowar, hybrid maize, Mexican wheat, TMV-2 and Spanish varieties of groundnuts are also grown in the district. The percentage of area under the high-yielding varieties to gross area sown during the years from 1971-72 to 1981-82 is as follows: 6.7 in 1971-72, 9.4 in 1972-73, 12.5 in 1973-75, 14.0 in 1974-75, 23.9 in 1975-76, 26.1 in 1976-77, 33.2 in 1977-78, 45.6 in 1978-79

54.4 in 1979-80, 49.0 in 1980-81 and 50.1 in 1981-82. The following table shows the percentage of gross area under high-yielding varieties of rice, jowar, ragi, bajra and wheat in the district during the years from 1972-73 to 1981-82.

Year	*Rice*	*Jowar*	*Ragi*	*Bajra*	*Wheat*
1972–73	8.9	17.0	—	—	50.0
1973–74	14.1	68.2	—	—	100.0
1974–75	14.6	58.5	—	—	—
1975–76	28.2	76.7	46.7	—	—
1976–77	33.3	41.1	—	—	—
1977–78	40.2	70.3	—	—	—
1978–79	51.2	59.2	—	—	—
1979–80	61.9	62.0	41.8	—	—
1980–81	61.1	72.4	44.3	100.0	—
1981–82	63.1	76.2	45.1	—	—

Intensive Agricultural Area Programme: The Intensive Agricultural Area Programme was introduced in the district in 1966–67 with an object to increase the overall production by adopting package of practices like supplying of improved seeds, fertilisers, agricultural credit and technical know–how. Much stress was laid on saturating the cultivated area with improved seeds, maximum use of organic manures and fertilisers and optimum utilisation of irrigation facilities, soil conservation and the use of improved agricultural practices. The progress made during some years from 1966–67 to 1982–83 was considerable. The area covered under this programme was 18,385 hectares in 1966-67 and it rose to 62,368 hectares in 1975–76.

Plant Protection: Plant protection measure is one of the most important operation adopted in growing high–yielding and hybrid varieties. The traditional method adopted were crude and uneconomical. Usually affected crops were uprooted and burnt. With the introduction of hybrid and high-yielding varieties, different chemicals were used to protect the crops. Farmers are advised and educated for taking up plant protection measures right from seed treatment, soil treatment, use of chemicals during pre-harvest and post-harvest stages of crops. Usually prophylactic and curative measures are

suggested for the control of pests and diseases. Fomerly the Department of Agriculture used to supply plant protection chemicals at 50 per cent subsidy. Now, only 25 per cent subsidy is allowed for the chemicals used for protecting crops. Similarly plant protection equipments were supplied at 50 per cent subsidy and the subsidy portion has been reduced to 25 per cent. Plant protection equipments are available with taluk development boards, service societies and Panchayats on hire basis. In addition, these equipments are supplied at subsidised rates to the small and marginal farmers under SFDA Programmes. The Agro-Industries Corporation is supplying plant protection equipments and chemicals, Agro-Kendras, Service Societies and private dealers who have obtained licences as per the Plant Protection Act are the main agencies for stocking and supplying chemicals to the farmers. Technical assistance in handling chemicals, preparing solutions and adopting dosages are extended by the extension staff. Particularly for hybrid and high-yielding varieties plant protection is a must. Major pests found on paddy are gall fly (kane pest), case worm, stem borers, gundi bugs, leaf rollers, swarming caterpillars, grass hoppers ant worms and rice hispa. Similarly the diseases noticed are blast, bacterial blight, false smut and helminthosporium. Farmers are advocated to take up plant protection measures from seed treatment to harvesting, plant protection trainings are also organised.

Field demonstration : The National Demonstration Scheme serves to carry the results of research to cultivators. Demonstration plots, one in each taluk were laid out. Multi-crop demonstrations are arranged with view to demonstrating how best the farmers can utilise the available land with available resources of labour input and capital for securing highest productivity and profits per acre per year. In order to popularise the high-yielding varieties in the district demonstration on hybrid jowar, hybrid maize and Mexican wheat and paddy were held.

Oil Seed Development Scheme : A comprehensive scheme for development of oil seeds was introduced in the district with the objective of stepping up production of oil seeds and to minimise the fluctuations in the production by adopting improved agronomic practices, use of improved seeds, demonstration and competitions. Short-duration variety of NPH-1 castor, groundnut and soyabeen and C. 68405 variety of sunflower were introduced in the district under the scheme. There were half acre demonstrations in kharif and summer seasons.

Sunflower Development Scheme: A Centrally-Sponsored Scheme for the Development of Sunflower was introduced in 1972-73 with the object of increasing the production of vegetable oil. The variety introduced was the high-yielding Russian variety EC. 68415 which is a short duration crop of 90 to 100 days suited to all the three seasons and best suited for the multiple-cropping system. It contains about 40 per cent oil. Demonstrations, training programmes and field days were held. Bulgarian and Australian sunflower seeds were also distributed free of cost to the farmers in order to popularise them.

Development of Pulses: There are some State and Central Schemes in operation in the district for the development of pulses. The crops covered are *togari*, bengal gram, green gram, black gram, etc. Under a Centrally-Sponsored Scheme for development of pulses, plant protection chemicals have been distributed at subsidised rates at 25 per cent of the cost of chemicals limited to Rs 15 per hectare. Under a State-Sponsored Scheme assistance was provided financially. Demonstration blocks were organised in the district under the State Scheme. Under the Centrally-Sponsored Scheme ten demonstration blocks were undertaken for *togari*, bengal gram, green gram and black gram in the district.

Multiple Cropping Scheme: A multiple cropping scheme is in operation in the district since 1971. The objectives of the scheme are: 1) to accelerate intensive cropping through multiple cropping in the selected villages and to expand the activities to the entire district, 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. Demonstration on two-crop sequences were laid out at the rate of Rs 300 per demonstration per hectare of plot. About 20 per cent grants provided for these demonstrations are earmarked for the welfare of the Scheduled Castes and Scheduled Tribes by conducting demonstrations in their fields.

Community Nursery Scheme: In order to inculcate in the minds of the farmers about the scientific methods adopted in raising

nurseries, the Department of Agriculture has taken a scheme to supervise the raising of nurseries on the farmers' fields. Subsidy at the rate of Rs 400 per 0.4 hectare of nursery raised is given to the farmers. The farmer can utilise the seedlings so raised and sell the remaining seedlings to the other farmers.

Sugarcane Development Scheme : A Sugarcane Development Scheme was taken up in the district in 1958 with the object of increasing the acre-yield through intensive cultivation and improved agricultural practices. The scheme envisages the establishment of a seed nursery, conducting of demonstrations, distribution of fertilisers and plant protection chemicals and conducting crop competitions.

Integrated Development of Western Ghats : The Integrated Development of Western Ghats Scheme is in operation in the district since 1973-74 to improve the Malnad tracts which have vast potential for development. Fertilisers are being supplied and training programmes at taluk levels and circle level programmes were conducted.

Agricultural Schools

The Agricultural School, Kumta was started in 1919 as Kumta Farm with the object of carrying out research work on the problems of the tract, to conduct trials and experiments on cultivation of crops, and agricultural practices and to introduce improved methods of agriculture. In 1947, the farm was converted into an Agricultural School with an additional objective of imparting agricultural training to the sons of farmers in the district, with prescribed courses in agriculture and allied subjects. The duration of the training was two years in the beginning and in 1966-67 it was reduced to one year. The activities of the school at present are (1) to train the sons of farmers in agricultural practices, (2) to multiply and distribute the improved and high-yielding varieties of seeds to the cultivators through development blocks and (3) to maintain poultry and dairy units for giving training to the students in mixed farming. The student strength was 25 and it was raised to 50 in 1978-79. The minimum qualification required for admission is seventh standard. The students must be from agricultural families and should be within the age group of 18 to 30 years (33 for SCs and STs) and a stipend of Rs 150 per month will be paid for 10 months. The area of the farm

attached to the school is 54.52 hectares and is divided into three sections viz., school section, field section and central nursery section. A nearby village will be selected for carrying extension services and the students with the staff members pay regular visits to the village to study the problems of farmers and try to solve them by giving guidance in different farm operations. There is also an agricultural school at Malgi (Mundgod tq.) in the district. A Farmers' Training Centre was started in 1983 under the Danida Scheme to train young farmers for ten days in all aspects of agriculture, dairying, horticulture and sericulture at Kumta.

Investigation of Rice Pest

A scheme for investigation on rice pest is in operation at Kumta since 1944. Paddy has numerous pests of which 12 pests are the most common in the district. They are gall fly, leaf roller, rice hispa, blue beetle, jassids, grass hopper, stem-borer, brown plant hopper, case worm, gundhi bug, thrips and cut worms. It is assessed that the loss due to these pests may range from 5 to 20 per cent in the district. Because of the heavy rain and also due to peculiar nature of some pests, it becomes difficult to take effective measures to control the pests. With the object to study the rice pests in general and gall fly in particular and to find out remedial measures, this scheme has been established.

Small Farmers Development Agency

The Government of India constituted the Small Farmers Development Agency and in the district, the Agency was started during 1970–71. The objectives are to help potentially viable small and marginal farmers possessing less than five acres of land. The chief function of the Agency was to identify the eligible farmers. Farmers in possession of land less than five acres and more than 2½ acres were considered as small farmers and farmers owning less than 2½ acres of land were considered as marginal farmers. Agricultural labourers who possess a homestead and have more than 50 per cent of their income from agriculture only were considered as agricultural labourers. The number of small farmers identified was 11,544 and the number enrolled was 18,454, the number of marginal farmers identified were 30,976 and enrolled were 15,704 and there were 5,689 agricultural labourers identified and only 82 were enrolled. The year-wise targets and achievements are detailed in next page.

Year	*Financial targets in lakhs of rupees*	*Amount spent in lakhs of rupees*	*No. of persons benefited*
1970–71	7.50	6.59	1,148
1971–72	20.00	5.14	1,623
1972–73	33.00	8.01	1,928
1973–74	30.49	6.88	2,009
1974–75	20.33	7.09	7,680
1975–76	24.50	15.84	12,848
1976–77	24.00	12.53	6,655
1977–78	20.00	10.33	1,518
1978–79	29.43	13.31	1,684

The Small Farmers Development Agency was merged with District Rural Development Society in 1979.

District Rural Development Society

The District Rural Development Society of the district was registered on 31–3–1979. The objectives of the Society are a) generation of full employment through production programmes in selected areas, and b) taking up of schemes which will generate additional employment and raise the income level of the identified target group consisting of small and marginal farmers, agricultural labourers, rural artisans and persons belonging to Scheduled Castes and Scheduled Tribes and other weaker sections. It also undertakes to implement the different programmes under the Small Farmers Development Agency, Drought Prone Area Programme, Integrated Rural Development and any other special economic programmes that are sponsored by the Central and State Governments by making amendments to the Memoranda of Association. The functions of the society are a) to identify the small and marginal farmers, agricultural labourers and others of the targeted group and their problems, b) to draw up model plans for investment and production activities to be undertaken by the small and marginal farmers, c) to execute these plans for the benefit of small farmers, marginal farmers and agricultural labourers, either directly or indirectly through the other agencies engaged in this direction in the field, like co–operative banks, commercial banks, departments of the Central and State Governments, etc., and d) to make the small farmers/marginal farmers and

families of the targeted group economically viable and for improving the lot of landless agricultural labourers by raising the output of small holding and generating employment through subsidiary occupations and also to reach the benefits of agricultural development to the economically weaker sections of the rural community. In fulfilling the declared objectives of the society, the physical and financial targets and achievements for the years 1981–82 to 1983–84 are given below.

Year	*Physical*		*Financial*	
	Target	*Achievement*	*Target*	*Achievement*
1981–82	9,524	8,366	93,00,000	81,17,284
1982–83	6,600	11,667	1,02,82,600	102,83,070
1983–84	6,600	10,117	88,07,300	90,91,414

The families of the targeted group have been granted loan for purchasing their requirements and creation of assets. On the strength of their identification based on income and land, subsidy to the extent of 25 per cent and 33⅓ per cent was given against the unit cost. The 11 principal banks having a network of 17 branches and co-operative institutions provide the institutional finance for the weaker sections of the targeted group. The loan component will be four times the subsidy to small farmers and thrice to all others like marginal farmers and others. Besides, Integrated Rural Development Programme, *Negilu Bhagya,* Bio-gas, Anthyodaya Programmes have also been implemented and the details of which are given below.

Negilu Bhagya : Negilu Bhagya is a scheme to help ex-tenants to have bullocks on subsidy and a mini-kit worth Rs 500. The unit cost fixed for a pair of bullocks is Rs 3,000 and a subsidy of Rs 1,000 or ⅓ of the cost whichever is less will be paid to the beneficiary. The mini-kit contains seeds, fertilisers, insecticides worth Rs 250 and implements worth Rs 250 which redresses the difficulties of the ex-tenant in the beginning. The number of families assisted is 801 with pairs of bullocks and 550 with mini-kits during 1983–84. *Bio-gas :* Construction of bio-gas plants is advocated to overcome the shortage of fuel and to protect the forest. A total of 400 bio/gobar gas plants were constructed during 1983–84 and an amount of Rs 10.72 lakhs was disbursed under subsidy. *Anthyodaya* :—Haliyal and Ankola taluks

were selected for the Anthyodaya programme and five families in each village and a total of 312 families were identified and assisted on integrated rural development pattern and the subsidy disbursed to the loan accounts of the beneficiaries was Rs 2.41 lakhs.

