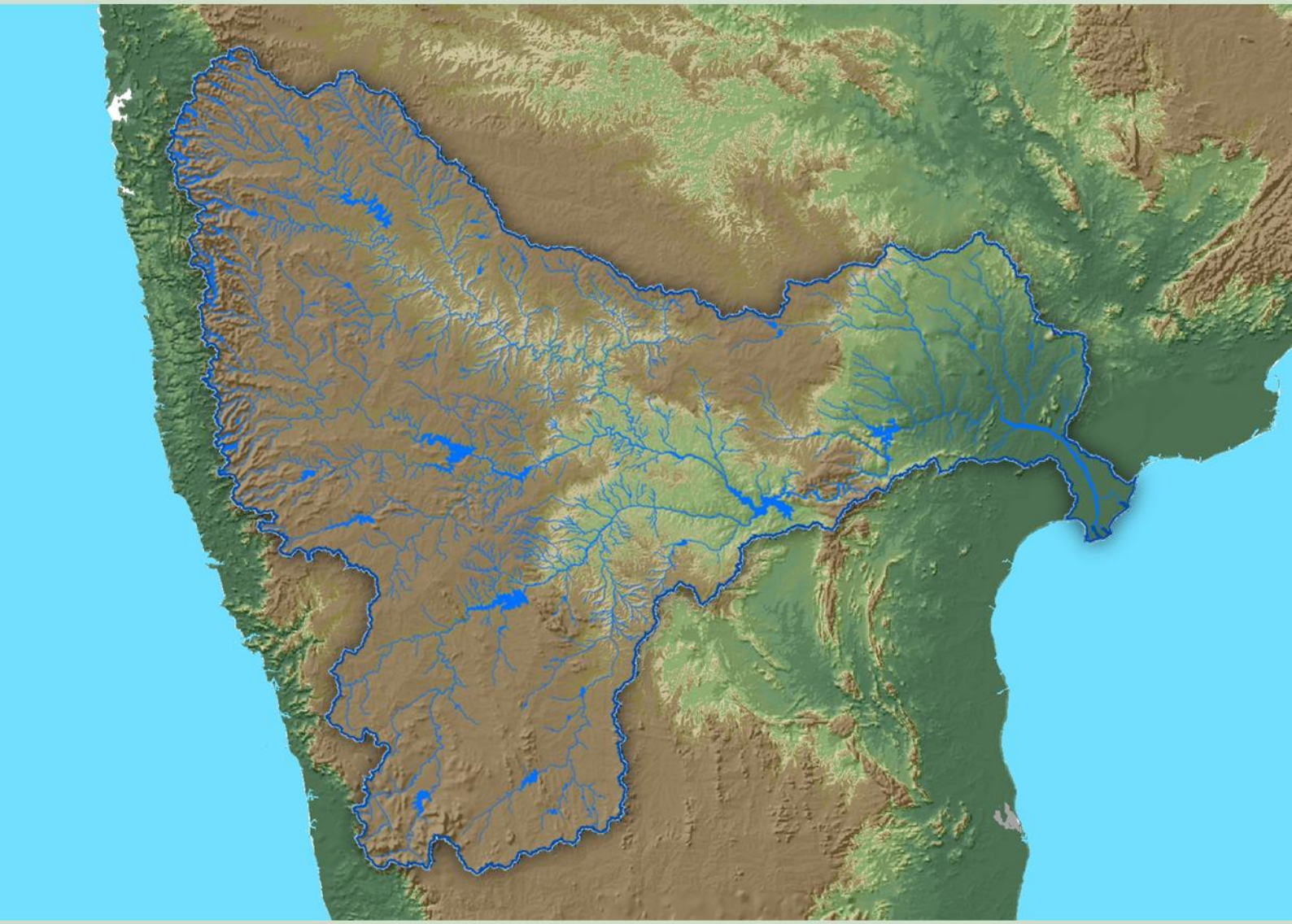
Version 2.0

Government of India
Ministry of Water Resources

KRISHNA BASIN



March, 2014

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Preface

Optimal management of water resources is the necessity of time in the wake of development and growing need of population of India. The National Water Policy of India (2002) recognizes that development and management of water resources need to be governed by national perspectives in order to develop and conserve the scarce water resources in an integrated and environmentally sound basis. The policy emphasizes the need for effective management of water resources by intensifying research efforts in use of remote sensing technology and developing an information system. In this reference a Memorandum of Understanding (MoU) was signed on December 3, 2008 between the Central Water Commission (CWC) and National Remote Sensing Centre (NRSC), Indian Space Research Organisation (ISRO) to execute the project "Generation of Database and Implementation of Web enabled Water resources Information System in the Country" short named as India-WRIS WebGIS.

India-WRIS WebGIS has been developed and is in public domain since December 2010 (www.india-wris.nrsc.gov.in). It provides a 'Single Window solution' for all water resources data and information in a standardized national GIS framework and allow users to search, access, visualize, understand and analyze comprehensive and contextual water resources data and information for planning, development and Integrated Water Resources Management (IWRM).

Basin is recognized as the ideal and practical unit of water resources management because it allows the holistic understanding of upstream-downstream hydrological interactions and solutions for management for all competing sectors of water demand. The practice of basin planning has developed due to the changing demands on river systems and the changing conditions of rivers by human interventions. The multiple uses of water and varying demands on a river basin require an integrated approach to managing river basin.

Basin wise report generation is one the important deliverables of India-WRIS project. Report of Krishna basin describes systematically the present status of water resources: major water resources projects, hydro-meteorological observations, surface and ground water development scenario, topographic characteristics, climatic variability, land use / land cover pattern & allied natural resources along with socio-economic profile of the basin. The report contains valuable latest information of the basin on all aspects of water resources and allied sectors and will be useful as baseline information for the irrigation officials, hydrologists, agriculturalists, conservationists, research organizations and all those involved in the development of Krishna basin.

Acknowledgement

The Krishna basin report is an outcome of the project "Generation of Database and Implementation of Web enabled Water resources Information System in the Country" short named as India-WRIS WebGIS jointly executed by the Central Water Commission (CWC) and National Remote Sensing Centre (NRSC), Indian Space Research Organization (ISRO). This comprehensive publication gives the present status of water resources assets, topographic features, climatic variability, land use / land cover pattern & allied natural resources along with socio-economic information of the basin.

We, on behalf of the authors and India-WRIS project team acknowledge; Shri Alok Rawat, Secretary, Ministry of Water Resources; Mrs. Sudha Midha, Additional Secretary, Ministry of Water Resources; Er. A. B. Pandya, Chairman, Central Water Commission; Dr. K. Radhakrishnan, Chairman, Indian Space Research Organization and Secretary, Department of Space; Shri Sudarsanam Srinivasan, Secretary to GOI and Member- Finance, Department of Space; Shri A. Vijay Anand, Additional Secretary, Department of Space; Dr. V. Koteswara Rao, Scientific Secretary, ISRO; Dr. V. Jayaraman, Ex-Director, NRSC for constant encouragement and guidance, technical discussions and for evincing keen interest in India-WRIS project and this report.

Our foremost acknowledgement is towards India-WRIS project team who created and organized large number of data sets and information in GIS format as seamless layers and attribute data for the entire country which served as base for this report. Thanks are also due to all CWC and NRSC / ISRO officials who carried out the quality assurance and shown their enthusiastic involvement. Finally, our sincere thanks are to all divisions and officials of NRSC and CWC for their valuable support during the preparation of this report.

The basin report includes the results generated through interpretation of latest satellite imageries as well as compilation of huge information from voluminous records. This would not have been possible without the countrywide support. We would like to thank all the organizations, institutes and individuals who contributed either directly or indirectly in bringing out this publication.

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Executive Summary

This report provides valuable information related to the topographic, demographic, climatic, surface and ground water resources, hydro-meteorological and water quality scenario of Krishna basin. The core components of the water network include the river Krishna, and its principal tributaries finally draining into the Bay of Bengal.

The Krishna river and its tributaries are an inter-state river system flowing through the states of Maharashtra, Karnataka and Andhra Pradesh. This river receives several tributaries on both the banks, out of which its principal tributaries joining from right are the Ghatprabha, the Malprabha and the Tungabhadra whereas those joining from left are the Bhima, the Musi and the Munneru.

The overall catchment comprises of 7 sub-basins, which have been further clustered into 391 Watersheds each of which represents a different tributary system.Out of seven sub-basins minimum area is covered by Krishna Middle Sub-basin which accounts for 8.73% of total basin area and consisting of 36 watersheds and maximum area is covered by Krishna Upper Sub-basin which accounts for 21.4% of total basin area and consisting of 85 watersheds.

The Krishna basin falls in Deccan plateau and Western Ghats. Around 55% of total basin area lies in the elevation zone of 500-750 m (SRTM; CGIAR, 2006). The Krishna basin has a tropical climate. The average annual rainfall (1969-2004) in the Krishna basin is 859 mm.The average annual mean temperature for this period is 26.32°C.

The basin falls into four major agro-climatic zones and six agro-ecological zones. As per the assessment of LULC (2005-06), major part of the basin (75.86%) is covered with agricultural area. Approximately 10% of the basin area is covered by forest, Wasteland covers around 7% of the total basin area and around 4% of the basin area is covered by water bodies.The important soil types found in the basin are black soils (regur), red soils, laterite and lateritic soils, alluvium, mixed soils (red and black, red and yellow, etc.) and saline and alkaline soils.

As per 2001 census, the total population in the basin is about 66341683 occupying around 47 districts.The basin spreads over 61 parliamentary constituencies (2009) comprising 25 of Andhra Pradesh, 19 of Karnataka, and 17 of Maharashtra.The population density ranges from 100- 200 persons per sq km to 500-1000 persons per sq km in most of the area of the basin. Most populated area in the basin is Hyderabad with more than 20,000 persons per sq km.

Krishna basin consists of surface water bodies in the form of lakes, ponds, reservoirs, tanks etc. Generally the water bodies in the basin provide water suitable for irrigation, and water supply.Tanks are the most predominant with the total number of 29237 in the basin.There are 660 Dams, 12 Barrages, 58 Weirs, 6 Anicuts and 119 lifts situated in the Krishna basin. Around 90% dams are used for the purpose of irrigation. Main AIBP projects falling under the basin are Bhima (Sangambanda) Project, Nagarjuna sagar left Project, Sriram sagar stage I (Pochampad), Sriram sagr stage II, Chaskman Project, Ghataprabha Stage-III Project, Jurala (Priyadarshini) Project, Kukadi Project, Malaprabha Project and Upper Krishna Project Stage-II.

At present there are 76 Major and 135 Medium irrigation projects in the Krishna basin.Other than this there are 10 ERM projects, 30 hydroelectric projects and 119 Lift irrigation projects are in this basin.

The important projects in the basin are Nagarjuna Sagar Major Irrigation Project, Krishna Barrage (including old Krishna Delta system), Upper Krishna Stage - I Major Irrigation Project, Tungabhadra Left Bank Canal & Dam Major Irrigation Project, Handri Neeva Sujala Sravanti (HNSS) Major Irrigation Project, Telugu Ganga Major Irrigation Project, Kukadi Major Irrigation Project, Bhima Major Irrigation Project,Upper Krishna Stage - II Major Irrigation Project and Malaprabha Major Irrigation Project.

47 meteorological and 9 flood forecasting stations of CWC (Central Water Commisssion) are located in the basin.Out of 9 FF stations, 6 are flood inflow stations (reservoirs) and 3 are flood level stations (river forecast stations). Water quality observations are taken at 28 surface water quality observation sites of CWC. The CGWB is monitoring the ground water levels four times a year (Jan/May/Aug/Nov) through a network of 1957 ground water observation wells.312 IMD stations and 78 AWS stations are also functional.

There are seven important Inter-basin transfer links proposed in Krishna Basin namely the Almatti-Pennar Link, the Srisailam-Pennar Link, the Nagarjunasagar-Somasila link, the Inchampalli-Nagarjunasagar Link, the Inchampalli –PulichintalaLink, the Polavaram-Vijayawada Link and the Bedti - Varada Link. There is one National Waterway named National Waterways-4 falls in this basin.

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1.1 Overview of basin

River basins form the basic hydrological units for water resources planning. The basin has been recognized as a practical hydrological unit for water resources management. In fact, optimal development of the water resources can't possibly be achieved unless individual water resources development projects are considered as a part of the basin level plan.

The Krishna Basin extends over the states of Andhra Pradesh (29.81%), Maharashtra (26.36%) and Karnataka (43.8%). Figure 1 shows the distribution of basin area over the three states. Krishna Basin is having a total area of 258948 sq. km which is nearly 8% of the total geographical area of the country. The basin has a maximum length and width of about 701 km and 672 km and lies between 73°17' to 81°9' east longitudes and 13°10' to 19°22' north latitudes. The basin is roughly triangular in shape and is bounded by Balaghat range on the north, by the Eastern Ghats on the south and the east and by the Western Ghats on the west. The Western Ghats form the main watershed in the Region between the Bay and Arabian Sea rivers. The geographical setting of the basin is shown in Map 1. The basin falls under division-All drainage flowing into Bay of Bengal and Region-Rivers draining in Bay of Bengal, delineated primarily based upon drainage of rivers to outlet.

Major part of the basin (75.86%) is covered with agricultural area. Approximately 10% of the basin area is covered by forest, wasteland covers around 7% of the total basin area and around 4% of the basin area is covered by water bodies.

Average annual surface water potential of this basin has been assessed at 78.1 BCM. Out of this, 58.0 BCM is utilizable water.The overall catchment of the basin comprises of 7 sub-basins, which have been further clustered into 391 watersheds each of which represents a different tributary system. Map 2a is the 56 m resolution False Colour Composite AWiFS satellite imagery of the Krishna basin. Map 2b shows the drainage and sub-basins of the Krishna Basin.The salient features for the basin are listed in Table 1.

