Pradhan Mantri Krishi Sinchayee Yojana

(PMKSY)

Udupi District
District Irrigation Plan

Nodal Agency
Joint Director of Agricullture
Department of Agriculture
Udupi Zilla Panchayat
Rajathadri, Udupi
2016

TABLE OF CONTENT

List of Tables

List of Figures

PART-II
Annexure Tables

1. Taluk wise rainfall in Udupi District
2. Gram Panchayath wise Land use pattern
3. Gram Phanchath wise population table
4. Production & Productivity of major crops
5. Taluk wise Ground water resources of Udupi District
6. Crop water requirement
7. a) Water requirement of different live stock
   b) Water requirement of live stock for 2020

8. a) Water requirement of Agro processing small and large scale units
   b)1 Water requirement of Domestic & Commercial units
   2 Water Requirement for SSI Industries
   3 Water Requirement for Large & Medium Scale Industries
   c) Water requirement of fishing harbour & break water unit at Hejamadi.

9. Village wise status of Command Area
10. Details of work under Varahi Irrigation Project.
11. Action Plan for completion of CADA & WM works

11.1 Atchkut details from ch.0.00km to 18.725 km of Varahi Right Bank Common Canal
11.2 Atchkut details from ch. 18.475 km to 42.73 km of Varahi Right Bank Canal
11.3 Atchkut details Distributory/Minor-wise of Varahi Left Bank canal
11.4 Achkut details of Varahi Lift Canal

12. Abstract of Action Plan of Minor Irrigation Department from 2016-17 to 2020-21

12.1 Action Plan for PMKSY from 2016-17 to 2020-21 under Minor Irrigation Department for Improvement of Madagas/Tanks
12.2 Action Plan for PMKSY from 2016-17 to 2020-21 under Minor Irrigation Departme for Vented Dam, anicut, pickups & Bhandaras

13 Action plan of Panchayatraj Engineering Division (PRED)

13.1 Action Plan for PMKSY from 2016-17 to 2020-21 of PRED for improvements of tanks

14. Action plan of PMKSY (Watershed) from 2016-17 to 2020-21

14.1 2016-17 Annual action plan of PMKSY (WD)
14.2 2016-17 Annual action plan of PMKSY-Per Drop More Crop)
14.3 PMKSY (WD)-MGNREGA Convergence Action Plan workwise detailed Action Plan

15. Strategic Action plan for Micro Irrigation under Horticulture Department from 2016-17 to 2020-21.
16. Strategic Action plan for Micro Irrigation under Agriculture Department from 2016-17 to 2020-21

Udupi District Irrigation Plan at Glance

The Government of India has accorded high priority for ensuring access to some means of protective irrigation to all agricultural farms in the country to produce 'per drop more crop', thus to bring much desired rural prosperity. With this vision, the Government of India has launched *Pradhan Mantri Krishi Sinchayee Yojana* (PMKSY) with the motto of *Har Khet Ko Paani.*PMKSY is to be implemented in area development mode based on area specific water resource endowments and needs. Programme architecture of PMKSY envisages decentralized State level planning and projectised execution structure. The States are expected to draw up the State Irrigation Plan (SIP) by consolidating District Irrigation Plans (DIPs). District Irrigation Plan (DIP) has, thus, been made the cornerstone for planning and implementation of PMKSY. DIPs are expected to present holistic irrigation development perspective of the district by carrying out stock-taking exercises of water resource potential, identify the needs and gaps in water management and irrigation infrastructure.

Udupi district has the lowest cropping intensity and lowest percentage of area under irrigation.Out of 110929ha gross cropped area, the gross irrigated area in Udupi district is 33642ha and net irrigated are is 32870ha. The irrigation intensity is 1.02. The percentage share of gross irrigated area in the gross cropped area works out to 30.3 percent, which is below both the state and national averages.Paddy, which is the only cereal crop grown in the district, is now grown mainly as rain-fed crop during Kharif season. Out of 49453 ha area under paddy, the rain-fed paddy during Kharif season accounts for 43012ha (87 percent). Hardly 13 percent of the area cultivated under paddy during rabi season is irrigated. The main irrigated crops grown in the district are areca nut, coconut and other horticulture and plantation crops. Sugarcane which was once grown in 2000 ha as irrigated crop is now almost abandoned with the closure of the sugar factory in Brhmavar.

Udupi district receives abundant rainfall of about 4000mm per annum. The district is also blessed with number of rivers, river tributaries and rivulets which provide very good scope for surface and ground water irrigation. There are, however, no any major and medium irrigation schemes in the district. The Varahi Irrigation Project, which was launched in the year 1979, is yet to be operational. At present, open-wells are the main sources of irrigation. Out of 33642 gross cropped area, 26465 ha (78.7 percent) are irrigated by open-wells. The lift irrigation accounts for 6 percent of the total gross cropped area. Tanks and tube wells only play minor role. The district has 26465 open wells, 289 tanks, 2226 lift irrigation and 520 tube wells. There are 48287 electricity pumps and 6362 diesel pumps installed in the district.

As per the latest ground water assessment, the ground water development in Udupi district is low to moderate and therefore considered under "Safe" category. Only 39.12 percent of the utilizable water resources are used for irrigation. After taking into account future demands for drinking and domestic services, livestock, industrial use and power generation, it is estimated that the balance ground water has irrigation potential of 50389 ha. The Varahi Irrigation Project which is under implementation is expected to irrigate 15702 ha; 8324ha in 33 villages of Kundapura taluk and 7378ha in 35 villages of Udupi taluk. Since the entire district falls under 'safe category' for surface and ground water exploitation, irrigation expansion for accelerated agricultural development through exploitation of both surface and ground water development in Udupi district poses real challenge.

Taking into consideration the water resource potential, demand for other uses and the water balance available for irrigation, the DIP for Udupi district aims at bringing additional 35615 ha cultivated area under irrigation. With the completion of the Varahi project and related lift irrigation schemes, the district expects to bring 18912 ha land cultivated in Kundapura and Udupi taluks under canal irrigation. With surface lift irrigation, PRED, minor and micro irrigation, additional 16703 ha cultivated land would be brought under irrigation. As per the PMKSY operational guidelines, the programme elements mainly focus on accelerating completion of on-going majour irrigation project (AIBP), surface and ground water minor irrigation and adoption of micro and precision irrigation (Har Khet ko Pani) and Watershed development particularly through converging MGNREGA (More crop per drop).

The detailed block-wise and village-wise irrigation schemes are identified and the DIP is a consolidated Block Irrigation Development Plans. While formulating the DIP, the strategies considered for accelerating irrigation development in the district are as follows:

- Completion of on-going Varahi Irrigation project through construction of canal distribution system to identified 33 villages in Kundapura taluk and 35 villages in Udupi district to bring15702 ha under irrigation.
- Construction of Lift Irrigation Schemes from Varahi at Irabailu, Siddapura and Sowkuru and one at Yennehole.
- Construction of 432 new vented dams to rivers to control entry of salt water, augment underground water recharge of wells and tube wells and enhance ground water table in their command areas and encourage lift irrigation.
- Rehabilitation of existing tanks/Madagas for rain harvesting and irrigation through channels
- Construction of bunds/barricades/Kattas to streams and rivulets for community irrigation during Rabi and summer seasons. Grama Panchayats would be made responsible for this community based initiatives through MGNREGA.
- Effective watershed development for efficient and productive water use and management by converging MGNREGA
- Encourage micro and precision irrigation at farm level.
- Capacity building, training and awareness campaign for encouraging farmers to attain ‘more crops per drop’.

Following these strategies and based on the year-wise physical programmes to be achieved, the allocation of financial resources required to achieve the set development objectives are worked out. Table below shows the summery of the financial plan for the DIP. The total investment outlay for comprehensive irrigation development in the district over the next five years would work out to Rs.1988.06crore. Out of this total outlay, Rs 1232.54crore (62 percent) for completion of on-going Varahi Irrigation Project and lift irrigation projects. Other major components are minor irrigation through vented dams, pickup, Bhandaras, tanks and Madagas which would require Rs.577 crore over a five year plan period. Traditionally seasonal Kattas/Bunds or barricades to store water from streams/rivulets for community irrigation during rabi and summer seasons were very common. The DIP proposes to revive this community irrigation through Grama Panchayats with convergence of MGNREGA. The watershed component and minor irrigation programmes also include funds required for awareness campaign and farmers’ capability building initiatives for efficient and productive use of irrigation water.

For each component, project reports will be prepared based on all essential ingredients i.e. feasibility studies, investment outlay, competence of implementing agencies, anticipated benefits

Table 5.2
PMKSY: District Irrigation Plan: Financial Plan
(Rs.in Lakh)

Component		2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	TOTAL
		Estimated cost (in Lakhs.)							
AIBP	AIBP	16988.57	19963.57	19663.57	17083.57	17097.57	16228.57	16228.5	123254
Har khet ko pani	CADA Shivamoga		715.00	923.00	1061.68	1283.35	1540.69	0	5524
	Minor Irrigation	16530.00	14035.00	11330.00	19270.00	64000.00	0	0	125165
	PRED	1044.00	1205.00	1171.00	1180.00	1040.00			5640
Per drop more crop	Agriculture Dept	132.30	132.3	132.3	132.3	132.3			662
	Watershed	134.16	135.23	143.9	144	145.84			703
	CADA shivmoga		0	32.00	53.33	391.65	659.31		1136
	Horticulture Dept	134.00	134.00	134.00	134.00	134.00			670

PMKSY	PMKSY Watershed	485.33	506.44	503.70	503.46	528.70			2528
Convergence with MGNREGA	Irrigation through GPs-construction of bunds/barricades to store water in streams/rivuleT Watershed	50.00	50.00	50.00	50.00	50.00	50.00	50.00	350
	MGNREGA Watershed	106.33	109.14	101.80	111.87	110.80			540
	MGNREGA Varahi	50.00	50.00						100
Western Ghat Project Plan		42.66	300.00	300.00	300.00	300.00			1242.66
Total		**35697.35**	**37335.68**	**34485.27**	**40024.21**	**85214.21**	**18478.57**	**16278.57**	**267513.85**

that will flow to farmers,time schedule for implementation etc. Annual Irrigation Plan (AIP) will be based on the DIP and feasibility reports on various components.

The programmes proposed in the DIP will facilitate not only water conservation, water use efficiency and *har khet ko pani*, but also crop diversification, increasing cropping intensity,adoption of integrated farming system and new technologies, productivity growth and doubling of farmers' income by the year 2020. With the implementation of the proposed DIP, agriculture in the district will become a commercial venture.

As per the operational guidelines of PMKSY, the DIP would be implemented in area development mode by adopting decentralized panchayat raj structure governance. The District Agriculture Department is the nodal agency for coordination and monitoring physical and financial progress. Actual implementation of various irrigation schemes will be the responsibility of the concerned Departments particularly Department of Varahi Project, Major and Minor Irrigation, Agriculture and Horticulture Departments. The District Level Implementation Committee (DLIC) will be formed, chaired by the Deputy Commissioner and comprise of CEO of ZP, Project Director, DRDA, CPO of ZP, Joint/Deputy Directors of Departments of Agriculture, Horticulture, Rural Development, Surface and Ground Water Resources, Irrigation and other line Departments of ZP, District Forest Officer, Lead Bank Officer of the District, two progressive farmers and a leading NGO working in the district as members. The Nodal Agency will be the member Secretary. The DLIC will oversee the implementation and inter-departmental coordination to ensure successful implementation of the DIP. It is also responsible to prepare Annual Irrigation Plans (AIPs) based on DIPs and submit periodic reports to State Level Sanctioning Committee (SLSC) which is chaired by the Chief Secretary of the State. This committee at State level *inter alia* vested with the authority to prioritize funding of projects, sanction DIPs and monitor and review implementation progress.

Chapter I
District Irrigation Plan: Preamble

Water is the basic necessity not only for irrigation for agriculture but also for human and animal consumption, fisheries, hydropower and industrial production. The economic development of the country is intricately and inseparably related to the efficient management of the scarce water resources and use of its in adequate quantity where and when it is needed. However the major problem in India is the severe shortages of water resources in many regions seasonally as a result of over exploitation of ground water and resultant depletion of underground water table, lack of conservation and underutilization of surface sources of water and uneven distribution of water resources over time and space. Even in the case of agriculture, out of about 141 million ha of net cultivated area in the country, only about 65 million hectare is presently covered under irrigation; this works out to 45 percent. Nearly 55 percent of the total net cultivated area is unirrigated and depend on rainfall. The rain-fed agriculture inherently characterized by low productivity and high risk and instability in production. Irrigation is critical for adoption of modern farming technology and inputs for productivity enhancement and increase farm income. There is therefore a need for optimal use of scarce water resources and ensuring access to irrigation to all agricultural farms

Recognizing the critical need of scarce water resource management and access to irrigation to all agricultural farms, the Government of India has accorded high priority for ensuring access to some means of protective irrigation to agricultural farms in the country to produce 'per drop more crop', thus bringing much desired rural prosperity. With this overreaching vision, the Government of India has launched *Pradhan Mantri Krishi Sinchayee Yojana* (PMKSY) with the motto of *Har Khet Ko Paani.*

1.1 Pradhan Mantri Krishi Sinchayee Yojana (PMKSY)

1.1.1 Objectives

The broad objectives of PMKSY are to achieve convergence of investments in irrigation at the field level, expand cultivable area under assured irrigation, improve on-farm water use efficiency to reduce wastage of water, enhance the adoption of precision-irrigation and other water saving technologies, enhance recharge of aquifers and introduce sustainable water conservation practices by exploring the feasibility of reusing treated municipal waste water for peri-urban agriculture and attract greater private investment in precision irrigation system.Following are set out as the specific objectives under the programme:

a. Achieve convergence of investments in irrigation at the field level (preparation of district level and if required, sub-district level water use plans)
b. Enhance the physical access of water on the farm and expand cultivable area under assured irrigation (Har Khet Ko Pani)
c. Integration of water source, distribution and its efficient use to make best use of water through appropriate technologies and practices
d. Improve on-farm water us efficiency o reduce wastage and increase availability both in duration and extent.
e. Enhance the adoption of précis ion-irrigation and other water saving technologies (More crop per drop),
f. Enhance recharge of aquifers and introduce sustainable water conservation practices
g. Ensure the integrated development of rain-fed areas using the watershed approach towards soil and water conservation, regeneration of ground water, arresting runoff, providing livelihood options and other NRM activities

h. Promote extension activities relating to water harvesting, water management and crop alignment for farmers and grassroots level field functionaries
i. Explore the feasibility of reusing treated municipal waste water for peri-urban agriculture and
j. Attract greater private investments in irrigation.

1.1.2Strategy and Focus Areas

To achieve the above objectives, the PMKSY strategize by focussing on end-to end solution in irrigation supply chain viz. Water source, distributing network, efficient farm level applications, extension services on new technologies and information. Strategically The PMKSY focuses on:

- Creation of new water sources, repair, restoration and renovation of defunct water sources, construction of water harvesting structures, secondary and micro storage, ground water development, enhancing potentials of traditional water bodies at village level.
- Developing/augmenting distribution network where irrigation sources (both assured and protective) are available or created
- Promotion of scientific moisture conservation and runoff control measures to improve ground water recharge so as to create opportunities for farmers to access recharged water through shallow tube/dug wells
- Promoting efficient water conveyance and field application devices within the farm viz. Underground piping system, drip and sprinklers, pivots, rain-guns and other application devices etc.
- Encouraging community irrigation through registered user groups/farm-producers' organizations/NGOs and
- Farmer oriented activities like capacity building, training and exposure visits, demonstrations, farm schools, skill development in efficient water and crop management practices (crop alignment) including large scale awareness on more crops per drop of water through mass media campaign, exhibitions, field days, and extension activities through short animation films etc.

The aforesaid areas only outline the broad contours of the PMKSY. The programme interventions should take into consideration location specific water resource conditions and requirements which should be identified through District and State Irrigation plans.

1.1.3 Programme Components

The PMKSY envisages the following programme components:

A. **Accelerated Irrigation Benefit Programme (AIBP)**: Completion of on-going major and medium irrigation including national projects.
B. **Har Khet Ko Pani:** This component focuses on augmenting of water resources and development of distribution network from source to the farm. The components include creation of new water resources through minor irrigation both surface and ground water, repair, restoration and renovation of water bodies, improving carrying capacity of traditional water sources and construction of rain water harvesting structures (Jal Sanchay), command area development through strengthening and creation of distribution network from sources to farms, ground water development through sink creation measures to store runoff/flood water during rainy season, micro/precision irrigation, improve water management and distribution system, diversion of water from source of plenty to nearby water scarce areas through lift irrigation from rivers/water bodies and rejuvenating traditional water storage systems at feasible locations.
C. Per Drop More Crop: This could be achieved through efficient on-farm water management system. The programme components include: promoting efficient water

conveyance and precision water application devices like drips, sprinklers, pivots, rain-guns in the farm (Jal Sanchan), construction of micro irrigation structures to supplement source creation activities including tube wells and dug wells wherever ground water available, secondary storage structures at tall end of canal system to store water whenavailable in abundance during rainy season or from perennial sources for use during dry period, water lifting devices like diesel/electric/ solar pump sets, extension activities for promotion of scientific moisture conservation and agronomic measures (Jal sancta), capacity building training and awareness campaign and ICT interventions through NeGP-A.

D. **Watershed Development:** Effective management of runoff water an improved soil and moisture conservation activities such as ridge area treatment, drainage line treatment, rain harvesting, in-situ moisture conservation and other allied actives on watershed basis and converging with MGNREGS for creation of water sources to full potential in identified backward rainfed blocks including renovation of traditional water bodies.

1.2 District Irrigation Plan (DIP)

PMKSY is to be implemented in area development mode based on area specific water resource endowments and needs. Programme architecture of PMKSY envisages decentralized State level planning and projectised execution structure. The States draw up their own State Irrigation Plan (SIP) by consolidating District Irrigation Plans (DIPs). District Irrigation Plan (DIP) has been made the cornerstone for planning and implementation of PMKSY. DIP are expected to carry out stock-taking exercises of water resource potential, identify the needs and gaps in water management and irrigation infrastructure by taking into consideration the District Agriculture Plan already prepared for Rastriya Krishi Vikas Yojana (RKVY), irrigation infrastructure currently available and resources that would be added during Twelfth Plan from other on-going schemes viz. Accelerated Irrigation Benefit Programme (AIBP) of the Ministry of Water Resources, River Development and Ganga Rejuvenation (Mower, RD&GR), Integrated Watershed Management Programme (IWMP) of Department of Land Resources (DoLR), the On Farm Water Management (OFWM) of Department of Agriculture and Cooperation (DAC), Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS), Rural Infrastructure Development Fund (RIDF), Member f Parliament Local Area Development (MPLAD) Scheme, MLA Local Area Development (MLALAD) Scheme and local body funds.

DIPs are expected to present holistic irrigation development perspective of the district outlining medium tolong term development plans integrating essentially three components: water resources, distribution network and water use applications incorporating all usage of water like drinking and domestic use, irrigation and industry. Hence the preparation of DIPs has to be taken up as joint exercise of all concerned departments. DIPs, thus, form the compendium of all existing and proposed water resource use network system in the district.

1.3 Process and Methodology

Keeping the above PMKSY objectives and guidelines, the DIP has been prepared at two levels, block and district. Creating access to water source either assured or protective to each farm require an in-depth demands and supply assessment of crop water requirement for various uses, effective rainfall and inventory of existing and potential new water sources considering geo-hydrological and agro-ecological profile of each block. This requires information on all sources of available water, distribution network, defunct water bodies, new potential water sources both surface and sub-surface systems, water harvesting structures, application and conveyance provisions crops and cropping pattern aligned to available quantity of water and suitable to local

agro ecology. All activities pertaining water harvesting, water augmentation from surface and underground sources, distribution and application of water including repair/renovation/restoration of water bodies, water harvesting structures, major, medium and minor irrigation works, command area development, precision irrigation etc are considered in the plan preparation process. Emphasises also given for reducing the gap between potential created and utilized through more focus on command area development and precision irrigation.

Since the preparation of DIP involves considering various parameters and modalities of water resources, distribution network and water use applications, the data collection and activity map preparation work was done primarily at block level. The Block-wise Irrigation plan was prepared by taking into account the available and potential water resources, present water use applications, and water requirement for agricultural development prioritizing the activities based on socio-economic and location specific requirement. For systematic planning, a SWOT analysis of the irrigation system in the district was done. The block-wise irrigation plan is formulated following intensive participatory consultation process with the concerned departments, Panchayat Raj institutions, Agricultural Research Centre Brahmavar, NGOs and main stakeholders, farmers' groups. Suggestions of local MP and MLAs are also incorporated in DIP.

The document for the DIP was divided into two parts. The Part-I contains main report of the DIP focusing on physiographic and agro-ecological features of the district, water scenario assessment, issues and challenges of irrigation development in the district, strategic action required for irrigation development and based on these analyses, the physical and financial plan for irrigation development in the district. The Part-II includes village-wise and block-wise supporting statistical tables based on which the the DIP was prepared.

Chapter 2

General Description of the District

2.1 Introduction

Udupi District is one of the thirty districts in Karnataka State. It came into existence as a separate district (District Code 569) on August, 24th 1997. The district comprises administrative subdivisions Kundapura, Udupi and Karkala taluks. Administratively, the district has 248 villages, 158 Grama Panchayats (GPs), one city municipality (Udupi City), two Town Municipalities (Kundapura and Karkala) and two Town Panchayats (Saligram and Kaup). Located between the foothills of Western Ghats in the East and Arabian Sea in the West, Udupi is one of the three coastal districts in the State. The district lies between 13^0 34'North latitude and 74^0 75' East longitudes covering an area of 3575 sq km. It is about 88 km in length and about 80 km in widest part and is bounded by Uttara Kannada district in the North, Shivamogga and Chikamagalur districts in the East and Dakshina Kannada district in the South, while Arabian Sea forms its western boundary. Location of Udupi district and the district map are given in Fig 2.1a and 2.1b.

Figure 2.1a: Location and District Maps

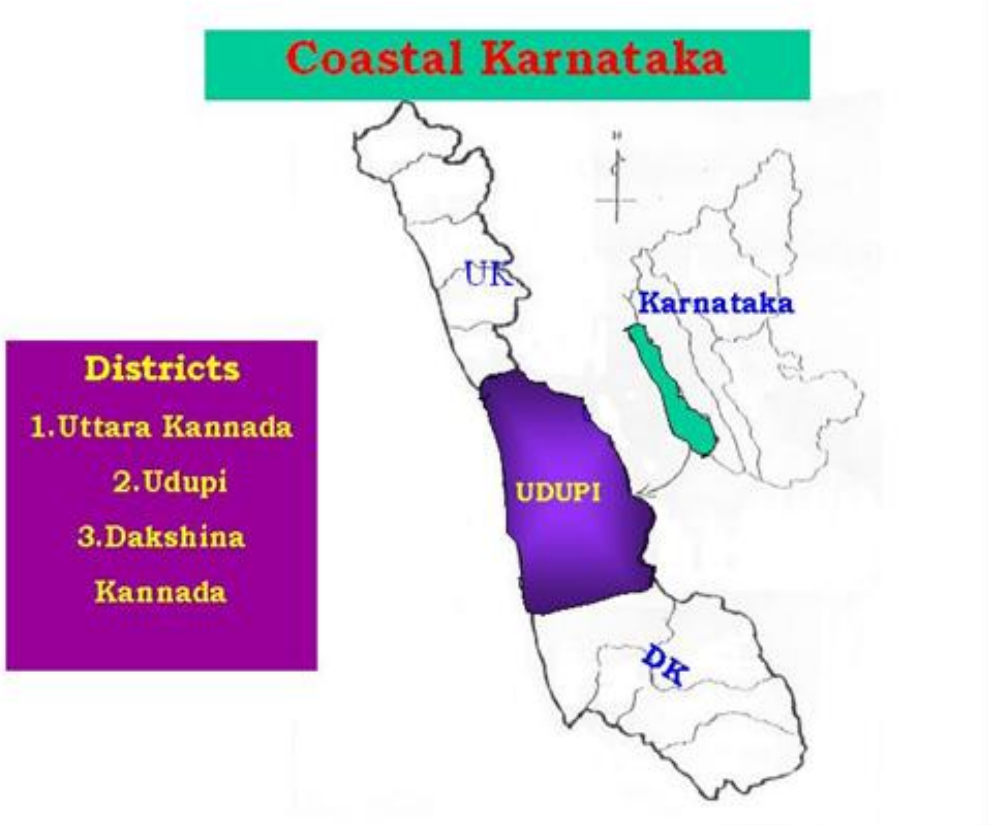
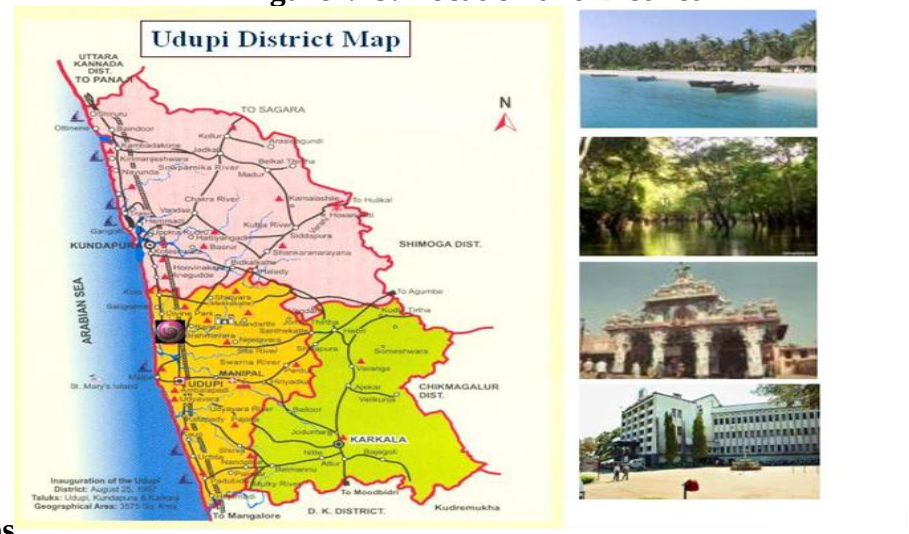


Figure2.1b: Location and District



Maps

The District constitutes a part of Tulu Nadu along with the neighbouring Dakshina Kannada. It is known for its temples, beaches, Udupi Hotels, and Udupi cuisine. It is also considered as the cultural and spiritual capital of Karnataka. Nagaradhane (snake worship), Bootharadhane (spirit worship), Kambla (Buffallo Race) and Yakshagana (classical folk dances) are well known indigenous cultural traditions. Jain, Christians and Muslim cultures evolved historically also integral part of the religious and cultural diversity in the district.