Integrated Rural Development Programme

On 2-10-1980, the Integrated Rural Development Programme was launched in the district. Prior to this, an allotment of Rs 2.5 lakhs per taluk (block) was provided and Mundgod taluk was selected as an intensive integrated rural development block with a budget of Rs 10 lakhs. With effect from 2-10-1980, all the blocks have been covered under this programme with a uniform budget of Rs 5 lakhs each for the first year, Rs 6 lakhs for the second year and Rs 8 lakhs for the next three years. It was targeted to assist 600 families in a year per block and to cover 3,000 families in the course of five years. There are 17,812 small farmers, 43,206 marginal farmers, 55,792 agricultural labourers and 9,995 rural artisans in the district. To achieve the desired result, cluster approach was followed with 5 to 6 villages in a cluster. Depending upon the size of the taluk, village, population of the targeted group, 5 to 10 clusters were taken for survey of the families with less than Rs 3,500 annual income from all sources, farmers with less than 5 acres of dry land, rural artisans, fishermen and the youths with aptitude to undergo training in selected vocation to have a gainful self-employment. After selection has been made, subsidies and loans were paid to the beneficiaries. The subsidy was 25 per cent to small farmers, $33\frac{1}{3}$ per cent to marginal farmers, agricultural labourers, rural artisans and fishermen, etc. For Scheduled Tribes, the subsidy was 50 per cent and it is regulated as per the unit cost fixed by the NABARD or actual cost whichever is less. The maximum subsidy admissible was Rs 3,000 and for Scheduled Tribe family, it was Rs 5,000. The schemes that are providing assistance are as follows :

Agriculture : The schemes were mostly land based like 1) land development, 2) agricultural implements, 3) plough bullocks, 4) subsidy on fertilisers, 5) bullocks with cart, 6) cattleshed and 7) farm/social forestry. Of all these programmes, the farmers were interested to have plough bullocks and bullocks with cart. To provide social education, demonstrations were also taken up. *Horticulture* : The farmers needed help towards the cost of seedlings and their planting, fertiliser application, etc. Demonstration was also arranged. *Minor Irrigations* : Digging of wells, installation of pumpsets,

renovation of wells were the schemes taken up under this programme. *Animal Husbandry :* Most of the marginal farmers and agricultural labourers took to milch cattle to supplement their income. Cross-bred cows, piggery, poultry, sheep, etc., are the other programmes. *Sericulture :* Sericulture is a new introduction in the district. This is popular with medium farmers and above. Reeling units, cocoon centres and marketing facilities are not readily available and therefore, the small farmers and marginal farmers are reluctant to take up this scheme. *Fisheries :* The fishermen in the coastal taluks are being helped by grant of loans for their boat and net. For a group of four families, gill net boat with inboard engines and with outboard engines, a loan of Rs 35,000 and a subsidy of Rs 1,166 were arranged. It was also proposed to help them by providing with a Purse-seine boat for 25 to 30 people. The achievements under different heads for the years 1981-82 and 1982-83 are given below

Scheme	*1981-82*		*1982-83*	
	Number	*Rs*	*Number*	*Rs*
Agriculture	2,022	10,44,711	3,366	24,56,087
Animal Husbandry	1,933	13,83,899	4,173	28,31,067
Fisheries	1,567	33,05,692	1,042	18,98,889
Minor Irrigation	324	3,04,426	319	3,19,021
Sericulture	328	61,722	247	69,345

Extension Training Sub-Centre

The Indo-Japanese Agricultural Extension Training Sub-Centre was started at Kumta in 1955. This Centre is intended to impart training to the farmers in advance rice cultivation technique, handling and maintenance of power tiller and other agricultural machineries. The main aim of starting this centre is to educate the small farmers to aim at maximum production with minimum expenditure. Further, special stress has been laid on the type, time, method and variety to be used for getting maximum production. Special attention is also paid to popularise mechanised farming more effectively and profitably. The areas of operation are Uttara Kannada, Shimoga, Dharwad, Belgaum and Bijapur districts.

Four types of trainings are imparted at the Centre : a) A complete

training by practical demonstration on the cultivation of paddy and also the cultivation of other food crops, fruits and flowers, animal husbandry, poultry, bee-keeping, etc. The use of the agricultural machineries is also demonstrated. The duration of the training is six days, b) The training in the use of power tillers, their dismantling and assembling will be given and in addition, training on cultivation of paddy and other food crops, horticulture, animal husbandry, poultry and bee-keeping is also imparted. The duration of the training is 20 days, c) To impart training on use of machineries and power tillers to the students of the Agricultural School, Kumta and the duration is six days, and d) to train enthusiastic workers in use of agricultural machineries and management and the period of training is three days.

Agro-Industries Corporation

The Karnataka Agro-Industries Corporation Limited has its activities in the district. The Corporation serves the farming community a) by assisting the community in development of land for cultivation and development of water resources, by offering custom training services of bulldozers, rigs, tractors and RBU and Well Master Cranes, b) by assisting the farming community by supplying fertilisers, seeds, pesticides, plant protection equipment, etc., at fair prices at the nearest points through Agro-Kendras, c) by assisting the farmers and institutions in the purchase of modern agricultural equipments like tractors, power tillers, diesel and electrical and deep-well pumpsets, sprayers, sprinklers, agricultural implements, etc. There is a sub-centre at Sirsi. There are two Agro-Kendras at Sirsi and Karwar and dealers at Honavar, Banavasi and Sirsi. The revenue was Rs 35,803-50 in 1979–80, Rs 2,31,577–50 in 1980–81, Rs 2,65,890–75 in 1981–82, Rs 2,90,950–20 in 1982–83, 2,95,875–40 in 1983–84 (for first nine months). The expenditure was Rs 18,725 in 1979–80, Rs 1,20,250–25 in 1980–81, Rs 1,30,450–30 in 1981–82, Rs 1,35,720–30 in 1982–83 and Rs 1,38,730–45 in 1983–84 (for first nine months).

In the Agro-Kendra at Karwar, the sales of fertilisers and seeds during 1982-83 were 20,216 quintals and 15.50 quintals respectively and the value of sales of pesticides was Rs 10,467–40 and the expenditure incurred was Rs 10,927–62. During the year 1983–84, the fertiliser sale was 29,800 quintals and that of seeds was 31 quintals and the value of sales of pesticide was Rs 20,510–90 and the expenditure was Rs 15,626-61. In the Agro-Kendra at Sirsi, during

1982–83 the 302.555 quintals of fertilisers, 10.30 quintals of seeds, pesticides worth Rs 1,25,133–09 were sold incurring an expenditure of Rs 24,254–35. During 1983–84, 537.573 quintals of fertilisers, 0.43 quintals of seeds, pesticides worth Rs 1,19,721–34 were sold incurring an expenditure of Rs 30,085–19.

Agricultural Extension

In the year 1979, the Karnataka State adopted a more effective system of extension organisation in the form of Agricultural Extension Project with the assistance of the World Bank. With this the extension service was repatterned and an Assistant Director of Agriculture, has been placed at the taluk level who acts as the captain of the extension services. Each such officer is concerned with the introduction of all land-based production technologies in his jurisdiction. The work is carried out in units under the directions of subject-matter specialists, each unit covering two or three taluks as its area of operation. This system is expected not only to take agricultural progress to the next phase of development, but also assure the availability of new technology at the doors of small and marginal farmers. This agricultural extension service of the department is also supported by the extension service of the University of Agricultural Sciences. Further the services of research scientists and subject-matter specialists of the University have been always made available to the Government agencies and to the progressive farmers.

Demonstrations and Trials

Large demonstrations are being organised in the farmer's fields on various crops and trials are conducted. The inputs are supplied and according to recommendations all package of practices are attended and observations made. For popularising the new methods and crops 'field days' are organised where large number of farmers participate and the methods adopted are explained and crop growth is seen by all the participants.

Syndicate Agriculture Foundation

The Syndicate Agriculture Foundation, Manipal registered in 1966 under the Karnataka Societies Registration Act 1960 (Karnataka Act 17 of 1960) has its branches in the district. The membership is open to farmers and others interested in farm and institutions engaged in activities connected with agricultural and horticultural development. The foundation is rendering assistance to farmers by

way of guidance and soil testing, supply of improved seeds, holding of demonstrations, seminars, field days, competitions, etc. Many progressive minded farmers of the district have been evincing interest in the activities of this foundation. Issues concerning latest agricultural problems are discussed in various seminars conducted by the foundation. Training classes on poultry farming, dairying and farm management are conducted for the benefit of farmers. The foundation has also arranged for free testing of soil samples of each member every year.

Farmers Forum

The Farmers Forum, Uttara Kannada, was started under the Karnataka State Farmers Forum. The main objective of the forum is augmentation of the farm produce. The forum holds conferences, exhibitions and seminars at taluk and district levels to help the farmers in their work and to promote mutual understanding and friendship among them.

Young Farmers Association

The Young Farmers Association also called Youth Club was started in the year 1957 in the district. It has organised village clubs. Through these clubs, the rural youth are trained to become good farmers and citizens. Efforts have been made to organise taluk committees of the association to regularise the programmes of the clubs. The members of clubs participate in taluk, District and State *melas*. The Association works in close co-ordination with the Agricultural Department and Extension Wing of the Development Blocks. These clubs are working on the principle concept of self-help and co-operative efforts in promoting agricultural activities. There are 477 youth clubs working in the district. They are organising regular meetings, 'Charcha Mandals', discussions, seminars, field visits, field days and training programmes, etc.

Krishika Samaj

A district branch of the State Krishika Samaj and Bharat Krishika Samaj is functioning in the district with its branches in all the taluks. The branches of the Karnataka Pradesh Krishika Samaj was started in the district. 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 improvements in the living standards of farmers. Meeting of the members of the Samaj are held periodically for discussing the problems of agriculture. There were 49 life members and 1,752 active members of the Samaj in the district (1984). Seminars, Krishi Melas, field days, field visits, study tours and crop competitions are conducted.

HORTICULTURE

Horticulture has made considerable impact on the economy of the district even from very early times. Travellers who visited Vijayanagara speak of orchards of mango, jack fruit, plantain, etc., beside the highway leading from the West Coast to the capital city. Ibn Batuta speaks of sugarcane plantations along the West Coast. He speaks of every house in this area having a kitchen garden where vegetables were grown. Spices like cardamom and pepper too were grown in abundance especially in the *malnad* and the coastal region. The Portuguese sources say that pepper from the Kannada coast was superior to that of Malabar and they called queen Chennabhairadevi of Gersoppa as the "Queen of Pepper" as her kingdom supplied huge quantities of pepper. Ginger, turmeric and tamarind were other items grown in gardens and groves for export. Fryer (1675) also speaks of the fame of "Carwar Pepper" which he describes "as the best and the dearest in the world".

For horticultural purposes the district can be divided into three regions. The main horticultural crops in the coastal belt are coconut, arecanut, cashewnut, pepper, betelvine, banana, mango, pineapple, sapota, guava and vegetable crops. The main cash crops in this area are arecanut and coconut. In the *malnad* areas in Sirsi, Siddapur, Supa and Yellapur taluks, the main horticultural crops are arecanut, coconut, cashewnut, pepper, cardamom and fruit crops like mango, pineapple and many vegetables. In the semi-*malnad* taluks of Mundgod and Haliyal the main horticultural crops are mango, sapota, guava, banana and pineapple, all varieties of vegetables and subsidiary food crops like sweet potato, tapioca and yam. The cultivation of pineapple in the up-ghat region has assumed prominence. Cocoa and Panniyur variety of pepper have also been introduced. Spice crops like cloves, nutmeg and cinnamon have also been raised.

The area of different horticultural crops in the district during

1983–84 are as follows (area in hectares): 1) Coconut 8,684.5 2) Arecanut 8,405.1, 3) Mango 1,961.1, 4) Banana 1,659.7, 5) Pineapple 745.6, 6) Cardamom 757.5, 7) Pepper 873.3, 8) Cocoa 144.4, 9) Cashew 6,678.3, 10) Other garden and fruit crops 2,987.3: total 32,892.0.

This area constitutes 30.13% of the total cropped area of the district. The hectarage of different horticultural crops in the district, is given hereunder.

Crop	*Hectarage*	*Crop*	*Hectarage*
Arecanut	8,405.1	Arona	29,7
Coconut	8,684.5	Rose apple	8.4
Cashew	6,673.3	Butter fruit	6.9
Cocoa	144.4	Ramphal	4.0
Betel leaves	550.5	Other fruits	392.3
Pepper	873.3	Gourds	207.0
Cardamom	757.5	Potato	8.0
Chillies	250.0	Tomato	217.0
Onion	196.0	Brinjal	308.0
Coriander	10.0	Cole crops	115.0
Ginger	46.5	Avare	126.0
Turmeric	52.8	Lady's finger	236.5
Garlic	6.5	Radish	191.1
Mango	1,961.1	Beetroot	8.5
Banana	1,659.7	Carrot	7.0
Lemon	228.2	Sweet Potato	420.5
Guava	177.1	Leafy Vegetables	184.5
Sapota	433.5	Capsicum	11.7
Pineapple	745.6	Tapioca	37.0
Jack	636.8	Other Vegetables	198.5
Pont	21.4	Water melon	72.0
Papaya	114.9		

Arecanut

Arecanut (*Areca catechu*) is also called betelnut which is a widely used article of consumption. The chewing of betel along with betel leaves and a little lime is a habit prevailing among all classes of

people. The cultivation is carried on mainly near the ghats in the deep narrow valleys in which are to be found perennial streams and abundance of shade and moisture. After a suitable area of the valley is selected, drainage and irrigation channels are dug. As a shade to areca, plantain suckers are planted. The areca pits are dug $2' \times 2' \times 2'$ at a distance of about nine feet from pit to pit and seedlings of two-and-a-half to three-years old are planted. Seednuts are usually selected from the second crop of mature trees and are put down in a well-moisture shady spot. They are left there for about one to three years, and then finally retransplanted in pits already dug for the purpose. About 400 to 500 plants are planted in an acre which has been the standard in fixing the revenue assessment from the days of old.

The annual cultivation practices comprise of digging round the bed 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 (*betta*) nearby. These four operations, being costly are sometimes confined to one-third of the garden a year, in view of convenience and economy. 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, and are cleared every year. The plants have to be regularly sprayed against diseases, particularly against *koleroga*, the deadliest disease of the crop. In recent times there is root-grub damage to areca plantations. An areca tree begins to bear fruit about ten years after its first planting or seven years after its second planting. From its fiftieth year until its decay, which happens between the seventieth and hundredth year, the quantity of fruit greatly diminishes but the quality improves. The crop is usually plucked when fully ripe between November and March. The nuts are dried in the shade for 40 days, and dehusked. Curing is also done.

Curing: The bunches of nuts have to be harvested by skilled labourers and the bunches are to be lowered to avoid damages to the nuts. The cured nuts have a good keeping quality. The process consists of four stages 1) husking the raw nut, 2) slicing, 3) boiling and 4) drying. The husking is the removing of the outer layer of

the nut and generally this work is entrusted to women labourers. Then the nuts, sliced into two halves or more, according to the grade for which they are required, are boiled in a copper pot, water mixed with *chogaru* to make the nuts and lends for chewing and for removing portion of tannic acid present in it. 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 them properly. It takes about five or six days of good sunshine and in the absence of sufficient sunlight, fire is kindled for drying. The nuts dried in the latter way are stated to be inferior to the sun-dried nuts.

Koleroga, the most serious disease is caused by a deadliest fungus which develops on the moist surface of the nuts during the rainy season and causes the premature shedding of the nuts. The tissues begin to rot and when the attachment of the nut to the stack withers shedding commences. The disease progresses continuously from July to October. If neglected, the disease attacks the crown of tree, causing its death. The disease is carried from year to year on the remains of the diseased materials which are the source of this disease. When the anchorage roots and feeding roots are attacked, they are sprayed by bordeaux mixture.

Cashewnut

The cashewnut tree (*Anacardium occidentale Linn*) a native of South America, was introduced in India mainly for the purpose of checking soil erosion on coastal lands and hill slopes. Cashew grows under varying soil and climatic conditions from the sandy coast, upto an elevation of 700 metres above the sea level, and in regions receiving an annual rainfall of 75 cms as well as in those with over 300 cms. Cashewnut gained commercial importance during the last 25 years on account of the increased demand for its edible kernel and shell oil in the international markets. Cashew is a highly cross-pollinated crop. Seeds for sowing should be collected from vigorous and healthy tree bearing regular and heavy crops of medium-sized nuts. Seeds produced from the current year crop register high percentage of germination. Cashew can also be propagated vegetatively by layers and grafts which is better than the crop by sowing seeds. It is necessary to manure the seedlings adequately every year. Interculture may be confined to shallow digging. The cashew tree begins

to bear fruit in the third year and it attains the full bearing stage by the tenth year. The trees bear good crops for nearly 20 to 25 years, after which they begin to decline. Only fully matured nuts which have a hard greyish outer shell should be harvested. The average yield from a bearing tree is estimated at five kg or even less. A well maintained plantation with optimum population of trees should yield over a tonne of nuts per acre. The cashew–apple is sweet when it is fully ripe. Its juice is rich in Vitamin C and sugar.