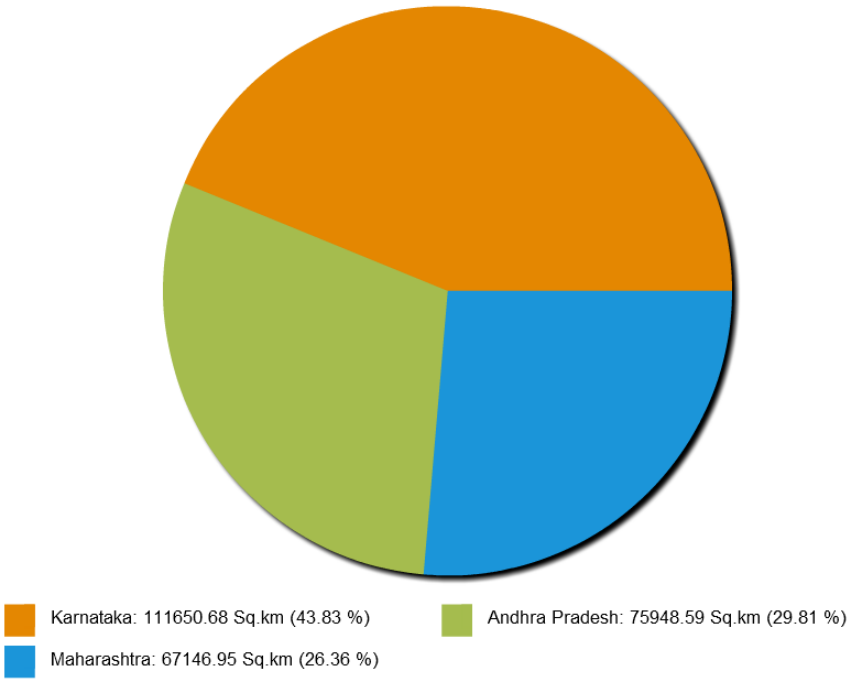


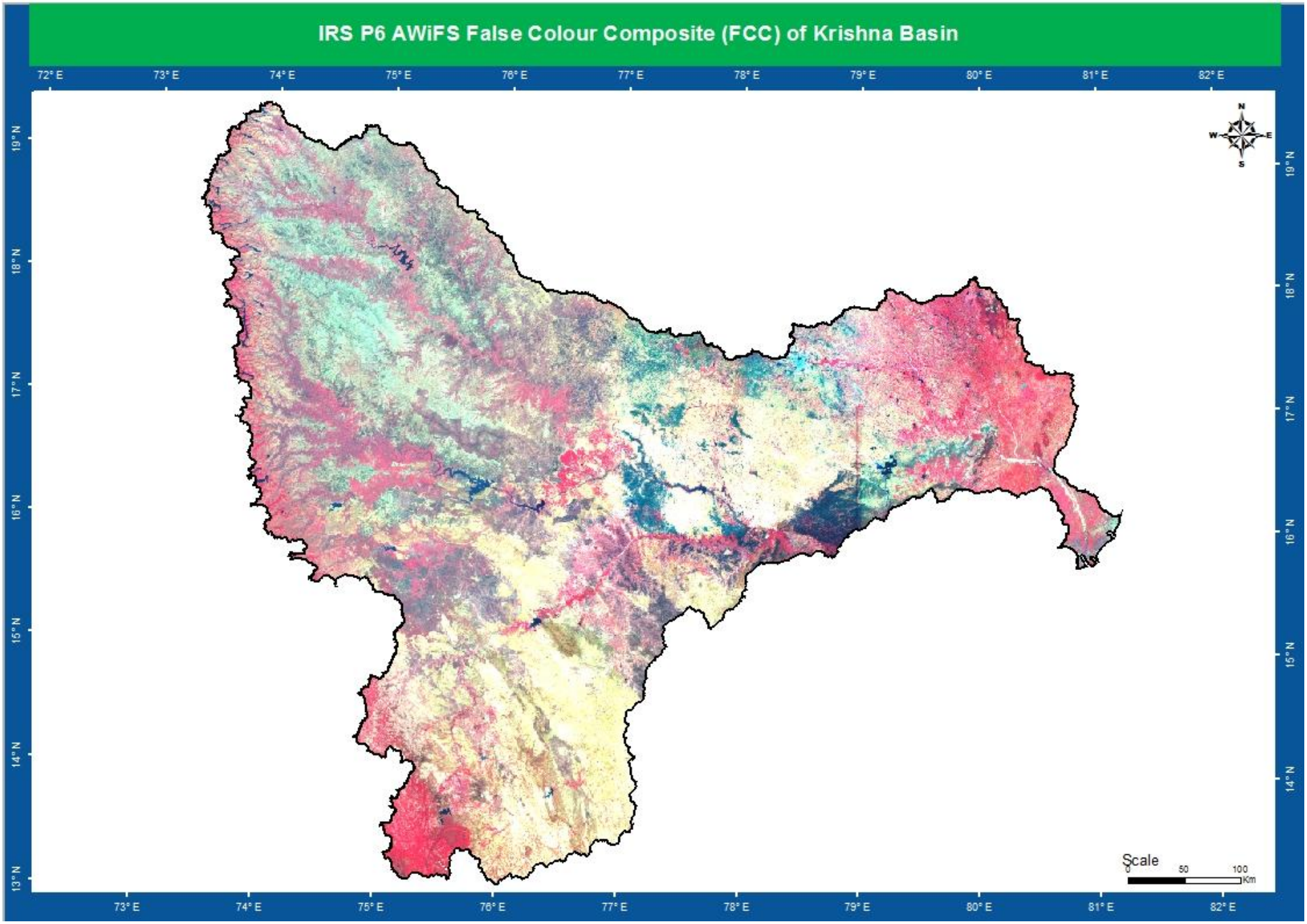
Figure 1. State-wise basin area

Table 1. Salient features of the basin

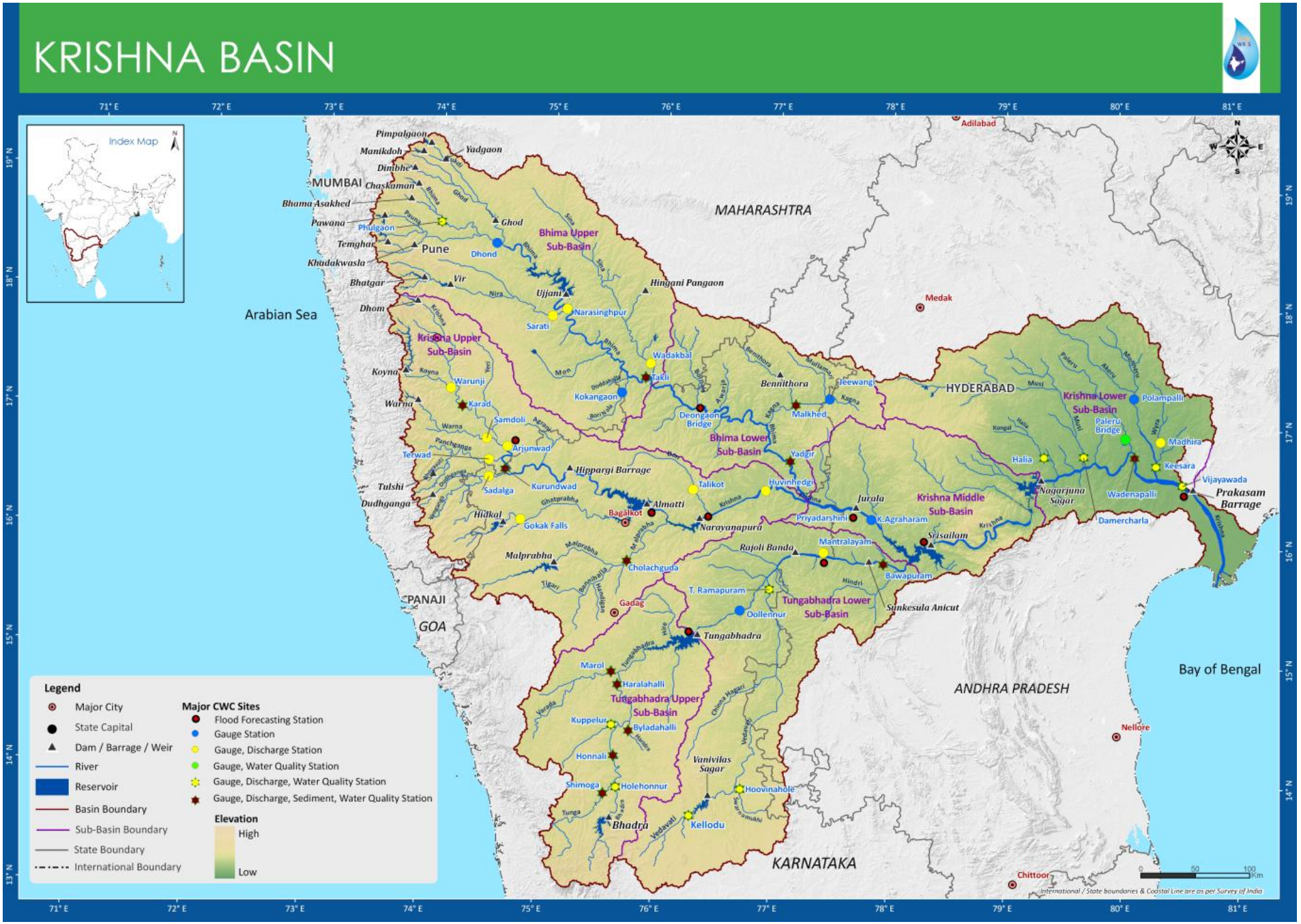
SI No.	Feature	Description
1	Basin Extent	73° 17' to 81° 9' E 13° 10' to 19° 22' N
2	Area (Sq.km)	a) 254750.14 (GIS based calculated) b) 258948 (Reported Area)
3	States in the basin	Karnataka (43.83%), Andhra Pradesh (29.81%) and Maharashtra (26.36%)
4	Districts (Census 2011)	47
5	Parliamentary Constituencies (2009)	61
6	Average Annual Rainfall (mm)	859.11
7	Average Annual Maximum Temperature (^{o}C)	32.14
8	Average Annual Minimum Temperature (^{o}C)	20.52
9	Total Population	66341683
10	Number of villages	27967
11	Highest Elevation (m)	1903
12	Avg. Annual Water Potential (BCM)	78.12
13	Utilizable Surface Water (BCM)	58
14	Number of Sub-basins	7
15	Number of Watersheds	391
16	Number of water resources structures	Dams-660 Barrages-12 Weir-58 Anicuts-6 Lifts-119 Power House-35
17	Highest Dam	Srisailam (N.S.R.S.P) Dam -145m
18	Longest Dam	Narayanapura Dam - 10.64 km
19	Highest Barrage	Tembhu Barrage - 8.13 m
20	Longest Barrage	Hipparagi Barrage - 5460 m
21	Number of Irrigation projects	Major-76 Medium-135 ERM-10
22	Number of HE projects	30
23	Number of Ground water observation wells	1957
24	Number of Hydro-Observation Sites	72
25	Number of Flood Forecasting Sites	9
26	Water tourism sites	57

Source: As per available data in India-WRIS

Map 1.Index map



Map 2a. Satellite imagery of Krishna basin



Map 2b. Krishna basin - Drainage & sub-basin

1.2 Topography

The western edge of the basin is an almost unbroken line formed by the Western Ghats whose height ranges from 600 m. to 2100 m. It has the heaviest rainfall and the most humid climate in the basin.Hardly 50 to 60 km. east of the ghats lie the sparsely cultivated and undulating plains of the Deccan with a dry climate and poor rainfall.

The interior of the basin is a plateau, the greater part of which is at an elevation 300 to 600 m. Its general slope is eastwards.Great undulating plains, divided from each other by flat-topped ranges of hills are the main characteristics of this plateau. The hill-sides are marked by conspicuous, wide, terraces except in the southern part where the hills are frequently crowned with great 'tors' or rounded hummocks of bare rock, the result of constant weathering.

The Eastern Ghats which form the eastern boundary of the peninsula are by no means so well-defined or continuous as the Western Ghats. To the south of the Krishna, the Eastern Ghats comprise parallel ranges, which are the successive outcrops of an ancient series of stratified rocks.

Except for the hills forming the watershed around the basin, the entire drainage basin of the river comprise rolling and undulating country, a series of ridges and valleys interspersed with low hill ranges. Large flat areas of the type seen in the Indo-Gangetic plains are scarce, except in the delta.

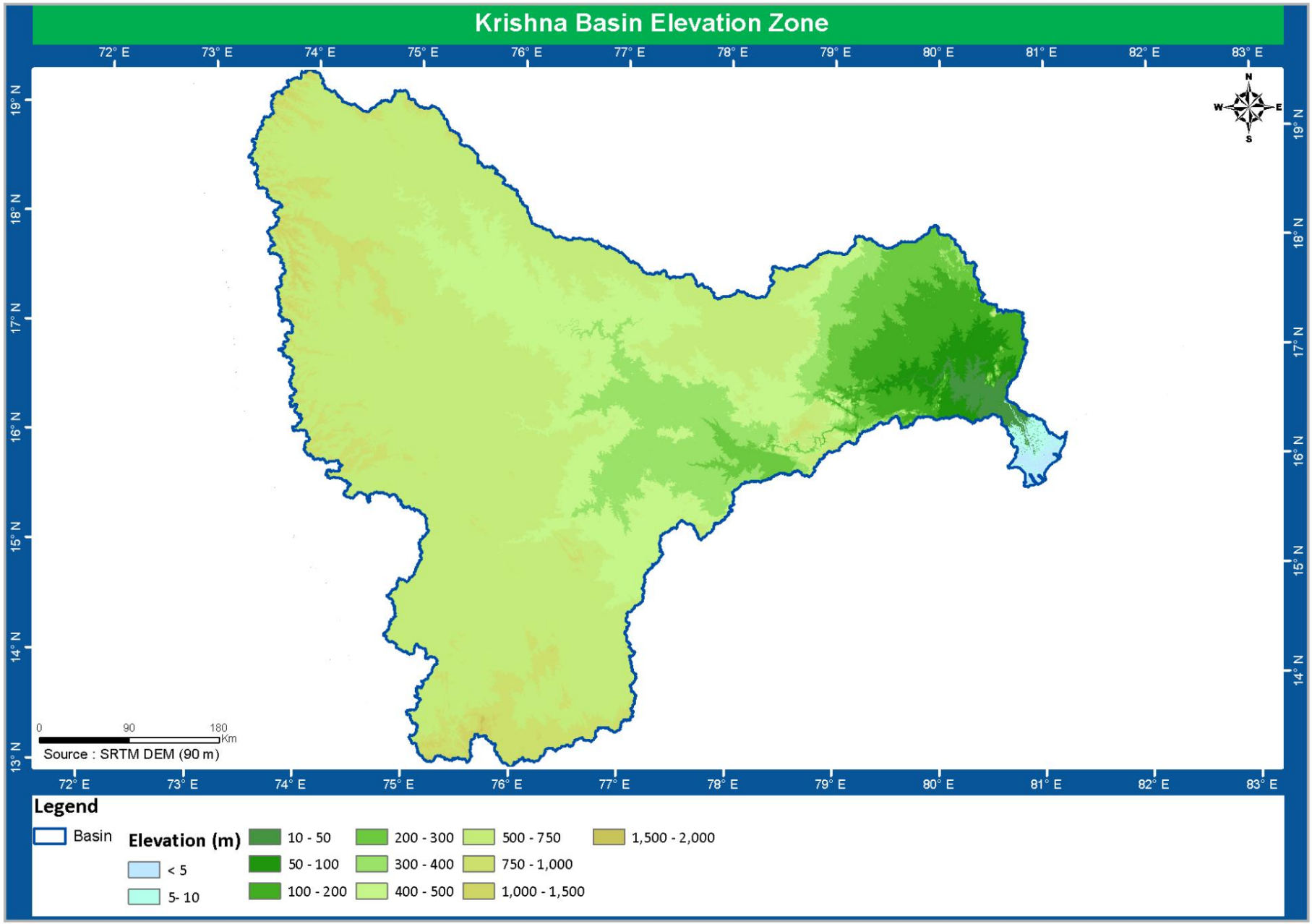
The delta of the Krishna formed by deposits at the mouth of the river over past ages consists of a wide belt of river-borne alluvium. The process of silt deposition at the mouth of the river is still continuing and the delta is gradually extending into the sea. (Source: India A Regional Geography, 1971)

The elevation variation in the basin is depicted in Table 2 and shown in Map 3. Major area of the basin falls under the elevation zone of 500-750 m. Highest elevation in the basin is 1903 m.

