



**GOVERNMENT OF KARNATAKA
DEPARTMENT OF AGRICULTURE**

**Pradhan Mantri Krishi Sinchayee Yojana
(PMKSY)**

**DISTRICT IRRIGATION PLAN
KOPPAL DISTRICT**



2016



GOVERNMENT OF KARNATAKA

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Deputy Commissioner, Koppal.

Foreword

“Hon’ble President in his address to the Joint Session of Parliament of 16th Lok Sabha indicated that each drop of water is precious and launched Pradhana Mantri Krishi Sinchayee Yojana (PMKSY), with a major objective 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. It will complete the long pending irrigation projects on priority. Micro-irrigation will be popularized to ensure” Per Drop More Crop”.

Koppal district has an average normal rainfall of 598 mm in 43 rainy days mainly in the months from July to October. The entire Koppal district comes under Northern Dry Zone (Zone III). The zone is characterized by low annual bimodal rainfall characterized by hot arid climate.

The net sown area of the district is 3.96 lakh ha, of which 24.24 % (0.96 lakh ha) is irrigated and the rest (75.76 %) is rainfed. Canals account for 49.0 % of the irrigated area and tube wells account for 47.7 % of the area irrigated and the remaining area is irrigated through other sources.

The present planning should give impetus on utilizing water for expansion of irrigated area, establishment of new industries, creation of special economic zone and also filling of canal water to the existing tanks so that the district can be model to the entire State. This provides additional job opportunities leading to economic growth of the district.

Under PMKSY, it is proposed to take various developmental activities to improve irrigation facilities in the district and also proposed to create an additional irrigation potential of 234375 ha by 2020 with a budgetary support of Rs.9195.26 crores. This will help in


intensive cultivation of crops, taking up of multiple crops, judicious use of water, change of cropping pattern which will create additional employment and income to farming community.

At the outset, I appreciate the efforts of the Department of Agriculture, particularly Joint Director and their team in collection of information from various departments and organizing District Level meetings which has led to finalize this report. I thank all the line department officials for providing timely information on their concerned templates. Further, I also express my heart felt of gratitude to Sri Basavaraja Raya Reddy, Hon'ble Minister for Higher Education, Govt. of Karnataka and MP/MLA for providing valuable suggestions during the preparation of the report.

I also thank the President and members of PLUS TRUST, Bengaluru for compilation, analysis and printing of the District Irrigation Plan in an exhaustive and excellent manner.

I hope this report will be useful in planning and efficient management of precious water resource of Koppal district.

Date : 28-10-2016


Deputy Commissioner
Koppal

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Pradhan Mantri Krishi Sinchayee Yojana (PMKSY)

I. Introduction:

The major objective of PMKSY is 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 (More crop per drop), 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.

PMKSY has been conceived by amalgamating ongoing schemes *viz.* Accelerated Irrigation Benefit Programme (AIBP) of the Ministry of Water Resources, River Development & Ganga Rejuvenation (MoWR, RD & GR), Integrated Watershed Management Programme (IWMP) of Department of Land Resources (DoLR) and the On-Farm Water Management (OFWM) of Department of Agriculture and Cooperation (DAC). The scheme will be implemented by Ministry of Agriculture, Water Resources and Rural Development. Ministry of Rural Development is to mainly undertake rain water conservation, construction of farm pond, water harvesting structures, small check dams and contour bunding etc. MoWR, RD & GR, is to undertake various measures for creation of assured irrigation source, construction of diversion canals, field channels, water diversion/lift irrigation, including development of water distribution systems. Ministry of Agriculture will promote efficient water conveyance and precision water application devices like drips, sprinklers, pivots, rain-guns in the farm “(Jal Sinchan)”, construction of micro-irrigation structures to supplement source creation activities, extension activities for promotion of scientific moisture conservation and agronomic measures.

Programme architecture of PMKSY will be to adopt a ‘decentralized State level planning and projectised execution’ structure that will allow States to draw up their own irrigation development plans based on District Irrigation Plan (DIP) and State Irrigation Plan (SIP). It will be operative as convergence platform for all water sector activities including drinking water & sanitation, MGNREGA, application of science & technology etc. through comprehensive plan. State Level Sanctioning Committee (SLSC) chaired by the Chief Secretary of the State with the authority to oversee its implementation and sanction of projects.

The programme will be supervised and monitored by an Inter-Ministerial National Steering Committee (NSC) will be constituted under the Chairmanship of Prime Minister with Union Ministers from concerned Ministries. A National Executive Committee (NEC) constituted under the Chairmanship of Vice Chairman, NITI Aayog to oversee programme implementation, allocation of resources, inter-ministerial coordination, monitoring & performance assessment, addressing administrative issues etc.

Components and responsible Ministries/ Departments are as follows:

1. AIBP by MoWR, RD &GR: To focus on faster completion of on-going Major and Medium Irrigation including National Projects.

2. PMKSY (Har Khet Ko Pani) by MoWR, RD & GR: Creation of new water sources through Minor Irrigation (both surface and ground water). Repair, restoration and renovation of water bodies; strengthening carrying capacity of traditional water sources, construction rain water harvesting structures (Jal Sanchay); Command area development, strengthening and creation of distribution network from source to the farm. To facilitate improvement in water management and distribution system for water bodies to take advantage of

available sources, which is not utilised to its fullest capacity (deriving benefits from low hanging fruits).

3. PMKSY (Watershed) by Dept. Of Land Resources, MoRD Water harvesting structures such as check dams, nala bund, farm ponds, tanks etc. Capacity building, entry point activities, ridge area treatment, drainage line treatment, soil and moisture conservation, nursery raising, afforestation, horticulture, fodder development, livelihood activities for the asset-less persons and production system & microenterprises for small and marginal farmers etc. Effective rainfall management like field bunding, contour bunding/trenching, staggered trenching, land levelling, mulching etc.

4. PMKSY (Per drop more crop) by Dept. of Agriculture & Cooperation, MoA Programme management, preparation of State/District Irrigation Plan, approval of annual action plan, Monitoring etc. Promoting efficient water conveyance and precision water application devices like drips, sprinklers, pivots, rain-guns in the farm (Jal Sinchan) Topping up of input cost particularly under civil construction beyond permissible limit (40%), under MGNREGA for activities like lining inlet, outlet, silt traps distribution systematic.

Construction of micro irrigation structures to supplement source creation activities including tube wells and dug wells (in areas where ground water is available and not under semi critical /critical /over exploited category of development) which are not supported under PMKSY (WR), PMKSY (Watershed) and MGNREGA.

Secondary storage structures at tail end of canal system to store water when available in abundance (rainy season) or from perennial sources like streams for use during dry periods through effective on-farm water

management. Water lifting devices like diesel/ electric/ solar pump-sets including water carriage pipes.

Extension activities for promotion of scientific moisture conservation and agronomic measures including cropping alignment to maximise use of available water including rainfall and minimise irrigation requirement (Jal sanrankchan). Capacity building, training for encouraging potential use water source through technological, agronomic and management practices including community irrigation. Awareness campaign on water saving technologies, practices, programmes etc. organisation of workshops, conferences, publication of booklets, pamphlets, success stories, documentary, advertisements etc. Improved/innovative distribution system like pipe and box outlet system with controlled outlet and other activities of enhancing water use efficiency.

District Irrigation Plans (DIPs)

District Irrigation Plan (DIP) shall be the cornerstone for planning and implementation of PMKSY. DIP will identify the gaps in irrigation infrastructure after taking into consideration the District Agriculture Plans (DAPs) already prepared for Rashtriya Krishi Vikas Yojana (RKVY) vis-à-vis irrigation infrastructure currently available and resources that would be added during XII Plan from other ongoing schemes (both State and Central), like Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGA), Rashtriya Krishi Vikas Yojana (RKVY), Rural Infrastructure Development Fund (RIDF), Member of Parliament Local Area Development (MPLAD) Scheme, Member of Legislative Assembly Local Area Development (MLALAD) Scheme, Local body funds etc. The gaps identified under Strategic Research & Extension Plan (SREGP) are to be used in preparation of DIP. DIPs will present holistic irrigation development perspective of the district outlining medium to long term development plans integrating three components viz.

water sources, distribution network and water use applications incorporating all usage of water like drinking & domestic use, irrigation and industry. Preparation of DIP will be taken up as joint exercise of all participating departments. DIP will form the compendium of all existing and proposed water resource network system in the district.

The DIPs may be prepared at two levels, the block and the district. Keeping in view the convenience of map preparation and data collection, the work would be primarily done at block level. Block wise irrigation plan is to be prepared depending on the available and potential water resources and water requirement for agriculture sector prioritising the activities based on socio-economic and location specific requirement. In case of planning is made based on basin/sub basin level, the comprehensive irrigation plan may cover more than one district. The activities identified in the basin/sub-basin plan can be further segregated into district/block level action plans.

i. Background

Hon'ble President in his address to the joint Session of the Parliament of 16th Lok Sabha indicated that "Each drop of water is precious. Government is committed to giving high priority to water security. It will complete the long pending irrigation projects on priority and launch the 'Pradhan Mantri Krishi Sinchayee Yojana' with the motto of 'Har Khet Ko Pani'. There is a need for seriously considering all options including linking of rivers, where feasible; for ensuring optimal use of our water resources to prevent the recurrence of floods and drought. By harnessing rain water through 'Jal Sanchay' and 'Jal Sinchan', we will nurture water conservation and ground water recharge. Micro irrigation will be to ensure 'Per drop-More crop'. Out of about 141 m. Ha of net area sown in the country, about 65 million hectares (or 45%) is presently covered under irrigation. Substantial dependency on rainfall makes cultivation in un-

irrigated areas a high risk, less productive profession. Empirical evidences suggest that assured or protective irrigation encourages farmers to invest more in farming technology and inputs leading to productivity enhancement and increased farm income. The overreaching vision of Pradhan Mantri Krishi Sinchayee Yojana (PMKSY) will be to ensure access to some means of protective irrigation to all agricultural farms in the country, to produce ‘per drop more crop’, thus bringing much desired rural prosperity.

ii. Vision

To utilize the available water resources in the district to the maximum extent in an efficient way to meet the basic needs of every living being and enhancing the livelihoods of rural population to the maximum extent thus alleviating poverty in a sustainable way without compromising the interests of future generations.

iii. Objective

Following are the objectives:

- Enhance the physical access of water on the farm and expand cultivable area under assured irrigation (Har Khet Ko Pani).
- Integration of water source, distribution and its efficient use, to make best use of water through appropriate technologies and practices.
- Improve on-farm water use efficiency to reduce wastage and increase availability both in duration and extent.
- Enhance the adoption of precision-irrigation and other water saving technologies (More crop per drop).
- Enhance recharge of aquifers and introduce sustainable water conservation practices.

- Ensure the integrated development of rain fed areas using the watershed approach towards soil and water conservation, regeneration of ground water and arresting runoff.
- Promote extension activities relating to water harvesting, water management and crop alignment for farmers and grass root level field functionaries.
- Explore the feasibility of reusing treated municipal wastewater for peri-urban agriculture.

iv. Strategy /approach

- Creation of new water sources; repair, restoration and renovation of defunct water sources; construction of water harvesting structures, secondary & micro storage, ground water development
- Developing/augmenting distribution network where irrigation sources (both assured and protective) are available or created;
- Promotion of scientific moisture conservation and run off control measures to improve ground water recharge to create opportunities for farmer 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 & Sprinklers
- Encouraging community irrigation through registered user groups.
- 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 crop per drop of water through mass media campaign, exhibitions, field days, and extension activities through short animation films etc.

CHAPTER I

General Information of the District.

1.1. District profile:

Koppal District is newly carved out from Raichur district on 1st April 1998 with four taluks viz., Koppal, Gangavathi, Kushtagi and Yelburga (Fig 1.1). Koppal district is surrounded by Raichur district in the east, Gadag district in the West, Bagalkot district in the north, Bellary district in the south. Koppal district of Karnataka is located at 15 ° 09' 00" to 16 ° 03' 30" N Latitude and 75 ° 47' 30" to 76 ° 48' 10" E longitude.

Fig1.1 Geographical map of Koppal district

Koppal District



The total geographical area of the district is 5,52,495 ha, of which 3,95,763 ha is net cultivated area. The gross cropped area is 4,88,490 ha., the

cropping intensity works out to 123.4 %. Gangavathi and Koppal taluks of the districts are blessed with Tungabhadra River.

The district has 2 City Municipal councils, 1 Town Municipal Council and 1 Town Panchayath (Table 1.1). The district comprises of 20 hoblies and 134 gram-panchayats and 594 inhabited and 35 un-habited villages. The total population of the district is 1389920 comprising of 699926 males and 689994 females. The literacy percentage of the district is 67.66.

Koppal district is primarily agrarian in nature. Nearly 83 % of district's population are settled in rural areas. Major land use in the district is for cultivation and other allied activities. Horticulture, animal husbandry, fisheries and sericulture are major allied activities supplementary to agricultural activities. Traditionally, the rural populations have engaged themselves in dairying and horticulture, while sericulture is added to their profession in the last decade.

The history of Koppal can be traced back to the kingdoms of Shathavahanas, Gangas, Hoysalas and Chalukya Dynasties. The name of the district i.e., Koppal is found in the poetic work of great poet Kavirajamarga as Viditha Maha Kopana Nagara. During Ashoka's period, i.e., Jainism gained greater momentum in this region. Therefore, it was called Jainkashi. In twelfth century A.D. Veerashaivism of social reformer Basaveshwara became popular. The present Gavi Math of Koppal has great attraction.

Anegundi of Gangavathi taluk was the first capital of great Vijayanagara Dynasty. The old palace and fort still exist where annual festival called "Anegundi Utsava" is being celebrated in a befitting manner every year. The other important historical places of Koppal district are Itagi, Kukanoor,

Madinoor, Indrakeela Parvatha, Kanakagiri, Pura, Chikkabenakal, Hirebenakal and Huligi.

Before independence, Koppal was under the Nizam of Hyderabad. Hyderabad-Karnataka region got independence from Nizam in 1948.

Table 1.1: District Profile

1.	District Code	29-56-05467
2.	Latitude and Longitude	15° 09' 00" to 16 ° 03' 30" N latitude, 75°47'30" to 76° 48' 10" E longitude.
3.	Total Number of block	4
4.	Total Number of Grama Panchayat	134
5.	Total No. of Hoblies	20
6.	Total Number of Villages	629
7.	Total Population	1398494
8.	Total Male Population	600855
9.	Total Female Population	595337
10.	Total Rural Population	1156216
11.	Total Urban Population	233704
12.	Total Child population	202302
13.	Total SC Population	258746
14.	Total ST Population	166033
15.	Total livestock	1033464
16.	Total poultry	3606078

Source: JDA, Koppal

1.2. Demography:

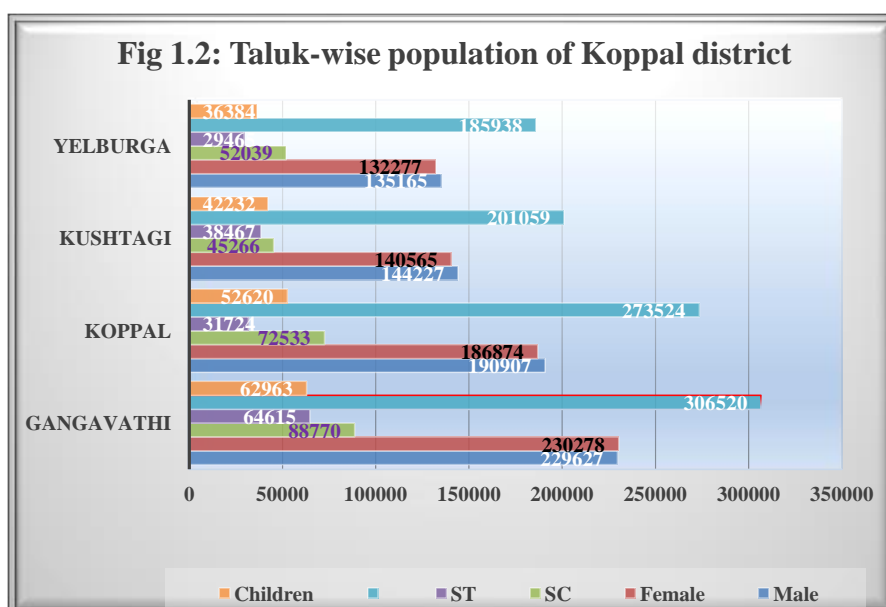
1.2.1: Population:

The total population of the Koppal district is 1398494 comprising 600855 male and 595337 female population. Taluk wise details are given in Table 1.2:

Table 1.2: Taluk-wise population of Koppal district

Sl. No.	Block/Taluk	Population			Total	SC	ST	Gen/ Others	Total
		Male	Female	Children					
1	Gangavathi	200641	202677	65700	469018	88971	64615	315432	469018
2	Koppal	163279	159955	54033	377267	72480	33424	271363	377267
3	Kushtagi	121415	118945	44407	284767	45256	38573	200938	284767
4	Yelburga	115520	113760	38162	267442	52039	29421	185696	267442
	TOTAL	600855	595337	202302	1398494	258746	166033	973429	1398494

Source: 2011 Census



Source: District at glance, 2014

Gangavathi taluk has the highest population of 469018 (33.54%), followed by Koppal 377267 (26.98%) and Kushtagi 284767 (20.36%). Yelburga has the lowest population(Fig1.2) of 267442 (19.12%). The Total Schedule Caste population of the district is 258746 (18.50%).

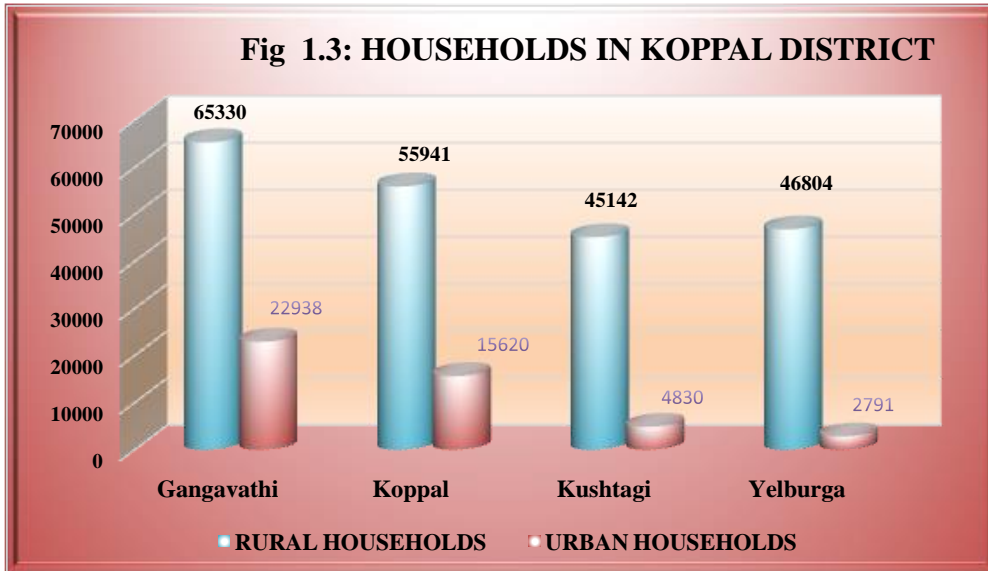
Yelburga has the highest percentage of SC population (19.46%) followed by Koppal (19.21%) and Gangavathi taluk (18.97%). Kushtagi taluk has the lowest percentage of SC population of (15.89%). The Schedule Tribe population of the district is 166033 (11.87%). Gangavathi taluk has the maximum ST population of (13.78%) followed by Kushtagi (13.55%) and Yelburga taluk (11.00 %). Koppal taluk has the minimum ST population of percentage (8.86%).

1.2.2 House Holds in Koppal district.

Table.1.3. Details of Households in Koppal district

Sl. No.	Taluk	No. of house holds
1.	Gangavathi	89885
2.	Koppal	73167
3.	Kushtagi	51341
4.	Yelburga	50213
TOTAL		264606

Source: JDA, Koppal



Source: JDA, Koppal

The total number of households in the district is 264606 (Table 1.3). Gangavathi taluk has the highest households of 89885 (33.97%), followed by Koppal 73167 (27.65%) and Kushtagi, 51341(19.40%). Yelburga has the lowest (Fig1.3) number of households of 50213 (18.98%). Village details are furnished at Annexure I

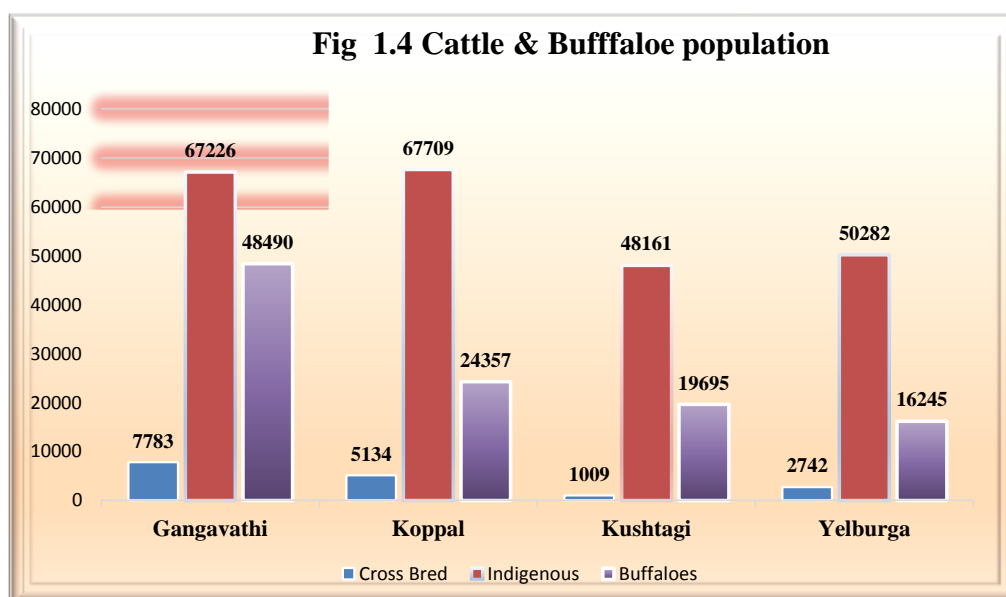
1.3. Biomass and Livestock

Domestication of animals along with agriculture is an important activity of rural population. This activity is providing additional employment and supplements to the income of the farming community. The district has 340819 (7.35%) large animals comprising cows, other milch and draft animals and 4298723 (92.65%) small animals in the district.

1.4: Large animal population (In Numbers)

Taluk	Large animals						Total livestock & poultry
	Indigenous Cow	Hybrid Cow	Indigenous Buffalo	Hybrid Buffalo	Any other Milch Or Meat Animals	Draft Animals (Buffalo/Yak/Bulls /Any other)	
Koppal	39844	12354	33951	0	139	18223	3623970
Gangavathi	39965	23457	16278	0	110	16084	363873
Kustagi	29684	11328	16654	0	10	17883	295617
Yelburga	26892	9484	10975	0	58	17446	356082
Total	136385	56623	77858	0	317	69636	4639542

Source: District at glance,2014



Source: District at glance,2014

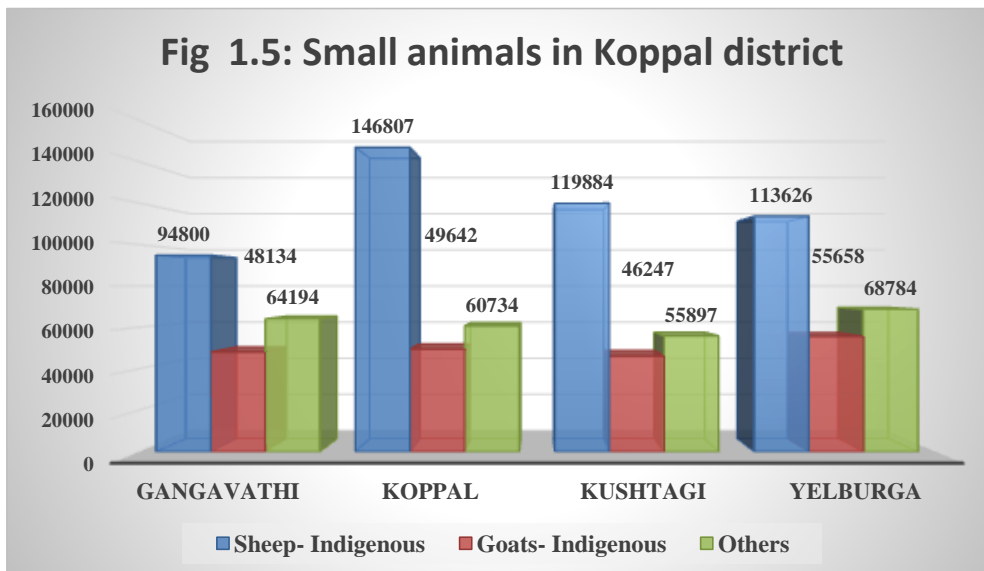
Among the large animals (Table1.4), Cows account for 56.63% (193008 Nos.), buffaloes 22.84% (77858 Nos.) and draft animals 20.43% (69636). Koppal taluk has the highest large animal population of 104511 (30.66%),

followed by Gangavathi (Fig 1.4) with 95894 (28.14%) and Kushtagi with 75559 (22.17%). Yelburga has the lowest large animal population of 64855 (19.02%)

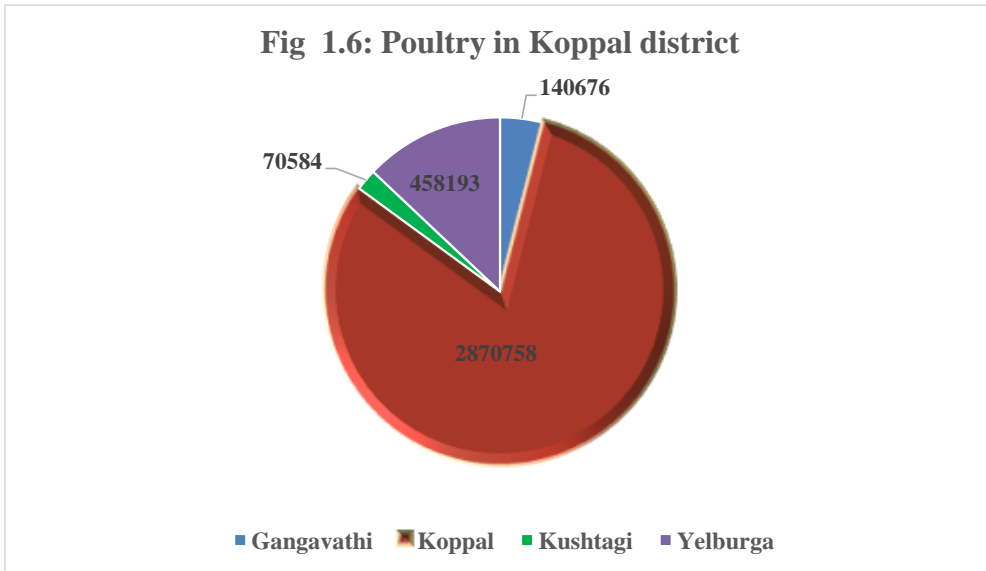
Table :1.5 Small animals in Koppal district. (In Numbers)

Taluk	Small Animals				
	Poultry (Nos)	Ducks (Nos)	Pigs (Nos)	Goats (Nos)	Sheep (Nos)
Koppal	3312341	5000	5669	49642	146807
Gangavathi	123737	200	1108	48134	94800
Kustagi	50000	0	3937	46237	119884
Yelburga	120000	0	1943	55658	113626
Total	3606078	5200	12657	199671	475117

Source: District at glance,2014



Source: District at glance,2014



Source: District at glance,2014

In the district, among small animals, lions share is poultry population (Fig 1.6)with 3606078 (83.89%), followed by sheep with 475117 (11.05%) and goat population is 199671 (4.64). other animals account (Fig1. 5 and Table 1.5) for 17857 (0.41%). Among the taluks, Koppal has the highest population of small animals with 3519459 (81.87%), followed by Yelburga with 291227 (6.77%) and Gangavathi with 267979 (6.23%). Kushtagi has the lowest population with 220058 (5.12%).

1.4 Agro-Ecology, Climate, Hydrology and Topography:

1.4.1 Agro-ecology

All four taluks of Koppal district come under Northern Dry Zone of Karnataka, (Zone III of agro-climatic zone of Karnataka). The zone is characterized by low annual bimodal rainfall. Further, the Koppal district comes under agro ecological zone 3 and 6, characterized by hot arid region with deep loamy saline and alkali soils, low to medium available water holding capacity

(AWC) and 60 to 90 days' length of growing period and hot dry semi-arid region with shallow and medium loam black soils, medium to high AWC with 90-120 days' length of growing period respectively.

1.4.2: Climate

The weather in Koppal is tropical, comprising summer, rainy and winter seasons respectively. Summer season is hot and dry while winter is cool and pleasant. From April to May it is summer in Koppal. The district is characterized by dryness for the major part of the year because of less rainfall. From July to October the town witnesses regular showers with an average rainfall of around 598.25 mm (Table 1.6) in about 37 rainy days every year. During winter season from November to February the temperature varies from 20°Celsius to 29°Celsius. Winter in Koppal is cool and moderate. October to November is post-monsoon season during which time the overall temperature is relatively cool and the frequency of rainfall is also low. With the onset of winter from the month of November the weather becomes even more pleasant.

Table 1.6: Rainfall pattern in Koppal district

Sl. No	Taluka	Agro Ecological Zone Type	Block Area (Ha)	Normal Annual Rainfall (MM)	Average Monthly Rainfall (MM)	No of Rainy days (No.)
1	Gangavathi	Zone - III	132131	585	36.11	37
2	Koppal		136755	628	44.18	36
3	Kustagi		135779	582	46.36	39
4	Yelburga		147830	598	43.96	37
Total/Mean			552495	598.25	42.70	37

Source: JDA, Koppal

1.4.3 Hydrology

The district is mainly underlain by gneisses, granites and schists. The hard rocks as they do not have any primary porosity however, weathering, fracturing, joints and tectonic features like folds and faults have secondary porosity and permeability. This has improved water yielding capacity of the wells. The main source of recharge is precipitation. Weathered thickness is reported minimum of 1m and maximum of 20 mbgl nearer to nalas. In general, ground water available in the weathered zone under phreatic condition and confined to semi-confined conditions in the jointed and fractured formation. Ground water developed through dug wells, dug cum bore wells and bore wells. Dug wells are commonly used for irrigation as well as for domestic purposes. Its depth ranges from minimum of 1.7m mbgl to maximum of 15.7m mbgl. Pink granite is more susceptible for weathering than gray granite. So, pink granite is good aquifer than gray granite. In granite gneisses the yield of the wells reported are in the range of 4-100m³/day in dug wells, and in dug cum bore wells it ranges between 28.8-42.3m³ withstanding pumping of 4-5hr/day and the specific capacity ranges between 35.0-240.5m³/day/m. The wells tapping schistose formation is poor yielding compared to granite and gneiss formations. The alluvium found along a major nala course as thin lenses with thickness of 6-8m mbgl. The diameter of wells are 3.5 to 5.00m bgl, the specific capacity reported was between 230.4 to 533.0 m³/day/m. taluk.

1.4.4: Topography:

The district, moderately plain with shallow troughs and mounds of granite hills appears to have a rugged topography. The highest peaks are found at Hanumasagar with an elevation of 728mts, at Ginigera with 622mts, and at Benekal with 697mts. above mean sea level. The average elevation of the district is about 500mts amsl.

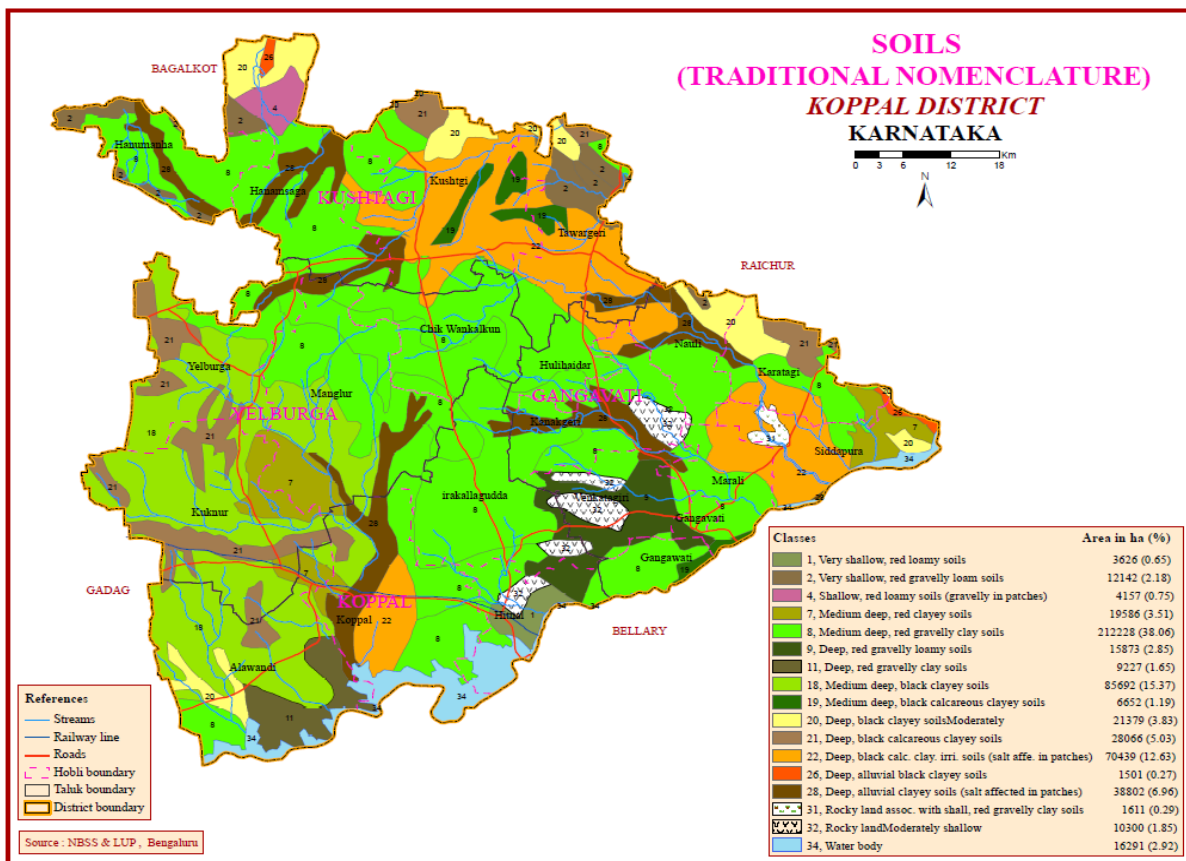
1.5: Soil Profile:

The soils of the district are mainly of the soil order Aridisols and Vertisols occurring in all the taluks of the district. Inceptisols occur mainly in Yelburga, Gangavathi and Kustagi, Alfisols in Koppal, Yelburga, Kushtagi and in patches in Gangavathi (Table 1.7). Entisols mainly occur in Kushtagi and Koppal and in patches in Gangavathi. The details of occurrence of soils and their characteristics are as follows:

Table 1.7: Soil Types of Koppal District.

