

CHAPTER IV

AGRICULTURE AND IRRIGATION

Udupi district can be divided into Coastal region, Central region and the Western Ghat region, based on the topography of the region. The Western Ghats, have extended as valleys into the central and coastal region in many parts. In the central region, there are a number of hillocks and valleys. This is the prime agricultural land of the district. In this region Arecanut, Coconut and Paddy cultivation is primarily undertaken and to a smaller extent, fruits and vegetables are also being cultivated. During monsoons, the rivers which flow from the Western Ghats give rise to floods, during which, the vegetation found on the slopes of the Ghat section get transported from one place to another. The cultivation of crops on either side of the riverbed is unpredictable due to floods, during the monsoon season. However, to a certain extent, the organic matter that gets deposited due to floods, increases the fertility status and is beneficial for subsequent crops. The silt and stone deposition on the riverbed due to flood waters, results in raising the riverbed which has worsened the flood situation. Deposition of silt on the plains, makes it unsuitable for crop cultivation. During summer season, the water level in most rivers reduces to minimum or gets dried up. However the water found at the sub-surface level on either side of the river bed helps to provide irrigation.

Soils of Udupi district can be classified as 1) Clayey soil, 2) Coastal soil, 3) laterite soil and 4) forest black soil. In these soils, the level of Potash is found to be low, level of phosphorous is medium and nitrogen is high. The silt level is more in coastal regions and continuous efforts have to be made to get a successful crop.

One of the main problems of the region, is the degradation of soil due to burning out of organic matter present in the soil, by the continuous and severe exposure to bright sunlight for most part of the year. The other problem of laterite soil is its acidic nature with high levels of iron and zinc and due to fixation, leads to non-availability of plant nutrients. As a result, though the recommended levels of fertilizers are used, achieving expected levels of crop production is a difficult task. A common phenomena in the district is the erosion of the fertile topsoil, swept away into the oceans, due to incessant rain during monsoons, resulting in low soil fertility status. This leads to draining of Calcium, and the soil becomes acidic. Hence, achieving better results in agricultural production, by adopting intensive agriculture practices is not possible. The erosion of the topsoil and fertile humus, necessitates sustained and repeated application of these materials for successful farming.

Though this region receives more rain, major portion of the annual rainfall is experienced during a particular season. Hence, cultivation of all cultivable land, in all three seasons of the year is not possible. Since distribution of rain during monsoon is not uniform, farmers experience difficulty when there is no sustained rainfall, for 10 to 15 days. In the absence of irrigation facilities through tanks, wells and other means of lifting water, agriculture is entirely dependent on nature which is a hindrance for the farmers. Water level in the tanks and wells starts decreasing by November and gets dried up in April-May, in most places. Hence, these means of irrigation do not have much use. Generally, by end April or May, if there are no rainshowers, sowing will have to be suspended in more than 75 per cent of the area. If the onset of monsoon does not start by the first week of June, successful paddy cultivation will also be difficult. Though the rivers flowing in the district originate in the Western Ghats and flows into the Arabian Sea, the water level reduces to minimum, after December. Hence, these are not helpful for irrigation. In contrast, now and then, during monsoons, thousands of hectares of land get submerged in flood waters. After January, the backwaters of the sea enters the river and this salt water creates problems in some of the areas.

All the three seasons *viz.* rainy season, winter and summer season are diverse in nature due to varied weather conditions and all crops cannot be grown during all the seasons. Use of specific

variety of a specific crop, for a particular agro-climatic situation is necessary. The weather condition is not so congenial to take up economic cultivation of profitable crops. Hence, farmers are forced to cultivate only a few selected crops. The special feature of the region is small size of agricultural holdings and the non availability of continuous cultivable paddy land. More than 80 per cent of the farmers are victims of this problem which makes their agricultural activity economically non viable.

The problem of small agricultural holding has become a major hurdle in achieving success in agricultural development. Since most farmers have small agricultural holdings and have low confidence in the modern methods of cultivation, even though efforts are made to instill confidence about modern methods, due to smaller land holding desired results has been minimal. This region, which is dominated by small sized land holding coupled with the complexities of the soil, adoption of mixed cropping system has turned out to be economically profitable. Analysis of agricultural cropping system reveals, that rather than adopting a specific balanced cropping system, the present system is more market/price oriented. As a result, every year farmers experience a low price situation in case of excessive production, due to market glut. Since, everyone produces the same crop during the same season, excessive supply of agricultural produce which is more than the demand, during particular months of the year leads to an extremely low price scenario (e.g. Tomato, Potato, & Onion).

In the coastal regions people tend to migrate to other places for their livelihood, resulting in labour shortage during cultivation and harvesting season. Thus timely harvesting cannot be initiated which affects the crop production negatively. In spite of all these problems, the presence of a good transport system and educated growers in the district has furthered the scope for agricultural development.

Agricultural Labourers

According to the 1991 agricultural census, there were 97,258 cultivators and 87,761 agricultural labourers in the district. According to the 2001 agricultural census, there were 83,305 Cultivators and 57,893 Agricultural labourers in the district. Among the cultivators category- 49,877 are males and 33,428 are females. Among Agriculture labourers- 28,956 are males and 28,956 are females. According to the agricultural census of 1991 and 2001,

taluk-wise details of Cultivators and Agricultural labourers are given in Tables 4.1 & 4.2

Table 4.1: Talukwise details of cultivators and agricultural labourers as per 1991 and 2001 census

Sl.No.	Particulars	Kundapura	Karkala	Udupi	Total
I No. of Cultivators as per 1991 census					
1	Male	20,998	11,987	20,146	53,131
2	Female	18,451	9,757	15,919	44,127
3	Total	39,449	21,744	36,065	97,258
II No. of Agricultural labourers as per 1991 census					
1	Male	15,893	6,819	14,587	37,299
2	Female	24,238	6,370	19,854	50,469
3	Total	40,131	13,189	34,441	82,462
III No. of Cultivators as per 2001 census					
1	Male	9,453	19,071	11,353	49,877
2	Female	12,298	13,279	7,851	50,462
3	Total	31,751	32,350	19,204	82,761
IV No. of Agricultural labourers as per 2001 census					
1	Male	11,709	11,694	5,553	28,956
2	Female	12,046	12,984	3,943	28,937
3	Total	23,755	24,642	9,496	57,893

Table 4.2: Talukwise details of agricultural land holdings during 2000-01

Sl.No.	Particulars	Kundapura	Karkala	Udupi	Total
I Marginal farmers (<1 hectare)					
i	Sched. Caste N	1,660	1,175	1,847	4,682
	A	582	477	482	1,546
ii	Sched, Tribe N	1,165	864	2,158	4,187
	A	508	403	820	1,731
iii	Others N	55,471	16,312	56,343	1,31,129
	A	16,449	6,475	18,357	41,281
iv	Total N	58,296	18,351	63,348	1,39,995
	A	17,544	7,355	19,659	44,558

Cont'd...

Sl.No.	Particulars	Kundapura	Karkala	Udupi	Total
II Small farmers (1-2 hectares)					
i	Sched. Caste N	263	168	128	559
	A	360	228	164	752
ii	Sched. Tribe N	421	290	458	1,169
	A	580	403	641	1,624
iii	Others N	8,097	5,793	8,766	22,656
	A	11,380	8,258	12,270	31,908
iv	Total N	8,781	6,251	9,352	24,384
	A	12,320	8,889	13,075	34,284
III Semi medium farmers (2-4 hectares)					
i	Sched. Caste N	52	24	6	82
	A	123	57	15	195
ii	Sched. Tribe N	138	87	121	346
	A	352	231	314	897
iii	Others N	3,508	4,379	4,341	12,228
	A	9,473	12,227	11,737	33,437
iv	Total N	9,698	2,093	4,468	12,656
	A	9,948	12,515	12,066	34,529
IV Medium farmers (4-10 hectares)					
i	Sched. Caste N	4	4	0	8
	A	22	25	0	47
ii	Sched. Tribe N	17	29	25	71
	A	89	149	139	377
iii	Others N	1,240	2,060	1,396	4,696
	A	7,051	11,794	7,906	26,751
iv	Total N	1,261	2,093	1,421	4,775
	A	7,162	11,968	8,045	27,175
V Big farmers (>10 hectares)					
i	Sched. Caste N	0	0	0	0
	A	0	0	0	0
ii	Sched. Tribe N	1	0	0	1
	A	10	0	0	10
iii	Others N	181	209	127	517
	A	3,622	2,989	1,992	8,603
iv	Total N	182	209	127	518
	A	3,632	2,989	1,992	8,613

Cont'd...