2.2 Physiographic Features of the District

The total geographical area of the district is 3575 square km, which constitute about 1.86 percent of the total geographical area of the state (Table 2.1). Geographically, Kundapura is the largest taluk with 1561 sq.kms 44 per cent), followed by Karkala, 1076 sq.kms (30 percent) and Udupi is the smallest, 928 sq.kms (26 percent). The district is blessed with diversified endowments of nature. The district has three distinct natural regions; coastal region with a coastal belt of about 98 kms, rolling midland plain terrain, covering 75 percent of the district and malnad region and the Ghat section with hills and thick forests. Many rivers take birth in the foothills of Western Ghats, flowing westwards and joining the Arabian Sea.

Table 2.1
Taluk-wise Geographical Area and Rainfall

Taluks/ District	Geographical Area (sq.kms)	Share in the District (per cent)	Rain Days	Normal Rainfall (mms)	Actual Rainfall 2014
Karkala	1076	30.18	128	4828	4600
Kundapura	1561	43.79	111	3925	3909
Udupi	928	26.03	110	3950	3320
District	**3565**	**100.00**	**129**	**4285**	**4009**
State	191791	1.86		1150	1144

Source: Udupi District at Glance: 2014-15. Note: Normal rainfall 1951 to 1990.

The district comprises of three distinct physiographic regions: coastal belt, Midland plain terrain and malnad. The narrow stretch of coastal tract consists of western parts of Kundapura and Udupi taluks with a coastal belt of about 98 km comprising beaches, spits and creeks, and backwater swamps. The midland part between Western Ghats and the coast which constitutes more than 50 percent of geographical area, is upland plain terrain intercepted with forested low hilly topography with valleys. The upland malnad region, consisting of eastern part of Kundapura and Karkala taluks is the Western Ghats forest area. The district has a large Western Ghats section with hills and thick forest cover accounting for 26 percent of total geographical area.

Table 2.2
Agro-Ecology, Climate, Hydrology and Topography

Agro Ecological Zone Type	Type of Terrain	Months	Average Monthly Rain fall* (mm)	No. of Rainy Days (No.)*	Maximum Rainfall Intensity (mm)			Average Weekly Temperature (C)						Potential Evapo-Transpiration (PET)			Cumulative Total	Elevation		
								Period						Period						
					Up to 15 Min	Beyond 15 but up to 30 Min	but up to 60	Summer (April-May)			Winter (Oct-Mar.)			Rainy (June-Sept.)			Summer	Winter	Rainy Season		Min.	Max.	Mean
ZONE-10	Coastal Plain & Western Ghat	Jan	1.0	0	150 mm/hr	100mm/hr	75mm/hr	24.3	33.97	-	23.8	33.10		22.9	31	-	36.63	28.5	29.76	94.89	0m	650m	*30-40mtrs*
		Feb	0.4	0																			
		Mar	4.0	1																			
		Apr	28.4	7																			
		May	167.8	13																			
		June	1127.3	26																			
		July	1457.0	31																			
		Aug	1048.0	30																			
		Sept	438.9	17																			
		Oct	212.9	18																			
		Nov	70.0	9																			
		Dec	15.6	1																			

* Average rain fall of 15 years ; Source :KSNDMC

Source: KSNMDC and KVK, ZARS, Brahmavar, Udupi Dist.

Udupi district has varied climatic zones. It is humid in the coastal region, cool in the Ghat region and warm in eastern region. Humidity is as high as 78 percent during greater part of the year. The temperature ranges from 22^0 C in winter to 37^0 C in summer. Agro-ecology, climate, hydrology and topography are shown in Table 2.2. There are four distinct seasons viz. rainy season from June to September, following withdrawal of monsoon, two months of warm and damp weather during October and November, a pleasant winter season between December and February and a hot and sultry summer season from March to May. The district is blessed with high rainfall from the south-west monsoon. Normal annual rainfall is about 4285mm, which is the highest in the state. The rainfall mostly spread during June to October. The number of rainy days in the district range from 116 to129. 2005 to 2014 yearwise rainfall is given in appendix annexure Table No.1 Part-II.

2.3 Land Use Pattern

Land utilization pattern in the district reveals that of the total geographical area of 3.56 lakh hectare (ha), the area under forest is one lakh ha (28 percent), area under cultivation, 96974 ha. (27 percent) and fallow land, 13460 ha (3.78 percent). The remaining 41 percent of the land is either not available for cultivation or uncultivable (Table 2.3).

Table 2.3
Land Utilization: 20014-15
(Hectares. Figure in bracket percentage))

Taluks	Geographical Area	Forest	Land not available for cultivation	Other Uncultivated Land	Fallow Land	Net cultivated area	Gross cropped area
Karkala	107586 (100.00)	32812 (30.50)	9342 (8.68)	36388 (33.82)	5128 (4.77)	23916 (22.23)	27319
Kundapura	156062 (100.00)	62605 (40.12)	23457 (15.03)	26952 (17.27)	1460 (0.93)	41588 (26.65)	47754
Udupi	92798 (100.00)	4686 (5.05)	21058 (22.69)	28709 (30.95)	6872 (7.40)	31470 (33.91)	35856
District	**356446 (100.00)**	**100103 (28.08)**	**53857 (15.11)**	**92049 (25.82)**	**13460 (3.78)**	**96974 (27.21)**	**110929**
State	**19049836 (100.00)**	**3071833 (16.12)**	**2173931 (11.41)**	**1614677 (8.48)**	**1785288 (9.37)**	**10404107 (54.62)**	**12873308**

Source: Annual Season Crop Report: 2014-15, DES.

The district has one of lowest percentage of area under cultivation in the state. The net cultivated area in the district is 27 percent of geographical area as compared to state's 55 percent. Taluk-wise data on land utilization shows that Kundapura has the highest forest area (40 percent) followed by Karkala (30 percent) and Udupi has lowest (5 percent). As against this, the proportion of net cultivated area is the highest in Udupi taluk (34 percent), followed by Kundapura (27 percent) and Karkala has the lowest (22 percent). The gross cropped area in the district is 1.11 lakh ha. The cropping intensity works out to 1.14 as against state average of 1.24 percent. Thelow cropping intensity is mainly due to lack of irrigation facilities. There is no much inter-taluk difference in the cropping intensity.With fast urbanization, land use for non-agricultural purposes is increasing and thereby limiting the scope for further increase the net cultivated area. However,

there is a good scope to increase the gross cultivated area by increasing the area under irrigation during rabi and summer seasons. There is also considerably a large area (35581 ha) of waste and fallow land which can be brought back under cultivation. The land use map of the district is given in Fig. 2.2. Annexure Table-2 Part-II contains GP-wise land-use pattern data.

Fig. 2.2: Land-use Map of Udupi District

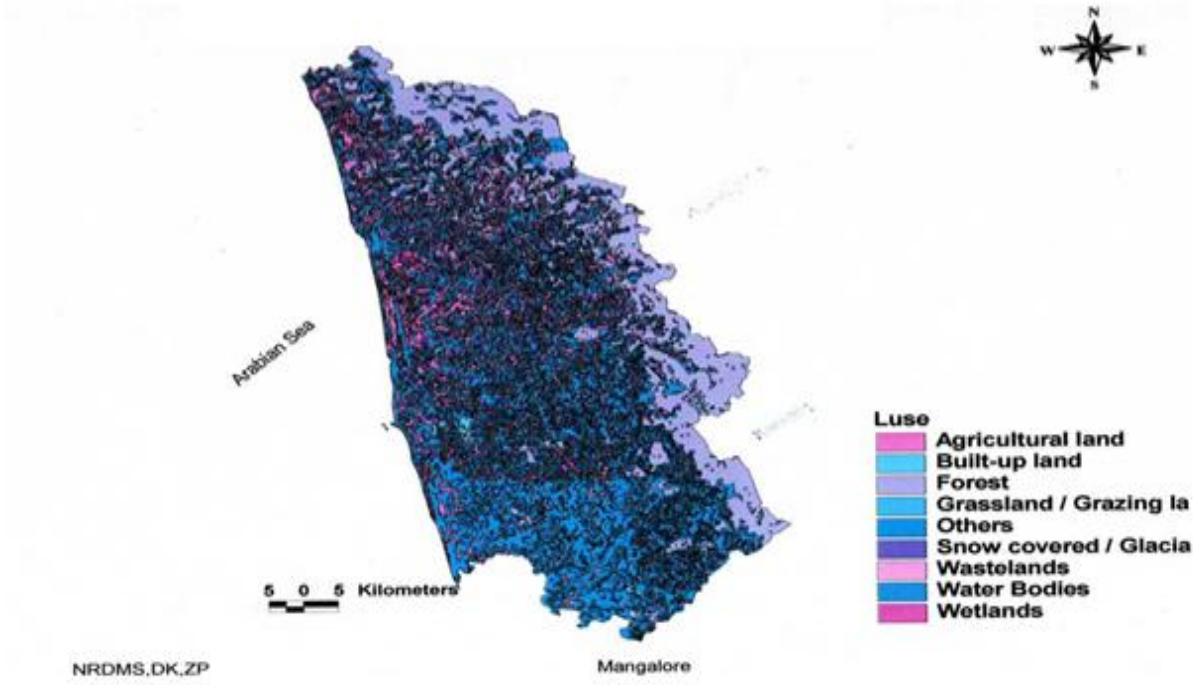
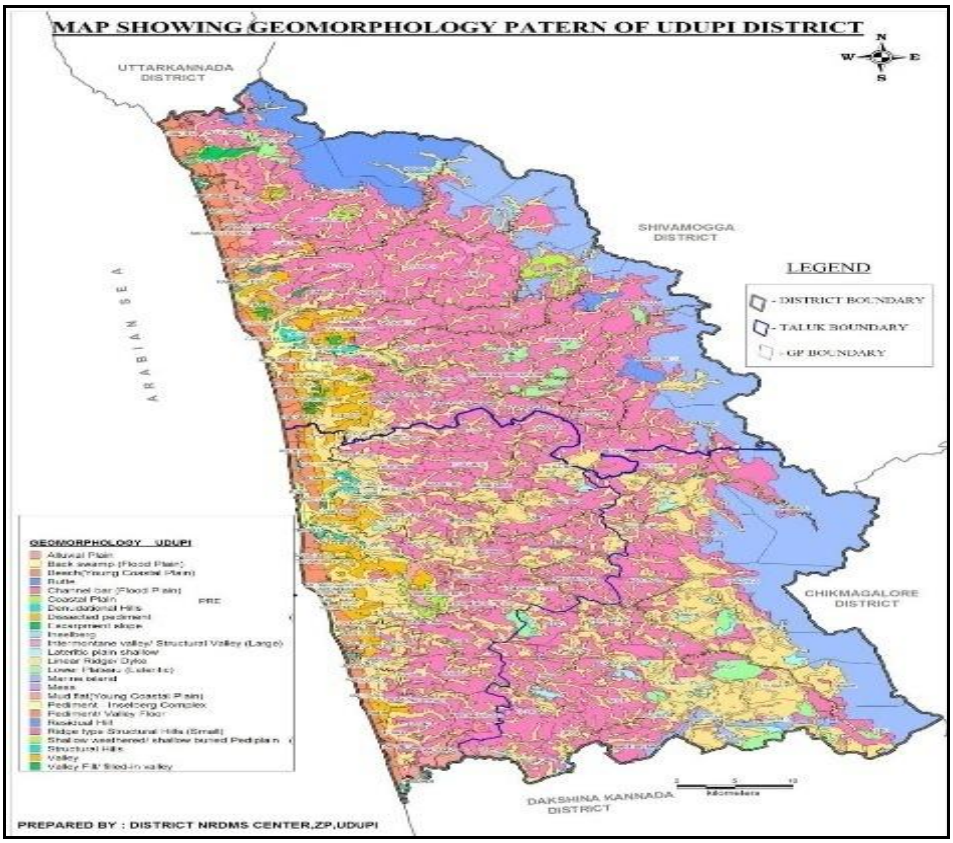


Fig.2.3 Map showing Geomorphology pattern of Udupi District



2.4 Soil Profile

Soil structure of the district contains three types: sandy alluvium soil, yellow loamy soil and red lateritic soil. The sandy soils are confined to narrow strip of the coastal belt having width ranging from less than 100 meter to about one km. The fine to medium texture sandy soils is characterized by their extremely high rate of infiltration. Yellow loamy soils, which are mostly found along river banks and lower valleys, are fertile and well suited for irrigation and proved to be responsive to irrigation practices. The red lateritic soils are the most dominant soil type in midland area. The texture of the soils varies from fine to coarse. The soils in the valleys and immediate slopes are rich in loam whereas in upper slopes and pediplanes, they are much coarser in nature. The soil in general is acidic due to heavy run-off, but rich in nitrogen and deficient in potassium and phosphorous. The land slope and soil profile are shown in Table 2.4.

2.4 Table : Soil Profile

Block	Area (ha)	Major Soil classes & Land Slope					
		0-3% (ha)		3-8% (ha)			
		Coastal alluvium (ha)	Low land (ha)	Mid land (ha)	Up land (ha)	Hillock (ha) 8-25% (ha)	Western ghats (ha) >25% (ha)
Udupi	**156059**	9268	9257	12818	29173	31983	0
Karkala	**107585**	773	6353	9273	33485	40976	16726
Kundapura	**92797**	10775	11482	15125	34810	47199	34304
Total	**356441**	**20816**	**27092**	**37215**	**98748**	**121540**	**51030**

Source: KVK & ZAHRS Brahmavar, Udupi Dist.

Fig.2.4 Land Slope in Udupi District

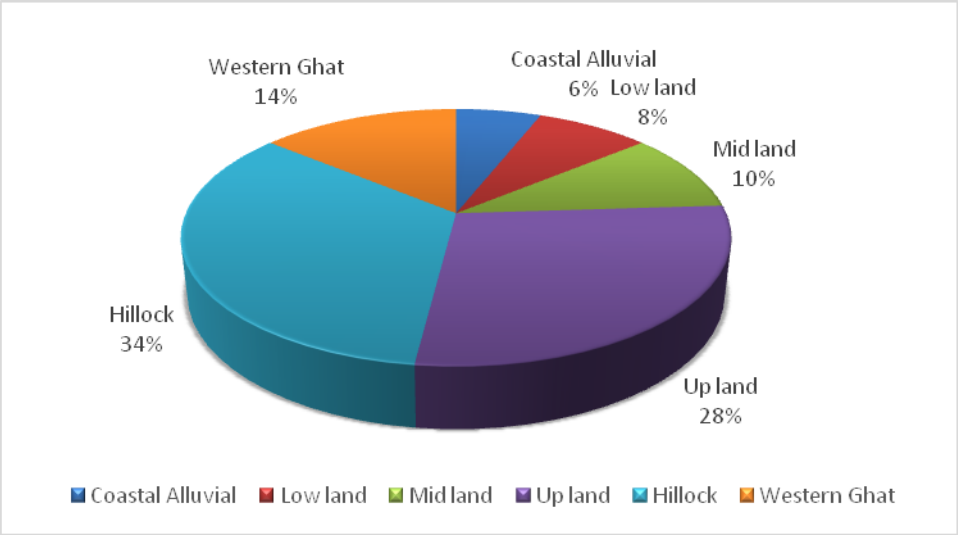
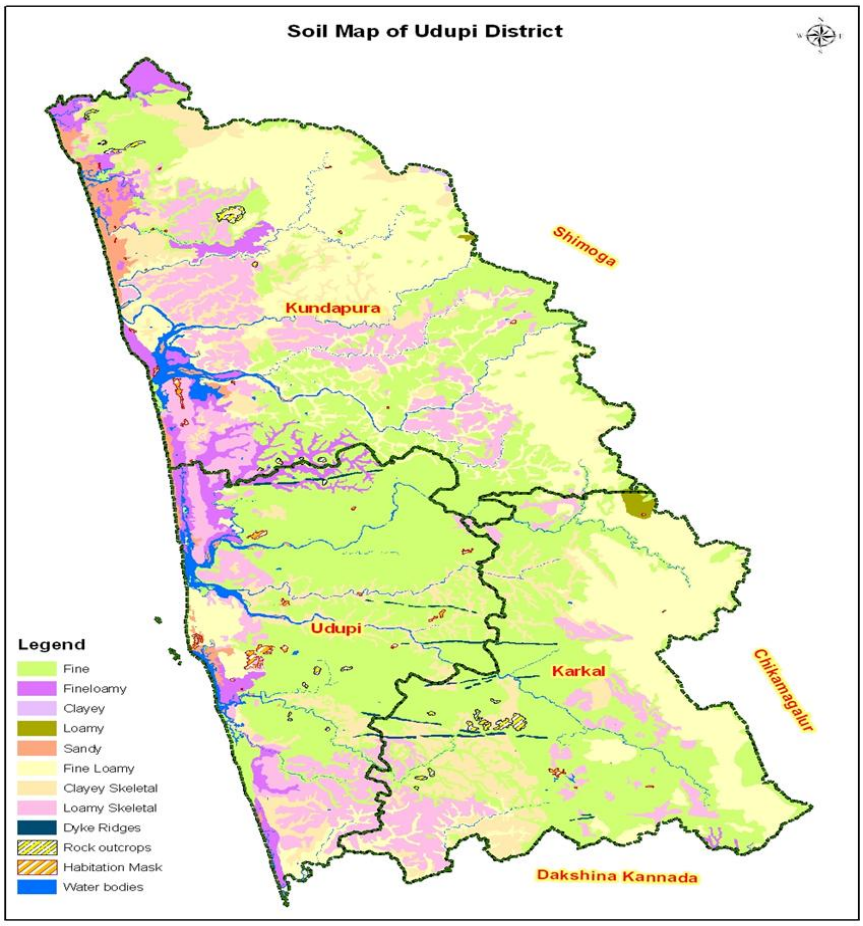


Fig. 2.5: Soil Map of Udupi District



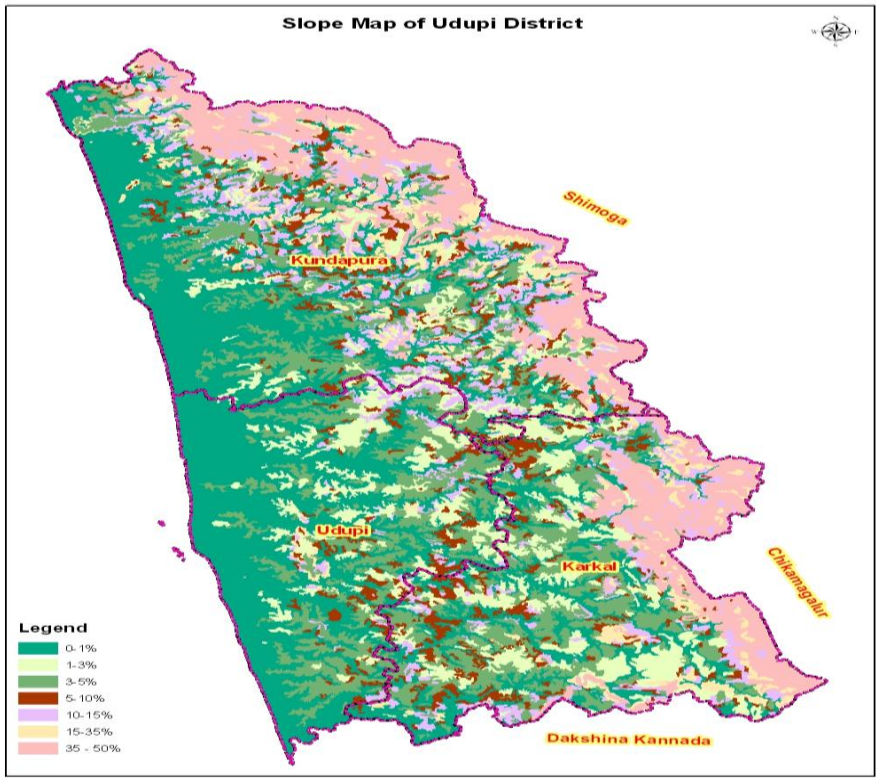


Fig.2.6 Slope May of Udupi District

There is no sediment monitoring station in Udupi District. Hence the data is taken from near by sediment monitoring station which present in Mudubidre block of Dakshina Kannada District and

Soil erosion by heavy rainfall and runoff causes serious loss of fertile topsoil. Soil compaction, low organic matter, loss of soil structure, poor internal drainage, Salinisation, and soil acidity problems are other serious soil degradation problems accelerated by the soil erosion process in the district. Greater the intensity and duration of a rainstorm, the higher is the soil erosion potential. The impact of raindrops on the soil surface can break down soil aggregates and disperse the aggregate material.Lighter aggregate materials such as very fine sand, silt, clay and organic matter are easily removed by the raindrop splash and runoff water; greater raindrop energy or runoff amounts are required to move larger sand and gravel particles. Since both District Soil erosion and run off status are presented in Table 2.5

.

Table 2.5
Soil Erosion and Run-off status

Name of the Micro Watershed	Name of Sediment Monitoring Station	Longitude	Latitude	Soil Erosion (Tone/Ha)	Runoff						Drought Frequency
					Peak Rate (cum/hr)	Frequency of Peak (No. in Months)	Total Runoff Volume of Rainy Season (ha-m)	Time of return of Maximum flood			
								5 years	10 years	In years	
IWMP-II	Padumarnadu(Mudbidre,Manglore) 543B4J2C	75°06’31.23”E	13°07’37.73”N	5-15	1270.8	three	96.96-101.64	-	-	-	Nil

The district is blessed with many rivers, most of which take birth in the foothills of Western Ghats, flowing westwards and joining the Arabian Sea. Important rivers of the district include: Seetanadi, Swarnanadi, Shambhavi, Chakra, Varahi (Haladi) and Gangolli. These rivers are perennial during normal rainfall years. There are many other minor rivers, tributaries and streams. They normally become dry during summer. In spite of many rivers, the district has one of the lowest net irrigated areas in the state.

Overshadowed by the Western Ghats in the east and Arabian sea in the west, the district has got many biospheres and genetic diversity. The Western Ghats Mountains have thick forests and vegetation and are rich in biodiversity. It is a treasure house of flora and fauna and medicinal plants. It has also falls such as Teethe Falls, and Barakana Falls and Someshwara Wild life Sanctuary and Mookambika wild life sanctuary. The district has 90km long coastal belt which provides good scope for fisheries in Udupi and Kundapura taluks. The coastal belt has a large number of wetlands, backwaters, estuaries and creeks, mangroves, salt marshes and lagoons. Malpe, Kaup, Thrasi and Maravanthe beaches are well known and have good tourism potential.

St. Mary's island has unique basalt rock formations and is a place of natural beauty. The district has also endowed with various mineral resource potentials. Iron-ores in Kerady of Kundapura Taluk, silica in Kaup, Moolur and Hejmady and aluminum reserves in Madalpare of Byndoor have been traced but not commercially exploited. Late rite and granite stones are available all across the state.