Sl. No.	Soil	Area (Ha)	% area	Characteristics
1	Aridisol	230924	42	Moderately deep to deep, well drained, gravelly clay to clayey soils, at places it is calcareous, on gently sloping to undulating interfluves with slight to moderate erosion.
2	Vertisol	125420	23	Deep to very deep moderately well drained to drained, calcareous cracking soils of valleys and on undulating interfluves with moderate erosion and at places severely eroded.
3	Inceptisol	69789	13	Deep to very deep and at places moderately deep, well drained, clayey soils. In valleys and gently sloping land with problems of drainage and salinity in patches.
4	Alfisol	68130	12	Moderately deep to deep, gravelly clay to clayey, on gently sloping interfluves at places it is shallow to somewhat excessively drained gravelly clay loam with low AWC, with slight to moderately erosion.
5	Entisol	31641	6	Very shallow, well drained to excessively drained, gravelly loam soils on ridges and rolling lands with very low AWC and with moderate to severe erosion
6	Water bodies	16291	3	
7	Rockland	10300	2	
	Total	552495		

Fig 1.7: Soils (Traditional Nomenclature), Koppal District



Source: NBSS&LUP,Bangalore

Slope characteristics:

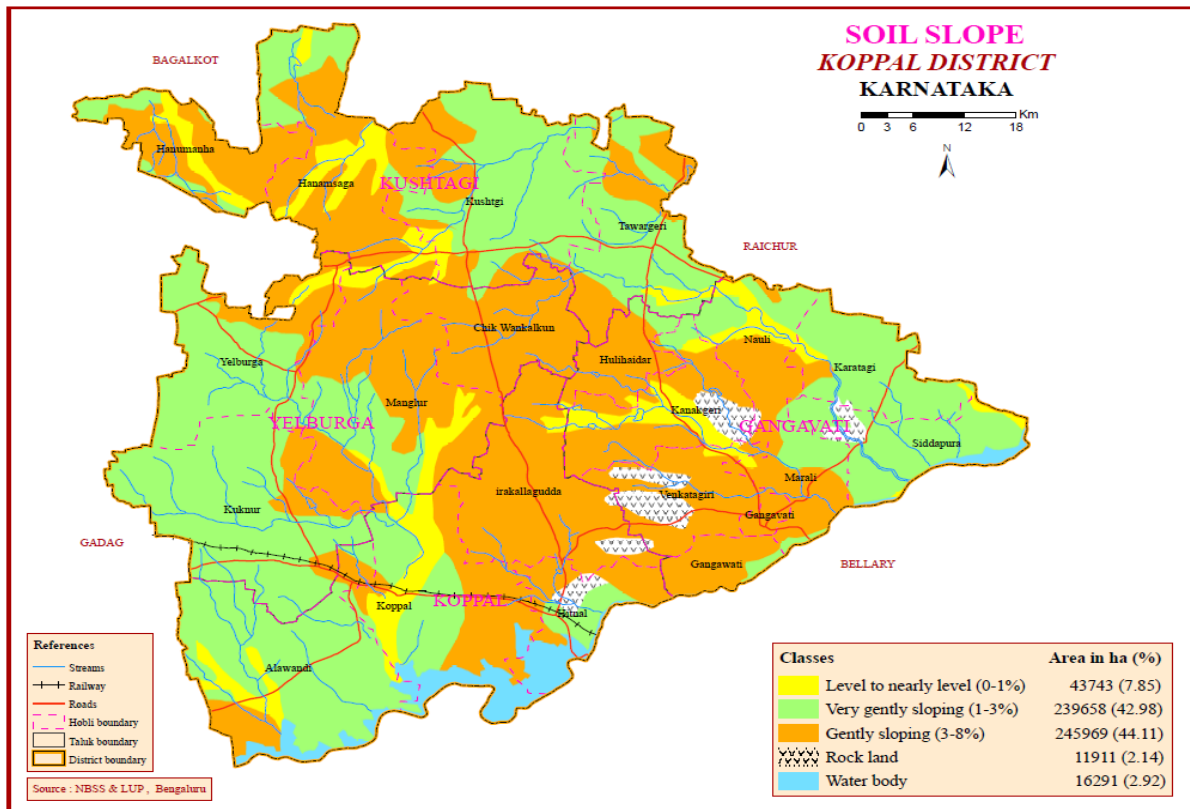
Totally about 461076ha (83.5%) area is having aslope % of 0 to 3% indicating major area is very flat. 71837ha (13.0%) areas falling under 3 to10% slope and the remaining area 19582ha (3.5%) is having a slope ranging from 10 to50% (Table 1.8 and Fig 1.8)

Table: 1.8. Slope Characteristics

Sl. No	Slope Category	Area (Ha)
1	0 - 1 %	159772
2	1 - 3 %	301304
3	3 - 5 %	57746
4	5 - 10 %	14091
5	10 - 15 %	8102
6	15 - 35 %	5759
7	35 - 50 %	5721
Total		552495

Source: JDA, Koppal

Fig 1.8: Soil Slope Classes

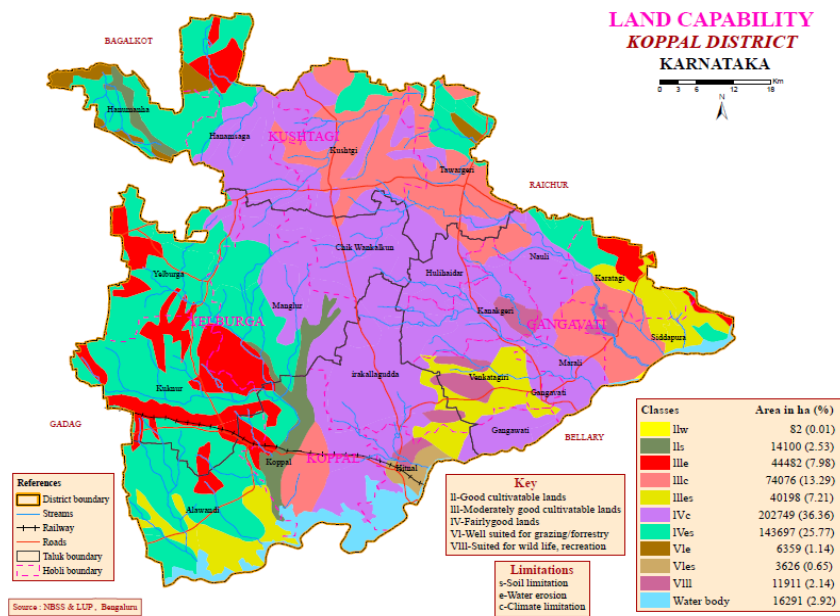


Source: NBSS&LUP, Bangalore

Land capability classes

None of lands in Koppal district falls under class I and 2.5% of land is classified as class II (Good cultivable land) and 28.5% of land is classified (Fig 1.9) as class III (moderately good). But 62% of lands fall under class IV (fairly good). Remaining lands area not suitable for cultivation. The major limitation of crop production in class III and class IV class lands is climate- with high temperatures, high evaporation rate, low precipitation.

Fig 1.9. Land capability classes of Koppal district

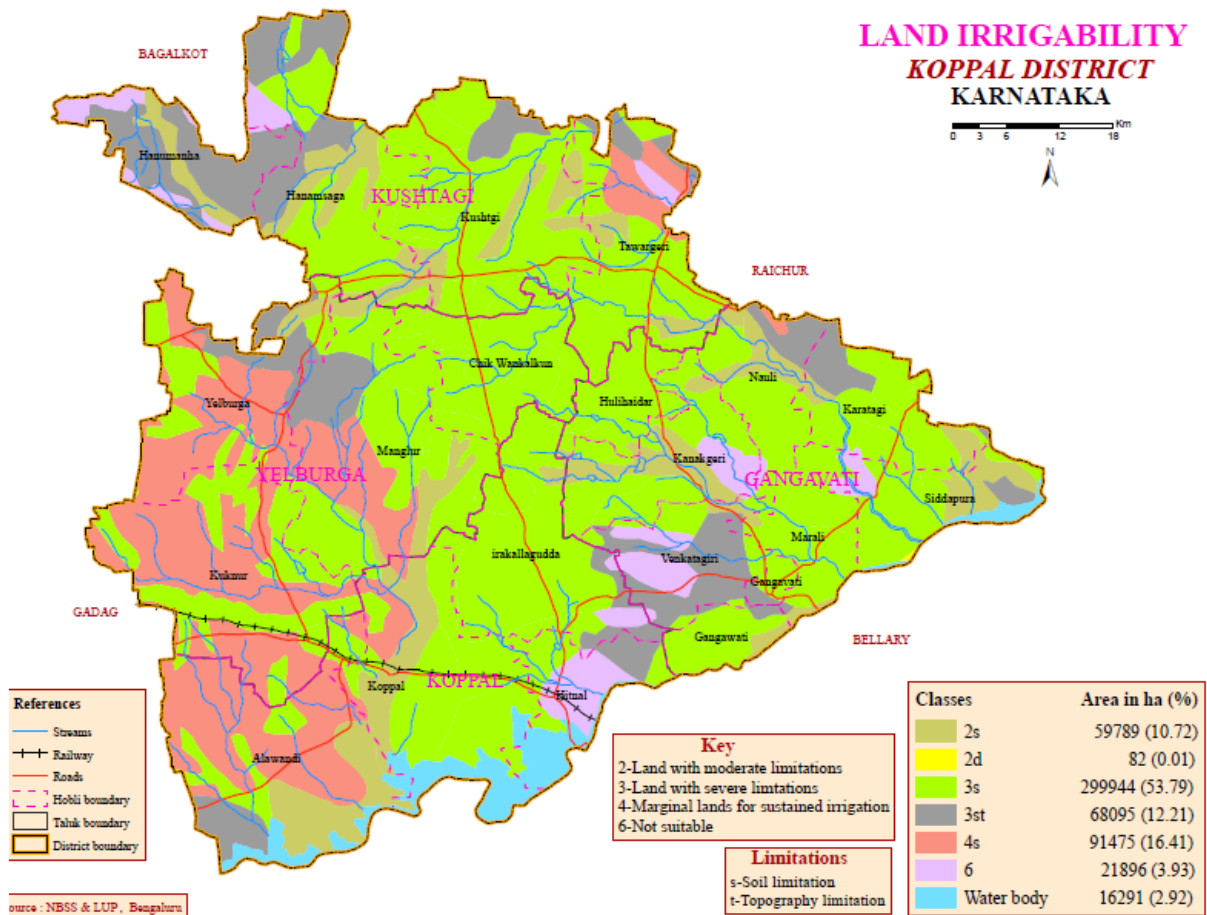


Source: NBSS&LUP,Bangalore

Land irrigability classes

Not all the cultivated lands are suitable to be irrigated in Koppal district. Only 10.7% of lands have moderate soil limitation, while 54% of lands have severe soil limitation to receive irrigation. Nearly, 12.2 % of lands have severe limitation of both soil and topography (Fig 1.10). Nearly 16.4 % of lands are marginal lands with not suitable for sustained irrigation.

Fig 1.10. Land irrigability classes in Koppal district

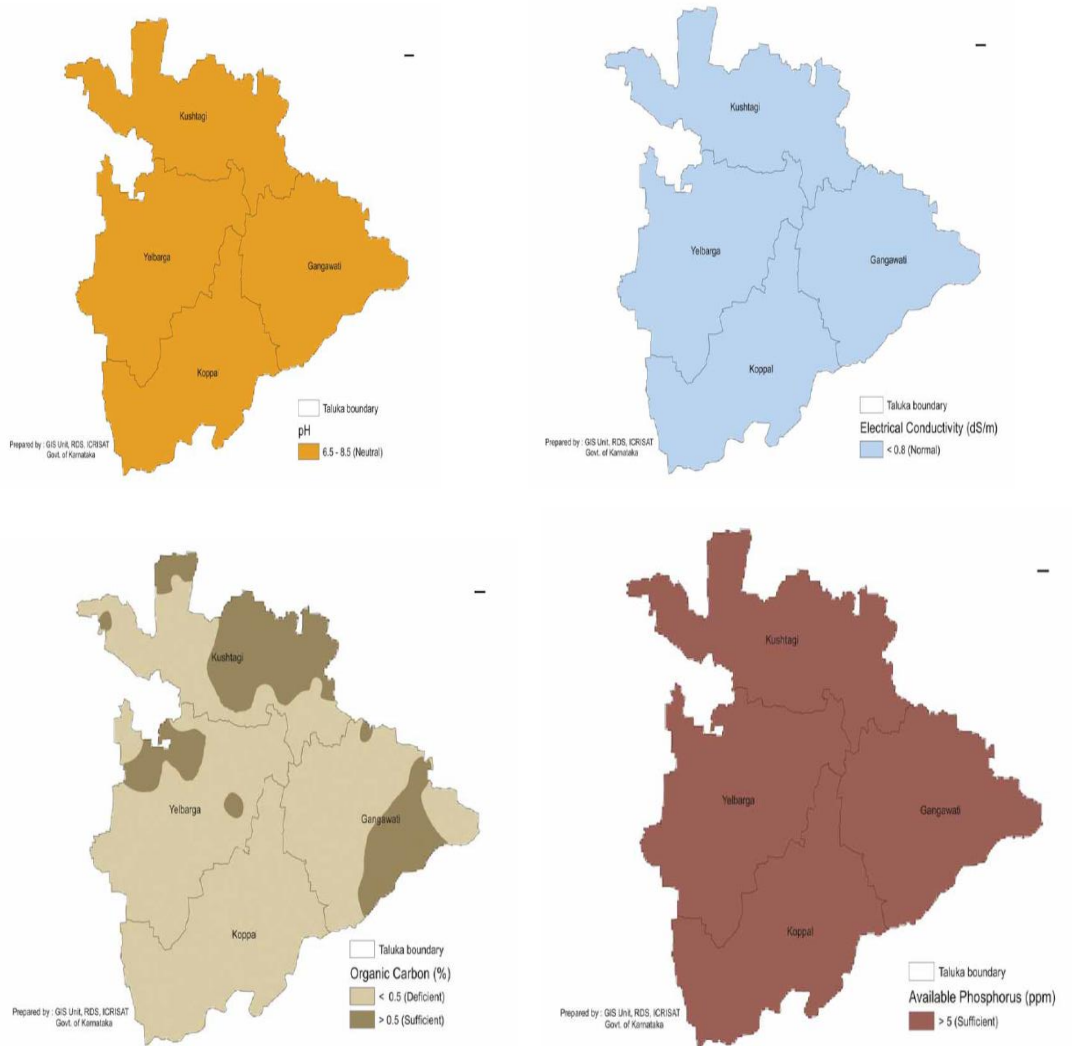


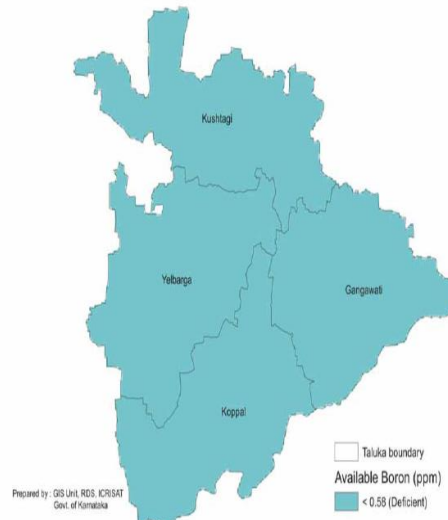
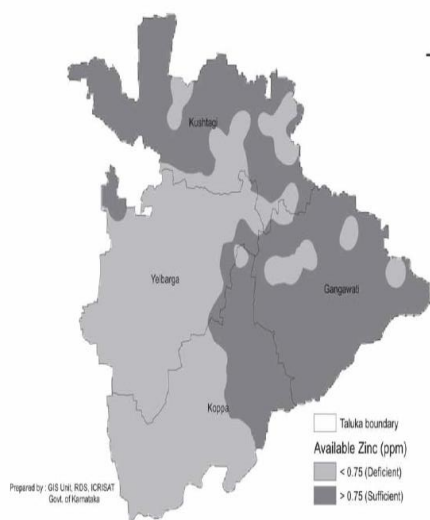
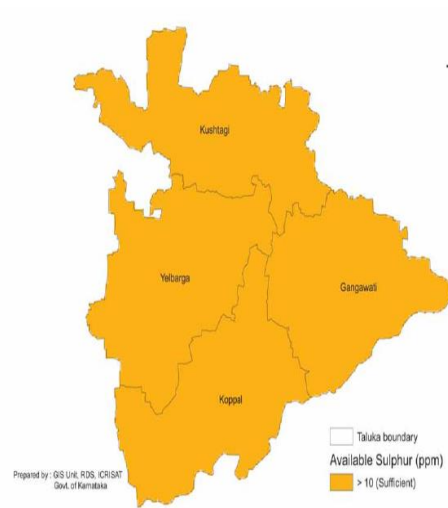
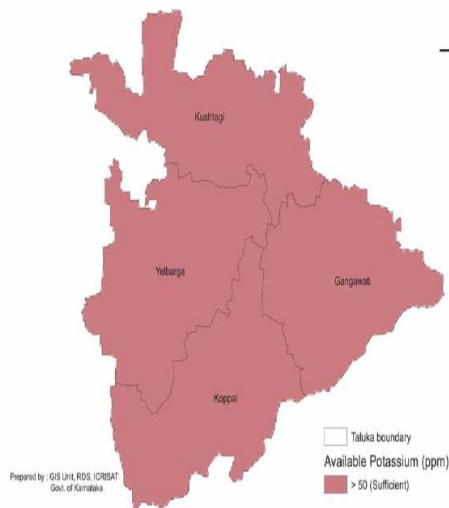
Source: NBSS&LUP,Bangalore

Fertility status of soils

The overall pH (6.5 to 8.5) is neutral and EC (0.8 dS/m) is normal, while the organic carbon status is deficient (<0.5%) in major part (Fig 1.11) of the district and sufficient (>0.5%) in certain parts of Kushtagi and Gangavathi taluks. The soils of Koppal district, are sufficient in Available Phosphorous, Available Potassium and Available Sulphur. The soils of Gangavathi taluk and the north-west area of Kushtagi taluk are sufficient in Available zinc (>0.75 ppm), whereas, the remaining area of the district is deficient (<0.75 ppm) in Available zinc. Mainly, the soils of the district are deficient in Available Boron (<0.58 ppm).

Fig 1.11: Soils and their fertility status





Source: NBSS&LUP, Bangalore

1.6: Soil Erosion and Runoff Status:

Soil erosion which occurs at varying rates is a widespread threat to sustainable resource management. The average annual soil loss was 27 tons $\text{ha}^{-1}\text{yr}^{-1}$. Major causes of soil erosion were cultivation without proper soil and water conservation measures in area not suitable for crops, denuded areas

without vegetation, cultivated fallow on moderate slopes, degraded forests/pastures on steep slopes and poorly managed forest cover. Appropriate soil conservation and land management techniques for the different soil erosion classes were suggested. It is generally associated with agricultural practices, leading to decline in soil fertility, bringing in a series of negative environmental impacts and has become a threat to sustainable agricultural production and water quality.

Soil erosion is one form of soil degradation. Soil erosion is a naturally occurring process on all land. The agents of soil erosion are water and wind, each contributing a significant amount of soil loss each year. Soil erosion may be a slow process that continues relatively unnoticed, or it may occur at an alarming rate causing serious loss of top soil. The loss of soil from farmland may be reflected in reduced crop production potential, lower surface water quality and damaged drainage networks.

In the district, moderately eroded soils account for about 43.33% (241599ha) occurring mainly in Koppal (Table 1.9 and Fig 1.12), Yelburga, Gangavathi taluks and in patches of Kushtagi, the severely eroded area accounts for about 27.36% (152546 ha), mainly found in Koppal, Yelburga, Kushtagi and in patches in Gangavathi taluk, while soils with nil or slight soil erosion accounts for about 24.25% (135225 ha) occurring mainly in Kushtagi, Ganagavathi and in small area in Koppal taluk. Nearly 70% of the area is moderately to severely eroded, surface run off is high, there by resulting in un-availability of water due to severe runoff and loss of soil fertility and top soil. Necessary water conservation measures are to be taken up to conserve and utilize available water to a maximum extent.

Table1.9: Soil Erosion and Runoff Status

Dist.Tal.GP	area. ha	T. Rainfall (mm)				T. Runoff %				No of runoff events				T.slt loss(t)			
		2011	2012	2013	2014	2011	2012	2013	2014	2011	2012	2013	2014	2011	2012	2013	2014
Koppal, Koppal, Hasagal	513	473.93	506.8	595	669.76	5.3	5	2.9	3.85	2	2	3	3	617.6	528.4	840	540

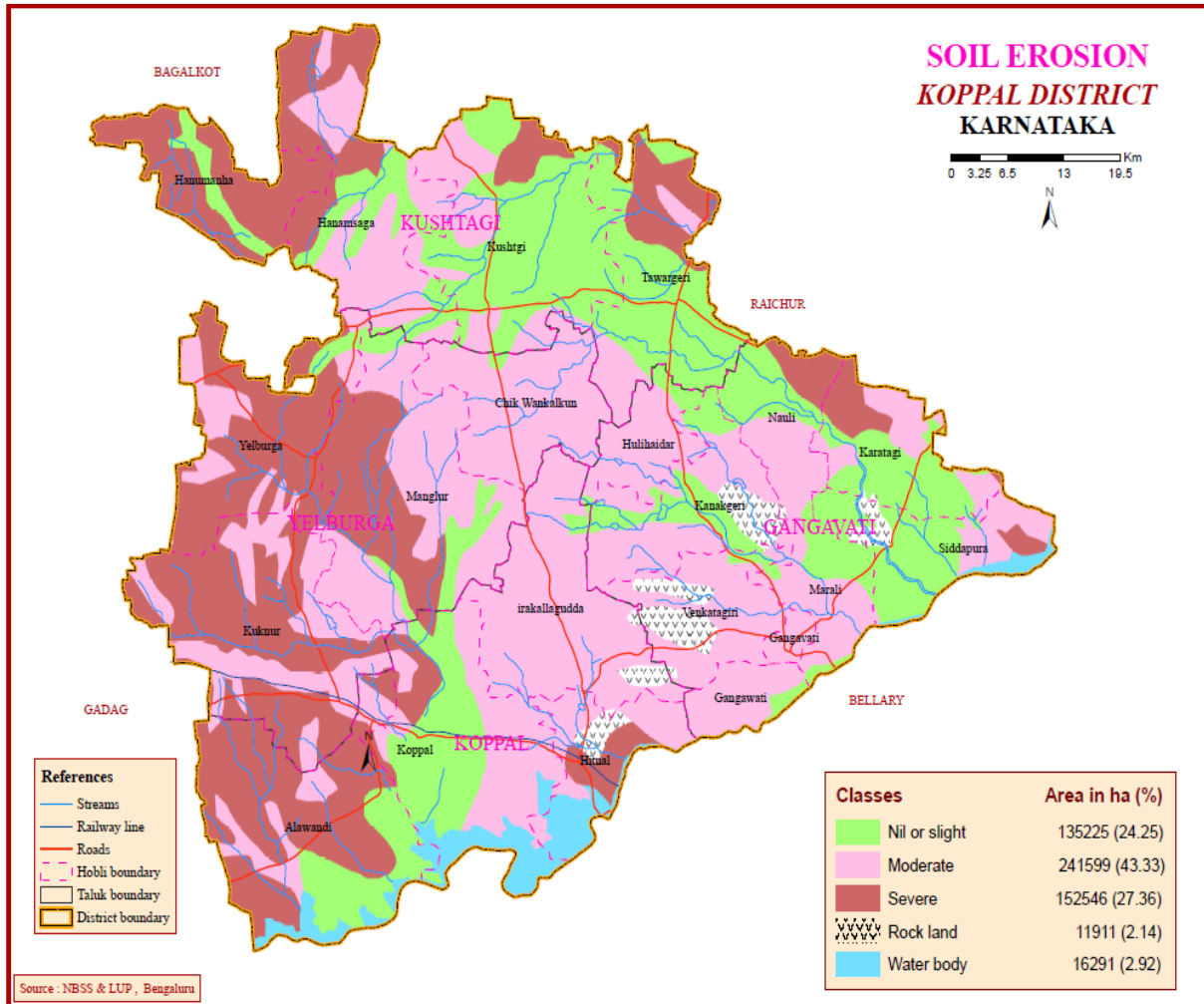
Dist.Tal.GP	Silt loss t/ha				Total NPK loss (Kg/ha/year)											
	2011	2012	2013	2014	2011			2012			2013			2014		
					N	P	K	N	P	K	N	P	K	N	P	K
Koppal, Koppal, Hasagal	1.20	1.03	1.64	1.05	4.3	1.5	2.8	4.5	1.6	6.2	3.8	0.9	3.2	1.9	0.7	1.5

Dist.Tal.GP	Soil		Dist.Tal.GP				T.no.wells	Defunct wells
			2011-12	2012-13	2013-14	2014-15		
Koppal, Koppal, Hasagal	Sandy loam	Koppal, Koppal, Hasagal	42-35	43-29	39-28	37-27	5	one well

Dist.Tal.GP	No of runoff events				T.Sgt. loss(t)			
	2011	2012	2013	2014	2011	2012	2013	2014
Koppal, Koppal, Hasagal	5	5	4	nil	324.8	293.7	560.0	Negligible

Source: Joint Director of Agriculture, Koppal

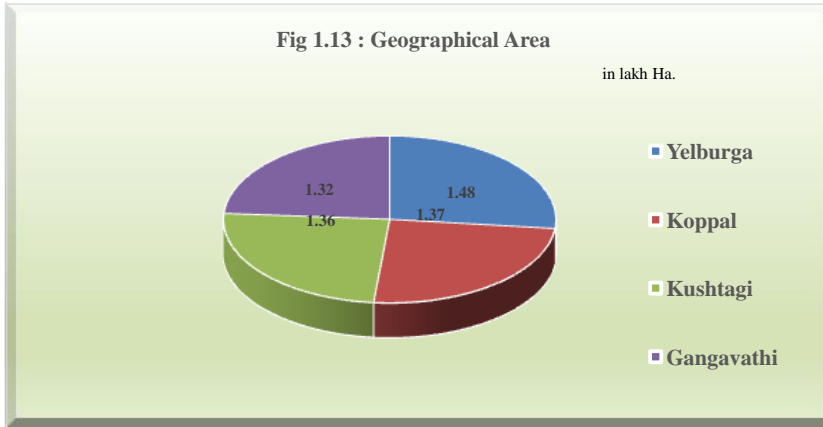
Fig 1.12: Soil Erosion



Source: NBSS&LUP, Bangalore

1.7: Land Use pattern:

Out of the geographical area of the district (552 495 ha.), Yelburga taluk has 147830 ha. area followed by Koppal (136755 ha), Kushtagi 135779 ha (Table 1.10 and Fig 1.13) and Gangavathi 132131 ha.



Source: district at glance,2014

Table 1.10 Land Use Pattern in Koppal district (Area in hectares)

Sl. No	Taluk	Total Geographical area	Gross cropped area	Net sown area	Area sown more than once	Cropping intensity (%)	Area under Forest	Area under waste land	Area under other uses
1	Gangavathi	132131	131732	93138	38594	141	14482	560	20439
2	Koppal	136755	113418	97037	16381	117	10779	430	7710
3	Kushtagi	135779	112011	92780	19231	121	4110	811	7658
4	Yelburga	147830	131329	112808	18521	116	80	767	3196
Total		552495	488490	395763	92727	123	29451	2568	39003

Source: district at glance,2014

Out of the Geographical area of 552495 ha, 395763 ha is the net sown area (71.63%) and the forest area accounts for 29451 ha (5.33%). Area sown more than once is 92727 ha and the cropping intensity works out to 123.

The net sown area is highest in Yelburga taluk-112808 ha (28.50%), followed by Koppal-97037ha (24.52%) and Gangavathi-93138ha (23.53%). Net cultivated area is lowest in Kushtagi-92780 ha (23.44%), Whereas, area under forest is highest in Gangavathi taluk with 14482 ha (49.17%), followed by Koppal with 10779 ha (36.60%) and Kushtagi with 4110 ha (13.96%). Yelburga has the lowest forest area of 80 ha (0.27%).

Compared to the Geographical area of the taluks, percentage of net sown area is highest in Yelburga taluk, followed by Koppal (73.44%), Gangavathi (70.49%) and lowest in Kushtagi (70.22%), whereas, Percentage of forest area is highest in Gangavathi (10.96%), followed by Koppal (8.16%), Kushtagi (3.11%) and the forest area percentage is lowest in Yelburga taluk.

CHAPTER II
DISTRICT WATER PROFILE

2.1. Area Wise, Crop Wise irrigation status:

Season wise, category wise irrigated and rainfed area details in Koppal district are furnished in Table 2.1. Koppal district has facility for irrigation on 56733 ha in kharif season, 4350 ha during rabi season and 40550 ha during summer, in addition to horticultural irrigated area of 6283 ha. This works out to total gross irrigated area of 107916 ha, although net irrigated area does not exceed 56733 lakh ha. Major crops receiving irrigation are cereals(98450 ha) followed by pulses (3174 ha).As compared to total area being cultivated under different groups of crops, the irrigated area is available for 41.7 % of cereal area, 3% of pulse area and small share of oilseed area. Of course, entire horticultural area is irrigated (6283 ha)

Table 2.1 Crop wise-season wise irrigated area in Koppal district(ha)

Details	Cereals	Pulses	Oilseeds	Fibre crops	Total	Horticultural
Kharif-irri.	56310	423			56733	
Kharif-dry	96238	39103			135341	
Kharif-total	152548	39526	42621	10772	245467	
Rabi-irri.	4066	284			4350	
Rabi- dry	41256	60862			102118	
Rabi- total	45322	61146	31630	12128	150226	
Summer-irri.	38083	2467			40550	
Summer-dry						
Summer-total	38064	2675	27058		67797	
TOTAL Irrigated	98459	3174			101633	
TOTAL dry	137494	99965			237459	
TOTAL	235953	103139			339092	
Horti-irrigated						6283
Horti-dry					-	-
Horti- total						6283

Source: JDA, Koppal

The above indicates that major share of agricultural land has no facility of irrigation especially for cultivation of pulses and oilseeds.

2.2. Production and productivity of major crops:

Season wise, Crop wise area sown, production and productivity of various crops are furnished at Table 2.2. Among the various crops, Paddy has given higher yields both under irrigated (60 qtls/ha) and rainfed (40 qtls/ha) condition than any other crop followed by Maize and Bajra. The productivity of maize is around 30 q/ha, which is higher than recorded under rainfed conditions (20 q/ha).

Under Pulses, Bengalgram has recorded higher yields both under irrigated (7qtls/ha) and rainfed (3.5qtls/ha) conditions, followed by Greengram and Redgram. Among Oilseeds, Groundnut and Sunflower have recorded almost the same yields both under irrigated (10t/ha) and rainfed (7 qtls/ha) conditions. Sunflower has recorded an average productivity of 12 q/ha under irrigated situations, while under rainfed conditions its productivity is poor (8 q/ha). Cotton has recorded 11 Qtls/ha and 6 qtls under irrigated and rainfed conditions, respectively.

In general, the production of most of the crops is very poor under rainfed conditions than irrigated situations and it is in tune with generalized principle that making water available to any crop during critical stages always improve the crop yield.

Table 2.2: Area, production and productivity of major agricultural crops

Sl. No.	Crops	Area (ha)			Production (000 qtl)			Productivity (qtl/ha)		
		Irrigated	Rain-fed	Total	Irrigated	Rain-fed	Total	Irrigated	Rain-fed	Average
1	2	3	4	5	6	7	8	9	10	11
1	Paddy	39678	242	39920	2380	9.7	2390	60	40	50
2	Maize	13216	32201	45417	396	644	1040	30	20	25
3	Bajra	978	43181	44159	8.8	259	267	9	6	7.5
4	Tur	622	12104	12726	4.7	66	71	7.5	5.5	6.5
5	Green Gram	0	18347	18347	0	73	73	6	4	5
6	Bengal Gram	0	88761	88761	0	310	310	7	3.5	5.25
7	Ground Nut	17970	7188	25158	179.7	50	230	10	7	8.5
8	Sunflower	6886	44014	50900	82.6	352	434	12	8	10
9	Cotton	16824	974	17798	185	5.8	190	11	6	8.5
Total		96174	247012	343186	3238	1771	5009			

Source: JDA, Koppal

2.3. Irrigation based classification:

Tungabhadra is a perennial river formed by the union of two rivers, viz., the Tunga and the Bhadra, both of which rise at Gangamula in the Varaha Parvata of the Western Ghats. This is also a perennial river, very deep in certain places and almost unaffordable even in the dry season. The Tungabhadra has a large number of rivulets and streams serving as tributaries. There is Tungabhadra reservoir at Munirabad which is in the border of Koppal taluk. The district is part of Krishna basin also. The main streams draining the area are Maskinala, Ikal-nadi and Hirenala which are Ephemeral in nature with dendritic to sub-dendric drainage pattern.

Table 2.3: Status of irrigated area in Koppal district (ha)

Irrigated		Rainfed	
Gross irrigated area	Net irrigated area	Partially irrigated area	Totally unirrigated area
180882	158282	60492	226964

Source: JDA, Koppal

The Net irrigated area of the district is 158282 ha and the gross irrigated area is 180882 ha (Table 2.3) indicating the availability of irrigation for more than one season on 22600 ha. Partially irrigated area accounts for 60492ha and about 226964 ha is under unirrigated condition. Majority of lands in Koppal district are still unirrigated which has resulted in drastic reduction of the district's agricultural production.

CHAPTER III

WATER AVAILABILITY

3.1. Status of Water availability:

Koppal district, at present, has nearly 0.4538 BCM of surface water from canal and minor irrigation tanks. The run off generated in the district as well as run off from adjoining districts like Haveri is collected in the reservoir of TBP. The district receives only 0.3752 BCM from TBP reservoir (Table3.1), as irrigable area by TBP canal is available in koppal and Gangavathi taluks. Remaining surface (0.0786 BCM) water collected by minor irrigation tanks. The data on surface water collected from various rain water harvesting structures is not available. The district also lacks sewage treatment plant and hence, use of treated effluent for any use is completely absent. Considering all these aspects, the district has limited surface water collected in tanks and reservoirs and the district does not have lift irrigation source, at present. However, the district is expected to get large volume of water from Singatalur Lift irrigation project across river Tungabhadra as well as 'Koppal Lift Irrigation Project' under Upper Krishna Project'. These projects are in final stages of completion.