Sl.No.	Particulars	Kundapura	Karkala	Udupi	Total
VI Total agricultural land holdings					
i	Sched. Caste N	1,979	1,371	1,981	5,331
	A	1,092	782	661	2,540
ii	Sched. Tribe N	1,742	1,270	2,762	5,774
	A	1,539	1,186	1,914	4,639
iii	Others N	68,497	25,753	73,973	1,71,223
	A	47,975	41,743	52,262	1,41,980
iv	Institutions N	133	194	190	517
	A	199	1,399	1,209	2,807
v	Total N	72,351	31,588	78,906	1,82,845
	A	50,805	45,115	56,046	1,51,966

Note: N- Number of land holdings; A- Area in hectares

Soil Health Centre

There is no separate Soil Health Centre at Udupi. The soil health centre (Soil testing laboratory) is located at Mangalore, the Dakshina kannada district headquarters, which conducts soil sample analysis. Soil analysis is a systematic scientific method through which one can ascertain the soil fertility status and the available nutrients in the soil. This helps in avoiding indiscriminate use of fertilizer. It also plays an important role to get a better crop yield, by applying balanced nutrients. Soil samples collected by the farmers and agriculture extension personnel are analysed and suitable recommendations on the use of chemical fertilizers is provided. Mobile soil testing units analyse soil samples on the spot and provide the required recommendation on balanced fertilizer usage. The water samples collected by the growers are also analysed to determine the suitability of water for irrigation and suitable usage is recommended. Samples of Calcium and Gypsum salts are also being analysed here. Mangalore centre has a capacity to analyse upto 30,000 samples per year.

The parameters analysed from soil samples are pH, Organic carbon, phosphorous, potash, nitrogen and electrical conductivity of the soil. This helps in understanding the component responsible for alkalinity. Cropping system to be followed is compared according to these parameters and a decision on quantity of suitable soil supplements like Gypsum salt and lime is provided. This also helps in deciding on the quantity of chemical fertilizers required for each crop to be grown in such soils. Suitable corrective measures are

suggested for the soil, where alkalinity is high. According to the procedure, which is in force since 1970-71, it is prescribed to provide the soil test result only in a particular format. The objectives are as follows: 1) To regulate procedures to be followed during soil testing, 2) To provide support to help the testing centre to work efficiently and 3) To give training on soil testing procedures that are to be followed every year. It has been planned on an experimental level that the results of soil analysis are compared and published in soil health journals, which are to be made available to the cultivators so that they can plan, experiment and implement procedures for crop production.

**Table 4.3: Land utilization details of the district
from 1999-2000 to 2002-2003**

Area in hectares

Sl. No.	Particulars	1999-2000	2000-2001	2001-2002	2002-2003
1	Total geographical area				
A	As per the review of surveyors	3,56,446	3,56,446	3,56,446	3,56,446
B	As per the records of the villagers	3,56,446	3,56,446	3,56,446	3,56,446
2	Forest area	99,439	99,569	99,569	1,00,102
3	Area not available for cultivation				
A	Area utilized for purposes other than agriculture	38,345	38,526	38,616	38,697
B	Barren and uncultivable land	11,910	11,689	11,670	11,621
4	Uncultivated land other than fallow				
A	Other fallow land suitable for cultivation	32,267	32,924	33,067	33,798
B	Permanent pastures and other grasslands	11,239	10,684	10,678	10,640
C	Groves and other tree crops not recorded in sown area	48,084	48,900	48,591	48,591
5	Fallow land				
A	Current fallows	5,297	4,903	4,202	3,903
B	Other fallow lands	8,204	8,632	8,415	9,685
	Sown area				
6	Net sown area	1,01,661	1,00,619	1,01,638	99,409
7	Gross sown area	1,33,261	1,30,556	1,29,285	1,25,132
8	Area sown more than once	31,600	29,937	27,647	25,723

Source: Report on area, production and productivity and prices of agriculture crops in Karnataka from 1999-2000 to 2002-2003

Seed production

The various rules of 1966, 1968 and 1983 framed by state and union governments are enforced in the district. Supervisors take samples of the seeds which are kept for sale at shops and send them to laboratories for examination. If the germination is below the specified level, action is initiated against the wrong-doers. There are two seed production units in the district – at Sanur in Karkala taluk and Koteswar in Udupi, where original/certified seeds are produced. The varieties for the production of certified seeds are obtained from agriculture universities, by placing an order in advance.

Crop system

Out of the total 1,25,132 hectares where cultivation was taken up in 2002-03, cereals were grown on 1,05,258 hectares and non-food crops on 19,874 hectares. While monocot crops (mainly rice) were grown on 63,488 hectares and dicot crops on 9,269 hectares. Oil seeds were grown on 2,365 hectares. Taluk-wise data of the cereals and pulses grown during 1999-2000 period is given in Table 4.5 and food and non food crops grown during 2001-02 period is given in Table 4.6.

Table 4.4: Talukwise land utilization details of the district during 2003-04
(Based on weather and crops annual report)

<i>Area in hectares</i>					
Sl.No.	Particulars	Udupi	Kundapura	Karkala	Total
1	Total geographical area	92,798	1,56,062	1,07,586	3,56,446
2	Forest area	4,686	62,605	5,295	38,819
3	Area not available for cultivation				
i)	Non agriculture	16,290	17,234	5,295	38,819
ii)	Barren	2,716	5,257	3,639	11,612
	Total	19,006	22,461	8,934	50,431
4	Uncultivated land other than fallow				
i)	Fallow land suitable for cultivation	11,340	6,595	17,181	35,116
ii)	Permanent pastures	5,223	3,490	1,924	10,637
iii)	Groves and other tree crops	12,635	16,892	18,911	48,428
	Total	29,188	26,977	38,016	94,181
5	Fallow land				
i)	Current	337	1,491	402	2,230
ii)	Others	4,855	1,857	3,652	10,364
	Total	5,192	3,348	4,054	12,594
6	Sown area				
	Net	34,726	40,641	23,771	99,138
	More than once	10,520	7,306	4,820	22,646
	Total	45,246	47,947	28,571	1,21,784

Source: Udupi district at a glance, 2004-05, District statistical officer, Udupi district, Udupi

Table 4.5: Talukwise area of agricultural crops grown in Udupi district during 2003-04

Sl.No.	Particulars	Udupi	Kundapura	Karkala	Total
1	Cereals				
	Paddy	4,091	3,690	4,602	12,383
	Paddy	17,878	11,165	20,677	49,720
	Total	21,969	14,855	25,279	62,103
2	Pulses				
	Black gram	1,268	263	4,345	5,876
	Horse gram	575	166	557	1,298
	Green gram	31	67	79	177
	Cowpea	50	46	310	406
	Total	1,924	542	5,291	7,757
3	Total food grains	23,893	15,397	30,570	69,860
4	Oilseeds				
	Groundnut	1,488	-	510	1,998
	Sesame	-	30	75	105
	Total	1,488	30	585	2,103

Source: Udupi district at a glance, 2004-05, District statistical officer, Udupi district, Udupi

Table 4.6: Crops and cropping systems followed in edible and non edible crops

Sl.No.	Particulars	1999-2000	2000-01	2001-02	2002-03
1	Edible crops				
i	Area (ha)	1,13,450	1,10,486	1,09,389	1,05,258
ii	Percentage of cropped area	85.10	84.63	84.61	84.12
iii	Percentage of total area sown in the state	1.30	1.23	1.30	1.28
2	Non edible crops				
i	Area (ha)	19,811	20,070	19,896	19,874
ii	Percentage of cropped area	14.90	15.37	15.39	15.88
iii	Percentage of total area sown in the state	0.60	0.61	0.62	0.61
3	Cereals				
i	Area (ha)	69,892	67,136	65,729	63,488
ii	Production (in tonnes)	1,23,908	1,35,790	1,39,602	1,32,901
iii	Productivity (kg/ha)	1,866	2,129	2,236	2,203

Cont'd..