Coconut

The coconuts grow well in sandy soils and large plantations extend along the coast line of the district. Scattered trees are also found on the banks of the fields and in other favourable spots. Coconut trees are usually propagated from nuts which have not been plucked, but have been allowed to ripen and fall from the tree. These nuts are put down in moist, ploughed ground with their tops above the surface. They sprout in about three months and after a year or two are transplanted in three feet cube pits. The manure for these trees consists mainly of earth from the bottom of the back waters and leaves and ash. Far away from the coast coconut trees need watering in summer and other dry seasons. The trees begin to bear fruit after five to twelve years according to the nature of the soil and continue to yield till they are about sixty years old. There has been a tendency in recent years to over-crowd the coconut plantation. It is estimated that the correct number should be about 75 trees per acre.

Spices

The spice crops are cultivated on a smaller scale when compared to the food crops, but yet they constitute a sizeable share in the international trade having foreign exchange. Pepper is an important spice crop in the district. It can be grown as a mixed crop, using arecanut palms as standards. Rooted cuttings at the rate of two per palm are planted at the base of each palm about 30 to 35 cms away from the base. While planting, southern side of the palm may be avoided. As the pepper–vine grows it has to be trained to the palm. Cattle manure or compost at the rate of 8 kg per vine is to be applied before the south–west monsoon. Ammonium Sulphate, Superphosphate and Nitrate of Potash at the rate of 500 gms, one kg and 100 grams respectively per vine may be applied in the month of August or September around the vine to a depth of about 15 cms,

about 30 cms away from the base and mixed with soil by forking. Pepper–vine commences yielding from the third year. There are various development schemes for the development of this crop in the district.

Farms and Nurseries

The Department of Hoticulture has opened nine farms and four nurseries at various places in the district for providing the required quality seed material for various horticultural crops. The area, the year of starting, the important crops, and the taluks in which they are located are given below.

Horticulture farm at	*Name of the taluk*	*Year of starting*	*Area in Hects.*	*Important crops*
1	2	3	4	5
Bhasgod	Ankola	1968	9.51	Mango, sapota, cashew, coconut and guava.
Hichkad	Ankola	1969	2.03	Mango, sapota, coconut & cashew.
Todur	Karwar	1978	7.29	Mango, sapota, cashew, guava, coconut, lime and pineapple.
Manki	Honavar	1977	5.77	Sapota, mango, coconut, lime and cinnamon.
Belke	Bhatkal	1976	18.23	Mango, sapota, cashew, coconut.
Hosur	Siddapur	1966	27.40	Pineapple, coconut, sapota, mango, cashew, guava, areca, pepper
Terkanahalli	Sirsi	1968–69	22.28	Sapota, guava, mango, coconut, cashewnut, pineapple.
Hitlakargadde	Yellapur	1973–74	28.35	Sapota, areca, coconut, guava, mango.
Bachaniki	Mundgod	1972–73	20.25	Coconut, sapota, mango.

1	2	3	4	5
District Horticulture Office Nursery.	Sirsi	1968–69	8.26	Mango, sapota, coconut
Assistant Horticulture Office Nursery.	Kumta	1972	0.14	Coconut, sapota
Assistant Horticulture Office Nursery.	Haliyal	1978	0.45	Coconut, sapota
Assistant Horticulture Office Nursery.	Karwar	1969–70	0.20	Coconut

Development Schemes

The fruit development scheme was started in the district in the year 1956. The soil and climatic condition of this district are best suited for the cultivation of various fruit plants like mango, guava, pine-apple, banana, jack, etc. Under this scheme every year thousands of various kinds of quality fruit plants are being supplied to the cultivators. The area covered under this scheme during 1977 season was 131.35 hectares.

The scheme for establishing progeny orchard/nursery and multiplication of pineapple suckers aims to multiply disease free suckers in progeny orchard-cum-nursery centres and supply the same to the needy cultivator at reasonable rates to extend the area under pineapple crop. The scheme was introduced in the year 1962 at Sirsi, Siddapur and Yellapur centres.

The vegetable development scheme which was commenced in the year 1962 envisages to increase the area under different vegetables and creating markets to provide fresh vegetables all through the year along with popularising both Indian and exotic varieties including hybrid vegetables in the district by conducting demonstration plots and also to supply quality seeds and seedlings. Every year sufficient vegetable seedlings of various kinds are being raised and distributed free of cost. Quality vegetable seeds are sold every year to increase the area and production. Besides number of demonstrations in respect of layout of vegetable gardens and plant protection measures are being laid out every year to educate the farmers. It

is also proposed to bring an area of about 1,000 acres under cultivation. The scheme for development of vegetables in river-bed, tank-bed and in paddy fields aims to utilise the available waste lands in river-beds, tank-beds, and seepage water to grow vegetables in shorter period to boost up vegetable production. It is envisaged to bring an area of about 100 acres every year under cultivation.

The subsidiary food crops development schemes was started in the year 1962 with an object to induce cultivators to take up the cultivation of subsidiary crops like sweet potato, tapioca, yam, diascoria, colocasia, potato, etc., to supplement the food production. high-yielding and hybrid varieties are also introduced every year.

The areca development scheme, was started in the year 1958 in the district aiming to raise quality seedlings and supplying to cultivators and suggesting the mixed cropping pattern in areca gardens to increase the production per acre and also to educate the areca growers to practise improved package of practices. Every year required number of seednuts are being sown in the departmental nurseries at Sirsi, Ankola and Kumta for raising seedlings to distribute among the cultivators. Besides the nursery programme demonstrations are being conducted regarding plant protection measures in the gardens for educating farmers to take up improved package of practices. It is proposed that about 5,000 seedlings will be supplied to the cultivators every year including Mangala varieties of arecanut for high yielding.

The coconut development scheme started in 1958 has the object to raise quality seedlings out of collected seednuts from mother palms with reputed characters. Every year quality seednuts are procured in coastal taluks as per the target from the marked palms to raise quality seedlings. The main variety grown in the west coast 'Tall' is known for its thick copra content and higher percentage of oil. It is planned to distribute about 25,000 seedlings every year so that new areas of 300 to 400 acres will be brought under coconut cultivation. There is a scheme for the maintenance of Agricultural Refinance Corporation Project orchard at Mundgod with an object to maintain varietal collections of coconut. In this orchard there are 180 palms of Tiptur variety, 300 of Kalachi, 89 of NCD and 80 T×D as at present.

The Cashew Development Scheme introduced in 1958, envisages

to bring more area under cashew cultivation by supplying quality seedlings to the cultivators. Suggestion of technical aspects regarding agronomical practices, plant protection measures, etc., are the other objectives. About 50,000 seedlings were distributed annually. There is a Centrally-sponsored scheme for laying out cashew manurial demonstrations to intensify the yield and to popularise the manurial practices among the cultivators. During 1981–82, 75 fertiliser demonstrations and plant protection demonstrations were laid out.

The Cardamom Development Scheme aims to raise quality seedlings and supply to the cultivators on no loss no profit basis, to increase the area under cardamom, suggestive control measures of the katte disease on cardamom and package of practices to increase the per acre production. Demonstrations of fertiliser application and plant protection measures are being taken up in the cultivators, fields. Under this scheme about 10,000 seedlings will be distributed.

The Pepper Development Scheme has been introduced in 1958 with the aim to increase the area under pepper cultivation in the district by advocating planting, recommending package of practices, suggesting plant protection measures and supply of genuine plant material. Every year rooted cuttings are produced and distributed to cultivators. Number of demonstration plots are being laid out to educate the farmers in fertiliser application, improved agronomic practices and effective plant protection measures. The important programme is to introduce the new hybrid variety Panniyur–1. It is aimed to distribute 30,000 rooted pepper cuttings every year.

The objective of the Plant Protection Scheme is to conduct plant protection demonstration on various crops, to educate the farmers to take up plant protection measures in controlling the pests and diseases of various crops thereby to increase the production of different horticultural crops. Under this scheme plant protection chemicals like fungicides, pesticides and plant protection equipments are provided at subsidised rate. It is proposed to cover every year about 5,000 acres under plant protection measures in different horticultural crops.

The scheme for training of gardeners has the main idea to impart practical training in horticulture, covering all horticultural programmes including establishment and maintenance of garden, knowledge of

several pests and diseases and their control. Under this scheme 15 students will be trained every year and a stipend of Rs 100/- will be paid for each student.

The Central sector scheme of Intergrated Development of Western Ghats introduced during 1974–75 aims at the establishment of demonstration and model multi-purpose horticultural farms having an area of 10 acres in a phased manner and development of all plantation crops including spices which are likely to be developed in the Western Ghat region for the benefit of the farmers. During 1982–83, the scheme envisaged the free supply of planting materials for development of one acre orchard such as coconut, areca, cardamom, mango and pepper for covering 230 beneficiaries in all the taluks except Haliyal and Mundgod at a cost of Rs 62,824. Plantation crops and spices are planted in Yellapur farm. Three progeny orchards are maintained at Yellapur, Honavar and Karwar at a cost of Rs 1,20,000.

The Centrally–sponsored scheme for laying out demonstration plots for improved practices in cashewnut, started in 1975–76 to conduct demonstrations in cultivators' plots on cashew and educate on proper package of practices to increase the yield per tree. Under this scheme, 270 demonstration plots were organised since 1975–76.

The scheme for development of Fruit Production (Banana) for export purpose was initiated in 1972. The objectives of the scheme are to conduct Banana Demonstration using export variety Banana (Cavendish) in farmers' fields and to cover additional area to increase production for export purpose. Under the scheme, every year three demonstration plots are organised in cultivators' fields, in addition to supplying of quantity banana suckers. The object of the scheme for organisation Panniyur–I Hybrid Pepper demonstration plot in cultivators' fields for rapid development of hybrid pepper is to conduct demonstration in farmers' fields at departmental cost, to educate the cultivators to take up hybrid pepper cultivation and thereby to increase the area under high–yielding variety. The aim of the Centrally–sponsored scheme for package of practices on coconut started in 1970 is to increase production per unit area through intensive production programme by popularising the package of practices and to enhance the per unit production through organising demonstrations.

The Coconut Refinance Scheme has the object to develop more

area under coconut with the aid of Agricultural Refinance and Development Corporation in the district. The scheme was introduced in the year 1970. Under this scheme long term loan of Rs 4,800 per acre is advanced through Primary Land Development Banks. During the co-operative year 1983-84 a sum of Rs 21.43 lakhs for the development of coconut garden of 190 hectares has been advanced covering eleven taluks.

The scheme for adoption of prophylactic plant protection measures in cashew plantation aims to educate the farmers to take up prophylactic plant protection measures and to boost up the cashew cultivation. During 1982-83, 400 hectares were covered under the scheme. The beneficiary was provided with the cost of chemicals and the spraying charges at the rate of Rs 90 per hectare to take up two sprays at the time of flowering. The scheme for the development of pineapple was recently introduced in the district. The main aim of this scheme is to multiply the pineapple suckers in the progeny orchard-cum-nursery centres which were started in the taluks of Sirsi, Siddapur, Yellapur, Honavar, Ankola and Karwar to the cultivators at concession rates to extend the areas under pineapple.

There is also a scheme for starting of Multi-purpose Horticultural Farms and nurseries by providing infrastructures to the farms like irrigation pumpset, wells and sheds for potting and store. A scheme for Marketing of Fruits and Vegetables is also started in the district with the object to establish Horticultural Produce Marketing Society at Sirsi, Kumta, Bhatkal and Ankola to facilitate the elimination of middlemen who deal in selling Horticultural Produce. There is a scheme for providing general employment for Scheduled Caste and Seheduled Tribe families under sub-plan with the object to extend the benefit of horticulture services, to improve the living condition of the SC/ST people and also to impart the technical know how in the cultivation of horticultural plants, development of fruit orchard is also undertaken. There is also, a scheme to train the sons of small and marginal farmers in horticulture and the training is imparted at Siddapur. Every year the target is to train 15 candidates and a stipend of Rs 150/- per month is also provided.

Special Schemes

The Integrated Scheme for the Development of Western Ghat region is in operation in the district to resort to the ecological balance and to stabilise the income of the people in this area. During

1981–82 three horticultural farms were maintained and six farms were started for propagation of fruit plants. In addition, 54 vegetable demonstrations were laid out, 180 marginal and small farmers were supplied with chemicals free of cost, 450 beneficiaries were supplied with coconut seedlings and vegetable seeds and seedlings, fertilisers and plant protection chemicals free of cost to the janatha houses, 180 beneficiaries were supplied with tools and implements, 270 beneficiaries were supplied with clove, nutmeg and cinnamon seedlings, four each.

The National Rural Employment Programme has the objective to guarantee gainful working opportunities to the rural people. During 1981–82 an amount of Rs 62,700 was spent to maintain eight horticulture farms at Sirsi, Siddapur, Mundgod, Yellapur, Bhatkal. Haliyal and two farms in Ankola. Cultural operations like levelling, bunding, weeding, irrigation, drainage, channel cleaning, excavation of prevention pits, trenches, etc., were attended and 12,542 mandays were generated during the period.

An integrated scheme for the control of black-headed caterpillar has the object to arrest the spread of black-headed caterpillar on coconut which is a serious pest in the coastal belt during summer. It was envisaged to supply the chemical free of cost to control the menace to the small and marginal SC/ST growers and at 50% subsidy to others. Biological control of the pest is also undertaken by releasing parasites. For this purpose, three major and six mini laboratories have been established in the district.

The Special Component Plan is introduced with the object to extend the benefit of horticultural service to improve the living condition of the Scheduled Caste people and also to impart the technical know-how in the cultivation of horticultural crops, besides the free supply of horticultural plants, tools and implements and the development of fruits and coconut orchards.

Under the Package Programme of Banana, four demonstrations have been taken up at a cost of Rs 1,300/- each in Siddapur, Honavar, Supa and Haliyal taluks. Quality planting materials, fertilisers and plant protection chemicals have been supplied under the schemes as per the package of practices to educate the cultivators.

Marketing

There is a horticultural society in the district with a view to

procure genuine plant materials from reputed nurserymen and supply the same to the members of the society and also to others who need plant materials. In addition the society is conducting fruit and vegetable shows every year in the district.

There are five industries connected with the processing of fruits and other products of horticulture. They are (1) Kamadhenu Co-operative Fruit Processing Factory, situated on the Sirsi-Banavasi Road, 16 km away from Sirsi which was started in 1979. But it is not functioning at present. (2) The Varada Fruit Product Pvt. Ltd., is situated at Banavasi. It processes 1½ to 2 tonnes of pineapple per day. (3) The Oriental Canneries and Fruit Processing Factory at Ankola was started in the year 1969–70 under the co-operative sector. It has a capacity of processing two to three tonnes of mango per day and operates only for two or three months in a year. (4) The Analkey Pineapple Processing unit at Mavingundi in Siddapur taluk is a small scale processing unit manufacturing pineapple squash and juice, and (5) There are six small scale coir industry units at Manki, Kumta, Belke, Ankola and Kodibag in Karwar under the co-operative sector. A regular exclusive coir shandy assembles at Honavar every Saturday.