Table 3.1 Status of water availability (BCM)

S. No	Sources	Total
1	Surface Irrigation	
(i)	Canal (Major & Medium Irrigation)	0.3752
(ii)	Minor Irrigation tanks	0.0786
(iii)	Lift Irrigation/ diversion	0.0000
(iv)	Various Water Bodies including Rain Water Harvesting	0.0000
(v)	Treated Effluent Received from STP	0.0000
(vi)	Untreated effluent	0.0000
(vii)	Perennial sources of water	0.0000
	Total surface water	0.4538
2	Ground Water	
(i)	Open well	0.7041
(ii)	Deep Tube Well	
(iii)	Medium Tube Well	
(iv)	Shallow Tube Wells	
	Total	1.1579

Koppal district has 0.7041 BCM of available ground water. The Yelburga and Koppal taluks of the district are over exploited (ground water development of 83% and 72 %, respectively). However, 58% of Kushtagi taluk and 43% of Gangavathi taluk are in safe region (ground water development is less than 50%). The overall scenario of ground water is not discouraging, provided major part of rain water is recharged to improve the net available ground water.

3.2 Status of Ground water availability:

The district is mainly underlain by gneisses, granites and schists. The hard rocks as they do not have any primary porosity, however, weathering, fracturing, joints and tectonic features like folds and faults have secondary porosity and permeability. This has improved water yielding capacity of the wells. The main source of recharge is precipitation. Weathered thickness is reported minimum of 1m and maximum of 20 mbgl nearer to nalas. In general, ground water available in the weathered zone under phreatic condition and

under confined to semi-confined conditions in the jointed and fractured formation. Ground water is developed through dug wells, dug cum bore wells and bore wells. Dug wells are common, used for irrigation as well as for domestic purposes. Its depth ranges from minimum of 1.7m mbgl to maximum of 15.7m mbgl. Pink granite is more susceptible for weathering than gray granite. So, pink granite is good aquifer than gray granite. In granite gneisses, the yield of the wells reported are in the range of 4-100m³/day in dug wells, and in dug cum bore wells it ranges between 28.8-42.3m³ withstanding pumping of 4-5hr/day and the specific capacity ranges between 35.0-240.5m³/day/m. The wells tapping schistose formation is poor yielding compared to granite and gneiss formations. The alluvium found along a major nala course as thin lenses with thickness of 6-8m mbgl. The diameter of wells are 3.5 to 5.00 mbgl, the specific capacity reported was between 230.4 to 533.0 m³/day/m. the bore wells drilled by farmers as well as Govt. agencies for domestic and irrigation purposes with depth range of 40- 70m and reported yield of bore wells ranges from 1 lps to 7.6 lps. The promising zone is 30-60 mbgl.

Pre-monsoon depth to water level during 2006 recorded in the range of minimum of 4.5mts and maximum of 16.50 mts. In the district, major parts of Koppal, Yelburga, and Kushtagi taluks are having depth to water levels in the range of 10-20 m. In major parts of Gangavathi taluk depth to water levels recorded in the range of 5-10 m range and a small patch is having 2-5 m range. Post monsoon depth to water level during 2006 range from 1.15 m to 16.24 m. Study of distribution of percentage of observation of wells during November 2006 by CGWB, show 30.77% having depth to water levels in the range of 5.0-10.0 mbgl, 38.46% wells have recorded water levels in the range of 10.0-20.0 mbgl. A small patch in Gangavathi taluk is having water levels of less than 2mbgl and a small patch of more than 20 mbgl is observed around in Kushtagi and Yelburga taluk.

As per hydro chemical data, E.C. values range from 730-2870 micro mhos /cm at 25°c is recorded. Chloride is in the range of 43 to 639 mg/l and fluoride in the range of 0.6 to 2.7 mg/l as based on the Bureau of Indian Standards recommendations for drinking water, the water E.C having less than 750 micro mhos/cm at 25°C is desirable and unsuitable if it is more than 3000 micro mhos/cm at 25°C. The concentration of fluoride is distributed in the district in the range of 1.0 to 1.5 mg/l up to maximum of 2.7 mg/l. The desirable limit for drinking purposes is less than 1 ppm. The concentration beyond 1 ppm is unsuitable, noticed as pockets in Gangavathi and Kushtagi taluks.

Table 3.2 Status of ground water in Koppal district

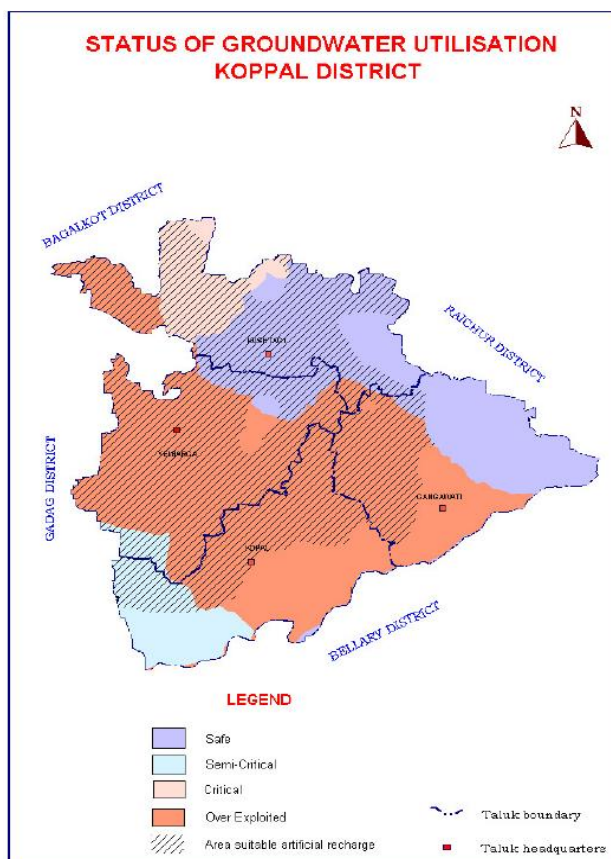
Taluk	Status of ground water exploitation- taluk wise (% area in each taluk)				Status of Gross ground water draft (ha m)		Net ground water availability*	Existing Gross ground water draft for irrigation **
	Safe	Semi critical	Critical	Over exploited	All uses	For domestic & industrial uses		
Gangavathi	60	--	--	40	6751	666	32442	6085
Koppal	20	20	--	60	5733	485	8395	5248
Kushtagi	45	35	--	20	4106	635	5233	5233
Yelburga	15	--	--	85	11106	920	7641	7641

(Adapted from CGWB Brochure of Koppal District- 2012)

* Calculated considering the natural recharge from all sources

** Calculated after considering other sector's needs.

Fig 3.1: Status of ground water utilization

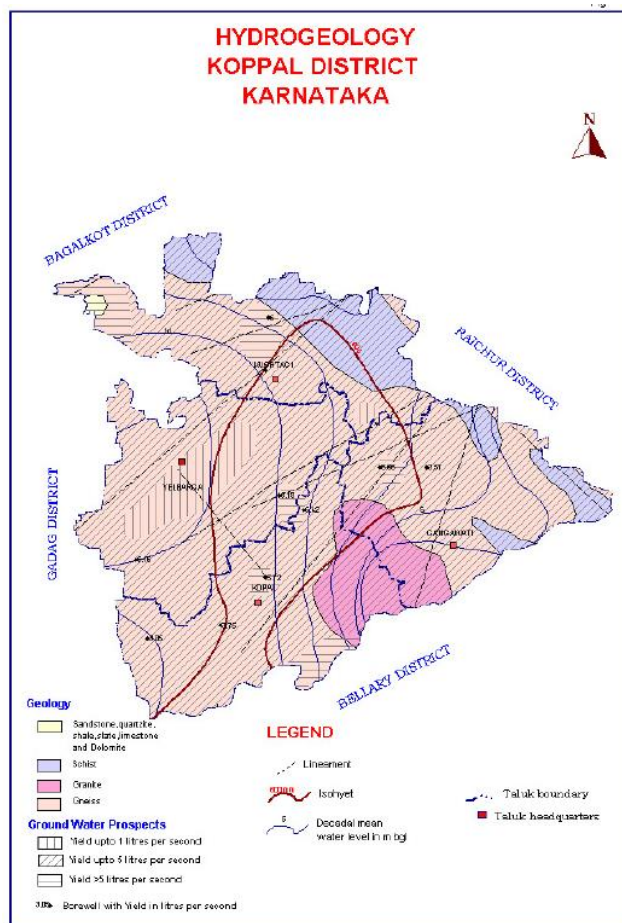


Out of 4 taluks of Koppal district, 85 % area of Yelburga (Table 3.2), 60% of Koppal and 40% area of Gangavathi taluks are treated as over exploited regions. These regions have utilized the ground water for more than the natural recharge capacity of ground water. The scope of further exploitation of ground water in these regions is limited.

However, in Gangavathi taluk 45% of the area is in safe zone and suitable for further ground water development. In Kushtagi taluk, 45% of the area is in safe zone and hence, more number of bore-wells could be suggested in Kushtagi taluk. The percentage of overexploited area in Kushtagi taluk is limited to only 20%.

Hydrogeological of Koppal district indicates that central region of Yelburga taluk has the potentiality to generate water yields upto 1 lps. Hence, in these regions digging of bore-wells for irrigation may be drastically reduced. In contrast, nearly 25 to 30 % of Kushtagi taluk has potentiality to generate water yields beyond 5 lps. This analysis substantiates recommending more bore-wells in Kushtagi taluk.

Fig 3.2 Hydro geology



3.3. Status of Command area:

Out of 4 taluks of Koppal district, Koppal taluk has been irrigated by Tungabhadra Left Bank Canal to the tune of 5286 ha spread over 18 villages (Annexure - 1). Koppal taluk is also irrigated by Veerapura Hirehalla Project

through canals to the tune of 8330 ha spread over 18 villages. Gangavathi taluk is irrigated by Tungabhadra Left Bank Canal to the tune of 21157 ha spread over 86 villages (Annexure - 1). In both these taluks, the undeveloped area in the canal command is to the tune 4250 ha (Table 3.3) .

Table 3.3 STATUS OF COMMAND AREA (existing) AREA IN HA

Sl. No	Taluk	Command Area			Saline/alkali/ waterlogged area	Total developed area	Total un-developed area
		Total Area	Developed Area	Un-developed Area			
1	Koppal	13616	13616	0	0	13616	0
2	Gangavathi	21157	16906	4250	6596	16906	4250

Source: CADA, Munirabad

Table 3.4 STATUS OF ONGOING LIFT IRRIGATION AREA IN HA

Sl. No.	Taluk	Name of Project	Command area being developed by Lift Irrigation
1	Gangavathi	Koppal Lift Irrigation	4000
2	Kushtagi	Koppal Lift Irrigation	32000
3	Yelburga	Koppal Lift Irrigation	45320
		Alur – Bannikoppa Lift Irrigation	5918
4	Koppal	Koppal Lift Irrigation	43760
		Mundargi Branch Canal	22544
		Alawandi – Bettegeri Lift Irrigation	2425
		Bahadur Bhandi Lift Irrigation	8903
Total			164870

Source: KNNL

In Gangavathi taluk, which is irrigated intensively for paddy cultivation since inception of TBP, large area has been identified as saline/alkali/water logged. The latest record from CADA TBP indicates that nearly 6600 Ha. has been identified to have salinity, alkalinity or water-logged situation. Other 2 taluks, namely Kushtagi and Yelburga do not have canal irrigated area at present. They are solely dependent on the underground water as well as few

surface irrigated sources. However, State funded Singatalur Lift Irrigation Project across Tungabhadra River is in the final stage of implementation. This Lift Irrigation Project is expected to irrigate 77632 ha. to Koppal taluk and 51238 ha. in Yelburga taluk. In addition, the Lift Irrigation Scheme will also provide the irrigation (Table 3.4) to Gangavathi and Kushtagi taluk , (4000 and 32000 ha). The civil works including the canal construction is in the final stage and these taluks may get irrigation in the next 6 months.

3.4. Existing type of irrigation:

Koppal district is mainly irrigated by bore-wells and canals. The canal irrigation is available in the district on an area of 47138 ha. spread in Koppal and Gangavathi taluks. Borewell irrigation is available in all the taluks with varying intensity. Koppal taluk has maximum area under borewell irrigation (18478 ha.). Out of the total irrigated area of 96019 ha.(Table 3.5), the ground water irrigation is to the tune of 45851 ha. and remaining 50168 ha. is irrigated by different surface sources of water.

Table 3.5 Source wise irrigated area

(Net Irrigated area in ha.)

Taluk	Surface		Groundwater		Lift	others	Total	
	Canal	Tanks	Open well	Bore well			Surface	Groundwater
Koppal	5860	105	566	18478	1309	0	7840	18478
Gangavathi	41278	0	0	6370	0	0	41278	6370
Yelburga	0	100	800	12677	0	0	900	12677
Kushtagi	0	150	0	8326	0	0	150	8326
Total	47138	355	1366	45851	1309	0	50168	45851
Grand Total							96019	

Source: CGWB Report 2013

3.5 Water availability in Koppal district

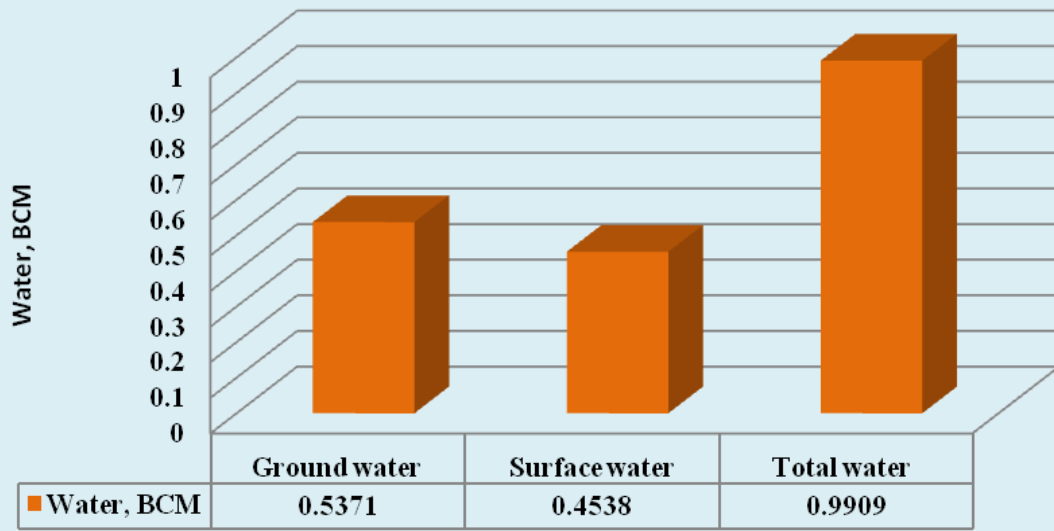
Water is available from underground water (as per Central Underground Board Booklet, 2012) and surface water from canals and tanks maintained by Zilla Panchayats and Minor Irrigation. Total water available for the district from underground tube wells is 0.5371 BCM (Table 3.6). Water from irrigation canals and tanks (maintained by Zilla Panchayats and Minor Irrigation Departments) is 0.4538 BCM. Here also, efforts are to be made to recharge these tanks for utilization – mostly for drinking, industrial or other purposes (Table 3.6). Further, water from canals is providing drinking water facility to some of the taluks. The total water available from various sources for Koppal district is 0.9909 BCM (Table 3.6, Fig. 3.3).

Table 3.6 Water availability in Koppal district

Taluks	Underground water, BCM (CGWB)#	Surface water, BCM##	Total Water Available
Gangavathi	0.32442	0.4538	0.99091
Koppal	0.08395		
Kushtagi	0.05233		
Yelburga	0.07641		
Total	0.53711	0.4538	0.99091

- CGWB Brochure of Koppal District – 2012; ## - Surface water includes water from canals (major and medium), minor irrigation tanks

Fig. 3.3. Water available from various sources in Koppal district



CHAPTER IV

WATER REQUIREMENT/ DEMAND

Water is a precious natural resource provided by nature to mankind for usage in various activities. Life does not exist without water. All living organisms depend on water for performing various vital functions for survival. Major portion of water is used for agriculture all over India and that too in Karnataka. Although water is a renewable resource, it is quite dynamic and becoming scarce due to spatial and temporal variation in rainfall. Water is needed to ensure food security, feed livestock, maintain organic life (sustain lifestyle of human beings, living creatures, conserve biodiversity and environment, industrial use, etc. However, with reckless abuse and increasing demand due to growing population and undesirable lifestyle, many states are facing severe water crisis. It is not only due to rapid population growth alone, but also on account of many other factors such as rise in per capita water demand arising out of continuous upward movement of living standards, increased reliance on irrigated agriculture, massive urbanization and industrialization etc. The available utilizable water resource of the country is considered insufficient to meet all future needs. Under such a situation, in order to face the challenge of water deficit, apart from accelerating pace of development of available utilizable water resources, all out efforts, on the part of people from every walk of life, would need to be made to conserve every drop of water and improve efficiency in all areas of water use.

The National Commission on Agriculture in 1976 estimated water resources in the country for 1974 and projected for 2000 and 2025 based on certain empirical formulae and assumptions related to runoff characteristics of soil, rainfall events and vegetation cover. India is a vast country with a geographical area of 328 Mha and receiving annual precipitation of 1194 mm.

This amounts to availability of 400 Mham (million-hectare meter) of water to India. Out of this, 17.5% goes as immediate evaporation (70 Mham), 53.8% as precipitation into soil (215 Mham) and 28.7% as surface water (115 Mham, which includes 10 Mham as snowfall). This precipitation into soil is further divided into 41.3% (165 Mham) as soil moisture and 12.5% as ground water (50 Mham). Water is lost through evaporation to an extent of 20% in medium and major reservoirs and 40% in tanks. This assumption is followed for Karnataka (Bhaskar *et al.*, 2016).

Karnataka has total geographical area of 19.20 million ha receiving an annual precipitation of 1133.3 mm (average of 55 years from 1960 to 2014). About 71% of rainfall is received during south west monsoon (June to September), while north monsoon contributes 17% (October to December) and early showers by 12%. The south west monsoon sustains agricultural activity in most parts of the state, as large proportion of agriculture is rainfed farming. Taking geographical area and rainfall into consideration, available water due to precipitation is 21.76 Mham to Karnataka (2176 Billion cubic m or 7688.8 TMC). Following NCA 1976 recommendation, out of 2176 BCM (7688.8 TMC) of water, 53.8% percolates into soil (1170.69 BCM or 4136.57 TMC), 17.5% as immediate evaporation loss (380.8 BCM or 1345.54 TMC), and 28.7% as surface water runoff (624.512 BCM or 2206.69 TMC).

The average annual rainfall in Karnataka is 1150 mm. The state is divided into three meteorological zones viz. North Interior Karnataka, South Interior Karnataka and Coastal Karnataka. Coastal Karnataka with an average annual rainfall of 3456 mm is one of the most rainy regions in the country. Contrasting this, the region of South Interior Karnataka and North Interior Karnataka receive only 1286 and 731 mm of average annual rainfall. (https://en.wikipedia.org/wiki/Rainfall_in_Karnataka).

Karnataka accounts for about six percent of the country's surface water resources. Around 60% of this is provided by the west flowing rivers while the remaining comes from the east flowing rivers. There are seven river basins in all formed by the Godavari, Cauvery, Krishna, the west-flowing rivers, North Pennar River, South Pennar, and Palar

(http://waterresources.kar.nic.in/river_systems.htm);

(https://en.wikipedia.org/wiki/Geography_of_Karnataka).

4.1. Water Demand for domestic need:

A number of factors like climate, culture, food habits, work and working conditions, level and type of development, and physiology determine the requirement of water. The per capita water requirement in urban areas is more than that in the rural areas. As per the Bureau of Indian Standards, IS:1172-1993, a minimum water supply of 200 litres per capita per day (lpcd) should be provided for domestic consumption in cities with full flushing systems. IS:1172-1993 also mentions that the amount of water supply may be reduced to 135 lpcd for the LIG and the economically weaker sections (EWS) of the society and in small towns [Modi 1998]. However, in the Tenth Plan (2002-07), the cities with planned sewerage systems are classified into two groups based on population, i e, metropolitan or megacities (minimum water supply level is 150 lpcd) and non-metropolitan cities (135 lpcd) [Government of India 1997, 2002]. Over and above the aforesaid demand, 15% losses may be allowed for determining the quantity of raw water required.

During 2015, water requirements for domestic use in taluks of Gangavathi and Koppal are relatively higher (0.0195 to 0.0238 BCM), while it was lower in taluks of Kushtagi and Yelburga (0.0138 to 0.147 BCM). This water requirement in these taluks corresponded to the prevalent population. For district as whole, water demand is 0.0719 BCM in 2015 (Table 4.1).

With projected growth of population of 16.2% during 2011 to 2020, the domestic water requirements in taluks of Gangavathi and Koppal would be relatively higher (0.0205 to 0.0249 BCM), followed by taluks of Kushtagi and Yelburga (0.0145 to 0.0154 BCM) (Table 4.1, Fig. 4.1).

Thus, domestic water requirement is projected at 0.0753 BCM in 2020 from the present consumption level of 0.0719 BCM during 2015 (Table 4.1, Fig. 4.1).

Table 4.1 Domestic water requirement/Demand of Koppal district - 2015 & projected for 2020

	Blocks	Population in 2011	Water demand, BCM	Population in 2015	Water demand in 2015, BCM	Projected population 2020	Projected water demand by 2020, BCM
1	Gangavathi	459905	0.0226618	482,901	0.0237949	505,896	0.0249280
2	Koppal	377781	0.0186152	396,670	0.0195459	415,559	0.0204767
3	Kushtagi	284792	0.0140331	299032	0.0147348	313,271	0.0154364
4	Yelburga	267442	0.0131782	280814	0.013837	294,186	0.0144960
	TOTAL	1,389,920	0.0684883	1,459,417	0.0719128	1,528,912	0.0753371

Water requirement for human being - 135 litres/head/day, lphd;

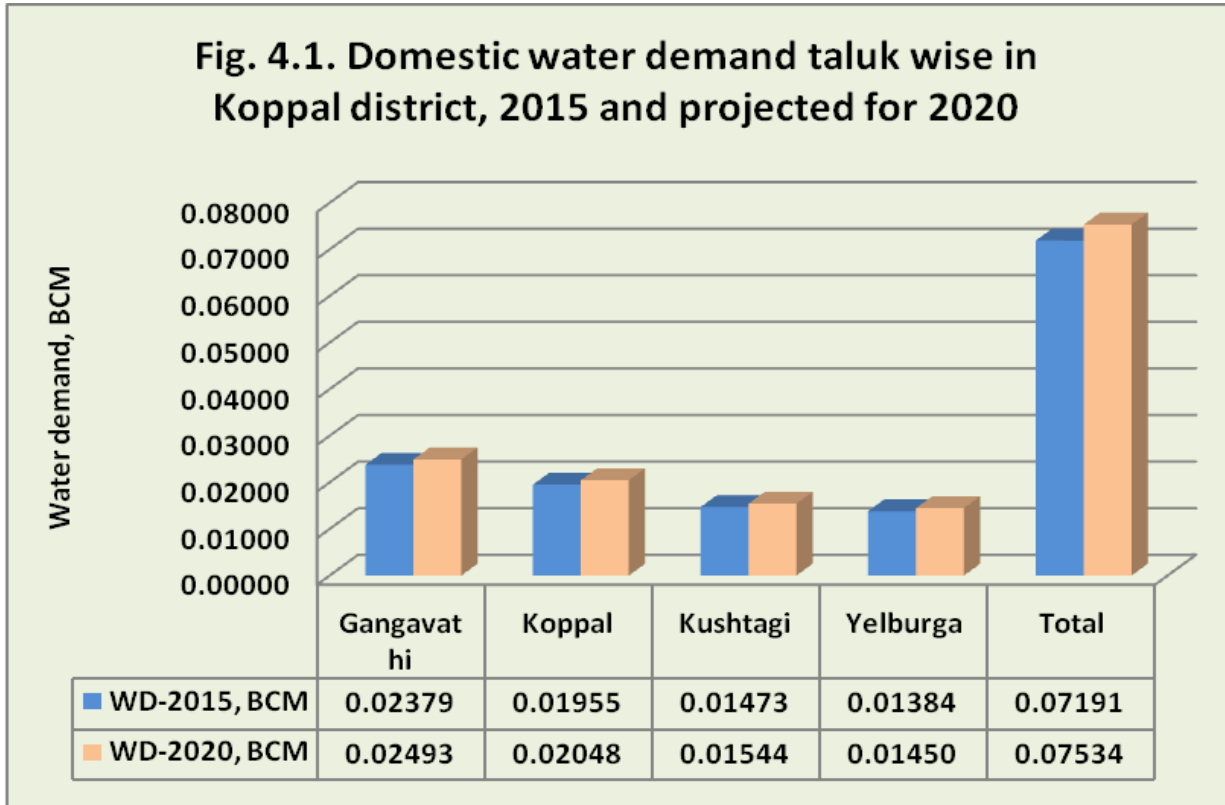
Domestic Water requirement/Demand in Billion cubic meter, BCM

= (Population X Water requirement, 135 lphd X 365 days)/ (1000 litres X 1,000,000,000)

Assumption: Increase in population during 2011 - 2021 is 16.2% similar to as that of decadal growth rate of population of 16.2% between 2001-2011.

{Source: Koppal district at a glance 2013-14, Directorate of Economics and Statistics, Government of Karnataka}

Fig. 4.1. Domestic water demand taluk wise in Koppal district, 2015 and projected for 2020



4.2. Water requirement for crops:

Field/horticultural/plantation crops grown in Koppal district are paddy, maize, groundnut, sunflower (both in Kharif & rabi), cotton, bajra, tur (in Kharif only), green gram (rabi only) (under agriculture), fruit crops, vegetable crops, spices and plantation crops. For calculation of water requirement of irrigated crops, following methodology and some assumptions have been used based on the recommendations of the NCA, 1976 and methodology suggested by Bhaskar et al. (2016). Irrigation water requirement considered for calculation purpose for various crops are transplanted rice (100 cm during Kharif, 125 cm during rabi), maize - 60 cm, bajra - 40 cm, cotton - 65 cm, red gram - 70 cm, groundnut - 45 cm, sunflower - 40 cm, green gram - 40 cm, vegetable crops - 50 cm, fruit crops - 60 cm, spices - 60 cm and plantation crops - 70 cm. From this water requirement of various crops and the area of the crops grown under irrigation, irrigation water requirement for crops has been worked out.

Assumption - Rain water accounted for crop use is 50% of total rainfall occurring during the cropping season in Koppal district, considering the soil type (aridisols, vertisols, inceptisols) and the intensity of rain. Rain water used for crops is used for calculating water demand of field crops under rainfed conditions. The water requirement of field crops is relatively higher (1.66009 BCM) in view of large area grown under rice (45,068 ha) particularly in Gangavathi and Koppal taluks. Water demand for total horticultural crops is 0.1087 BCM for Koppal district, of which major share goes to fruit crops (0.0435 BCM) and vegetable crops (0.0555 BCM). Further, water demand of total horticulture crops in Gangavathi and Koppal taluks are relatively more (0.0315 BCM in Koppal to 0.0358 BCM in Gangavathi) as compared to Yelburga (0.0235 BCM) and Kushtagi taluks (0.0178 BCM). The total water demand of total crops for Koppal district for 2015 is 1.76879 BCM. The total water demand of various crops is more in Gangavathi taluk in view of large area and more area irrigated. The projected water demand for total crops is also worked out for 2020, keeping 10% increase in irrigated area due to efficient rain water use, more under area and other means. For Koppal district, the projected total water demand for crops is 1.94567 BCM by 2020 as compared to the present demand of 1.76879 BCM), which amounts to 10% increase (Table 4.2, Fig. 4.2, 4.2a).

Fig. 4.2. Water demand of total crops of Koppal district, 2015 and projected for 2020

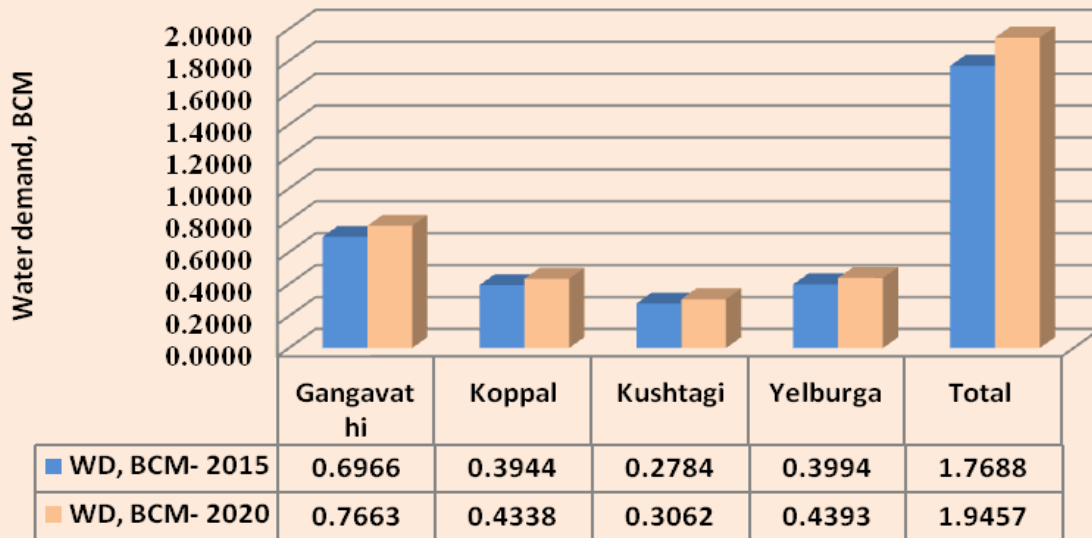
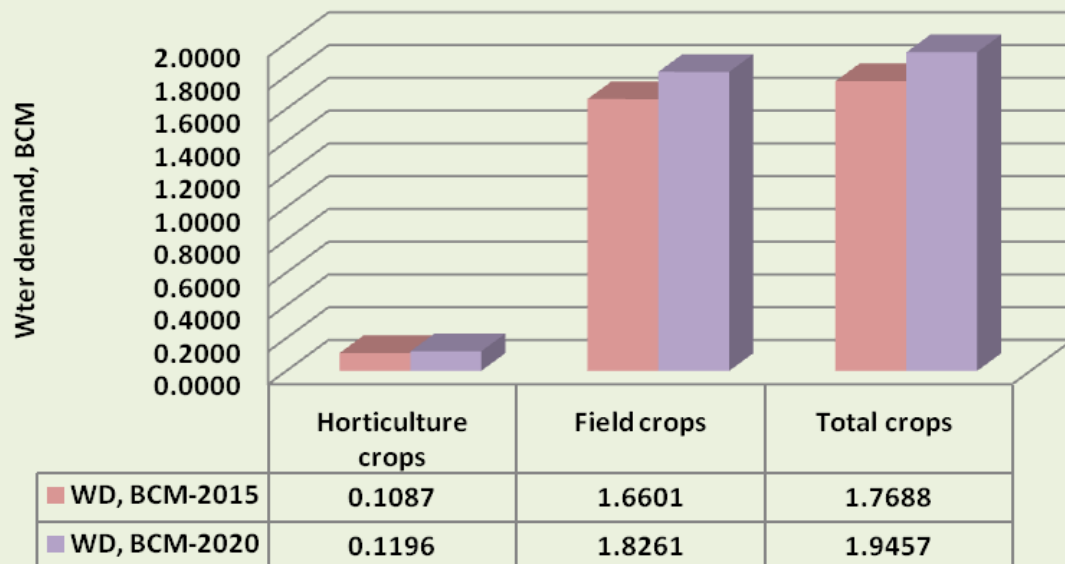


Fig. 4.2a. Water demand of various crops in Koppal district, 2015 and projected for 2020



**4.2. Water requirement of horticulture and agricultural crops (BCM) in Koppal district
- 2014-15**

	Taluks	Fruit crops	Vegetable crops	Spices	Plantation crops	Total - Horticulture crops	Agriculture crops (Irrigated + Rainfed)	Total crops
Net Water requirement, BCM								
1	Gangavathi	0.01334	0.020585	0.000096	0.001757	0.035782	0.66084	0.69662
2	Koppal	0.00772	0.022075	0.000726	0.001022	0.031539	0.36284	0.39438
3	Kushtagi	0.01000	0.005675	0.000093	0.001232	0.017839	0.26056	0.27840
4	Yelburga	0.01248	0.007175	0.000096	0.002926	0.023541	0.37585	0.39939
	Total	0.04354	0.05551	0.002712	0.006937	0.108701	1.66009	1.76879
	Projected for 2020 - 10% increase	0.047896	0.061061	0.0029832	0.0076307	0.119571	1.82610	1.94567

Water requirement for crops: Fruit crops - 60 cm, Vegetable crops - 50 cm, Spices - 60 cm and Plantation crops - 70 cm

Here 50% of rainfall is accounted as water available for rainfed crop use considering the intensity of rain and soil type- aridisols, vertisols, inceptisols.

Irrigation water requirement, ha - cm = Area of the crop, ha X Water requirement of the crop, cm

One ha-cm = 1,00,000 litres or 100 cubic meters

Irrigation water requirement in BCM = {(Irrigation water requirement, ha-cm X 100)/1,000,000,000}

Source: JDA, Koppal

4.3. Water requirement of Livestock:

Livestock sector plays a significant role in rural economy of India. It contributes to 5% of total domestic gross product (DGP) and one fourth of total agricultural GDP (AgGDP). Livestock sector is unique in terms of providing employment opportunity particularly to two third of women workforce in India towards animal rearing. Livestock is an integral part of mixed farming of Indian agriculture. Both indigenous cattle and buffalo population registered an annual decline of 4.5 per cent and 4.3 per cent respectively between 2007 and 2012 census periods, while that of crossbred cattle increased by 5.8 per cent. (<https://www.Uttara%20Kannada/Livestock%20census%20Karnataka.pdf>).

Besides, contributing food and inputs (draught energy and manure) for crop production, livestock are important as savings or investments for the poor

household and provide food security or insurance through various ways in different production systems. Rainfed regions support the highest number of livestock units. Except buffalo and pigs, more than half of all livestock species (52.3 to 60.1%) are concentrated in the rainfed region. Even 43.1% of the total buffalo and 44.7% of pigs are reared in rainfed region. Irrigated region accounts for higher proportion of buffalo (43.1%) and except sheep it accounts for second highest population of all major livestock species. although the resource degradation in rainfed areas has been observed, various support programmes of the government are encouraging mixed farming to stabilize the income of the resource poor farmers of arid and semi-arid regions of the state. Considering these facts, increase in total population of the livestock has been maintained at 5% in 2020 as compared to earlier census of 2012 (Anjani Kumar and Singh, 2008).