Sl.No.	Particulars	1999-2000	2000-01	2001-02	2002-03
4	Pulses				
i	Area (ha)	12,164	11,389	76,249	72,757
ii	Production (in tonnes)	4,708	5,350	4,589	2,619
iii	Productivity (kg/ha)	407	494	459	297
5	Food grains				
i	Area (ha)	82,056	78,525	76,249	72,757
ii	Production (in tonnes)	1,28,616	1,41,140	1,44,191	1,35,520
iii	Productivity (kg/ha)	1,650	1,892	1,991	1,961
6	Oilseeds				
i	Area (ha)	3,113	3,044	2,570	2,365
ii	Production (in tonnes)	4,913	4,109	4,342	3,360
iii	Productivity (kg/ha)	1,510	1,421	1,778	1,495
7	Sugarcane				
i	Area (ha)	1,663	1,361	933	345
ii	Production (in tonnes)	1,69,044	1,26,709	75,340	29,170
iii	Productivity (t/ha)	107	98	85	89

Crops

In low-lying areas of the coastal region, paddy is cultivated during all the three seasons of the year. Paddy is cultivated under rain-fed conditions during monsoon/ *kharif* season and during *rabi* and summer, crops are grown under irrigated/semi-irrigated condition by utilizing the external water resources from rivers and tanks. In areas where water availability is limited, one or two crops of paddy are grown, pulses, oilseeds or vegetable crops are grown as a third crop. In fertile soils, sugarcane is cultivated. The important pulses grown in this region are green gram, black gram and cowpea. Among oilseeds, groundnut and sesame (*Sesamum indicum*) are important. Lady's Finger(Okhra), brinjal, chillies, watermelon, cucumber, radish, etc. are the vegetables cultivated in *rabi* and summer season. In the valleys of the eastern region, paddy is cultivated during monsoon. In addition, areca, banana, pepper, cocoa, and other horticultural crops are also seen. In the northern region cashew cultivation is in practice. Mango, Jackfruit, Sapota, guava, pineapple, rubber are the horticultural crops of the region.

Paddy: Paddy is the principal food crop of the region. Based on water availability, this crop can be cultivated during all three seasons of the year. Paddy is being cultivated in about 60,000 ha area in the district.

Major pests : Grain smut (shoots grow like a caterpillar, panicle does not grow), 2. Flour mite (crop turns yellow, flour mite is seen on the sides of the leaf), 3. Green plant hopper (white patches on the leaf), 4. Stem borer (dries the leaf shoots, seeds become hollow) 5. Leaf folder (folds the leaf) 6. Rice hispa (eats the green part of the leaf in straight lines) 7. Case worm (Tillers suspend on water and ladder-like white patches are seen on the leaf) 8. Paddy blue beetle (eats the green part of leaf in straight lines) 9. Grasshopper (feeds on the sides of the leaf and tillers) 10. Orange headed hopper (feeds on panicle milk, panicles turn yellow) 11. Coorg caterpillar (damages crops by feeding on panicle milk) 12. panicle mite (leaf turns yellow and looks like burns)

Diseases: 1. Blast (diamond shaped brown patches on the leaf and center of these patches turn grey), 2) Brown spot (egg like brown patches on the leaves and brown coloured grains), 3. Incense stick disease (leaf turns into white shiny surface and incense stick like panicles are seen) 4. Falls smuts (stems and panicles turn into reddish brown) and leaf smut (side leaf of panicles become dry and bend). Paddy varieties

Paddy productivity during different seasons/ under different conditions

Season	Occasion	Productivity (Quintals/ha)
Kharif	<i>Betta- Makki</i> (highland)	30-37
	<i>Majalu- aremakki</i> (Terraces)	50-62
	<i>Bailu-Honda</i> (lowlying land)	45-55
Rabi	<i>Edasuggi</i> (Early Rabi)	45-55
	<i>Suggi</i> (Rabi)	37-50
Summer	Early Summer	50-62
	Summer	50-62

Mahaveer (IET 2886 Red Annapoorna): This variety of paddy was released into the market in 1985 and is considered appropriate for dry land. It can be harvested between 105-110 days, the yield is 12-16 quintals per acre. The rice is red, long and mid-sized. This variety grows to a height of 80-85 centimetres. This can be grown in rain-fed areas also.

M O-4: This variety of paddy can be grown on steep land and also on lower areas which are not flooded. Released in 1995, this variety is derived from PTB20 and can be harvested in 130-135 days. Also called Bhadra, it grows to a height of 100-105 centimetres. Rice is short, thick and reddish in colour. The per acre yield is 18-20 quintals.

Lata (IET 7956): This was released in 1994 and is recommended to be grown on steep land. It can be harvested in 120-125 days and the yield is 18-20 quintals per acre. While paddy is brownish and rice is long, thick and white.

Shakti: This can be grown during the three seasons, the variety was released in 1979. It can be harvested in 125-130 days in the first season and takes 120-125 days for a second harvest. It grows to a height of 90-95 centimetre and a yield of 18-20 quintals can be expected. The rice is short and white.

Phalguna: (IR8): Suitable for steep / plain land, this can resist floods for 5-6 days. The variety, released in 1979, grows to a height of 103-105 centimetres and can be harvested in 135-140 days. A yield of 20-25 quintals per acre can be expected and the variety is Biotype-2 disease resistant. Rice is long, thin and white. If harvest is delayed, the grain may fall.

Netravati: (IET 2886): Also called KKP6, this variety was released in 1990 and recommended to be grown on plain land. It can be harvested in 135-140 days and can withstand floods for 5-6 days. The yield per acre is 20-22 and the rice is thick, short and white.

CTH1 - Mukti: This can be grown on both steep and plain land. This variety was released in 1992 and the rice is red. While it was recommended to be grown on irrigated land during winter, it can be grown in coastal areas during summer too. The crop can be harvested in 120-125 days and the expected yield is 18-20 quintals per acre. However, it is difficult to store the seeds for a long time in coastal areas.

Jyoti (PTB10 I.R.8): This variety was released in 1974 and is suitable for steep land. This can be harvested in 90-105 days and grows to a height of 80-85 centimetres. Its gloom is brown, the grain is red and mid-sized. A yield of 15-18 quintals per acre can be expected and if harvesting is delayed, the grains may fall.

Jaya (TN1.141): Released way back in 1970, this variety gives a maximum yield of 20-25 quintals per acre. This is recommended for coastal areas and can be harvested in 120-25 days. Rice is short and thick. It is the best variety and is well known across the country.

Crop rotation system

The crop rotation system that can be followed in this region depends on the topographical condition and availability of water facilities. The important crop rotation systems suitable for different conditions are given below.

Sl.No.	Kharif	Rabi	Summer
1.	Low lying area		
	Paddy	Paddy	Paddy
	Paddy	Paddy	Pulse/ Ground nut
	Paddy	Pulse/ Ground nut	
	Paddy	Vegetable crops	
	LAND		
2.	Majalu-Moderately high 1 and (Terraced)		
		Paddy	Paddy
		Paddy	Groundnut/Sesame
		Paddy	Vegetable crops
3.	Highland (hilly area)		
		Paddy	Green manure crop
		Paddy	HorseGram

Regional Research Station, Brahmavar

Established in 1982, the Brahmavar regional research station which comes under the University of Agricultural Sciences, Bangalore is the main research centre of the coastal region. This is located on Brahmavar-Hebri road, about two kilometres from Brahmavar. The centre is spread on 127 hectares and covers five coastal taluks of Udupi and Dakshina Kannada districts. Identification of unique/area-specific problems, conducting need-based researches and providing information based on science and traditional knowledge, to farmers are the responsibilities of the research centre.

Priorities of research: 1.Paddy and Paddy related projects: Paddy, groundnut, black gram and vegetables. 2. Coastal horticulture: mainly,

cashew, mango, sapota, jasmine etc. 3. Management of soil and water: Drip irrigation for soil and water conservation. 4. Inland fishery.

Results of the research: 1. Development of paddy varieties, selection and release of- a). MO-4 (Bhadra): Red and thick rice, paddy is resistant to disease. Harvesting in 130 days during November. b) Lata (IET-7956): Thick rice, resistant to disease. Harvesting in 125 days during November. c) Mukti (CTH-1): Red, thick rice. Harvesting in 115 days (January).