IRRIGATION

Irrigation was an inseparable part of agriculture in ancient Karnataka and Nagavarma II, in the Kannada dictionary *Abhidana Vastukosha* speaks of two types of agricultural lands, *devamatrika* and *nadimatrika,* the former depending upon only rain water and latter on irrigation. Inscriptions also speak of irrigational tanks such as *kere, katte, kola, kunte, samudra, done, hokkarane* (*pushkarani*), etc. The Sanskrit encyclopaedia, *Manasollasa* classifies wells as *kupa* (one without an outlet), *vapi* (with one outlet), and *pushkarani* (with many outlets) and calls a reservoir created by raising a bund across a river or a stream as *tataka.* Canals are spoken of in inscriptions as *kalu, kaluve,* or *baykal,* sluices as *tubu,* bunds as *setu,* and *agali* and *neerottu,* devices regulating flow of water from bunds. The lifting device *yeta* (picottah) is mentioned in a *vachana* of Basaveshwara, and Ranna's *Ajitapurana* speaks of *araghatta ghatiyantra* or the persian wheel. The Kannada encyclopaedia, *Lokopakara,* has a chapter, *udakargala* which speaks of the methods by which water sources can be located. It gives a list of plants, trees, creepers or other situations which indicate the water

source. The earliest irrigational work of Uttara Kannada known from records is of the days of Chutu Nagashri at Banavasi, dating back to the early centuries of the Christian era when a tank was excavated by her. Sinking of wells and tanks was considered a meritorious act. Kings, queens, royal officials and the rich built tanks and other such water storages with the same devotion with which they built temples. The tank at Gudnapur is of Kadamba times. Kadamba Ravivarman granted one *nivartana* of land for preserving a tank and excavating a granary. A levy called *neerukooli* or simply called as *katte* or *kere* or *kaluve* was also levied in certain places for the maintenance of irrigational devices. The Government and the public took equal interest in extending and maintaining the irrigational facilities.

In modern times, irrigation has also become a science and it now covers not only the scientific application of water artificially to the soil to make up the deficiency of moisture necessary for plant growth, but also the investigations, planning, design, construction, maintenance and operation of structure and channels for the conveyance of water. From the sources to the point of application and all related problems including engineering, agronomical, economic and social irrigation also includes research to stable agriculture.

In this district, in the coastal belt and the *malnad* region, where rainfall is high but confined to 3 or 4 months in the year, irrigation is necessary for growing multiple crops during the dry seasons as well as to mitigate occasional short periods of deficiencies, of rainfall at critical crop stages. It has been found that lower the rainfall in any given year, the greater are the chances of drought and famine.

In the district irrigation facility is a necessity for stepping up agricultural production. Mountainous topography of the district does not permit to implement major irrigation projects. This is the main reason for not fully utilising the available irrigational potential. Even lift irrigation is difficult due to hilly regions and unfavourable physical conditions. Even from early times the main source of irrigation were only wells, tanks and other minor resources. The Irrigation ratio for the district during 1982 is 18.8 per cent. The net irrigated area is 20,738 hectares and net sown area was 1,10,145 hectares. The percentage net area irrigated to net area sown was 21.9 in 1971–72, 20.5 in 1975–76 and 18.8 in 1981–82. The percentage of net area irrigated by canals to net area irrigated by all sources was

8.4 in 1971–72 and it was nil in 1975–76 and 1981–82. The percentage of net area irrigated by tanks to net area irrigated by all sources was 50.8 in 1971–72, 65.6 in 1975–76 and 46.6 in 1981–82. The percentage of net area irrigated by wells to net area irrigated by all sources was 13.6 in 1971–72, 14.3 in 1975–76 and 16.9 in 1981–82. The percentage of net area irrigated by other sources to total area irrigated by all sources was 27.2 in 1971–72, 20.1 in 1975–76 and 36.5 in 1981–82.

Minor Irrigation Projects

The minor irrigation works comprise (1) Construction of new tanks including percolation, (2) pick–ups or bhandaras across small streams or rivers, (3) repairs and improvements to existing tanks, (4) desilting of tanks (5) modernisation of tanks and canal systems and (6) lift irrigation schemes. Minor irrigation projects are taken up under various schemes and assistance to the extent of 50 per cent is available by the Centre for certain schemes and in certain other cases the assistance is 100 per cent.

Dharma Project: This Scheme was included in the Second Five Year Plan with a provision of Rs 67 lakhs for the plan period. Actual work was started during the year 1956–57 and the project was commissioned during the year 1967–68. The total cost of the project was Rs 132.94 lakhs. The project consists of an earthen dam across the river Dharma which is sub basin of the Varada river. The dam site is situated at Malgi village of Mundgod taluk. The main purpose of the project is irrigation. The total catchment area is 97.77 sq km and the total water spread area is 6.53 sq km; maximum height of the dam is 22 metres with a gross storage capacity of 23.25 mm^3. The total irrigated area is 611.52 Mcft (khariff) and 294.02 Mcft (rabi). It has got one sluice. By using the water of this project paddy is grown in 5,872 hectares and sugarcane is grown in 102 hectares. The annual additional yield is stated to be 0.002575 million tonnes of food crops valued at Rs 7.73 lakhs. Even though the location of the Dharma project falls within the geographical limits of Uttara Kannada District the irrigational facilities are enjoyed by the farmers of Hanagal Taluk of Dharwad District. The water is harnessed near Yamagalli village of Hanagal Taluk by a storage reservoir.

Bachanki Dam Project: The project consists of an earthen dam across the Bachanki *nala* at Bachanki, 5 km north of Mundgod Town to irrigate the land released to the Tibetan refugees. The work was

started during the year 1969 and was completed during the year 1974. The cost of the project is Rs 1,31,70,940. Seven villages of Mundgod taluk namely Bachanki, Majjigeri, Kop, Kusur, Indur, Nandikatta and Hungund, were shifted to avoid submersion during rainy season. The catchment area is 5.7 sq km and maximum water spread area is 203.15 hectares. The gross capacity of the reservoir is 11.14 MM^3. The maximum height of the dam above the *nala* bed is 23.3 metres. It has got 21.33 metres length spill way on the left flank and 30.23 metres length of flush escape type of waste weir on the right flank. The right-bank canal irrigates 971 hectares (of both khariff and rabi paddy) in Mundgod Taluk.

Attiveri Tank Project : The Attiveri tank project was started during the year 1984 and the work is in progress. The dam site is situated at Attiveri, 16 km from Mundgod town. The project consists of a dam across Ganjigutti nala a sub-series of Bedti river. The catchment area is 36.00 sq km with a storage capacity of 5.4695 MM^3. The total water spread area is 100.97 hectares. The tank has got an atchkat of 350 hectares with a cropped area of 462 hectares. It has got two sluices at chainage of 600 metres and 880 metres respectively. The left-bank canal with a length of 3.53 km irrigates 205 hectares and the right-bank canal with a length of 2.5 km irrigates 145 hectares. The total cost of the project is Rs 18.1958 millions. When the project is completed, the Nelliharvi village of Kalghatgi taluk in Dharwad District and Agadi and Hungund village of Mundgod taluk will be benefited.

Durgadahalla Tank Project : The work was started during June 1984 at Durgadahalla in Haliyal Taluk with a total outlay of Rs 343.15 lakhs. The length of the tank is 1,005 metres with a height of 22.78 metres above the lowest bed level. The total atchkat is 740 hectares and catchment area is 32.29 sq km. When the dam is completed it can hold 5.4738 MM^3 of water. It has got two sluices.

Tanks : Tanks are the major source of irrigation in the district from early days. During the year 1910-11 there were 5,409 tanks for irrigational purposes and 2,708 tanks for other purposes. During 1981-82 the net area irrigated by the tanks constituted 46.6 per cent of the net area irrigated. There were 1,011 tanks as minor irrigation sources with a total atchkat of 15,923 hectares. These tanks irrigate a net area of 9,477 hectares. A statement showing the taluk-wise abstract of minor irrigation sources in Uttara Kannada district is given on page 347 (Classification as on 1-4-1983).

Taluk	Tank with atchkat								Other Minor Irrigation Works		Lift Irrigation Scheme		Atchkat in Hectares Total	
	4 to 20		20 to 40		40 to 200		above 200							
	No.	Atch.	No.	Atch.	No.	Atch.	No.	Atch.	No.	Atch.	No.	Atch.	No.	Atch.
Karwar	20	151	1	24	—	—	1	217	20	507	—	—	42	899
Ankola	8	90	2	54	—	—	—	—	18	421	—	—	28	565
Kumta	27	171	—	—	—	—	—	—	10	435	—	—	37	606
Honavar	20	158	—	—	—	—	—	—	8	237	6	584	34	979
Bhatkal	9	71	—	—	—	—	—	—	28	742	—	—	37	813
Mundgod	136	1,271	33	918	19	1,085	1	345	1	25	—	—	190	3,644
Sirsi	213	1,740	22	600	18	1,197	—	—	18	290	—	—	271	3,827
Supa	33	306	3	87	2	104	—	—	9	223	—	—	47	720
Yellapur	76	679	4	96	—	—	—	—	7	69	—	—	87	844
Siddapur	182	1,215	5	139	1	155	—	—	17	209	—	—	205	1,718
Haliyal	113	1,112	29	817	29	2,013	4	1,108	—	—	—	—	175	5,050
Total	837	6,964	99	2,735	69	4,554	6	1,670	136	3,158	6	584	1,153	19,665

Irrigation Wells: The existing ground water potential available in the district can be fully tapped by sinking large number of irrigation wells. But it is observed that there is not much enthusiasm among the farmers in *malnad* area to sink more wells though plenty of ground water is available. It is observed that not even one irrigation well existed in Supa taluk till 1973 and between 1973 and 1983 only 14 irrigation wells were sunk in Supa taluk. As in 1983, there were 12,732 irrigational wells in the district of which 3,381 wells were fitted with I P sets and 9,811 were operated by other modes of lifts like *yeta*, persian wheel, etc. But *kapile* is not in use in the district for irrigation purpose. A statement showing the number of irrigation wells in the district is given below

Name of the Taluk	*No. of Wells*	*Wells fitted with I. P. set*	*Wells operated by other modes of lift*	*No. of irrigation bore wells*
Ankola	285	170	115	—
Bhatkal	601	333	268	—
Haliyal	19	9	10	26
Honavar	4,804	1,529	3,335	14
Karwar	365	175	190	—
Kumta	6,390	920	5,470	6
Mundgod	29	22	7	4
Siddapur	58	51	7	—
Sirsi	490	132	358	—
Supa	14	3	11	—
Yellapur	77	37	40	—
Total	13,132	3,381	9,811	50

It is stated that 3,527 hectares of land has been irrigated by wells in the district and the average gross area irrigated per well is the lowest in the district, compared to the other districts of the State. It is only 0.2 hectares per well. Majority of the wells were constructed by the farmers with their own funds. About 22 per cent of the wells were constructed through the assistance of Government Land Development Banks and Corporate Banks. Well irrigation is used mostly to raise garden crops like areca in the district.

The detailed Census of irrigation wells conducted during 1968–69,

and 1971–72 showed that mechanical water lifting using electrical and diesel pumpsets are becoming popular. The percentage increase year to year in the number of irrigation pumpsets serviced from 1971–72 to 1981-82 are 18.9 in 1971–72, 12.8 in 1972–73, 8.8 in 1973–74, 6.8 in 1974–75, 5.3 in 1975–76, 5.3 in 1976–77, 5.7 in 1977–78, 7.3 in 1978–79, 7.0 in 1979–80, 9.7 in 1980-81 and 14.5 in 1981–82. The number of irrigation pumpsets serviced per 100 hectares of gross areas irrigated under wells is 70 in 1971–72 and 137 in 1981–82. The number of irrigation pumpsets serviced per 1,000 hectares of gross area sown is 18 in 1971–72, 25 in 1975–76 and 40 in 1981–82.

Lift Irrigation: There are 6 lift irrigation schemes in the district, all situated in Honavar taluk with a total atchkat of 584 hectares. The net area irrigated is 192 hectares.

ANIMAL HUSBANDRY

Animal husbandry is always a supporter of agriculture with its power, manure, etc., supplied by the cattle. Bullocks and he-buffaloes were used as drought animals in ploughing and for carts and asses and bullocks were used as pack animals too. Caravans of bullocks and asses carried merchandise across the ghat sections. People who did not engage in agriculture such as Brahmanas also took to animal husbandry to meet domestic needs. Pietro Della Valle (1623) speaks Brahmanas of a village near Honavar raising cows and buffaloes. The Dutch traveller Linschoten speaks of Goa and its neighbouring areas having plenty of cattle, goats, sheep and pigs. He speaks of buffaloes milk being sold and also that of goats. Barbosa speaks of he-buffaloes and bullocks being used for ploughing.

In modern times, the primary objectives of the animal husbandry sector have been well defined. This sector is to produce improved bullocks for agriculture, to increase *per capita* availability of milk, to make available good poultry, to increase *per capita* availability of eggs, to provide better veterinary aid and to increase the nutritional level of livestock by stepping up production of fodders. There is, in reality, no distinctive breed of cattle in Uttara Kannada. Heavy rainfall and lack of suitable local breeding bulls in sufficient numbers are the main cause for this. The cows and bulls in the district are dimunitive 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 extraordinary power of endurance with resistance to diseases. Due to the low quality of the cattle, the lactative period is 6 to 7 months and the dry period is 7 to 8 months. In rural parts, the farmers spend practically nothing towards their maintenance. They make use of them for cultivation, milk and manure. These animals have been playing an important role in the rural economy of the district. Due to very heavy rains for three months from June to August, cattle can hardly move in the open for grazing and are confined to sheds where they are fed with paddy straw, speargrass and small quantities of green grass. From September to December when the rains have receded, grass is available in plenty and therefore, the animals feed well. After this period, the luxuriant growth of grass disappears and till the onset of the monsoon the feed for cattle is generally poor which leads to deterioration of the stock. Hardly any fodder crops are grown. The hill grass *muli* (or *karada*) is not properly utilized for ensilaging it for fodder. The heavy monsoon causes considerable erosion in the soil and hence it is necessary for the farmer to depend on his cattle for manure. That is why cattle sheds in the district are used as some form of compost pits. A thick layer of green leaves is spread on the floor of the cattle pans over which the cattle are let loose. The excreta and the leaf get thoroughly mixed up and fermented during the long monsoon months. A fresh layer of leaves is spread over the earlier heap once in two or three days. A testimony to the hardihood of the cattle is that they survive this ordeal during the rainy season. Malnutrition and indiscriminate breeding have also been responsible for the degeneration.