Water requirement for livestock and other animals namely - indigenous cattle, cross bred cattle, draft animals/bulls/others, sheep, goats, pigs, duck, and poultry, have been calculated separately with the corresponding population for 2012. The projected water requirement for livestock population at 2020 has also been calculated separately for all live stocks. The total water requirement for live stocks for 2012 and projected for 2020 is provided taluk wise in Table 4.3.

Total population of livestock and other animals in Koppal district is 4639,542 during 2012 and their water requirement is 0.00718 BCM. Considering the increase in the population of livestock at 5%, their water demand would 0.00754 BCM with corresponding population of 4871,519 (Table 4.3, Fig. 4.3). Water demand of livestock is more in Koppal taluk, followed by in Gangavathi and Kushtagi, while it is very less in Yelburga taluk, as reflection of livestock population in these taluks.

Table 4.3. Water requirement of livestock in Koppal district in 2012 and projected for 2020

Sl. No.	Taluk	Water requirement of livestock, Billion cubic meters (BCM)			
		Population, 2012	Present Water requirement for 2012, BCM	Projected Population, 2020	Water requirement for 2020, BCM
1	Gangavathi	363,873	0.001846683	382,067	0.001939017
2	Koppal	3623,970	0.002450266	3805,169	0.002572779
3	Kushtagi	295,617	0.001537736	310,398	0.001614623
4	Yelburga	356,082	0.001349336	373,886	0.001416803
	TOTAL	4639,542	0.007184021	4871,519	0.007543223

Water requirement for various livestock: litres/head/day, lphd: Indigenous cattle - 36 lit; Cross bred cattle/Buffalo - 55 lit; Sheep/Goat - 3.5 lit; Pigs - 6.3 lit; Poultry - 0.3 lit; Dog - 1.8 lit; Duck - 1.0 lit; Others (Bull/He Buffalo/Others - 55 lit

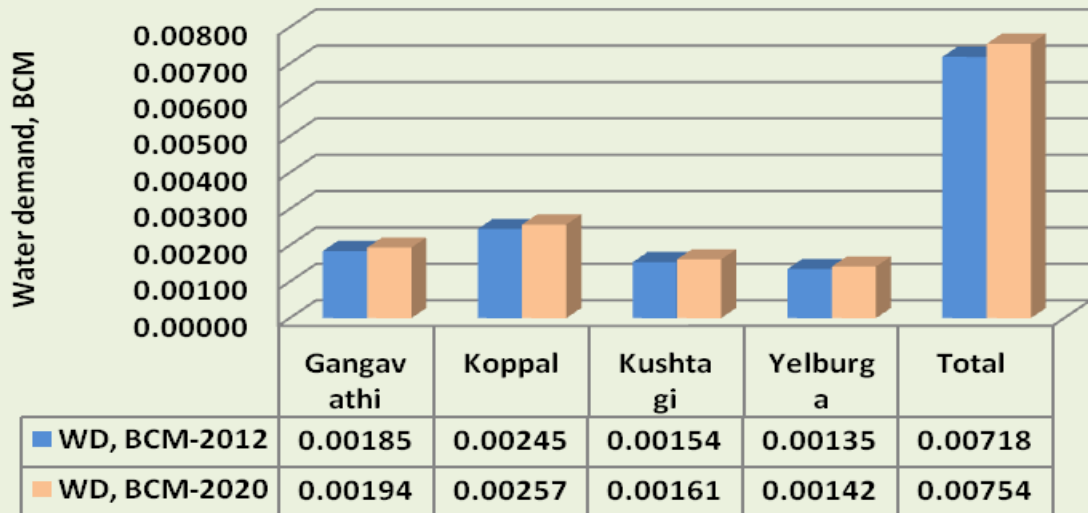
Water requirement is calculated based on water requirement for various livestock(s), BCM = {(Population of livestock * Water requirement for various livestock, lphd X 365 days)/1000*1000,000,000}

Livestock population is projected to be increased by 5% over 2012 census, due to encouragement in the government policies and more support for integrated farming systems. Though cattle population has decreased particularly in favour of indigenous cattle, this reduction is compensated with increase in the density of cross bred animals and other animals due to economic considerations.

(Anjani Kumar and Singh, D.K. 2008. Livestock production systems in India: An appraisal across agro-ecological regions. Indian Journal of Agricultural Economics, 63(4): 577-597)

Source: Deputy Director, Department of Animal Husbandry and Veterinary Services, Koppal

Fig. 4.3. Water demand of livestock and other animals in Koppal district, present and projected for 2020



4.4. Water demand for Industry

Surface water is the major source of water for the industries in India (41%) followed by groundwater (35%) and municipal water (24%). With greater demand for water, water availability to Industries is becoming scarce and have to invest more for getting water. In addition, industries have to adopt conservation measures and reuse of water after treatment. The water available from waste water treatment is being used for gardening.

While inadequate availability of water is the major risk facing the industries (37%), others agree that poor water quality is another major risk in the running of business (14%). Sectors like pharmaceuticals, power, food processing and agriculture feel the brunt of poor water quality. High costs for obtaining water are hindering the business interest of smaller industries and the ones which are located in the drier regions of the country. Around 14 per cent of the respondents also feel that environmental changes over the past few

decades have had an impact on freshwater availability. A realization is gradually emerging that rectifying measures needs to be taken by industries to augment freshwater through rainwater harvesting and wastewater treatment and reuse.

Indian industry is becoming responsive to the fact that it should be the role of every user to undertake measures for water conservation. It is desirable that the shared responsibility of companies across sectors is to join hands with communities and governments to work on programmes for water conservation, recharge and wastewater treatment (FICCI, 2011).

In Koppal district, there are 18 industries, which are located in Koppal taluk itself. Total water demand at present is 0.0116 BCM, which is directly met from Tungabhadra dam. The projected demand for 2020 is 0.0116 BCM (Table 4.4). It is necessary to augment the requirement of fresh water by undertaking wastewater treatment and using it for horticulture, gardening, ash handling, washing of ore, flushing toilets, cleaning, fire-fighting and dust suppression activities. The industries must see a merit and an economically value in reusing wastewater for purposes where water quality is not an important criterion. There is need to take up water auditing to understand the complete water use pattern in their operations and look for water saving measures.

Table 4.4 Water demand of Industries in Koppal district - present and projected for 2020 (all in Koppal Taluk)

	Name of the Industry	Water demand, BCM	
		2015	2020
1	Kirloskar Ferrous Industries Ltd., Bevinahalli	0.0116	0.0116
2	Hospet Steels Ltd. (Comprises Kalyani Steels & Mukund ltd), Ginigera		
	Total	0.0116	0.0116

Source: Assistant Executive Engineer, KNNL, Head Works Sub-Division, Munirabad

Sl. No. Industries - 1, 2 - water demand is met directly from Tunga Bhadra Dam.

Here rain water harvesting measures are to be created in the premises of the industries to augment the water demand and also to recharge the bore well.

4.5. Water demand for power generation: In Koppal district, Shivapur Mini Hydel Power Plant located in Koppal taluk uses 1.98 BCM of water to generate 18 MW power. However, the water after power generation, is used for irrigation and other purposes. The water requirement is not exclusive for power generation. There is no additional proposal for power generation. Hence, the same water of 1.98 BCM will be used to generate power (Table 4.5).

Table 4.5 Water demand for power generation in Koppal district

Block	Name of the power generating unit/ Power requirement	Present Water demand, BCM	Proposed for new power generating unit	Water demand at 2020, BCM
Koppal taluk	Shivapur Mini Hydel Power Plant (Bhoruka Power Corporatin Ltd.), Hosabandi Hariapur Post, Koppal Taluk - 2X 9 MW power generation	1.98	No new	1.98

Water is used for power generation and then the water is used for irrigation and other purposes

4.6. Water demand for other public purposes: Water is also required to be provided in public places like schools, colleges, offices, public toilets, bus station, railway stations, theatres, hostels, hotels, restaurants, hospitals, nurses' homes and medical quarters, community hall and all other public places. The parameters like number of person involved in each activity, type facility available, extent of usage, etc. are not available for these places. Hence, water demand is assumed that 10% of domestic requirement is considered as water demand for these public places. The water demand for these public places amounted to 0.00719 BCM in 2015, whereas the projected water demand would be 0.007534 BCM by 2020 (Table 4.6).

4.7. Total water demand of the district for various sectors:

At present, water demand in Koppal district is 3.84668 BCM, which includes water requirement of 1.98 BCM used for power generation. Of the total water requirement of 3.84668 BCM, next major share is for irrigation purpose

(growing crops)- 1.7688 BCM (46.0%). The next share of water demand is for domestic purpose amounting to 0.0719127 BCM (1.9%). The other demand includes water for purposes like livestock, industrial and other purposes, amounting to 0.6% of total water demand (Table 4.6, Fig. 4.4).

The projected water requirement in 2020 is around 4.8% higher than that of 2015, amounting to 4.02768 BCM as compared to the present demand of 3.84668 BCM (Table 4.6, Fig. 4.4, 4.5).

Table 4.6. Total water demand for various sectors in Koppal district - present and projected demand

Taluks	Water demand at present (2015), BCM						
	Domestic	Crops (irrigated + rainfed)	Livestock	Industries	Power generation	Other public places	Total water demand, BCM
Gangavathi	0.02379492	0.69662	0.00184668	0	0	0.0023795	0.724641
Koppal	0.01954592	0.39438	0.00245027	0.0116	1.98*	0.0019546	2.409931
Kushtagi	0.01473478	0.27840	0.00153774	0	0	0.0014735	0.296146
Yelburga	0.01383712	0.39939	0.00134934	0	0	0.0013837	0.415960
Total	0.07191274	1.76879	0.00718402	0.0116	1.98*	0.0071913	3.846678
Taluks	Water demand for 2020, BCM						
Gangavathi	0.024928	0.76628	0.0025728	0	0	0.0024928	0.796274
Koppal	0.02047668	0.43382	0.001939	0.0116	1.98*	0.0020477	2.449883
Kushtagi	0.01543644	0.30624	0.0016146	0	0	0.0015436	0.324835
Yelburga	0.01449603	0.43933	0.0014168	0	0	0.0014496	0.456692
Total	0.07533715	1.94567	0.0075432	0.0116	1.98*	0.0075337	4.027684

Assumption - Increase in population is 16.2%, crops by 10%, livestock by 5%, Industrial use - same, Power generation - No new proposed

* - 1.98 BCM of water is not considered for demand purpose, as the same water is used for irrigation and other purposes, after power generation.

Fig. 4.4. Water demand of various sectors talukwise in Koppal district - 2015 and 2020

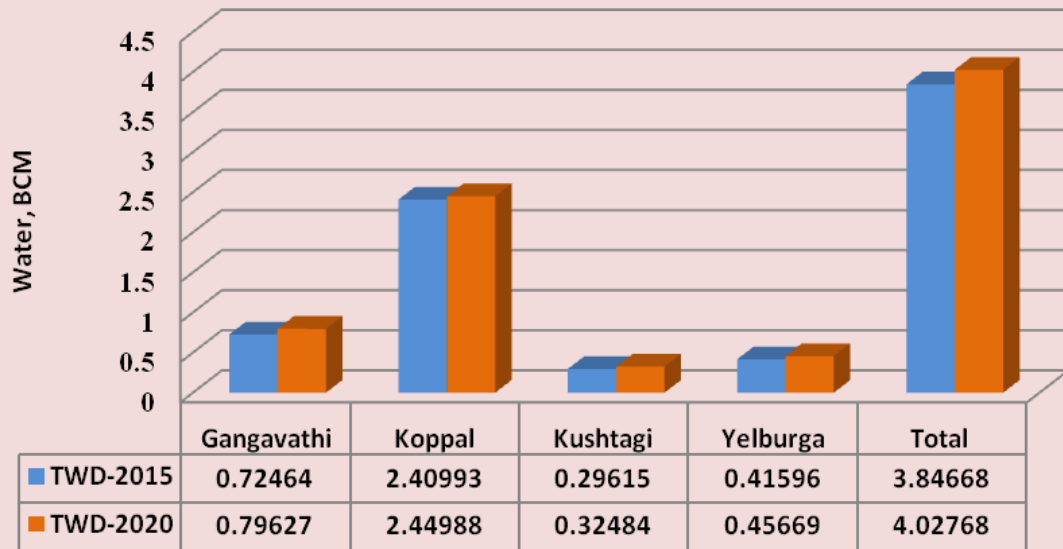
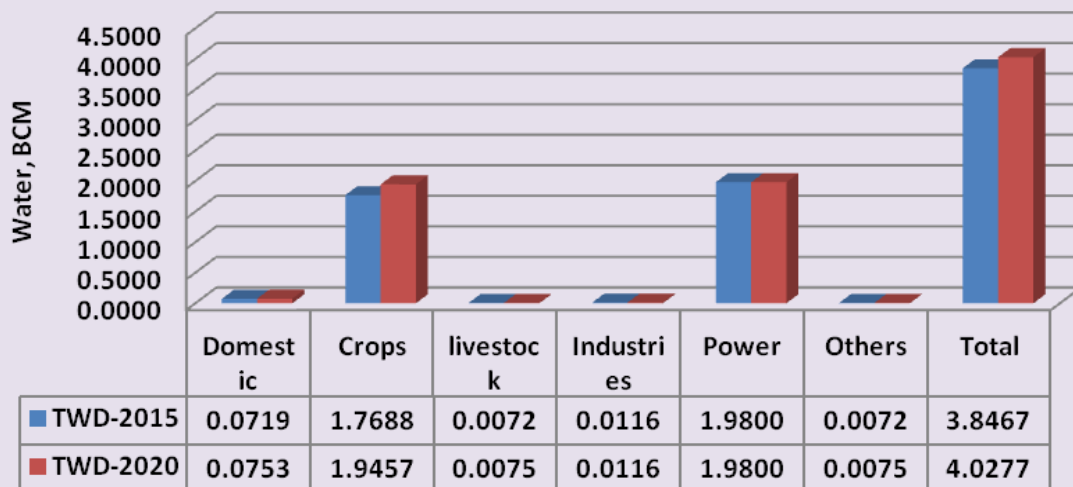


Fig. 4.5. Water demand sector wise in Koppal district - 2015 and 2020



4.8. Water budgeting: Total water available from various sources occurring over the territory of Koppal district is 0.9909 BCM, of which, water accounted for surface water is 45.8% and available underground water is 54.2% (Table 4.7). Gangavathi, Koppal and Yelburga have relatively more groundwater available for use as compared to Yelburga.

The total water availability for the district is 0.9909 BCM, which is pretty lower than the present requirement (2015) of 3.84668 BCM and for 2020 is 4.0277 BCM (Table 4.7, Fig. 4.6). Thus, there is negative balance of water (-2.8558 BCM for 2015 and -3.0368 BCM for 2020) suggesting the necessity of harnessing the rainwater more judiciously to encourage ground water recharge, encouraging more water harvesting above the soil and other conservation measures (Fig. 4.6, 4.7).

The projected demand of water for all various sectors in 2020 is 4.02768 BCM and the same has to be considered as water potential to be created for the district (Table 4.7, Fig. 4.6, 4.7).

Table 4.7. Water budgeting for Koppal district – available, demand and water potential to be created by 2020

Taluks	Underground water, BCM (CGWB)	Surface water, BCM	Total water availability BCM – 2015 (1+2)	
	1	2	3	
Gangavathi	0.32442	0.4538	0.50751	
Koppal	0.08395			
Kushtagi	0.05233			
Yelburga	0.07641			
Total	0.53711	0.4538	0.99091	
Taluks	Total Water demand, BCM - 2015	Water balance available after meeting all demands, BCM- 2015	Projected total water demand, BCM – 2020	Water balance available after meeting all demand, BCM – 2020
	4	5	6	7
Gangavathi	0.724641	-2.8558	0.796274	-3.0368
Koppal	2.409931		2.449883	
Kushtagi	0.296146		0.324835	
Yelburga	0.415960		0.456692	
Total	3.846678	-2.8558	4.027684	-3.0368

Source: calculated as per data provided by JDA, Koppal and CGWB report
CGWB - Central Ground Water Board, 2012 for Koppal district

Fig. 4.6. Water budgeting in Koppal district along with demand and balance for 2015

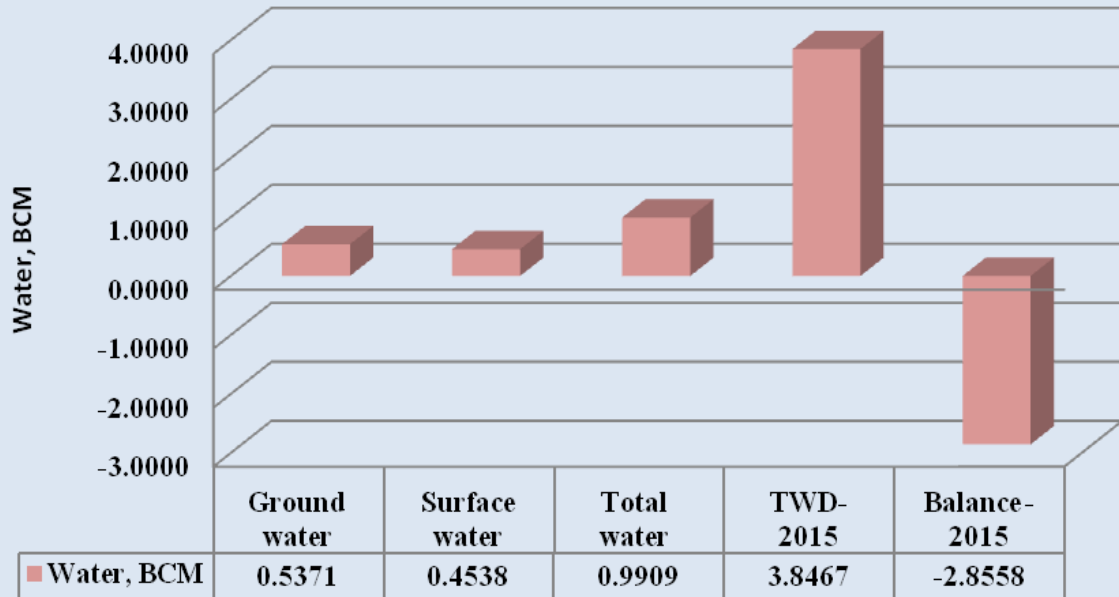
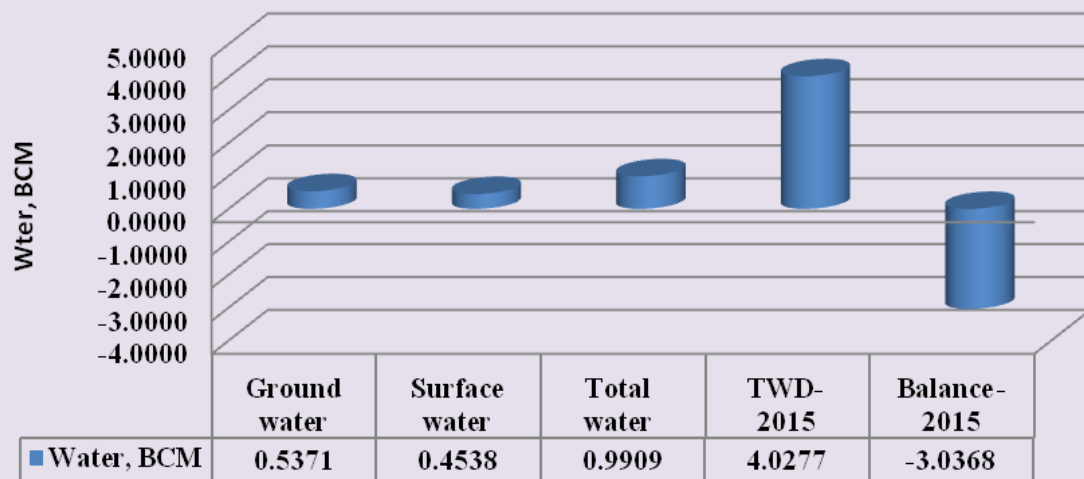


Fig. 4.7. Water budgeting in Koppal district along with demand and balance -2020



CHAPTER V

STRATEGIC ACTION PLAN FOR IRRIGATION

5.1. Background:

The district of Koppal, comprising of 4 taluks namely Gangavathi, Koppal, Kushtagi and Yelburga, was carved out of erstwhile Raichur district. The district is primarily dependent on agrarian economy as 83.2% of the population is dependent on agriculture. Out of the total geographical area of 5.52 lakh ha. 3.96 lakh ha. is cultivated to grow different crops (71.1 %). Major profession of the population of all the taluks is agriculture. The prospect of agricultural activities has decided the per capita income of major section of the population. The great indifference shown towards the agricultural improvement by Nizam of Hyderabad, within which these 4 taluks were ruled for more than a century, also resulted in poor economic status of the rural population.

Prior to construction of Tungabhadra dam, these 4 taluks were fully dependent on rainfed agriculture. Due to a low rainfall ranging from 582 to 628 mm annually, which was spread in 36 to 39 days of the year, the crop yields were substantially low. As a result, poverty ruled in most rural areas of these 4 taluks. With the establishment of Tungabhadra Project, Gangavathi taluk was greatly benefited with the canal irrigation. While Koppal taluk was benefited by a small area (2600 ha.) under canal irrigation. Kushtagi and Yelburga taluks remained fully dependent on rainfed agriculture. Even Gangavathi and Koppal taluks had a large un-irrigated area to the tune of 63.2 and 76.2 % of respective cultivated area. This resulted into a vast difference in agricultural growth between irrigated Gangavathi/Koppal taluks and dry Kushtagi/Yelburga taluks. Within the taluks of Gangavathi and Koppal, irrigated farmers prospered with high income as against the dryland farmers. The irrigated regions of Koppal and Gangavathi were mainly growing paddy in both the seasons, as the irrigation intensity in such areas was as high as 210 %.

The unequal growth rates in agriculture prompted the rainfed farmers of all 4 taluks to harness the ground-water. In the last two decades, many bore-wells have been dug in all 4 taluks mainly to assist the protective irrigation in rainfed regions. The open wells, which were helpful in creating irrigated areas, slowly dried up in the last 15 to 20 years not only due to deep bore-wells in the regions but also due to excess drawal of ground water. The limited number of tanks that were available prior to establishment of TBP, were also not maintained properly due to paucity of funds and neglect by Government authorities/local people. Large scale efforts to harvest the rain water in the form of barrages/bandaras/check dams were also extremely limited in those days. As a result of these developments, Koppal district remained with a very poor agricultural growth rate, except the irrigated regions of Gangavathi taluk.

Realizing the importance of irrigation in drought stricken Koppal district, Government of Karnataka initiated many major irrigation projects to increase the irrigated area in Koppal, Yelburga and Kushtagi taluks. These comprised of Koppal Lift Irrigation Scheme of Upper Krishna Project, Singatalur Lift Irrigation Project (Mundargi Branch Canal and Alur Banni Koppa Project), Hirehalli Lift Irrigation Project, Bahadur Bhandi Project and Alwandi-Betageri Project. Out of these proposed projects, Hirehalli Lift Irrigation Project is commissioned and irrigating 8330 ha. in Koppal taluk. All the above named projects are in the final stages of completion, adding 164870 ha. of irrigated area.

Even after commissioning of all the above projects, nearly 49 % of the cultivated area will not get any opportunity to irrigate. The ambitious aim of PMKSY envisages the provision for minimum protective irrigation can only improve the agricultural growth in these rainfed areas. This objective can be achieved by utilizing the rain water more efficiently by harvesting structures like farm ponds, check-dams, barrages and other surface structures.

The ground water scenario in the district has reached alarming situation due to over exploitation with no regards to annual replenishable recharge. Major part of Yelburga, Gangavathi and Koppal are already over exploited in respect of their ground water as indicated by ground water development of more than 110 %. These situations call for immediate infrastructural facilities for large scale artificial recharge of ground water, especially in over exploited taluks. The Comprehensive Action Plan must include the extensive measures to strengthen the maximum rain water harvesting for percolation and recharge.

The forth coming Strategic Action Plan, prepared for each taluk separately, has included the irrigation infrastructure for major irrigation, minor irrigation, ground water recharge, harvesting of rain water, improvement of irrigation efficiency and strengthening the adoption of micro-irrigation in the district.

5.2. Taluk wise Strategic Action Plan:

Considering the existing infrastructure in each taluk and considering the irrigation potential required to be created to meet the gap between demand and supply of all the sectors of water use, taluka wise Strategic Action Plans are developed.

TALUKA PLANS

Table 5.1: STRATEGIC ACTION PLAN FOR GANGAVATHI TALUK

Component	No of Villages	No of structures/ Capacity (M3)	Water resource	New irrigation Potential (ha)	I yr	II yr	III yr	IV yr	V yr	Estimated cost (Rs in lakh)	Table ref.in district plan
AIBP (subsurface drainage- major irrigation) MaI	32	-	Surface (5758 ha) *	-	588	588	588	588	586	2938	Table 5.5
Digging of bore wells @ (Har khet ko pani) MI	55	825	Ground	1650	247	247	247	247	249	1237**\$	Table 5.5
Seed money to WUA MaI	-	10000	-	-	22	22	22	22	20	108	
Micro irrigation (drip and sprinkler) A	75	1200	Ground	1800	72	72	72	72	72	360#	Table 5.7
Training farmers A		7000	Ground	-	252	252	252	252	252	1260	Table 5.5
PMKSY water shed	35	175	Surface	175	21	21	21	21	21	105	Table 5.8
1. Farm ponds WS											
2. Percolation tank WS	-	54	-	-	48	48	48	48	50	242	
3. Bunding / trench WS cum bunding	-	28500	-	-	371	371	371	371	369	1853	
4. Check dams WS	-	114	-	570	93	93	93	93	92	464	
5. Nala bund WS	-	29	-	60	48	48	48	48	50	242	
6. Gokatte WS	-	145	-	145	126	126	126	126	124	628	
7. Boulder checks WS	-	100	-	-	3	3	3	3	3	15	

8. Rubble checks WS	-	75	-	-	4	4	4	4	3	19	Table 5.8
9. Afforestation (ha) F	-	9300	-	-	279	279	279	279	278	1394	
10. Dryland horticulture H	-	6450	-	-	623	623	623	623	623	3115	
MNAREGA Secondary storage structures (renovation of tanks) MI	20	40/ 0.53 TMC	Surface	4700	200	200	200	200	200	1000&&	Table 5.9
Recharge structures Borewell recharge A	50	3000	Ground	-	240	240	240	240	240	1200 ***	Table 5.9
State funded plan Alawandi – betegeri lift irrigation MaI	-	0.001	-	242	177	177	177	177	180	888^^^	Table 5.10
Farm pond + lining by PVC sheat + lifting device + pipes MI	^	0.000125	-	6250	1093	1093	1093	1093	1091	5463	Table 5.5
Externally funded plan EPI	-	0.355	-	-	3200	3200	3200	3200	3200	16000	Table 5.11
				15592	7707	7707	7707	7707	7703	38531	

*Area covered under subsurface drainage

**private investment

\$ calculated @Rs1.5lakh/well

#calculated @ Rs30,000/ha

&& calculated @ Rs 25 lakh/ tank

&calculated @ Rs500000/structure

^calculated @ Rs60000/structure

\$\$ Calculated@ Rs 4lakh/ structure

@@ suggested in 43% safe area as per CGWB report

***calculated @Rs40,000/bore well

^^^ Area irrigated is estimated on pro rata basis for different taluks in these projects implemented concurrently for more than one taluk

Note: Numbers of water harvesting structures (farm ponds, check dams and percolation tank) and their costs proposed in the plan are according to the information supplied by JDA, Koppal

Fig 5.1 COMPONENT WISE NEW IRRIGATED AREA CREATED (HA) - GANGAVATHI TQ.

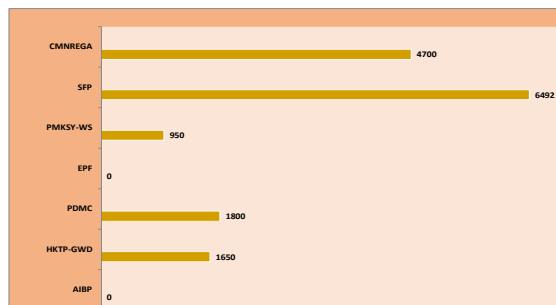
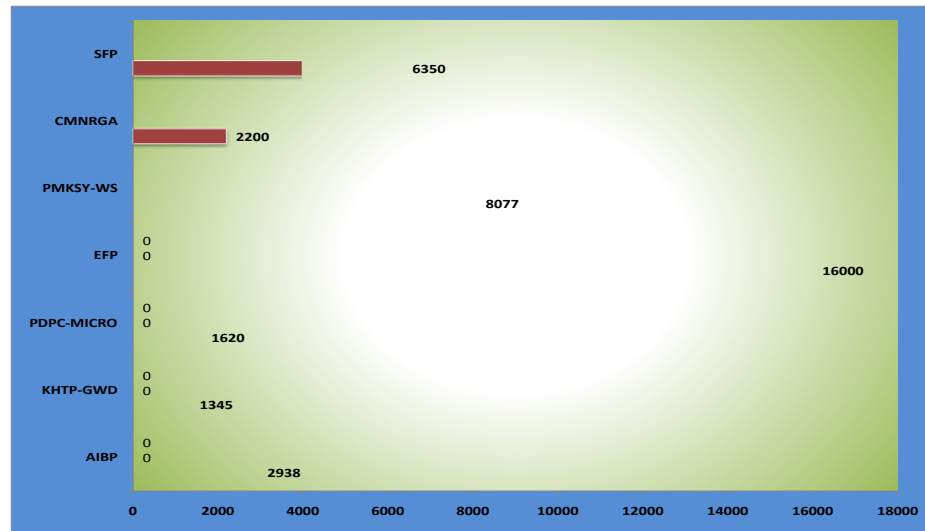


Fig 5.2 COMPONENT WISE BUDGET REQUIREMENT (LAKH RUPEES) - GANGAVATHI TQ.



Possible impact of the plan (annually)

- Increase in paddy production (due to good drainage): on new 5752 ha@ 10q/ha-575 T
- Increase in paddy production on new 10000 ha@ 50q/ha – 50,000 T
- Increase in cotton production: on new 1500 ha @15 q/ha -2250 T
- Increase in maize production: on new 3200 ha@ 70 q/ha-22499 T
- Increase in pulse production: on new 15000 ha @ 16 q/ha 2.4lakhT
- Increase in g.nut: on new 8830 ha @20 q/ha - 17660 T
- Saving of water from 1800 ha micro irrigation: 720 ha m. (@0.4 M/ha)
- Ground water recharge: 800ha m (@2 ham/struct.)

Suggested cropping plan and annual income improvement in newly irrigated area per ha

Present cropping / present net income		Expected cropping expected net income	
Jowar/bajra/ rainfed cotton/ green gram/redgram	Rs. 20,000/ha	Maize/ irrigated cotton/ groundnut/	Rs 45000/ha

DETAILS OF COMPONENTS

AIBP: Accelerated Irrigation Benefit Programme
HKKP: Hark khet ko Pani
PDPC: Per Drop More crop Table 5.12
PDPC-WS: Drop More crop-Water shed
CMGNREGA: Convergence with MGNREGA
SFP: State Funded Plan

DETAILS OF DEPARTMENTS

MaI - Major Irrigation department
MI - Minor irrigation department
A - Agriculture department
H - Horticulture department
WS - Water shed department
F - Forest department
SFP - Department

Table 5.2 STRATEGIC ACTION PLAN FOR KOPPAL TALUK

Component	No of Villages	No of structures/ Capacity (M3)	Water resource	New irrigation Potential (ha)	I yr	II yr	III yr	IV yr	V yr	Estimated Cost (Rs in lakh)	Table ref.in district plan
AIBP (minor/major irrigation) MaI	-	22940	Surface	33160	12390	12390	12390	12390	12387	61947	Table 5.5
Digging of bore wells @@ (Har khet to pani) MI	45	900	Ground	1800	270	270	270	270	270	1350**\$	Table 5.6
Seed money to WAA MaI	-	10000	-	-	22	22	22	22	20	108	Table 5.5
Micro irrigation (drip and sprinkler) A	95	1300	Ground	2600	78	78	78	78	78	390#	Table 5.7
Training farmers A		7000	Ground	-	252	252	252	252	252	1260	
PMKSY water shed 1. Farm pond WS	-	365	Surface	365	44	44	44	44	43	219 ^	Table 5.9
2. Percolation tank WS	-	54	-	-	48	48	48	48	50	242	
3. Bunding / trench cum bunding WS	-	75000	-	-	975	975	975	975	975	4875	
4. Check dams WS	-	261	-	1305	209	209	209	209	208	1044	
5. Nala bund WS	-	73	-	145	72	72	72	72	74	362	Table 5.9
6. Gokatte WS	-	320	-	320	272	272	272	272	274	1362	

7. Boulder checks WS	-	480	-	-	9	9	9	9	9	45	
8. Rubble checks WS	-	410	-	-	11	11	11	11	12	56	
9. Afforestation (ha) F	-	25200	-	-	756	756	756	756	756	3780	
10. Dryland horticulture H	-	17950	-	-	1764	1764	1764	1764	1764	8820	
Secondary storage structures (tanks) MI	24	24/0.35 TMC	Surface	2447	120	120	120	120	120	600 &&	Table 5.10
Recharge structures Borewell recharging A	40	3500	Ground	-	280	280	280	280	280	1400 *	Table 5.9
State funded plan											
Koppal lift irrigation MaI	-	0.1246 BCM	-	38512	44488	44488	44488	44488	44488	222440	
Alwandi- betgeri lift irrigation MaI	-	0.009 BCM	-	2182.5	1599	1599	1599	1599	1599	7995	Table 5.5
Bahaddur bandi lift irrigation MaI	-	0.016 BCM	-	2590	1800	1800	1800	1800	1800	9000	
Singatalur lift irrigation MaI	-	0.06 BCM	-	14237	120	120	120	120	119	599	Table 5.5
Hire halla project MaI	-	0.056	-	-	250	250	-	-	-	500	
Farm pond + lining by PVC sheat + lifting device + pipes MI	-	0.000125	-	6250	1092	1092	1092	1092	1095	5463	Table 5.10

Externally funded plan											
Modernization / balance work of TBP, VNC MaI	-	0.200	-	-	1600	1600	1600	1600	1600	8000	Table 5.5
Total				105913	68521	68521	68271	68271	68273	341857	

Note:

**private investment

\$ calculated @Rs1.5lakh/well

#calculated @ Rs30,000/ha

&& calculated @ Rs. 25 lakh/ tank

&calculated @ Rs 4 00000/structure

^calculated @ Rs60000/structure

\$\$ Calculated@ Rs. 4.25 lakh/structure

@@ suggested in 28 % semicritical area as per CGWB report

Pertains to Singatalur Lift irrigation project, which is in its final stage of completion

• Calculated @Rs 50,000 / bore well

Note: Numbers of water harvesting structures (farm ponds, check dams and percolation tanks) proposed in the plan and their costs are according to the information supplied by JDA, Koppal

Fig 5.3 COMPONENT WISE NEW IRRIGATED AREA CREATED (HA)-KOPPAL TQ.