2. Paddy production: a) Use of a balanced mix of compost fertilizers (derived from green leaves) and chemical fertilizers is better than the use of mere chemical fertilizers. b) Fertilizers providing nitrogen, phosphorous and potassium in the ratio of 60:30:45 is required. c) Use of rock phosphate is better than super phosphate. d) Rather than cultivating two yields of paddy, it is always better to cultivate paddy and groundnut or paddy and vegetables alternately. 3. Groundnut: a) Apart from the already existing TMV-2 variety, the DH 3-30 and DH-40 are also good. b) If groundnuts are dried and packed in plastic bags, the seeds can be preserved till the next season for cultivation. c) Sowing is recommended in November and spacing of one foot between two strips should be done.

4. Dicot crops: a). Black gram: LBG-17 has shiny seeds, resistant to ash disease; b) Green gram-Poosa-103 is ash disease resistant. c). Black eyed beans -cow pea: TVX-940-02 variety is disease-resistant and gives a good yield. 5. Mango: Ratna hybrid which is of good quality, gives a yield every year. 6. Plantain: Robusta variety is good. It is suggested to plant two saplings in a pit. 7. Papaya: Coorg Honeydew is a good variety.

8. Cashew: a) Ullal-1, 2, 3 and 4. b) Annually-each tree is manured with a ratio of 500:120:120gm.

9. Turmeric: Suguna, Sudarshan, 10. Ginger: Maran variety. 11. Chilli: Poosa Jwala and G-4 varieties. 12. Amaranth leaves: CO-3 variety 13. Radish: Poosa Chetaki variety. 14. Tomato: Shakti and Sheshard varieties which are resistant to locally noticed diseases. 15. Jasmine: Jaji and Kakada give good yields while Udupi jasmine gives good returns on investment. 16. Crossandra: bright orange. 17. Inland Fishery: It is recommended to leave a part of the tank unused till fingerlings (young fishes) grow up.

Benefits for the farmers:

1.Availability of Information: Dissemination of information to farmers through personnel, newspapers or television on topics like- Crop production, crop cultivation, soil and water conservation, agriculture, mechanisation in agriculture and seed preservation;
 2.Solutions for problems: locals meet to discuss with scientists;
 3.Forum to exchange ideas: group discussions, face to face meetings;
 4. Availability of seeds: Superior quality paddy of different varieties to be made available.
 5. Availability of seedlings Cashew, Jasmine, Sapota, and mango seedlings of different varieties to be made available

Raitha Samparka Kendras (Farmer Liaison Centres):

The new *Raitha Mithra Yojane* was implemented in the year 2001-02 to transfer technologies uninterruptedly with an aim to achieve development in the field of agriculture, and in turn to develop the farming community by encouraging them to adopt improved technologies in the field. Under this programme *Raitha Samparka Kendras* (Farmer Liaison Centres) were established in each *hobli* (Revenue blocks) head quarters. The main objective of this centre is to constantly transfer improved technologies in a systematic and effective way. The main activities of the centre, is to identify problems faced by the farmers while adopting technologies in the field and to provide corrective measures and also to convince them to adopt such technologies. Locally, basic technical support services viz. seed germination test, testing of physical characteristics of chemical fertilizers and providing suggestions, etc. are also provided to the farming community. *Raitha Samparka Kendras* are working hard to fulfil the following objectives viz 1) To work as a primary unit to implement crop husbandry programmes of the department, to identify field problems and suggest corrective measures, 2) To fulfil the requirement of extension services in agriculture and other related production activities, especially in horticulture and crop production, 3) To work as a centre to identify and solve problems faced by farmers, farm women and young farmers, scientifically, and as a centre for information and discussion 4) To fulfil the requests for agricultural input needed locally, and 5) To provide practical training to agricultural graduates.

IRRIGATION

The sources of irrigation can be classified into a) canals, b) Tanks, 3) Wells, 4) other sources. In Udupi district there are no canal irrigation facilities. Irrigation facilities are provided through Tanks, wells, lift irrigation and by other means. The details of the irrigation facilities are provided in the next table.

**Table 4.7: Taluk-wise irrigated area in the district
(in hectares) during 2003-04**

Sl.No.	Net irrigated area	Udupi	Kundapura	Karkala	Total
1	From canals	-	-	-	-
2	From tanks	150	177	1,560	1,882
3	From wells	6,474	4,789	4,627	15,890
4	From bore wells	68	214	178	460
5	Lift irrigation	660	827	3,770	8,257
6	Others	5,084	2,589	1,230	8,903
7	Total	12,436	8,596	11,365	32,397

Table 4.8: Details of irrigated area in the district (in hectares)

Sl.No.	Details		1999-2000	2000-01	2001-02	2002-03
1	From canals	Total	-	-	-	-
		Net	-	-	-	-
2	From tanks	Total	2,747 (7.30)	2,677 (7.40)	2,381 (6.50)	2,236 (6.49)
		Net	2,266 (6.30)	2,201 (6.40)	2,273 (6.60)	2,178 (6.48)
3	From wells	Total	14,174 (37.50)	13,536 (37.60)	14,467 (39.20)	16,741 (48.60)
		Net	13,335 (37.20)	12,870 (37.50)	13,722 (40.00)	16,285 (48.44)
4	From bore wells	Total	196 (0.50)	333 (0.90)	338 (1.00)	493 (1.43)
		Net	194 (0.50)	330 (1.00)	334 (1.00)	491 (1.16)
5	Lift irrigation	Total	883 (2.30)	875 (2.40)	872 (2.40)	4,803 (13.94)
		Net	852 (2.40)	848 (2.50)	872 (2.40)	4,802 (13.94)
6	Others	Total	19,825 (52.40)	18,607 (51.60)	18,151 (51.00)	10,126 (29.54)
		Net	19,218 (53.60)	18,054 (52.60)	17,859 (50.10)	10,131 (30.14)
	From all sources	Total	37,825	36,028	36,209	34,449
		Net	35,865	34,303	35,031	33,617

(...) - Figures in parenthesis indicates percentage values

HORTICULTURE

The status of horticulture during ancient times can be learnt from available inscriptions, literary sources and writings/stories of travellers. There are many evidences of floral gardens, especially of gardens related to temples and towns mentioned in the inscriptions. Orchards were maintained, for which references are available. Travellers who visited the capital of Vijayanagar, have mentioned that orchards existed not only on the outskirts of the capital but also on either side of the highway that used to connect the capital and the west coast. One such traveller Mr. Domingo Paes , has mentioned that “ There are canopies of trees in between two or three highways while you travel. On the outskirts of the cities, towns and villages, there are mango, jackfruit, tamarind and other bigger trees. They provide shade and shelter for the businessman to rest along with his merchandise”. In the gardens, areca, coconut and beetle vines were grown. The inscriptions and the literary evidence provide details about *Pogavana*, the areca gardens. A traveller from Italy, Scissor Fredrik(1567) has said “There is no tree, other than coconut, that is profitable and most beneficial”. Ibnabathutha has mentioned that there were sugarcane plantations all along the west coast.

Vegetables were grown in backyard gardens and paddy fields. Ibnabathutha mentions that each and every house on the west coast maintained and cultivated vegetables. In the coastal region important spices like cardamom and black pepper were grown in large quantities. The Portuguese had mentioned that the Kanara coastal pepper was superior than the Malabar pepper. Horticulture crops occupied an important place in Dakshina Kannada district. The Office of the Deputy Director of Horticulture Department is functioning in the district. The Horticultural department personnel provide technical advice to farmers on horticultural crop production and crop protection measures at the taluk(block) level. Seeds and seedlings of horticultural crops like fruits, spices, vegetables, that are suited to the different agro-climatic conditions of different taluks of the district, are produced and distributed to the farmers in accordance with their requirement. Horticultural exhibition, field day, and seminars are

organized at the district and taluk level. Seedlings, seeds, fertilizer and pesticides are distributed from the taluk level offices. Horticultural farms, nurseries and parks are being maintained. The schemes implemented by the department are as follows:

State level schemes/programmes : 1) Maintenance and development of horticultural farms, nurseries, 2) Coconut development board supported Integrated Pest Management, 3) Integrated vegetable crop development scheme, 4) Cocoa development scheme, 5) Integrated cashew development scheme, 6) Integrated pest and disease control scheme, 7) Training and extension schemes and 8) Horticultural parks scheme.

Central Sponsored scheme/Programme: 1) Modern scheme on model vegetable development programme, 2) Model Cocoa development programme, 3) Model medicinal and dye plants development programme, 4) Model farm and nursery development programme, 5) Modern scheme on integrated development model for spices 6) Modern integrated cashew development model scheme.