2.5 Demography

As per 2011 census, the total population of Udupi district is 11.77 lakh, of which 5.62 lakh were males and 6.15 lakh females (Table 2.6). The proportion of male population works out to 47.7 percent as against the women's share of 52.3 percent. The sex Ratio works out to 1094 as against state average of 973. The population of Udupi district has increased by 65118 persons during the decade 2001-11 and in terms of percentage; it has registered a decadal growth of 5.8 percent. The

Table 2.6
Population of Udupi District
(2011)

Taluk	Population			SC	ST	General
	Male	Female	Total			
Udupi	103591	112500	562799	32843	26087	503869
Kundapura	187586	210885	398471	22759	14719	360993
Karkala	270954	291845	216091	19827	12091	184173
District	562131	615230	1177361	75429	52897	1049035

Source: 2011 Census

The decadal growth rate of population of the district has recorded declining trend from 1981-1991 onwards; it declined from 9.4 percent to 7.1 percent during 1991 -2001 and to 5.8 percent during 2001-11. The decadal growth of population is lower than state average of 15.7 percent. The district has one of the lowest decadal population growth rates in the state. Hindus account for about 84 percent of the population, followed by Muslims, 11 percent and Christians, 4 percent. The district has the lowest percentage of schedule caste (SC) population in the state. As against the state percentage of 17.2 percent SC population, the district has only 6.4 percentage SC population. Even in the case of schedule tribe (ST) population, the district has 4.5 percent as compared to state's 7 percent

Taluk-wise, Udupi taluk has the highest population (5.63 lakh), followed by Kundapura (3.98 lakh) and Karkala (2.16 lakh). The population density of the district works out to 330 per sq.km as against the state population density of 319. Udupi taluk has the highest population density (607 per sq. km) and Karkala the lowest (201 per sq. km). Kundapura has a density of 256 per sq. Kim. The taluk-wise rural and urban composition of the population is shown in Table 2.7. Out of 11.77 lakh population in the district, the rural population is 8.43 lakh (71.6 percent) and urban population, 3.34 lakh (28.4 percent). The share of rural population has declined from 81.5 percent in 2001 to 71.6 percent in 2011 and the share of urban population increased from 18.5 percent to 28.4 percent. In absolute numbers, the rural population declined by 62590 and the urban population. Gram Panchayath-wise population data are given in Part-II.Annexure Table-3.

Table 2.7
Rural-Urban Population: 2011

Taluk	Rural	Urban	Share in Total (Percent)	
			Rural	Urban
Udupi	302092	260707	53.7	46.3
Kundapura	357798	40673	89.8	10.2
Karkala	183410	32681	84.9	15.1
District	843300	334061	71.6	28.4
State	37469335	23625962	61.3	38.7

Source: 2011 Census

increased by 127708 during this decade. Taluk-wise, Kundapura has the highest percentage of rural population (89.8 percent), followed by Karkala (84.9 percent). Udupi has the lowest (53.7 percent) rural population.

The literacy rate in the district is 86.24 percent as against the state average of 75.6 percent. It has increased from 81.25 percent in 2001. Next to Dakshina Kannada, the district has the highest literacy rate in the state. The literacy rate among males is 91.41 percent and among females 81.58 percent. In rural areas, the literacy rate is 83.9 percent and urban areas 92.1 percent. In rural areas 89.8 percent of males and 78.6 percent of females are literates, whereas in urban areas, male and female literacy rates are 95.2 percent and 89.2 percent respectively. Taluk-wise, Udupi has the highest literacy rate (89.3 percent) followed by Karkala (86.7percent). Kundapura's literacy rate is 81.6 percent.

During 2001 and 2011, the total workforce of the district has increased from 4.88 lakh to 5.13 lakh. While the male workers constitute 60 percent of total male population, the percentage share of female workforce in total female population is only 29. The occupational pattern shows urban trends in rural employment, more workers are engaged in non-farm employment. The cultivators constitute 12.3 percent of workforce and agricultural labourers 12.4 percent. The number of cultivators in the district declined from 92662 in 1991 to 63143 while agricultural labourers declined from 82314 to 63390.

2.6 Agriculture

Agriculture and allied activities are the backbone of the district's rural economy, where the majority of the population lives. In the coastal area, fishing is the main occupation. Agriculture and allied activities contributes 17 percent to district GDP. During 2014-15 crop years, the net cultivated area was 96974 ha and gross cropped area, 110929 ha. The cropping intensity works out to 1.14, which is one of the lowest in the state. The district witnessed steady deceleration in gross cropped area since 2001. The gross cropped area declined from 133261ha in 2000-01 to 110929 ha in 2014-15. The cropping intensity which was 1.31 was reduced to 1.14 during this period. The district has at present no any operational major and medium irrigation projects. Consequently, irrigated area is mainly through wells, tanks and check dams. Varahi irrigation project, which was launched in 1980s, is yet to become operational. Table 2.8 shows the present cropping pattern in the district.

Table 2.8
Cropping Pattern in Udupi District

Crops grown	Area under Crop (ha)	Percentage Share
Food Crops: Paddy	49555	44.68
Maize	30	0.01
Pulses	3948	3.56
Oilseeds	1865	1.68
Plantation Crops	25767	23.23
Fruit Crops	22433	20.22
Vegetables	1533	1.38
Sugarcane	53	0.01
Flowers, spices and other crops	5798	5.23
Total	110929	100.00

Source: Agricultural Department, ZP, Udupi.

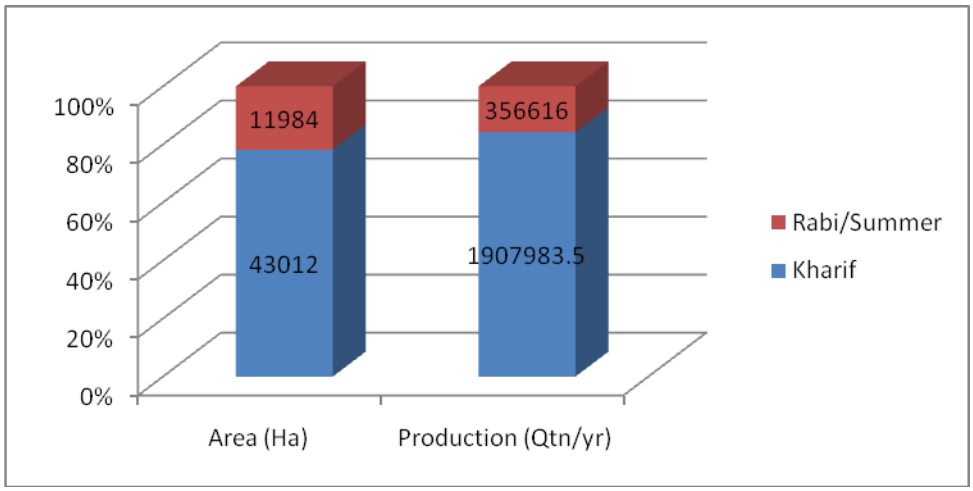
The cropping pattern in Udupi is mainly concentrated on paddy.During the crop year 2014-15, total area under paddy was 49555 ha. Paddy crop was mainly raised during Khariff - the rainy season. In rabi season, mainly pulses and oilseeds are grown. Pulses grown are black gram, horse gram, green gram, cowpeas. The area under pulses was 3948 ha. Groundnut is the main oilseed grown in the district. Groundnut is grown in 1800 ha. Sesamum is grown in 36 ha.and other oilseeds in 29 ha. Paddy accounts for nearly 47 percent of the total gross cropped area, followed by pulses (4.6 percent) and oilseeds (1.8 percent). The area under food grains is steadily declining mainly due to high cost of cultivation and labour scarcity. The area under paddy cultivation has declined from 69892 ha in 199-00 to 49555 ha in 2014-15. The area under pulses witnessed a decline from 11759 ha to 3948 ha during this period. Sugarcane, which was grown once in about 2000 ha, is now abandoned with the break-down of Brahmavar sugar factory.

The district has substantial acreage under horticultural crops. Coconut accounts for 17798 ha, areca nut, 7837 ha, cashew-nut 19373 ha, rubber 4693 ha, banana 992 ha, black pepper 353 ha, and vegetables 1533 ha. The district is also known for growing Mallige in 214 ha. The area under the plantation and horticulture crops also in recent years witnessed stagnation.

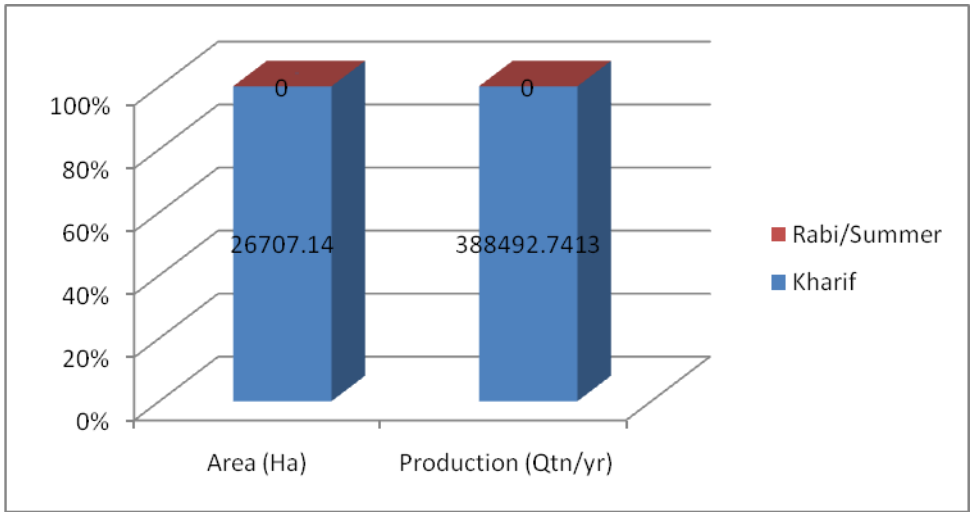
Small and marginal farmers dominate the agricultural scene. Of the total holdings, 79 percent are marginal farmers with land-holding less than 1ha. They own34 percent of the land area. Small farmers with 1to 2 ha constitute 13 percent of farmers and own 23 percent of land. Marginal and small farmers, together, account for 92 percent of farming community with less than 2ha holdings. The medium and large farmers with above 2ha, on the other hand, form 8 percent of farming community and own 42 percent of the land area cultivated. The average size of land-holding works out to 0.74 ha.

In kharif season, under rain-fed condition, cereal crops are sown in an area of 43012 ha and in rabi and summer, it is sown in an area of 6537 ha. During rabi and summer seasons, pulses and oil seeds are sown in an area of 3648 ha and 1799ha respectively. In kharif season, cereals are grown under rain-fed condition and the production of cereals in kharif season in the district was 1.90 lakh tones and the productivity was 44Quintal/ha. In rabi and summer, under rain-fed condition, the total production and productivity were 70950 Quintal and 13.05 Quintal/ha respectively. In rabi and summer seasons, under irrigated condition, crops are sown in an area of 6537 ha in the district. The total production and productivity during these seasons were 0.28lakh ton and 43.71 Quintal/ha respectively. The production and productivity of majour crops grown in te district is given in Annexure Table-4 Part-II.

Fig:- Status of Water availability in 3 season



Agriculture



Horticulture

2.7 Biomass and Livestock

Considering the agro-climatic and physio-geographic conditions, Udupi district was, once, declared as a district not favourable for development of animal husbandry activities. However, the situation has recently changed. Small and marginal farmers and other weaker sections of the rural community have accepted dairy farming as a viable option for their livelihood. The district has now 155309 local cows, 96748 cross-bred cows and 8846 buffalo (Table 2.9).

Table 2.9
Biomass and Livestock
(Number)

Livestock	Udupi	Kundapura	Karkala	Total
Poultry	560870	470123	162779	1193772
Ducks	60	54	44	158
Pigs	1766	966	366	3098
Goats	4586	1323	691	6600
Sheep	38	23	9	70
Indigenous Cows	32198	80972	42139	155309
Cross-bred Cows	51286	27450	18012	96748
Buffalo	2499	4343	2004	8846
Draft Animals (Buffallo/Yak/Bull & Others)	8248	16943	11019	36210
Total	661551	602197	237063	1500811

Source: Animal Husbandry and Veterinary Services Department, ZP, Udupi.

The milk production in the district is 172020 litres per day. The Karnataka Milk Federation operates a dairy unit at Mangalore with a processing capacity of milk up to 2 lakh litres per day. There are also two private milk processing units in the district. As against the white revolution in milk production, meat production in the district is very negligible, the lowest in the state. In spite of growing demand, the progress in poultry, goat and sheep rearing and piggery in the district is very negligible. Except a few commercial poultry, there is no expansion in the poultry sector. Traditional backyard poultry keeping is also declining. The district is depending on other districts for supply of goat meat and poultry products.

The district has 98 km. long coastal belt, which provides good scope for fisheries in Udupi and Kundapura taluks. There are around 64 fishing villages with 31364 fishing families. Out of 45551people involved in fishing, 16445 are women. Malpe and Gangolli are the two major fishing harbours in the district. Besides these harbours, there are three fishing jetties at Hejmady, Kodibengre and Shiroor and 10 landing centres spread throughout the coastal belt. Fishing is mainly done by using 70 purse-seiners, 1140 mechanized trawlers, 2998 gillnetters and 1811 traditional boats. The district has 13 cold and frozen storages and 74 ice plants. The annual fish production during 2011-12 was 107795 metric tons valued at Rs.549 crore. Since the district has heavy rain fall, a number of tributaries and backwatersprovide good scope for inland fishery. Inland fishery is now undertaken mainly in tanks and streams. Prawn cultivation is also undertaken in about 125 ha ponds using backwaters. During 2011-12, the district has produced 1670 metric tons of fresh water fish and 96 metric tons of brackish water shrimp.

2.8 Industry and Service sectors

The district has no majour industries. Brahmavar Sugar Factory is at present non-functional. Agro-industries in the district include cashew nut processing, rice mills, coconut powder units, fish canning and processing and fishmeal oil units. The district has three industrial estates mainly in automobiles, chemicals, ferrous and non-ferrous, mechanical engineering, textiles, wood and others. In the tertiary sector, communication, trade, hotels, banking and insurance, health and education dominate. Though Udupi is known for its temples, beaches and other numerous tourist spots of great scenic beauty, development in tourism is yet to take off. As regards power generation, the district has two units operating, one from Varahi and other Nandikur Thermal Plant. Well-knit and well connected motorable roads and other infrastructure are the hall mark of Udupi district

Udupi district, though, presents a picture of all round development and ranks 5^{th} in per capita GDP and third in literacy rate in the state, there are many grey areas of development. The decelerating growth in agriculture, near stagnation in industrial growth and declining employment opportunities are serious development issues of concern.

Chapter 3

Water Resource Scenario of Udupi District

The primary focus of the DIP is to develop holistic irrigation development perspective of the district outlining medium to long term development goals integrating three components viz. Water resources, distribution network and water use application s incorporating all usage of water like drinking and domestic use, irrigation, fisheries, hydropower and industry. To develop such a holistic perspective, an assessment of geology and hydrology of the district, water resource availability at both, surface and ground water sources, present usage for various purposes, potential demand and demand –supply gap is required. This chapter therefore focuses on present water resource scenario in Udupi District with this perspective.

3.1 Rainfall and River Basins

Udupi district has climatically four seasons: rainy season from June to September, following withdrawal of monsoon, two months of warm and dump weather during October to November, winter season between December and February and hot and sultry summer season from March to May. The distract is blessed with heavy rainfall from June to September from South-West Monsoon (Table 2.2). Normal annual rainfall is about 4182 mm which is the highest in the state. With the heavy rainfall, the district is blessed with many rivers and tributaries. The district has river basins of Shambhavi (Mulki), Swarna, Yennehole, Madisala, Sita, Haladi, Chakravani, Swaparnika (Kollur), Gangolli and Sankadagudi hole sub basins. These rivers mainly flow from Western Ghats and are perennial during normal rainfall years. Their tributaries and smaller streams, however, become dry during summer. The prevailing high gradient in the hilly terrain and heavy rainfall brings great volume of water in these rivers during monsoon. These rivers join Arabian Sea and are prone to tidal effects to considerable lengths in the inland area.

Table 3.1shows source-wise the present status of surface water availability in the district.

Table 3.1
Status of Water Availability

Sources	Kharif	Rabi	Summer	Total
Surface Irrigation				
i) Canal Major & Medium Irrigation	0.030	0.214	0.217	0.461
ii) Minor Irrigation tanks	0	0.0038	0	0.0038
iii) lift Irrigation/Diversion/VD/SWED	0	0.198	0.015	0.213
iv) Various Water Bodies including Rain water Harvesting				0
v) Treated effluent Received from STP	0.0005	0.0005	0.00046	0.00146
vi) Untreated Effluent	0.0031	0.0031	0.0031	0.00930
vii) Perennial sources of water	12.80	2.9706	0.03944	15.8064
TOTAL				**16.495**
Ground Water	**0.20736**			**0.20736**

Source:-Major & Minor irrigation Dept.,UDA, Udupi District

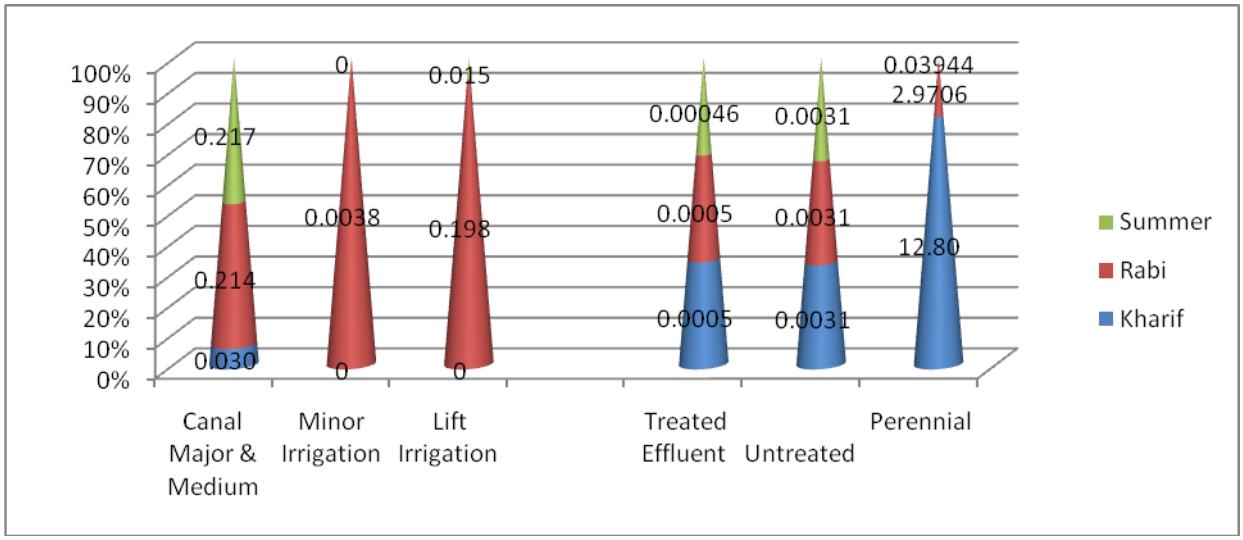


Fig.3-1-1:Status of Water Availability in Three Seasons

In canal majour and medium sources, 0.030 BCM of surface water is available in Kharif. In Rabi and Summer, the water availability is 0.217 BCM and 0.461 BCM respectively. The Minor irrigation tanks provides 0.038BCM during rabi season. Lift Irrigation/Diversion/VD/SWED provides 0.198 BCM and 0.015 BCM during Rabi and Summer respectively. Treated effluent Received from STP provides 0.0005, 0.0005 and 0.00046 BCM in Kharif Rabi and Summer respectively, where as Untreated Effluent account for 0.0031, 0.0031 and 0.0031 BCM in Kharif, Rabi and Summer respectively. Perennial source of water in the District provide 12.80, 2.9706 and 0.03944 BCM of water in Kharif, Rabi and Summer respectively. The total surface water availability would e 16.495BCM.

3.2 Underground Water Resources

Occurrence of ground water as per the occurrence and behavior of ground water, ground water system of the district is described under four zones by the Central Ground Water Board: (a) Shallow zones up to 25m., (b). Moderately Deep zone (25-60 m), (c) Deep Zone (60-100mm), (d) Very Deep Zone (Beyond 100mm). In these zones, ground water levels are generally controlled by lithology, physiographic features, and rainfall distribution in space and time. Hence in pediplain areas, depth to water level is highly variable. The water level in general shows depletion from November to May. During pre-monsoon, the depth to water level varies between 1.55 to 12.33 mbgl in the district. Pre-monsoon water level is in the range of 5 to 10 mbgl mostly found in lateritic terrain. Water level less than 5 mgl occurs along the coastal belt. Post monsoon water level generally varies between 1.37 to 10.33 mbgl in the district.

Ground water level fluctuates from season to season due to the seasonal variations of rainfall. The water levels are deepest before commencement of southwest monsoon in May and shallowest. In August/November,water levels rise after rains indicating the building up of ground water storage in the ground water reservoir, which gets depleted by evaporation and exploitation during non-monsoon period. In general Udupi district shows water level fluctuation between 2 and 4m (rise in water level). Fluctuation of more than 4 m occurs in eastern and southern part of the district. As per the latest ground water resource assessment carried out by CGWB, based on GEC ’97 methodology, the entire district falls in *safe category* from ground water utilisation point of view. Hence, ground water is available for future development. The CGWB has estimated the net ground water availability in the district at 50590HAM. Udupi taluk has net ground water availability of 15073 HAM, Kundapura, 12952HAM and Karkala 22365HAM. Talukwise Ground

water resource of Udupi District is given Apendix Table-5.

Table 3.2 shows the block-wise status of ground water availability as per the CGWB notification for Udupi District.

Table 3.2
Status of Ground Water Availability

Status of Block as per Central Ground Water Board Notification				Ground Water (BCM)		
Block Name	**Critical**	**Semi-Critical**	**Safe**	**Draft**	**Recharge**	**Balance**
UDUPI	Nil	Nil	Safe	0.0395306	0.0940031	**0.0544725**
KUNDAPURA	Nil	Nil	Safe	0.0478434	0.0949374	**0.0470940**
KARKALA	Nil	Nil	Safe	0.0330176	0.1388117	**0.1057941**
Total				**0.1203916**	**0.3277522**	**0.2073606**

Source: Department of Mines and Geology, Udupi

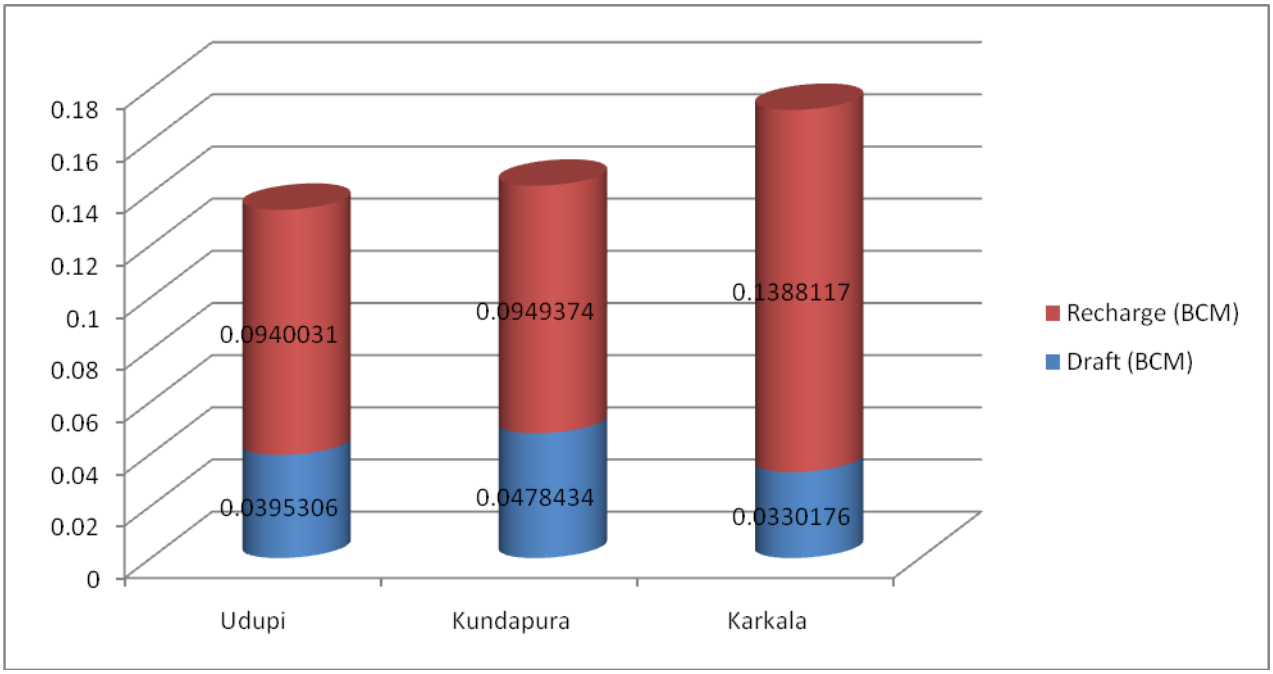


Fig.3-2-1: Status of Ground Water Availability

Open wells, shallow/medium/deep tube wells together account for 0.21 BCM of ground water availability in the District. Total recharge for underground water is estimated at 0.3277522BCM and the present draft from underground water, at 0.1203916BCM. The ground water balance is presently estimated at 0.2073606BCM. Block-wise Karkala has the highest water ground availability (0.1057941BCM), followed by Udupi block (0.0544725. Kundapura has the lowest water surplus (0.0470940BCM)

3.2.1 Demands for Water Resources

Water is required for multiple uses such as agricultural irrigation, drinking and domestic uses, industrial purpose and hydropower generation. More than 75 percent of the demand for water resources comes from agricultural irrigation. In what follows, the present and future demands for water resources for various purposes are looked into.