Table 2. Elevation zones

S.no.	Elevation (m)	Area (Sq.km)	% of Total Area
1	< 5	1057	0.41
2	5-10	1235	0.48
3	10-50	2539.88	0.98
4	50-100	4703.20	1.82
5	100-200	10996.29	4.25
6	200-300	11776.93	4.55
7	300-400	22153.55	8.56
8	400-500	42362.64	16.36
9	500-750	141635.72	54.70
10	750-1000	18344.96	7.08
11	1000-1500	2089.03	0.81
12	1500-2000	54.04	0.02

Note: Based on SRTM DEM



Map 3. Elevation zones

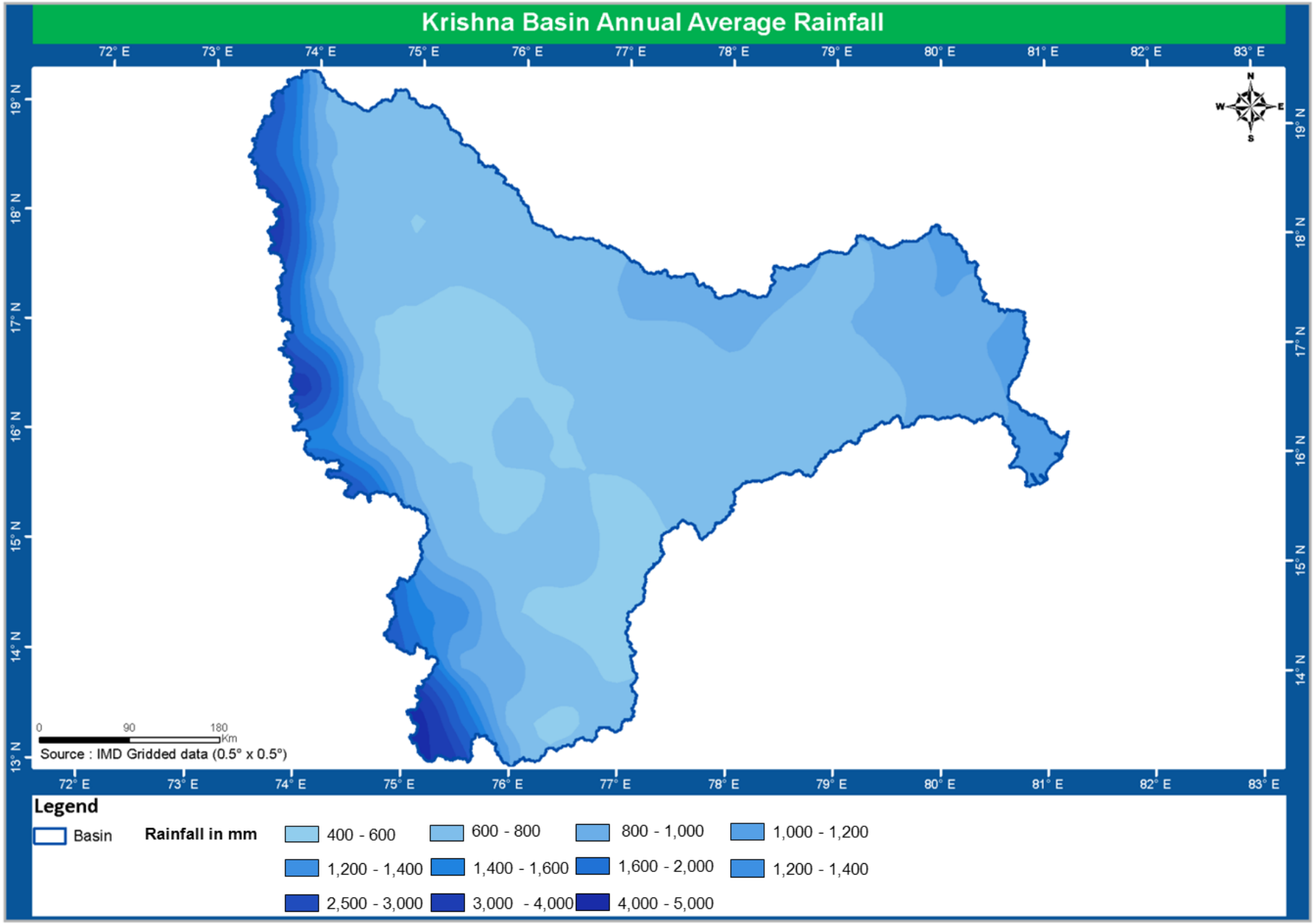
1.3 Climate

The Krishna basin has a tropical climate. The climate is dominated by the southwest monsoon, which provides most of the precipitation for the basin. High flow in the rivers occurs during the months of August-November and the lean flow season is from Aril to May. Climate types range from per-humid through dry sub-humid in the west through semi-arid in the central and eastern parts of the basin.The south-central part of the basin is truly arid.

The region with its north-south elongation and typical arrangement of the major relief fetaures, responds differently to the monsoon currents and thus exhibits sub-regional climate variations within this tropical monsoon zone. Western Ghats exert considerable influence as as a climate barrier or rather a divide in the spatial distribution of climate attributes, the temperature, rainfall and relative humidity etc.Around the year, four distinct seasons occur in the basin. They are 1) the cold weather, 2) the hot weather, 3) the south-west monsoon, 4) the post monsoon.The cold weather season from mid-October to mid-February is generally pleasant in the entire basin.The western and the north-eastern regions are colder than the rest of the basin.In the hot weather season, the heat is unbearable in the central, northern and eastern regions of the basin.It is comparatively pleasant in the western-most parts.The south-west monsoon sets in by mid-june and ends by mid-October. During this period, the basin receives about 80% of its total annual rainfall. After the withdrawal of the south-west monsoon in the middle of October, the weather clears up gradually and it is cool thereafter.

1.3.1 Rainfall

Like most other parts of India, the Krishna basin receives its maximum rainfall during the south-west monsoon. The monsoon winds strike the west coast of the Indian peninsula from the west and south-west and strike the Western Ghats or the Sahyadri Range, which present an almost uninterrupted barrier ranging from 610 m to 2,134 m in height.
According to the India-WRIS database the average annual rainfall in the Krishna basin for the period of 1969 to 2004 is 859 mm. The south-west monsoon sets in the middle of June and withdraws by the middle of October. About 90% of annual rainfall is received during the Monsoon period, of which more than 70% occurs during July, August and September. The distribution of annual average rainfall for Krishna basin has been shown in Map 4. Western parts of the basin receive maximum rainfall. However, around 203 blocks of 30 districts (16-Karnataka, 8-Andhra Pradesh & 6-Maharashtra) falling in the basin are drought prone (Source: Drought Prone Areas Program, DPAP, MoRD, 2002). Sub-basin Wise Annual Average Rainfall (mm) (1971-2004) distribution has been given in Annexure II : A.



Map 4. Annual average rainfall

1.3.2 Temperature

The western area of the basin being closer to sea, is less continental and presents a comparatively low annual range of temperature.In winter while the maximum temperature in all parts varies between 30 °C and 35 °C, the minimum shows the significant variations.The places away from the coast show decreasing minima. Night temperatures are the main elements which make the winters more severe in central and western parts.In summers, while the western parts show a moderate heating, an effect of altitude and nearness to sea, the places deep inside the land and those remote from the maritime influences and at comparatively lower altitudes, show higher temperature.In contrast to diurnal heating in these parts the cooling in the night is slow.

According to the India-WRIS database the average annual mean temperature in the Krishna basin for the period of 1969 to 2004 is 26.32°C.During January, which may be taken as representative of the winter months the average mean temperature for the period of 1969-2004 in the basin is 22.39° C. During April, which may be taken as representative of the summer months the average mean temperature for the period of 1969-2004 in the basin is 29.50° C. During July, which may be taken as representative of the monsoon months the average mean temperature for the period of 1969-2004 in the basin is 26.10° C. During October, which may be taken as representative of the post-monsoons months the average mean temperature for the period of 1969-2004 in the basin is 25.78° C. Monthly average temperature profile chart of the basin which depicts the maximum, mean and minimum temperature for the period of 1969-2004 has been shown in Figure 2. Temperature profile in the basin (36 Years Average for the period 1969-2004) has been given in Annexure II- B.

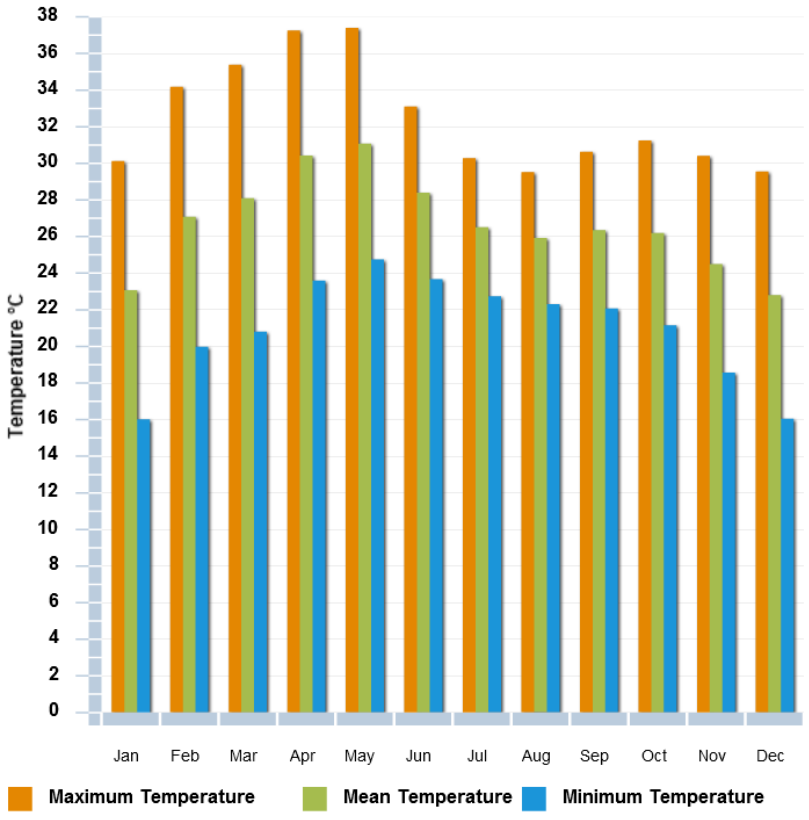


Figure 2. Monthly average temperature (36 years, 1969-2004)

1.3.3 Trends and variability

The high rainfall zone along the Western Ghats forms the western boundary of the Krishna Basin for a distance of about 708 km and many channels, big and small, carry the drainage of this area into the Krishna. The annual rainfall varies from 3048 mm to 1016 mm in this reach.

East of the Western Ghats, the annual rainfall decreases rapidly until it is less than 600 mm. Along the line running approximately from Chitradurga to Sangli, to Puna and then to a point north and east of a line connecting Kurnool, Raichur, Bijapur and Ahmednagar.East of this, the rainfall again gradually increases to about 900 mm. in and around Guntur area.

During the three months, March to May, the rainfall in the most parts of the basin varies from 20 mm to about 50 mm June to September are the four months of the south-west monsoon during which all parts of the basin receive their maximum rainfall.

The actual rainfall varies widely from year to year. There are also variations in the incidence and distribution of rainfall in time and space.Krishna Basin shows a variable rainfall across the basin. Figure 3 depicts the histogram for average annual rainfall data for over past 35 years. Year 1975 shows highest average annual rainfall of approximately 1400 mm rainfall in the basin whereas 1972 data shows least rainfall in past 35 years. (Annexure II: A)

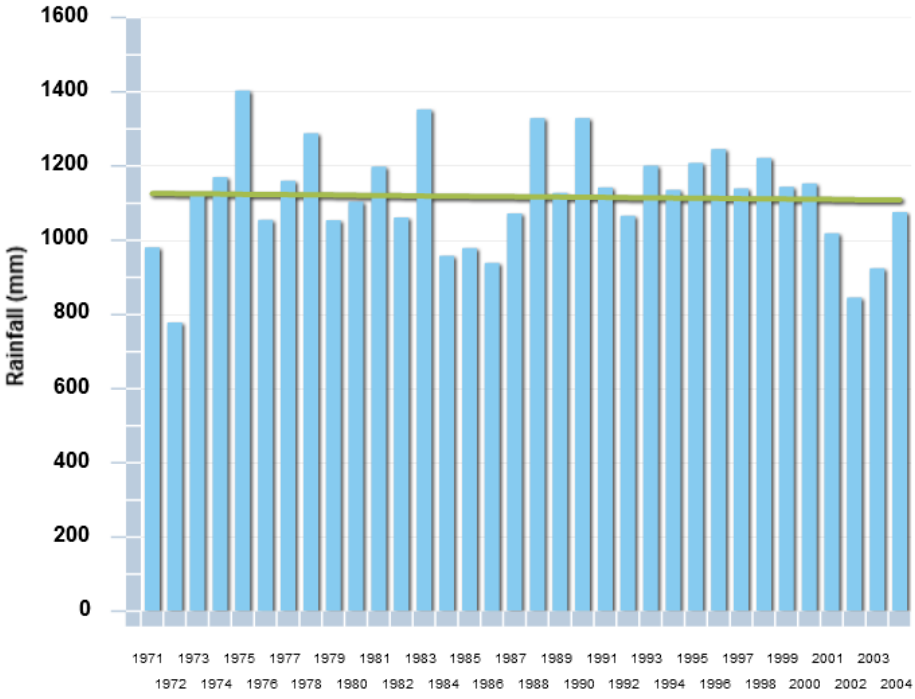


Figure 3. Trend of annual rainfall (1971-2004)

1.4 Major rivers

River network or drainage channels which flow from higher reaches to lower levels often follow the topography and slope of the terrain.They flow towards the sea or lake waters. The network of drainage constitutes a watershed or catchments.It consists of River and Streams.