Zilla panchayath Scheme/Programmes: 1) Central zone drip irrigation programme, 2) Publicity and literature programme, 3) Horticultural farm maintenance, 4) Horticulture buildings and 5) Coconut seed collection and nursery management.

The climatic and soil conditions of the district are suitable for the growth of various horticultural crops, which are the main cash crops for the farmers. From a long time horticultural crops such as coconut, areca, cashew, spices such as black pepper, ginger, turmeric, fruits such as mango, sapota, banana and vegetables were grown. The approximate area for the cultivation of horticultural crops is 61,495 hectares, for spices- 47,313 hectares, fruits-6,489 hectares, vegetables-7,322 hectares, flowers -371 hectares. The research centre for agriculture in the district, conducts researches and implements programmes related to horticultural crops. The statistics of the horticultural crops are given in the tables 4.9 and 4.10

Table 4.9: Statistics of horticultural crops in Udupi district

Sl. No.	Particulars / year	2000-01	2001-02	2002-03
1	Geographical area (ha)	3,56,446	3,56,116	3,56,116
2	Cultivated area (ha)	1,47,078	1,47,078	1,47,078
3	Per cent of geographical area under cultivation	41	41	41
4	Area under horticultural crops (ha)	58,160	59,394	61,495
5	Per cent of cultivated area under horticultural crops	40	40	42
6	Fruit crops			
i	Area (ha)	7,127	6,284	6,489
ii	Production (t/ha)	1,10,277	1,03,807	1,07,316
iii	Yield (t/ha)	15	17	17
iv	Value (in lakhs)	4,431	2,845	3,783
7	Vegetable crops			
i	Area (ha)	4,742	6,975	7,322
ii	Production (t/ha)	67,729	81,315	84,462
iii	Yield (t/ha)	14	12	12
iv	Value (in lakhs)	2,922	1,724	2,322
8	Spice crops			
i	Area (ha)	1,390	1,904	1,901
ii	Production (t/ha)	6,660	8,343	7,742
iii	Yield (t/ha)	05	04	04
iv	Value (in lakhs)	1,534	1,258	3,082
9	Plantation crops			
i	Area (ha)	44,396	43,804	45,412
ii	Production (t/ha)	51,413	36,106	32,704
iii	Yield (t/ha)	01	01	01
iv	Value (in lakhs)	16,393	14,036	19,168
10	Commercial flower crops			
i	Area (ha)	505	427	371
ii	Production (t/ha)	2,738	2,047	1,976
iii	Yield (t/ha)	05	05	05
iv	Value (in lakhs)	380	677	249
11	Total horticultural crops			
i	Area (ha)	58,160	59,394	61,495
ii	Production (t/ha)	2,38,817	2,31,618	2,34,200
iii	Yield (t/ha)	04	04	04
iv	Value (in lakhs)	25,661	20,540	29,209

Sl. No.	Particulars / year	2000-01	2001-02	2002-03
12	Total area under horticulture in the District			
i	Area (ha)	3.80		
ii	Rank among districts	12		
13	Fruit crops			
1	Mango			
i	Area (ha)	2,239	2,095	2,147
ii	Production (t/ha)	15,673	18,198	19,323
iii	Yield (t/ha)	07	09	09
iv	Value (in lakhs)	627	550	967
2	Banana			
i	Area (ha)	1,709	1,478	1,539
ii	Production (t/ha)	34,825	27,485	28,710
iii	Yield (t/ha)	20	19	19
iv	Value (in lakhs)	1,741	932	1,257
14	Plantation crops			
1	Coconut			
i	Area (ha)	14,844	15,415	15,504
ii	Production (t/ha)	1,632	1,668	706
iii	Yield (t/ha)	20	19	19
iv	Value (in lakhs)	4,080	5,547	5,697
2	Areca nut			
i	Area (ha)	8,419	5,149	5,119
ii	Production (t/ha)	8,419	7,721	7,679
iii	Yield (t/ha)	01	01	02
iv	Value (in lakhs)	28,620	2,444	7,052
3	Cashew nut			
i	Area (ha)	20,557	22,861	24,416
ii	Production (t/ha)	41,114	27,624	24,281
iii	Yield (t/ha)	02	01	01
iv	Value (in lakhs)	9,045	6,013	4,296

Source: Karnataka State Horticultural Crops Statistics at a glance, 2000-01, 2001-02, Directorate of Horticulture, Lalbagh, Bengaluru-560 004

**Table 4.10: Taluk wise horticultural crops statistics
for the year 2002-03**

Sl. No.	Particulars / year	Karkala	Kundapura	Udupi	Total
1	Fruit crops				
i	Area (ha)	1,456	2,333	2,700	6,489
ii	Production (t/ha)	20,761	41,029	45,526	1,07,316
iii	Yield (t/ha)	14	18	17	17
iv	Value (in lakhs)	601	1,568	1,514	3,783
2	Vegetable crops				
i	Area (ha)	1,529	3,812	1,981	7,322
ii	Production (t/ha)	18,110	44,765	21,587	84,462
iii	Yield (t/ha)	12	12	11	12
iv	Value (in lakhs)	484	1,274	564	2,322
3	Spice crops				
i	Area (ha)	382	582	937	1,901
ii	Production (t/ha)	1,984	2,439	3,320	7,742
iii	Yield (t/ha)	05	04	04	04
iv	Value (in lakhs)	454	1,396	1,238	3,087
4	Plantation crops				
i	Area (ha)	13,797	17,261	14,354	45,412
ii	Production (t/ha)	10,171	11,317	11,317	32,704
iii	Yield (t/ha)	01	01	01	01
iv	Value (in lakhs)	9,314	6,944	2,910	19,168
5	Commercial flowers				
i	Area (ha)	83	144	144	371
ii	Production (t/ha)	448	632	896	1,976
iii	Yield (t/ha)	05	04	06	05
iv	Value (in lakhs)	690	53	106	849
6	Total horticultural crops				
i	Area (ha)	17,247	24,132	20,116	61,495
ii	Production (t/ha)	51,473	1,00,181	82,546	2,34,200
iii	Yield (t/ha)	03	04	04	04
iv	Value (in lakhs)	11,543	11,234	6,432	29,209

Source: Karnataka state horticultural crops statistics at a glance, 2002-03, Directorate of Horticulture, Lalbagh, Bengaluru-560 004

ANIMAL HUSBANDRY AND VETERINARY SERVICES

Providing medical treatment to livestock population, providing vaccination as a precautionary measure against the spread of infectious diseases, development of high yielding crossbred livestock through artificial insemination using semen from superior/high yielding breeds, in place of local and dwarf breed of the hill tract, to improve milk production and availability by increasing the milking capacity of each milch animal, providing encouragement and technical know-how to farmers to grow green fodder required for the livestock, crossbred piggery, supply of *Giriraja* poultry birds, increasing the egg-laying capacity of each bird, to provide encouragement through technical guidance and subsidy to the beneficiaries under various programmes, etc., are the main objectives of the department. Development of cattle is an integral part of agriculture. Integration of Animal Husbandry with Agriculture will help in the proper utilization of by-products of crop production, maintenance of soil fertility by which income of the rural people can be enhanced.

Table 4.11: Live Stock Census of Udupi District for the Year 2002-03

Sl.No.	Particulars	Kundapura	Karkala	Udupi	Total
1	Cows				
	i Local	1, 09,424	67,061	70,377	2,46,862
	ii Exotic	0	06	0	06
	iii Cross bred	26,	15,460	49,332	91,635
	iv Total	1,36,267	82,527	1,19,709	3,38,503
2	Buffaloes	22,596	12,847	13,694	49,137
3	Sheep				
	i Local	04	01	05	10
	ii Exotic	0	0	0	0
	iii Cross bred	0	0	0	0
	iv Total	04	01	05	10
4	Goats	450	280	1,319	2,049
5	Pigs				
	i Local	299	182	600	1,081
	ii Exotic	0	0	0	0
	iii Cross bred	24	10	0	34
	iv Total	323	192	600	1,115

Sl.No.	Particulars	Kundapura	Karkala	Udupi	Total
6	Rabbits	139	02	19	160
7	Dogs	37,515	29,079	54,142	1,20,736
8	Other animals	106	02	21	129
9	Total animals	1,97,400	1,24,930	1,89,509	5,11,839
10	Total poultry birds	2,88,819	1,16,753	3,43,127	7,48,699