3.3 Water Requirement for Crop Production

At present out of total net cultivated area of 96974 ha, the net area irrigated is 32870 which constitutes 34 percent of the total cultivated area. The gross irrigated area is 33642 ha. As per the CGWB assessment, the district has potential to bring additional 50389 ha under irrigation. The issues and challenges of irrigation development in the district are discussed in depth in the next chapter. In what follows, the focus is restricted to gauge the holistic perspective of water resource use for agricultural irrigation along with other uses in the district.

Table 3.3
Water Requirements for Crop Irrigation

Taluk	Crops	Present Irrigated Area (ha)	Projected Irrigated Area (ha)	Crop water demand (mm)	Present water demand (BCM)	Projected water demand (BCM)
Udupi	Areca nut	1077.00	2577.00	891	0.003920	0.009380
	Coconut	7802.00	8502.00	622	0.003433	0.003741
	Other Horticulture crops	866.83	1560.75		0.007851	0.014145
	Paddy	1165	8000	1200	0.013974	0.096000
	Pulses	2015	2762	300	0.006046	0.008287
	Oilseeds	440	489	600	0.002639	0.002934
	Sugar Cane	40	2000	1840	0.000736	0.036800
	Total	**13405.45**	**25890.86**		**0.038600**	**0.171286**
Kundapura	Areca nut	3415.00	7165.00	891	0.01243	0.02608
	Coconut	6109.00	6809.00	622	0.00269	0.00300
	Other Horticulture crops	890.41	1571.83		0.00806	0.01424
	Paddy	2657	9157	1200	0.03188	0.10988
	Pulses	1515	2076	300	0.00454	0.00623
	Oilseeds	1359	1511	600	0.00816	0.00907
	Sugar Cane	15	3000		0.00028	0.05520
	Total	**15960.19**	**31290.00**		**0.06804**	**0.22369**
Karkala	Areca nut	3355.00	7105.00	891	0.01221	0.02586
	Coconut	3904.00	4504.00	622	0.00172	0.00198
	Other Horticulture crops	600.90	957.42		0.00532	0.00856
	Paddy	2715	4000	1200	0.03258	0.04800
	Pulses	118	162	300	0.00035	0.00049
	Oilseeds	0	0		0.00000	0.00000
	Sugar Cane	0	500		0.00000	0.00920
	Total	**10692.84**	**17228.37**		**0.0522**	**0.0941**
District	Areca nut	7847.00	16847.00		0.02856	0.06132
	Coconut	17815.00	19815.00		0.00784	0.00872
	Other Horticulture crops	2358.14	4090.00		0.02124	0.03695
	Paddy	6536.13	21157.00		0.07843	0.25388
	Pulses	3648.00	5000.00		0.01094	0.01500
	Oilseeds	1799.21	2000.23		0.01080	0.01200
	Sugar Cane	55.00	5500.00		0.00101	0.10120
	Total	**40058.48**	**74409.23**		**0.1588**	**0.4891**

Source: Agriculture, Horticulture & ZAHRS Brahmavar, Udupi Dist.

Important irrigated crops grown in the district are among food crops, paddy and among

horticulture crops, areca nut, coconut, oil palm, banana, cocoa, watermelon and vegetables. Table 3.3 sets out the water requirement of various crops grown in the district both present and projected for the year 2020.

Annexure Table-6 contains the taluk-wise and crop-wise estimated water requirements both present and projected. The total estimated demand for water for crop production at present is 0.168822BCM and it is expected to increase to 0.48906BCM by 2020. The total irrigated area proposes to increase from 33642ha to 69257 ha during over next five years period.

3.4 Domestic Water Demand

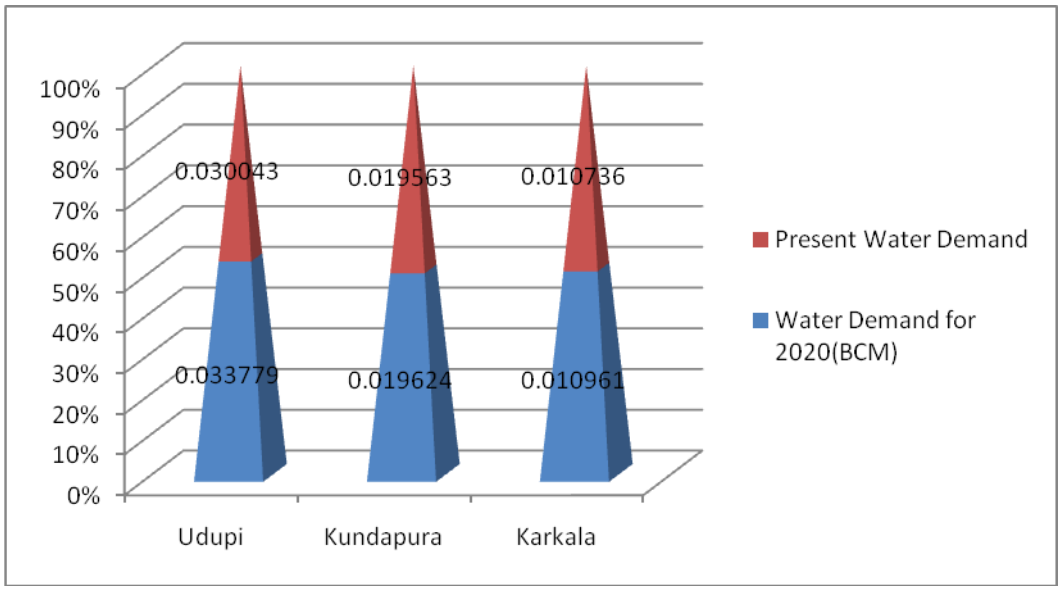
The total population in Udupi district in 2015 is 1224607 and projected population by 2020 is 1306228. At the rate of 135 lpd, the demand for domestic use is expected to increase from 0.060343 BCM to 0.064364BCM during this period. Since Udupi district as one of the lowest annual population growth, Table 3.4 shows the taluk-wise estimates of the present and projected gross water demand in the district.

Table 3.4: Domestic Water Demand

Blocks	Population in 2015 (no)	Projected population in 2020 (no)	Present Gross Water Demand (BCM)	Projected Gross Water Demand (BCM)
Udupi	609701	685521	0.030043	0.033779
Kundapura	397022	398258	0.019563	0.019624
Karkala	217884	222449	0.010736	0.010961
District	**1224607**	**1306228**	**0.060343**	**0.064364**

Source:- Dept of Statistics Udupi.

Fig:-



3.5 Livestock Water Demand

The total number of livestock in the District is 1500811. Table 3.5 contains taluk-wise present and projected demand for water for livestock by the year end of 2020. The water requirements of different livestock are shown in Appendix Table 7a & 7b.

Table 3.5
Water Demand for Livestock in Udupi District

Block	Total Live stock (no)	Projected Total live stock in 2020 (no)	Present water demand (BCM)	Water demand in 2020 (CM)
Udupi	661551	727706	0.0025	0.0027
Kundapura	602197	662417	0.0022	0.0025
Karkala	237063	260769	0.0009	0.0010
Total	**1500811**	**1650892**	**0.0056**	**0.0061**

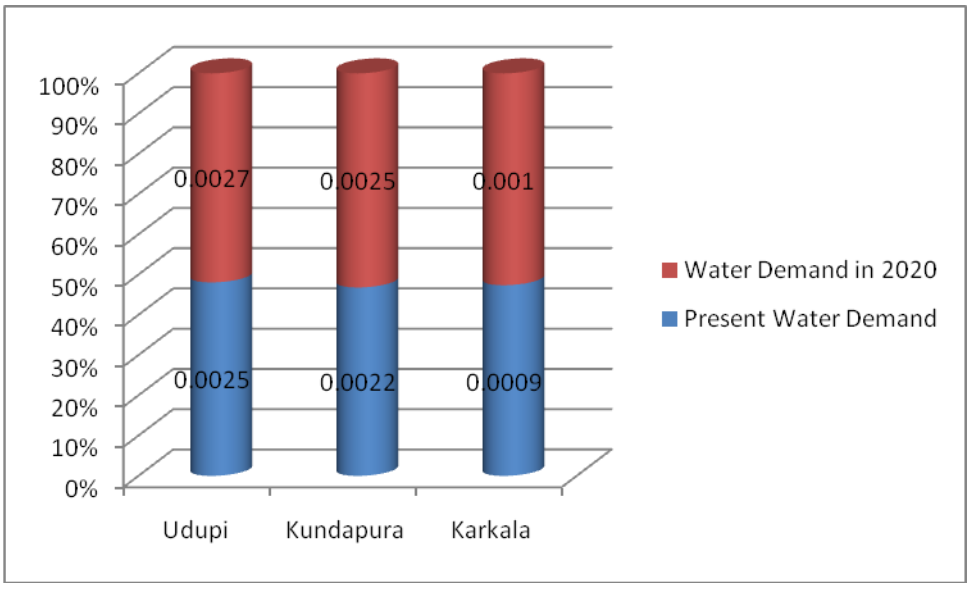


Fig.3-3-1: Live Stock water demand

The total livestock is expected to increase from 1500811 to 1650892 by 2020. The water demand for the livestock is going to increase from 0.0056 BCM to 0.0061BCM.

3.6 Industrial Water Demand

The total number of industries registered as on March 2015 in the District is 11283. It include mainly agro-processing industries, large, medium and small scale industries and commercial units. The present water demand for these industries is estimated at 0.0086459BCM. As shown in Table 3.6, the projected water demand by 2020 for these industries is estimated at 0.0093258BCM. The details of taluk-wise water demands of major categories of industries in the district are set out in Appendix Table 8a, 8b, 8c.

Table 3.6
Taluk-wise Industrial Present and Future Water Demand

Block	Name of the industry	Present Water demand (BCM)	Future Water demand, 2020 (BCM)	Water potential to be created (BCM)
UDUPI	Agro-Processing unit & Large & Small Scale Industries/Domestic & Commercial units	0.006133	0.0068122	0.0006795
KUNDAPURA		0.001182	0.0012220	0.0000400
KARKALA		0.001245	0.0012917	0.0000466
Total		**0.00856**	**0.0093259**	**0.0007661**

Source: Department of Industry and Commerce, UDA and PCB, Udupi

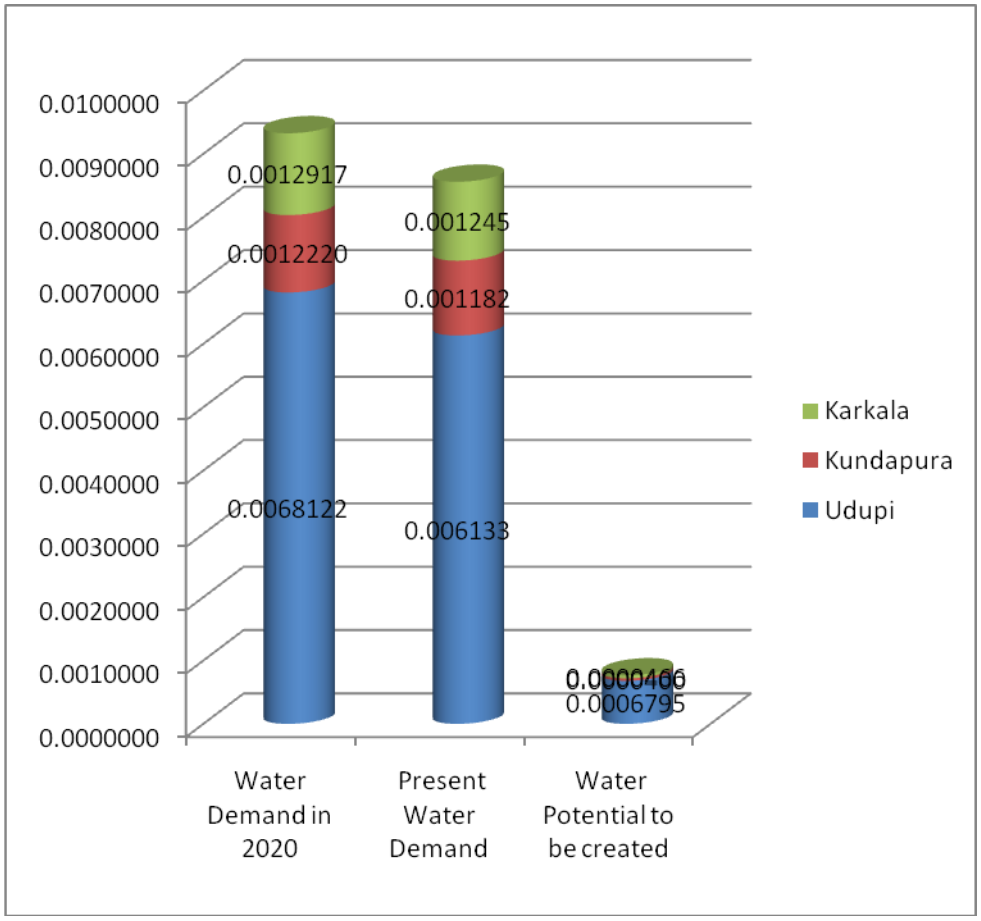


Fig.3-4-1: Industrial water demand

3.7 Water Demand for Power Generation

There are at present only two power plants which generate electricity in Udupi district. In Table 3.7, the water requirements of these plants are given. For the Power plant at Sankuru, Udupi Taluk with 1200MW power capacity, the water source is sea water. The demand for water for this plant at present is estimated at 0.0876BCM. With the projected increase in power generation, the expected water demand for this plant in 2020 is estimated at 0.1766 BCM. For the power plant at

Table 3.7
Water Demand for power generation

Block	Power requirement MW	Water demand (BCM)	Water demand in 2020(BCM)	Existing Water potential (BCM)	Water potential to be created (BCM)
Udupi	1200	0.0876	0.1766	0.0876	0.1766
Kundapura	460	0.000460782	0.00046078	0.292536	-
Total	1660	0.088060782	0.17706078	0.380136	0.1766

Source: UPCL, Udupi and KPCL,Udupi

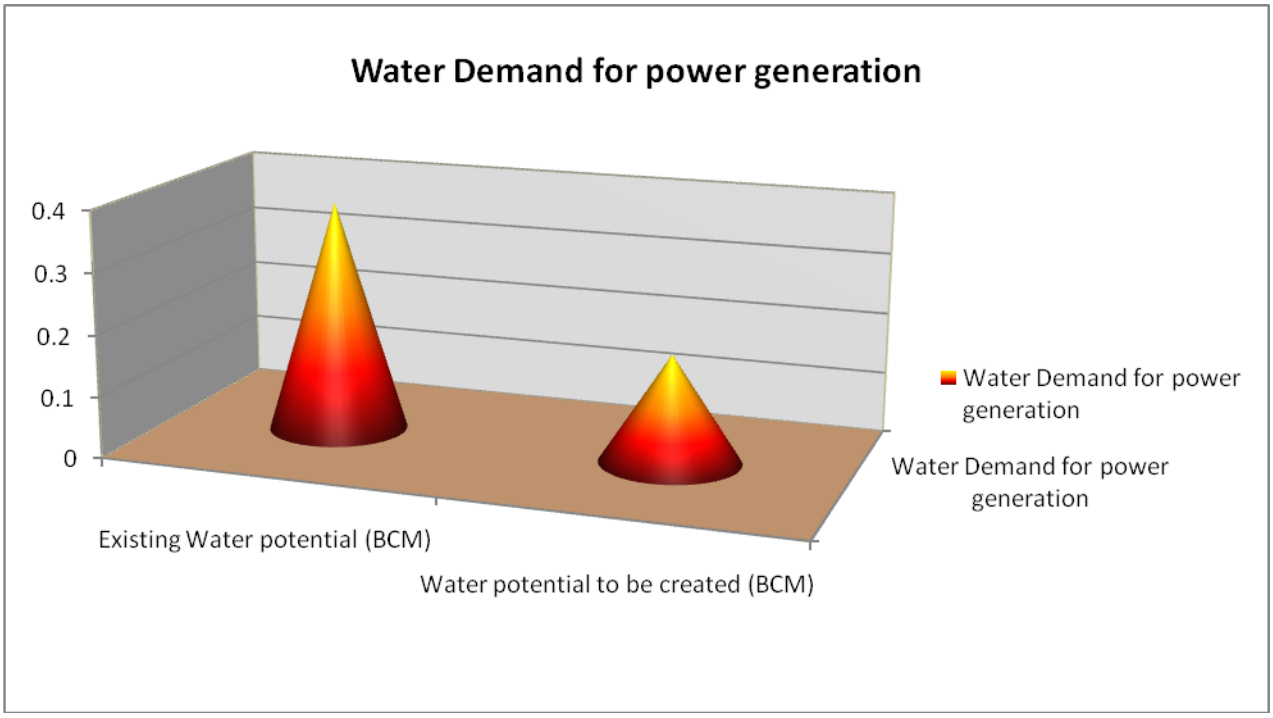


Fig.3.5.1: Water demand for power generation

Hosangadi, Kundapura Taluk with 460MW capacity, the water requirement is estimated at 0.000460782 BCM. In next five years, no change in its water requirement is envisaged.

3.8 Total Demand for Water Resources

With a view to have holistic perspective for water resource demand in the Udupi district, it is important to take into account the demand for water for various uses. Table 3.8 presents taluk-wise the present total estimated water requirements and projected water demand for various sectors.

Table 3.8
Taluk-wise Total Demand for Water in Udupi District (BCM)

Sectors	Udupi		Kundapura		Karkala		District	
	Present	Projected	Present	Projected	Present	Projected	Present	Projected
Irrigation	0.03860	0.171286	0.068040	0.22369	0.052186	0.094093	0.158826	0.489073
Domestic	0.03004	0.033779	0.019563	0.01962	0.010736	0.010961	0.060343	0.064364
Livestock	0.00245	0.002696	0.002231	0.00245	0.0009	0.000966	0.005560	0.006116
Industrial	0.00613	0.006812	0.001182	0.00122	0.001245	0.001292	0.008560	0.009326
Power Generation	0.08760	0.176600	0.000460	0.00046	0	0.000000	0.088061	0.177061
Total	0.16482	0.391174	0.091477	0.24745	0.065046	0.107312	0.321349	0.745940

From the table, it may be seen that the total demand for water for all purposes would increase from the present 0.321349BCM to 0.745940BCM by the year end 2020.

3.9 Water Resource Budget

A water resource budget reflects the water availability, water application and water balance for a region. It shows not only supply and demand for water in a region but also safety and sustainability of water use for various purposes and future potential for further exploitation for the benefit of development. Table 3.9 summarizes taluk-wise water availability, water demand and the water balance both present and projected for the year 2020.

Table 3.9
Taluk-wise Water Availability, Water Demand and Water Balance

Name of Blocks	Existing water availability (BCM)		Total (BCM)	Water Demand (BCM)		Water balance(BCM)	
	Surface water	Ground Water		Present	Projected (2020)	Present	Projected (2020)
Udupi	5.690	0.0545	5.7445	0.16491	0.39117	5.57959	5.35333
Karkala	3.031	0.0471	3.0781	0.06505	0.24746	3.01305	2.83064
Kundapura	7.774	0.1058	7.8798	0.09148	0.10731	7.78832	7.77248
Total	**16.495**	**0.20736**	**16.7024**	**0.321435**	**0.74594**	**16.38093**	**15.95642**

Source: Departmentsof Major and Minor Irrigation, Mines and Zoology and others
Note: The data on surface water availability for Udupi includes Karkala.

As against the total water availability of 16.38093BCM, only 0.321435BCM is at present used for various purposes in the district. It works out to 2 percent of the total water availability in the district. Even with the projected demand for water of 0.74594BCM, the district will have water balance of 15.95642BCM. With the projected increase in water demand, the percentage of water use in total water availability would increase to 6 percent.

Chapter 4
Irrigation Development in the District: Issues and Challenges

Irrigation plays a dominant role in determining cropping intensity and productivity in agriculture. The dependency on rainfall makes cultivation in unirrigated areas a high risk and less productive. The assured irrigation encourages farmers to invest more in farming technology and inputs leading to productivity enhancement and increased farm income. In India, out of the 141million ha of net cultivated land, only about 65 million ha (45 per cent) is presently covered under irrigation. Nearly 55 percent of the net cultivated area is rain-fed. In Karnataka, out of gross cultivated area, only 40.96ha is gross irrigated area which constitutes 31.8 percent of the gross copped area. Gross irrigated area in Udupi district is 33642ha and net irrigated are is 32870ha. The percentage share of gross irrigated area in the gross cropped area works out to 30.3 percent, which is below both the state and national averages.

The primary vision of PMKSY is therefore to ensure access to some means of protective irrigation to all agricultural farms in the country, to produce 'per drop more crop' to bring much desired rural prosperity. This chapter therefore focuses on assessment of the present status of irrigation source-wise in the district and scope for future development and SWOT analysis of the same to provide the basic framework for preparing the DIP.

4.1 Source-wise Present Irrigation Status

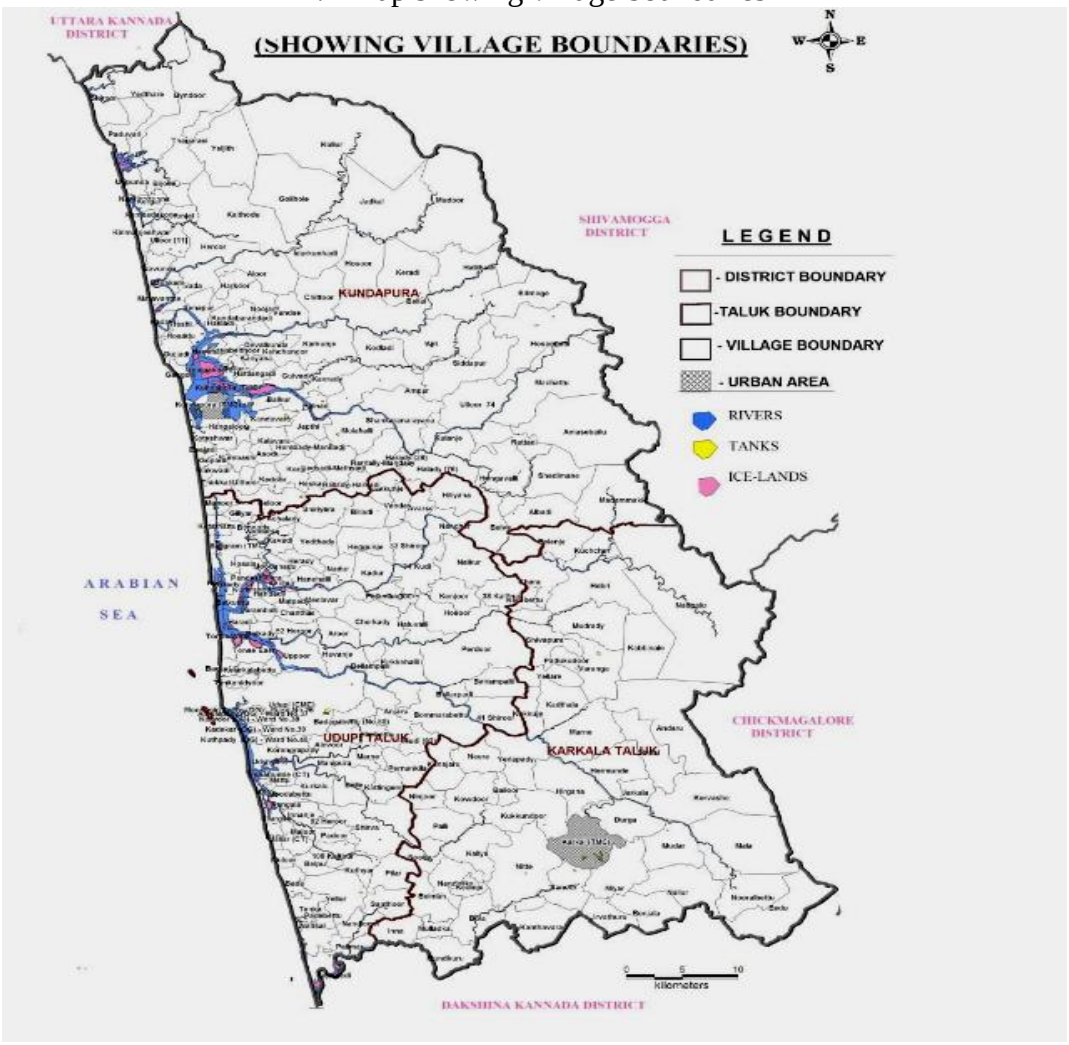
Out of gross cropped area of 110929 ha, gross irrigated area in the district accounts for 33642 ha. The net irrigated area is 32870ha. The total irrigated area constitutes 30 percent of the gross cropped area. Irrigation intensity works out to 1.02 which is one of the lowest in the state. Taluk-wise, the gross irrigated area in Udupi taluk is 11159 ha and the net irrigated area 10975 ha. In Kundapur taluk, the gross and net irrigated areas are 13221ha and 12971 ha respectively. In Karkala taluk, the respective gross and net irrigated areas are 9262 ha and 8924ha.Table 4.1 shows the taluk-wise sources of irrigation.