The Krishna is the second largest eastward draining interstate river in Peninsular India. The Krishna River rises from the Western Ghats near Jor village of Satara district of Maharashtra at an altitude of 1337 m just north of Mahabaleshwar. The total length of river from origin to its outfall into the Bay of Bengal is 1400 km. Its principal tributaries joining from right are the Ghatprabha, the Malprabha, the Koyna, the Venna, the Varna, the Panchganga,the Dudhganga and the Tungabhadra whereas the Bhima, the Musi and the Munneru are principal tributaries joining the river from left.

The Ghataprabha rises in the Western Ghats at an altitude of 884 m and flows eastwards for a length of 283 km . Two of its tributaries, the Hiranyakeshi and the Markandeya, also rise in the Western Ghats and flow through Maharashtra and Karnataka.

The Malaprabha rises in the Western Ghats, at an altitude of about 793 m, about 16 km west of Jamboti in the Belagum district of Mysore. The river flows first in an easterly and then in a north-easterly direction and joins the Krishna at an elevation of about 488 m, about 306 km from its source.

The Tungabhadra, an important tributary of the Krishna, is formed by the union of the Twin Rivers Tunga and Bhadra, which rise together in the Western Ghats at Gangamula at an elevation of about 1196 m. The united river Tungabhadra flows for about 531 km in a generally north-easterly direction, through Karnataka and Andhra Pradesh and joins the Krishna beyond Kurnool at an elevation of about 264 m. The total drainage area of the Tungabhadra is 71417 sq km. Like the Bhima, it drains about 206 km length of the Western Ghats.

The Bhima also rises in the Western Ghats at an about 945 m and flows south-eastwards through Maharashtra and Mysore. It has a total length of 861 km and falls into the Krishna about 26 km. north of Raichur at an altitude of 343 m.

The Musi rises at an altitude of about 661 m in the Medak district of Andhra Pradesh. It flows through Hyderabad city and runs mostly west to east until it is joined by the Aleru. Then it flows south-wards and drops into the Krishna near Wazirabad, at an elevation of about 61 m. When it confluences with Krishna River, Musi River have already flown for 267 km (Source: India A Regional Geography). GIS calculated length of major rivers in the Krishna basin has been given in Table 3.

Table 3. Length of major rivers

S. no.	River	Length of the River (km)
1	Krishna	1435.07
2	Bhima	860.67
3	Tungabhadra	551.56
4	Musi	352.02
5	Malaprabha	325.74
6	Ghataprabha	298.73
7	Munneru	217.79
8	Varna	158.43
9	Koyna	151
10	Dudhganga	129.78
11	Panchganga	128.68

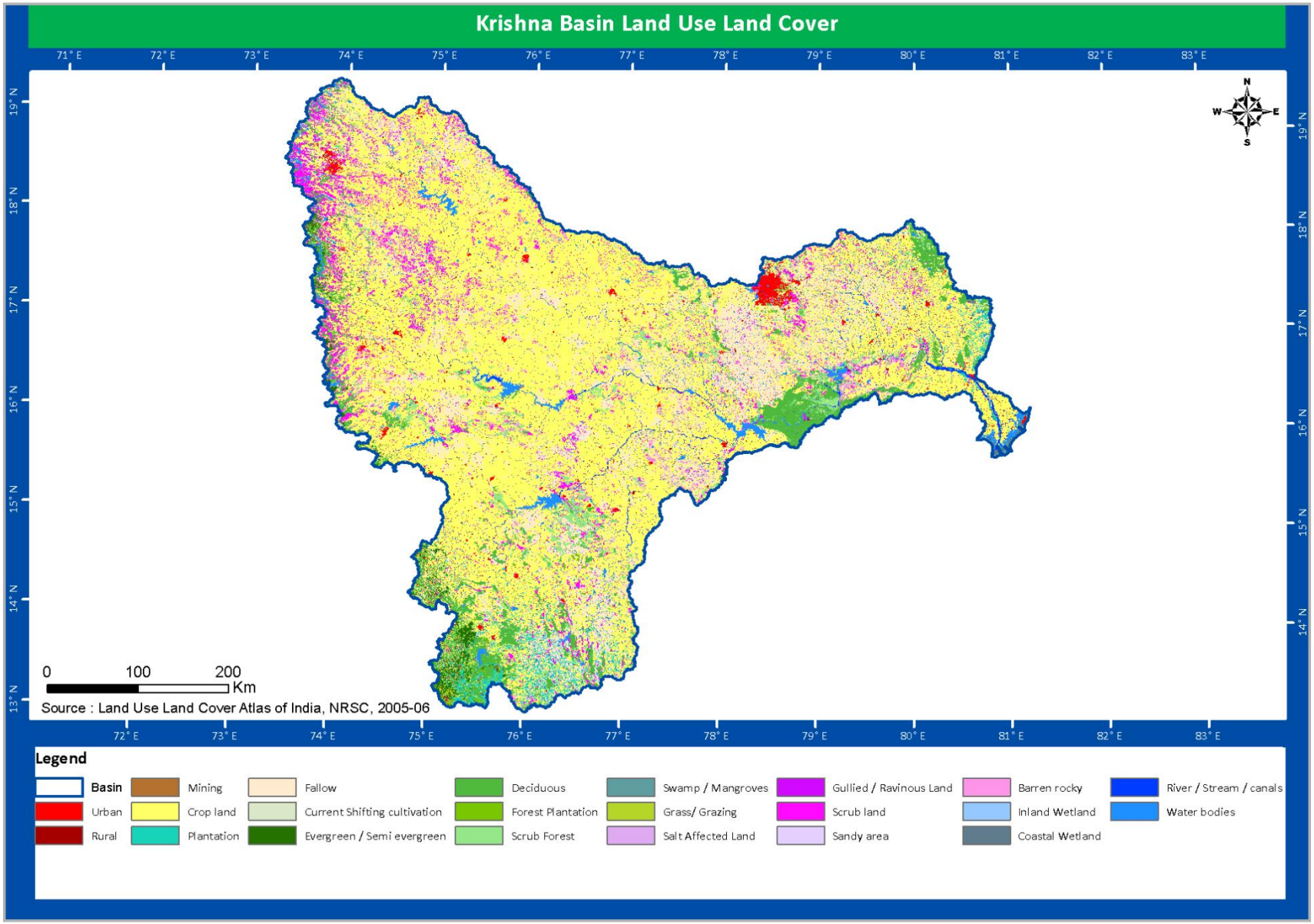
1.5 Land use/land cover

Land use is a description of how people utilize the land and socio-economic activity. Urban and agricultural land uses are two of the most commonly known land use classes. At any one point or place, there may be multiple and alternate land uses, the specification of which may have a political dimension.Land cover is the physical material at the surface of the earth. Land covers include grass, asphalt, trees, bare ground, water, etc. This basin holds a variety of land cover and land use classes. The level of utilization of land depends on the socio-cultural and economic achievement of people living under different nature environment. Accordingly, people have developed different land use techniques and the land use pattern. Thus, land utilization is a dynamic process, varied spatially and temporally. Land use pattern has a long drawn effect on the economy as well as on the ecology of any area. The land use classification scheme developed by the National Remote Sensing Agency (Dept. of Space, Govt. of India) has been adopted for the various States of India. The Major classes of land use as identified by the State Remote Sensing Application Centre are built-up land, agricultural land, forest land, wasteland, water bodies and others.

The land use / land cover (2005-06) of Krishna basin has shown in Map 5. Statistics of land use / land cover (2005-06) has been given in Table 4. Major part of the basin (75.86%) is covered with agricultural area. Approximately 10% of the basin area is covered by forest, wasteland covers around 7% of the total basin area and around 4% of the basin area is covered by water bodies. The other categories of land use / land cover in the basin are wasteland, built-up Land and grassland.

Table 4. Land use/ land cover statistics (2005-06)

S.no.	Category	Area (Sq. km)	% of Total Area
1	Built Up Land	5931.50	2.29
2	Agricultural	196434.14	75.86
3	Forest	25986.84	10.04
4	Grassland	273.54	0.11
5	Wasteland	19781.85	7.64
6	Waterbodies	10540.13	4.07



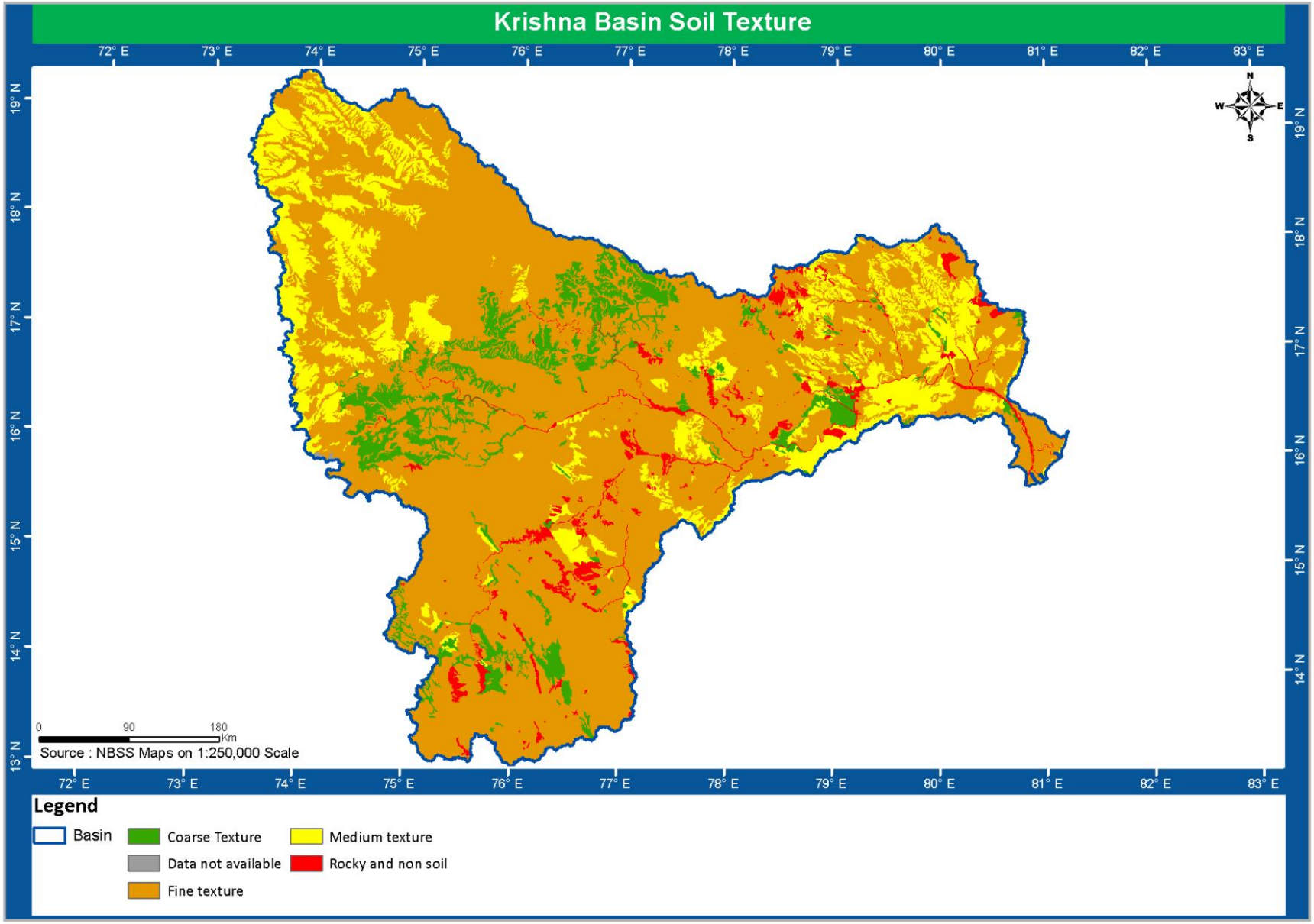
Map 5. Land use/land cover (2005-06)