In recent years, the awareness to improve the conditions of cattle has set in the minds of the farmers of the district. The measures to be taken towards improvement are controlled breeding, balanced feeding and prevention of diseases. It has been accepted that cross-breeding is the only tool available to the farmers to increase the milk production in the shortest period by using superior germ plasm of exotic bulls. A section of people called Gaulis, who are migrants from Maharashtra, are found settled in considerable number in the forest tract regions, and are engaged in tending cattle and dairying, especially in Mundgod, Haliyal and Yellapur taluks.

Livestock Population

The Census of livestock is being taken every five years. The

following table gives the livestock population in the district as per the Census conducted during recent decades.

Year of Census	*Cattle*	*Buffaloes*	*Sheep*	*Goats*	*Pigs*	*Poultry*
1956	2,73,648	79,110	2,513	3,293	880	3,10,191
1961	2,94,026	84,414	2,783	2,939	729	3,23,450
1966	3,45,881	96,663	3,672	5,977	802	3,44,456
1972	3,70,367	99,802	5,008	9,428	936	4,43,961
1977	3,92,959	97,227	8,060	10,781	1,044	3,38,228
1983	3,97,633	1,02,841	5,724	20,082	2,507	3,97,840

(for taluk-wise figures—1983, see General Appendices at the end).

The percentage increase or decrease in cattle, buffaloes, sheep, goat and poultry is shown below (for the Census year) :

	1961 *over* 1956	1966 *over* 1951	1972 *over* 1966	1977 *over* 1972	1983 *over* 1977
Cattle	+ 7.45	+17.63	+ 7,08	+ 6.10	+ 1.19
Buffaloe	+ 6.70	+14.51	+ 3.25	− 2.58	+ 5.77
Sheep	+10.74	+31.94	+36.38	+60.94	−28.98
Goats	−10.75	+69.34	+57.74	+14.35	+86.27
Poultry	+ 4.27	+ 6.49	+28.89	−23.82	+17.62

The bovine population per square km in 1966 was 43, 46 in 1972 and 48 in 1977. The number of working bovines in rural areas per 100 hectares of gross area sown was 108 in 1966, 122 in 1972 and 128 in 1977. The bovine population per 1,000 human population was 575 in 1966, 540 in 1972 and 500 in 1977. The number of cows in milk per lakh of human population was 5,662 in 1966, 6,011 in 1972, and 5,397 in 1977. The number of she-buffaloes in milk per lakh of human population was 478 in 1966, 575 in 1972 and 822 in 1977. The number of goats per lakh of human population was 777 in 1966, 1,082 in 1972 and 1,100 in 1977. The number of pigs per lakh of human population was 104 in 1966, 107 in 1972 and 107 in 1977, eing the lowest in the State. The number of fowls per lakh of human population was 44,697 in 1966, 50,931 in 1972 and 34,485 in 1977.

Veterinary Institutions

The district had 46 veterinary institutions in 1971–72 comprising of three Veterinary Hospitals, 10 Veterinary Dispensaries and 33 Rural Veterinary Dispensaries along with one key village scheme at Sirsi which worked out to 9,500 heads of bovines per institution. In 1980–81, there were 64 veterinary institutions comprising of three Veterinary Hospitals including one key village scheme at Sirsi with its seven sub-centres, one Veterinary Aid Centre and two Rural Dairy Centres at Bhatkal and Siddapur catering to about 9,000 heads of bovines per institution. In 1982–83 there were three Veterinary Hospitals, 20 Veterinary Dispensaries, 37 Rural Veterinary Aid Centres, one Key Village Scheme including seven sub-centres and two Rural Dairy Centres and three chilling centres functioning, catering to about 8,000 heads of bovine population per institution. In addition there are two artificial insemination main centres at Kumta and Sirsi with seven sub-centres. These institutions, apart from extending veterinary aid to the livestock also play a major role in implementing the developmental schemes.

In 1983–84 there were three Veterinary Hospitals, one each at Karwar, Kumta and Sirsi, 17 Veterinary Dispensaries at Ankola, Gokarn, Honavar, Manki, Bhatkal, Murdeshwar, Siddapur, Harshikatta, Bhairumbe, Banavasi, Vanalli, Mundgod, Yellapur, Manchikeri, Haliyal, Dandeli and Supa, 26 Rural Veterinary Dispensaries at Ghadsai, Harwada, Kekkar, Nagaraballi, Haldipur, Bengre, Herur, Lambapur, Adukatte, Hulekal, Bedasgaon, Salkani, Indoor, Pala, Malgi, Badangod, Kalkeri, Nandoli, Mudangi, Chavatti, Kalche, Arabail, Umachagi, Mavinmane, Murakwad and Belwatgi. Seven Veterinary Aid-Centres at Agsur, Adigon, Hiregutti, Katgal, Kyadagi, Heggarani and Supa, one key village main centre at Kumta, seven key village scheme sub-centres at Ajjibal, Isloor, Nerlavalli, Hegdekatta, Hulgol, Janmane and Hulimalgi, one artificial insemination main centre at Kumta and 28 artificial insemination centres at Karwar, Ankola, Honavar, Bhatkal, Kulve, Golikatta, Katur, Chigalli, Chitgeri, Hungunda, Vajralli, Kirwatti, H. Kop, Dehalli, Idgundi, Kannigeri, Yellapur, Kawalwad, N.S. Kop, Tergaon, Madanalli, Yedegaon, Gundolli, Bhagwati, Alur, Haliyal and Jagalbet. There were two rural dairy centres at Bhatkal and Siddapur and three chilling plants at Haliyal, Kirwatti and Mundgod.

The percentage increase in the creation of veterinary institutions in the district during the years from 1971-72 to 1980–81 was 36.11

in 1971–72, 4.00 in 1973–74, 3.92 in 1975–76, 5.66 in 1980–81 and the years not mentioned, indicate that there was no change.

The following table gives the yearly average number of cases treated in the various veterinary institutions in the district.

Particulars	*1980–81*	*1981–82*	*1982–83*
A. Cases handled at the veterinary institutions :			
No. of cases handled at the veterinary institutions	75,818	74,019	68,504
Surgical operations conducted	293	300	248
No. of castrations perfomed	3,031	2,362	2,705
B. Cases handled on tour :			
Fresh cases handled	8,215	7,912	10,690
Surgical operations conducted	17	75	16
Castrations performed	1,557	1,236	1,598
Total	88,931	85,904	83,761

Mobile Veterinary Clinic : There is a mobile veterinary clinic in the district stationed at Karwar under the control of one Assistant Director. It is well equipped with medicines and utilised to attend fixed centres on tour routes in a week and also outbreaks and emergency cases. During 1982–83 the mobile clinic operated on 107 days, visiting 688 villages and treated 9,161 cases, castrated 126 bullocks and conducted propaganda for insemination, and treatment of sterile cattle in the backward areas is being done by paying visits every week by rotation.

Animal diseases : The common animal diseases in the district are gastro intenstinal ailments like diarrhoea and dysentry, deficiency diseases like milk fever and hypocalcaeimia and Endo-enteritis. Among the contagious diseases Haemorrhagic Septicaemia and Anthrax are the two main diseases generally found in the district. The out-break of Haemorrhagic Septicaemia is found in the beginning and end of monsoons. There are poultry deficiency diseases such as roup, rickets, etc. The mortality of animals from various contagious diseases were 36 in 1980–81 (one from black quarter, 23 from Haemorrohagic Septicaemia and 12 from Anthrax), 31 in 1982

(six from Rinderpest, two from black quarter and 23 from Haemorrhagic Septicaemia) and 54 in 1982–83 (33 from Haemorrhagic Septicaemia and 21 from Anthrax). In addition there were deaths due to non-contagious diseases and the number was 32 in 1980–81 (12 from wild animals, 15 from criminal poisoning and five from natural decay and accidents), 11 deaths in 1981–82 (five from wild animals and six from natural decay and accidents), and two in 1982–83 (one from criminal poisoning and one from natural decay and accidents).

Artificial Insemination : With a view to upgrading the local nondescript cattle and buffaloes rapidly by scientific methods two main artificial insemination centres at Kumta and Sirsi were established with Jersey and Holstein bulls, Murrah and Surti buffalo bulls. There are seven artificial insemination sub-centres at Karwar, Ankola, Bhatkal, Honavar, Yellapur, Mundgod and Haliyal. The semen samples collected were put to various laboratory tests prior to insemination. In addition frozen semen supply is also undertaken. In 1982–83, 591 semen collections were made as against 597 in 1981–82. The total number of inseminations done during 1982–83 was 8,011 as against 8,643 in 1981–82, out of which 4,530 were cows and 3,481 buffaloes as against 5,155 and 3,468 in 1981–82 respectively.

Small Farmers Development Agency

It was felt that the various developments scheme operated in the district did not reach all the sections of the population. In order to help the small and marginal farmers and agricultural labourers, the Small Farmers Development Agency was started in the district during Jan 1971 and in November 1978 it merged with the District Rural Development Society. Animal Husbandry schemes have been taken up under the Agency and identified small and marginal farmers and agricultural labourers were advanced loans through the financing institutions and subsidy was also given by the Agency. The following table gives the achievement of the Agency during the years from 1971–72 to 80–81.

Year	*No. of milch animals given (subsidised)*	*No. of bullock pairs given (subsidised)*	*No. of Model cattlesheds (subsidised)*	*No. of Poultry units given*
1	2	3	4	5
1971–72	539	—	—	17
1972–73	850	—	—	17

1	2	3	4	5
1973–74	1,580	—	—	—
1974–75	2,104	1,763	56	40
1975–76	706	612	39	—
1976–77	188	53	29	—
1977–78	686	830	117	—
1978–79	382	656	106	—
1979–80	362	775	100	—
1980–81	670	864	44	—

District Rural Development Society : The District Rural Development Society which was started in the year 1978 has under it animal husbandry schemes. It is also advancing loans through financial institutions and subsidy to the extent of 25% to small farmers and 33⅓ per cent to marginal farmers and agricultural labourers. The achievement of the society under the animal husbandry sector during the years 1980–81 to 1982–83 are detailed below

	1982–83	*1981–82*	*1980–81*
No. of Milch Animals supplied	4,076	1,840	670
No. of Bullock pairs supplied	2,297	1,954	864
No. of Model cattle sheds	140	121	44
No. of Poultry started by the Government	3	10	—
No. of sheep rearings	47	—	—
No. of beneficiaries trained	—	—	—
No. of Jersey cows supplied	43	—	—

Special Component Plan

The Special Component Plan is a programme under which cluster of villages is selected for assisting farmers belonging to the Scheduled Castes with milch cattle units, buffalo units, sheep units, piggery units, goat units and poultry units. Recently rabbit raising has been introduced by the DRDS. A rabbit farm was established at Sirsi in 1984 at a cost of Rs 5,000. It had 16 male and 16 female adult rabbits at the end of June 1985. Of the 26 bunnies born ten were sold. Assistance for the construction of shelter and

providing feed of animals is also made available. The plan has been introduced in the district during 1980–81 in a phased manner. The plan envisaged a 80 per cent subsidy by the department and 20 per cent of loan from financial institutions. Later in 1982–83 this was modified to 60 per cent subsidy from the Department and a 40 per cent loan to be obtained from the various financial agencies.

During 1980–81, the programme was fully implemented in selected cluster of villages in Ankola taluk. Under the scheme of supply of milch animals, five cross-bred cows under State assistance and eight cross-bred cows under Central assistance were made available, in Ankola taluk. Under the poultry unit scheme an amount of Rs 37,600 was provided under Central assistance for the supply of poultry of 100 birds each. Under the supply of sheep units scheme an amount of Rs 28,000 for seven sheep units was sanctioned to the selected cluster of villages in Ankola taluk and later it was shifted to Haliyal taluk.

During 1982–83 the scheme was in operation in the entire district. An amount of Rs 1,63,800 was spent for the purchase of 21 cross-bred milch cows under the State and Central assistance and were distributed among the Scheduled Caste beneficiaries in selected cluster of villages in the district. Under the supply of milch buffalo scheme, 21 Scheduled Caste families were supplied with 21 milch buffaloes under the State and Central assistance schemes. Under the State and Central assistance schemes, 25 goat units were purchased at Rs 91,280 and were distributed to 25 Scheduled Caste families. Since goat is a hardy animal this scheme is beneficial in the district.

Dairy Development Scheme

Under the Rehabilitation of the Gowli Scheme, three rural veterinary dispensaries in Haliyal, Yellapur and Mundgod taluk were started during 1971–72 and three chilling centres were established in Haliyal, Kirwatti and Mundgod which collected milk and supplied it to the dairy at Dharwad. During 1976–77 two rural dairy centres at Bhatkal and Siddapur were commissioned and one milk chilling unit was sanctioned to the Co-operative Milk Union, Sirsi. The procurement of milk at these two rural dairy centres were 19,830 litres during 1977–78, 49,787 litres in 1978–79, 62,172 litres in 1979-80, 79,940 in 1980–81, 87,412 litres in 1981–82 and 1,22,683.5 litres in

1982–83. One more rural dairy centre has been sanctioned to Karwar during 1980–81.

Western Ghat Development Programme

The Western Ghat Development Programme started functioning in the district from October 1965 with two artificial insemination sub-centres at Kulvi and Goli in Sirsi taluk. During 1975, eight farmers were provided with a subsidy of Rs 2,500 each for growing improved varieties of fodder in their private holdings in not less than an area of two acres by each farmer. Improved varieties of fodder were Hybrid Napier, Dharwad-2 and paragrass. There were other schemes like the free supply of cross-bred bulls to the rural and interior farmers and assistance to buy cross-bred female calves which were started during 1976–77 and continued upto 1979–80.

Applied Nutrition Programme

The programme was started in different blocks of the district in different years under different series and they are Haliyal (1967–68, Series III), Mundgod and Yellapur (1969–70 series V), Siddapur (1971–72, series VII), Bhatkal (1973–74, series X), Kumta (1977–78, XIII) and Honavar (1978–79 series XIV). During 1971–72, the Department of Animal Husbandry and Veterinary Services provided financial assistance of Rs 35,384 to three blocks to start 10 village poultry units. During 1972–73 a sum of Rs 50,504 was allotted to three blocks to start 14 poultry units. During 1975–76, three poultry units at Shirali, Bailur and Muttalli of Bhatkal taluk were established with Central assistance and one poultry unit in Siddapur Block was established at a cost of Rs 2,000. During 1976-77, three poultry units and 27 backyard poultry units were established with Central assistance. Pregnant women, nursing mothers and children in selected families in rural areas were supplied eggs free. Now due to the stoppage of UNICEF aid, the programme has been discontinued.

Other Schemes

There are various other schemes for the development of livestock in the district which are detailed below. For the main purpose of improving the nondescript and uproductive cattle of the district, the Department of Animal Husbandry and Veterinary Services implemented a scheme called the Hill Cattle Development Scheme in 1963. The scrub bulls are castrated to prevent breeding by them and artificial insemination of cows is done with proven bulls semen. There is also an intensive cattle development scheme in operation

with 15 units located in Haliyal, Yellapur and Mundgod Taluks of the district, under the control of the Project Officer, I.C.D S. Dharwad. The units were increased to 19 in 1973-74 and are in operation even during 1982-83. There is one intergrated sample survey scheme introduced in the district, for the collection of statistical data season-wise. This scheme was sponsored by the Government of India on 50 per cent matching basis, with an object to estimate major livestock products. There are 11 Animal Husbandry Extension Officers, one in each of the development block of the district to implement the Animal Husbandry Schemes of the blocks.