Table 4.1
Taluk-wise Source-wise Irrigated Area: 2014-15
(ha)

Sources of Irrigation	Udupi		Kundapura		Karkala		District	
	Number	Gross	Number	Gross	Number	Gross	Number	Gross
Canals	-	-	-	-	-	-	-	-
Tanks	155	271	30	86	104	96	289	453
Wells	10114	10114	10464	10464	5887	5887	26465	26465
Tube wells	46	46	26	26	448	448	520	520
Lift Irrigation	728	613	388	328	1110	1033	2226	1974
Other Sources	-	-	-	2257	-	1721	-	3978
Total		**11159**		**13221**		**9262**		**33642**

Source: Udupi District at Glance 2014-15, DSO, ZP

4.1 Map showing village boundaries



There is at present no any major irrigation scheme operating in Udupi district. Varahi Irrigation Project which is the only majour irrigation project launched in the district has not yet become operational. The minor irrigation schemes include both surface water and ground water schemes. The ground water schemes consists of Dug wells, Shallow and Deep tube wells, while surface water schemes includes surface flow (tanks, anicuts, pick ups, barrages) and lift irrigation schemes. Traditionally lift irrigation was the major irrigation practice. Water management practices like sprinkler irrigation is taking popularity in recent years. Open-wells are the main sources of irrigation. Out of 33642 gross cropped area, 26465 ha (78.7 percent) are irrigated by open wells. The next most important source of irrigation is lift irrigation. It accounts for 6 percent of the total gross cropped area. Tanks and tube wells only play minor role. Other sources include river tributaries and rivulets, check dams etc. The district has 26465 open wells,289 tanks, 2226 lift irrigation and 520 tube wells. To extract water from these sources, there are 48287 electricity pumps and 6362 diesel pumps installed in the district. Taluk-wise, the relative importance of various sources is almost the same.

At the outset, it is important to note that the district witnessed steady decline in the area under irrigation. In the year 2010-11, the gross irrigated cropped area was 34348 which declined to 32870 in the year 2014-15. In spite of abundant rainfall, many rivers flowing, good scope for surface irrigation and considered safe for ground water irrigation, irrigation development in the

district was completely ignored.

4.2 Crop Wise Irrigation Status

In Table 4.2, the crop-wise irrigation status in different taluks in the district is analysed.

Table 4.2
Crop Wise Irrigation Status

Crops	Udupi		Kundapura		Karkala		District	
	Rainfed	Irrigated	Rainfed	Irrigated	Rainfed	Irrigated	Rainfed	Irrigated
Paddy: Kharif	17073	-	17947	-	7992	-	43012	-
Paddy: Rabi	-	1081	-	2645	-	2715	-	6441
Paddy: Summer	-	84	-	12	-	-	-	96
Pulses	2173	-	1571	-	204	-	3948	-
Oilseeds: Groundnut	468	-	1382	-	15	-	1865	-
Horticulture & Plantation	-	9243	-	9904	-	7560	-	26707
Total	**19714**	**10408**	**20900**	**12561**	**8211**	**10275**	**48825**	**33244**

Source: Agriculture & Horticulture Department

Paddy is the only cereal crop grown in the district. Traditionally, it was grown during kharif, rabi and summer seasons. Rabi and summer paddy was irrigated through traditional irrigation system. It is now grown mainly during kharif season as rain-fed crop. Out of 49453 ha area under paddy, the rain-fed paddy during Kharif season accounts for 43012ha (87 percent). Hardly 13 percent of the area cultivated under paddy during rabi season is irrigated. The area under paddy cultivation declined during the last two decades. In 1999-00, the area under paddy cultivation was 69892ha, which now declined to 49453 ha. The decline was mainly in irrigated paddy during rabi and summer seasons.

Pulses and oilseeds are grown as rain-fed during rabi season. The area under pulses is 3948 ha and oilseeds, 1865 ha. Both these cops are grown mainly in Kundapura and Udupi taluks. During the last two decades, the district witnessed significant decline in pulses. In 1999-00, the area under pulses was 11759 ha which declined to 3948 ha in 2014-15.

The main irrigated crops grown in the district are horticulture and plantation crops. Out of gross irrigated area of 33642 ha, 27201 ha irrigated area is under horticulture and plantation crops. This constitutes 81 percent of the gross cropped area in the district. The main irrigated horticulture crops are coconut and areca nut. Other horticulture crops irrigated in the district are Banana, Black pepper and vegetables. Sugarcane which was once grown in above 2000 ha as irrigated crop is now almost abandoned with the closure of the sugar factory in Brahmavar.

4.3 Irrigation Development: Issues and challenges

The district receives rainfall of about 4000mm per annum. Due to steep slopes prevalent in the Western Ghats and lateritic terrain in other areas, a large quantity of the rain water joins the sea as surface runoff. The distinct is, however, blessed with number of rivers, river tributaries and rivulets which provide very good scope for creation of water sources through miner irrigation both surface and groundwater. Rainwater runoff and soil erosion can be controlled by the construction of tanks, gullies and plugs, furrows, bunds etc at appropriate sites. The Rabi and summer cultivation could be intensified by creating more storage space for building up ground water storage during the monsoon period.

Traditionally construction of Kattas and other temporary structures in the form of barricades erected across rivers, streams and rivulets to hold back the flowing water provided sources of irrigation during Rabi and summer seasons. Similarly, another most common traditional system of water conservation followed was use of Madakas mostly found in geographical areas that have high terrain on three sides and shallow area on middle. The barricades constructed stores the water flown down from the higher level in the madaka. Water stored was used through channels for irrigation during Kharif whenever rainfall is irregular and during rabi seasons.

As per the latest ground water assessment, the ground water development in Udupi district is low to moderate and therefore considered under "Safe" category. The total area irrigated through ground water structure is at present 32311 ha. Only 39.12 percent of the utilizable resources are used. According to CGWB, the balance ground water irrigation potential of 50389 ha can be brought under utilization by constructing about 17406 different types of abstraction structures in the district. Recharge trenches, contour bunds, infiltration wells, check dams and subsurface dykes are the suitable artificial recharge structures, which can be constructed simultaneously while developing the ground water. In hard rock terrains, dug wells and bore wells are considered feasible with depth range of 25 to150 mbgl and in soft rock aquifers dug wells and filter points with depth up to 15 mbgl feasible.

Since the entire district falls under safe category, irrigation expansion through exploitation of both surface ground water development in Udupi district poses real challenge. The ground water is potable and considered as good for irrigation purpose. In coastal areas, however, salinity ingression and coastal salinity problems occurs which poses problem for irrigation during summer season. The check dams/barrages/vented dams can be constructed across rivers to control ingression of salinity water during summer and divert water into the canals for irrigation. Existing vented dams with some modifications can also be made use along with the tanks and natural Madagas as temporary reservoirs. Varahi Irrigation Project, which was launched in 1998, has potential to bring about additional 15702 ha through canal irrigation in Kundapura and Udupi taluks. Already construction of canals for bringing under irrigation 1603 ha has been completed.
With irrigation development, the need for change of cropping pattern for every season is also critical for efficient and productive use of irrigated water.

4.4 SWOT Analysis

Udupi district is considered safe for irrigation development and provide a challenging scope. The district has very good potential for irrigation from both surface and ground water sources. The main strengths, weaknesses, opportunities and threats for irrigation development in the district can be summarized as follows:

Strength:

- The distinct belongs to coastal zone with an annual rainfall of about 4000mm.
- District is considered safe for irrigation development.
- All three taluks in the district blessed with number of rivers, river tributaries and rivulets which provide good scope for surface irrigations schemes and also to augment ground water resources in surrounding areas.
- Varahi Irrigation Project – a major irrigation project is already under implementation. The completion of this project has potential to irrigate additional 15702ha in Kundapura and Udupi taluks.

- The district, at present, utilizes only 39 percent of underground water potential for irrigation. As per the latest underground water potential estimate, the district has potential to bring about 50389ha under irrigation.
- The district provides very good scope for micro irrigation. The existing 36453 wells and 289 tanks can be renovated and exploited to irrigate during Rabi and summer seasons.
- There are four lift irrigation schemes viz. Charugundi, Nancharu, Irmadi and Muggeri which can be rejuvenated to create irrigation capacity of 426ha.
- 97 vented dams have been already constructed which have irrigation potential of 1921 ha.
- There is good scope for reviving the traditional irrigation sources like Madagas and putting temporary bunding/barricades to streams/rivutes for Rabi and summer irrigation in most of the villages in the district.
- The district has agro-climatic conditions well suited for crop diversification particularly through horticultural and medicinal plants.
- Enterprising and educated farming community.
- Well connected road and transport network
- High penetration of banking facilities for enabling farmers for on-farm investment.

Weaknesses

- Marginal and small farmers with less than 1ha dominate agriculture.
- Holdings are fragmented, scattered and not levelled and therefore not economical for canal irrigation.
- In coastal areas, salinity ingression and coastal salinity problems poses problem for irrigation during Rabi and summer seasons.
- Heavy rainfall leading to continuous leaching of nutrients constraints crop production.
- Though heavy rainfall, rainfall not well distributed, shorter rainy days and longer dry period in the year
- The district has the lowest cropping intensity and irrigation intensity in the state.
- Acute shortage of agricultural labour and very high labour wages made crop production unviable
- Younger generation is not interested in agriculture
- Lack of diversification and monocarp farming system of paddy which is labour intensive and at present not viable.
- Conversion of arable land to non-arable land for housing and commercial use at rapid speed
- Closure of Brahmavar sugar factory and resultant abandoning of labour saving sugar cultivation in the district.

Opportunities

- Scope for crop diversification, doubling cropping intensity, carrying out integrated farming system and enhancing productivity growth
- Completion of Varahi Irrigation Project – a major irrigation project in the district.
- Rehabilitation of Brahmavar sugar factory and promotion of labour saving sugarcane crop as a cash crop.
- Increase in cropping intensity and productivity by minor irrigation projects by building vented dams and renovating existing vented dams to rivers.
- Implementing micro irrigation for effective water management
- Effective integrated water shed development programmes.
- With faster urbanization, opening up of international airport, good scope for growing irrigated fresh vegetables, floriculture, fruits, aromatic and medicinal plants for both domestic and export markets.
- Value additions through agro processing and contract farming initiatives.

Threats

- Scattered and uneven land holding pattern comes in the way of effective surface irrigation system.
- Small and marginal farmers may oppose canal distribution system in their fields.
- In coastal areas salinity problem pose problem for minor irrigation through dug wells/tube wells.
- Monocarp paddy cultivation and absence of crop diversification
- Delay in construction of canal distribution system of Varahi Irrigation Project.
- Absence effective water management of canal irrigation under Varahi project leading to water logging and salinity of irrigated water
- Non-rehabilitation of Brhmavar sugar factory threatens sugarcane cultivation.
- Urbanization and industrialization leading to reduction in cultivable land.
- Scarcity of agricultural labour, resultant high cost of cultivation and lack of incentive for agriculture
- With the abandoning of agriculture, older and women cultivators not interested to change over to cop diversification and modern farming practices.

While preparing and implementing the DIP, the strength, weaknesses, opportunities and threats should be looked into and required interventions should be considered.

Chapter 5

District Irrigation Plan

This chapter focuses on the vision, the strategies required to be undertaken to achieve the vision and the District Irrigation Pan for allocation of resources by taking into consideration the operational guidelines indicated under PMKSY. The analysis of surface and groundwater potential, demand assessment for various uses of water and the need for irrigation development and the attainable level adumbrated in the earlier chapters provided broad perspective framework for formulating the DIP.

5.1 Vision for DIP

The Government of India has set a vision of doubling farmers' income by 2020. The Karnataka Agriculture Policy Document of Karnataka (2006) focuses on achieving the agricultural growth rate of 4.5 percent per annum. It has laid down following farmer-centric objectives:

- Protect and improve the soil health,
- Conservation and sustainability of natural resources with special emphasis on water
- Micro irrigation,
- Crop diversity
- Integrated farming system
- Cop insurance Scheme

In Udupi district, the agricultural development should aims at arresting the present negative growth and re-engineering the sector to growth path to achieve targeted annual growth rate of 4.5 percent. The major thrust areas required to achieve this objective would be increase in cropping intensity through irrigation development, increase in productivity, crop diversification, labour-saving farm mechanization, organic farming/integrated nutrient management, IPM, watershed area development, post harvesting processing, agro-forestry, dairy development, and fishery development. Though the district is blessed with heavy rainfall, number of rivers and streams and categorized as safe for ground water exploitation, it has the lowest cropping intensity, lowest net area irrigated and lowest irrigation intensity. To achieve the above set vision, the district requires the irrigation development based on water resource potential, need assessment and attainable level of irrigation development after taking into account water demand for other uses. As per the overreaching vision of PMKSY, the objective is to ensure access to some means of protective irrigation to all agricultural farms (*Har khet ko pani)* in the district to produce *'per drop more crop'* to bring much desired rural prosperity.

5.2 Strategies

While formulating the DIP, the strategies proposed for accelerating irrigation development in the district are as follows:

- Completion of on-going Varahi Irrigation project through construction of canal distribution system to identified 33 villages in Kundapura taluk and 35 villages in Udupi district to bring15702 ha under irrigation.

- Construction of Lift Irrigation Schemes from Varahi at Irabailu, Siddapura and Sowkuru and one at Yennehole.
- Construction of 432 new vented dams to rivers to control entry of salt water, augment underground water recharge of wells and tube wells and enhance ground water table in their command areas and encourage lift irrigation.
- Rehabilitation of existing tanks/Madagas for rain harvesting and irrigation through channels
- Construction of bunds/barricades/Kattas to streams and rivulets for community irrigation during Rabi and summer seasons. Grama Panchayats would be made responsible for this community based initiatives through MGNREGA.
- Effective watershed development for efficient and productive water use and management by converging MGNREGA
- Encourage micro and precision irrigation at farm level.
- Capacity building, training and awareness campaign for encouraging farmers to attain 'more crops per drop'.

5.3 District Irrigation Plan

The DIP aims at bringing additional 35615 ha cultivated area under irrigation. With the completion of the Varahi Irrigation Project and related lift irrigation projects, the district expects to bring 18912 ha land cultivated in Kundapura and Udupi under canal irrigation. With surface lift irrigation and ground water minor irrigation, additional 16703 ha cultivated land will be brought under irrigation. As per the PMKSY operational guidelines, the programme elements mainly focus on accelerating completion of on-going majour irrigation project, surface and ground water minor irrigation and adoption of micro and precision irrigation in the district. While formulating District Irrigation Plan, the following are taken into consideration:

- Water resource potential in the district and present and future demand for water for various uses
- Present irrigation infrastructure, gaps in irrigation infrastructure, source-wise irrigation and scope for both surface and ground waterirrigation development,
- Present net and gross irrigated areas, cropping intensity, productivity, scope for crop diversification and productivity growth
- Udupi District Agricultural Plan prepared for Rastriya Krishi Vikas Yojana (RKV)
- On-going both state and central majour and minor irrigation schemes and watershed projects.
- Convergence of MGNREGA for irrigation development at GP level

Following these strategies, the block-wise irrigation schemes are identified and the DIP is a consolidated Block Irrigation Development Plans. Part-II of the DIP contains detailed supporting statistical tables for year-wise, block-wise, scheme-wise targeted physical programmes to be achieved and financial resources required for effective implementation of the DIP in the next five years. Table 5.1 and 5.2 summarizes the physical and financial plan of the DIP for irrigation development in the district. It should be noted that the cost estimates for activities of respective components are as per the existing guidelines of the State Government. The total investment outlay for comprehensive irrigation development in the district over the next five years would work out to Rs.1987.86crore. Out of this total outlay, Rs 1226.54crore (62 percent) for completion of on-going Varahi Irrigation Project and lift irrigation projects. Other major components are minor irrigation through vented dams, pickup, Bhandaras, tanks and Madagas which would require Rs.577 crore over a five year plan period. Traditionally seasonal Kattas/Bunds or barricades to store water from streams/rivulets for community irrigation during rabi and summer

seasons were very common. The DIP proposes to revive this community irrigation through Grama Panchayats with convergence of MGNREGA. The watershed component and minor irrigation

Table 5.1

PMKSY: District Irrigati1n Plan

Physical Programme

Concerned Ministry/Department	Component	2016-17		2017-18		2018-19		2019-20		2020-21		2021-22		2022-23		Total	
		Ha	**No.**	**Ha**	**No./km**	**Ha**	**No.**	**Ha**	**No.**	**Ha**	**No./km**	**Ha**	**No./km**	**Ha**	**No.**	**Ha**	**No./km**
AIBP			1	140.82	58						3				1	141	63
					13.6						**24**		**20**		**13**		**70.6**
Har Khet ko pani	CAD			2500	5	3000	5	3000	5	3500	5	3702	5			15702	25
	Minor Irrigation		123		136		137		231		94					0	721
	PRED		49		47		47		48		47					0	238
Per Drop more Crop	Agriculture Dept	750		750		750		750		750						3750	0
	Watershed		64		70		73		73		75					0	355
	CADA			0			1500		2500		5570		8000			0	17570
	Horticulture Dept	200		200		200		200	200	200						1000	200
PMKSY Watershed		961	145	1050	150	1747	137	1607	135	1601	143					6966	710
Western Ghat Project Plan		155	10	100	10	100	10	100	10	100	10					555	50

Convergence with MGNREGA	MGNREGA Watershed	1153	125	1175.	125	1000	123	945	132	720	129					4993	634
	Varahi		1													0	1
	Total	**3219**	**518**	**5915.**	**615**	**6797**	**2032**	**6602**	**3334**	**6871**	**6100**	**3702**	**8025**	**0**	**14**	**33106.82**	**20638**

Table 5.2
PMKSY: District Irrigation Plan
Financial Plan
(Rs.in Lakh)

Component		**2016-17**	**2017-18**	**2018-19**	**2019-20**	**2020-21**	**2021-22**	**2022-23**	**TOTAL**
		Estimated cost (in Lakhs.)							
AIBP	AIBP	16988.57	19963.57	19663.57	17083.57	17097.57	16228.57	16228.5	123254
Har khet ko pani	CADA Shivamoga		715.00	923.00	1061.68	1283.35	1540.69	0	5524
	Minor Irrigation	16530.00	14035.00	11330.00	19270.00	64000.00	0	0	125165
	PRED	1044.00	1205.00	1171.00	1180.00	1040.00			5640
Per drop more crop	Agriculture Dept	132.30	132.3	132.3	132.3	132.3			662
	Watershed	134.16	135.23	143.9	144	145.84			703

	CADA shivmoga		0	32.00	53.33	391.65	659.31		1136
	Horticulture Dept	134.00	134.00	134.00	134.00	134.00			670
PMKSY	PMKSY Watershed	485.33	506.44	503.70	503.46	528.70			2528
Convergence with MGNREGA	Irrigation through GPs-construction of bunds/barricades to store water in streams/rivuleT Watershed	50.00	50.00	50.00	50.00	50.00	50.00	50.00	350
	MGNREGA Watershed	106.33	109.14	101.80	111.87	110.80			540
	MGNREGA Varahi	50.00	50.00						100

Western Ghat Project Plan	42.66	300.00	300.00	300.00	300.00			1242.66
Total	**35697.35**	**37335.68**	**34485.27**	**40024.21**	**85214.21**	**18478.57**	**16278.57**	**267513.85**

programmes also include funds required for awareness campaign and farmers' capability building initiatives for efficient and productive use of irrigation water.

5.4 Strategic Action plan for Irrigation in the District under PMKSY

The strategic action plan for irrigation development as envisaged under the DIP/PMKSY is briefly adumbrated in Table 5.3.

Table 5.3

Strategic Action Plan

Concerned Ministry/Department	Component	Activity	No.	Ha	Capacity in (BCM)	Command Area/Irrigation Potential (Ha.)	Implementation	Estimated cost (in Lakhs.)
MoWR	AIBP	Major Irrigation	1		0.468	12327	7	113600.00
MoWR		Medium Irrigation	3			3070	5	9054.00
MoWR		Surface Irrigation	58			140.82	2	600.00
MoWR	Har khet ko pani	Lift Irrigation						
MoWR		GW Minor irrigation	721		0.182990	15249.20	5	125165.00
		GW Dev (PRED)	238		0.048241	2408.78	5	5640.00
MoWR		RRR of Water Bodies						
MoWR		Construction of field channels						
MoWR		Line Field Channels (CADA Shivmoga)	1	1570 2			5	5523.71
MoWR		Unlined Channels						
MoWR		Micro Irrigation (CADA Shivmoga)		785			4	1136.29
MOA & FW-DAC & FW		Non- DPAP Drip (Horticulture Dept)		1000			5	670.00
MOA & FW-DAC & FW		Non- DPAP Sprinkler (Agriculture Dept)		3750			5	661.50
MOA & FW-DAC & FW		Drought Proofing through check Dams/water Harvesting Structures(Watershed)	355		0.000108 62		5	703.10
DOLR-MORD	PMKSY Watershed	Newly created WHS						
DOLR-MORD		Farm Ponds	12		0.00000 10	4.80	5	1.54
DOLR-		Vented Dams	672		0.00072	3360	5	2024.82

MORD					73			
DOLR-MORD		Nala Bunds	11		0.0000165	66	5	49.8
DOLR-MORD		NRVT (Rmt)		5120	0		5	149.52
DOLR-MORD		Fishery ponds/Cattle pond	30		0.0000147	180	5	84.20
		Forestry		1150	0		5	78.87
		Dry land Horticulture		1199	0		5	138.84
DOLR-MORD	WesternGhat Development Project	Vented Dams/Nala Bunds/NRVT/Other ground water recharge structure	50	555			5	1242.66
DOLR-MORD	Convergence with MGNREGA	Newly created						
DOLR-MORD		Water Conservation (Vented Dam)	136		0.000082	680	5	103.98
DOLR-MORD		Water Harvesting-Shallow well	498		0.000030	199.20	5	382.73
DOLR-MORD		Creation of Irrigation of Canals & Drains- Nala revetment		4993			5	53.24
DOLR-MORD		Irrigation through GPs-construction of bunds/barricades to store water in streams/rivulets					7	350.00
DOLR-MORD		Renovation and Maintainance of Irrigation canals & Drains (VARAHI Project)	1	3375			2	100.00
Grand Total			**2787**	**32094**	**0.70021**	**37685.80**		**267513.85**

The Various irrigation development programmes proposed in the DIP will facilitate not only water conservation, water use efficiency and har khet ko pani, but also crop diversification, increasing cropping intensity, adoption of integrated farming system and new technologies, productivity growth and doubling of farmer's income by the year 2020 in the district through 'more crop per drop'. With the implementation of the proposed DIP, agriculture in the district will become a commercial venture.

As regards funding is concerned, the resources already committed under RKVY, on-going both central and state schemes, MGNREGA, Rural Infrastructure Development Fund (RIIDF), Member of Legislative Assembly Local Area Development (MLALAD) scheme and Member of Parliament Local Area Development (MPLAD) would be considered. The balance resource allocation is expected to come from PMKSY. For each component, project reports will be prepared based on all essential ingredients i.e. feasibility studies, investment outlay, competence of implementing agencies, anticipated benefits that will flow to farmers, time schedule for implementation etc.

Chapter 6

Implementation and Monitoring

Any plan, howsoever systematically formulated, unless implemented efficiently and effectively, it cannot realize the targeted development objectives. This requires not only implementation and managerial arrangements and capability to implement, monitor and evaluate programmers but also taking effective steps to ameliorate the problems indicated in SWOT analysis in chapter 4. The DIP should not be implemented in isolation. It should be considered as an integral part of the Comprehensive District Agricultural Plan under RKVY to achieve the set development objectives. It also follows there from that the DIP can be implemented effectively and efficiently only if there are good governance and coordination at all levels of institutional set up involved in implementation and management of various component programmed activities. Good governance is about providing an administration that is transparent and accountable to people and effective and efficient in delivering social and economic public services. This requires harmonization of implementing arrangements and institutions with the Panchayat Raj set up and constant monitoring and attention with focus on implementation, performance and impact. Development experience already evidently demonstrates that while good governance can facilitate to achieve human well being and sustained and inclusive development, poor governance could well impede development in all respects.

As per the operational guidelines of PMKSY, the DIP should be implemented in area development mode by adopting decentralized panchayat raj governance structure. The District Agriculture Department is the nodal agency for preparation of the DIP and coordination and monitoring physical and financial progress of the DIP during implementation. The actual implementation of various irrigation schemes will be the responsibility of the concerned Departments particularly Department of Major and Minor Irrigation, Varahi Irrigation Project Authorities, Agriculture Department and Horticulture Department..

As recommended under PMKSY, the District Level Implementation Committee (DLIC) will be formed, chaired by the Deputy Commissioner and comprise of CEO of ZP, Project Director, DRDA, CPO of ZP, Joint/Deputy Directors of Departments of Agriculture, Horticulture, Rural Development, Surface and Ground Water Resources, Irrigation and other line Departments of ZP, District Forest Officer and Lead Bank Officer of the District. The DLIC also include two progressive farmers and a leading NGO working in the district as members. The Joint Director of Agriculture Department ZP will be the member Secretary. The DLIC will oversee the implementation and inter-departmental coordination to ensure successful implementation of the DIP. It is also responsible to prepare Annual Irrigation Plans (AIPs) based on DIPs, monitor the progress of various components of the AIPs, undertake public awareness campaign and publicity efforts for farmers and other stakeholders to build support for effective implementation of the DIPs and submit periodic reports to State Level Sanctioning Committee (SLSC) which is already constituted under RKVY and chaired by the Chief Secretary of the State. This committee at State

level *inter alia* vested with the authority to prioritize funding of projects, sanction DIPs and monitor and review implementation progress.