1.6 Soils

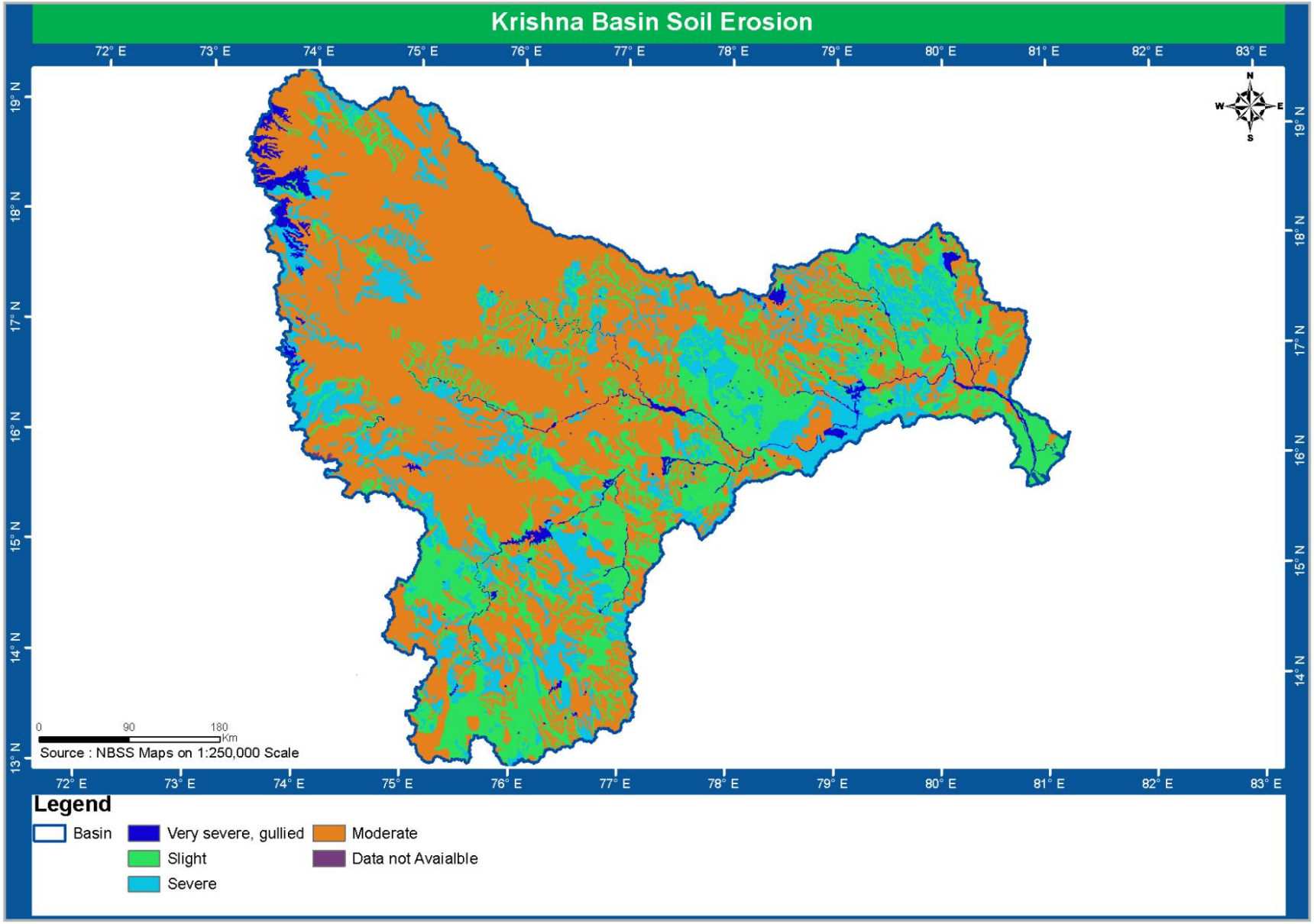
Soil is composed of minerals, mixed with some organic matter, which differ from its parent materials in terms of its texture, structure, consistency, color, chemical, biological and other characteristics. Information on the soil profile is also required for simulating the hydrological character of the basin. The important soil types found in the basin are black soils (regur), red soils, laterite and lateritic soils, alluvium, mixed soils (red and black, red and yellow, etc.) and saline and alkaline soils.

The typical lateritic soil occurs in Kolhapur and Satara districts and continues down the Ghats in Konkan. The soils are poor in organic matter; often covered with forests or orchards. In Kolhapur district the cashewnut orchards grow well in this soil. Deep black soil is found mostly in Bellary, Dharwar and in certain areas of Bijapur and Gulbarga. It has a high content of calcium and potash but is deficient in nitrogen and phosphorus. Cotton and groundnuts grow well in this type. The medium red soil covers the south maidan. It is sandy on high ground and loamy in lower areas; in the tank beds the soil turns to gray. These soils are not very rich in plant food. There are some isolated patches of mixed black and red soils as in Shimoga and Chitradurga. The soils of Andhra Plateau are mostly residual in origin. They have mostly developed through decomposition of local rock materials except in the important river valleys where transported alluvium is encountered. The black cotton soils are generally encountered as narrow strip and at places into wider patches also. Their large stretches are met within the Mahbubnagar and Kurnool district of the basin. These are either transported weathered materials. Lime in the form of Kankar nodules is often present, their concentration increases with depth. Compared to their red counterparts, they are more fertile and most suitable for cotton cultivation. But the fertility of these black cotton soils largely depends on the local topographical features. On high elevations and sloping grounds the soils are thin, light coloured and less fertile, while in the low lying lands they are thick, deep coloured and fertile. A lateritic cap has developed over the trap in the Ananthgiri Hill region of Hyderabad district. The soil possesses a brick-like red colour owing to its high iron contents. It is poor in almost all the plant nutrients, origin matters and soluble salts (Source: India A Regional Geography).

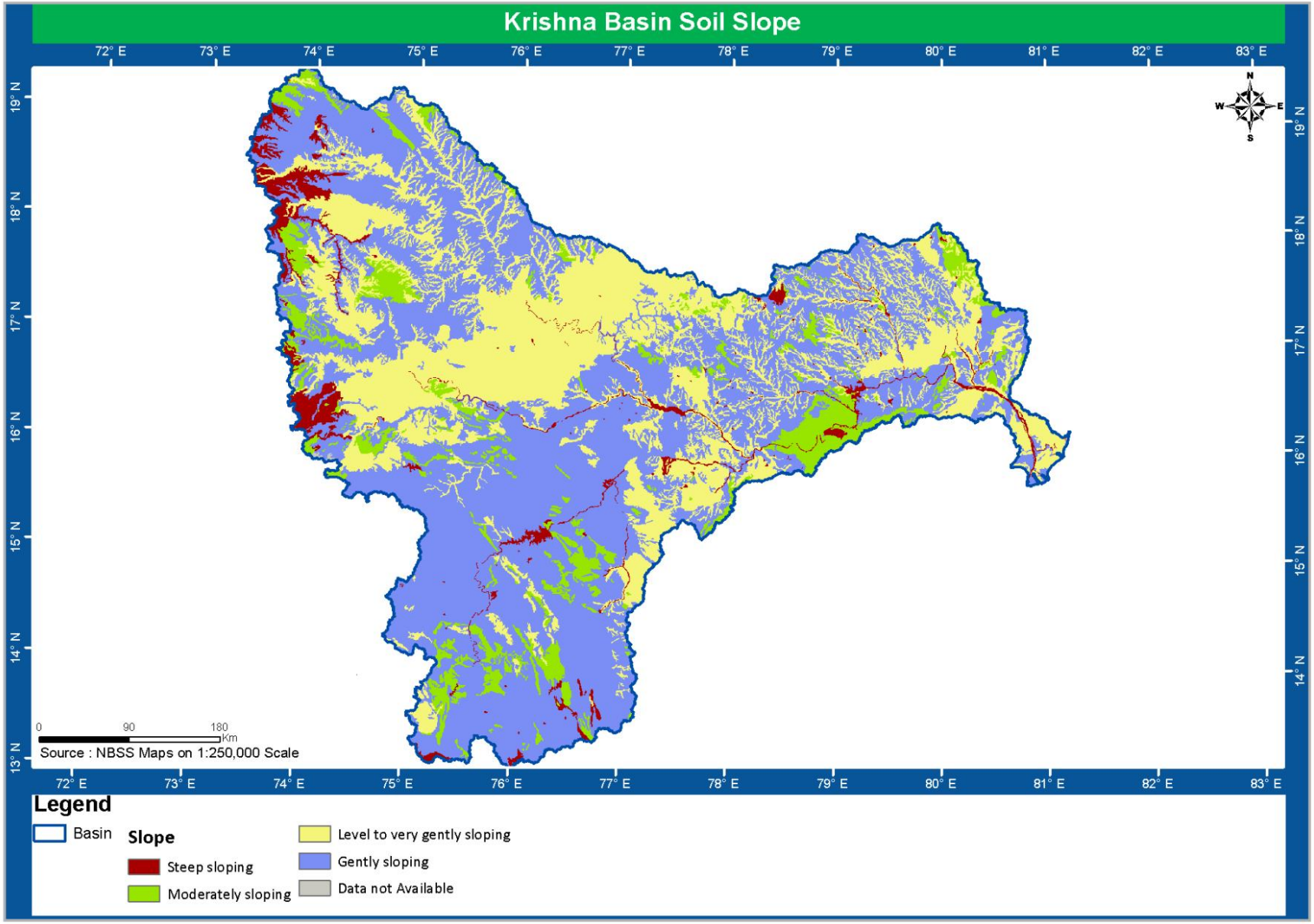
Map 6-Map 9, shows the main soil classification in the basin based on soil texture, soil erosion, soil slope and soil productivity respectively. The soil texture map of the basin in Map 6 shows the distribution of soil texture in the basin. Most area of the basin is having Fine texture of Soil. Based on texture major part falls under fine texture category (72.62%) with rocky and water bodies accounting for the minimum of 3.31%.Medium Texture (16.19%) and Coarse Texture (7.7%) are also found in some areas of the basin.The soil erosion map of the basin in Map 7 shows Soil erosion in the basin. Soil erosion is moderate in more than 56% of the total basin area with very severe erosion in 2.5% of the basin area. Slight erosion which is 24.18% of the total basin area has been mostly found in Krishna Lower Krishna Middle, Tungabhadra Lower and Tungabhadra Upper sub-basins. The soil slope map of the basin in Map 8 shows Soil Slope in the basin. The broad soil groups based on Slope 67.69 % falls under categories Gently Sloping (54%) followed by Nearly Level (38%) then Moderately Sloping(around 8%) and least is Steeply Sloped (around 4%). The soil productivity map of the basin in Map 9 shows Soil productivity in the basin. Soil productivity ranges from highly productive to non-productive area, 38.95% and 7.29% of the basin area respectively.



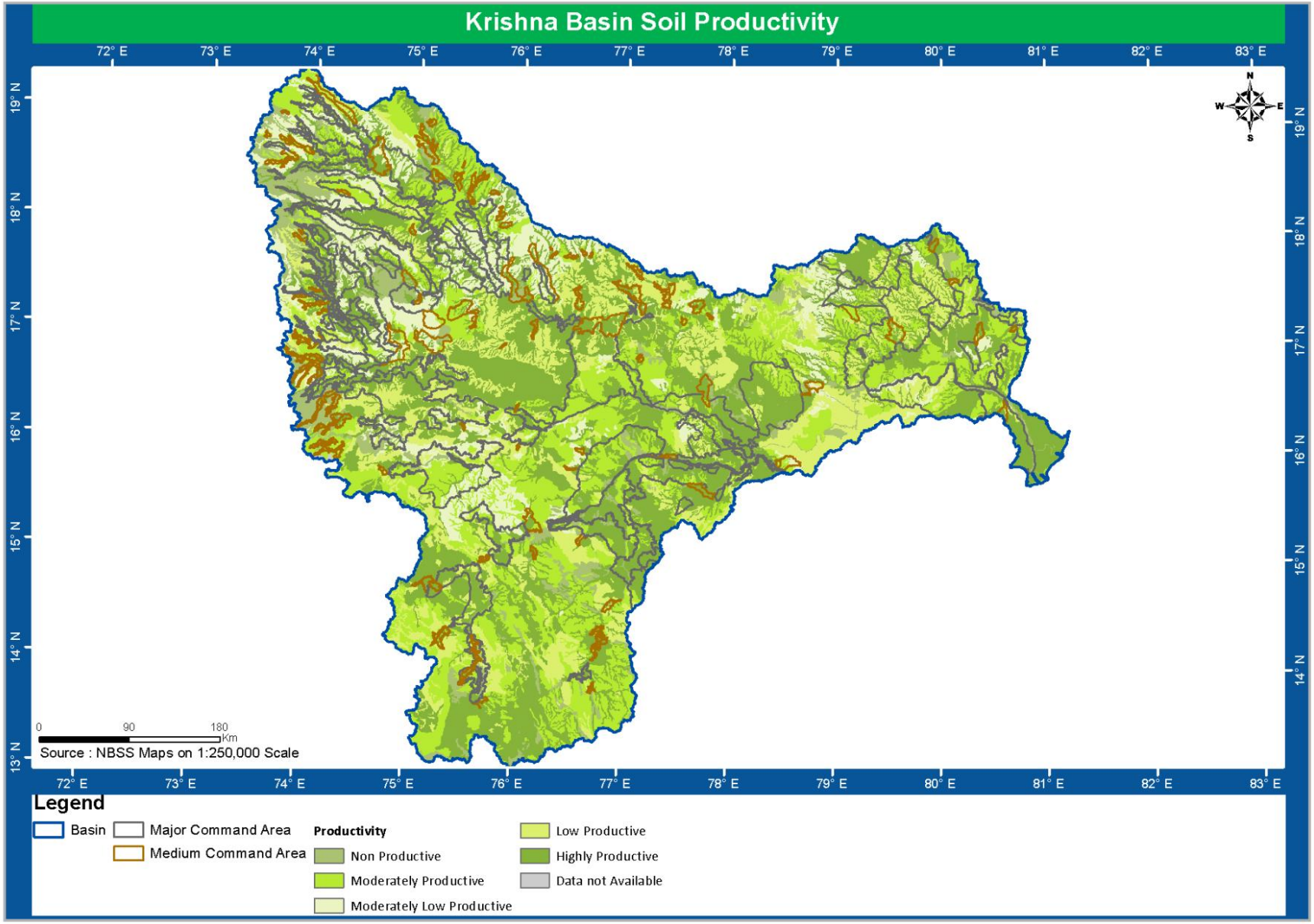
Map 6. Soil texture



Map 7. Soil Erosion



Map 8. Soil slope



Map 9. Soil productivity

1.7 Agro-climatic zones

India present a large number of complex agro climatic situations. The planning commission after examining the earlier studied at the regionalisation of the agricultural economy has recommended that agricultural planning to be done on the basis of agro-climatic regions. An agro-climatic zone is a land unit in terms of major climate, and growing period which is climatically suitable for a certain range of crops and cultivars (Agro-Ecological Regions of India, 1992).