Sl. No.	Particulars	Achievement	
		Economical	Physical
1	Udupi	36,236	800
2	Karkala	44,122	900
3	Hebri	17,489	200
4	Kundapura	45,342	1,400
	Total	1,43,189	3,300

FISHERIES

Fisheries in Karnataka is being practiced since ancient times. This is evident from the copper inscriptions obtained during archaeological survey done at Brahmagiri. It is well known that in the district, there lived, Sri Galada Kannappa, a poet and contemporary of Sri. Basaveshwara. 'Gala' in kannada means fishing hook. *Besthas*, *Mogaveeras*, *Kharvis*, and other communities are the fisherman community found in the State. These communities have been practicing fishing since time immemorial. It is mentioned in the '*Maanasollasa*' a literature available, that fishing as a sporting event was conducted by royal families. The king who authored this book mentions that the fibre of the '*Murva*' plant which was used to tie the ends of a bow, was also being used to weave fishing nets. Various types of fishing hooks have also been explained. It is reported that Bamboo and '*mada*' trees were in use to prepare the rod for the fishing hook. Dr.G.R.Kuppuswamy who studied Raghavanka's '*Harishchandrakavya*' has listed various types of fishing nets that were in use. They are *Thadike vale* (*Vale* / *Bale* in Kannada means net), *Thattivale* (Basket net), *Haasuvale*, *Beesuvale*, *Ballivale*, *Thodakuvale*, *Kannivale* and other types of nets like *Kodathivale*, *Koduvale*, *Thallivale*, *Ballivale*, *Jaruvale*, *Thoruvale*, *Thottivale*, *Kaluvale*, *Sidivale*, and *gotavale*. Raghavanka has described two types of Bestha(fisherman) community- they are '*meenugaara bestha*' and '*jalagaara bestha*'.

Both Raghavanka and Someshwara have explained various types of fishes that are available in various water bodies like the ocean, sea, river, tank, lakes *etc.*. They have also provided descriptions of the fishes in the river and the sea. Raghavanka has explained various types of fishes in his book. In Someshwara's '*Manasollasa*' various (culinary) khaadhya recipes for fishes are mentioned. Using fish, both as a source of food and plant manures is also mentioned.

Out of 30 districts in the state, Dakshina Kannada, Uttara Kannada and Udupi districts are the only districts that have a sea coast. Of the 300 km of coast line in the state, 42 km is in Dakshina Kannada and 98 Km is in Udupi, remaining 160 Km is in Uttara Kannada district. Of the vast area that encompasses the Arabian sea, the State has 27,000 sq km continental shelf and 87,000 sq km area of exclusive economic zone. This area is available for fishing and other ocean related economic activities.

Generally, during the southwest monsoon, neither traditional boats nor mechanized boats venture into the sea for fishing activities. These three months are not suitable for marine fishing. The rivers bring in plenty of fresh water to the sea and reduces the temperature and salt concentration during monsoons. This type of relatively cold water contains high levels of nutrients, whereas they are deficient in oxygen availability. The highspeed winds of the monsoon coupled with a higher tidal pressure, helps in proper mixing of cold and normal water. This helps in the accumulation of food nutrients which in turn helps in the growth of fishes. This region attracts fishes in groups for food, during almost all seasons.

Mackerel and oil sardines which are considered as the backbone of coastal/marine fishing are available in plenty. The production of Mackerel fish is very high and the state's coastline is referred to as the '*Mackerel coast*'. These are available in plenty, starting from the *Rathnagiri* coast of Maharastra to Quillon in Kerala. Having 62 per cent of meat portion this fish is preferred by most of the coastal population. Considering its importance in fishing, the Government of India declared mackerel fish as the '*National fish*'. In the coastal region of

the state about 50 varieties of fishes are recognized as economically important. Apart from Mackerel and Oil sardine, the other important fishes are prawn, other oil sardine fishes, *Anchoviella*, *Sciaenids*, *Seerfish*, *Cuttle* fish, etc..

Prawn, as a seafood resource, is considered as the gold mine of the sea and is available in plenty in the coastal area of the State. This resource which is economically valuable is in great demand in the international market. To increase prawn production, intensive prawn cultivation is in practice all along the coastline. The unscientific method of cultivation causing environmental pollution, deterioration in the quality of water bodies and other social related problems forced the Supreme Court of India to pass an order to ban/to destroy all the prawn cultivation ponds within the vicinity *i.e.* 500 m from the coast. In response to an appeal in this regard, the court has agreed to review its order and may suggest adopting some measures that are environmentally friendly. In Dakshina Kannada district prawn cultivation is done only in a few places.

Table 4.12: Fishing boats in the district during the year 2004-05

Sl. No.	Landing canters	Pursene	Trawlers	Gil Netters	Log Liners	Other mechanized boats	Total
1)	Details of mechanized boats for the year 2004-05						
Udupi taluk							
1	Hejamadi	03	24	122	-	-	149
2	Polippu	-	-	177	-	-	177
3	Udyaavara	-	-	69	-	-	69
4	Malpe	104	636	485	-	-	1233
5	Hangarakatte	-	125	75	-	-	195
Kundapura taluk							
6	Bijaadi	-	-	77	-	-	77
7	Gangolli	35	210	499	29	-	773
8	Navunda	-	-	250	-	-	250
9	Tarapathi	-	-	250	-	-	250
10	Shiruru	-	-	260	-	-	260
	Total	142	995	2264	29	-	3430

Sl. No.	Landing Canters	Kairampani / Shore Seanes	Patte Bale Gatakagalu	Others	Total
2) Details of non mechanized boats					
Udupi taluk					
1	Hejamadi	02	-	54	56
2	Polippu	08	-	74	82
3	Udyaavara	01	-	268	269
4	Malpe	25	-	655	680
5	Hangarakatte	04	-	225	229
Kundapura taluk					
6	Bijaadi	08	-	12	20
7	Gangolli	10	42	213	265
8	Navunda	03	22	35	60
9	Tarapathi	05	36	66	107
10	Shiruru	-	-	290	290
	Total	66	100	1892	2058

Marine fishing in the State has been complete in all respects since many decades. The important one being the use of a big fishing net called '*Rampani*' in the fishing activity of the district. This net has the capacity to catch bigger fishes and also catch various other fishes in its vicinity. Most importantly, Mackerel, oil sardine and other shoal fishes can be caught in this net. Previously, these nets were used in plenty thus supporting thousands of fishermen of the coastal region. With each net, approximately 100 fishermen could catch shoal fishes on a co-operative basis. After the introduction of purse seine boats, the importance of Rampani nets were reduced. The smaller version of the rampani net is called '*hand rampani*' or '*payodha*'. This can be used with small boats and by very few people. Hand rampani is used occasionally during monsoon and in places where bigger rampani cannot be used.

Though, fishing by mechanized boats are banned along the state coast, traditional boats are allowed. Traditional fishermen can conduct fishing activities using outboard engine during monsoon. Hence, in recent days, the number of such boats is on the rise which will have a negative impact on the resources. In view of this, there is a need to conduct a scientific study on the impact of fishing during monsoon using hand rampani nets. This is important considering the social and economic development of the poor fishermen. The wooden boats that

are four to eleven metres in length, are the commonly used traditional boats. Generally, these boats are carved out of a single piece of wood and are called dugout boats. These boats are run using an oar or barge.

The programme of mechanization of traditional boats was started during 1980s resulting in the extension of marine fishing activities. During 1976 purse seine boats were introduced for the first time in the district and have earned fame for their capacity to catch mackerel and oil sardine fishes and are hence accepted by fishermen. Presently each purse seine boat with advanced technology costs about 20 lakh rupees. The number of these boats has gradually increased resulting in the fishermen earning good money. As the number of these boats increased, the fishes available to each such boat has started decreasing. The length of the nets of each purse seine boat is about 500 to 800 m and the depth from which it can catch is in the range of 50 to 70 m. Naturally, the fishing capacity is more. Each purse seines boat has the capacity to catch about three to seven tonnes of fish, everyday.

Fishing using Trawls, purse seine boats, motorized Gillnet boats and other motorized boats are prohibited during rainy season (June 1st to August 31st). Fishermen follow this strictly. This season is the breeding season for most of the fish varieties; this practice helps the fishes to complete their breeding and thus leads to an increase their respective population.