Annexure: Tables

Table 1

Taluk-wise Annual Rainfall in Udupi District

Year	Udupi	Kundapura	Karkala	Total
2005	3210	4553	4390	4251
2006	3432	4756	5229	4672
2007	3971	5440	5088	5064
2008	3154	4013	4465	4004
2009	4284	5749	5791	5480
2010	4668	5176	5196	5084
2011	4636	5077	5469	5113
2012	3898	4283	4464	4265
2013	4162	4864	5145	4815
2014	3320	3909	4600	4009
Normal	3950	3925	4828	4285

Source: Udupi District at Glance 2014-15, DSO, ZP Udupi.

Table 2

Gramapanchayatwise Land Use Pattern

Sl.No.	Name of the Gram Panchayat	Name of the Villages Covered	Total Geographical Area					Area under Forest	Area under Wasteland	Area under other uses
				Gross Cropped Area(1)	Net Sown Area(2)	Area sown more than once (1-2)	Cropping Intensity(%)			
1	Byndoor	Byndoor	4348	768	716	52	107	2101	82	1396
2	Shiroor	Shiroor	1466	645	624	21	103	133	58	631
3	Paduvari	Paduvari	1577	470	452	18	104	600	75	432
4	Uppunda	Uppunda	593	651	478	79	136	0	36	0
5	Bijuru	Bijuru	1152	1014	694	320	146	69	69	0
6	Edtare	Edtare	3478	768	664	104	116	1218	71	1421
7		Teggarse	1790	460	407	53	113	738	63	529
8	Kergalu	Kergalu	409	477	298	84	160	0	28	0
9		Nandanavana	157	149	133	16	112	0	1	7
10	Kolluru	Kolluru	9641	234	213	20	109	8962	63	382
11	Jadkal	Jadkal	5329	1525	1449	76	105	2893	28	883

12		Muduru	5808	689	620	69	111	3312	58	1749
13	Golihole	Golihole	4528	655	583	72	112	2423	107	1342
14		Yalagit	3408	473	452	21	105	1789	83	1064
15	Kalthodu	Kalthodu	4104	607	507	100	120	2018	59	1420
16	Kambadakone	Kambadakone	478	463	306	158	152	0	15	0
17		Heranjalu	536	343	289	54	119	51	48	94
18	Kirimanjeshwara	Kirimanjeshwara	773	500	397	103	126	0	55	218
19	Navunda	Navund	635	415	323	91	128	2	85	133
20	Heruru	Heruru	1862	689	677	11	102	564	76	533
21		Ulluru-11	764	557	451	106	123	133	54	19
22	Maravante	Marvante	451	295	271	24	109	0	42	115
23	Nada	Nada	1134	801	713	88	112	61	45	227
24		Hadavu	248	204	178	26	115	0	42	2
25		Badakere	298	196	186	10	105	0	5	97
26	Hallihole	Hallihole	2930	835	778	56	107	1337	76	683
Total Byndoor Hobli			**57899**	**14881**	**12861**	**1831**	**116**	**28405**	**1426**	**13376**
27	Aluru	Aluru	1938	411	356	54	115	693	155	680
28		Harkuru	1334	413	362	51	114	485	87	349
29	Keradi	Keradi	2669	573	512	61	112	1241	182	674
30		Bellala	2581	458	368	91	125	648	470	1005
31	Chitturu	Chitturu	1847	518	445	73	116	730	134	465
32		Iduru Kunjadi	1720	403	376	27	107	911	111	294
33		Hosuru	2297	458	407	51	112	783	296	760
34	Vandse	Vandse	988	329	286	43	115	178	98	383
35	Hakladi	Hakladi	614	409	329	80	124	20	4	181
36		Nujadi	828	428	385	43	111	17	120	263
37		Kundabarandadi	486	278	250	28	111	59	22	128
38	Trasi	Trasi	537	320	306	15	105	0	65	151
39		Hosadu	539	308	272	37	113	69	65	96
40	Gujjadi	Gujjadi	705	305	269	36	113	56	79	266
41	Hemmadi	Hemmadi	623	264	222	42	119	0	141	218
42		Kattabelturu	519	281	215	66	131	95	18	125
43		Devalkunda	542	341	271	70	126	121	9	71
44	Talluru	Talluru	488	266	223	43	119	119	2	102
45		Uppinakudru	457	313	205	109	153	0	32	112
46	Hattiyangadi	Hattiyngadi	431	285	265	20	107	64	5	77
47		Kanyana	670	490	438	53	112	98	15	68
48		Kenchanuru	497	285	241	43	118	65	43	104
49	Karkunje	Karkunje	1844	518	396	122	131	595	173	558
50		Gulvadi	1153	361	293	68	123	192	133	467
51	Ajri	Ajri	3037	800	726	74	110	1308	162	767
52		Kodladi	1390	586	527	58	111	509	86	209

53	Hosangadi	Hosangadi	3541	557	477	79	117	2197	36	751
54		Edmoge	2706	483	437	46	110	2020	57	146
55	Siddapura	Siddapura	3008	900	816	84	110	1174	203	732
56		Ulluru-74	2266	640	578	62	111	770	135	721
57	Shankaranaraya na	Shnkaranarayan a	2110	1084	959	126	113	180	206	640
58		Kulanje	1440	484	398	86	122	140	277	540
59	Amparu	Amparu	2272	827	768	59	108	274	95	1075
60	Kavradi	Kavradi	1026	365	311	54	117	62	62	538
61		Halnadu	462	403	354	49	114	6	37	16
62	Gangolli	Gangolli	407	142	138	4	103	6	71	188
63	Nada	Senapura	668	396	328	68	121	0	89	182
64	Hallihole	Kamalashile	1798	281	233	48	121	1151	81	286
65	Amasebylu	Muchchattu	5411	1090	1022	68	107	4079	18	224
Vandse Hobli			**57852**	**18055**	**15765**	**2291**	**115**	**21115**	**4072**	**14611**
66	Basruru	Basruru	576	361	281	80	129	205	9	0
67	Anagalli	Angalli	660	298	263	35	114	0	57	305
68	Hangaluru	Hangaluru	316	269	241	28	112	0	1	46
69	Koni	Koni	472	267	242	25	110	99	13	93
70		Kundavara	763	345	285	60	121	0	27	392
71	Koteshwara	Koteshwara	712	466	432	34	108	0	14	232
72	Bijadi	Bijadi	427	330	280	50	118	0	2	95
73		Gopadi	214	185	144	41	129	0	12	16
74	Balkuru	Balkuru	471	268	204	64	132	0	6	196
75	Kumbhashi	Kumbhashi	451	395	276	119	143	0	6	51
76	Tekkatte	Tekkatte	467	484	327	136	148	0	4	0
77	Beluru	Beluru	883	536	443	94	121	2	69	275
78	Keduru	Keduru	646	378	284	94	133	61	2	206
79		Ulturu	482	272	236	36	115	0	20	190
80	Kalavara	Kalavara	777	355	307	48	116	25	34	363
81		Korgi	1007	404	353	51	114	0	17	587
82		Heskathuru	289	198	166	32	119	64	4	23
83		Vakvadi	570	325	278	47	117	0	26	219
84		Asodu	446	299	263	36	114	0	15	133
85	Molahalli	Molahalli	2204	640	549	91	117	451	257	856
86	Hombadi Mundadi	Hombadi Mundadi	403	243	213	30	114	93	25	42
87		Yadyadi Matyadi	1088	519	462	58	113	283	59	227
88		Japthi	898	374	327	47	114	0	8	516
89	Hardalli Mandalli	Hardalli Mandalli	1253	348	258	90	135	413	123	369
90		Halladi Harkadi	423	228	179	50	128	0	12	183
91	Haladi 76	Haladi 76	1503	592	511	81	116	40	292	579
92		Haladi 28	459	167	140	27	119	13	12	268

93	Hengavalli	Henga	2603	531	463	68	115	1683	6	384
94	Belve	Belve	2261	652	602	50	108	812	205	592
95		albadi	1555	608	550	58	111	580	9	358
96	Madamakki	Madamakki	4178	550	498	53	111	3015	30	584
97		Shedimane	2206	1615	1562	53	103	578	1	11
98	Amasebylu	Amasebailu	5923	602	536	65	112	4053	434	834
99		Rattadi	1316	479	408	71	117	586	36	215
100	Purasabhe	Kundapura	879	291	266	25	109	0	186	402
101	Purasabhe	Vaderahobli	525	270	245	26	110	0	56	199
Kundapura Hobli			**40308**	**15145**	**13071**	**2052**	**116**	**13054**	**2090**	**10041**
Total Kundapura Taluk			**156059**	**48081**	**41697**	**6174**	**115**	**62574**	**7587**	**38027**
110	Idu	Idu	2993	501	415	86	121	1637	318	538
111		Nooralbettu	2120	400	326	74	123	1356	139	226
112	Nalluru	Nalluru	2465	950	859	91	111	610	158	746
113	Mudaru	Mudaru	2004	874	776	98	113	217	121	791
114	Durga	Durga	1972	620	534	86	116	777	108	468
115	Miyaru	Miyaru	2168	965	858	106	112	287	307	610
116	Renjala	Renjala	1851	487	406	80	120	723	168	474
117		Irvattooru	1150	610	541	69	113	278	8	253
118	Sanuru	Sanoor	1506	744	649	94	114	46	134	582
119	Kantavara	Kantavara	1991	699	590	110	119	268	296	728
120	Bola	Bola	1812	633	586	47	108	131	325	722
121		Kedinje	286	93	86	7	108	0	68	125
122	Nitte	Nitte	3929	1338	1267	71	106	232	533	1827
123	Belkan	Belman	1455	473	418	55	113	0	323	659
124		Nandalike	1199	418	348	70	120	156	61	564
125		Sooda	980	283	263	21	108	80	91	525
126	Mundkur	Mundkuru	1406	689	555	134	124	60	304	352
127		Mulladka	531	270	215	56	126	16	59	186
128	Inna	Inna	1020	422	399	23	106	40	41	517
129	Palli	Palli	1523	469	404	64	116	172	216	667
130		Ninjooru	915	280	226	53	124	32	229	374
131		Kalya	1889	818	747	71	110	228	55	788
132	Byluru	Bailooru	433	203	186	17	109	16	27	186
133		Kaudooru	1608	534	447	87	120	158	347	568
134	Nire	Neere	1229	462	431	31	107	200	76	491
135		Kanajaru	1421	477	437	40	109	136	199	609
136	Kukkunduru	Kukkundooru	2644	987	846	141	117	138	439	1080
137	Karkala	Karkala kasba	2264	486	395	91	123	143	867	768
Karkala Hobli			**46763**	**16184**	**14209**	**1974**	**114**	**8138**	**6016**	**16424**
138	Shivapura	Shivapura	1978	510	433	77	118	229	276	963
139		Kerebettu	437	210	179	31	117	0	27	200

140	Belanje	Belanje	996	357	289	68	124	257	68	314
141		Kuchooru	1723	371	308	63	120	739	301	313
142	Hebri	Hebri	3072	418	354	64	118	1237	436	981
143		Chara	1869	417	382	35	109	194	553	705
144	Nadsalu	Nadpalu	13833	521	459	62	113	10685	1519	1108
145	Mudradi	Kabbinale	2595	263	241	22	109	1804	93	436
146		Mudradi	2367	627	567	60	111	447	585	708
147	Varanga	Varanga	1997	581	519	62	112	100	638	678
148		Padukudooru	479	239	165	73	144	108	33	99
149		Andaru	4158	479	434	45	110	2039	700	940
150	Kadtala	Kadtala	1473	388	334	54	116	85	388	612
151		Ellare	1008	359	309	51	116	226	160	264
152		Kukkunje	846	417	379	39	110	178	37	213
153	Marne	Marne	3089	1263	1130	133	112	870	150	806
154		Hermude	1183	407	353	54	115	194	121	461
155	Shirlalu	Shirlalu	3682	594	527	66	113	1057	825	1206
156		Kervashe	4218	717	608	109	118	953	1490	1057
157		Jarkala	588	245	212	33	116	91	5	247
158	Mala	Mala	4701	1065	911	154	117	2457	646	534
159	Hirgana	Hirgana	2367	692	616	77	112	421	574	680
160	Erlapadi	Erlapadi	2163	661	533	128	124	303	334	864
Ajekaru Hobli			**60823**	**11800**	**10241**	**1559**	**115**	**24673**	**9960**	**14389**
Total Karkala Taluk			**107585**	**27984**	**24450**	**3534**	**114**	**32812**	**15976**	**30813**
161	Kotatattu	Kotathattu	455	470	334	135	141	0	2	0
162	Kota	Manooru	547	667	428	239	156	0	17	-136
163		Giliyaru	522	430	359	70	120	0	47	46
164	Pandeshwara	Pandeshwara	327	276	206	70	134	0	25	27
165		Moodahadu	300	203	157	46	129	0	44	53
166	Kodi	Kodi	442	151	128	23	118	0	63	228
167	Irodi	Irodi	365	291	212	79	137	0	39	35
168		Balekudru	359	219	176	43	124	0	18	123
169	Barkuru	Hosala	474	236	203	33	116	0	125	112
170		Kachuru	195	143	107	36	134	0	9	43
171	Vaddarse	Vddarse	338	248	193	55	128	0	59	32
172		Kavadi	572	288	236	52	122	0	95	189
173		Bannadi	197	190	145	45	131	0	13	-6
174		Achladi	300	252	191	61	132	0	16	32
175	Yadtadi	Yadtadi	1207	518	434	84	119	170	62	457
176		Heradi	523	175	142	32	123	99	55	194
177	Shiriyara	Shiriyara	1379	610	504	106	121	139	87	543
178	Billadi	Billadi	1139	310	241	69	129	119	179	531
179		Vandaru	722	291	212	79	137	146	97	189

180	Avarse	Avarse	750	346	257	89	135	94	71	239
181		Hiliyana	1404	322	248	74	130	166	85	831
182		Kakkunje	726	226	190	36	119	131	96	272
183	Heggunje	Heggunje	1301	539	445	94	121	95	240	427
184		33 Shiroor	1052	335	269	66	124	172	121	424
185	Hanehalli	Hanehalli	723	513	421	92	122	0	87	123
186	Kaduru	Kadooru	1066	435	351	84	124	175	139	317
187		Nadooru	675	337	304	33	111	100	41	197
189		Karkada	388	292	226	66	129	0	35	62
190		Gundmi	394	335	274	61	122	0	24	35
191		Chitrapadi	289	264	201	63	131	0	5	21
192		Parampalli	397	361	312	49	116	0	10	10
Kota Hobli			**19529**	**10271**	**8106**	**2165**	**127**	**1606**	**2003**	**5650**
194	Nalkuru	Nalkuru	2015	440	396	44	111	207	565	803
195		Nacharu	1149	496	448	48	111	117	62	473
196	Kokkarni	Pejamangooru	829	497	435	62	114	10	6	316
197		34 Kudi	1452	636	582	54	109	92	196	527
198	Cherkadi	Cherkadi	2107	825	765	60	108	73	538	672
199	38 Kalatturu	38 Kaltooru	1090	424	394	30	108	258	16	393
200		Kenjooru	1093	554	501	53	111	86	78	376
201	Karje	Hosuru	1569	442	397	45	111	285	174	667
202		Halivalli	881	391	351	40	111	86	117	287
203	Perduru	Perdooru	4606	1418	1353	65	105	407	1388	1393
204	Kunjalu	Neelavar	1248	533	464	69	115	0	326	390
205		Aroor	1017	390	333	57	117	0	182	445
206	Kukkehalli	Kukkehalli	1415	489	435	53	112	57	411	458
207		Bellampalli	708	363	318	45	114	17	48	280
208	Byrampalli	Bairmpalli	1343	435	391	44	111	87	254	566
209		Bellarpadi	431	375	358	17	105	0	2	54
210		41 Shiroor	1426	383	353	30	109	338	293	412
211	Uppuru	Uppoor	1217	527	485	42	109	0	123	567
212	Varamballi	Varamballi	508	230	203	26	113	0	152	126
213	Haradi	Haradi	592	318	291	27	109	0	104	171
214		Baikadi	358	205	184	21	111	0	82	71
215	Chantaru	Chantaru	564	244	204	39	119	0	140	181
216		52 Herooru	682	339	290	50	117	0	5	337
217	Havanje	Havanje	1038	362	320	43	113	75	152	450
218	Handadi	Handadi	326	225	194	31	116	0	1	100
219		Matapadi	327	194	155	39	125	0	95	37
220		Kumragodu	228	159	139	20	114	0	4	64
221	Kalyanapura	Moodutonse	762	368	364	3	101	0	82	312
222	Tonse	Padutonse	652	385	382	4	101	0	27	239

Brahmavar Hobli			**31633**	**12646**	**11484**	**1162**	**110**	**2195**	**5625**	**11166**
224	Tenkanidiyuru	Tenkanidiyooru	338	169	160	9	106	0	26	144
225		Kelarkalabettu	295	100	93	7	108	0	29	166
226	Badanidiyuru	Badanidiyooru	299	127	120	7	106	0	6	165
227	Ambalapadi	Ambalapadi	212	38	36	1	104	0	38	137
228		Kidiyooru	290	92	90	1	101	0	11	187
229		Moodanidamboo oru	398	53	52	1	102	0	71	274
230	Kadekaru	Kadekaru	346	99	99	0	100	0	48	200
231		Kutpadi	148	64	63	1	101	0	17	67
232	Udyavara	Udyavara	963	304	292	12	104	0	126	533
233	80 Badagubettu	80 Badagubettu	949	288	279	10	103	93	127	440
234	Atradi	Atradi	472	368	345	23	107	0	13	92
235		Hirebettu	882	443	422	21	105	13	147	280
236	Kodibettu	Anjaru	1285	340	307	33	111	110	201	634
237		82 Kudi	657	146	134	12	109	0	88	422
238		Pernankila	1071	383	379	5	101	83	132	472
239	Bommarabettu	Bommarabettu	2565	626	563	63	111	104	577	1258
240	Manipura	Manipura	921	286	251	35	114	0	139	496
241		Marne	400	163	138	25	118	0	41	196
242	Alevuru	Alevooru	736	209	186	23	112	7	136	383
243		Korangrapadi	525	221	193	28	114	0	68	236
245		Herga	1247	307	295	12	104	0	76	864
246		Shivalli	2234	232	224	8	104	0	321	1680
247		76 Badagubettu	734	177	169	8	105	0	162	395
248		Puttooru	736	101	97	5	105	0	169	466
249		Kodavooru	913	351	345	6	102	0	77	485
Udupi Hobli			**19616**	**5687**	**5330**	**357**	**107**	**410**	**2845**	**10674**
251	Belle	Belle	1322	299	282	16	106	0	383	641
252		Kattingari	822	260	227	33	114	3	178	381
253	Kurkalu	Kurkalu	941	467	439	28	106	0	40	433
254	Shirva	Shirva	3183	1021	896	126	114	98	359	1705
255	Innanje	Innanje	634	309	283	25	109	0	53	272
256		Pangala	367	210	187	22	112	0	2	155
257	Katapadi	Moodabettu	417	239	228	11	105	0	19	159
258		Enagudde	403	179	168	11	106	0	81	144
259	Kote	Kote	187	93	84	8	110	0	11	83
260		Mattu	240	127	103	24	123	0	3	111
261	Uliyaragoli	Uliyaragoli	493	291	273	18	106	0	17	185
262	Kapu	Padu	348	180	159	21	113	0	40	128
263		Mooluru	304	170	151	19	112	0	8	126

264	Mallaru	Mallaru	482	226	211	16	107	0	20	235
265	Majuru	Majooru	206	124	109	15	113	0	1	81
266		92 Heroor	268	101	94	8	108	0	34	133
267		Padooru	579	243	221	21	110	0	105	231
268	Kutyaru	Kutyaru	739	267	245	22	109	0	130	342
269		108 Kalturu	690	198	185	13	107	70	117	306
270	Mudarangadi	Pilaru	1200	246	226	20	109	127	204	624
271		Satooru	1040	253	230	23	110	92	64	631
272	Belapu	Belapu	585	242	220	22	110	0	63	280
273	Bada	Badanidiyooru	882	309	302	7	102	0	175	397
274	Elluru	Ellooru	1758	457	424	33	108	40	361	900
275	Plimaru	Palimaru	638	316	289	27	109	0	34	288
276		Nandikooru	703	229	208	21	110	46	85	344
277	Tenka	Tenka	595	290	272	19	107	0	31	274
278	Padubidri	Nadsalu	911	302	266	35	113	0	129	480
279		Padebettu	358	136	104	32	130	0	52	170
280	Hejamadi	Hejamadi	728	345	320	25	108	0	76	306
Kapu Hobli			**22019**	**8128**	**7409**	**719**	**110**	**475**	**2874**	**10542**
Total Udupi Taluk			**92797**	**36732**	**32329**	**4402**	**114**	**4686**	**13347**	**38032**
Grand Total Udupi District			**356441**	**112797**	**98477**	**14110**	**115**	**100071**	**36911**	**106872**

Table 3
Gramapanchayatwise Population(Demography) data

Name of the Gram Panchayat	Name of the Villages Covered	Code of Villages covered	Population				SC		ST		General		Total	
			M	F	CH*	Total	No. of household	No. of Members	No. of household	No. of Members	No. of household	No. of Members	No. of household	No. of Members
Shiroor	Shiroor	608660	7650	7936	1846	17432	95	444	5	22	2966	16966	3066	17432
Yedthare	Yedthare	608661	4280	4525	822	9627	77	359	107	498	1681	8770	1865	9627
Paduvari	Paduvari	608662	3048	3281	648	6977	111	516	2	11	1192	6450	1305	6977
Uppunda	Uppunda	608663	5039	5427	990	11456	41	191	3	12	2123	11253	2167	11456
Bijoor	Bijoor	608664	3005	3387	583	6975	42	193	11	49	1139	6733	1191	6975
Nandanavana	Nandanavana	608665	454	521	57	1032	17	81	0	0	156	951	173	1032
Kergal	Kergal	608666	1268	1768	354	3390	26	119	0	2	576	3269	602	3390
Kirimanjesh	Kirimanj	6086	3002	3744	708	7454	68	314	2	7	1362	7133	1431	7454

war	eshwar	67												
Kambadakone	Kambadakone	608668	1650	1815	341	3806	52	240	3	16	544	3550	599	3806
Ulloor [11]	Ulloor [11]	608669	875	1183	216	2274	23	107	4	20	398	2147	425	2274
Navunda	Navund	608670	2357	2830	562	5749	10	45	6	29	1023	5675	1039	5749
Badakere	Badakere	608671	648	907	156	1711	0	0	0	0	327	1711	327	1711
Maravanthe	Maravanthe	608672	2324	2451	490	5265	36	168	9	40	881	5057	926	5265
Hadavu	Hadavu	608673	407	670	81	1158	1	4	0	0	242	1154	243	1158
Nada	Nada	608674	1752	2398	366	4516	80	370	30	139	881	4007	990	4516
Heroor	Heroor	608675	942	1401	245	2588	11	50	66	308	452	2230	529	2588
Kalthodu	Kalthodu	608676	2082	2551	539	5172	36	169	85	396	852	4607	974	5172
Heranjal	Heranjal	608677	684	844	160	1688	30	138	1	6	299	1544	330	1688
Thagarasi	Thagarasi	608678	1251	1549	308	3108	43	199	48	222	520	2687	611	3108
Byndoor	Byndoor	608679	2243	2518	484	5245	39	182	111	516	1020	4547	1170	5245
Yeljith	Yeljith	608680	1038	1236	265	2539	6	29	154	718	296	1792	457	2539
Kollur	Kollur	608681	1477	1444	344	3265	33	152	113	525	611	2588	757	3265
Golihole	Golihole	608682	1411	1765	303	3479	5	21	187	869	487	2589	678	3479
Jadkal	Jadkal	608683	1606	1825	403	3834	22	101	188	876	645	2857	855	3834
Mudoor	Mudoor	608684	1389	1309	275	2973	38	176	94	436	562	2361	694	2973
Hallihole	Hallihole	608685	1020	1103	205	2328	83	384	99	461	313	1483	495	2328
Trashi	Trashi	608686	1281	1627	232	3140	95	442	1	5	602	2693	698	3140
Hosadu	Hosadu	608687	1422	1642	197	3261	57	263	11	53	621	2945	689	3261
Gujjadi	Gujjadi	608688	2689	2878	475	6042	138	642	3	12	1037	5388	1178	6042
Gangolli	Gangolli	608689	5731	6049	1234	13014	166	774	8	36	2372	12204	2546	13014
Uppinakudru	Uppinakudru	608690	949	1180	207	2336	59	275	0	0	446	2061	505	2336
Tallur	Tallur	608691	1566	1871	364	3801	99	459	26	123	693	3219	818	3801
Hattiangadi	Hattiangadi	608692	827	900	170	1897	55	254	0	0	283	1643	338	1897
Kanyana	Kanyana	608693	956	1046	180	2182	69	321	14	67	326	1794	409	2182
Kattabelthoor	Kattabelthoor	608694	1315	1582	273	3170	56	261	10	47	603	2862	669	3170
Hemmadi	Hemma	6086	1772	2176	345	4293	35	164	7	34	757	4095	800	4293

	di	95												
Hakladi	Hakladi	608696	1061	1588	234	2883	48	221	8	38	523	2624	579	2883
Senapur	Senapur	608697	1065	1293	214	2572	46	215	7	31	486	2326	539	2572
Harkoor	Harkoor	608698	790	1032	186	2008	46	215	6	30	333	1763	386	2008
Kundabarandadi	Kundabarandadi	608699	595	834	141	1570	23	109	3	14	278	1447	304	1570
Noojadi	Noojadi	608700	701	969	172	1842	24	110	15	68	321	1664	359	1842
Devalkunda	Devalkunda	608701	710	927	129	1766	34	159	0	1	324	1606	358	1766
Kenchanoor	Kenchanoor	608702	527	656	141	1324	19	88	6	29	237	1207	262	1324
Gulvadi	Gulvadi	608703	2051	2291	498	4840	106	494	2	10	767	4336	875	4840
Karkunje	Karkunje	608704	1891	2039	431	4361	23	106	12	57	806	4198	841	4361
Vandse	Vandse	608705	1165	1343	243	2751	17	77	9	41	541	2633	566	2751
Aloor	Aloor	608706	1325	1916	343	3584	34	159	5	25	667	3400	707	3584
Idurkunhadi	Idurkunhadi	608707	827	1074	241	2142	25	114	3	13	391	2015	418	2142
Chittoor	Chittoor	608708	1161	1457	299	2917	31	146	55	257	476	2514	563	2917
Hosoor	Hosoor	608709	917	1218	225	2360	26	119	40	188	387	2053	453	2360
Keradi	Keradi	608710	1127	1200	247	2574	41	190	83	388	388	1996	512	2574
Bellal	Bellal	608711	1096	1395	289	2780	27	124	35	164	490	2492	552	2780
Kodladi	Kodladi	608712	814	970	178	1962	15	70	81	378	288	1514	384	1962
Kavrady	Kavrady	608713	2169	2518	537	5224	64	297	16	75	919	4852	999	5224
Halnad	Halnad	608714	460	564	88	1112	42	196	2	9	194	907	238	1112
Ampar	Ampar	608715	2105	2414	424	4943	109	509	37	174	904	4260	1051	4943
Shankaranarayana	Shankaranarayana	608716	2176	2559	409	5144	65	303	108	500	853	4341	1026	5144
Siddapur	Siddapur	608717	3359	3368	674	7401	114	529	87	405	1249	6467	1450	7401
Ajri	Ajri	608718	1643	1974	400	4017	52	241	23	106	731	3670	806	4017
Kamalashile	Kamalashile	608719	621	662	127	1410	17	80	70	327	188	1003	276	1410
Edmoge	Edmoge	608720	964	938	218	2120	52	242	120	556	254	1322	426	2120
Hosangadi	Hosangadi	608721	2186	2276	410	4872	77	356	148	687	907	3829	1131	4872
Machattu	Machattu	608722	1105	1275	236	2616	11	50	30	141	491	2425	532	2616