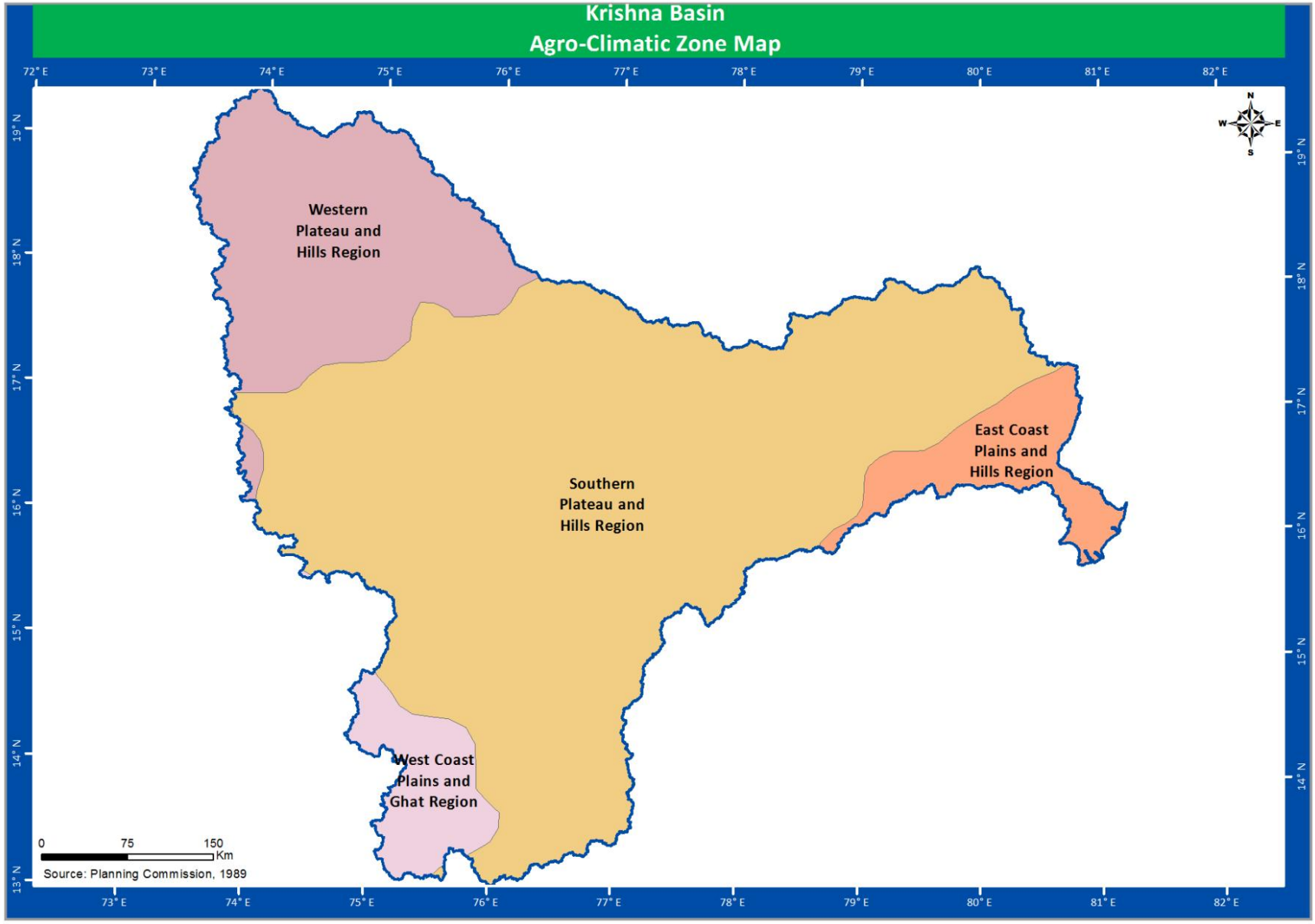
Most of the area of Krishna basin falls under Krishna and Pennar meteorological sub zone. It falls in four Agro-Climatic Zone shown in map (Map 10), viz., Western plateau and hills region, Southern plateau and hills region, East coast plains and hills region and West coast plains and Ghat region.

The delta area of the basin is subject to flooding. It has been observed that the river bed in delta area is continuously raised due to silt deposition resulting in reduction in carrying capacity of the channel. The coastal cyclonic rainfall of high intensity and short duration makes the flood problem worse. Some parts of the basin, especially the Rayalaseema area of Andhra Pradesh, Bellary, Raichur, Dharwar, Chitradurga, Belgaum and Bijapur districts of Karnataka and Pune, Sholapur, Osmanabad and Ahmedanagar districts of Maharashtra are drought-prone.

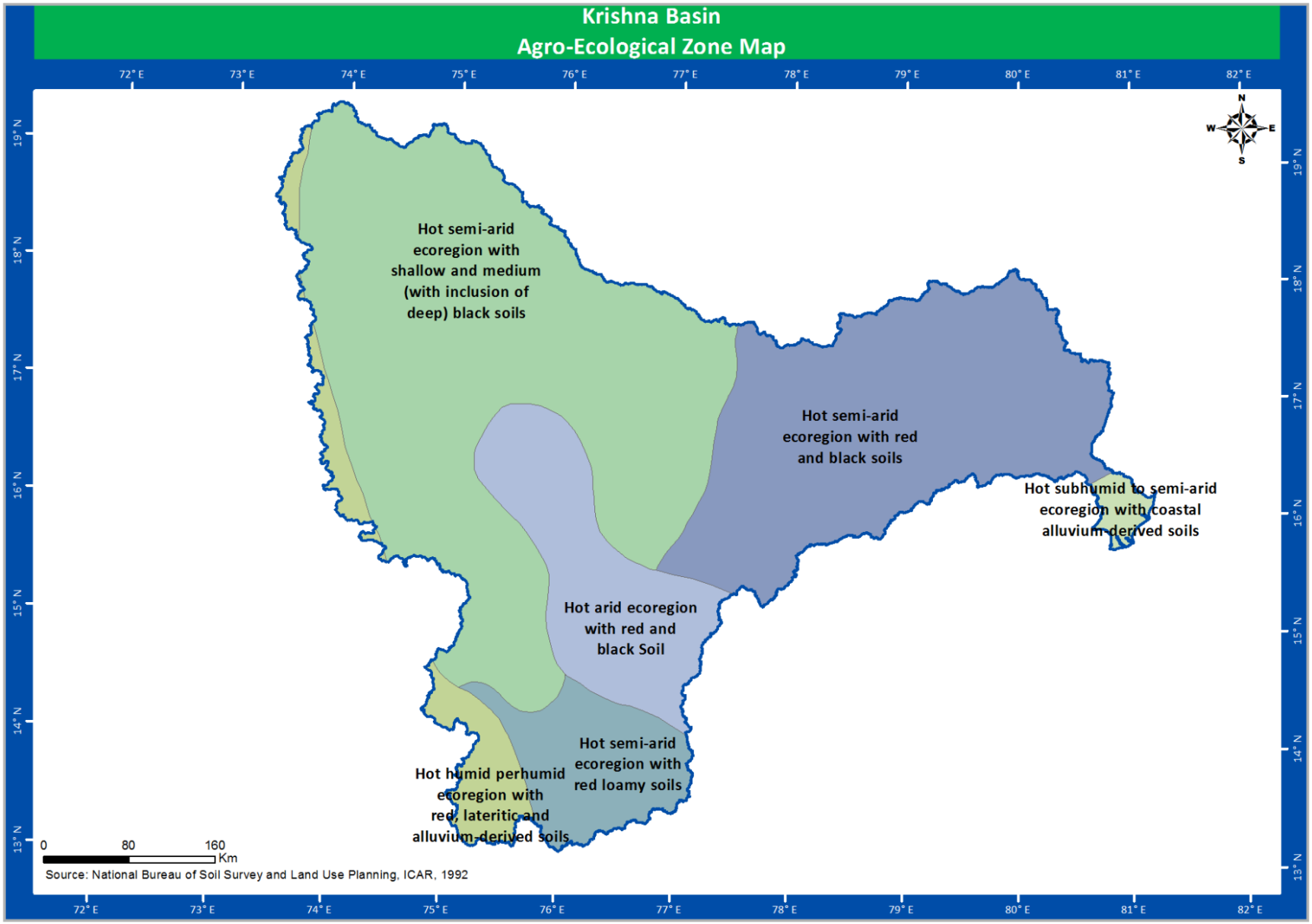
1.8 Agro-ecological zones

An agro-ecological region is the land unit on the earth's surface carved out of agro-climatic region when it is superimposed on landform and kinds of soils and soil conditions that act as modifiers of climate and LGP (Agro-Ecological Regions of India, 1992).

The agro-ecological zone map of Krishna basin has been shown in Map 11. There are six Agro-ecological Zones in the basin namely Hot semi-arid ecoregion with shallow and medium (with inclusion of deep) black soils, hot humid perhumid ecoregion with red, lateritic and alluvium-derived soils, hot semi-arid ecoregion with red and black soils, hot subhumid to semi-arid ecoregion with coastal alluvium derived soils, hot arid ecoregion with red and black soil and hot semi-arid ecoregion with red loamy soils.



Map 10. Agro-climatic zones



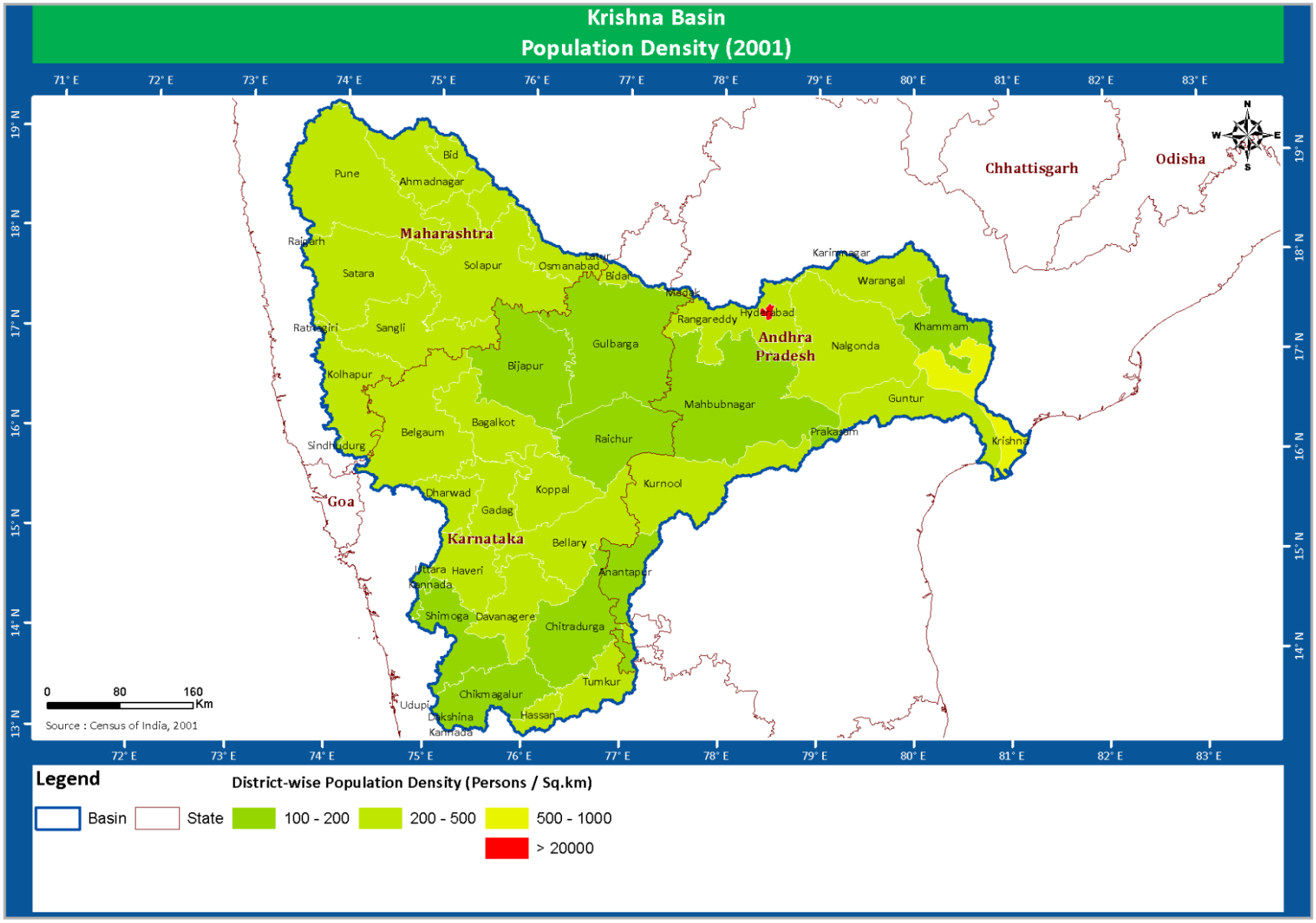
Map 11. Agro-ecological zones

1.9 Demography

Demographics are the quantifiable statistics of a given population. The basin spreads over 47 districts and 61 parliamentary constituencies (2009) comprising 25 of Andhra Pradesh, 19 of Karnataka, and 17 of Maharashtra. On the basis of the 2001 census total no. of villages falling in the basin is 27967 with 13231871 no. of households. The total population in this basin is 66341683. Source of drinking water in the basin includes a total of 23310 wells, 11006 tube wells and 29569 no. of hand pumps.

The major cities in the basin are Pune, Hyderabad & Vjayawada. The district-wise population density of Krishna Basin is shown in Map 12. The population density ranges from 100- 200 persons per sq km to 500-1000 persons per sq km in most of the area of the basin. Most populated area in the basin is Hyderabad with population density of more than 20000 persons per sq km.

District details which includes state name, district (2011), population (2011), total area (Sq. Km), district area in basin (sq. km), % of district area in the basin has been given in Annexure I: A. Parliamentary constituency details which includes state name, parliamentary constituencies (2009), total area (sq. km), area falling in basin (Sq. Km), % area in the basin has also been given in Annexure I: B. Sub-basin wise no. of districts, no. of villages, total population, Male population, Female population, no. of households has been given in Annexure III: A. Sub-basin wise drinking water facilities (wells, tubewells, and handpumps) also have been given in this Annexure III: B.



Map 12. Population density

2. Hydrological units

2.1 Sub-basins

Semi-automated approach for delineation of hydrological units (basin, sub-basin and watershed) uses SRTM DEM, topo maps on 1:50000 scale, IRS P6 LISS-IV & CARTOSAT merged data, drainage network, surface water bodies, rail/road network and other ancillary data. Drainage divides from contour/ridge lines are used to demarcate the boundary of hydrological units. The divide has been marked where flow is in opposite directions. Knowledge of terrain as well as DEM is essential for accurate demarcation of boundary. Hydrological boundary has been validated with reference to contours and drainage network. Hydrological unit boundary cuts perpendicular to the contour lines but it does not cross the drainage line at any location except its outlet. This approach is potentially more objective, repeatable, cost-effective, and consistent than previously adopted manual delineation methods.

The Krishna basin is split into 7 sub-basins namely Bhima lower sub-basin (9.28%), Bhima upper sub-basin (17.58%), Krishna lower sub-basin (15.5%), Krishna middle sub-basin (8.73%), Krishna upper sub-basin (21.4%), Tungabhadra lower sub-basin (16.31%), and Tungabhadra upper sub-basin (11.2%) (Map 13), each of which represents a different tributary system. The percentage area covered by sub-basins in the basin is shown in Figure 4. Major tributaries contributing to various Sub-basins in the basin are-

Bhima lower sub-basin-Bhima, Don, Bori, Chikka, Chinamageri, Dodda Halla, Dogi Halla, Gandori, Garaganji Halla, Hippargi Halla, Hire Halla, and Kanga rivers.