Poultry Development

There is a Poultry Extension Centre at Kumta and during 1981-82 the strength of the centre was 1,940 birds as against 1,700 birds in 1982-83. The following table gives the various achievements of the Centre from 1971 to 1982-83.

Year	*No. of eggs produced*	*No. of eggs used for hatching*	*No. of eggs sold for hatching purpose*	*No. of eggs sold for table purpose*	*No. of birds sold for breeding purpose*	*No. of birds sold for table purpose*
1971-72	4,530	401	49	4,080	24	78
1975-76	1,079	—	—	1,079	814	221
1979-80	—	—	—	—	1,251	194
1980-81	—	—	—	—	1,348	16
1981-82	—	—	—	133	1,370	97
1982-83	—	—	—	—	1,294	16

There is a scheme to assist the weaker sections in poultry. During 1971-72, 10 farmers in Honavar taluk were provided with Rs 500 towards 50 per cent of the cost of birds to start poultry units.

Piggery Development

The Piggery development scheme was started in the district during 1973-74, with the following objectives. a) To supply pedigree pigs to private breeders, b) to supply pigs to weaker sections at the subsidised rates, c) to supply exotic pedigree boars to the farmers to take up cross-breeding to upgrade the local pigs with exotic boars, d) to supply clean and wholesome pork to the public, e) to train the personnel who were interested in pig rearing and also

beneficiaries selected under various programmes free of cost, and f) to provide extensive service to private pig breeders. During 1973–74, two boars and two trios were supplied in Bhatkal taluk and in 1974–75, eight boars were supplied in Haliyal taluk to the farmers.

A cattle show was conducted at Gudnapur during 1952-53. There are no recognised slaughter houses in the district. But the Assistant Directors and Veterinary Assistant Surgeons to the district are rendering assistance to the municipalities where their services are required to inspect the meat.

FISHERIES

The term fisheries is applied to the profession of catching any forms of life living in the rivers and seas. The district has a coastal line of 144 km extending from Majali from north to Gorte in Bhatkal taluk to the south and the full length is endowed with rich sources of fisheries. The fishing wealth of the district is estimated to be about four lakh tonnes though the present production is about 1/10th of it. Fisheries contribute about 4.5% of the total income of the district. The coastal line of this district also called the "Mackerel coast" for mackerels are available in abundance. In addition quite a number of varieties of fish are found here (for information on types of fishes available, vide Chapter I, Fauna). Eeven fishes are found in the *gazni* lands. The district has made rapid stride, in the field of fishing during the past 25 years. At present, the production is about 40,000 tonnes, worth about Rs eight crores of which about 700 tonnes of fish valued at about Rs three crores are exported annually. In addition to the long coastal line, it has about 65 km wide contitnental shelf making available about 1,000 square km of fertile inshore area for fisheries besides the vast off-shore and deep sea areas adjoining the district. It has also vast standing water area in the form of brackish water region suitable for mari-culture development near the mouths of the Kali, the Gangavali, the Aghanashini, the Sharavati and the Venktapur rivers.

The resources of fresh water is small. According to fisheries resources, there are 48 major tanks, 1,123 minor tanks and two reservoirs with waterspread area of about 8,000 hectares. The running water fishery is considerable in the waters of the above mentioned rivers.

Fishermen population : Fishing is one of the oldest professions in the district. People belonging to many communities and religions are engaged in both inland and sea fishing. The fishermen belong to the communities of Harikanta, Tandel, Kharvi, Gabits, Ambigas, Boyipagi, Mogers and Agers, Dalji's and Christians. In recent years, people belonging to Dhonikhan, Bandekar, Goud Saraswats, Mesta, Hegde and Gowdas have also taken up this profession. Out of the total population of the district, fishermen form about 5.1% with the total population of 54,763. Of these, 7,367 belong to scheduled caste, 53,263 live in coastal areas and 1,500 in inland areas. Of these, nearly 12,500 are active fishermen. These fishermen are scattered in 118 coastal villages and about 15 inland villages in the district.

Types of fishes : The major portion of fisheries of this coast is made up of sardines, the mackerel, and the other miscellaneous peplagic fishes which come into the inshore during the fishing season. Although, these shoaling fishes appear on the coast with almost clocklike regularity, there are fluctuations in their abundance, which makes fishing somewhat uncertain. Tables on p. 361–362 gives the catch statistics of the important varieties of marine fish in the district.

There are 16 centres for marine fish landing in the district. They are Arga, Bhatkal, Binaga, Chendiye, Gangavali, Karwar, Honavar, Kharvi, Keni, Kodar, Kumta, Majali, Manki, Murdeshwar, Shirali and Tadri.

The tables on pages 363–364 give the centre–wise and month-wise marine fish landing for the years from 1976–77 to 1983–84.

Development of Fisheries

The development of fisheries was taken up in the Second Five Year Plan. In recent years, the development of marine fisheries has generally progressed along the following lines: 1) Increasing the catch by improving and extending the catching of fish in the sea and for this purpose, a) introduction of mechanical powers for fishing and b) introduction of improved fishing year and fishing craft. 2) Improving the utilisation of fish by providing facilities for preservation, processing, distribution and marketing. Ancillary to these programmes of development have been, 3) Setting up of boat building yards for construction of improved types of fishing boats, 4) Training of fishermen in the use of new types of fishing boats and fishing methods, 5) Provision of Harbour facilities and facilities

Different types of fish caught in the district from 1972–73 to 1983–84 (in tonnes)

Type	1972-73	1973-74	1974-75	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81	1981-82	1982-83	1983-84
Sharks	2,198	1,860	1,044	421	391	1,187.0	9,044.0	1,455.8	1,347.4	1,044.2	1,039.0	1,075.4
Skates	—	—	—	192	67	272.7	228.0	548.0	244.2	136.8	114.0	171.9
Rays	—	—	—	—	—	—	228.0	548.0	493.8	233.9	250.6	291.6
Oil Sardine	1,488	1,111	2,034	5,982	3,800	2,363.0	1,549.6	9,145.0	5,798.7	7,878.2	2,901.3	6,285.9
White	66	12	70	67	98	40.0	26.5	145.9	103.2	95.6	286.3	520.2
Enzovilla	—	—	—	—	—	—	—	—	4.0	4.9	267.7	900.1
Other cupids	797	254	157	216	287	171.0	590.9	357.4	1,346.8	1,196.8	1,050.7	1,465.2
Mackerels	3,461	7,422	1,099	12,768	1,869	15,151.0	6,915.6	6,098.8	4,195.4	556.2	526.6	753.8
Seers	298	330	277	329	467	567.0	691.2	877.1	722.0	855.3	1,004.4	945.0
Tuna	—	65	—	74	73	54.0	61.3	116.2	59.1	165.4	352.2	446.2
Lactarices	307	198	64	99	100	468.0	460.7	496.2	582.6	722.8	953.8	1,495.6
Silver Belly	353	105	154	27	202	93.0	214.1	773.2	660.7	536.3	620.1	1,219.3
Garros	105	—	27	229	173	135.0	137.5	86.8	95.6	18.5	12.6	15.2
Cyaniodes	—	5	702	616	624	609.0	885.5	1,781.6	1,416.7	1,548.6	1,693.3	2,665.8
Pomfrets	88	32	108	32	121	960.0	213.7	225.9	380.1	208.7	673.1	507.5
Ribbon fish	10	5	25	27	40	1,731.0	772.1	168.6	223.7	185.5	286.1	261.0

Type	1972-73	1973-74	1974-75	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81	1981-82	1982-83	1983-84
Silver bar	—	14	31	100	376	214.0	196.6	516.3	416.6	247.0	120.8	154.0
Cat fish	473	467	430	562	412	1,317.0	1,033.7	1,565.5	1,321.8	1,914.1	1,902.0	1,071.1
Red Mullet	198	122	213	390	328	183.0	192.9	353.2	449.4	200.0	301.3	332.3
Karangids	—	—	36	221	209	214.0	311.2	222.7	102.2	260.2	196.7	270.3
Flat fish	—	—	6	51	39	269.0	103.0	835.1	411.0	175.4	296.4	440.0
Scales	150	268	—	—	—	—	—	—	30.0	—	52.3	10.0
Lady fish	246	196	261	471	326	244.0	273.0	321.9	447.1	234.8	243.1	262.1
Prawns	926	1,250	1,906	2,077	2,437	5,165.0	2,263.0	2,041.8	1,802.2	1,541.0	3,455.7	2,966.9
Crabs	60	21	52	45	42	43.0	25.2	97.6	83.5	149.4	79.4	247.2
Shell fish	560	290	204	130	422	363.0	726.9	2,309.8	2,140.3	801.2	730.4	432.8
Miscellaneous	4,587	7,138	5,508	5,502	8,760	17,502.0	12,165.8	14,957.1	9,380.1	9,961.2	8,586.2	10,175.3
Total	16,370	21,165	14,408	30,618	21,592	49,291.7	30,942.4	46,147.5	34,258.2	35,872.1	27,996.1	35,381.6

Centre-wise maraine fish landings in Uttara Kannada District during the years from 1976–77 to 1983–84 (in tonnes)

Fishing Centre	1976-77	1977-78	1978-79	1979-80	1980-81	1981-82	1982-83	1983-84
Arga	425	2,067	572	811	395	297	152	157
Bhatkal	345	1,769	4,260	3,573	3,554	7,055	3,671	5,927
Binaga	504	3,128	1,096	1,119	375	396	201	255
Chendiye	3,597	5,926	2,507	1,677	463	217	257	180
Gangavali	179	397	305	449	423	310	309	430
Harwada	422	699	456	502	417	391	308	443
Honavar	6,205	6,227	4,071	10,130	5,724	6,312	3,221	6,821
Karwar	1,512	17,015	7,500	12,298	9,659	10,376	10,845	11,893
Keni	602	913	715	730	718	1,014	878	1,108
Kodar	847	962	630	1,129	419	287	336	333
Kumta	468	428	428	2,308	2,741	1,703	1,989	1,618
Majali	1,169	1,984	1,853	1,506	796	830	775	1,004
Manki	55	295	456	306	170	127	128	103
Murdeshwar	132	489	523	438	383	431	601	553
Shirali	2,236	2,025	1,605	2,297	2,763	1,643	1,979	2,781
Tadri	2,894	4,967	3,965	6,875	5,258	4,486	2,351	2,175
Dt. Total	21,592	49,291	30,942	46,148	34,258	35,857	28,001	35,381

Month-wise fish landings in Uttara Kannada District from 1976–77 to 1983–84
(Quantity in tonnes–Value in Rs in lakhs)

Month	1976-77		1979-80		1981-82		1982-83		1983-84	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
April	895	11.58	3,206	56.08	3,601	63.68	2,110	53.22	3,063	129.19
May	786	10.17	2,623	43.45	2,175	48.02	1,760	46.59	2,145	88.02
June	277	4.88	1,346	28.72	461	11.97	583	18.30	450	15.26
July	496	6.42	1,548	46.09	838	23.75	646	26.72	521	27.27
August	876	11.34	1,554	33.59	825	20.00	584	34.30	770	55.94
September	2,490	32.22	3,137	51.08	4,893	134.00	3,177	119.48	3,629	135.46
October	3,787	49.12	4,768	46.04	4,467	83.56	3,654	89.59	4,667	142.52
November	1,957	25.33	6,249	67.13	4,688	74.75	3,071	84.14	4,404	81.24
December	2,162	27.98	6,986	73.23	4,537	89.30	3,316	108.59	3,122	80.58
January	3,484	45.10	5,940	72.20	3,679	107.35	2,948	125.37	3,861	124.46
February	2,057	26.60	4,539	53.22	2,736	67.34	3,354	133.06	5,784	141.33
March	2,025	28.80	4,252	47.95	2,975	69.81	2,798	118.91	2,965	114.37
Total	21,592	279.54	46,148	618.78	35,875	792.53	28,001	958.27	35,381	1,135.64

for landing of fish, fish handling, berthing of boats, boat repairs, transport and marketing of fish, etc., 6) Survey and location of fishing ground in new areas and evaluation of better fishing gear and craft through design and experiment and 7) Building up of a stronger and better man-power organised by the industry through socio-economic betterment of the fishermen by means of education, rehabilitation, co-operation and financial assistance.

Though the district has vast continental selve with huge fishing resources, the fishing operations could not for obvious reasons be extended to the deeper waters. With a view to exploit the untapped resources, mechanisation of fishing in the district was started in 1959 with the introduction at the first mechanised trawler in the private sector at Karwar.

In the first phase of development, the State Government allotted 135 trawlers to trained fishermen groups. In the second stage, 55 imported and indigenous engines were provided to the trained fishermen groups on loan-cum-subsidy basis. In the third stage between 1967 and 1969, 100 numbers of 30 feet mechanised boats were allotted to trained fishermen groups with 50% subsidy through the North Kanara Co-operative Fish Marketing Federation at a cost of Rs 43 lakhs under Agriculture Refinance Scheme. In the Fourth Plan, payment of subsidy on indigenous marine diesel engines and introduction of institutional finance through banks was introduced. Individual boats numbering 209 have availed the subsidy, by the end of 1982–83. There were 850 trawlers of which 190 were My boats, 100 boats of the Federation and more than 500 financed by banks. This has helped to a great extent the exploitation of prawns which is in high demand for export.

Mechanised boats for fishing, shoaling fishes like mackerel and sardines started in 1975–76 with the introduction of two Purse-seine boats. During 1983-84, there were 108 Purse-seine boats owned by Rampani fishermen and others. One Purse-seine boat has been allotted exclusively to Scheduled Caste fishermen of the Ager community in Karwar taluk. The introduction of Purse-seine boats has helped the increase in fish production of the district, besides making fish available throughout the fishing season.

Schemes have also been introduced to convert the traditional boats into mechanised boats by providing out-board and in-board engines and nets. The scheme of mechanised gill-net was introduced in

1980–81. As in 1983–84, there were 420 mechanised gill-net boats in the district. The introduction of this gill-netting has helped the increased production, quality table fishes such as seers, pomfrets and sharks. The following table gives the number of trawlers, Purse-seines and gill-nets in the district during the years from 1975–76 to 1983–84.

There were three trawlers in 1961–62, 44 in 1964–65, 141 in 1967–68, 308 in 1970–71 and 336 in 1973–74.

Year	*Trawlers*	*Purse-seines*	*Gill-nets*
1975–76	369	2	—
1976–77	371	12	—
1977–78	418	15	—
1978–79	484	40	—
1979–80	492	55	—
1980–81	538	64	66
1981–82	538	91	260
1982–83	652	108	410
1983–84	744	108	410

Inland Fisheries

With the preponderance of marine fisheries in the district, the inland fisheries occupy a secondary place. There are 48 major tanks, 1,123 minor tanks, two reservoirs and five major rivers which are used for fishing purposes. The table on p. 367 shows the inland fisheries resources.