Ulloor 74	Ulloor 74	608723	1436	1623	287	3346	36	168	39	182	618	2996	693	3346
Kulanje	Kulanje	608724	811	1000	176	1987	9	43	109	505	293	1439	411	1987
Hangaloor	Hangalor	608725	1919	2159	469	4547	33	152	2	10	960	4385	995	4547
Koni	Koni	608726	1620	1809	331	3760	54	252	0	0	692	3508	746	3760
Beejadi	Beejadi	608727	2688	3034	553	6275	51	236	3	12	1214	6027	1267	6275
Gopadi	Gopadi	608728	1428	1611	293	3332	60	279	15	69	643	2984	718	3332
Vakwadi	Vakwadi	608729	1188	1360	215	2763	40	184	11	52	498	2527	549	2763
Thekkatte	Thekkatte	608730	2438	2632	520	5590	51	237	2	7	1015	5346	1067	5590
Ulthoor	Ulthoor	608731	703	945	150	1798	28	130	1	6	366	1662	395	1798
Beloor	Beloor	608732	1385	1701	254	3340	63	295	12	55	633	2990	708	3340
Kedoor	Kedoor	608733	905	1065	161	2131	46	213	10	47	381	1871	437	2131
Kumbashi	Kumbashi	608734	2434	2685	466	5585	104	485	10	45	1028	5055	1142	5585
Asodu	Asodu	608735	471	550	93	1114	7	31	4	19	215	1064	226	1114
Kalavara	Kalavara	608736	1169	1347	248	2764	105	490	3	13	481	2261	589	2764
Kandavara	Kandavara	608737	1430	1622	305	3357	113	524	5	25	522	2808	640	3357
Anagalli	Anagalli	608738	1324	1517	219	3060	55	256	0	0	652	2804	707	3060
Basrur	Basrur	608739	2881	3156	576	6613	50	234	9	41	1297	6338	1356	6613
Balkur	Balkur	608740	1264	1435	299	2998	52	241	2	7	531	2750	584	2998
Japthi	Japthi	608741	918	1072	188	2178	13	59	1	3	458	2116	471	2178
Hombady-Mandadi	Hombad Mandadi	608742	640	736	194	1570	55	255	11	52	272	1263	338	1570
Korgi	Korgi	608743	906	1202	215	2323	62	290	1	4	415	2029	478	2323
Heskathoor	Heskathoor	608744	430	461	89	980	0	0	0	0	186	980	186	980
Hallady-Harkadi	Hallady-Harkadi	608745	675	799	132	1606	16	74	15	69	290	1463	321	1606
Yedyadi-Mathyadi	Yedyadi Mathyadi	608746	1136	1291	229	2656	32	149	3	16	499	2491	534	2656
Molahalli	Molahalli	608747	1688	2038	353	4079	89	413	1	5	762	3661	852	4079
Hardally-Mandally	Hardally Mandally	608748	1403	1635	260	3298	47	220	15	70	607	3008	669	3298
Harady (28)	Harady (28)	608749	530	617	115	1262	16	74	5	22	250	1166	271	1262

Halady (76)	Halady (76)	608750	1193	1324	274	2791	19	87	40	186	532	2518	591	2791
Hengavalli	Hengavalli	608751	1382	1743	321	3446	42	196	37	173	614	3077	693	3446
Belve	Belve	608752	1498	1631	326	3455	51	238	8	37	714	3180	773	3455
Albadi	Albadi	608753	1382	1682	344	3408	53	245	17	81	701	3082	771	3408
Shedimane	Shedimane	608754	988	1150	232	2370	18	84	14	66	460	2220	492	2370
Rattadi	Rattadi	608755	807	970	166	1943	24	111	41	189	347	1643	412	1943
Amasebailu	Amasebailu	608756	1312	1395	327	3034	12	54	161	747	442	2233	614	3034
Madammakki	Madammakki	608757	785	835	147	1767	3	13	39	183	290	1571	332	1767
Kundapura (TMC)	Kundapura (TMC)	803139	13513	14317	2614	30444	309	1439	78	362	5885	28643	6272	30444
Koteshwar (CT)	Koteshwar (CT)	608758	4400	4869	960	10229	39	182	20	92	2072	9955	2131	10229
Total Kundapura Taluk			**169101**	**193107**	**36263**	**398471**	**4894**	**22759**	**3166**	**14719**	**71513**	**360993**	**79573**	**398471**
Manoor	Manoor	608759	2547	2826	503	5876	82	381	3	13	1028	5482	1113	5876
Kotathattu	Kotathattu	608760	2180	2545	446	5171	39	183	13	59	980	4929	1032	5171
Giliyar	Giliyar	608761	1618	2057	307	3982	65	303	12	57	807	3622	884	3982
Bannady	Bannady	608762	523	594	89	1206	11	53	1	6	235	1147	248	1206
Vaddarse	Vaddarse	608763	949	1053	161	2163	20	92	6	30	420	2041	446	2163
Kodi	Kodi	608764	1949	2134	407	4490	18	85	1	4	841	4401	860	4490
Balkudru	Balkudru	608765	1338	1212	186	2736	73	338	1	5	504	2393	578	2736
Irody	Irody	608766	1540	1814	302	3656	24	112	1	5	841	3539	866	3656
Pandeshwara	Pandeshwara	608767	1202	1597	243	3042	25	118	8	35	684	2889	717	3042
Moodahadu	Moodahadu	608768	937	1019	151	2107	18	85	0	1	440	2021	458	2107
Hosala	Hosala	608769	1223	1423	201	2847	34	157	9	40	607	2650	649	2847
Kavadi	Kavadi	608770	872	1104	154	2130	15	68	19	89	460	1973	494	2130
Achalady	Achalady	608771	465	571	97	1133	17	80	5	21	230	1032	252	1133
Shiriyara	Shiriyara	608772	2172	2274	393	4839	96	447	1	4	834	4388	931	4839
Kakkunje	Kakkunje	608773	551	760	129	1440	18	85	3	16	269	1339	291	1440
Billadi	Billadi	608774	1233	1297	246	2776	43	198	5	22	467	2556	514	2776
Yedthady	Yedthady	608775	1944	1932	354	4230	48	223	28	132	722	3875	798	4230
Herady	Herady	608776	887	948	174	2009	15	69	135	627	274	1313	424	2009
Kachur	Kachur	608777	752	944	141	1837	8	38	1	5	421	1794	430	1837
Hanehalli	Hanehalli	608778	1763	2085	358	4206	55	258	53	246	814	3702	922	4206
Nadur	Nadur	608779	820	924	146	1890	8	38	6	28	362	1824	376	1890

Heggunje	Heggunje	608780	1507	1852	317	3676	37	170	33	153	743	3353	812	3676
Vandar	Vandar	608781	684	810	156	1650	10	45	5	24	300	1581	315	1650
Avarse	Avarse	608782	654	857	135	1646	27	124	1	5	313	1517	341	1646
Hiliyana	Hiliyana	608783	1327	1520	287	3134	51	236	17	81	525	2817	593	3134
33 Shiroor	33 Shiroor	608784	921	999	172	2092	23	107	37	171	376	1814	436	2092
Kadur	Kadur	608785	1138	1254	173	2565	26	121	22	101	493	2343	541	2565
Tonse West	Tonse West	608786	3291	3871	848	8010	145	674	5	25	1512	7311	1662	8010
Haradi	Haradi	608787	1575	1891	305	3771	68	314	3	12	771	3445	841	3771
Kumragod	Kumragod	608788	688	819	139	1646	4	20	2	10	366	1616	372	1646
Handady	Handady	608789	1427	1627	255	3309	101	471	1	6	657	2832	760	3309
Matpady	Matpady	608790	859	906	162	1927	15	72	30	139	351	1716	396	1927
Chanthar	Chanthar	608791	2454	2611	447	5512	53	246	104	483	1115	4783	1272	5512
Baikady	Baikady	608792	1525	1643	281	3449	54	253	7	33	807	3163	869	3449
Uppoor	Uppoor	608793	3510	3679	634	7823	94	437	34	157	1667	7229	1795	7823
Havanje	Havanje	608794	1666	1802	282	3750	72	334	57	265	666	3151	795	3750
Aroor	Aroor	608795	1635	1719	255	3609	44	203	178	827	541	2579	763	3609
Neelavar	Neelavar	608796	1500	1720	260	3480	5	25	91	423	661	3032	757	3480
Cherkady	Cherkady	608797	2880	2955	500	6335	56	262	406	1890	923	4183	1386	6335
Bellampalli	Bellampalli	608798	998	1029	141	2168	9	41	74	343	382	1784	465	2168
Kukkehalli	Kukkehalli	608799	1429	1507	252	3188	39	180	127	589	512	2419	677	3188
Haluvalli	Haluvalli	608800	861	944	177	1982	7	32	109	506	291	1444	407	1982
Pejamangoor	Pejamangoor	608801	2023	2129	339	4491	45	208	50	233	783	4050	878	4491
34 Kudi	34 Kudi	608802	1605	1703	266	3574	7	31	43	202	662	3341	712	3574
Nanchar	Nanchar	608803	1184	1271	236	2691	27	126	44	203	456	2362	527	2691
Nalkur	Nalkur	608804	1797	1864	342	4003	37	172	14	64	741	3767	792	4003
Kenjoor	Kenjoor	608805	1209	1403	238	2850	14	64	63	294	515	2492	592	2850
38 Kalthur	38 Kalthur	608806	849	942	182	1973	16	75	84	391	327	1507	427	1973
Hosoor	Hosoor	608807	1180	1254	224	2658	16	75	186	867	365	1716	568	2658
Perdoor	Perdoor	608808	4806	5215	936	10957	117	546	195	908	1935	9503	2248	10957
Bairampalli	Bairampalli	608809	1443	1531	323	3297	31	146	13	62	599	3089	644	3297
Bellarpadi	Bellarpadi	608810	412	391	64	867	4	19	5	25	164	823	173	867
41 Shiroor	41 Shiroor	608811	934	1056	165	2155	49	228	40	185	334	1742	423	2155
Badanidiyur	Badanidiyur	608812	1688	1973	357	4018	72	336	5	23	818	3659	895	4018
Athradi	Athradi	608813	1257	1332	274	2863	26	122	97	451	524	2290	647	2863
Anjaru	Anjaru	608814	1802	1884	327	4013	54	249	121	564	722	3200	897	4013

Bommarabettu	Bommarabettu	608815	3751	3962	650	8363	58	268	234	1089	1640	7006	1932	8363
Kudi (82)	Kudi (82)	608816	695	791	107	1593	9	43	54	250	287	1300	350	1593
Hirebettu	Hirebettu	608817	1170	1240	209	2619	23	105	122	569	434	1945	579	2619
Marne	Marne	608818	551	612	91	1254	20	94	39	181	209	979	268	1254
Pernankila	Pernankila	608819	833	850	158	1841	30	140	30	138	340	1563	400	1841
Mattu	Mattu	608820	1148	1182	179	2509	34	157	0	1	513	2351	547	2509
Kote	Kote	608821	1432	1654	319	3405	35	162	2	9	744	3234	781	3405
Kurkalu	Kurkalu	608822	2198	2639	449	5286	95	440	12	57	1167	4789	1274	5286
Belle	Belle	608823	2045	2467	392	4904	119	555	28	128	1088	4221	1235	4904
Kattingere	Kattingere	608824	911	1124	191	2226	31	142	7	34	525	2050	563	2226
Shirva	Shirva	608825	5782	6530	1084	13396	197	915	91	424	2895	12057	3183	13396
92 Heroor	92 Heroor	608826	514	650	122	1286	6	26	4	17	291	1243	300	1286
Padoor	Padoor	608827	965	877	141	1983	7	31	9	41	392	1911	407	1983
Majoor	Majoor	608828	790	887	203	1880	26	121	4	18	361	1741	391	1880
Innanje	Innanje	608829	1318	1634	253	3205	43	199	13	61	651	2945	707	3205
Pangala	Pangala	608830	865	991	139	1995	48	225	5	25	436	1745	490	1995
Uliargoli	Uliargoli	608831	2463	2858	577	5898	112	521	7	33	1171	5344	1290	5898
Padu	Padu	608832	2216	2500	421	5137	53	246	13	59	1101	4832	1167	5137
Muloor	Muloor	608833	1235	1500	352	3087	34	159	2	7	631	2921	667	3087
Belpu	Belpu	608834	1734	1936	457	4127	67	311	6	26	799	3790	871	4127
108 Kalthur	108 Kalthur	608835	1193	1415	243	2851	25	116	21	97	615	2638	661	2851
Kuthyar	Kuthyar	608836	1107	1416	219	2742	32	147	17	78	573	2517	621	2742
Pilar	Pilar	608837	1293	1672	256	3221	49	230	32	151	798	2840	880	3221
Yellur	Yellur	608838	2305	2699	449	5453	78	364	12	55	1175	5034	1265	5453
Tenka	Tenka	608839	1809	2075	342	4226	88	410	4	19	855	3797	947	4226
Padebettu	Padebettu	608840	784	935	146	1865	36	167	8	39	375	1659	419	1865
Hejamadi	Hejamadi	608841	3359	3874	842	8075	65	301	3	13	1671	7761	1739	8075
Palimar	Palimar	608842	1444	1593	282	3319	47	218	6	29	695	3072	748	3319
Nandicoor	Nandicoor	608843	1263	1455	269	2987	71	332	13	59	624	2596	708	2987
Santhoor	Santhoor	608844	1035	1226	200	2461	16	74	9	43	584	2344	609	2461
Saligram (TP)		803140	6570	7345	1208	15123	217	1011	38	177	2967	13935	3222	15123
Udupi (CMC + OG)		803141	65310	67458	12192	144960	1803	8385	1457	6774	30727	129801	33987	**144960**
Varamballi (CT)		608845	2969	3210	630	6809	103	480	20	92	1447	6237	1570	6809
52 Heroor (CT)		608846	2174	2226	378	4778	47	218	28	132	1069	4428	1144	4778

Tonse East (CT)		608847	3427	3849	635	7911	103	478	20	95	1746	7338	1869	7911
Tenkanidyoor (CT)		608848	2737	2973	478	6188	44	205	4	20	1428	5963	1476	6188
Korangrapady (CT)		608849	2192	2303	449	4944	126	587	37	174	983	4183	1147	4944
Badagabettu (No.80) (CT)		608850	4532	4057	720	9309	112	522	239	1110	1752	7677	2103	9309
Alevoor (CT)		608851	2891	2822	589	6302	77	357	181	840	1176	5105	1433	6302
Udyavara (CT)		608852	5077	5806	971	11854	120	559	16	75	2584	11220	2720	11854
Manipura (CT)		608853	2147	2374	480	5001	41	189	76	352	975	4460	1091	5001
Yenagudde (CT)		608854	2172	2371	474	5017	41	190	5	23	1107	4804	1153	5017
Moodabettu (CT)		608855	2145	2423	450	5018	98	458	7	34	1108	4526	1214	5018
Mallar (CT)		608856	3228	3636	901	7765	161	749	20	95	1342	6921	1524	7765
Bada (CT)		608857	3345	3898	874	8117	33	154	17	78	1707	7885	1757	8117
Nadsal (CT)		608858	5138	5344	1129	11611	195	907	23	106	2229	10598	2447	11611
Total udupi Taluk			**246445**	**268415**	**47939**	**562799**	**7063**	**32843**	**5610**	**26087**	**113144**	**503869**	**125817**	**562799**
Belenje	Belenje	608865	884	943	170	1997	18	84	60	278	312	1635	390	1997
Kuchchur	Kuchchur	608866	1074	1071	209	2354	6	27	75	347	378	1980	458	2354
Nadpalu	Nadpalu	608867	1057	1191	230	2478	24	112	63	291	476	2075	563	2478
Hebri	Hebri	608868	2732	2763	511	6006	72	336	188	873	1042	4797	1302	6006
Chara	Chara	608869	2271	2365	429	5065	63	294	150	697	841	4074	1054	5065
Kerebettu	Kerebettu	608870	398	400	85	883	10	46	17	80	135	757	162	883
Shivapura	Shivapura	608871	1874	1867	343	4084	66	306	110	513	676	3265	852	4084
Mudrady	Mudrady	608872	1856	2091	348	4295	52	243	68	317	853	3735	973	4295
Kabbinale	Kabbinale	608873	650	644	113	1407	11	51	79	366	212	990	302	1407
Varanga	Varanga	608874	1720	1959	332	4011	56	262	86	398	670	3351	812	4011
Padukudoor	Padukudoor	608875	299	375	51	725	29	134	0	2	126	589	155	725
Yellare	Yellare	608876	705	737	141	1583	29	133	65	301	219	1149	312	1583
Kukkuje	Kukkuje	608877	616	700	122	1438	44	206	34	156	238	1076	316	1438

Kadthala	Kadthala	608878	1060	1092	197	2349	80	370	58	271	349	1708	487	2349
Marne	Marne	608879	3431	3599	736	7766	118	549	152	709	1410	6508	1681	7766
Yerlapady	Yerlapady	608880	2030	2227	455	4712	122	569	23	108	836	4035	982	4712
Hirgana	Hirgana	608881	2107	2497	415	5019	59	275	63	293	1006	4451	1128	5019
Hermunde	Hermunde	608882	657	682	124	1463	22	101	27	125	258	1237	307	1463
Andaru	Andaru	608883	1024	1100	234	2358	34	158	92	426	381	1774	507	2358
Shirlal	Shirlal	608884	955	1119	177	2251	18	86	63	293	442	1872	524	2251
Jarkala	Jarkala	608885	397	417	82	896	17	77	0	0	154	819	171	896
Kervashe	Kervashe	608886	1332	1362	324	3018	53	247	58	272	515	2499	627	3018
Mala	Mala	608887	2603	2830	565	5998	162	752	109	507	1067	4739	1338	5998
Kanajaru	Kanajaru	608888	1177	1249	200	2626	36	169	22	102	529	2355	587	2626
Neere	Neere	608889	1328	1474	251	3053	71	329	5	23	642	2701	718	3053
Bailoor	Bailoor	608890	486	593	106	1185	14	63	1	6	222	1116	237	1185
Kowdoor	Kowdoor	608891	1765	2103	338	4206	127	592	40	186	785	3428	952	4206
Ninjoor	Ninjoor	608892	915	1028	149	2092	46	215	8	36	394	1841	448	2092
Palli	Palli	608893	1505	1673	336	3514	79	369	83	385	637	2760	799	3514
Kallya	Kallya	608894	1624	1877	363	3864	94	438	81	376	693	3050	868	3864
Kukkundoor	Kukkundoor	608895	5766	6153	1261	13180	286	1328	80	374	2664	11478	3030	13180
Nitte	Nitte	608896	5505	5855	994	12354	297	1383	54	249	2226	10722	2577	12354
Nandalike	Nandalike	608897	1540	1823	363	3726	118	548	2	8	774	3170	894	3726
Sooda	Sooda	608898	900	1081	166	2147	36	166	28	130	473	1851	537	2147
Belman	Belman	608899	2099	2498	448	5045	82	383	32	147	1106	4515	1220	5045
Inna	Inna	608900	1406	1805	312	3523	17	77	25	116	823	3330	865	3523
Mulladka	Mulladka	608901	567	672	114	1353	23	107	19	87	268	1159	310	1353
Mundkuru	Mundkuru	608902	2354	2894	499	5747	86	398	24	112	1230	5237	1340	5747
Bola	Bola	608903	1600	1971	343	3914	79	367	11	50	848	3497	938	3914
Kedinje	Kedinje	608904	378	403	83	864	11	50	1	5	179	809	191	864
Kanthavara	Kanthavara	608905	1439	1659	252	3350	72	335	28	130	653	2885	753	3350
Miyar	Miyar	608906	3194	3452	672	7318	223	1038	30	138	1447	6142	1700	7318
Durga	Durga	608907	1490	1592	301	3383	74	343	106	494	557	2546	737	3383
Mudar	Mudar	608908	2592	2925	571	6088	196	910	37	174	1123	5004	1356	6088
Nooralbettu	Nooralbettu	608909	1032	1096	239	2367	45	211	24	112	413	2044	482	2367
Eedu	Eedu	608910	2191	2471	514	5176	111	514	29	133	924	4529	1063	5176
Nallur	Nallur	608911	2491	2813	525	5829	167	775	21	96	1075	4958	1262	5829
Renjala	Renjala	608912	1233	1364	235	2832	116	540	23	107	444	2185	583	2832

Irvathuru	Irvathuru	608913	1057	1266	195	2518	86	398	5	22	459	2098	549	2518
Karkal (TMC)	Karkal (TMC)	803142	11542	12109	2149	25800	375	1744	114	529	5318	23527	5807	25800
Sanoor (CT)	Sanoor (CT)	608914	2988	3307	586	6881	133	619	30	141	1319	6121	1482	6881
Total Karkala Taluk			**93896**	**103237**	**18958**	**216091**	**4264**	**19827**	**2600**	**12091**	**40824**	**184173**	**47688**	**216091**
Udupi District			**509442**	**564759**	**103160**	**1177361**	**16221**	**75429**	**11376**	**52897**	**225481**	**1049035**	**253078**	**1177361**

Table 4

Production and Productivity of Major Crops

Season	Crop Sown			Rainfed				Irrigated				Total		
	Cereals	Pulses	Oil Seeds	Area (ha)	Production (qtn/yr)	Productivity of Yield (Kgs/ha)	Cost of Cultivation (Rs./ha)	Area (ha)	Production (qtn/yr)	Productivity of Yield (Kgs/ha)	Area (ha)	Production (qtn/yr)	Productivity of Yield (Kgs/ha)	Cost of Cultivation (Rs./ha)
A. Kharif														
Udupi	17073	0	0	17073	772295	45.23	20000	0	0	0	17073	772295	45.23	20000
Kundapur	17947	0	0	17947	797599	44.44	20000	0	0	0	17947	797599	44.44	20000
Karkala	7992	0	0	7992	338090	42.30	20000	0	0	0	7992	338090	42.30	20000
Total	**43012**	**0**	**0**	**43012**	**1907984**	**131.98**	**20000**	**0**	**0**	**0**	**43012**	**1907984**	**44.36**	**20000**
B. Rabi/summer														
Udupi	1165	2015	440	2455	26075	10.62	25000	1165	50843	43.66	3620	76918	21.25	25000
Kundapur	2657	1515	1359	2874	44308	15.42	25000	2657	121698	45.81	5531	166006	30.01	25000
Karkala	2715	118	0	118	567	4.81	25000	2715	113125	41.67	2833	113692	40.13	25000
Total	**6537**	**3648**	**1799**	**5447**	**70950**	**13.03**	**25000**	**6537**	**285666**	**43.71**	**11984**	**356616**	**29.76**	**25000**