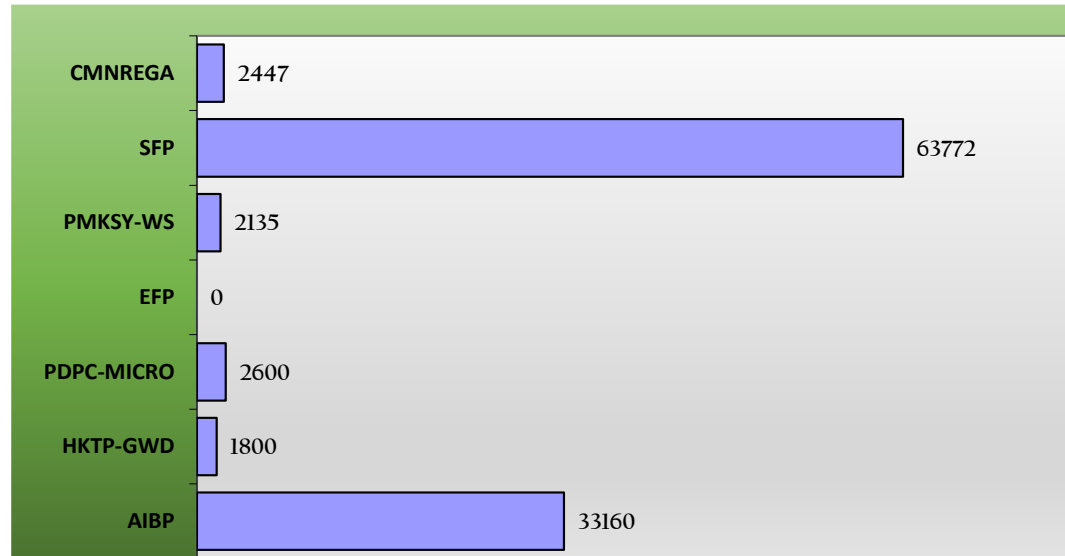
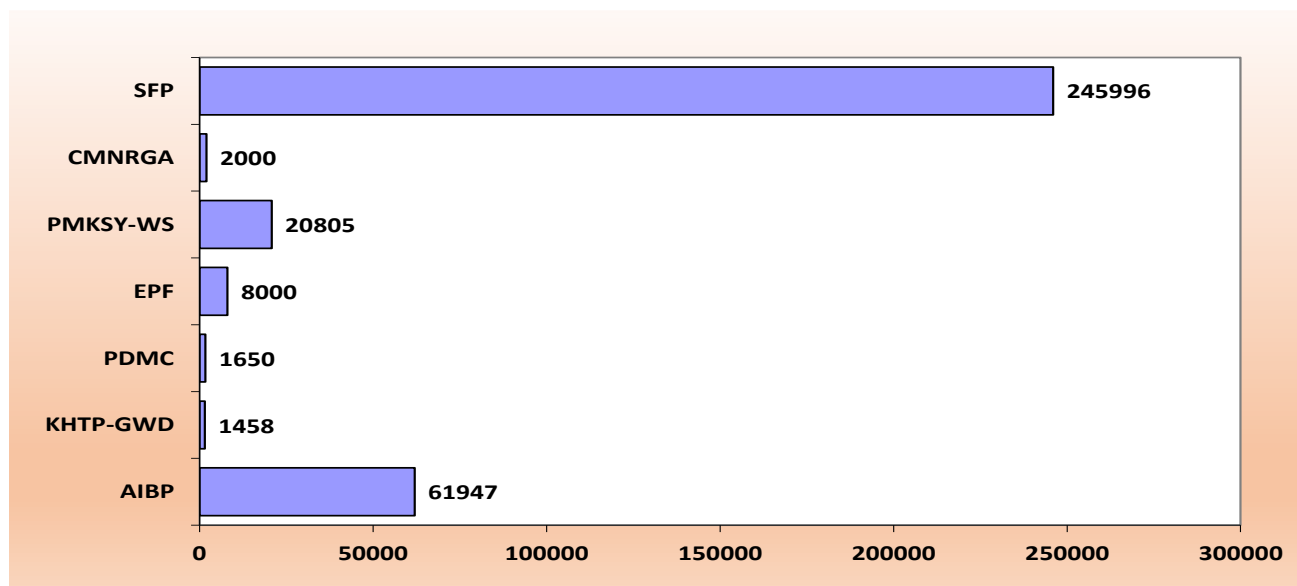


Fig 5.4 COMPONENT WISE BUDGET REQUIREMENT LAKHS- KOPPAL TQ.



Possible impact of the plan (annually)

- Increase in paddy production: on new 50,000 ha @ 55q/ha- 2.75 lakh T
- Increase in cotton production: on new 5000 ha @15 q/ha -7500 T
- Increase in maize: on new 20,000 ha @ 70 q/ha-1.4 lakh T
- Increase in g.nut: on new 10019 ha @20 q/ha -20038 T
- Saving of water from 2600 ha micro irrigation: 1040 ha m. (@0.4 M/ha)
- Ground water recharge: 1000 ha m (@2 ham/struct.)

Suggested cropping plan and annual income improvement in newly irrigated area per ha

Present cropping / present net income		Expected cropping expected net income	
Jowar/bajra/ rainfed cotton/ green gram/redgram	Rs 20,000/ha	Paddy/ Maize/ irrigated cotton/ groundnut/	Rs 45000/ha

Table 5.3 STRATEGIC ACTION PLAN FOR YELBURGA TALUK

Component	No of Villages	No of structures/ Capacity (M3)	Water resource	New irrigation Potential (ha)	I yr	II yr	III yr	IV yr	V yr	Estimated Cost (Rs in lakh)	Table ref.in district plan
AIBP (minor irrigation) MI	NA	66	surface	3483	1850	1850	1850	1850	1852	9252	Table 5.5
Digging of bore wells (Har khet to pani)@@ MI	34	400	Ground	800	120	120	120	120	120	600 \$**	Table 5.6
Micro irrigation (drip and sprinkler) A	85	150	Ground	3000	90	90	90	90	90	450 #	Table 5.7
Training farmers MaI		7000	Ground	-	252	252	252	252	252	1260	
PMKSY water shed	-	365	Surface	365	44	44	44	44	43	219^	Table 5.9
1. Farm pond WS											
2. Percolation tank WS	-	50	-	-	45	45	45	45	45	225	
3. Bunding / trench cum bunding WS	-	56300	-	-	732	732	732	732	732	3660	
4. Check dams WS	-	204	-	1020	163	163	163	163	164	816	
5. Nala bund WS	-	45	-	90	45	45	45	45	45	225	
6. Gokatte WS	-	250	-	250	212	212	212	212	211	1059	
7. Boulder checks WS	-	780	-	-	7	7	7	7	8	36	
8. Rubble checks WS	-	735	-	-	9	9	9	9	8	44	
9. Afforestation (ha) F	-	17400	-	-	540	540	540	540	538	2698	
11. Dryland horticulture H	-	1200	-	-	1153	1153	1153	1153	1155	5767	Table 5.9

MNAREGA Secondary storage structures (tanks) MI	16	16	Surface	2033	80	80	80	80	80	400 &&	Table 5.10
Recharge structures (borewell) A	60	4000	Ground	-	320	320	320	320	320	1600*	Table 5.9
State funded plan											
Koppal lift irrigation MaI	-	0.0623	-	19256	22244	22244	22244	22244	22244	111220	Table 5.5
Singatalur lift irrigation MaI	-	0.06	-	14237	120	120	120	120	119	599	
Farm pond + lining by PVC sheat + lifting device + pipes MI	-	0.000125	-	6250	1093	1093	1093	1093	1091	5463	Table 5.10
Total				50784	29119	29119	29119	29119	29117	145593	

Note:

**private investment

\$ calculated @Rs. 1.5lakh/well

#calculated @ Rs. 30,000/ha

&& calculated @ Rs. 25 lakh/ tank

&calculated @ Rs. 4 00000/structure

^^ calculated @ Rs. 15000/structure

\$\$\$ calculated @Rs.20,000/ structure

^calculated @ Rs. 60000/structure

\$\$ Calculated@ Rs. 4.25lakh/ structure

* calculated@ Rs. 40,000/ recharge

@@ suggested in 17 % safe/semi critical area as per CGWB report

Pertains to Singatalur Lift irrigation project, which is in its final stage of completion

Note: Numbers of water harvesting structures (farm ponds, check dams and percolation tanks) proposed in the plan and their costs are according to the information supplied by JDA, Koppal

Fig 5.5 COMPONENT WISE IRRIGATED AREA CREATED (HA)- YELBURGA TQ.

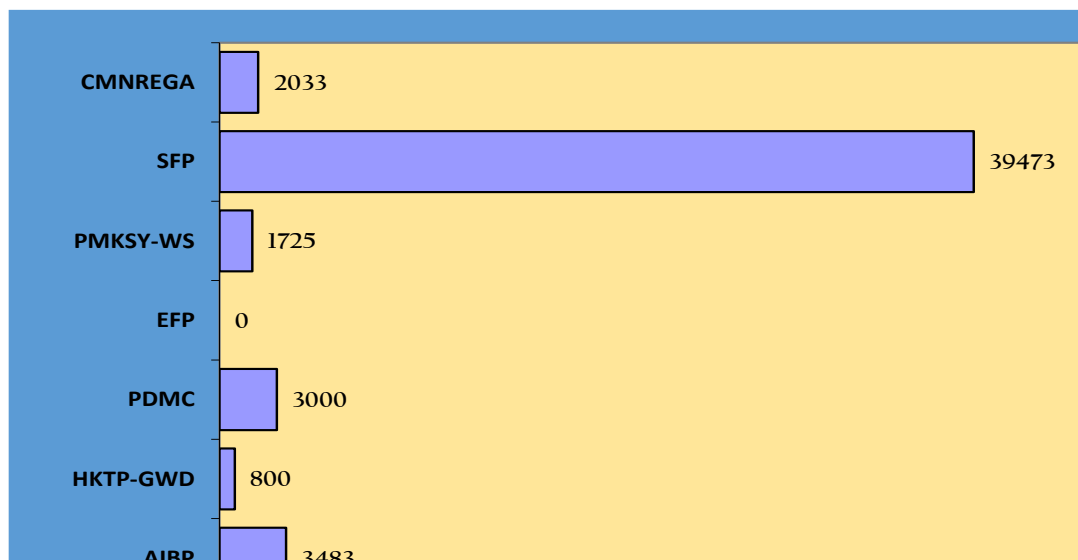
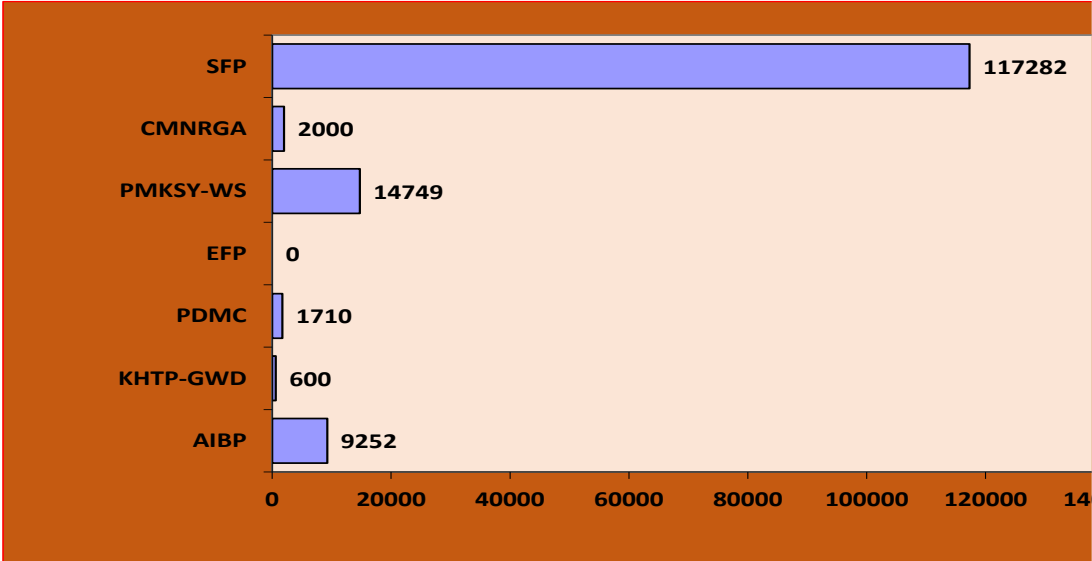


Fig 5.6 COMPONENT WISE BUDGET REQUIREMENT(LAKHS)- YELBURGA TQ.



Possible impact of the plan (annually)

- Increase in paddy production: on new 30,000 ha @ 55q/ha- 1.65 lakh T
- Increase in cotton production: on new 5000 ha @15 q/ha -7500 T
- Increase in maize: on new 10,000 ha @ 70 q/ha-0.7 lakh T
- Increase in irrigated tur production: on new 10,000 ha- 20,000 T @ 20q/ha
- Increase in g.nut: on new 4241 ha @20 q/ha - 8482 T
- Saving of water from 8918 ha micro irrigation: 3567 ha m. (@0.4 M/ha)
- Ground water recharge: 8000 ha m (@2 ham/struct.)

Suggested cropping plan and annual income improvement in newly irrigated area per ha

Present cropping	/ present net income	Expected cropping	expected net income
Jowar/bajra/ rainfed cotton/ green gram/redgram	Rs 20,000/ha	Paddy/ Maize/ irrigated cotton/ groundnut/	Rs 45000/ha

Table 5.4. STRAGETIC ACTION PLAN FOR KUSHTAGI TALUK

Component	No of Villages	No of structures/ Capacity (M3)	Water resource	New irrigation Potential (ha)	I yr	II yr	III yr	IV yr	V yr	Estimated Cost (Rs in lakh)	Table ref.in district plan
AIBP (minor/major irrigation) MI	-	46	-	3737	417	417	417	417	420	2088	Table 5.6
Digging of bore wells (Har khet to pani)@@ MI	50	700	Ground	1400	210	210	210	210	210	1050 **	
Micro irrigation (drip and sprinkler) A	70	1600	Ground	3200	96	96	96	96	96	480 #	Table 5.7
Training farmers MaI		6885	Ground	-	252	252	252	252	253	1261	Table 5.5
PMKSY water shed	-	382	Surface	382	46	46	46	46	45	229 ^	Table 5.9
1. Farm pond WS	-	53	-	-	48	48	48	48	47	239	
2. Percolation tank WS	-	74500	-	-	969	969	969	969	967	4843	
3. Bunding / trench cum bunding WS	-	269	-	1345	218	218	218	218	216	1088	
4. Check dams WS	-	219	-	438	217	217	217	217	219	1087	
5. Nala bund WS	-	316	-	316	270	270	270	270	272	1352	
6. Gokatte WS	-	680	-	-	10	10	10	10	8	48	
7. Boulder checks WS	-	610	-	-	12	12	12	12	12	60	
8. Rubble checks WS	-	25150	-	-	754	754	754	754	755	3771	
9. Afforestation (ha) F	-	17770	-	-	1758	1758	1758	1758	1759	8791	
12. Dryland horticulture H	-										

Secondary storage structures (tanks) MI	41	41	surface	6505	156	156	156	156	155	779 &&	Table 5.10
Recharge structures Bore well recharge A	60	3500	Ground	-	280	280	280	280	280	1400*	Table 5.9
State funded plan											
Koppal lift irrigation MaI	-	0.1246	-	38512	44488	44488	44488	44488	44488	222440	Table 5.5
Farm pond + lining by PVC sheat + lifting device + pipes MI	-	0.000125	-	6250	1092	1092	1092	1092	1095	5463	Table 5.10
Total				62085	51293	51293	51293	51293	51297	256469	

Note:

**private investment

\$ calculated @ Rs.1.5lakh/well

#calculated @ Rs. 30,000/ha

&& calculated @ Rs. 25 lakh/ tank

&calculated @ Rs. 400000/structure

^^ calculated @ Rs. 15000/structure

\$\$\$ calculated @Rs. 20,000/ structure

^calculated @ Rs. 60000/structure

\$\$ Calculated@ Rs. 4.25lakh/ structure

* calculated@ Rs. 40,000/ recharge

@@ suggested in 17 % safe/semi critical area as per CGWB report

Pertains to Singatalur Lift irrigation project, which is in its final stage of completion

Note: Numbers of water harvesting structures (farm ponds, check dams and percolation tanks) proposed in the plan and their costs are according to the information supplied by JDA, Koppal

Fig 5.7 COMPONENT WISE IRRIGATED AREA CREATED (HA)- KUSHTAGI TQ.

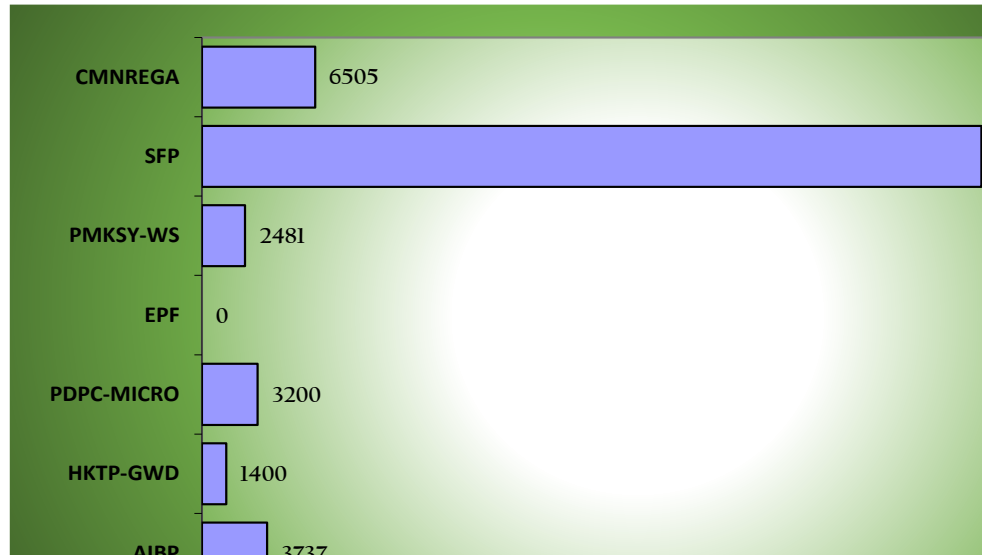
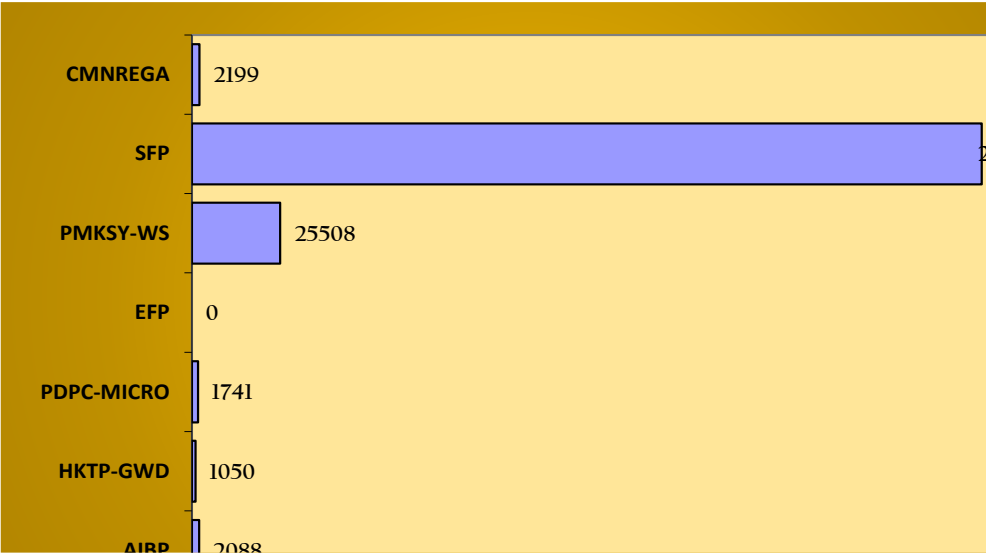


Fig 5.8 COMPONENT WISE BUDGET REQUIREMENT (LAKHS)- KUSHTAGI TQ.



Possible impact of the plan (annually)

- Increase in paddy production: on new 20,000 ha@ 55q/ha- 1.1 lakh T
- Increase in cotton production: on new 10000 ha @15 q/ha -15000 T
- Increase in maize: on new 10,000 ha@ 70 q/ha-0.7 lakh T
- Increase in irrigated tur production: on new 4559 ha- 9118 T @ 20q/ha
- Saving of water from 3200 ha micro irrigation: 1280 ha m. (@0.4 M/ha)
- Ground water recharge: 7000ha m (@2 ham/struct.)

Suggested cropping plan and annual income improvement in newly irrigated area per ha

Present cropping income	/ present net	Expected cropping income	expected net
Jowar/bajra/ rainfed cotton/ green gram/redgram	Rs 20,000/ha	Paddy/ Maize/ irrigated cotton/ groundnut/	Rs 45000/ha

STRATEGIC ACTION PLAN FOR KOPPAL DISTRICT

Table 5.5: DISTRICT IRRIGATION PLAN - AIBP WORKS

S. No	Name of the Blocks/sub Districts	Concerned Ministry/Department	Activity	Total Number/Capacity (cum)	Command Area/Irrigation Potential (Ha)	I yr.	II yr.	III yr.	IV yr.	V yr.	Estimated cost (Rs in lakh)
1	Gangavathi tq.	MoWR	Major irrigation- Providing sub-surface drainage on 5758 ha irrigated area	-	-	588	588	588	588	586	2938
	Yelburga Kushtagi Koppal.	MoWR	Surface Minor irrigation- construction of check dams/barrages/filling up of tanks	66 46 22940	3483 3737 33160	1850 418 10121	1850 418 10121	1850 418 10121	1850 418 10121	1852 416 10123	9252 2088 61947
TOTAL					40380	15245	15245	15245	15245	15245	76225

Table 5.6 DISTRICT IRRIGATION PLAN - HAR KHET KO PANI

S. No	Name of the Blocks/sub Districts	Concerned Ministry/ Department	Activity	Total Number/ Capacity (cum)	Command Area/Irrigation Potential (Ha)	I yr	II yr	III yr	IV yr	V yr	Estimated cost (Rs in lakh)
	Gangavathi tq		Ground water Development	825	1650	248	248	248	248	245	1237
	Koppal tq	MoWR		900	1800	270	270	270	270	270	1350
	Yelburga tq			400	800	120	120	120	120	120	600
	Kushtagi tq			700	1400	210	210	210	210	210	1050
7		MoWR	Seed money to water user's associations								
7.1		MoWR	Seed money to WUA	20000	-	43	43	43	43	44	216
7.2		MoWR	unlined Channels								
			Total	22825	5650	891	891	891	891	889	4453

Table 5.7 DISTRICT IRRIGATION PLAN – PER DROP MORE CROP-MICRO IRRIGATION

S. No	Name of the Blocks/sub Districts	Concerned Ministry/ Department	Activity	Total Number/ Capacity (cum)	Command Area/Irrigation Potential (Ha)	I yr	II yr	III yr	IV yr	V yr	Estimated cost (Rs in lakh)
1	Gangavathi tq	MOA&FW DAC&FW	Non-DPAP- Drip Agriculture	1200	1800	72	72	72	72	72	360
2	Koppal tq			1300	2600	78	78	78	78	78	390
3	Yelburga tq			1500	3000	90	90	90	90	90	450
4	Kushtagi tq			1600	3200	96	96	96	96	96	480
			Training farmers	27885		1008	1008	1008	1008	1009	5041
12			TOTAL	33485	10600	1344	1344	1344	1344	1345	6721

Table 5.8 DISTRICT IRRIGATION PLAN- PMKSY WATER SHED

Sl. No	Name of the Blocks/sub Districts	Concerned Ministry/ Department	Activity	Total Number/Capacity (cum)	Command Area/Irrigation Potential (Ha)	I yr	II Yr	III yr	IV yr	V yr	Estimated cost (Rs in lakh)
17.1	Gangavathi	DOLR-MORD	Farm ponds	175	175	21	21	21	21	21	105
	Koppal tq			365	365	44	44	44	44	43	219
	Yeburga tq			365	365	44	44	44	44	43	219
	Kushtagi tq			382	382	46	46	46	46	45	229
17.2	Gangavathi	DOLR-MORD	Percolation Tanks	54	-	48	48	48	48	50	242
	Koppal tq			54	-	48	48	48	48	50	242
	Yeburga tq			50	-	45	45	45	45	45	225
	Kushtagi tq			53	-	48	48	48	48	47	239
17.3	Gangavathi	DOLR-MORD	Bunding/ trench cum bunding	28500	-	370	370	370	370	373	1853
	Koppal tq			75000	-	975	975	975	975	975	4875
	Yeburga tq			56300	-	732	732	732	732	732	3660
	Kushtagi tq			74500	-	968	968	968	968	971	4843
17.4	Gangavathi	DOLR-MORD	Check dams	114	570	93	93	93	93	92	464
	Koppal tq			261	570	209	209	209	209	208	1044
	Yeburga tq			204	1020	163	163	163	163	164	816
	Kushtagi tq			269	1345	217	217	217	217	220	1088
17.5	Gangavathi	DOLR-MORD	Nala bund	29	60	48	48	48	48	50	242
	Koppal tq			73	145	72	72	72	72	74	362
	Yeburga tq			45	90	45	45	45	45	45	225
	Kushtagi tq			219	438	217	217	217	217	219	1087
17.6	Gangavathi	DOLR-MORD	Gokatte	145	145	125	125	125	125	128	628
	Koppal tq			320	320	272	272	272	272	274	1362
	Yeburga tq			250	250	212	212	212	212	211	1059
	Kushtagi tq			316	316	270	270	270	270	272	1352

17.7	Gangavathi	DOLR-MORD	Boulder ckecks	100	-	3	3	3	3	3	15	
	Koppal tq			480	-	9	9	9	9	9	9	45
	Yeburga tq			780	-	7	7	7	7	8	36	
	Kushtagi tq			680	-	9	9	9	9	12	48	
17.8	Gangavathi	DOLR-MORD	Rubble ckecks	75	-	4	4	4	4	3	19	
	Koppal tq			410	-	11	11	11	11	12	56	
	Yeburga tq			735	-	9	9	9	9	8	44	
	Kushtagi tq			610	-	12	12	12	12	12	60	
17.7	Gangavathi	DOLR-MORD	Afforestation (ha)	9300	--	279	279	279	279	278	1394	
	Koppal tq			25200	=	756	756	756	756	756	3780	
	Yeburga tq			17400	-	540	540	540	540	538	2698	
	Kushtagi tq			25150	-	754	754	754	754	755	3771	
17.8	Gangavathi	DOLR-MORD	Dryland horticulture (ha)	6450	-	623	623	623	623	623	3115	
	Koppal tq			17950	-	1764	1764	1764	1764	1764	8820	
	Yeburga tq			1200	-	1153	1153	1153	1153	1155	5767	
	Kushtagi tq			17770	-	1758	1758	1758	1758	1759	8791	
	Gangavathi	DOLR-MORD	Taluk total	44942								
	Koppal tq			120113								
	Yeburga tq			88329								
	Kushtagi tq			11980								
TOTAL				265367	7291	12598	12598	12598	12598	12665	63057	

Table 5.9: CONVERGENCE WITH MGNREGA

S. No	Name of the Blocks/sub Districts	Concerned Ministry/ Department	Activity	Total Number/ Capacity (cum)	Command Area/Irrigation Potential (Ha)	I yr	II yr	III yr	IV yr	V yr.	Estimated cost (Rs in lakh)	
19		DORD-MORD	Newly created									
19.1		DORD-MORD	Water Conservation									
19.2		DORD-MORD	Water Harvesting									
			Bore well recharging									
			Gangavati	3000	-	240	240	240	240	240	1200	
			koppal	3500	-	280	280	280	280	280	1400	
			Yalaburga	4000	-	320	320	320	320	320	1600	
			Kushtagi	3500	-	280	280	280	280	280	1400	
19.3		DORD-MORD	Creation of irrigation canals and Drains									
19.4		DORD-MORD	Providing Infrastructure for Irrigation									
19.5		DORD-MORD	Land Development									

20		DORD-MORD	Renovation								
20.1		DORD-MORD	Renovation of water bodies including desilting								
	Gangavathi tq			40/.53T MC	4700	200	200	200	200	200	1000
	Koppal tq			24	2447	120	120	120	120	120	600
	Yeburga tq			16	2033	80	80	80	80	80	400
	Kushtagi tq			41	6505	156	156	156	156	155	779
20.2		DORD-MORD	Renovation & Maintenance of Irrigation canals&Drains								
			Total	121	15685	1676	1676	1676	1676	1675	8379

5.10 STATE FUNDED PROJECTS FOR IRRIGATION

S. No	Name of the Blocks/sub Districts	Component/ Activity	Total Number/Capacity (cum)	Command Area/Irrigation Potential (Ha)	Period of Implementation (5/7yrs)	I yr.	II yr	IIIyr	Vyr	yr	Estimated cost (Rs in lakh)
21	State Planned Scheme of Irrigation- MAJOR IRRIGATION										
21.1	Koppal Kushtagi Yelburga	Koppal Lift irrigation (UKP)	0.3115 BCM	96280	5 yrs	111220	111220	111220	111220	111220	556100
21.3	Gangavathi Koppal	Alawandi-Betgeri Lift irrigation	0.01 BCM	2425	5 yrs	1776	1776	1776	1776	1779	8883
	Koppal	Bahaddur Bandi Lift irrigation	0.016 BCM	2590	5 yrs	1800	1800	1800	1800	1800	9000
	Koppal Yelburga	Singatalur Lift Irrigation	0.12 BCM	28474	5 yrs	240	240	240	240	238	1198
	Koppal	Hirehallaproject (repairs / residual works)	0.056 BCM	-*	2 yrs	250	250	-	-	-	500
22	State planned schemes- KRISHI BHAGYA SCHEME (farm ponds)										
	All taluks	Farm pond+lining by PVC sheet+ lifting device + pipes	25000 (0.0005 BCM)	25000	5yrs	4370	4370	4370	4370	4370	21850
		TOTAL	0.7575 BCM	154769		119656	119656	119406	119406	119407	597531

*No new irrigated area is added (existing: 8330 ha)

5.11 EXTERNALLY FUNDED PROGRAMME OF IRRIGATION (ASIAN DEVELOPMENT BANK)

Sl. No	Name of the Blocks/sub Districts	Component/ Activity	Total Number/Capacity (cum)	Command Area/Irrigation Potential (Ha)	Period of Implementation (5/7yrs)	Iyr	IIyr	III yr	IVyr	V yr	Estimated cost (Rs in lakh)
	Koppal Gangavathi	Modernisation/ balance works of TBP, VNC	0.555BCM	-*	5 yrs	4800	4800	4800	4800	4800	24000
Total			0.555 BCM			4800	4800	4800	4800	4800	24000

*No new irrigated area is added (existing: 36668 ha)

5.12: RURAL AND URBAN WATER USE

DEAILS	TOWN/CITY	BUDGET REQUIRED (Rs. In lakhs)
Urban water supply needs	Gangavathi	10500
	Koppal	12450
	Yelburga	7150
	Kanakagiri	7500
	Kukanoor	7000
	Karatagi	8500
	Bhagyanagar	5500
	Total	58600
District Urban Development Cell (DUDC)	Different CMC/ TMC/TP	68950
Rural water supply needs		9526
GRAND TOTAL		137076

FINAL ABSTRACTS OF KOPPALA DISTRICT IRRIGATION PLAN

5.13 COMPONENT WISE IRRIGATION POTENTIAL CREATED (in HA)

Taluks	GNG	KPL	YLBRG	KSTG	TOTAL
AIBP	-	33160	3483	3737	40380
HKKP	1650	1800	800	1400	5650
PDMC-MI	1800	2600	3000	3200	10600
PMKSY-WS	950	2135	1725	2481	7291
CMGNREGA	4700	2447	2033	6505	15685
State funded	6492	63772	39743	44762	154769
TOTAL	15592	105914	50784	62085	234375

5.14 COMPONENT WISE TALUK WISE BUDGET REQUIREMENT (Rs in lakhs)

Talluks	GNG	KPL	YLBRG	KSTG	TOTAL
AIBP	2938	61947	9252	2088	76225
HKKP	1345	1458	600	1050	4453
PDMC	1620	1650	1710	1741	6721*
PMKSY-WS	8077	20805	14749	21508	65142
CMGNREGA	2200	2000	2000	2179	8379
SFP	6350	245996	117282	227902	597530
ADB	16000	8000	-	-	24000
TOTAL	38530	341856	145596	256468	782450
URWS	137076				137076
	GRAND TOTAL				919526

5.15 YEAR WISE TALUK WISE BUDGET REQUIREMENT (Rs in lakhs)

Taluk / year	Iyr	II yr	III yr	IV yr	V yr	TOTAL
Gangavati	7707	7707	7707	7707	7703	38531
Koppal	68521	68521	68271	68271	68273	341857
Yelburga	29119	29119	29119	29119	29117	145593
Kushtagi	51293	51293	51293	51293	51297	256469
TOTAL	156640	156640	156390	156390	156390	782450
URWS	137076					137076
	GRAND TOTAL					919526

5.16 TALUK WISE DEPARTMENT WISE BUDGET REQUIREMENT (Rs in lakhs)

Dept./ Taluk	GNG	KPL	YLBRG	KSTG	TOTAL
MaI	19934	310589	113079	223701	667303
MI	7700	7413	15715	9380	40208
A	2820	3050	2050	1880	9800
H	3115	8820	5767	8791	26493
WS	3968	8205	6284	8946	27003
F	1394	3780	2698	3771	11643
TOTAL	38531	341857	145593	256469	782450
URWS	137076				137076
	GRAND TOTAL				919526

Abbreviations used:

AIBP- Accelerated Irrigation benefit Programme of GoI

KKKP- Har Khet Ko Pani, which was envisaged to bring in more irrigated area

PDMC-MI: Per drop more crops- Micro irrigation

PMKSY- WS: Pradhan mantri Krishi Sinchai Yojana- water shed

CMGNREGA: Convergence of funds for rejuvenation/desilting/improvement of existing tanks as well as unused tanks

URWS: Urban and Rural Water Supply

*includes allotment of 5041 lakh rupees for training 27885 farmers in all 4 taluks

Fig 5.9: COMPONENT WISE IRRIGATED AREA TO BE CREATED IN KOPPAL DISTRICT (%)