Initially, all trawl boats worked on one-day trawl fishing. This practice means, on a single day all the boats are used for fishing, to bring the prawns harvested, into the same station/ harbour. As the availability of prawns reduced, it became difficult to cope even with the expenses incurred on diesel. In order to continue fishing without incurring losses, multiple days of trawl fishing has been brought into practice. Accordingly, trawls stay at sea for 3-4 days and sufficient quantity of ice cubes are also carried along. Due to this practice, boats can go deep into the sea for fishing. Uneconomical purse seine boats are converted/changed into trawl boats and used for fishing.

In recent years, importance is being given to inland fisheries in the district. The district has 108 small tanks with facilities for hatcheries with a total area of 34.74 ha. The fisheries department is procuring and distributing artificially produced *Katla*, *Rohu*, *Mrughal*, and other fingerlings to increase economically viable fish varieties in these tanks.

Table 4.13: Fishing nets in the district during the year 2004-05

Sl. No.	Landing Canters	Dragnets	Gil netters	Tralnets	Cyastnets
1	Hejamadi	15	75	75	103
2	Polippu	27	170	-	94
3	Udyaavara	-	73	-	63
4	Malpe	35	110	2565	400
5	Hangarakatte	14	81	130	140
6	Bijaadi	06	-	-	18
7	Gangolli	58	200	600	85
8	Navunda	55	70	-	10
9	Tarapathi	150	80	-	60
10	Shiruru	12	1040	-	30
	Total	372	1899	3370	

...cont'd

Sl. No.	Landing Canters	Shore Seanes	Others	Disco Nets	Pursenes	Total
1	Hejamadi	-	03	60	20	351
2	Polippu	-	-	127	32	450
3	Udyaavara	77	-	26	13	252
4	Malpe	-	95	360	68	3633
5	Hangarakatte	-	-	95	-	460
6	Bijaadi	-	-	75	40	139
7	Gangolli	05	75	616	330	1969
8	Navunda	08	-	165	30	338
9	Tarapathi	09	-	580	70	649
10	Shiruru	-	-	-	-	1082
	Total	99	173	1804	602	9323

Table 4.14: Fishing nets in the district during the year 2004-05*in metric tonnes & value in lakh rupees*

Sl. No.	Name of the species of fish	2000-01		2001-02		2002-03	
		Quantity	Value	Quantity	Value	Quantity	Value
1	Sharks	493.98	186.42	524.60	205.99	335.47	187.63
2	Rays and skates	68.60	11.73	116.08	24.92	172.53	57.49
3	Oil sardines	9932.98	1043.97	9789.38	766.72	12168.82	860.68
4	White sardine	129.70	29.70	100.85	25.84	504.39	80.90
5	Othersardine	1304.00	100.37	1008.82	89.81	2468.73	213.48
6	Other clupedis	1546.61	82.81	1546.23	112.74	1127.12	85.07
7	Silver bar	63.50	8.91	71.17	11.56	191.75	23.21
8	Mackerel	6428.16	1335.21	2557.07	602.80	3375.45	933.67
9	Seer fish	1466.11	795.01	856.69	500.83	1321.67	885.48
10	Tuna	2434.37	173.83	906.06	77.47	1054.19	102.10
11	Lacrarius	552.90	81.26	563.62	75.39	525.19	89.38
12	Lady fish	100.05	75.18	48.45	44.18	17.00	12.02
13	Mallets	109.50	26.59	84.12	22.52	17.00	7.21
14	Carangids	1580.00	66.36	2467.24	110.42	2410.40	243.72
15	Promfrets	338.35	217.13	253.28	184.92	240.00	209.75
16	Silver Bellie	1961.70	67.08	1270.48	87.58	1536.89	110.36
17	Gerres	31.62	8.93	15.51	6.91	2.00	0.72
18	Sciaenids	1860.20	171.53	1757.89	214.26	995.80	111.89
19	Ribbon fish	4195.15	261.36	944.95	47.44	32269.64	09.37
20	Flat fish	108.40	17.04	121.60	20.88	84.34	13.77
21	Anchoviella	471.30	51.91	375.88	27.03	513.00	69.25
22	Big eye	-	-	-	-	1335.00	120.76
23	Cat fish	353.70	4603	291.09	41.66	278.50	43.86
24	Eels	0.00	0.00	0.00	0.00	1.00	0.05
25	Soles	3413.29	171.43	2130.45	133.75	980.25	121.32
26	Jew fish	162.04	25.52	301.00	52.62	540.68	93.80
27	Lizard fish	-	-	-	-	1204.97	110.09
28	Pink Perch	-	-	-	-	37.57	308.64
29	Prawns	1771.60	1496.67	2532.22	2339.64	3530.41	5022.48
30	Rock cob	-	-	-	-	952.15	114.18
31	Crabs	848.25	79.97	789.10	57.57	691.92	89.05
32	Shell fish	48.50	1.34	115.00	6.29	-	-
33	Squids	2146.24	858.80	1838.67	699.14	2912.13	1263.78
34	Squilla	6289.64	65.98	5585.63	57.36	3757.32	80.58
35	Miscellaneous	17603.77	1010.78	13492.79	739.65	6775.20	389.07
	Grand Total	67514.21	8568.94	52455.92	7387.89	59005.39	12434.81

Table 4.15: Month wise production of sea fish in the district*in metric tonnes & value in lakh ₹*

Sl. No.	Months	2000-01		2001-02		2002-03	
		Quantity	Value	Quantity	Value	Quantity	Value
1	April	5509.25	695.37	4741.65	493.20	6775.92	850.09
2	May	5326.46	649.40	3776.93	413.49	6825.90	719.442
3	June	1434.85	477.35	919.00	326.68	1912.48	370.33
4	July	2038.81	626.85	2204.03	1058.33	2908.06	1156.12
5	August	2268.00	453.75	4064.49	847.03	3300.17	618.05
6	September	11580.48	1388.27	8141.32	822.46	9753.15	1156.62
7	October	11810.89	1093.91	7078.38	653.31	7502.56	1164.88
8	November	7035.81	764.37	2178.74	426.97	5234.94	773.37
9	December	5652.61	640.61	3437.12	416.28	6272.98	996.96
10	January	5973.10	750.42	3893.00	436.08	5986.64	1035.29
11	February	4012.20	515.20	5586.41	631.82	3865.58	792.91
12	March	4871.75	517.44	6434.85	862.24	4871.80	963.04
	Total	67514.21	856.94	52455.92	7387.89	65210.14	10597.10

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Sl. No.	Months	2003-04		2004-05	
		Quantity	Value	Quantity	Value
1	April	5995.15	1209.84	4592.99	731.66
2	May	7873.14	1652.19	3406.90	795.79
3	June	2831.99	667.72	1806.30	521.14
4	July	1328.60	1060.65	1659.40	949.16
5	August	4725.55	1096.81	3464.70	1905.48
6	September	11503.20	1740.14	8451.45	1451.67
7	October	7530.19	1184.83	8846.25	1108.35
8	November	5780.80	766.54	4721.46	734.82
9	December	4335.40	581.91	4179.56	926.64
10	January	3100.53	690.57	5966.84	1294.86
11	February	4126.15	708.08	6079.93	1020.14
12	March	4658.72	1022.84	5829.61	1004.10
	Total	63789.42	12382.12	59005.39	1243.81

Table 4.16: Inland fish production from 2001 to 2005*in metric tonnes & value in lakh ₹*

Sl. No.	Landing canters	1999-2000		2000-2001		2001-2002	
		Quantity	Value	Quantity	Value	Quantity	Value
1	Mulki	1923.66	290.82	-	-	-	-
2	Hejamadi	-	-	1278.27	220.93	757.63	113.49
3	Polippu	3271.67	530.01	777.8	137.87	504.14	116.36
4	Udyaavara	1250.72	152.92	1470.9	117.48	187.23	20.87
5	Malpe	41156	4258	40653.5	4117.58	33034	3260.44
6	Hangarakatte	1479.6	234.74	3279.62	420.61	2899.9	299.9
7	Bijaadi	306	28.89	248.53	31.82	579.44	211.05
8	Gangolli	13283.28	1786.76	13774.1	2259.29	8879.51	1958.24
9	Navunda	1802	272.59	2383.35	445.64	2243.74	514.14
10	Tarapathi	2931	533.6	333.5	653.72	2801.5	720.44
11	Shiruru	44799	89.65	313.14	163.99	568.83	172.95
12	Tapathi	0.00	0.00	0.00	0.00	0.00	0.00