Horticultural & Plantation												
A. Kharif	Arecanut	coconut	oilpalm	banana	cocoa	Water melon	Area (ha)	Production (qtn/yr)	Area (ha)	Production (qtn/yr)	Productivity of Yield (Kgs/ha)	Cost of Cultivation (Rs./ha)
Udupi	1077	7802	4	358	2	0			9243	134450	1454.64	297157

Kundapur	3415	6109	0	374	6	0			9904	144074	1454.64	318427
Karkala	3355	3904	19	259	23	0			7560	109969	1454.64	243051
Total	**7847**	**17815**	**23**	**991**	**31**	**0**	**0**	**0**	**26707**	**388493**	**4363.92**	**858635**

B. Rabi/summer												
Udupi		0				3	0	26075	3	1200	40000	150000
Kundapur		0				10	0	44308	10	4000	40000	150000
Karkala		0				0	0	567	0	0		0
Total	**0**	**0**				**13**	**0**	**70950**	**13**	**5200**		**300000**

source :- Agriculture & Horticulture Dept udupi

Table 5
Taluk-wise Ground Water Resources of Udupi District
(HAM)

Particu;lars	**Udupi**	**Kundapura**	**Karkal**	**Total**
Net annual GWavailability	15073	12952	22365	50390
Existing Gross GW draft for irrigation	5811	3518	7759	17088
Existing gross GW draft for domestic and industrioal water supply	833	680	1110	2623
Existing gross GW draft for all use	6645	4198	8868	19711
Allocation for domestic and indfustrial use for next 5 years	1180	961	1571	3712
Net GW availability for future irrigation	8081	8473	13036	29590
Average crop water requirement (m/ha)	0.58	0.59	0.59	0.59
Irrigation potential (ha)	13933	14361	22095	50389

Source: Central Ground Water Board:

Table- 6

Crop Water Requirement

Block	**Crops**	**Area sown (ha)**	**Irrigated area (ha)**	**Irrigated area (ha)2020**	**Crop water demand (mm)**	**Water potention required (BCM)**	**Existing Water potential (BCM)**	**Water potential to be created (BCM)**
Udupi	Arecanut	1077.00	1077.00	2577.00	891	0.00392	0.00392	0.00938
Kundapura		3415.00	3415.00	7165.00		0.01243	0.01243	0.02608
Karkala		3355.00	3355.00	7105.00		0.01221	0.01221	0.02586
Total		7847.00	7847.00	16847.00	0	0.02856	0.02856	0.06132
Udupi	coconut	7802.00	7802.00	8502.00	622	0.00343	0.00343	0.00374
Kundapura		6109.00	6109.00	6809.00		0.00269	0.00269	0.00300
Karkala		3904.00	3904.00	4504.00		0.00172	0.00172	0.00198
Total		17815.00	17815.00	19815.00	0	0.00784	0.00784	0.00872

Udupi	Oilpalm	4.00	4.00	4.35	621	0.000002	0.000002	0.000002
Kundapura		0.00	0.00	0.00		0.00000	0.00000	0.00000
Karkala		19.00	19.00	20.65		0.00001	0.00001	0.00001
Total		23.00	23.00	25.00	0	0.00001	0.00001	0.00001
Udupi	Banana	358	358	550	175	0.00332	0.00332	0.00510
Kundapura		374	374	550		0.00347	0.00347	0.00510
Karkala		259	259	400		0.00240	0.00240	0.00371
Total		991.00	991.00	1500.00	0	0.00920	0.00920	0.01392
Udupi	Cocoa	1.83	1.83	2.94	265.50	0.00002	0.00002	0.00003
Kundapura		6.41	6.41	10.29		0.00006	0.00006	0.00010
Karkala		22.9	22.9	36.77		0.00021	0.00021	0.00034
Total		31.14	31.14	50.00	266	0.00029	0.00029	0.00046
Udupi	Water melon	3	3	3	33	0.00001	0.00001	0.00001
Kundapura		10	10	12		0.00003	0.00003	0.00004
Karkala		0	0	0		0.00000	0.00000	0.00000
Total		13.00	13.00	15.00	0	0.00004	0.00004	0.00005
Udupi	Vegetables (Mainly Brinjal)	500	500	1000	900	0.00450	0.00450	0.00900
Kundapura		500	500	1000		0.00450	0.00450	0.00900
Karkala		300	300	500		0.00270	0.00270	0.00450
		1300.00	1300.00	2500.00		0.01170	0.01170	0.02250
A) Cereals								
Udupi	Paddy	18237	1165	8000	1200	0.21885	0.01397	0.09600
Kundapura		20604	2657	9157		0.24725	0.03188	0.10988
Karkala		10707	2715	4000		0.12849	0.03258	0.04800
Total		49548	6536	21157		0.59458	0.07843	0.25388
B) Pulses -								
Udupi	Blackgram	2015	2015	2762	300	0.00605	0.00605	0.00829
Kundapura		1515	1515	2076		0.00454	0.00454	0.00623
Karkala		118	118	162		0.00035	0.00035	0.00049
Total		3648	3648	5000		0.01094	0.01094	0.01500
D) Oil Seeds-								
Udupi	Ground nut	440	440	489	600	0.00264	0.00264	0.00293
Kundapura		1359	1359	1511		0.00816	0.00816	0.00907
Karkala		0	0	0		0.00000	0.00000	0.00000
Total		**1799**	**1799**	**2000**		**0.01080**	**0.01080**	**0.01200**
E) Commercial Crops								
Udupi	Sugarcane	40	40	2000	1840	0.000736	0.000736	0.0368
Kundapura		15	15	3000		0.000276	0.000276	0.0552
Karkala		0	0	500		0	0	0.0092
Total		55	55	5500		0.001012	0.001012	0.1012
Udupi	All	30478.29	13405.45	25890.86		0.24347	0.03860	0.17129
Kundapura		33907.15	15960.19	31290.00		0.28340	0.06804	0.22369
Karkala		18685.17	10692.84	17228.37		0.14809	0.05219	0.09409
Grand Total		83070.61	40058.48	74409.23		0.67497	0.15883	0.48907

Source: Agriculture & Horticulture, ZARS, Brahamvar

Table -7a

Water Requirement of different livestocks

Taluk	Small Animals										Large Animals						Draft Animal (Buffalo/yak/ bulls/any other (Nos.)	Water BCM
	Poultry (No.)	Water BCM	Ducks (No.)	Water BCM	Pigs (Nos).	Water BCM	Goats (Nos.)	Water BCM	Sheeps (Nos.)	Water BCM	Indigenous Cow (Nos.)	Water BCM	Hybrid Cow (Nos.)	Water BCM	In Descripitive Buffalo (Nos.)	Water BCM		
Udupi	560870	0.0021	60	0.000000	1766	0.00001	4586	0.000017	38	0.0000001	32198	0.000119	51286	0.000190	2499	0.000009	8248	0.000031
Kundapura	470123	0.0017	54	0.000000	966	0.00000	1323	0.000005	23	0.0000001	80972	0.000300	27450	0.000102	4343	0.000016	16943	0.000063
Karkala	162779	0.0006	44	0.000000	366	0.00000	691	0.000003	9	0.0000000	42139	0.000156	18012	0.000067	2004	0.000007	11019	0.000041
Total	**1193772**	**0.004**	**158**	**0.000001**	**3098**	**0.00001**	**6600**	**0.000024**	**70**	**0.0000003**	**155309**	**0.000575**	**96748**	**0.000358**	**8846**	**0.000033**	**36210**	**0.000134**

Water Requirments for different animals

Particulars	Poultry	Ducks	Pigs).	Goats	Sheeps	Indigenous Cow	Hybrid Cow	In Descripitive Buffalo	Draft Animal (Buffalo/yak / bulls/any other
Maintainance	10 LPD	10 LPD	45 LPD	30 LPD	30 LPD	130 LPD	200 LDP	300 LPD	200lPD
Drinking	150 MLPD	150ML PD							

Table-7b

Water requirement of livestock for 2020

Live stock Water Demand for (2020) is calculated taking into consideration of increase in 10%

Taluk	Small Animals										Large Animals						Draft Animal (Buffalo/yak / bulls/ any other	Water BCM
	Poultry (No.)	Water BCM	Ducks (No.)	Water BCM	Pigs (Nos).	Water BCM	Goats (Nos.)	Water BCM	Sheeps (Nos.)	Water BCM	Indigenous Cow (Nos.)	Water BCM	Hybrid Cow (Nos.	Water BCM	In Descripitive Buffalo (Nos	Water BCM		
Udupi	616957	0.0023	66	0.0000	1943	0.0000	5045	0.0000	42	0.0000	35418	0.0001	56415	0.0002	2749	0.0000	9073	0.0000
Kundapura	517135	0.0019	59	0.0000	1063	0.0000	1455	0.0000	25	0.0000	89069	0.0003	30195	0.0001	4777	0.0000	18637	0.0001
Karkala	179057	0.0007	48	0.0000	403	0.0000	760	0.0000	10	0.0000	46353	0.0002	19813	0.0001	2204	0.0000	12121	0.0000
Total	**1313149**	**0.0049**	**174**	**0.0000**	**3408**	**0.0000**	**7260**	**0.0000**	**77**	**0.0000**	**170840**	**0.0006**	**106423**	**0.0004**	**9731**	**0.0000**	**39831**	**0.0001**

Table 8a

Industrial Water Demand

Water requirement of Agroprocess, small & large scale units

Block	Name of the industry	Water demand (BCM)	Water demand (BCM)	Water demand in 2020 (BCM)	Water demand in 2020 (BCM)	Existing Water potential (BCM)	Water potential to be created (BCM)
UDUPI	Agro Processing units and small & large scale units	501850	0.000183	627313	0.0002290	0.000183	0.0000458
KUNDAPURA		38250	0.000014	47813	0.0000175	0.000014	0.0000035
KARKALA		111150	0.000040	138938	0.0000507	0.000041	0.0000101

Total	651250	0.000237	814063	0.0002971	0.000238	0.0000594

Source: Industry and Commerce Dept.

Table 8b(1)

Water Requirement for SSI Industries

District: Udupi

Sl. No.	Type of Agro-Processing unit	Taluk	No. of Processing units	Water Demand (LPD)
1	**2**	**3**	**4**	**5**
1	**Rice Mill**	Udupi	**35**	**5250**
2		Kundapur	**12**	**1800**
3		Karkala	**35**	**5250**
1	**Rice/Rice roti**	Udupi	**104**	**10400**
2		Kundapur	**85**	**8500**
3		Karkala	**124**	**12400**
1	**Oil Mills**	Udupi	**97**	**9700**
2		Kundapur	**44**	**4400**
3		Karkala	**72**	**7200**
1	**Cashew**	Udupi	**124**	**12400**
2		Kundapur	**154**	**15400**
3		Karkala	**205**	**20500**
1	**Banana Chip**	Udupi	**1**	**100**
2		Kundapur	**4**	**400**
3		Karkala	**0**	**0**
1	**Decicated coconut powder**	Udupi	**3**	**450**
2		Kundapur	**7**	**1050**
3		Karkala	**5**	**750**
1	**Flouring of Food Grains**	Udupi	**57**	**5700**
2		Kundapur	**47**	**4700**

3		Karkala	**29**	**2900**
1	**Fruit Juice**	Udupi	**5**	**1000**
2		Kundapur	**2**	**400**
3		Karkala	**4**	**800**
1	**Milk Processing and products**	Udupi	**8**	**1600**
2		Kundapur	**2**	**400**
3		Karkala	**5**	**1000**
1	**Poultry and Cattle fileds**	Udupi	**24**	**2400**
2		Kundapur	**12**	**1200**
3		Karkala	**12**	**1200**
	Total:		**1318**	**139250**

Table 8b(2)

Water Requirement for Large & Medium Scale Industries

Sl. No.	Name of the unit	Address	Taluk	Product Manufactued	Water requirement (LPD)
1	M/s. Keltech Energies	Vishwanagar, Varanga, Karkala.	Karkala	Industrial Explosives & Expanded Perlite Products.	6800
2	M/s. Raj Fish Meal & Oil Company	Malpe, Udupi.	Udupi	Fish Meal	8550
3	M/s. Goan Fresh Marine Exports Pvt. Ltd	Manoor Village, Kota, Udupi.	Udupi	Fish, Fishery Products	11100
4	M/s. Massilly India Packaging Private Limited	Bommarabettu, Hiriyadka, Udupi Tq.	Udupi	Metal Box, Lug Cups, Twist off Caps	3400
5	M/s. Baliga Fish Nets,	S.No: 237/1, Hanumantha Nagar, Puttur, Udupi.	Udupi	Nylon Filament Rigid Nets	22700
6	Manipal Media & Network Pvt. Ltd.,	Udyavani Building Manipal, Udupi	Udupi	Printing	8200
7	Suzlon Wind International Ltd.,	Plot No: 7, Suzlon Infrastructure Ltd, SEZ, Padubidri, 574 117	Udupi	Assembly of Nacelle for Wind Mills	9500
8	SE Blades Ltd (Formerly S.EComposite Ltd.),	Plot No: 3, Suzlon Infrastructure Ltd, SEZ, Padubidri 574 111.	Udupi	Rotar Blade Manufacturing unit for Wind Mills	42500

9	Tebma Shipyards Limited.,	Malpe Fishing Harbour, Kodavooru Village, Malpe, Udupi	Udupi	Manufacture of small sized Ocean going vessels	32700
10	Tebma Shipyards Limited.,	Balakudru Village, Hangarakatte, Udupi Tq.	Udupi	Manufacture of small sized Ocean going vessels	36750
11	Lamina Foundries.,	Kuntady Road, Nitte, Karkala Tq.	Karkala	Grey Iron Castings	52350
12	M/s. Best Sellers Apparels Private Limited	Bajal Street, Manipal, Udupi.	Udupi	Readymade Garments	49200
13	Manipal Technologies Limited., (Formerly Manipal Press Ltd),	Udayavani Building, Press Corner, Manipal - 576 104	Udupi	Printing	183100
14	Udupi Power Corporation Limited.	Kolacharu, Yellur Village, Pilar Post, Udupi.	Udupi	Electricity	45150
	Total:				**512000**

Table 8b.3

Water Requirement of Domestic and Commercial Units

Block	Name of the industry	Water demand (BCM)	Water demand in 2020 (BCM)	Existing Water potential (BCM)	Water potential to be created (BCM)
UDUPI	Domestic & Commerce	0.0059495	0.006497	0.0059495	0.0005475
KUNDAPURA		0.001168	0.0012045	0.001168	0.0000365
KARKALA		0.0012045	0.001241	0.0012045	0.0000365
Total		0.008322	0.008943	0.008322	0.0006205

Source: Urban Devlopment Authority , Udupi District

Table 8 (c)

Water Requiremtn of fishing harbour and break water unit @ Hejamadi

Block	Name of the industry	Water demand (BCM)	Water demand in 2020 (BCM)	Existing Water potential (BCM)	Water potential to be created (BCM)
Udupi	Construction of Fishing Harbour & Break Waters at Hejamadikodi	0.0000862	0.0000862	0	0.0000862

Source Karnataka Pollution Control Board

Table 9

Status of Command Area

Total area of Major Irrigation under canal command is 3375 ha. and Minor Irrigation is ha 12149 ha. Total Command area accounts for 15524 ha.

Status of Command Area

S.No.	Name of the Village	Information of Canal Command			Information on the other Services Command			Total Area	
		Total Area	Developed Area	Undeveloped Area	Total Area	Developed Area	Undeveloped Area	Developed Area	Undeveloped Area
1	2	3	4	5	6	7	8	4+7	5+8
1	Ullur	96.89	96.89	-	-	-	-	96.89	-
2	Siddapura	19.15	19.15	-	-	-	-	19.15	-
3	Shankaranarayana	39.83	39.83	-	-	-	-	39.83	-
4	Kullunje	207.67	207.67	-	-	-	-	207.67	-
5	Halady-76	387.68	387.68	-	-	-	-	387.68	-
6	Halady-28	143.11	143.11	-	-	-	-	143.11	-
6	Kakkuje	392.01	392.01	-	-	-	-	392.01	-
7	Vandaru	35.09	35.09	-	-	-	-	35.09	-
8	Billady	168.97	168.97	-	-	-	-	168.97	-
9	Shiriyara	954.29	954.29	-	-	-	-	954.29	-
10	Halladi-Harkady	150.49	150.49	-	-	-	-	150.49	-
11	Hardalli-Mandalli	683.09	683.09	-	-	-	-	683.09	-
12	Yadyaddi-Matyadi	96.74	96.74	-	-	-	-	96.74	-
Total		**3375**	**3375**	**0**	**0**	**0**	**0**	**3375**	**0**

1	Bola	96.00	96.00	-	-	-	-	96.00	
2	Mundkur	73.30	73.30	-	-	-	-	73.30	
3	Belman	165.57	165.57	-	-	-	-	165.57	
4	Mala	111.13	111.13	-	-	-	-	111.13	
5	Mudar	60.00	60.00	-	-	-	-	60.00	
6	Miyaru	47.30	47.30	-	-	-	-	47.30	
7	Hirgana	59.30	59.30	-	-	-	-	59.30	
8	Durga	45.00	45.00	-	-	-	-	45.00	
9	Nallur	12.00	12.00	-	-	-	-	12.00	
10	Inna	132.60	132.60	-	-	-	-	132.60	
11	Idu	108.19	108.19	-	-	-	-	108.19	
12	Kalya	60.00	60.00	-	-	-	-	60.00	
13	Kukkundoor	42.00	42.00	-	-	-	-	42.00	
14	Nitte	42.00	42.00	-	-	-	-	42.00	
15	Irvathur	11.00	11.00	-	-	-	-	11.00	
16	Karkala Purasabhe	15.00	15.00	-	-	-	-	15.00	
17	Yerlapady	41.52	41.52	-	-	-	-	41.52	
18	Kadthala	52.11	52.11	-	-	-	-	52.11	
19	Nadpalu	42.50	42.50	-	-	-	-	42.50	
20	Hebri	69.00	69.00	-	-	-	-	69.00	
21	Shirlalu	42.50	42.50	-	-	-	-	42.50	
22	Shivapura	65.00	65.00	-	-	-	-	65.00	
23	Kuchoor	18.00	18.00	-	-	-	-	18.00	
24	Mudradi	98.00	98.00	-	-	-	-	98.00	
25	Varanga	20.00	20.00	-	-	-	-	20.00	
26	Hejamadi	69.00	69.00	-	-	-	-	69.00	

27	Padubidri	102.00	102.00	-	-	-	-	102.00	
28	Palimaru	437.23	437.23	-	-	-	-	437.23	
29	Kuthyaru	99.00	99.00	-	-	-	-	99.00	
30	Mudarangadi	123.00	123.00	-	-	-	-	123.00	
31	Ellur	61.00	61.00	-	-	-	-	61.00	
32	Kapu Purasabhe	283.93	283.93	-	-	-	-	283.93	
33	Belapu	56.00	56.00	-	-	-	-	56.00	
34	Belle	150.00	150.00	-	-	-	-	150.00	
35	Katapadi	30.00	30.00	-	-	-	-	30.00	
36	Kurkalu	239.00	239.00	-	-	-	-	239.00	
37	Udyavara	169.20	169.20	-	-	-	-	169.20	
38	Alevoor	101.00	101.00	-	-	-	-	101.00	
39	Manipura	172.61	172.61	-	-	-	-	172.61	
40	Athradi	250.49	250.49	-	-	-	-	250.49	
41	Kodibettu	110.18	110.18	-	-	-	-	110.18	
42	Byrampalli	107.00	107.00	-	-	-	-	107.00	
43	Perdoor	330.00	330.00	-	-	-	-	330.00	
44	80 Badagabettu	55.00	55.00	-	-	-	-	55.00	
45	Ambalapadi	103.00	103.00	-	-	-	-	103.00	
46	Kadekaru	45.00	45.00	-	-	-	-	45.00	
47	Aroor	198.80	198.80	-	-	-	-	198.80	
48	Kunjalu	358.20	358.20	-	-	-	-	358.20	
49	Haradi	80.48	80.48	-	-	-	-	80.48	
50	Badanidiyur	25.00	25.00	-	-	-	-	25.00	
51	Udupi Nagarasabhe	51.00	51.00	-	-	-	-	51.00	

52	Kalyanapura	28.00	28.00	-	-	-	-	28.00	
53	Kokkarne	320.00	320.00	-	-	-	-	320.00	
54	Cherkadi	337.00	337.00	-	-	-	-	337.00	
55	Karje	130.37	130.37	-	-	-	-	130.37	
56	38 Kalathur	34.00	34.00	-	-	-	-	34.00	
57	Nalkur	112.00	112.00	-	-	-	-	112.00	
58	Namcharu	141.70	141.70	-	-	-	-	141.70	
59	Shiriyara	419.00	419.00	-	-	-	-	419.00	
60	Billadi	233.00	233.00	-	-	-	-	233.00	
61	Avarse	203.00	203.00	-	-	-	-	203.00	
62	Vaddarse	354.14	354.14	-	-	-	-	354.14	
63	Barkur	87.00	87.00	-	-	-	-	87.00	
64	Saligrama Pattana Panchayath	40.66	40.66	-	-	-	-	40.66	
65	Heggunje	37.00	37.00	-	-	-	-	37.00	
66	Kadur	110.00	110.00	-	-	-	-	110.00	
67	Kota	15.00	15.00	-	-	-	-	15.00	
68	Yadthadi	41.00	41.00	-	-	-	-	41.00	
69	Belve	132.22	132.22	-	-	-	-	132.22	
70	Hombadi Mandadi	146.40	146.40	-	-	-	-	146.40	
71	Hardalli Mandalli	124.00	124.00	-	-	-	-	124.00	
72	Korgi	40.00	40.00	-	-	-	-	40.00	
73	Kalavara	217.00	217.00	-	-	-	-	217.00	
74	Koteshwara	60.89	60.89	-	-	-	-	60.89	
75	Beejadi	35.00	35.00	-	-	-	-	35.00	
76	Thekkatte	32.36	32.36	-	-	-	-	32.36	

77	Kandavara	62.00	62.00	-	-	-	-	62.00	
78	Koni	41.00	41.00	-	-	-	-	41.00	
79	Beloor	80.00	80.00	-	-	-	-	80.00	
80	Amasebailu	205.00	205.00	-	-	-	-	205.00	
81	Hengavalli	109.00	109.00	-	-	-	-	109.00	
82	Madamakki	41.00	41.00	-	-	-	-	41.00	
83	Molahalli	15.00	15.00	-	-	-	-	15.00	
84	Haladi	30.00	30.00	-	-	-	-	30.00	
85	Kedur	10.00	10.00	-	-	-	-	10.00	
86	Kavradi	41.00	41.00	-	-	-	-	41.00	
87	Amparu	209.58	209.58	-	-	-	-	209.58	
88	Hakladi	43.00	43.00	-	-	-	-	43.00	
89	Bijur	96.63	96.63	-	-	-	-	96.63	
90	Siddapura	81.00	81.00	-	-	-	-	81.00	
91	Keradi	63.00	63.00	-	-	-	-	63.00	
92	Shankaranarayana	41.00	41.00	-	-	-	-	41.00	
93	Hallihole	199.00	199.00	-	-	-	-	199.00	
94	Hemmadi	676.00	676.00	-	-	-	-	676.00	
95	Nada	512.00	512.00	-	-	-	-	512.00	
96	Kalthodu	121.00	121.00	-	-	-	-	121.00	
97	Kambadakone	160.61	160.61	-	-	-	-	160.61	
98	Kirimanjeshwara	337.00	337.00	-	-	-	-	337.00	
99	Uppinakudru	41.00	41.00	-	-	-	-	41.00	
100	Yadthare	46.38	46.38	-	-	-	-	46.38	
101	Chittur	48.00	48.00	-	-	-	-	48.00	
102	Ajri	19.00	19.00	-	-	-	-	19.00	
103	Anagalli	16.00	16.00	-	-	-	-	16.00	
104	Shirur	9.00	9.00	-	-	-	-	9.00	
105	Hattiangadi	20.00	20.00	-	-	-	-	20.00	
106	Uppunda	9.00	9.00	-	-	-	-	9.00	
Total		**12149.08**	**12149.08**					**12149.08**	
Grand Total		**15524.08**	**15524.08**	**0.**	**0**	**0**	**0**	**15524.08**	**0.00**

Source:Department of Major irrigation and Minor irrigation Udupi District

Table-13

Total Water Demand of the District as per the Strategic Action Plan for Irrigation in District under PMKSY (2020)						
S.No.	Block	Components				
		Watershed	Varahi	Minor irrigation	PRED	Total BCM
1	UDUPI	0.00032	0.00000	0.05262	0.00495	0.05790
2	KUNDAPURA	0.00037	0.468	0.09187	0.00282	0.56306
3	KARKALA	0.00026	0.00000	0.02705	0.04047	0.06778
TOTAL		0.00095	0.468	0.17154	0.04824	0.68874