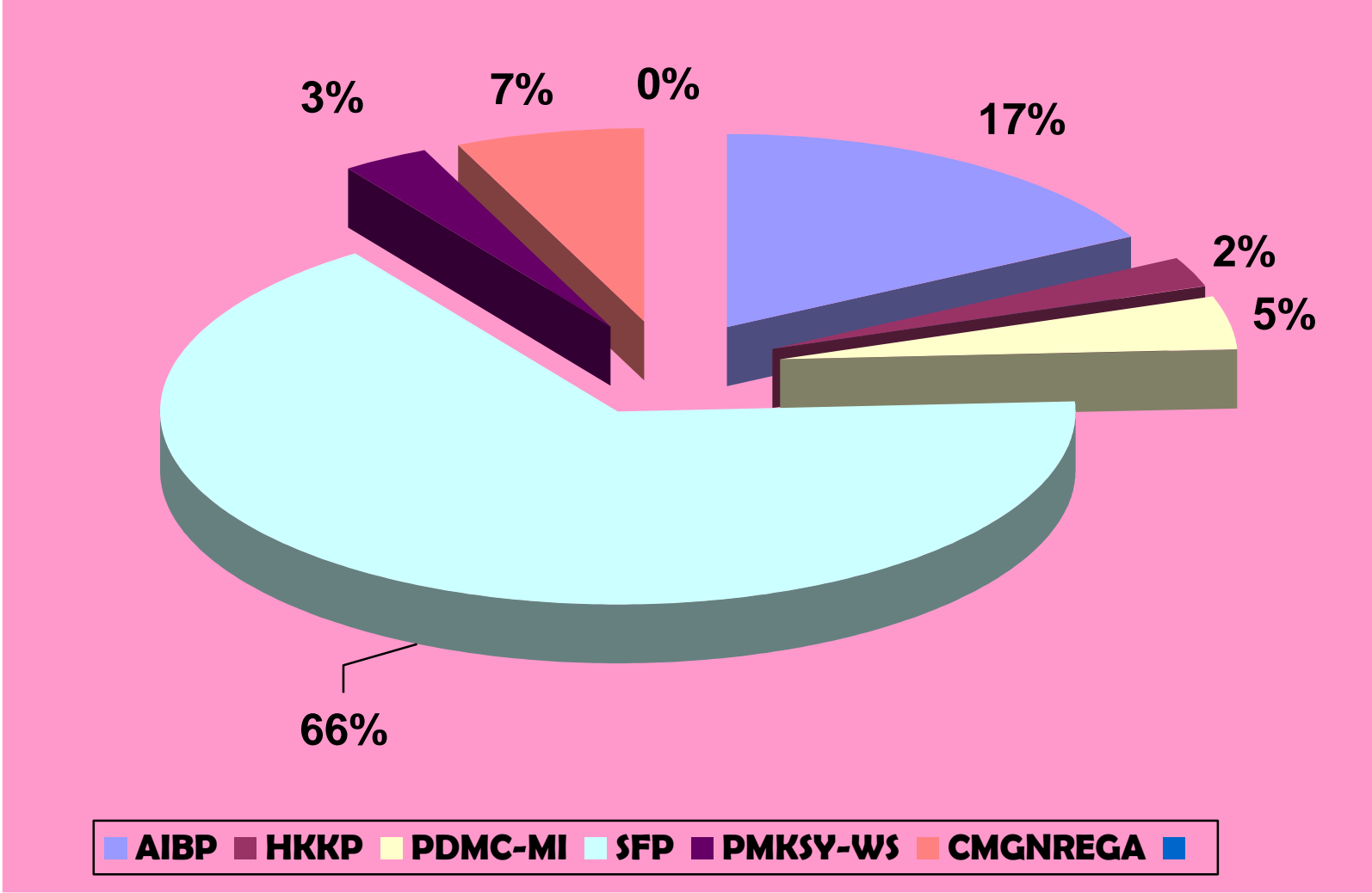
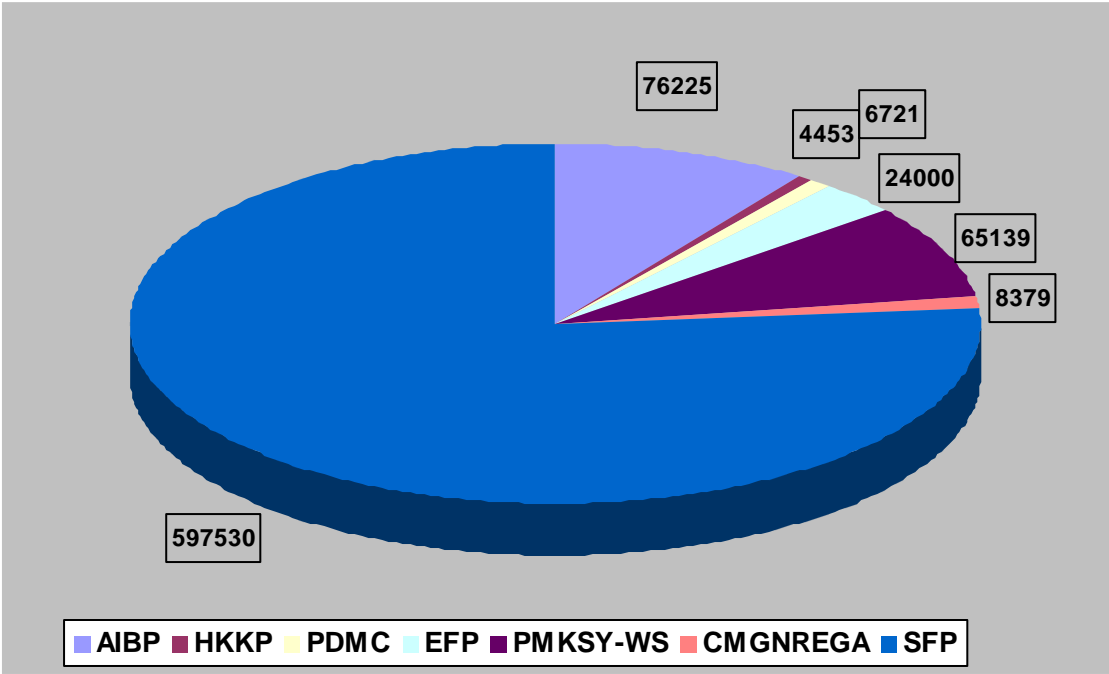


Fig 5.10 : COMPONENT WISE DISTRIBUTION OF BUDGET IN KOPPAL DISTRICT (Rs in lakhs)



CONCLUSIONS

- Koppal district is essentially dry region receiving scanty rainfall- falling in typical dry land regions of Karnataka. The district depended on rainfed agriculture, although Gangavathi taluk was irrigated by Tungabhadra Irrigation Project. Major part of Koppal taluk remained unirrigated (73.2 % of net cultivated area)
- The analysis of all available water resources of Koppal district indicated that, an excellent scope exists to harvest rainwater by strengthening the water harvesting structures like farm ponds, check dams, barrages, bandharas etc.
- As 57% of the district is over exploited in respect of under ground water resources (the extraction of under ground water is greater than natural recharge), there is an urgent need to take up large scale measures to artificially recharge the ground water by structures like percolation tanks, bore well recharge structures
- Under minor irrigation, new irrigated area of 40380 ha has been suggested by construction of 23052 check dams/ farm ponds in all taluks under AIBP component
- As a part of drought proofing in dry lands of district, 2224 structures have been proposed in all the taluks of district to be taken up under 'Per drop- more crop' component with funds of MOA & FW-DAC & FW. Through this measure, 10600 ha of irrigated area will be added
- Under 'Hark het Ko Pani' component, as many as 2825 new bore wells have been suggested in safe regions of Kushtagi, Gangavathi, Koppal and Yelburga taluks to create new irrigated area to the tune of 5650 ha. Nearly 29% of total geographical region of the district is classified by Central Ground Water Board as safe regions, wherein ground water development is less than 50%
- Existing bore wells in critical and over exploited regions of the district need to be used efficiently by adopting micro irrigation. For this purpose, nearly 10600 ha covered under good irrigation has been suggested to adopt micro irrigation. As micro irrigation, will save at least 50% of water, new irrigated area of 10600 ha is expected to be created in all taluks.
- Under PMKSY- water shed, utilizing the budget under DOLR-MORD, 47 percolation tanks have been suggested to improve the ground water status in the district, by 7291 ha m annually.

- The district is luckily blessed to receive large irrigation water from state funded Singatalur Lift Irrigation Scheme from Tungabhadra river as well as 'Koppal Lift Irrigation Scheme' of Upper Krishna Project. By using 13.87 TMC of water in both these projects, nearly 15685 ha of new irrigated area is being brought soon.
- Under Convergence with MGNAREGA scheme, 121 renovation/ rejuvenation programmes for 121 tanks and 14000 borewell recharging structures have been suggested to bring back 15685 ha of irrigated area, by harvesting the surface water more effectively. This work may cost around Rs 8379 lakhs using the funds of DORD-MORD.
- Urban and rural domestic water supply programme requires a budget of Rs 1370.76 crores in the next five years
- In total, Koppal district will be added with 234375 ha of newly irrigated area after five years after implementation of PMKSY with a total budget out lay of Rs 9195 crores- which includes Rs 5975 crores already spent for ongoing State Government funded Lift Irrigation projects of Singatalur (across Tungabhadra) and Koppal Lift Irrigation Project of Upper Krishna Project.
- Besides this, Koppal taluk is already being irrigated by 'Hurchalla' lift irrigation project and irrigating nearly 8300 ha.
- The district's net irrigated area is expected to increase from the present level to 299068 ha, by which 75.5% of net cultivated area is expected to be covered under irrigation.
- The dry land farmers of Koppal district typically grow crops like jowar, sunflower, cotton, groundnut, Bengal gram and invariably end up in low yields. The new irrigated area in the district is expected to change the cropping pattern to paddy, hybrid cotton, irrigated groundnut and hybrid maize crops. These crops are expected to increase the profitability from the present Rs 20,000 /ha to nearly Rs 40-50 thousand under irrigation.
- Koppal district has 20595 area under horticultural crops. Availability of irrigation in Koppal district may boost the present horticultural production, besides serving as impetus to expand the area under horticultural crop.

APPENDICES

Appendix 1.1: General Information of the District

Sl No	Name of the District	District Code	Latitude	Longitude
1	Koppal	29-56-05467	15 ° 09' 00" to 16 ° 03' 30" N	75 ° 47' 30" to 76 ° 48' 10" E

Appendix 1 2: DETAILS OF POPULATION IN KOPPAL DISTRICT

Name of the Gram Panchayat	Name of the Village Covered	Code of Villages Covered	Population			
			M	F	CH	Total
HIREMYAGERI	Sankanur	601230	926	981	286	2193
	Katral	601231	277	268	124	669
	Sirgumpi	601232	564	549	200	1313
	Sompur	601233	416	428	115	959
	Hiremyageri	601234	1835	1879	520	4234
	Sompur	601366	725	683	269	1677
Mudhol	Mudhol	601235	2954	3056	886	6896
BALLUTGI	Chikoppa	601236	544	492	222	1258
	Ballutgi	601238	1840	1868	653	4361
	Hosahalli	601257	587	524	187	1298
BANDI	Tumurguddi	601237	950	930	355	2235
	Jhulkatti	601239	353	351	117	821
	Bandi	601240	1088	1011	330	2429
	Kadbalkatti	601241	153	136	56	345
	Hagedhal	601244	370	359	145	874
	Bassapur	601245	432	437	170	1039
	Boon Koppa	601246	195	228	83	506
VAJRA BANDI	Chikbannigol	601242	586	606	260	1452
	Konasagar	601243	878	868	312	2058
	Dammur	601247	781	806	361	1948
	Vajra Bandi	601248	851	858	416	2125
	Salbhavi	601250	320	316	165	801
	G.Jarkunti	601253	295	333	155	783

HIRE ARLIHALLI	Kalak Bandi	601266	392	360	103	855
	Matrangi	601267	243	253	87	583
	Hire Arlihalli	601268	1152	1027	408	2587
	Biraldinni	601284	351	314	124	789
	Hosur	601285	469	438	147	1054
	Ningalbandi	601286	883	901	376	2160
MATALDINNI	Budakunti	601269	486	463	153	1102
	Putakmari	601270	337	325	106	768
	Yeddoni	601271	833	836	358	2027
	Kalbhavi	601280	372	374	122	868
	Mataldinni	601281	1064	1050	347	2461
	N.Jarkunti	601283	293	285	106	684
TALKERE	Gule	601272	221	215	87	523
	Budur	601273	581	538	242	1361
	Guntamadu	601274	240	244	121	605
	Sidlabhavi	601275	405	404	194	1003
	Chikka Mannapur	601276	413	389	180	982
	Vanjabhavi	601277	192	183	75	450
	Choudapur	601279	375	380	126	881
	Talkere	601294	1349	1335	440	3124
GANDHAL	Markat	601278	515	500	198	1213
	Gandhal	601295	1334	1288	616	3238
	Hire Waddarkal	601296	881	868	375	2124
	Katgihalli	601297	574	526	254	1354
	Tippanhal	601298	457	456	212	1125

HIRE WANKAL KUNTA	Yapaldinni	601289	469	442	173	1084
	Nilogal	601290	375	378	95	848
	Uppaldinni	601291	245	225	108	578
	Chikwankal Kunta	601292	461	456	210	1127
	Hire Wankal Kunta	601293	1511	1443	456	3410
	Uchalkunta	601299	438	478	165	1081
GUNHALU	Bukkanhatti	601300	190	198	102	490
	Gunhalu	601301	1554	1623	576	3753
	Hunsihal	601302	1696	1563	694	3953
BEVOOR	Kolihal	601303	670	593	195	1458
	Myadneri	601304	561	552	222	1335
	Bevoor	601318	2288	2213	671	5172
VANGERA	Guttur	601311	513	534	178	1225
	Lakmangule	601312	397	370	142	909
	Ryavanki	601315	931	866	249	2046
	Vangera	601317	1403	1381	428	3212
	Kavalkere	601323	171	178	76	425
MURDI	Makkahalli	601249	159	166	60	385
	Mandalhari	601287	348	348	142	838
	Taralkatti	601288	1033	1073	359	2465
	Narsapur	601309	307	316	120	743
	Murdi	601310	1420	1383	572	3375
CHIKMYAGERI	Kudri Kotgi	601255	480	463	164	1107
	Malaksamudra	601263	722	705	247	1674
	Kudgunti	601264	710	711	232	1653
	Chikmyageri	601313	1517	1453	447	3417

GEDIGERA	Madlur	601251	379	386	148	913
	Lagalur	601252	69	70	22	161
	G.Virapur	601254	203	212	102	517
	Maranhal	601256	449	447	205	1101
	Hanmapur	601305	203	204	92	499
	Gedigera	601306	1074	1135	493	2702
	Talur	601307	606	577	261	1444
	Hulegudda	601308	730	697	368	1795
BALGERA	Budgumpi	601314	482	441	135	1058
	Balgera	601327	1175	1106	455	2736
	Tipparasanhalu	601328	156	153	72	381
	Chanpanhalli	601344	256	242	72	570
	Konapur	601345	287	270	104	661
	Kakkihalli	601346	594	602	275	1471
	Harishankerbandi	601347	96	97	32	225
KALLUR	KALLUR	601265	1445	1402	406	3253
Sanganhal	Sanganhal	601261	1308	1235	343	2886
KARMUDI	Karmudi	601258	1311	1318	396	3025
	Bandihal	601259	877	768	222	1867
	Tondihal	601260	887	882	260	2029
RAJOOR	Dyampur	601341	781	749	215	1745
	Rajoor	601342	1183	1168	320	2671
	Adoor	601343	771	760	175	1706
YARIHANCHINAL	Yarihanchinal	601338	1409	1411	368	3188
	Binhal	601339	1011	1019	317	2347
	Sidnekoppa	601352	522	463	151	1136

MANDALGERI	Chiken Koppa	601340	786	788	208	1782
	Bhatpanhalli	601351	477	455	164	1096
	Mandalgeri	601353	948	979	220	2147
BANNIKOPPA	Ningapur	601362	381	383	91	855
	Male Koppa	601367	659	624	138	1421
	Bannikoppa	601368	1223	1223	261	2707
Tadkal	Advihalli	601369	140	137	35	312
	Tadkal	601370	3049	3092	857	6998
BHANAPUR	Veerapur	601359	813	781	242	1836
	Bhanapur	601360	541	584	140	1265
	Talbal	601361	365	349	128	842
	Lakmapur	601371	689	686	179	1554
	Chitapur	601372	184	162	68	414
	Komlapur	601373	525	550	171	1246
ITAGI	Gorelekoppa	601349	210	225	85	520
	Itagi	601354	1892	1756	532	4180
	Mannapur	601363	453	495	160	1108
Kuknoor	Kuknoor	601348	7936	7872	2225	18033
BENAKAL	Masabhanchinhal	601355	957	956	286	2199
	Nittali	601356	537	520	171	1228
	Benakal	601358	1425	1424	435	3284
Sirur	Sirur	601324	728	743	216	1687
	Bedwatti	601325	407	402	106	915
	Yadiapur	601326	894	877	311	2082
	Chendoor	601329	552	547	145	1244
	Gavarhal	601357	376	347	124	847

Hirebeedinhalu	Arkeri	601330	649	678	164	1491
	Muthalu	601331	274	292	67	633
	Kadar Halli	601332	454	451	129	1034
	Hirebeedinhalu	601333	521	500	157	1178
	Chikbeedinhalu	601334	601	594	299	1494
	Honhunashi	601337	392	380	150	922
Mangalore	Mangalore	601322	3699	3652	1021	8372
Kudri Moti	Watparvi	601319	939	883	365	2187
	Nelgeri	601320	632	613	215	1460
	Bhairnaikanhalli	601321	568	512	167	1247
	Kudri Moti	601335	1752	1824	685	4261
	Chendinhal	601336	223	215	64	502
Yelburga (TP)	Yelburga (TP)	803070	6504	6365	1945	14814
NILOGAL	Rampur	601374	391	403	159	953
	Vakkandurga	601375	590	570	259	1419
	Nilogal	601378	1800	1706	768	4274
	Bommanhal	601379	531	498	179	1208
	Basapur	601380	345	296	133	774
TUGGALDONI	Mittalkod	601377	963	885	351	2199
	Shadalgera	601382	646	599	235	1480
	Tuggaldoni	601383	998	1012	372	2382
	Nirlakoppa	601384	272	265	93	630
HANMANHAL	Bilekal	601381	979	939	464	2382
	Hanmanhal	601385	1849	1758	611	4218
	Masbinkurbanhal	601386	117	113	54	284
	Kodatgeri	601387	517	516	212	1245
	Rangapur	601388	386	365	126	877
	Guddadadevalapur	601391	743	697	224	1664

JAGIR GADADUR	Konapur	601392	393	410	205	1008
	Paramanhatti	601393	372	323	161	856
	Jagir Gadadur	601394	1064	924	359	2347
	Habalkatti	601399	1003	954	365	2322
	Badimnhal	601401	477	442	180	1099
	Tumrikoppa	601408	677	679	311	1667
	Parasapur	601455	361	326	96	783
MALGITTI	Kadival	601389	440	404	184	1028
	Pattalchinti	601390	646	608	173	1427
	Mastkatti	601395	423	393	171	987
	Malgitti	601397	1397	1357	433	3187
	Gadchinti	601398	298	278	98	674
HIREGONNAGAR	Gorbihal	601407	447	460	131	1038
	Hiregonnagar	601409	1419	1390	523	3332
	Varikal	601410	217	229	87	533
	Chickgonnagar	601411	140	126	29	295
	Mugnoor	601415	954	938	331	2223
YERIGERI	Venkatapur	601403	529	495	219	1243
	Gudadurkal	601404	630	652	270	1552
	Madnal	601405	512	489	179	1180
	Yerigeri	601406	1385	1354	486	3225
	Chandragiri	601433	280	271	94	645
	Mavinitagi	601434	404	425	183	1012
Hanamsagar	Hanamsagar	601435	6386	6311	2177	14874
KABBARGI	Sebankatti	601429	532	543	199	1274
	Mannerhal	601430	936	874	315	2125
	Beelagi	601431	325	310	66	701
	Kabbargi	601432	1376	1297	612	3285

KATAPUR	Katapur	601416	1231	1172	463	2866
	Kalgonhal	601417	355	360	107	822
	Kadoor	601419	185	176	57	418
	Yerigonhal	601420	308	325	119	752
	Huchnoor	601421	356	354	118	828
	Antarthana	601422	366	364	120	850
	Puratageri	601423	265	277	68	610
	Tengunti	601492	714	718	305	1737
HULGERA	Bandargal	601424	593	561	192	1346
	Hulgera	601428	2320	2410	875	5605
ADVIBHAVI	Mudhotagi	601436	271	257	101	629
	Develapur	601437	225	229	116	570
	Hanamageri	601438	260	281	145	686
	Miyapur	601439	486	524	199	1209
	Advibhavi	601444	726	662	300	1688
	Hulsegeri	601445	438	454	227	1119
	Malkapur	601446	224	218	70	512
	Hosalli	601447	564	541	215	1320
	Topalkatti	601452	538	513	175	1226
CHALGERA	Zhunjalkoppa	601448	227	204	82	513
	Zhoolkatti	601450	427	425	168	1020
	Chalgera	601451	2130	2103	665	4898
	Kalalbandi	601454	1275	1157	424	2856
BENKANHAL	Kumblavati	601412	1063	986	400	2449
	Benkanhal	601413	1046	1037	456	2539
	Yelbunchi	601414	967	971	450	2388
	Madikera	601449	768	779	341	1888

HIREBANNIGOL	Donnegudda	601457	237	213	88	538
	Bisnhal	601458	264	262	148	674
	Kankoppa	601459	519	450	216	1185
	Chicknandihal	601462	401	398	153	952
	Hirebannigol	601463	935	943	259	2137
	Yelburthi	601464	734	667	279	1680
KORDAKERA	Hirenandihal	601460	843	812	293	1948
	Kordakera	601461	941	826	325	2092
	Gorvarbenchamatti	601498	176	163	64	403
	Byalihal	601499	311	335	138	784
	Madalgatti	601500	213	199	103	515
	Shakapur	601501	654	639	263	1556
TALUGERI	Talugeri	601453	1147	1196	361	2704
	Vanageri	601494	888	915	365	2168
	Nidsesi	601497	1112	1069	432	2613
BIJAKAL	Kawalbodur	601481	813	807	346	1966
	Mankalkeri	601482	69	74	21	164
	Basapur(M)	601485	100	111	51	262
	Gonhal(K)	601486	187	157	53	397
	Gudadur(M)	601490	690	674	269	1633
	Hosur(K)	601491	217	228	75	520
	Bijakal	601493	1096	1022	465	2583
	Tekkalki	601495	544	595	209	1348

DOTIHAL	Matur	601475	144	119	37	300
	Dotihal	601476	1903	1803	569	4275
	Kesoor	601477	933	917	271	2121
	Nadavalkoppa	601478	211	170	84	465
	Kalkeri	601479	315	308	130	753
	Hesrur	601483	323	299	125	747
KYADIGUPPA	Timmanhatti	601402	160	138	69	367
	Mensageri	601440	680	687	338	1705
	Kyadiguppa	601441	1136	1121	394	2651
	Kadekoppa	601442	449	442	195	1086
	Tonsihal	601465	688	647	283	1618
	Gotagi	601466	827	863	283	1973
MUDENOOR	Sirguppa	601467	491	494	195	1180
	Megur	601468	213	236	78	527
	Banhatti	601469	175	152	45	372
	Benchamatti	601470	75	79	36	190
	Mudenoor	601471	686	618	182	1486
	Kudloor	601472	229	248	70	547
	Balutagi	601473	738	685	264	1687
	Jalihal	601474	425	445	152	1022
	Ryawanki	601484	322	327	98	747
	Teggihal	601487	439	487	204	1130
	Madapur	601488	472	502	186	1160

JUMLAPUR	Rampur(Jagir)	601489	302	288	61	651
	Sasvihal	601514	354	376	136	866
	Muddalgundi	601515	355	331	103	789
	Advibhavi	601516	364	354	120	838
	Myadardokki	601517	523	510	243	1276
	Hagaldhal	601526	323	353	115	791
	Jumlapur	601528	838	858	312	2008
	Idlapur	601529	416	428	151	995
	Nandapur	601530	607	573	237	1417
KILARHATTI	Kidadur	601518	366	370	118	854
	Kalmalli	601519	1439	1412	668	3519
	Kilarhatti	601520	552	534	255	1341
	Umlirampur	601522	161	184	77	422
	Narinhal	601523	477	478	221	1176
	Garjanhal	601524	678	650	281	1609
	Zhoolkunti	601525	489	465	187	1141
TAWARGERA	Vithalapur	601531	369	381	113	863
	Tawargera	601532	7144	7101	2402	16647
MANEDHAL	Rampur(M)	601511	238	230	73	541
	Huliyapur	601533	794	767	266	1827
	Gudadhanamsagar	601534	551	543	244	1338
	Bachinhal	601535	388	392	154	934
	Chickmukrtinhal	601536	133	140	62	335
	Manedhal	601537	953	944	333	2230
	Hiremukartihal	601547	363	361	184	908
Lingadhalli	601548	595	578	238	1411	

SANGANHAL	Metthinhal	601538	204	221	94	519
	Kanhal	601539	196	206	90	492
	Pura	601540	516	530	249	1295
	Sanganhal	601541	721	745	298	1764
	Ganganhal	601542	237	256	128	621
	Hiretemminhal	601543	512	501	218	1231
	Hadagli	601544	147	126	55	328
	Virupapur	601545	458	382	155	995
	Siddapur	601546	255	256	107	618
	Homminhal	601549	359	391	136	886
	Hongaddi	601550	259	282	100	641
HIREMANNAPUR	Hiremannapur	601507	2518	2400	727	5645
	Mayadhunsi	601508	3	1	0	4
	Hanchinhal	601509	425	433	159	1017
	Nawalhalli	601510	855	815	260	1930
	Neerloti	601512	482	450	136	1068
KANDAKUR	Nerebenchi	601502	511	530	168	1209
	Kurbanhal	601503	453	487	158	1098
	Kandakur	601504	1761	1681	650	4092
	Gumgeri	601505	825	805	301	1931
	Ganganhal	601506	412	420	166	998
	Nagarhal	601513	227	236	131	594
Kushtagi TMC	Kushtagi TMC	'803071	10704	10706	3468	24878

GOURIPUR	Gouripur	601561	884	873	464	2221
	Devlapur	601562	400	408	196	1004
	Chikka Wadderkal	601563	69	63	32	164
	Somsagara	601565	551	564	225	1340
	Advibhavi	601566	931	913	441	2285
	Hulsanhatti	601567	473	478	172	1123
HULIHYDER	Layadhunsi	601551	603	599	214	1416
	Hulihyder	601552	1938	1834	703	4475
	Hosgudda	601553	275	254	145	674
	Hanmanhal	601557	450	410	180	1040
	Kanakapura	601558	419	436	208	1063
	Varankhed	601559	124	136	69	329
	Bailakampur	601560	362	356	144	862
	Basrihal	601564	675	674	318	1667
HIRE KHED	Godinal	601554	452	474	211	1137
	Sirwar	601556	516	557	249	1322
	Neerloti	601581	262	239	100	601
	Chikka Khed	601582	265	247	110	622
	Hire Khed	601583	603	640	297	1540
	Malligwad	601584	343	333	115	791
	Katapur (Khalsa)	601587	359	310	128	797

KARDONA	Guddadur	601555	507	530	262	1299
	Yettinhatti	601657	214	225	93	532
	Bunhatti	601658	176	175	50	401
	Kardona	601664	441	440	158	1039
	Katapur (Umli)	601666	348	333	186	867
	Akalkumpi	601667	246	253	108	607
	Hatti	601668	57	54	11	122
	Mallapur	601665	489	499	228	1216
	Wadki	601669	513	529	177	1219
NAVALI	Eachanhal	601659	390	365	162	917
	Uddihal	601660	474	489	175	1138
	Kyarihal	601661	60	61	8	129
	Sankanhal	601662	206	220	72	498
	Navali	601663	2457	2395	871	5723
	Adapura	601670	566	569	148	1283
	Bhairapura	601671	35	31	16	82
BEVINHAL	Mylapur	601678	1329	1346	382	3057
	Bevinhal	601679	2000	2077	686	4763
	Pannapur	601680	1746	1774	464	3984
Karatgi	Karatgi	601681	13069	12975	3947	29991
CHALLUR	Gudur	601677	575	582	175	1332
	Challur	601682	2118	2161	693	4972
	Somanhal	601683	1129	1098	338	2565

CHIKKA DANKANKAL	Chirchanagudda	601672	725	715	247	1687
	Chikka Dankankal	601673	679	662	229	1570
	Jeeral	601674	866	881	328	2075
	Jeeralkalgudi	601675	1220	1298	421	2939
	Hire Dankankal	601676	974	975	293	2242
SULEKAL	Kalkera	601588	825	835	300	1960
	Benkanhal	601589	380	412	147	939
	Sulekal	601590	1033	1023	398	2454
	Tippanhal	601591	474	491	208	1173
Kanakgiri	Kanakgiri	601580	7480	7230	2228	16938
CHIKKA MADINAL	Ramdurg	601574	343	338	170	851
	Jalihuda	601577	309	270	138	717
	Chikka Madinal	601578	1251	1257	461	2969
	Naglapur	601579	215	212	108	535
	Bankapur	601592	498	481	237	1216
	Kardigudda	601593	44	33	17	94
	Hire Madinal	601594	356	382	197	935
MUSLAPUR	Ingaldal	601568	340	342	169	851
	Parapur	601569	238	229	97	564
	Kannermadu	601570	436	457	176	1069
	Muslapur	601571	1041	953	377	2371
	Bommasagara	601573	434	435	222	1091
	Obalbanda	601575	539	466	195	1200
	Rampur	601576	256	230	94	580
AGOLI	Hampasadurg	601595	388	366	157	911
	Agoli	601596	1296	1266	458	3020
	Vithlapur	601597	618	626	282	1526

Venkatagiri	Dasanhal	601605	1048	1171	366	2585
	Venkatagiri	601606	1260	1227	561	3048
	Udamkal	601607	942	1061	349	2352
	Banderhal	601608	385	378	139	902
	Gaddi	601609	259	261	99	619
CHIKKA BENKAL	Lingadhalli	601610	366	356	144	866
	Yemmigudda	601611	171	162	51	384
	Mukkumpi	601612	1112	1070	407	2589
	Hire Benkal	601613	1220	1242	422	2884
	Chikka Benkal	601614	1157	1075	453	2685
Basapattana	Basapattana	601615	3840	3794	1338	8972
MALLAPUR	Laxmipur	601616	83	75	27	185
	Rangapur	601617	178	166	40	384
	Mallapur	601625	1308	1319	488	3115
	Rampur	601626	919	881	289	2089
ANEGUNDI	Tirmalapur	601618	119	129	33	281
	Anjanhalli	601620	128	125	42	295
	Virupapuragaddi	601621	200	210	65	475
	Hanmanhalli	601622	189	172	58	419
	Chickrampur	601623	252	244	62	558
	Sanapur	601628	713	701	214	1628
	Anegundi	601639	1578	1675	480	3733

SANGAPUR	Sangapur	601619	1577	1633	517	3727
	Krishnapur	601627	34	45	13	92
	Vipra	601633	368	226	84	678
	Rajapur	601635	3	1	0	4
	Singangund	601636	4	5	0	9
	Basvandurg	601637	493	515	168	1176
	Ramdurg	601638	350	348	124	822
CHIKKA JANTKAL	Hosalli	601630	1326	1373	536	3235
	Nagarhalli	601631	283	297	139	719
	Achalapur	601654	15	16	0	31
	Ayodhya	601655	1006	1139	332	2477
	Chikka Jantkal	601656	1490	1692	579	3761
WADDARHATTI	Arhal	601603	1718	1687	552	3957
	Waddarhatti	601708	3952	3991	1170	9113
HERUR	Herur	601643	2316	2358	672	5346
	Gonal	601644	461	463	114	1038
	Batterhanchnal	601645	1004	957	312	2273
KESARHATTI	Malkanmardi	601599	717	787	250	1754
	Arlahalli	601600	307	305	95	707
	Battarnarsapur	601601	396	411	144	951
	Kesarhatti	601602	1138	1185	366	2689
	Kesakihanchnal	601640	582	608	189	1379
	Markumbi	601642	742	733	245	1720
HANWAL	Guldal	601641	466	455	129	1050
	Hanwal	601646	2694	2776	864	6334
Hosekera	Hosekera	601647	2683	2835	761	6279

MARLI	Marli	601648	2240	2303	559	5102
	Acharnarsapur	601651	1097	1116	313	2526
DANAPUR	Hebbal	601650	869	905	322	2096
	Danapur	601652	1494	1603	506	3603
	Jangamarkalgudi	601653	2072	2143	620	4835
Sriramanagar	Sriramanagar	601649	4137	4175	1114	9426
GUNDUR	Singanhal	601693	1447	1518	584	3549
	Gundur	601694	2595	2639	739	5973
Hulkihal	Tondihal	601684	1141	1227	356	2724
	Hagedal	601685	497	481	167	1145
	Hulkihal	601687	1558	1671	481	3710
Marlanahalli	Juratgi	601686	928	931	262	2121
	Marlanahalli	601688	2267	2380	687	5334
Budugumpa	Budugumpa	601690	2351	2538	752	5641
	Timmapur	601691	555	568	160	1283
	Halsamudra	601692	641	616	141	1398
Yerdona	Yerdona	601689	3012	3087	881	6980
Bennur	Bennur	601704	978	995	377	2350
	Nandihalli	601705	780	782	248	1810
	Kakkargol	601706	804	850	238	1892
	Shalignoor	601707	187	187	81	455
Ulenoor	Eliganoor	601701	1162	1223	483	2868
	Jamapur	601702	754	756	245	1755
	Ulenoor	601703	1416	1384	471	3271
Siddapur	Krishnapur	601695	114	112	29	255
	Siddapur	601696	4154	4264	1397	9815
	Bargur	601697	977	1015	335	2327
	Kottankal	601700	461	474	131	1066