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Sl. No.	Landing canters	2002-2003		2003-2004		2004-2005	
		Quantity	Value	Quantity	Value	Quantity	Value
1	Mulki	-	-	-	-	-	-
2	Hejamadi	571.43	104.71	530.80	132.55	242.06	109.64
3	Polippu	473.62	101.84	386.06	103.87	564.04	117.52
4	Udyaavara	183.71	25.11	173.70	32.89	147.53	23.74
5	Malpe	37430	4178.83	45336.60	7662.80	42399.40	7324.05
6	Hangarakatte	2828.5	428.77	1904.01	451.44	938.56	297.25
7	Bijaadi	42.61	4.8	62.90	6.09	135.00	40.99
8	Gangolli	16978.53	3909.08	10269.00	2892.90	11079.00	4001.91
9	Navunda	2592	668.7	1468.00	306.48	611.00	43.36
10	Tarapathi	3358	909.32	568.00	30.91	1943.00	154.50
11	Shiruru	751.74	265.94	936.35	290.96	945.80	321.85
12	Tapathi	0.00	0.00	2154.00	473.05	0.00	0.00

in metric tonnes

Year	2000-01	2001-02	2002-03	2003-04	2004-05
Production	1,713.29	1,731.29	1,637.58	2,221.21	1,864.18

Varieties of fish found in the District

Sl. No.	Common Name	Scientific Name	Local/Vernacular Name
a)	Marine		
1	Sharks	<i>Xiloscyllium sp.</i>	Thate, Chate, Ballar
		<i>Stegostoma, scoliodon,</i>	
		<i>Rhizoprionodon</i>	
		<i>Galeocerdo, Carcharhinus, Sphyrna</i>	
2	Skates and Rays	Skates: <i>Rhynchobatus</i>	
		<i>Rhinibatus</i>	Tsorake, Torake, Atte
		Rays: <i>Dasyatis,</i>	Balliyar, Garagasa
		<i>Aetobatus, Aetomylaeus, Rhinoptera</i>	
3	Oil sardine	<i>Sardinella longiceps</i>	Bhuthayi, Baige
4	White sardine	<i>Escuolosa thoracata</i>	Bolanzeer
		<i>(Kowala coval)</i>	
5	Other sardine	<i>Sardinella</i>	Bhuthayi, Erabye, Suvadi
6	Anchovies	<i>Stiolephprus, Thryssa,</i>	Kollatara
		<i>Coilia, Setipinna</i>	
7	Other Clupeids	<i>liisha, Opisthopterus,</i>	Manangu
		<i>Nemastolosa, Nodonoto</i>	
		<i>stoma, Chirocentrus</i>	
8	Indian Mackerel	<i>Rastrelliger karnagurta</i>	Bangude
9	Seer	<i>Scomberomorus sp.</i>	Anjal
10	Tuna	<i>Thunnus sp. (Albacora,</i>	Khedaar
		<i>Yellowfin, Big eye tuna,</i>	
		<i>(Blue fin tuna)</i>	
		<i>Katsuwonus (Skip jack</i>	
		<i>Tuna); Ethynnus</i>	
		<i>(Little tuna)</i>	
11	Pomfrets	<i>Pampus Apolectes,</i>	Maanji, Bili
		<i>Parastromatous,</i>	
		<i>Niger sp.</i>	Maanji, Kappu maanji
12	Lactarius	<i>Lactrius lactarius</i>	Ade, Adavu

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Varieties of fish found in the District (cont'd)

Sl. No.	Common Name	Scientific Name	Local/Vernacular Name
13	Carangids	<i>Megalopsis cordyla</i> ,	
		<i>Sclaroides sp.</i> ,	Gondlu, Kadande
		<i>Trachinotus, Caranx</i> ,	
		<i>Selar, Carangoides</i>	Bonke kodwai
14	Silver Bellies	<i>Leiognathus sp., Secutor sp.</i> ,	
		<i>Gazza sp.</i>	Kuruchi, Kurchi
15	Sciaenids (Crockers)	<i>Sciaena, Protonibea</i> , <i>Johnius, Otolithus</i> , <i>Otolithoides</i>	Kalluru, Kodwai
16	Ribbon fish	<i>Trichiurus sp.</i> , <i>Lepturacanthus sp.</i>	Pambol
17	Flat fish	<i>Psettodes erumel</i> (<i>Indian Halibut</i>) <i>Cynoglossus, Pseudor</i> <i>Honus, Solea Synaotura</i> , <i>Euryglossa</i>	Chappate, Halage
18	Cat fish	<i>Arius sp. (Tachysurus)</i> <i>Plotosus sp.</i> ,	Thede, Sedee
19	Eels	<i>Congresox sp.</i> ,	Haavu Ucchu
		<i>Muraenesox</i>	
20	Pink perch	<i>Nemipterus japonicus</i>	Madmal
21	Crabs	<i>Scyllaserrata, Neptunus sp.</i> , <i>Matuta planipes</i>	Edi
22	Prawns	<i>Metapeneaus sp.</i> ,	
		<i>Penaeus sp.</i> ,	Sigadi, Ette
23	Pearl spot	<i>Etroplus sp.</i>	Kari, Eri
24	Silver Bellies	<i>Leognathus sp., Gazza sp.</i>	Karli
25	Soles	<i>Cynoglossus sp.</i>	Nangu, Erume
26	Shell	<i>Perna viridis, P. indica</i> <i>Crassostrea madrasennis</i> <i>Loliga sp.</i>	Chippu, Maruvai, Mali
27	Squids and Cuttle fish	<i>Loliga duvauceli</i> <i>Septaculeata, Sepia sp.</i> <i>Otapus sp.</i>	Bondas

...Cont,d.

Varieties of fish found in the District (cont'd)

Sl. No.	Common Name	Scientific Name	Local/Vernacular Name
28	Squilla	Mantis shrimp, Oratasquilla sp.	Pacche meenu
b)	Estuarine Fishes		
1	Lady fish	Sillago sihoma	Kaane, Kandike
2	Mulletts	Mugil Rhinomugil, Valamugil, Liza	Bodaas
3	Geerres	Gerres	
		Gerreomaarpha	Paiyi, Bainge
4	Etroplus	Etroplus suratensis,	
		E. maculates	
c)	Inland Fishes		
1	Cat fish	Wallogo attu Ompak binanlatus Mystus oar	Baale Goddale
	Mystus seenghata	Thuragi, Girlu	
2	Chelu meenu	Heteropneustes fossilis	Chelu
3	Ane meenu	Clarius batrachus	Murugodu, Aane
4	Bilihalati	Silonia childrenii	Bili Halapi
5	Common Carp	Cyprinus carpio var. communis	Pare
		C. carpio var. scalaris	Kannadi
		C. carpio var. nudus	Betthale
6	Grass carps	Ctenopharyngodon idella	Hullu gende
7	Silver carps	Hypophthalmichthys molitrix	Belli gende
8	Major carps	Catla catla	Catla
		Labeo calbasu	Kari, Kakke, Kemmacchalu
		Labeo rohita	Rohu
		Labeo fimbriatus	Kemmenu
		Cirrhina mrigal	Mrigal
9	Minor carps	Labeo bata Cirrhina reba Cirrhina fulungee Puntius ticto	Panchari Aarjee Aarjee Naya paise
		Puntius sarana	Gende

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Varieties of fish found in the District (cont'd)

Sl. No.	Common Name	Scientific Name	Local/Vernacular Name
10	Bilihargi	Puntius pulchellus	Biliaragi
11	Kolcha	Puntius kolus	Kolacha
12	Mahseer	Tor khadree Tor mussullah, Tor tor	Bili
13	Saslu	Rosbora	Saslu, pakke
14	Chappali meenu	Notopterus notopterus	Chappali
15	Murrels	Channa gachua Channa marulius Channa striatus Channa punctatus	Kallu korava Hoo kacchu, Avalu Kacchu Korava
16	Nettikannukorva	Glossogobius giuris	Nettikannukorva
17	Bitiha	Chela chela	Belli
18	Haragi	Barbus pulchellus	Aaragi
19	Pakke	Esomus daniconius	Meese pakke
20	Halati	Pseudotropicus lakree	Halati
21	Gambusia	Gambusia affinis	Gambusia
22	Jilebi	Tilapia mossambica	Tilapia, Jilebi

Source: Statistical Belletim of Fisheries 2004-05, Department of fisheries.