These inland resources yield valuable estuarine fish and shell-fish. Usually carps are found in these sources. The other fishes found are *Labeo calbasu, Labeo fimbriatus, Barbus conirostris, Barbus carnaticus, Barbus kolus, Barbus mache cola, Barbus labecula, Barilius species, Ophiscephelus marulius, Ophiscephelus striatus, Mystus species, Callichrous species* and *Masta combelus armatus.*

In the estuaries, mullets, Indian whiting, etroplus and chanos may be found. In recent years, fry and fingerlings of major carps like catla, soha and mrigal have been obtained and stocked. Special mention may be made of the exotic fish *Tilapia mossambica* which is thriving and breeding profusely. The *gourami* has also come to stay. The inland fisheries serve to supply fish to the interior places where marine fish does not reach regularly. The work of inland fisheries

Table showing the inland fisheries resources in the Uttara Kannada District as in 1983–84

Name of the taluk	*Large Tanks*				*Small Tanks*				*Area of reservoirs in hectares*	*Length of rivers (in km)*
	Tanks with water throughout the year		*Tanks where water is available for a short period*		*Tanks with water throughout the year*		*Tanks where water is available for a short period*			
	No.	*Area in hectares*	*No.*	*Area in hectares*	*No.*	*Area in hectares*	*No.*	*Area in hectares*		
Ankola	—	—	—	—	5	0.80	9	1.21	—	52
Bhatkal	—	—	—	—	—	—	21	4.36	—	45
Haliyal	7	125.30	—	—	36	128.00	130	176.00	—	60
Honavar	2	23.93	4	50.44	2	12.16	13	73.73	—	42
Karwar	2	70.00	—	—	87	2.05	5	7.50	—	45
Kumta	—	—	2	27.14	1	5.21	24	137.82	—	51
Mundgod	8	295.80	15	237.60	9	32.12	159	308.85	1,182.00	—
Siddapur	2	32.23	—	—	90	60.25	188	31.41	—	80
Sirsi	4	114.32	1	16.80	132	177.19	114	98.68	—	83
Yellapur	1	23.00	—	—	38	125.82	60	55.89	4,443.96	45
Total	26	684.58	22	331.98	400	548.68	723	895.45	5,625.96	503

in the district is mainly exploitation of tanks and direct fish production and disposal of fishes by auction. At present, the fish seeds are brought from outside districts and supplied to Panchayats and Co-operative Societies. A fish seed production centre is being constructed at Bachaniki in Mundgod taluk.

Fishery Survey Unit

The Fishermen Training Centre at Karwar has been converted into fishery survey unit. It has conducted exploration survey of fishery resources around Karwar. This survey has helped the successful introduction of Purse-seines in the district in a short period.

Mariculture

A mariculture unit was sanctioned to this district during 1974-75 with the aim of surveying and popularising brackish water fish culture. The unit has completed the survey of all the available brackish water resources. There are about 3,240 ha of *khar* land area of brackish water found suitable for rearing of prawns and brackish water fishing. A brackish water fish farm is constructed in an area of 11 ha at Kanasgiri in Karwar taluk. The unit has also conducted prawn culture experiments in private fields to demonstrate prawn culture in order to encourage private fishing farming. In addition, two more new Central plans have been sanctioned to this district.

Applied Nutrition Programme

The Applied Nutrition Programme was implemented in the taluks of Haliyal, Sirsi, Siddapur, Mundgod, Honavar and Yellapur taluks. In these taluks, demonstration of fish culture and feeding programmes were undertaken. In Honavar, light mechanised boats were supplied to fishermen at concessional rates under the scheme. The fish caught under this scheme was distributed to the feeding centres in Sirsi, Honavar and Kumta taluks.

Fishing Methods

Sea fishing has been perfected in the course of hundreds of years. The most common methods of catching fishes from the sea on this coast may be classified as,

1) Gill-net fishing: a) Drift gill-nets, b) Set gill-nets and c) Encircling gill-nets. 2) Seining: a) Shore seines big and small and b) Boat seines. 3) Cast-net fishing. 4) Hook and line fishing. 5) Fishing by traps and other devices.

Gill-net fishing : In the gill-nets, the fish get caught in the mesh of the net. In the attempt to free itself, the twine ships under the gill cover and the fish gets caught. These nets are rectangular in shape and a series of nets are tied end to end and made to hang in the water. The size of the mesh varies according to the type of fish to be caught. There are various kinds of drift nets used in the district. Set gill-nets are anchored and are not allowed to drift. Like drift nets, they may be operated at a surface or at the bottom. The encircling gill-nets known as *pattabale* is commonly used for catching mackerel. Two canoes are generally required for its operation, but a large number may combine.

Shore seine : The *rampani* net which is a large shore seine is widely in use along the coast. It is a long rectangular net somewhat deep 9 to 10 inches in the middle and tapering towards the ends to six metre and made up of number of pieces which may be as many as 700. The pieces in the middle have very small measures which gradually increases towards the extremities. The head of the net is floated with wooden floats and the bottom is weighted. A thick coir rope about one km long is attached at each end for hauling the net 60 to 80 people are required for its operation. This net has a great catching power and catches all kinds of fishes covering within its range. A good haul may be about 100 tonnes and one operation may fetch one lakh rupees of more. A small shore seine known as *kairampani* is operated when small hauls are near shore. The *kairampani* is often operated in seasons during the monsoon months and at places when the big *rampani* cannot be operated.

Boat seine : This is a large circular bag-net generally made of hemp, with a long wing of coir-rope netting attached on either side. The mesh varies from ½ inch to 1½ inches. This is locally known as *maribale*, or *ghorbale*, for catching shoaling fish like cat fish, mackerel and sardines.

Castnet fishing : The castnet (*beesu bale*) is a universally employed fishing gear in the sea as well as in the rivers and tanks. It would be difficult to find a fishing family which does not own a cast net. It is operated from the shore as well as from a craft. It has many variations differing from one another in size of the meshes, diameter of its circle and weights at the periphery. Some of the cast nets are quite large and may be as big as 40 feet in diameter.

Hook and line fishing : Suspending a baited hook at the end

of a line and enticing and catching fish, which when trying to swallow the bait get hooked is an ancient method of fishing followed by professionals as well as amateurs.

Long line fishing : A long line to which are attached 200 to 1,000 hooks baited with flesh of eal, sardine, mackerel and other selective fish are set in the sea at known fishing grounds. The fish caught by this method are chiefly cat fish, sharks, sags, shales, seer, carrangids and small jew fish.

Angling : Fishing with leaded line armed with one or more hooks just above the head is practised to a limited extent during the leisure hours of the fishermen, mainly to get their daily needs of fish. Anything with a rod and line is common in the back waters, rivers and ponds.

Trawling : Trawling consists of dragging a bag-net along the bottom of sea. The water is strained through the meshes of the moving net and the fish are caught in the key. The mouth of the net is kept open with a device which consists of two boards, one on each side which when dragged through the water tend to move apart. These boards are called the otter boards and the method of fishing is called otter trawling.

Basket traps are used to catch fish in flowing water in small irrigation ditches, inlet and outlet channels of tanks, surplus drains, etc. The plunge basket is again a type gear which is widely in use. It is used to catch morals, claris and other mud fishes in very shallow areas. The cast net, the rod and line, the basket trap and the plunge basket, require only one person to operate whereas other gears required two or more persons. The materials for fishing nets, have undergone a considerable change and synthetic materials like nylon, polyester, polypropylene, etc., are being used for fishing nets lines and cordage in addition to cotton threads. With the expansion of Purse-seining, the use of machine made bebbing has not only become necessary and acceptable but the demand for it has also been on the increase.

Fishing craft

The traditional and most common fishing craft in use on the coast is the dug-out canoe which ranges in length from four metres to eleven metres. It is made by scooping out wood and shaping from a single log of wood of suitable length and so the name is given. The large

canoes may be provided with a top strake of wooden plank to increase the depth. The canoe is propelled by ore or sail and is used in all indigenous fishing gear in the sea as well as in the estuaries and back waters. Some may be operated with an outrigger. Attempts were made at the beginning of Second Plan to motorise the canoe with inboard engines but without much success. In recent years, attempts have been made to motorise them with kerosene as fuel without board motors. The fishing craft used for the operation of the Rampani nets is larger and plank built provided without riggers. The catches made by the mechanised boats and non-mechanised boats and their value for the year 1982–83 are as follows: Mechanised boats 20,563 tonnes; non–mechanised boats 7,431 tonnes; total value Rs 9,58,28,160.

Utilisation and Curing

Until about a quarter century ago, only about 30 to 40 per cent of the fish landed on the coast used to be consumed fresh and more than 50% used to be salted and sun-dried which were the chief methods of preserving fish. The Government aimed at the development of fisheries in directing towards providing facilities for preserving and storing fish and for quick distribution. Besides supplying salt at subsidised rate at the Government fish curing yards, ice plants and cold storages all along the coast was first set up by the Government followed by the co–operatives and private sectors for which the Government provided incentives by way of subsidies has changed the pattern of utilisation of the sea fish. The present pattern of utilisation of the sea fish is that about 60 to 65 per cent is cured and sun-dried, five to eight per cent frozen, 0.5 to 1 per cent canned, three to four per cent converted to manure and three to four per cent used for miscellaneous purposes.

Sun Drying: Some fish which have small and thin body tend themselves to preservation simply by drying in the sun. Small prawn, ribbon fish, mullets, soles, silver bellies and white bait are preserved in the manner. *Salt curing:* Curing of fish with salt constitutes one of the most important methods of preserving fish on this coast and a large proportion of the catch is preserved by this means. The easy availability and storability of salt add plenty of sunlight and the difficulty and expense of providing other means of preservation at the fish landing centres makes salt curing economical and inevitable. There are fifteen fish curing yards situated in the vicinity of major fish landing centres. *Dry curing:*

Large fishes such as seer, pomfret, cat fish, jew fish, purches, etc., are slit through the dorsel line. The vertebral column is severed from the depth of the fish, but not detached. This operation makes this fish wide flat. Cuts are then made length wise on the thick fleshy part. *Wet curing :* This method is called "Ratnagiri curing" or "Karvahi curing". Large-sized fish are split and cleared before they are treated with salt. Ordinarily one maund of salt is required for every three maunds of fish. On the first day half of the quantity of salt is rubbed on the cut surface of the fish and then stacked in quadrangular heaps up to a height of a metre. The small-sized fish are merely treated with salt and heaped up. On the second day, one half of the remaining salt is rubbed in and the fish is so restacked that the top fish comes to the bottom and *vice versa.* On the third day, the remaining salt is supplied and the fish are restacked again. The fish becomes fit for export in about a week. *Colombo curing :* The fish like mackerel and seer are pickled, the method which goes by the name of Colombo curing or *jadi* or pickling. Along with the salt an acid fruit called Korkapulli is used and this gave the fish a distinctive flavour.

International Projects and Centrally-Sponsored Projects

Under the International Project Scheme, 1,160 metres long wharf, ice plant and cold storage, auction hall, boat building yard and training centre were constructed at Karwar during the period, from 1962-72 at a total cost of Rs 25 lakhs including the Centrally-Sponsored Scheme. Harbour and shore facilities are being provided at Kasarkod at a total cost of Rs 7.5 lakhs. To develop infrastuctural facilities for fishing, a scheme at Tengingundi and Alvekodi of Bhatkal taluk was introduced at a cost of Rs 26.12 lakhs. Under this scheme, approach roads, modern curing and drying yards, service stations, workshops, ice plants, community building and insulated tractors have been provided.

Indo-Denmark Project

The Government of Karnataka with the assistance of the Denmark Government has started a Project at Tadri to improve Tadri fish landing centre keeping in view the social and economic upliftment of poor traditional fishermen and their families. The aim of this Project is to support mechanisation and modernisation in fishing and processing by supporting the use of new methods and technologies. The project also aims at increasing the average income of the

fishermen from about Rs 3,200 to about Rs 5,400 and also create employment in the fishery sector to about 3,500 jobs. The central place is located at Tadri and Belekeri, Keni, Gangavali, Dabbanashashi, Kagal Hini, Kumta, Mirjan and Betkuli are included for getting benefit out of this scheme. Under this scheme, 50 country boats will be mechanised and 200 gill-netters are provided with fishing accessories and 20 Purse-seine boats will be made available. It is proposed to construct a 250 metre length fishing Harbour at Tadri for the mechanised boats to halt. In addition, 155 metre length brack water for obstructing sand to enter the port, a slipway and a big hall to auction the fish will be constructed.

A 45 tonnes per day capacity ice plant, a storage to preserve 100 tonnes of ice, a freezing house to store 100 tonnes of fish processing centre will be constructed under this scheme. In addition, facilities will be provided to store 300 tonnes of freezed fish. Facilities like ice vans and refrigerated cabinets will be provided. The workshop will also be provided to repair boats. An experimental boat building centre will be started to find out the feasibility of using cement, iron, fibre glass, etc., instead of wood to construct fish boats. Tracing will also be imported in various aspects of fishing. Houses will be constructed to about 500 houseless fisheries families. According to previous estimates, the total cost would be Rs 6,38,00,000 out of which the assistance from Denmark Government would be Rs 5,32,50,000. After the completion of this project, it is expected that there will be all-round development of fishermen around Tadri.

The administrative set up will be headed by a steering committee consisting of a panel of six members appointed by the Goverment of Denmark and the Government of Karnataka. This committee is the highest policy decision making body. There is also an Executive Committee of six members appointed by the steering committee. The associated parties of the Project are the Co-operative Society at Tadri and the Karnataka Fisheries Development Corporation Ltd. The project carries out a number of innovations and experiments which may gradually spread to the fisheries sector in other parts of India.

The scheme has a training programme also in the following items under this project. a) Boat building in wood, fibre glass and ferro-cement. b) Out-board and diesel mechanic. c) Fishing gear

technology. d) Operation and handling of out-board powered dug-out canoes. e) Processing and handling. f) Seamanship, navigation, first-aid running cost and g) Economic management and marketing.

Indo-Norwegian Project

The Indo-Norwegian Project in Karwar is one of the major projects taken in Karnataka for Fisheries Department. The project site is located on the western side of the Baithkol Cove on the leeward of the big hill getting into the sea and known as "Karwar Head". This scheme was taken up from first November, 1962 in accordance with the III supplementary agreement entered into between the United Nations and the Governments of Norway and India. The agreement came to an end on 31st March 1967 and was further extended upto 31st March, 1972 to complete certain schemes taken up for execution. The main programmes under the scheme are: 1) Exploratory and experimental fishing. 2) Construction of fishing harbour. 3) Establishment of Fishermen training centre. 4) Construction of ice, cold storage and freezing plant. 5) Setting up of boat building yard with workshop and servicing station. 6) Construction and supply of mechanised fishing boats. 7) Organisation and development of efficient marketing system.

Exploratory fishing : The exploratory fishing was carried out by the Exploratory Fishing Unit of the Indo-Norwegian Project with a 43′ boat of the State Government and two smaller boats constructed by the project. At present, the exploratory fishing is mainly being carried out from the project headquarters at Ernakulam with bigger vessels.