Mustur	Mustur	601698	2209	2273	668	5150
	Kuntoji	601699	1230	1216	415	2861
Gangawati CMC	Gangawati CMC	803072	49605	50066	14971	114642
Kawaloor	Gudigera	601709	418	416	154	988
	Kawaloor	601710	3111	3105	1036	7252
Hatti	Murlapur	601725	264	263	65	592
	Ghatreddihal	601727	379	370	86	835
	Belgatti	601728	634	602	180	1416
	Hatti	601729	1036	1016	348	2400
	Raghunathanhalli	601730	248	243	79	570
	Hydernagar	601732	623	632	255	1510
Alwandi	Alwandi	601724	3190	3216	770	7176
	Kampli	601740	304	292	80	676
Bochanhalli	Keslapur	601733	263	235	98	596
	Halwagali	601734	640	605	208	1453
	Nilogipur	601735	650	634	238	1522
	Bochanhalli	601738	1333	1324	482	3139
	Bhairapur	601739	429	424	157	1010
Betgera	Moranhalli	601741	697	692	250	1639
	Betgera	601742	1913	1991	438	4342
Mattur	Tigari	601736	1029	974	330	2333
	Hunkuntiakkapur	601737	884	862	333	2079
	Neeralgi	601744	868	856	228	1952
	Mattur	601745	890	814	293	1997
Katarkigudlanur	Dombarhalli	601719	458	412	114	984
	Belur	601720	849	761	280	1890
	Katarkigudlanur	601743	2034	2006	668	4708

Bisarhalli	Bisarhalli	601721	1924	1807	585	4316
	Bikanhalli	601722	372	363	120	855
	Mainahalli	601723	903	874	252	2029
Hiresindogi	Handral	601711	809	792	262	1863
	Hiresindogi	601717	1771	1828	600	4199
	Budihal	601780	350	372	109	831
Gondbal	Muddaballi	601779	1078	1086	286	2450
	Gondbal	601781	2012	1828	501	4341
Kolur	Katrahalli	601715	423	443	158	1024
	Chiksindogi	601718	592	586	209	1387
	Dadegal	601767	432	405	166	1003
	Kolur	601768	727	734	217	1678
	Mangalapur	601769	571	564	205	1340
	Horthatanhal	601770	426	427	148	1001
	Gunhalli	601771	349	381	139	869
Halgera	Hanwal	601712	342	365	93	800
	Wadganhal	601713	1015	961	320	2296
	Halgera	601714	1626	1654	450	3730
Ojanhalli	Chilwadgi	601750	943	899	362	2204
	Naregal	601751	701	658	236	1595
	Yettinhatti	601752	579	577	191	1347
	Ojanhalli	601753	1102	1067	367	2536
	Tankankal	601754	549	565	208	1322
BHAGYANAGAR	Koppal (Rural)	601766	8380	8199	2409	18988

LEBGERA	Hanmanhalli	601755	434	425	169	1028
	Taad Kanakapur	601814	595	564	211	1370
	Kamanur	601820	869	838	313	2020
	Lebgera	601821	835	869	301	2005
	Sangapur	601822	199	167	56	422
	Hatti	601749	485	465	183	1133
	Bhimanur	601823	525	505	206	1236
MADINUR	Madinur	601746	1070	1119	355	2544
	Devlapur	601747	188	166	63	417
	Kalkera	601748	739	707	271	1717
	Mudlapur	601811	233	236	86	555
	Budsettinhal	601813	554	503	184	1241
Kinhal	Kinhal	601812	4331	4265	1206	9802
IRKALGADA	Kodadhali	601799	436	426	147	1009
	Chamalapura	601800	394	410	144	948
	Jinnapur	601802	611	584	239	1434
	Hosahalli	601806	11	14	3	28
	Irkalgada	601808	1810	1744	601	4155
	Wadderhatti	601809	251	282	83	616
	Hanmanhatti	601810	365	348	148	861
	Yelamgera	601815	777	812	321	1910

HASGAL	Sidaganhalli	601787	196	178	98	472
	Hiresulikeri	601788	767	721	381	1869
	Chiksulikeri	601795	427	415	173	1015
	Hasgal	601796	570	584	162	1316
	Hosur	601797	415	403	190	1008
	Chilkmukki	601798	773	758	243	1774
	Gosaldoddi	601801	193	189	77	459
	Metgal	601803	379	337	86	802
	Arsinkera	601804	426	415	221	1062
CHIKBOMMANHAL	Achartimmapur	601789	46	38	28	112
	Challari	601790	633	618	316	1567
	Hirebommanhal	601791	1048	975	401	2424
	Chikbommanhal	601792	858	845	309	2012
	Ganganhal	601793	386	345	159	890
	Uplapur	601794	197	208	83	488
INDARGI	Wanballary	601805	989	1005	442	2436
	Indargi	601832	2391	2286	917	5594
Tawagera	Kenchandoni	601807	425	410	273	1108
	Abbigeri	601817	593	574	203	1370
	Kukanpalli	601818	1263	1080	343	2686
	Tawagera	601819	525	548	163	1236
	Halahalli	601824	663	651	310	1624
	Dhangaldoddi	601825	630	566	218	1414

BUDUGUMPA	Amarapur	601826	62	53	17	132
	Budugumpa	601827	1915	1723	704	4342
	Bilebhavi	601828	351	351	128	830
	Sulthanpur	601829	12	4	1	17
	Chandragiri	601830	190	205	123	518
	Nageshanahalli	601831	603	622	278	1503
	Jabbalgudda	601833	725	667	302	1694
	Kumar Ramankunta	601834	3	4	2	9
	Halekunta	601835	372	337	165	874
BANDIHARLAPUR	Basapur	601841	818	865	285	1968
	Rajarampet	601842	51	55	16	122
	Narayanpet	601843	84	65	14	163
	Bandiharlapur	601847	2305	2334	775	5414
SHIVAPUR	Achalapur	601839	118	108	39	265
	Ayodhya	601844	43	51	21	115
	Attivatti	601845	3	3	2	8
	Mohammad Nagar	601846	442	435	134	1011
	Shivapur	601848	1782	1795	562	4139
HULGI	Hulgi	601856	2115	2111	633	4859
	Munirabad (Rural)	601857	1188	1286	419	2893
	Munirabad Project Area (CT)	'601860	3852	3765	541	8158
MUNIRABAD (DAM)	Holemudlapur	601859	428	426	123	977
Hosahalli	Hosahalli	601858	4891	5008	1702	11601
HITNAL	Bevinhalli	601850	1007	972	336	2315
	Hitnal	601853	2414	2384	810	5608
	Kampasagar	601855	723	748	221	1692
AGALKERA	Shahapur	601760	821	834	323	1978

	Agalkera	601849	2113	2115	667	4895
	Bullapur	601854	51	49	8	108
GULDAHALLI	Gabbur	601757	548	493	189	1230
	Lingadahalli	601759	357	377	128	862
	Rudrapura	601761	78	73	22	173
	Guldahalli	601837	1164	1130	458	2752
	Kerihalli	601838	717	664	332	1713
		Kutganhalli	601756	383	365	152
GINIGERA	Giniger	601758	3837	3278	1334	8449
	Kanakapur	601762	1128	1026	389	2543
	Basapur	601764	890	810	395	2095
	Kidadhal	601765	416	407	200	1023
		Allanagar	601763	537	507	168
HIREBOGANHAL	Hireboganhal	601776	1069	983	359	2411
	Chikboganhal	601785	646	577	265	1488
	Karkihalli	601786	1016	1021	391	2428
	Hirekhasankandi	601851	728	761	315	1804
		Halwarti	601775	1036	976	465
KUNIKERA	Kunikera	601777	1468	1384	619	3471
	Lachankera	601784	1438	1363	481	3282
		Chukankal	601772	539	535	171
BAHADDURBANDI	Bahaddurbandi	601773	1262	1191	419	2872
	Huvinhal	601774	354	385	146	885
	Hoshalli	601778	839	820	337	1996
	Hyati	601782	987	987	340	2314
	Mellikeri	601783	194	197	93	484
		Koppal(CMC)	803073	30541	30492	9665
Total			600855	595337	202302	1398494

Appendix 1. 3: Land Utilisation Statistics (preceding 3 years' average)

District: Koppal

(Area in hectares)

Sl No	Taluk	Geographical area	Forest area	Land under non-agri. Use	Cultivable waste	Permanent pastures	Land under miscellaneous tree crops and groves	Current fallow	Other fallows	Net sown area	Gross cropped area	Cropping intensity (%)
1	2	3	4	5	6	7	8	9	10	11	12	13
1	Gangavati	132131	14482	20439	560	7193	0	19343	0	93138	131732	1.41
2	Koppal	136755	10779	7710	430	1486	210	4823	0	97037	113418	1.17
3	Kustagi	135779	4110	7658	811	3898	0	12675	0	92780	112011	1.21
4	Yelburga	147830	80	3196	767	2098	0	32343	0	112808	131329	1.16
Total		552495	29451	39003	2568	14675	210	69184	0	395763	488490	1.23

Appendix 1.4: Data on Weather (Available normals)

District: Koppal

Sl.No.	Taluk	Rainfall		Temperature		Humidity (%)	
		No. of rainy days	Average rainfall (mm)	Min. 0C	Max. 0C	Min	Max
1	2	3	4	5	6	7	8
1	Gangavati	37	585				
2	Koppal	36	628				
3	Kustagi	39	582				
4	Yelburga	37	598				
Total		37	587	0	0	0	0

Appendix 1.5: Taluka wise monthly rainfall data(mm)

District:

(Latest data)

Sl.No.	Taluk	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total	Avg
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	Gangavati	0.80	0.03	13.15	85.19	26.28	28.91	17.14	64.94	166.77	18.20	4.90	7.00	433.31	36.11
2	Koppal	0.65	0.04	18.19	44.15	32.73	69.43	15.50	110.58	194.55	41.12	3.24	0.00	530.18	44.18
3	Kustagi	1.03	0.01	14.30	72.87	59.59	49.69	9.33	74.77	217.56	46.50	9.61	1.00	556.26	46.35
4	Yelburga	0.74	0.14	23.45	74.50	27.55	79.31	15.12	95.13	161.19	48.59	1.80	0.00	527.52	43.96
Total		0.80	0.06	17.41	69.13	36.27	57.46	14.33	86.72	184.53	38.84	4.81	2.00	512.36	42.70

Appendix 1.6 Runoff and soil loss in Koppal district

Dist.Tal.G P	area · ha	T. Rainfall(mm)				T. Runoff %				No of runoff events				T.slt loss(t)			
		2011	2012	2013	2014	2011	2012	2013	2014	2011	2012	2013	2014	2011	2012	2013	2014
Koppal, Koppal, Hasagal	513	473.93	506.8	595	669.76	5.3	5	2.9	3.85	2	2	3	3	617.6	528.4	840	540

Appendix 1.7 Slope characters of Koppal district

Slope Characteristics		
Sl NO	Slope Category	Area (Ha)
1	0 - 1 %	159772
2	1 - 3 %	301304
3	3 - 5 %	57746
4	5 - 10 %	14091
5	10 - 15 %	8102
6	15 - 35 %	5759
7	35 - 50 %	5721
Total		552495

Appendix 3.1: Minor Irrigation tanks

Taluka	No of tanks	Water storage capacity (million cubic feet)	Area that can be Irrigated (Ha)
Koppal	24	349.78	2447
Gangavathi	40	529.01	4701
Yalburga	16	277.17	2033
Kushtagi	41	779.24	6505
Total	121	1935.20	15686

Appendix 3.2 Irrigation by minor irrigation structures in Koppal district(ha)

Sl.No.	Taluk	Canals (Area)	Tanks		Open Wells		Tube/Bore Wells		Lift irrigation		Other sources		Total	
			Nos.	Area	Nos.	Area	Nos.	Area	Nos.	Area	Nos.	Area	Nos.	Area
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	Koppal	-	24	1263	-	-	-	-	13	2932	1	40	38	4235
2	Gangavathi	-	40	2239	-	-	-	-	2	135	10	496	52	2870
3	Yalburga	-	16	881	-	-	-	-	0	0	6	260	22	1141
4	Kushtagi	-	41	2301	-	-	-	-	0	0	14	660	55	2961
	Total		121	6684	0	0	0	0	15	3067	31	1456	167	11207

Executive Engineer,
M.I.Division
Kushtagi

Table 3.3: Land Utilisation Statistics (preceding 3 years' average)

District: Koppal

SI No	Taluk	Geographical area	Net sown area	Gross cropped area	Tube Wells		
					Nos	Gross Irrigated Area	Net Area Irrigated
1	2	3	11	12			
1	Gangavati	132131	93138	131732	300	13685	13087
2	Koppal	136755	97037	113418	4965	38386	26374
3	Kustagi	135779	92780	112011	300	20757	14412
4	Yelburga	147830	112808	131329	952	22266	18462
Total		552495	395763	488490	6517	95094	72335

Appendix 3. 4: Details of command area, presently irrigated under TBP, in koppal district

Name of the BLOCK	Sl. no	Name of the Village	TBP commond Notified AREA in Ha	TBP Canal Irrigation Area in Ha as on 2015
	1	2		
KOPPAL BLOCK	1	Munirabad	273.00	172.00
	2	Holimudlapur	135.00	132.00
	3	Huligi	14.00	309.00
	4	Hosalli	90.00	136.00
	5	Kampasagar	245.00	100.00
	6	Bullapur	47.00	83.00
	7	Hitnal	254.00	334.00
	8	Agalkera	218.00	199.00
	9	Sivpur	321.00	492.00
	10	ckikkakasankindi	31.00	304.00
	11	Bevinahal	63.00	249.00
	12	Sahapur	59.00	73.00
	13	Bandiharlapur	130.00	166.00
	14	Md.nagar	66.00	87.00
	15	Attivatti	80.00	76.00
	16	Narayanpet	64.00	60.00
	17	Basapur	77.00	61.00

	18	Ayodya	72.00	52.00
	19	Rajam-pet	44.00	40.00
		Block TOTAL	2283.00	3125.00
GANGAVATI	1	Tirumalpur	33.00	32.00
BLOCK	2	Chikkarampur	0.00	89.00
	3	Virupapur gaddy	0.00	54.00
	4	Sanapur	19.00	74.00
	5	Krishnapur	52.00	56.00
	6	Rajapur	40.00	62.00
	7	Shingangundi	66.00	87.00
	8	Sangapur	128.00	179.00
	9	Lakshmipur	49.00	124.00
	10	Rampur	76.00	183.00
	11	Hanumanhalli	0.00	85.00
	12	Anegundi	106.00	214.00
	13	Basavanadurga	38.00	204.00
	14	Ramdurga	106.00	106.00
	15	Vipra	0.00	105.00
	16	Mallapur	56.00	69.00
	17	Virupapur	35.60	130.00
	18	Rangapur	38.00	52.00
	19	Anjanhalli	12.00	83.00
	20	Basapatna	432.00	500.00
	21	Hirejantakal	0.00	275.00
	22	Gangavati	931.30	1011.00
	23	HOsalli	0.00	209.00
	24	Nagaralli	0.00	129.00
	25	Odderhatti	229.00	350.00

	26	Hirebenakal	20.00	25.00
	27	Dasanahal	108.00	250.00
	28	Bagalpur	267.50	320.00
	29	Battarhanchinal	277.42	540.00
	30	Chikkajantgal	0.00	304.00
	31	Jangamarkalgudi	334.20	619.00
	32	Ayodya	363.42	494.00
	33	Achalapur	85.80	91.00
	34	Danapur	374.30	582.00
	35	Arahal	370.92	450.00
	36	Herur	561.92	782.00
	37	Hanval	2360.10	2000.00
	38	Kesarahatti	272.15	300.00
	39	Gonal	35.88	244.00
	40	Marakumbi	260.08	250.00
	41	Marali	588.91	755.00
	42	Hoskera	488.08	773.00
	43	Guldal	316.05	410.00
	44	Kesakkiahanchinal	112.20	232.00
	45	Singanal	622.67	850.32
	46	Jiralkalgudi	307.05	350.00
	47	Gundur	1465.86	1608.00
	48	Krishnapur	404.40	450.00
	49	Achar narasapur	378.50	315.00
	50	Shriramnagar	766.13	752.00
	51	Hebbal	775.26	541.00
	52	Baragur	509.08	540.47
	53	Mustur	1119.00	1480.37

	54	Jampur	0.00	746.47
	55	Kuntoji	432.00	980.50
	56	Chikkadankankal	143.32	200.00
	57	Hirednkankal	197.66	250.00
	58	Tondihal	723.24	678.00
	59	Somnal	331.49	736.00
	60	Gudur	0.00	223.23
	61	Challur	1213.17	876.00
	62	Hagedal	393.98	423.00
	63	Mylapur	52.26	200.00
	64	Bevinhal	590.07	1244.00
	65	Karatagi	894.35	2226.00
	66	Pannapur	427.47	424.00
	67	Hulkihal	716.85	1035.00
	68	Marlanahalli	371.31	490.00
	69	Juratagi	291.00	384.00
	70	Yaradona	1367.97	1632.00
	71	Budagumpa	643.00	870.00
	72	Timmapur	640.26	982.00
	73	Halasamudra	369.51	246.10
	74	Krishnapur	0.00	230.00
	75	Siddapur	775.79	1005.00
	76	Kotnekal	403.49	670.29
	77	Iliganur	838.21	1144.20
	78	Ulenur	989.60	1110.61
	79	Jamapur	489.68	746.00
	80	Kuntoji	165.20	980.00
	81	Bennur	1021.59	840.32

	82	Shalignur	213.38	350.00
	83	Kakkargol	948.09	936.15
	84	Nandihalli	0.00	350.06
		GVT.Block TOTAL	31635.72	43979.09
		KOPPAL BLOCK	2283.00	3125.00
		DISTRICT TOTAL	33645.7	46932.1

Sl. No	Name of the Village	TBP commond Notified AREA in Ha	TBP Canal Irrigation Area in Ha as on 2015
1	2		
1	Holimudlapur	135.00	132.00
2	Munirabad	273.00	172.00
3	Huligi	14.00	309.00
4	Hosalli	90.00	136.00
5	Kampasagar	245.00	100.00
6	Bullapur	47.00	83.00
7	Hitnal	254.00	334.00
8	Agalkera	218.00	199.00
9	Sivpur	321.00	492.00

10	ckikkakasankindi	31.00	304.00
11	Bevinahal	63.00	249.00
12	Sahapur	59.00	73.00
13	Bandiharlapur	130.00	166.00
14	Md.nagar	66.00	87.00
15	Attivatti	80.00	76.00
16	Narayanpet	64.00	60.00
17	Basapur	77.00	61.00
18	Ayodya	72.00	52.00
19	Rajam-pet	44.00	40.00
20	Tirumalpur	33.00	32.00
21	Chikkarampur	0.00	89.00
22	Virupapur gaddy	0.00	54.00
23	Sanapur	19.00	74.00
24	Krishnapur	52.00	56.00
25	Rajapur	40.00	62.00
26	Shingangundi	66.00	87.00
27	Sangapur	128.00	179.00
28	Lakshmipur	49.00	124.00
29	Rampur	76.00	183.00
30	Hanumanhalli	0.00	85.00
31	Anegundi	106.00	214.00
32	Basavanadurga	38.00	204.00
33	Ramdurga	106.00	106.00
34	Vipra	0.00	105.00
35	Mallapur	56.00	69.00
36	Virupapur	35.60	130.00
37	Rangapur	38.00	52.00
38	Anjanhalli	12.00	83.00

39	Basapatna	432.00	500.00
40	Hirejantakal	0.00	275.00
41	Gangavati	931.30	1011.00
42	HOsalli	0.00	209.00
43	Nagaralli	0.00	129.00
44	Odderhatti	229.00	350.00
45	Hirebenakal	20.00	25.00
46	Dasanahal	108.00	250.00
47	Bagalpur	267.50	320.00
48	Battarhanchinal	277.42	540.00
49	Chikkajantgal	0.00	304.00
50	Jangamarkalgudi	334.20	619.00
51	Ayodya	363.42	494.00
52	Achalapur	85.80	91.00
53	Danapur	374.30	582.00
54	Arahal	370.92	450.00
55	Herur	561.92	782.00
56	Hanval	2360.10	2000.00
57	Kesarahatti	272.15	300.00
58	Gonal	35.88	244.00
59	Marakumbi	260.08	250.00
60	Marali	588.91	755.00
61	Hoskera	488.08	773.00
62	Guldal	316.05	410.00
63	Kesakkihanchinal	112.20	232.00
64	Singanal	622.67	850.32
65	Jiralkalgudi	307.05	350.00
66	Gundur	1465.86	1608.00
67	Krishnapur	404.40	450.00

68	Achar narasapur	378.50	315.00
69	Shriramnagar	766.13	752.00
70	Hebbal	775.26	541.00
71	Baragur	509.08	540.47
72	Mustur	1119.00	1480.37
73	Jampur	0.00	746.47
74	Kuntoji	432.00	980.50
75	Chikkadankankal	143.32	200.00
76	Hirednkankal	197.66	250.00
77	Tondihal	723.24	678.00
78	Somnal	331.49	736.00
79	Gudur	0.00	223.23
80	Challur	1213.17	876.00
81	Hagedal	393.98	423.00
82	Mylapur	52.26	200.00
83	Bevinhal	590.07	1244.00
84	Karatagi	894.35	2226.00
85	pannapur	427.47	424.00
86	Hulkihal	716.85	1035.00
87	Marlanahalli	371.31	490.00
88	Juratagi	291.00	384.00
89	Yaradona	1367.97	1632.00
90	Budagumpa	643.00	870.00
91	Timmapur	640.26	982.00
92	Halasamudra	369.51	246.10
93	Krishnapur	0.00	230.00
94	Siddapur	775.79	1005.00
95	kotnekal	403.49	670.29
96	iliganur	838.21	1144.20

97	Ulenur	989.60	1110.61
98	Jamapur	489.68	746.00
99	Kuntoji	165.20	980.00
100	Bennur	1021.59	840.32
101	Shalignur	213.38	350.00
102	Kakkargol	948.09	936.15
104	Nandihalli	0.00	350.06
	Total	33918.72	47104.09

Appendix 4.1 Domestic water demand

Blocks (Name of the city /Town)	Population in 2015	Projected population in 2020	Gross water demand(BCM)
Koppal City with TB river as source	80000	105000	14.17 MLD
Gangavati City with TB river as source	114000	135000	18.22 MLD
Yelburga Town with Hirehalla dam as source	17000	19000	2.56 MLD
Kustagi town with Almatti Dam as source	26500	28500	3.84 MLD

Source KUWSD Board

Appendix 4.2 Talukwise Water Demand of Koppal District (Rural)

I Gangavathi Taluk:

1	Rural population in 2015	:	356950
2	Considering 1.58 % increase in population per year, the population in 2020	:	385149
3	Water demand per year considering 40 LPCD		
	$\frac{385149 \times 40 \times 365}{1000 \times 10^9}$:	0.0056 BCM

II Koppal Taluk:

1	Rural population in 2015	:	321587
2	Considering 1.58 % increase in population per year, the population in 2020	:	346992
3	Water demand per year considering 40 LPCD		
	$\frac{346992 \times 40 \times 365}{1000 \times 10^9}$:	0.0051 BCM

III Kushtagi Taluk

1	Rural population in 2015	:	275400
2	Considering 1.58 % increase in population per year, the population in 2020	:	297157
3	Water demand per year considering 40 LPCD		
	$\frac{297157 \times 40 \times 365}{1000 \times 10^9}$:	0.0043 BCM

IV Yelburga Taluk

1	Rural population in 2015	:	260993
2	Considering 1.58 % increase in population per year, the population in 2020	:	281611
3	Water demand per year considering 40 LPCD		
	$\frac{281611 \times 40 \times 365}{1000 \times 10^9}$:	0.0041 BCM

Total water demand for the District (Rural)

1	Rural population in 2015	1214930
2	Considering 1.58 % increase in population per year, the population in 2020	1310909
3	Water demand per year considering 40 LPCD	0.0191 BCM
	$\frac{1310909 \times 40 \times 365}{1000 \times 10^9}$	

Executive Engineer
RDW&S Division
Koppal

Appendix 4.3 Livestock Water demand

Block	Total no of Livestock & Poultry	Present Water Demand (Bcm) in ltrs/day	Water Demand in 2020 (Bcm) ltrs	Existing water potential	Water Potential to be created
Koppal	3623970	7065475	10598213		0
Gangavthi	363873	5545894	8318841		0
Kustagi	295617	4640740	6961110		0
Yelburga	356082	4128885	6193328		0
Koppal	4639542	21380995	32071492		0

Note: required amount of water is 10 % of animal's body wieght

on average

*50 Litres /day for cattle & buffalos

*5 Litres /day for sheep, goat & pigs

*0.25 Litres /day for poultry

APPENDIX 5.1: List of works proposed under minor irrigation department in Yelburga taluk

SL No	Name work	Estd.Cost (Rs. In Lakhs)	Potential planned in (Ha)	BC Ratio
1	2	6	7	9
1	Construction of Check Dam Near Karmudi Village Site-1	87.00	40.00	1.10
2	Construction of Check Dam Near Tumar guddi Village	79.00	33.00	1.13
3	Construction of Check Dam Near Maddalur Village	93.00	40.00	1.25
4	Construction of Check Dam Near kudari koti Village	71.00	40.00	1.10
5	Construction of Check Dam Near Sompur Village	55.25	25.00	1.10
6	Construction of Check Dam Near Malekoppa Village Site-1	76.00	39.00	1.20
7	Construction of Check Dam Near Manapur Village	84.50	40.00	1.10
8	Construction of Check Dam Near Mandalgeri Village Site 1	137.00	40.00	1.15
9	Construction of Check Dam Near Batapan Halli Village	122.00	50.00	1.10
10	Construction of Check Dam Near Binnal & Chikenakoppa Village	107.80	45.00	1.10
11	Construction of Check Dam Near Binnal & Yere Hanchinal Village	56.00	35.00	1.28
12	Construction of Check Dam Near TondiHall Village	192.00	60.00	1.15
13	Construction of Check Dam Near SidanekoppaVillage Site-1	107.00	45.00	1.16
14	Construction of Check Dam Near Sidanekoppa Village Site-2	102.00	45.00	1.22
15	Construction of Check Dam Near Sidanekoppa Village Site-3	103.00	45.00	1.26
16	Construction of Check Dam Near Sidanekoppa Village Site-4	102.00	45.00	1.26
17	Construction of Check Dam Near Sidanekoppa Village Site-5	99.00	40.00	1.25
18	Construction of Check Dam Near Balgeri Village	122.00	50.00	1.10
19	Construction of Check Dam Near Budgumpi Village	154.60	55.00	1.11
20	Construction of Check Dam Near Kallur Village	387.00	155.00	1.10
21	Construction of Check Dam Near Gedageri Village Site-1	128.00	52.00	1.12

22	Construction of Check Dam Near Gedageri Village Site-2	118.70	58.00	1.16
23	Construction of Check Dam Near Tumarguddi Village	105.50	55.00	1.11
24	Construction of Check Dam Near Yelburga Village	184.50	80.00	1.11
25	Construction of Check Dam Near Mudhol Village	159.50	60.00	1.12
26	Construction of Check Dam Near Karmudi Village Site -2	121.00	50.00	1.10
27	Construction of Check Dam Near Sanknur Village Site -1	116.80	48.00	1.18
28	Construction of Check Dam Near Sanknur Village Site -2	113.00	50.00	1.15
29	Construction of Check Dam Near Sirgumpi Village Site -1	123.50	50.00	1.16
30	Construction of Check Dam Near Sirgumpi Village Site -2	140.00	58.00	1.13
31	Construction of Check Dam Near Katral Village	133.00	55.00	1.11
32	Construction of Check Dam Near Maddlur Village Site -2	125.00	50.00	1.14
33	Construction of Check Dam Near Yere Hanchinal Village Site -1	133.00	55.00	1.18
34	Construction of Check Dam Near Yere Hanchinal Village Site -2	136.00	55.00	1.15
35	Construction of Check Dam Near Batapanhalli Village Site -2	74.78	35.00	1.23
36	Construction of Check Dam Near Batapanhalli Village Site -3	91.00	40.00	1.23
37	Construction of Check Dam Near Goralekoppa Village	113.00	50.00	1.19
38	Construction of Check Dam Near Itage Village	82.50	40.00	1.23
39	Construction of Check Dam Near Gedageri Village Site-3	75.50	35.00	1.24
40	Construction of Check Dam Near Murudi Village	111.50	50.00	1.22
41	Construction of Check Dam Near Hire Vankalkunta Village	170.00	60.00	1.16
42	Construction of Check Dam Near Kalbavi Village	121.50	50.00	1.16
43	Construction of Check Dam Near Yaddoni Village	77.00	35.00	1.29
44	Construction of Check Dam Near Komalapur Village	94.25	40.00	1.21
45	Construction of Check Dam Near Lakamapur Village Site-1	71.80	35.00	1.26
46	Construction of Check Dam Near Lakamapur Village Site-2	76.50	35.00	1.24
47	Construction of Check Dam Near Chikoppa Village Site-1	67.00	30.00	1.17
48	Construction of Check Dam Near Chikoppa Village Site-2	122.00	50.00	1.27
49	Construction of Check Dam Near Aralihali Village Site-1	94.00	40.00	1.25

50	Construction of Check Dam Near Aralihali Village Site-2	121.50	50.00	1.25
51	Construction of Check Dam Near Bevoor Village	105.00	45.00	1.24
52	Construction of Check Dam Near Guttur Village	78.50	35.00	1.24
53	Construction of Check Dam Near Kudugunti Village	148.50	60.00	1.16
54	Construction of Check Dam Near Mangalore Village Site-1	180.00	65.00	1.18
55	Construction of Check Dam Near Mangalore Village Site-2	140.30	60.00	1.23
56	Construction of Check Dam Near Tondihal Village Site-1	191.00	65.00	1.18
57	Construction of Check Dam Near Tondihal Village Site-2	105.80	45.00	1.22
58	Construction of Check Dam Near Vazarbandi Village	72.00	35.00	1.24
59	Construction of Check Dam Near Balutagi Village Site-1	53.60	35.00	1.26
60	Construction of Check Dam Near Balutagi Village Site-2	96.50	45.00	1.26
61	Construction of Check Dam Near Malekoppa Village Site-2	85.30	35.00	1.14
62	Construction of Check Dam Near Mandalgeri Village Site-2	76.00	35.00	1.24
63	Construction of Bridge cum barrage Near Battappan Halli Village	280.00	100.00	1.18
64	Construction of Bridge cum barrage Near Yere Hanchinahal & Timmapur Village	298.00	100.00	1.11
65	Construction of Bridge cum barrage Near Virapur & Chandur Village	814.00	175.00	1.11
66	Construction of Bridge cum barrage Near Hire Bidnahall Village	589.00	130.00	1.10
67	Construction of Pickup near Kudlur village in Kushtagi Taluk, Koppal District.	80.00	40.00	1.10
68	Construction of Pickup near Hulyapur (Navalahalli-Hulyapur) village in Kushtagi Taluk, Koppal District.	90.00	45.00	1.30
69	Construction of Pickup across smalla halla near Navalahalli-Hulyapur village in Kushtagi Taluk, Koppal District.	80.00	40.00	1.10
70	Construction of Pickup near Maturu village in Kushtagi Taluk, Koppal District.	150.00	42.00	1.10
71	Construction of Pickup near Bijakal village in Kushtagi Taluk, Koppal District.	80.00	40.00	1.10
72	Construction of Pickup near Hesaruru village in Kushtagi Taluk, Koppal District.	60.00	40.00	1.15
73	Construction of Pickup near Basapur village in Kushtagi Taluk, Koppal District.	200.00	68.00	1.12

74	Construction of Pickup in the lands of Prahlad near Huliapur village in Kushtagi Taluk, Koppal District.	150.00	50.00	1.16
75	Construction of Pickup near Balutagi village in Kushtagi Taluk, Koppal District.	100.00	60.00	1.18
76	Construction of Pickup near Tengunti village in Kushtagi Taluk, Koppal District.	120.00	63.00	1.10
77	Construction of Pickup near Nidashesi village in Kushtagi Taluk, Koppal District.	80.00	40.00	1.10
78	Construction of Pickup near Jalihal village in Kushtagi Taluk, Koppal District.	130.00	65.00	1.12
79	Construction of Pickup near Dhotihal village in Kushtagi Taluk, Koppal District.	40.00	40.00	1.10
80	Construction of Pickup near Masabanala-Kurubanala village in Kushtagi Taluk, Koppal District.	37.00	40.00	1.16
81	Construction of Pickup across right side halla near Malagitti village in Kushtagi Taluk, Koppal District.	35.00	40.00	1.18
82	Construction of Pickup across left side halla near Malagitti village in Kushtagi Taluk, Koppal District.	55.00	40.00	1.10
83	Construction of Pickup near Mettalakoda village in Kushtagi Taluk, Koppal District.	60.00	40.00	1.12
84	Construction of Pickup near Kadiwal village in Kushtagi Taluk, Koppal District.	75.00	40.00	1.12
85	Construction of Pickup near Malagitti-Kadiwal village in Kushtagi Taluk, Koppal District.	30.00	40.00	1.10
86	Construction of Pickup near Nilogal village in Kushtagi Taluk, Koppal District.	60.00	40.00	1.16
87	Construction of Pickup near Shakhapur village in Kushtagi Taluk, Koppal District.	25.00	40.00	1.15
88	Construction of Pickup near Honamatti village in Kushtagi Taluk, Koppal District.	100.00	45.00	1.13
89	Construction of Pickup near Dhotihal village in Kushtagi Taluk, Koppal District.	45.00	40.00	1.15
90	Construction of Pickup in N.H. Road side near Killarahatti village in Kushtagi Taluk, Koppal District.	55.00	40.00	1.10
91	Construction of Pickup across Garjanal halla near Tavaragera village in Kushtagi Taluk, Koppal District.	53.00	40.00	1.16
92	Construction of Pickup near Kalamalli village (Tavaragera, Kalamalli, Amrapur Road) in Kushtagi Taluk, Koppal District.	60.00	40.00	1.15
93	Construction of Pickup across halla near Hanchinal village in Kushtagi Taluk, Koppal District.	130.00	65.00	1.10

94	Construction of Pickup across halla near Sanganal village in Kushtagi Taluk, Koppal District.	40.00	40.00	1.10
95	Construction of Pickup across halla near Killarahatti village in Kushtagi Taluk, Koppal District.	60.00	40.00	1.15
96	Construction of Pickup across Chathrar madagu halla near Amarapur village in Kushtagi Taluk, Koppal District.	56.00	40.00	1.16
97	Construction of Pickup in the lands of Basanagouda in Vithalapur village in Kushtagi Taluk, Koppal District.	65.00	40.00	1.13
98	Construction of Pickup near Menedal village in Kushtagi Taluk, Koppal District.	100.00	55.00	1.10
99	Construction of Pickup near Siddapur-Menedal village in Kushtagi Taluk, Koppal District.	120.00	58.00	1.10
100	Construction of Pickup near Hiremukartinal village in Kushtagi Taluk, Koppal District.	120.00	60.00	1.15
101	Construction of Pickup near Mudenoor village in Kushtagi Taluk, Koppal District.	200.00	72.00	1.10
102	Construction of Pickup near Kesur-Dhotihal village in Kushtagi Taluk, Koppal District.	180.00	52.00	1.14
103	Construction of Pickup near Amarapur (Kamblyar Hall) village in Kushtagi Taluk, Koppal District.	40.00	40.00	1.12
104	Construction of Pickup near Huliyapur Tanda Hale Pickup village in Kushtagi Taluk, Koppal District.	160.00	48.00	1.11
105	Construction of Pickup near Kushtagi (Kandakur Road) village in Kushtagi Taluk, Koppal District.	60.00	40.00	1.17
106	Construction of Pickup near Kushtagi (Tavaragera Road) village in Kushtagi Taluk, Koppal District.	53.00	40.00	1.12
107	Construction of Pickup near Nidashesi village in Kushtagi Taluk, Koppal District.	75.00	40.00	1.10
108	Construction of Pickup near Taluvagera village in Kushtagi Taluk, Koppal District.	55.00	40.00	1.10
109	Construction of Pickup near Yelaburti village in Kushtagi Taluk, Koppal District.	30.00	40.00	1.10
110	Construction of Pickup near Hirebannigol village in Kushtagi Taluk, Koppal District.	30.00	40.00	1.10
111	Construction of Pickup near Yelaburti (Yelburti to Byalihal Road) village in Kushtagi Taluk, Koppal District.	47.00	40.00	1.13
112	Construction of Pickup near Kabbaragi village in Kushtagi Taluk, Koppal District.	66.00	40.00	1.40
113	Construction of Checkdam near Betageri village	176.00	50.00	1.10

114	Construction of Checkdam near Rangunathanahalli -2 Village	107.00	50.00	1.10
115	Construction of Checkdam near Rangunathanahalli -3 Village	111.30	50.00	1.10
116	Construction of Checkdam near Budhial Village (2)	135.50	50.00	1.10
117	Constn.of Pickup Across Ichala Halla near Kolor & Dedagal	77.00	40.00	1.47
118	Construction of Barrage-Cum-Bridge to Madinuru, Ojanhalli, Yatnatti, Gondabal, Budihal, Hydernagar, Raghunathanahalli, Nelogipura site-1, Nelogipura site-2, Handral site-1, Handral site-2, Kavaluru site-1, Kavaluru site-2, Ghatareddihal, Hiresindogi, Kataraki, Gudlanur, Bhochanahalli, Alavandi, Kampli, Dambarahalli, Betageri, Vadaganal, Hirehalla site-1, Hirehalla site-2, Hirehalla site-3, Channahalla site-1, Channahalla site-2, Channahalla site-3, Naregal and Chilavadagi villages of total 30 places.	20000.00	7200.00	1.18
119	Construction of check dam to selected places of Koppal Taluka.	10000.00	5500.00	1.10
120	Construction of new tanks in Koppal constituency.	5000.00	4000.00	1.12
121	Filling of water to tanks in Koppal constituency.	15000.00	6000.00	1.15
	Total	63395.8		

Appendix 5.2 Details of irrigation projects being undertaken in Koppal district

Name of Project	Source	Type of irrigation	Taluka covered	Area of irrigation (Ha)	Water allocation	Status
Koppal Lift Irrigation	Narayanapura Back waters	Lift	Koppal	43760.00	3.982 TMC	Not irrigating yet. Project launced, canal work need to start.
			Kushtagi	32000.00	2.912TMC	
			Yalburga	45320.00	4.124 TMC	
			Gangavathi	4000.00	0.364 TMC	
			sub total	125080.00	11.382 TMC	
Mundragi branch canal (Km 33-72)	Singatalur lift	Lift	Koppal	22544.00	270 cusecs discharge. For entire Singatalur lift including right bank (Huvina Hadagali), the total allocation is 16 TMC	Not irrigating yet. Project launced, canal work need to start.
Alur-Bannikoppa	Singatalur lift	Micro irrigation	Yalburga	5918.25		
			sub total	28462.25		
Hirehalla Project	Veerapura-Hirehalla (Krishna Basin)	Canal/Flow	Koppal	8330.00	1.67 TMC	Area is already being irrigated since around 2007.