Bhima upper sub-basin -Bhima, Bor and Dodda Halla rivers.

Krishna lower sub-basin-Krishna, Pakhal or Munneru, Musi, Kongal, Halia, Bukler, Aler, Akeru, Palleru, Shamirpet Vagu, and Yesvantapuran Vagu rivers.

Krishna middle sub-basin- Krishna, Bhimanapalli Vagu, Chinna Vagu, Dindi, and Pedda Vagu rivers.

Krishna upper sub-basin-Krishna, Ghatprabha, Malaprabha, Chikodi Halla, Dudhganga, Vedganga, Kappur Halla, Jabapur Halla, Adda Halla, Agrani, Badachi Halla, Beeni Halla,Betgeri Halla, chail Halla, Don rivers.

Tungabhadra lower sub-basin-Tungabhadra, China Hagari, Dodda Halla,garchi Vanka, Hagari, Kanigana Halla, Komativani Vanka, Nari Halla, sindhnur N rivers.

Tungabhadra upper sub-basin-Tungabhadra,Vardha,Kumadvati,Karala Halla,Dodda Halla,Hire Halla,Vadagatte Halla rivers.

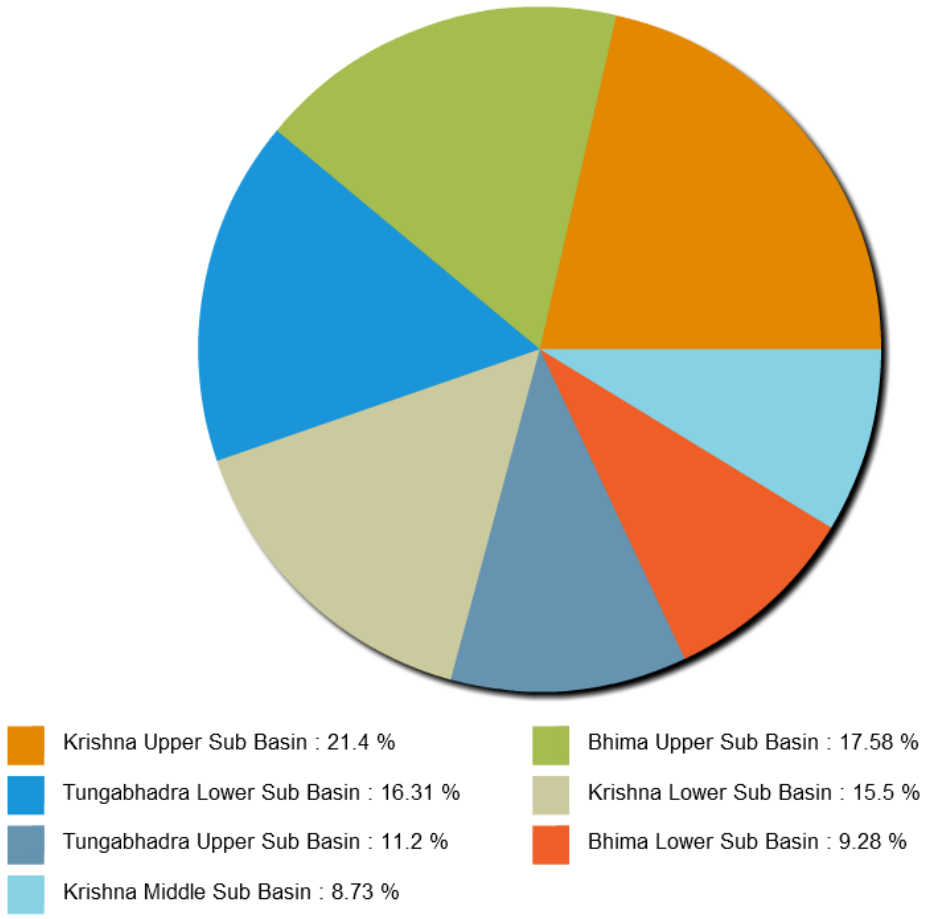


Figure 4. Sub-basins and per cent drainage area

2.2 Watersheds

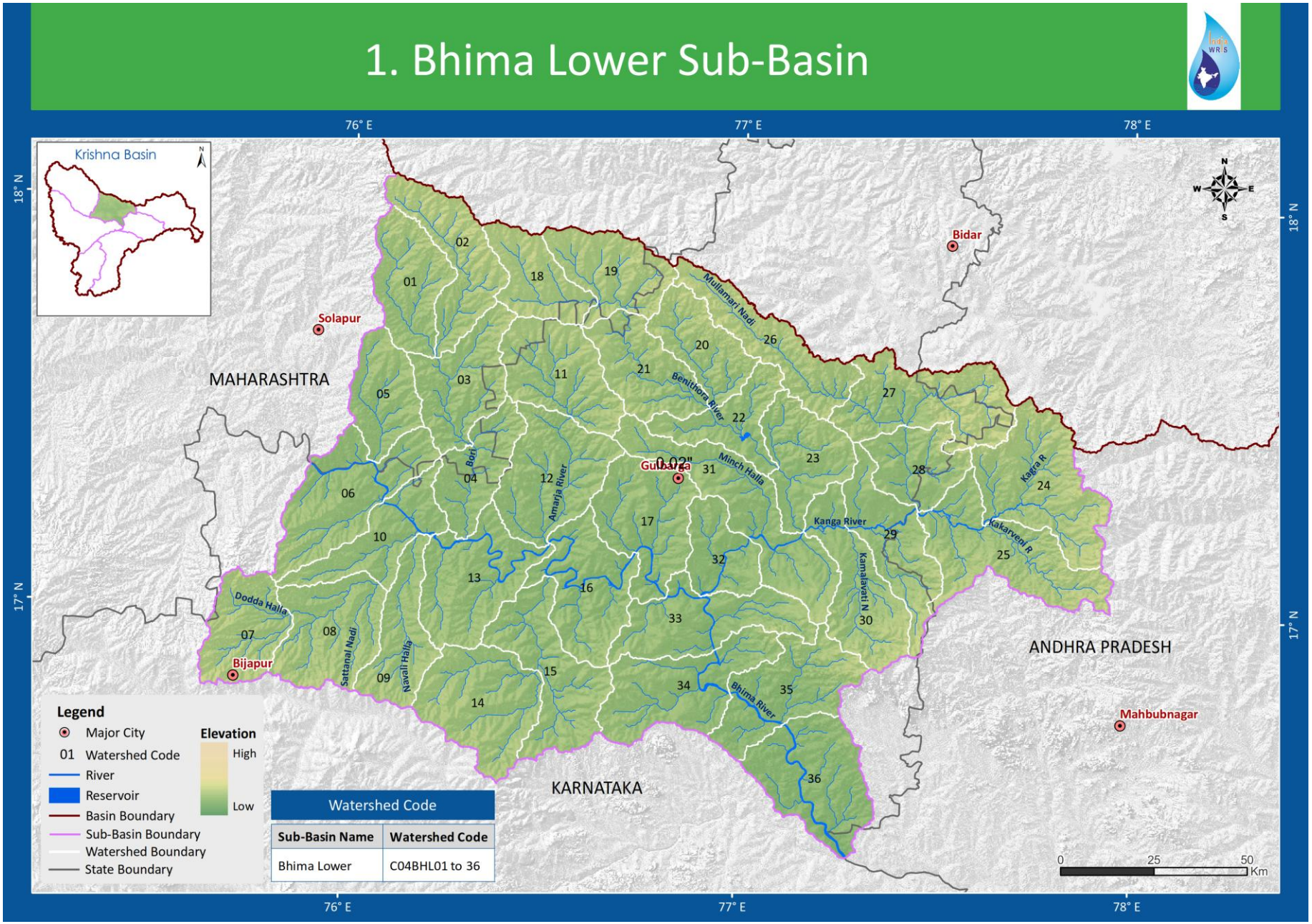
Hydrological unit wise assessment of water resources is a prerequisite for its proper management as it is fast becoming scarce in India. Sub-basins could be sub divided into smaller hydrological units namely, watershed for water resources management at larger scale (micro level). Watershed is a natural hydrological entity that covers a specific areal expanse of land surface from which rainfall flows to a defined drain, channel, stream or river at any particular point. Watershed should be delineated purely on the basis of hydrologic principles. Size of the watershed is governed by the size of stream and its boundaries.

Seven sub-basins of Krishna basin have been further classified into 391 Watersheds each of which represents a different tributary system for size ranging from 278 Sq Km to 976 Sq Km with maximum number of watersheds falling in Krishna Upper Sub-basin. Number of watersheds and the range of size for the Sub-basins are mentioned in Table 5.

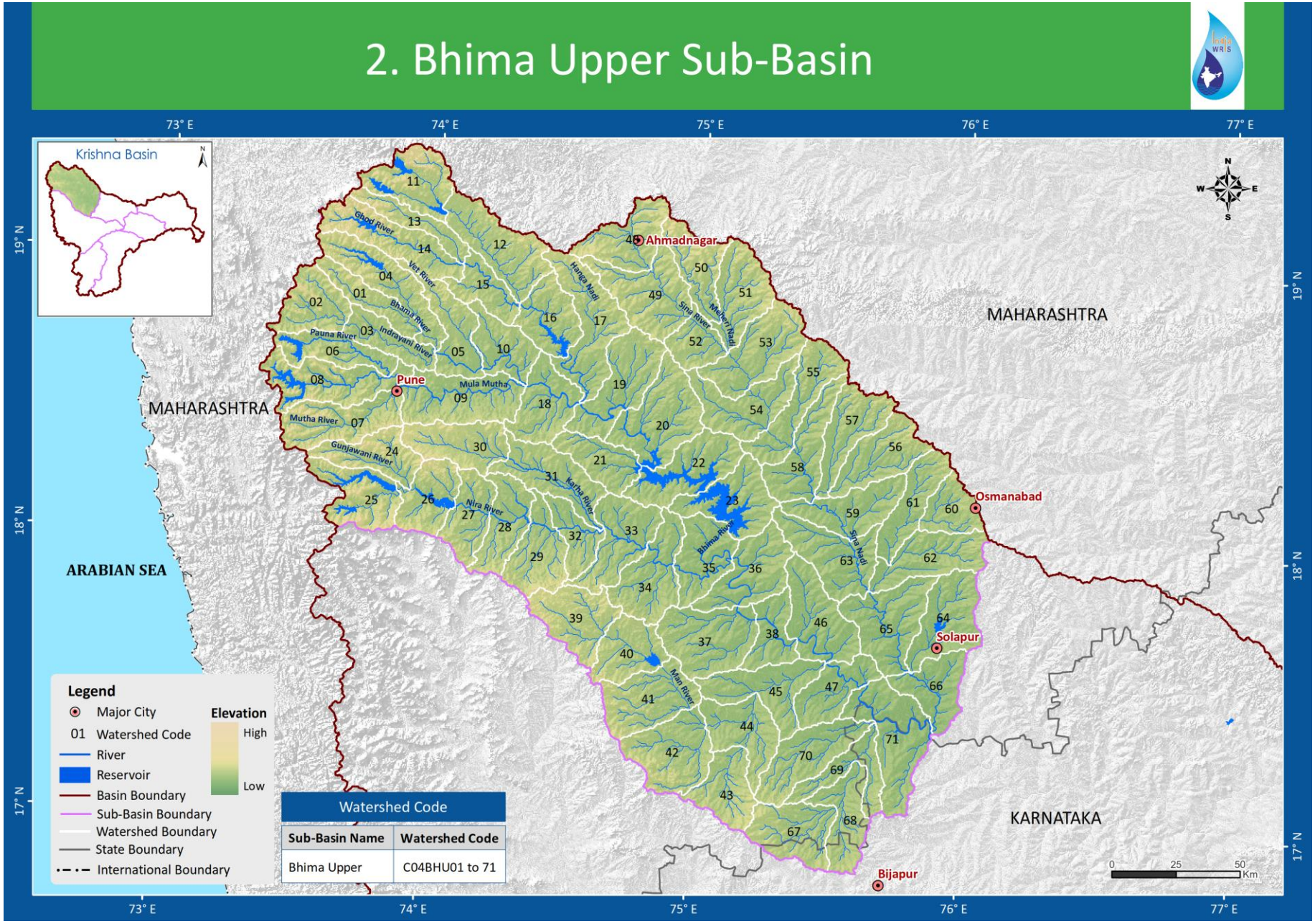
Table 5. Sub-basin wise watersheds

S.no.	Sub-basin	Area (Sq. km.)	No. of Watersheds	Size Range of Watershed
1	Bhima Lower	23652.70	36	396 - 929
2	Bhima Upper	44793.32	71	351 - 940
3	Krishna Lower	39494.33	59	277 - 971
4	Krishna Middle	22229.12	36	341 - 963
5	Krishna Upper	54504.77	85	322 - 964
6	Tungabhadra Lower	41556.48	59	357 - 976
7	Tungabhadra Upper	28519.41	45	331 - 924