Fishing harbour : With a hundred per cent grant from the Government of India under the Centrally-sponsored scheme, the construction of fishing harbour at the project site, Karwar, was taken up. After the dredging work is completed, mechanised boats and deep-sea fishing and trawlers upto about 70′ can be berthed along this warf. This harbour can be advantageously utilized as a base for deep-sea fishing vessesls during all seasons of the year. Apart from the deep-sea fishing trawlers, about 150 to 200 mechanised boats of 30′ to 43′ can be operated. The catches landed by the mechanised and deep-sea fishing trawlers can be handled in the auction hall.

Fishermen Training Centre : The fishermen training centre under the project was opened in January 1964 to train the fisher-youths

in different aspects of mechanised fishing i.e., navigation, seamenship, operation of mechanised boats, improved method of fishing, construction of nets, first aid, etc. Refresher course for instructors of the fishermen training centres of Karwar, Honavar, Gangolli and Mangalore was conducted during May and June 1967. The Purse-seine net given under Norwegian aid to the fishermen training centre was operated with 36′ M boat off Tadri port from 12th January to 12th February, 1970 for the first time on this coast successfully. This operation is being continued along the coast of this district by the Karwar training centre.

Ice cold storage and freezing plant : The ice cold storage and freezing plant has a capacity of producing 15 tonnes of ice per day, 70 tonnes of ice storage, 50 tonnes of chilled fish storage and 50 tonnes of frozen fish storage. This plant utilized by the North Kanara District Co-operative Fish Marketing Federation and the Fisheries Development Corporation. They are freezing prawns and exporting to United States of America, Japan, etc. Fresh mackerels, seer fish etc., are frozen and sent to hinterland.

Boat building yard: The construction of the boat building yard was commenced from July 1966. The machineries for the workshop received under Norwegian aid were installed and put into operation in July. 1967. A servicing station is attached to the boat building yard. This yard is now under the control of the Fisheries Development Corporation.

Under the Norwegian aid, 38 marine diesel engines were received and 38 numbers of mechanised boats of 28′ to 43′ 6″ size were constructed and supplied to the trained fishermen groups. One refrigerated van and one truck are made available for fish transport. At important fish consuming centres, the refrigerated fish holds of one to three tonnes capacity were purchased.

Deep Sea Fishing

The Government has transferred to the Fisheries Corporation, two 57′ deep sea fishing trawlers of which one is being operated with Karwar as base. The total expenditure incurred on the project is about Rs 120 lakhs. The activities generated by the project had the most telling impact on the fishing community. The development of the harbour facilities under the project has made it possible for Karwar to be the base for the operation of the large fishing vessels.

Other facilities

With the introduction of mechanised fishing, facilities have been provided for landing and berthing of mechanised boats at several places on the coastal line of this district under the Crash Programme at places like Sadashivgad, Karwar, Ankola, Honavar, Belekeri, Keni, Tadri, Kagal Hini, Tengingundi and Bhatkal. Auction halls have been constructed at Karwar, Keni, Tadri, Honavar, Tengingundi and Bhatkal and Centrally-Sponsored Schemes and Indo-Norwegian Project. Roads have been constructed for quick transport of fish to avoid perishing at different places all over the coast. Till 1983-84, 44 fishing roads with a total length of 68 km a cost of Rs 16 lakhs have been completed (see also Chapter VII for details). Insulated trucks and delivery vans have also been financed for transporting fish.

Preservation

In the beginning, the Government established fish curing yards along the coastal line, providing facilities for curing and drying of fish. There are 15 fish curing yards at Majali, Karwar, Binaga, Arga, Chendiye, Kodar, Harwada, Keni, Gangavali, Kumta, Honavar, Manki, Murdeshwar, Shirali and Bhatkal. To preserve the fish in fresh condition and for export, ice plants, cold storages. freezing plants and freezing storages were installed. The first ice plants in the private sector were put up at Chendiye and Belekeri and later all along the coast, on important landing centres. As in 1983–84, there are 17 ice plants, five cold storages, three freezing plants and three frozen storages. To encourage construction of these plants, the Government has assisted in the form of subsidy. Recently, 'the Karnataka Fisheries Development Corporation has started a large fish manure factory. In addition, there are many traditional small fish manure and oil extraction plants functioning in the district.

Marketing

The municipalities, Village Panchayats and Fisheries Co-operative Societies have been assisted by the Government under a scheme to give marketing facilities at important fish consuming centres. Under this scheme, subsidised loan has been given for construction of markets at Ankola, Haliyal, Kumta, Shirali, Amdalli, Chitakul, Hegde and Binaga. In 1983–84, the local bodies have been given financial assistance to construct a modernised fish selling stall at Karwar and fish marketing centres at Bhatkal and Kaikini. Under this scheme, a sum of Rs 2.62 lakhs have been spent.

Introduction of mechanised fishing and scheme for the ice plant processing unit and preserving unit have helped to make ready the locally available fish for export. Prawns and some varieties of fishes such as mackerels, seers and pomfrets are processed and exported from this district since 1973. The following table shows the fish catch and their value for the years from 1956–57 to 1983–84.

The table showing the fish catch and their value for the years from 1956–57 to 1983–84

Year	*Quantity of fish caught in tonnes*	*Value in Rs*
1956-57	10,050.0	—
1957-58	19,630.0	—
1958-59	24,000,0	—
1959-60	16,800.0	—
1960-61	27,200.0	1,07,50,000
1961-62	9,538.7	45,86,792
1962-63	60,230.5	21,09,343
1963-64	63,517.5	1,80,66,554
1964-65	48,749.1	1,42,09,275
1965-66	42,650.5	1,70,60,000
1966-67	45,762.5	1,75,77,684
1967-68	32,739.2	1,21,07,440
1968-69	36,563.0	1,44,87,080
1969-70	48,398.0	2,59,63,218
1970-71	60,720.0	2,35,82,280
1971-72	56,110.0	2,56,38,060
1972-73	16,370.0	78,75,397
1973-74	21,165.0	2,35,15,364
1974-75	14,408.0	1,67,91,000
1975-76	30,618.0	3,35,74,343
1976-77	21,591.8	2,61,57,262
1977-78	49,296.6	4,69,68,865
1978-79	30,942.4	3,80,89,605
1979-80	46,147.5	6,18,78,802
1980-81	34,258.2	5,49,91,125
1981-82	35,871.2	7,92,50,786
1982-83	27,996.1	9,58,28,760
1983-84	35,381.6	11,35,63,590

The percentage increase (+) or decrease (−) over the previous years in total fish catch for some years in the district from 1971–72 to 1981–82 is as follows: −7.50 in 1971–72, +300.15 in 1975–76. −62.85 in 1976–77, +128.60 in 1977–78, −37.13 in 1978–79, +48.96 in 1979–80, −25.46 in 1980–81, and +4.57 in 1981-82.

Special Programmes

Under a new scheme called "Sagara Deepa", the State Government has provided share capital to the fisheries co-operative societies and the Federation. Likewise, it is planned to provide financial aid to traditional fishermen for purchasing fishery equipment. The Government has sanctioned a special insurance scheme to the fishermen involved in accident and disasters through the local co-operative societies. A scheme has been implemented for the availment of Rs 15,000 to the distressed member or his near relatives at a low premium under this scheme and it is expected that 14,000 members of the fisheries societies will be benefited.

Pelagic Fisheries Project

An FAO/UNDP supported Pelagic Fisheries Project based at Cochin covered this district also in its survey of pelagic fisheries resources as a result of which the mackerel and oil sardines resources have been estimated and additional resources of anchovites, horse mackerel, etc., have been identified. This new knowledge is expected to help in further expansion of the fishing industry in this district.

State Assistance

Government investment in the development of fisheries in the district through the Five Year Plans has been characterised by the grant of liberal assistance for expansion of fishing, fish processing, transport and marketing apart from the money spent on infrastructure like harbour facilities, ice and cold storage facilities, training and educational institutions. The expansion of mechanised fishing was made possible in the initial years by the Government by constructing the boats and giving them on hire purchase, treating a part of the cost as subsidy and balance as loan. This enabled the fishermen to own boats without having to make initial investments and to repay the cost through their earnings through the boats. The commercial banks in the State have also assisted this industry in a big way. This has been further helped by the availability of refinance facilities from Agricultural Refinance and Development Corporation. Rapid expansion of Purse-seining in the State in recent

years also was made possible by the banks coming forward to give loans while the Government supported with subsidies. The Government assistance has also been given in the form of grants and loans through co-operatives to enable fishermen to buy synthetic material like nylon for fishing nets.

Fishermen Co-operative Societies have been encouraged by the strengthening of their share capital through matching contribution from Government and by grants towards managerial expenses. Assistance to the fishermen co-operatives has also been available from the National Co-operative Development Corporation in the form of loans, share capital, etc., for selected schemes (see chapter VI). In certain years in the past, fishing in the coast had been so poor to cause a fish famine putting the coastal fishermen especially the *rampani* fishermen to great difficulties. In such years, the State Government has gone to their rescue by advancing famine relief loans on low interest or free of interest. Such loans were disposed in three years in the last 25 years i.e., 1961–62, 1972-73 and 1977–78.

Central Assistance

The pattern of Central assistance to fisheries development has been changing from time to time. In the earlier plans, the assistance was scheme-wise, the pattern varying from scheme. This was taken or changed to assistance to agricultural schemes under which fisheries was included. At the same time, the Central Government gave also direct assistance by way of Centrally-sponsored schemes. An important scheme financed in this manner is the provision of lending and berthing facilities for fishing vessels in minor ports. During the Second Five Year Plan, the FAO under its expanded Technical Assistance Programme provided through the Central Government, the services of experts in various fields. The pioneering work of Food and Agricultural Organisation Fishery Engineer in 1956 resulted in the discovery of prawn fishing grounds on the coast and in the introduction of trawling from small mechanised boats. This organisation carried out detailed survey reports and prepared project report for the construction of fishing harbour at Honavar.

Fisheries Corporation

The Karnataka Fisheries Development Corporation was commissioned in 1971. Its main objectives are 1) to conduct fishing in territorial waters, 2) to manufacture, stock, sell, purchase and use ice for fishing, processing and other purposes, 3) to carry on business

of repairs and servicing of fishing boats and engines of every type and description, 4) to purchase, hire, charter or procure otherwise fishing vessels of every kind and description, 5) to construct build, acquire, equip and maintain in India and elsewhere ice plants, freezing plants, etc., for preserving, processing, storing and marketing fish and other aquatic products and other perishable foods and 6) to process oil extraction and deal in fish products. In 1984, the Corporation possessed one ice plant of 15 tonnes capacity per day, in freezing one plate freezer of capacity of 10 tonnes per day, a tunnel of 5 tonnes per day, ice storage of 30 tonnes, fresh fish storage of 50 tonnes and frozen storage of 250 tonnes. There is a fish meal plant commissioned in 1982 at Baithkol, Karwar with a capacity of 30 tonnes per day of fish meal, oil and manure. It also produces dry fish and squilla powder. An ice plant is located at Bhatkal with an ice production capacity of four tonnes per day. The ice plant at Kumta is of the capacity of two tonnes per day.

The Corporation has taken up production of ice, processing of prawns and fish for internal marketing. It has also taken up marketing of the catches of 19 Purse-seine boats from November 1984 at Karwar fishing harbour which has helped the fishermen to get better prices. It also operates a 43′ Purse-seine boat and one trawler through fishermen groups who are paid 35 per cent of the value of catches as their share. It also runs two frozen fish sales units at Karwar and Dandeli and has plans to extend it to Sirsi and Bhatkal in the near future. It has also erected a 10-tonne ice plant at Alvekodi in the district for use by the Department of Fisheries. It has also provided soft loan of Rs 14,50,000 to 51 units of *rampani* groups in the district to acquire Purse-seine boats.

The Corporation had entered into an agreement with Tamilnadu Fisheries Development Corporation for joint operation of their 6 Purse-seine boats in the Karnataka Coast. The operation started in 1981-82 and continued upto 1983-84. Out of the six boats only one boat was operated at Bhatkal in the district.

Central Research Sub-Station

The Central Marine Fisheries Research Sub-Station was started at Karwar in 1948 as the Mackerel unit of the Central Marine Fisheries Research Station. In 1957 its name was changed as Central Marine Fisheries Research Unit. In 1965, it was renamed as the Central Marine Fisheries Research Sub-Station. It has as its objective

the estimation and conservation of marine fishery resources in the country. This Sub-station has in its charge the zone extending from Majali to Honavar. From the fish landing centres already located, random samples are collected every month by the survey shaft and also details of the amount of catch, the effort expended and the area exploited. Once in ten years, a complete census of village-wise data on fishing establishments, fishermen population and fishing units is undertaken. Detailed biological studies on oil-sardine, mackerel and prawns are conducted at this Sub-station on a continuing basis so that any marked departure from normal can be recognised and the casual factors traced. The laboratory studies are based on the material obtained from the landing centres and the field studies are conducted through a programme of tagging. In this programme, live fish are measured, marked with specially prepared and coded plastic tags and released at some distance away from the scene of capture. Suitable rewards are offered to those returning the recovered fish and with the information obtained from these recoveries, studies are made on growth, migration and mortality. Investigation on the hydrological features of the Karwar Bay is in progress and is mainly directed towards the analysis of the chemical composition of the sea water, the seasonal variation has made many contributions to add to the knowledge of local fish and fisheries.

There is a Marine Biology Department of Karnatak University for Training students for M.Sc. (see also Chapter XV). There are two marine fisheries training centres located at Karwar and Honavar.

Regulations: Fishing in the sea and in the estuaries has been traditionally free, there being no legislation to control it. Fisheries in territorial waters (distance of 19 km from shore) are within the perview of State Government. With the increased operations of mechanised fishing vessels, the scope for clash between the traditional non-mechanised fishing and the mechanised fishing has increased. This has been felt in recent years and delimiting the zones of operations is described as essential. Destructive methods of fishing like dynamiting and poisoning are prohibited.

Fishermen Co-operative Societies

In order to encourage co-operative spirit among the fishermen, fisheries co-operative societies have been formed in the district. As in 1983-84, there wese 29 fisheries co-operative societies of which 26 societies are along the coast and three societies are in the Inland

taluks. For the benefit of these fisheries co-operative societies, a Fishermen Co-operative Marketing Federation has also been organised at the district level. Of the societies functioning on the coastal line, one fishermen co-operative society has been organised exclusively for the Scheduled Caste fishermen and a Purse-seine boat has been provided to the members of this society under the Special Component Plan. Government has implemented some schemes for the development of these societies. Of these fisheries, equipment loan plan, administration plan, share capital plan and National Co-operative Development Plan are important (see also Chapter VI).

Education and Training

To educate the fishermen, schools were opened exclusively for the children, of this community at primary, higher elementary and high school levels during the early Plan periods. These schools were transferred to the education department in 1975 (see also Chapter XV).

Training centres were started at Karwar and Honavar to train local fishermen in modern methods of fishing. These institutions so far have trained more than 1,300 fishermen. In addition, fishermen have been trained at the Central Fishery Training Institute at Madras and Cochin.