Alawandi-Betageri	Tungabhadra	Lift	Koppal	2425.00	0.50 TMC	Not irrigating yet. Project launced, Tender under process.
Bahaddurbhandi	Tungabhadra	Lift	Koppal	8903.00	0.60 TMC	Not irrigating yet. Project launced, Tender under process.
Tungabhadra Left bank high level Canal	Tungabhadra	Canal/Flow	Koppal	414.00	0.815 X 10 ⁻⁴	Old project. Running regular.
No-2 Tungabhadra Left Bank Canal	Tungabhadra	Canal/Flow	Koppal	4872.39		Old project. Running regular.
			Gangavathi	21156.90		Old project. Running regular.
		Grand Total		199643.54		

Appendix 5.3

Abstract Action Plan for completion of CAD W&M Works - Fund requirement

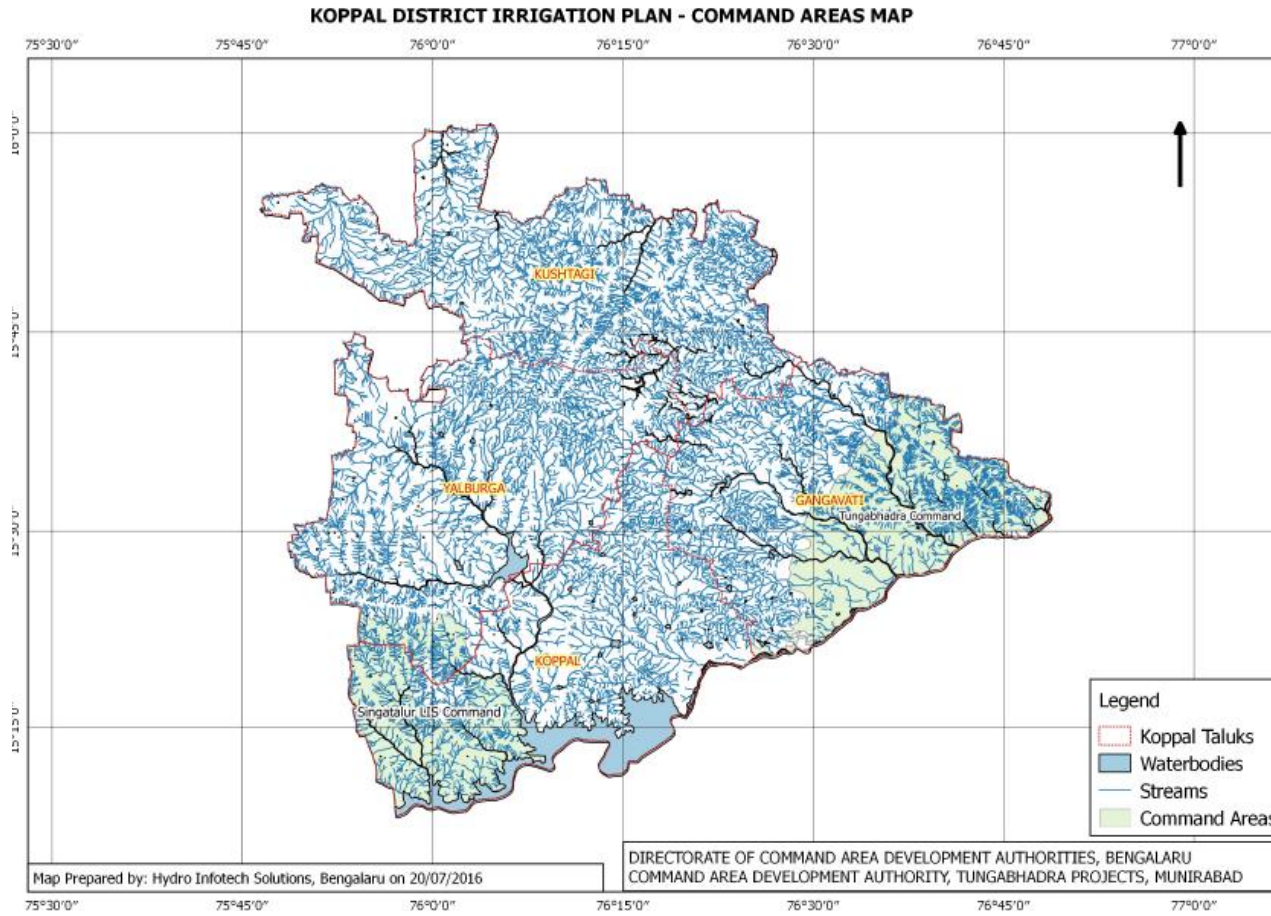
Name of the **TUNGABHADRA**
 project: **PROJECT**
 District: **KOPPALA**

Contemplated Atchcut:
 25752.20 Ha
 Balance Cost: 3204.48 lakhs
 Total Cost: lakhs

Sl. No	Activities	Balance		2016-17				2017-18			
		Phy (Ha)	Fin (Lakhs)	Phy (Ha)	Fin (Lakhs)	Central share	State share	Phy (Ha)	Fin (Lakhs)	Central share	State share
1	B) HAR KETH KO PANI	25752.20	3154.07	1207.68	529.80	264.90	264.90	4909.00	567.45	283.72	283.72
2	C) PER DROP MORE CROP	27995 nos	50.41	10878.00	10.34	7.78	2.59	5382.00	8.01	6.01	2.00
3	D) WATER SHED DEVELOPMENT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	OTHERS	723.00	2892.00	145.00	580.00	290.00	290.00	145.00	580.00	290.00	290.00
	GRAND TOTAL	25752.20	6096.48	1207.68	1120.14	562.68	557.49	4909.00	1155.46	579.73	575.72

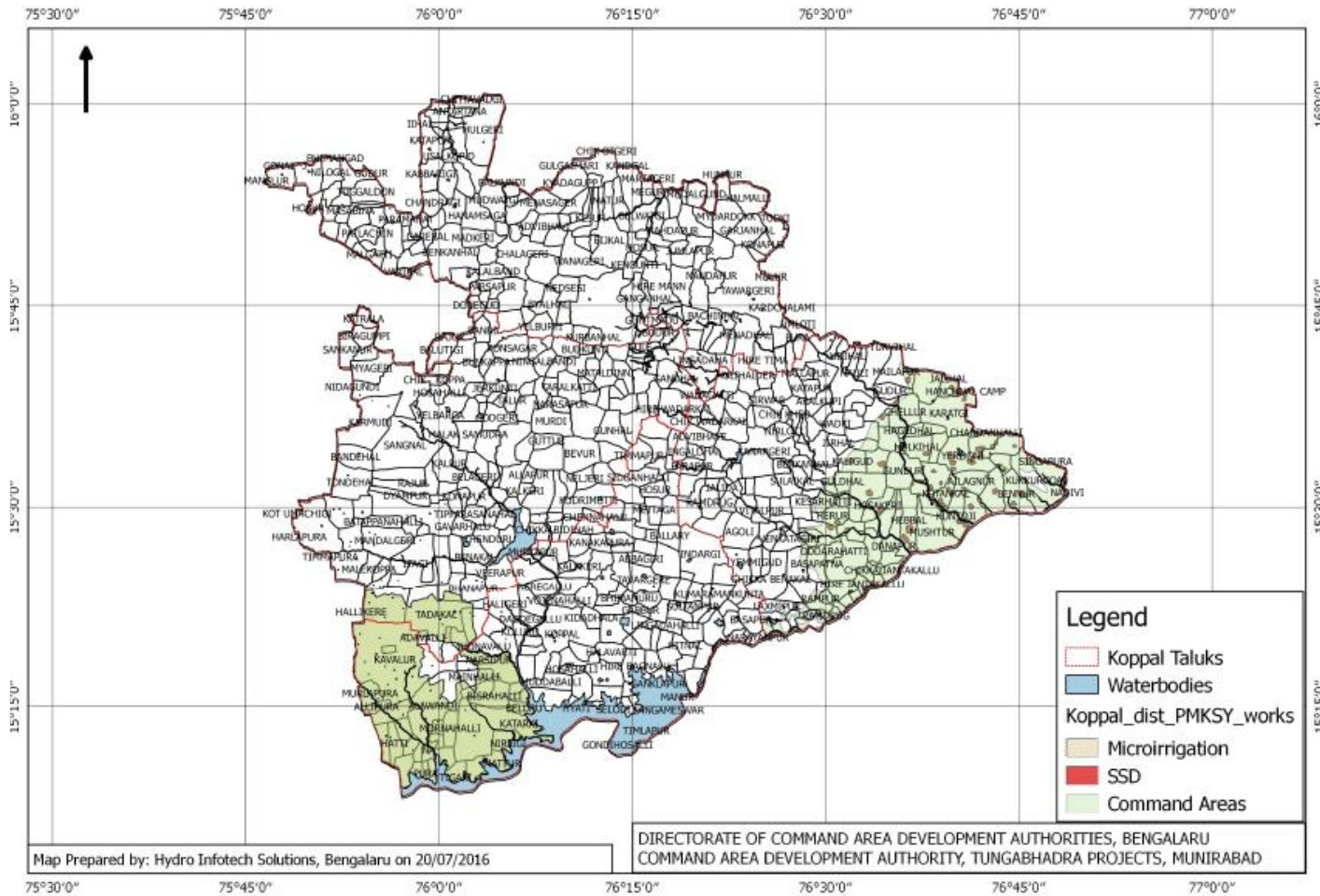
<i>Activities</i>	<i>2018-19</i>				<i>2019-20</i>				<i>2020-21</i>			
	<i>Phy (Ha)</i>	<i>Fin (Lakhs)</i>	<i>Central share</i>	<i>State share</i>	<i>Phy (Ha)</i>	<i>Fin (Lakhs)</i>	<i>Central share</i>	<i>State share</i>	<i>Phy (Ha)</i>	<i>Fin (Lakhs)</i>	<i>Central share</i>	<i>State share</i>
<i>B) HAR KETH KO PANI</i>	<i>6135.87</i>	<i>656.06</i>	<i>340.74</i>	<i>314.71</i>	<i>6627.15</i>	<i>708.55</i>	<i>368.65</i>	<i>339.90</i>	<i>6872.20</i>	<i>734.79</i>	<i>381.87</i>	<i>352.48</i>
<i>C) PER DROP MORE CROP</i>	<i>6727.00</i>	<i>10.02</i>	<i>7.52</i>	<i>2.50</i>	<i>7265.00</i>	<i>10.82</i>	<i>8.11</i>	<i>2.71</i>	<i>7534.00</i>	<i>11.22</i>	<i>8.42</i>	<i>2.80</i>
<i>D) WATER SHED DEVELOPMENT</i>	<i>0.00</i>	<i>0.00</i>	<i>0.00</i>	<i>0.00</i>	<i>0.00</i>	<i>0.00</i>	<i>0.00</i>	<i>0.00</i>	<i>0.00</i>	<i>0.00</i>	<i>0.00</i>	<i>0.00</i>
<i>OTHERS</i>	<i>145.00</i>	<i>580.00</i>	<i>290.00</i>	<i>290.00</i>	<i>144.00</i>	<i>576.00</i>	<i>288.00</i>	<i>288.00</i>	<i>144.00</i>	<i>576.00</i>	<i>288.00</i>	<i>288.00</i>
<i>GRAND TOTAL</i>	<i>6135.87</i>	<i>1246.08</i>	<i>638.26</i>	<i>607.21</i>	<i>6627.15</i>	<i>1295.37</i>	<i>664.76</i>	<i>630.61</i>	<i>6872.20</i>	<i>1322.01</i>	<i>678.29</i>	<i>643.28</i>

Appendix 5.4



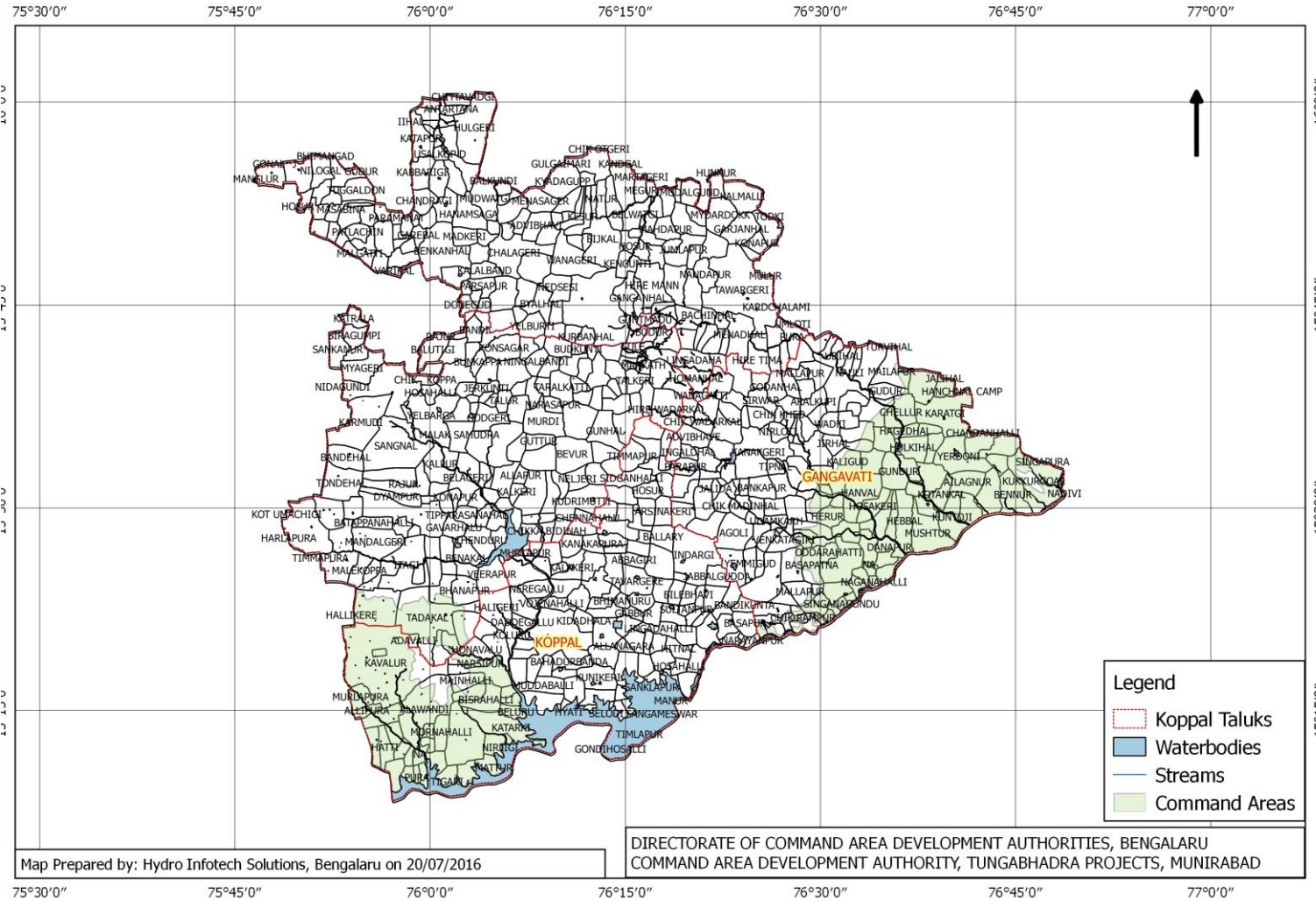
Appendix 5.5

KOPPAL DISTRICT IRRIGATION PLAN - CADA PMKSY WORKS MAP



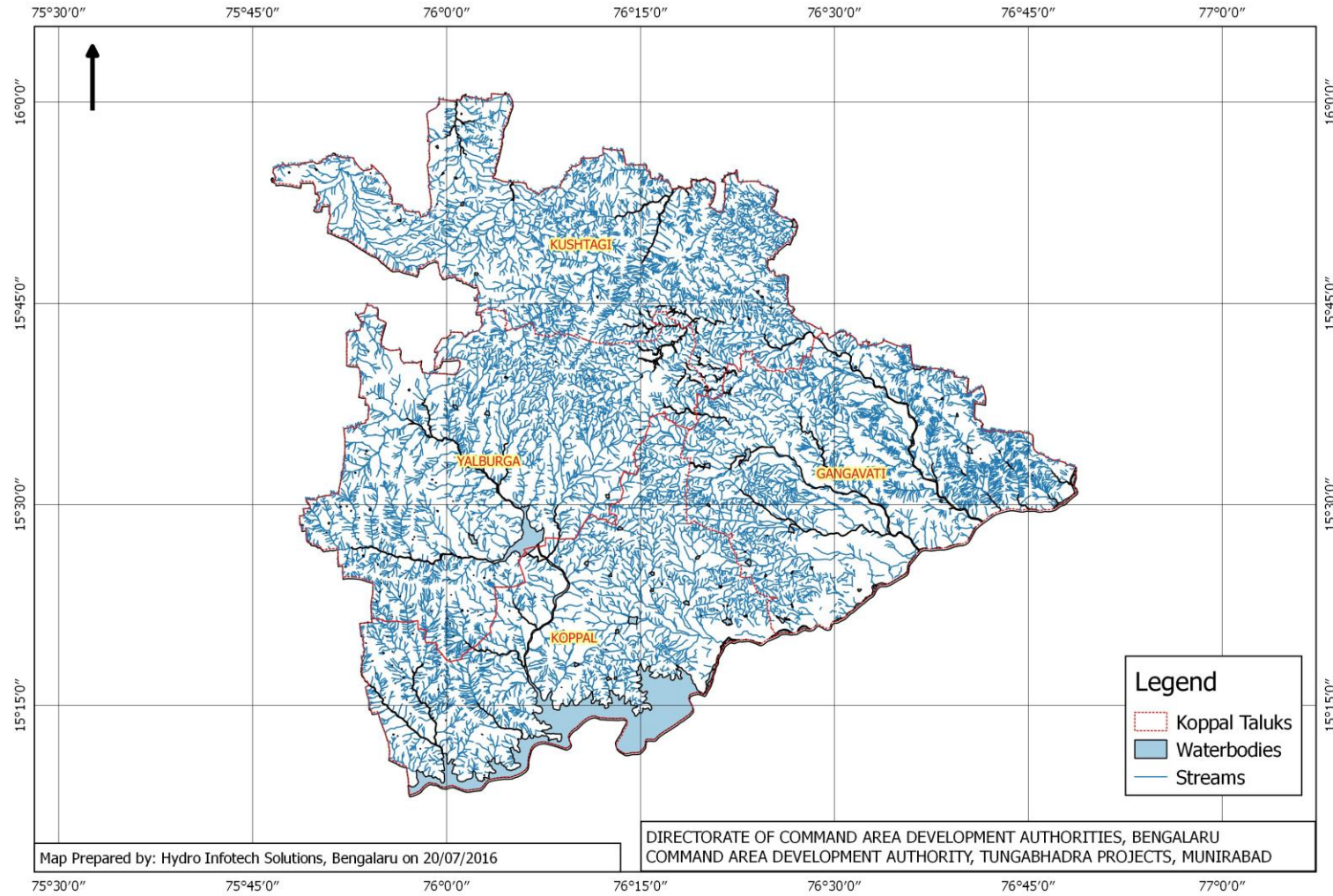
Appendix 5.6

KOPPAL DISTRICT IRRIGATION PLAN - VILLAGE MAP



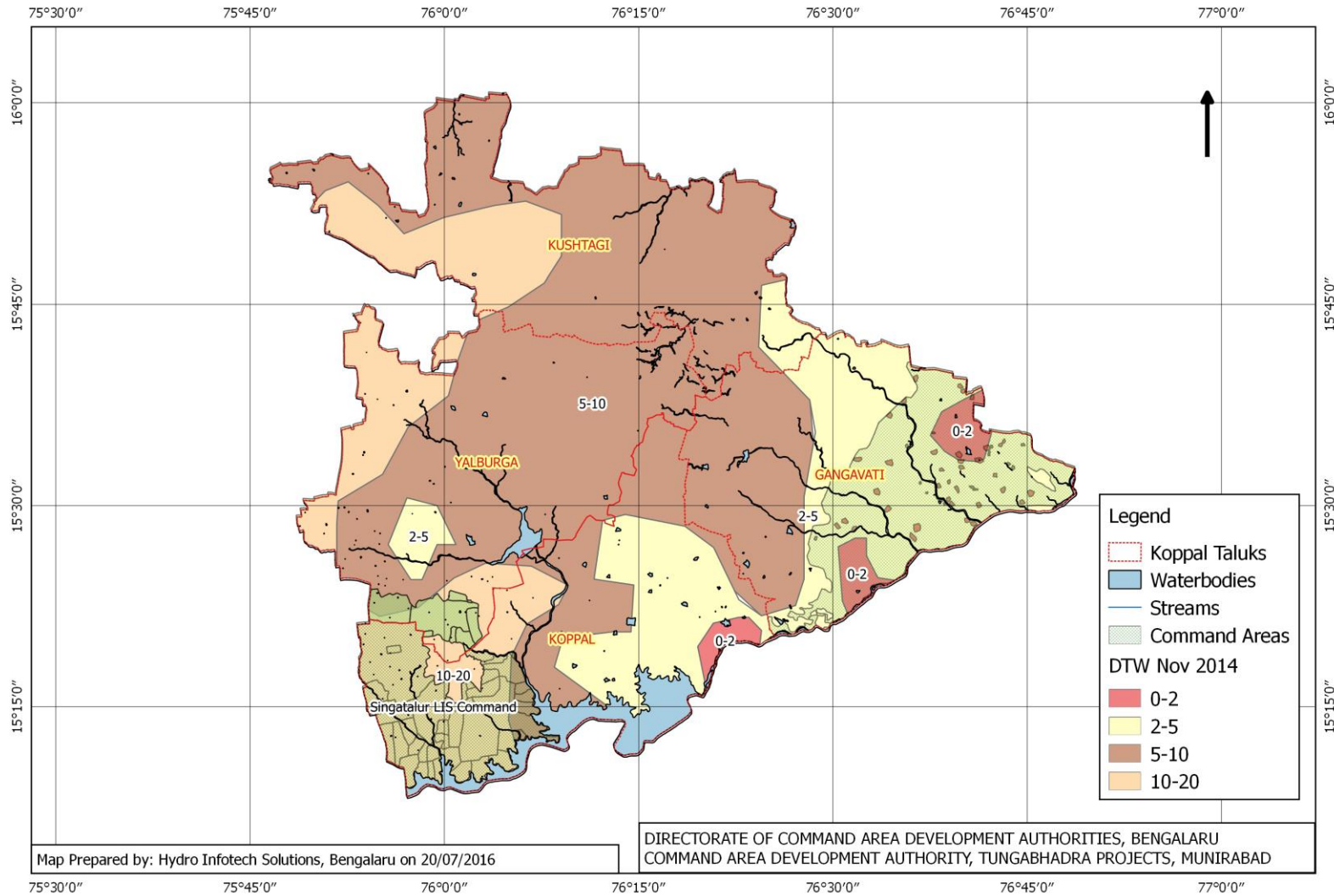
Appendix 5.7

KOPPAL DISTRICT IRRIGATION PLAN - WATERBODIES AND DRAINAGE MAP



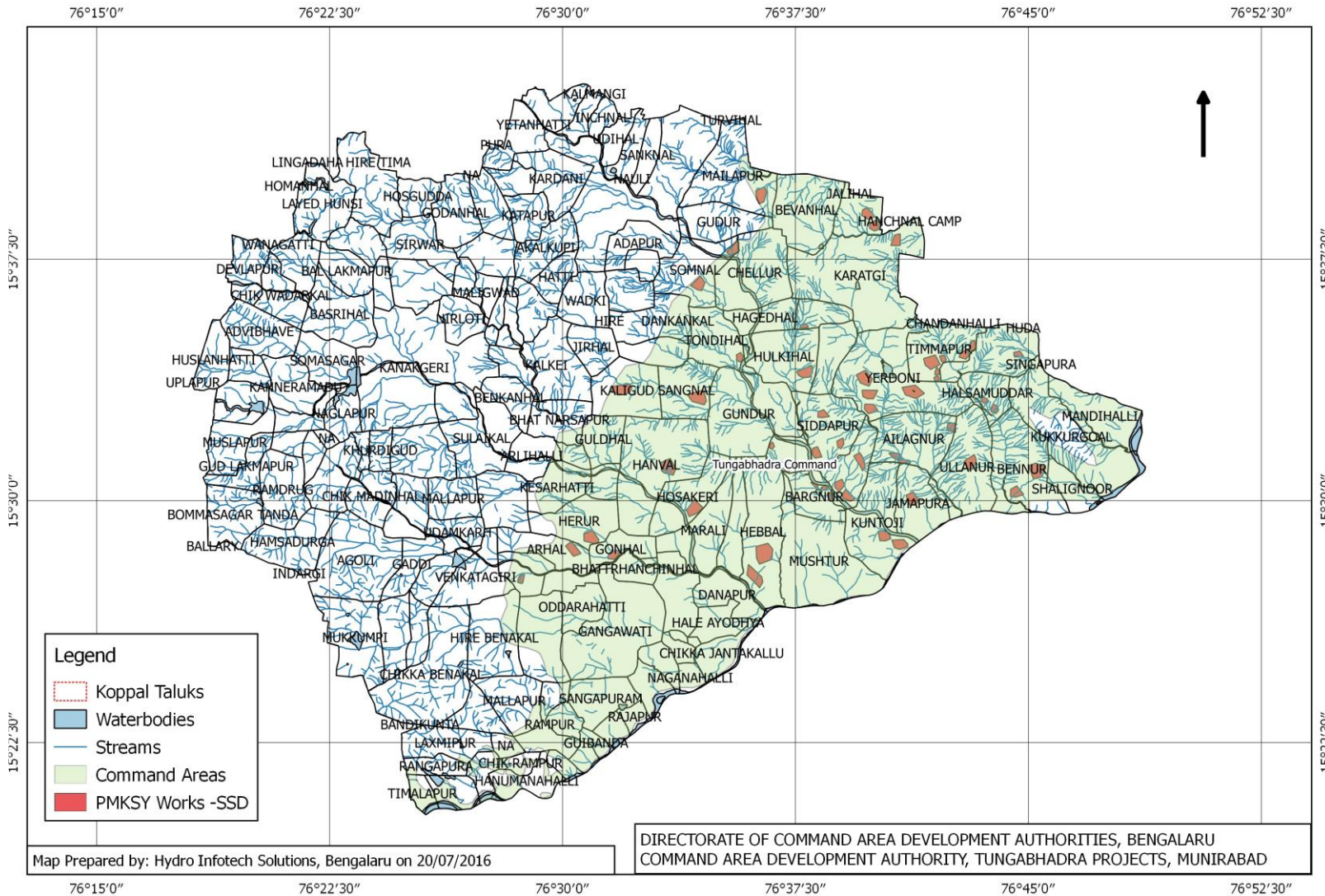
Appendix 5.8

KOPPAL DISTRICT IRRIGATION PLAN - DEPTH TO GROUNDWATER MAP (CGWB, NOV 2014)



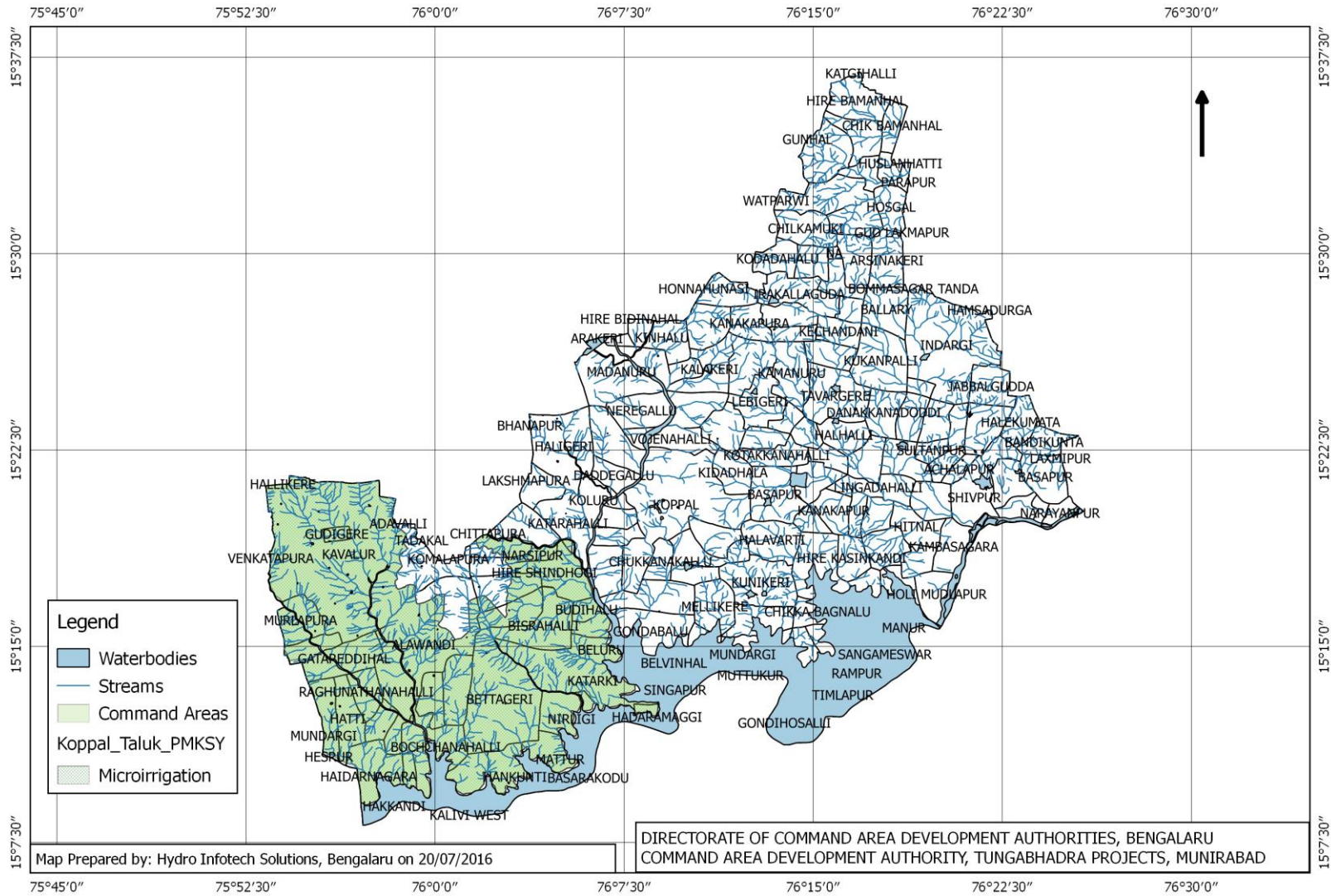
Appendix 5.9

KOPPAL DISTRICT IRRIGATION PLAN - GANGAVATI TALUK PMKSY WORKS MAP



Appendix 5.10

KOPPAL DISTRICT IRRIGATION PLAN - KOPPAL TALUK PMKSY WORKS MAP



Appendix 5.11

KOPPAL DISTRICT IRRIGATION PLAN - YELBURGA TALUK PMKSY WORKS MAP