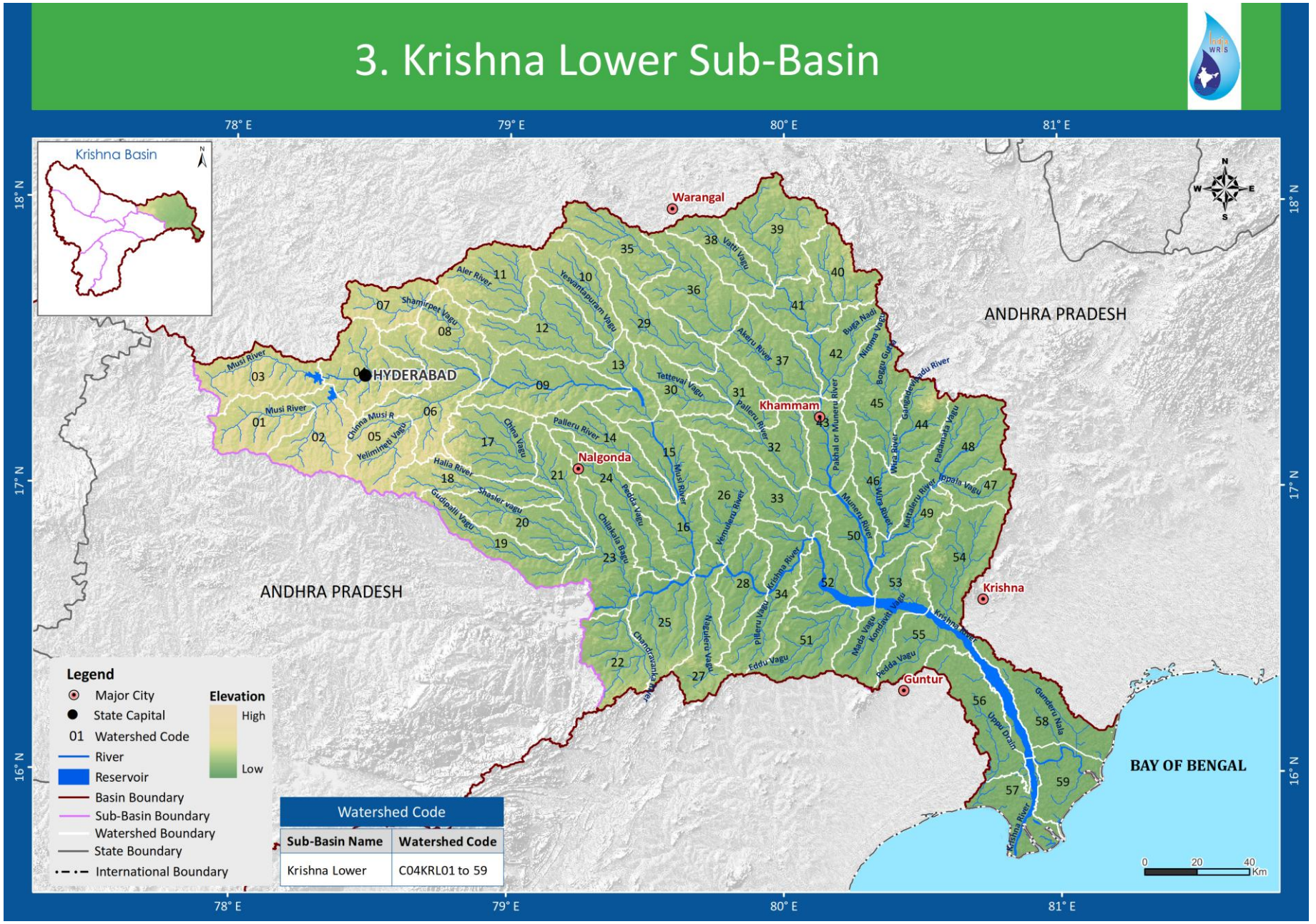
The white boundary within the basin represents delineated watersheds. Each watershed is given an 8 digit alphanumeric code for identification. Each letter in the code has a description. For example if Watershed code is C04BHL01, the first alphabet (**C**04BHL01) stands for the Water resource region (India-WRIS). Following 2 digits represents basin code (C**04**BHL01). Next three letters (C04**BHL**01) represents sub-basin name which is followed by watershed number (C04BHL**01**). The distribution of watersheds over the seven sub-basins of Krishna basin has been shown in Map 13a - Map 13g.



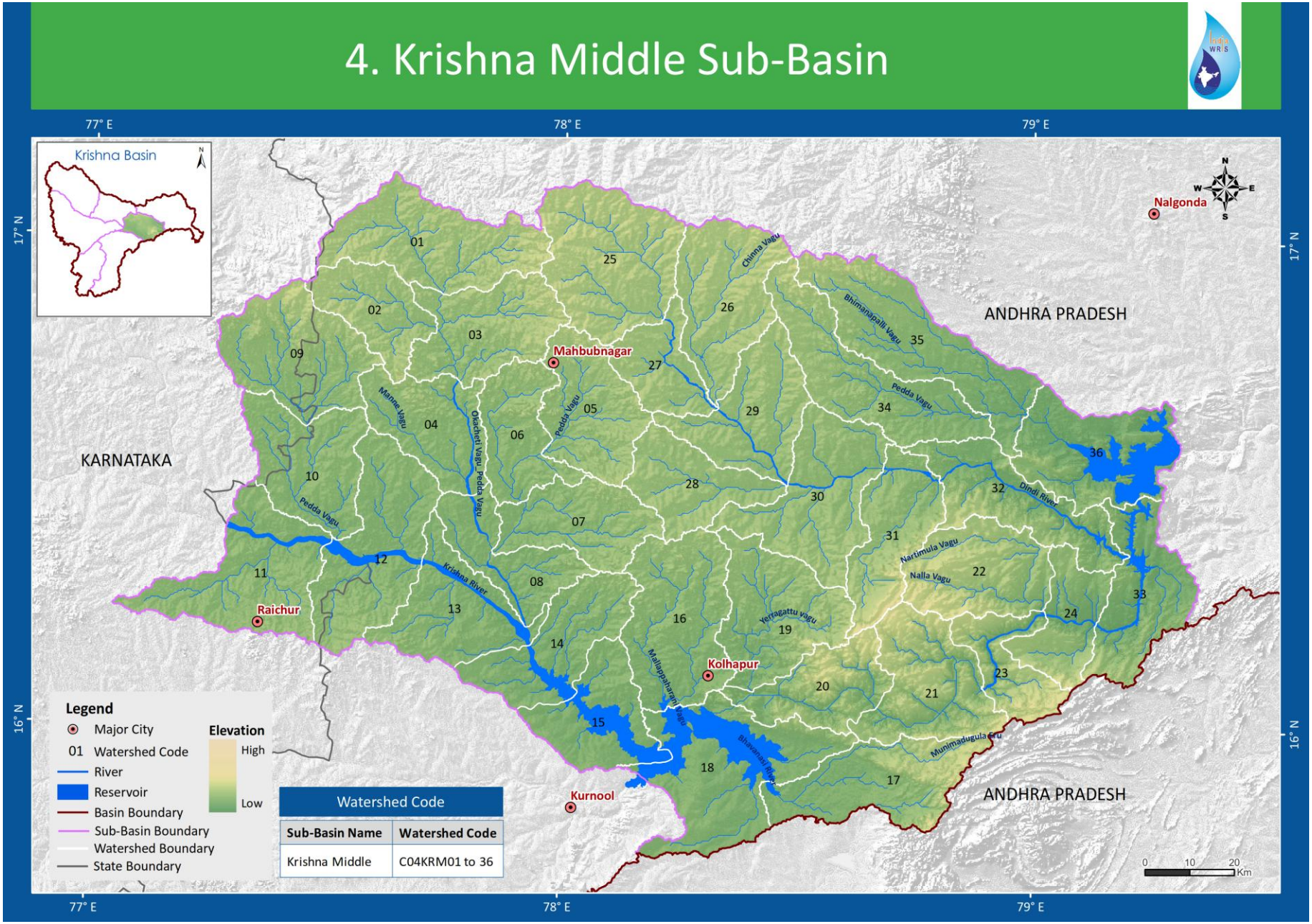
Map 13a. Bhima lower sub-basin and watersheds



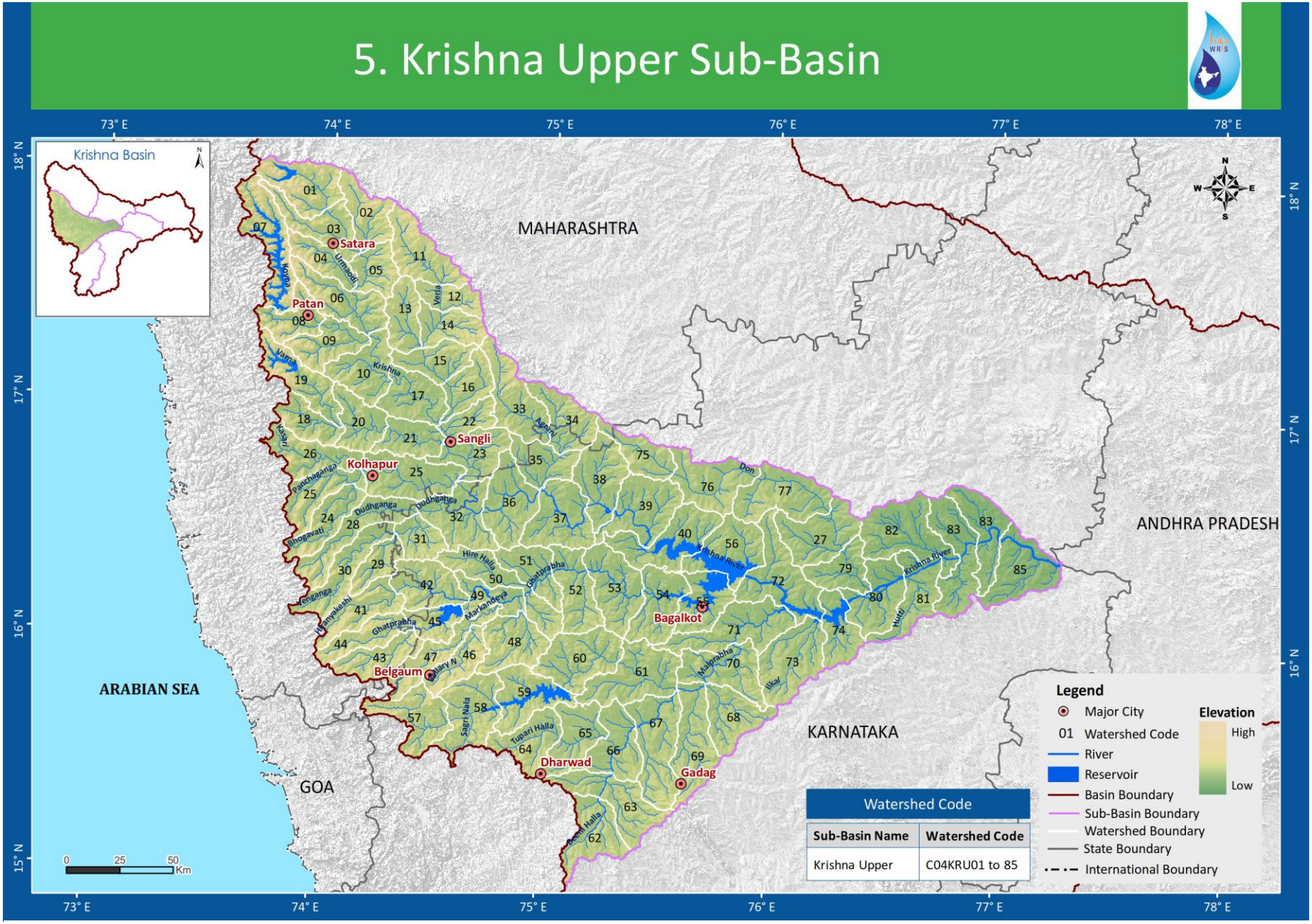
Map 13b. Bhima upper sub-basin and watersheds



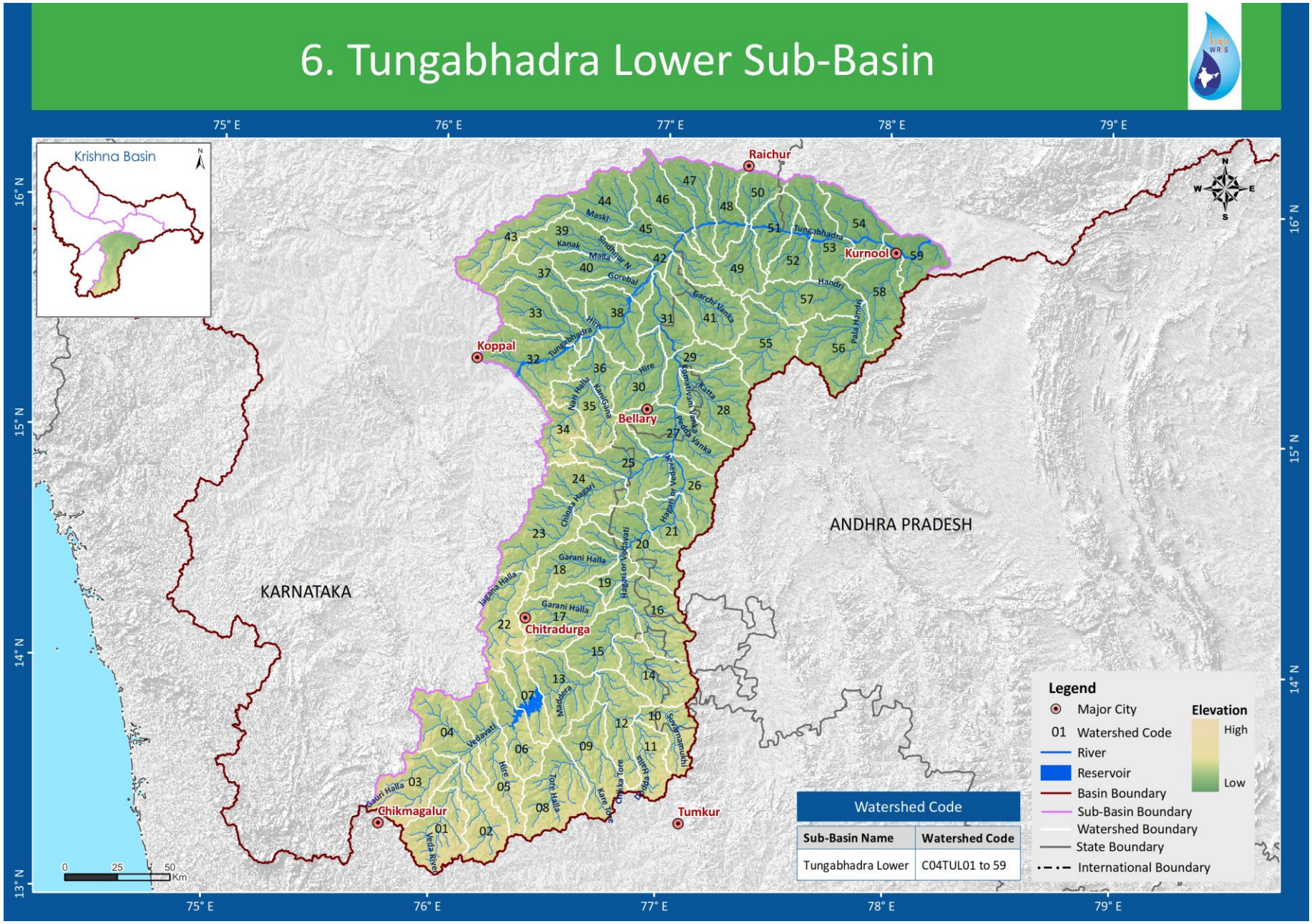
Map 13c. Krishna lower sub-basin and watersheds



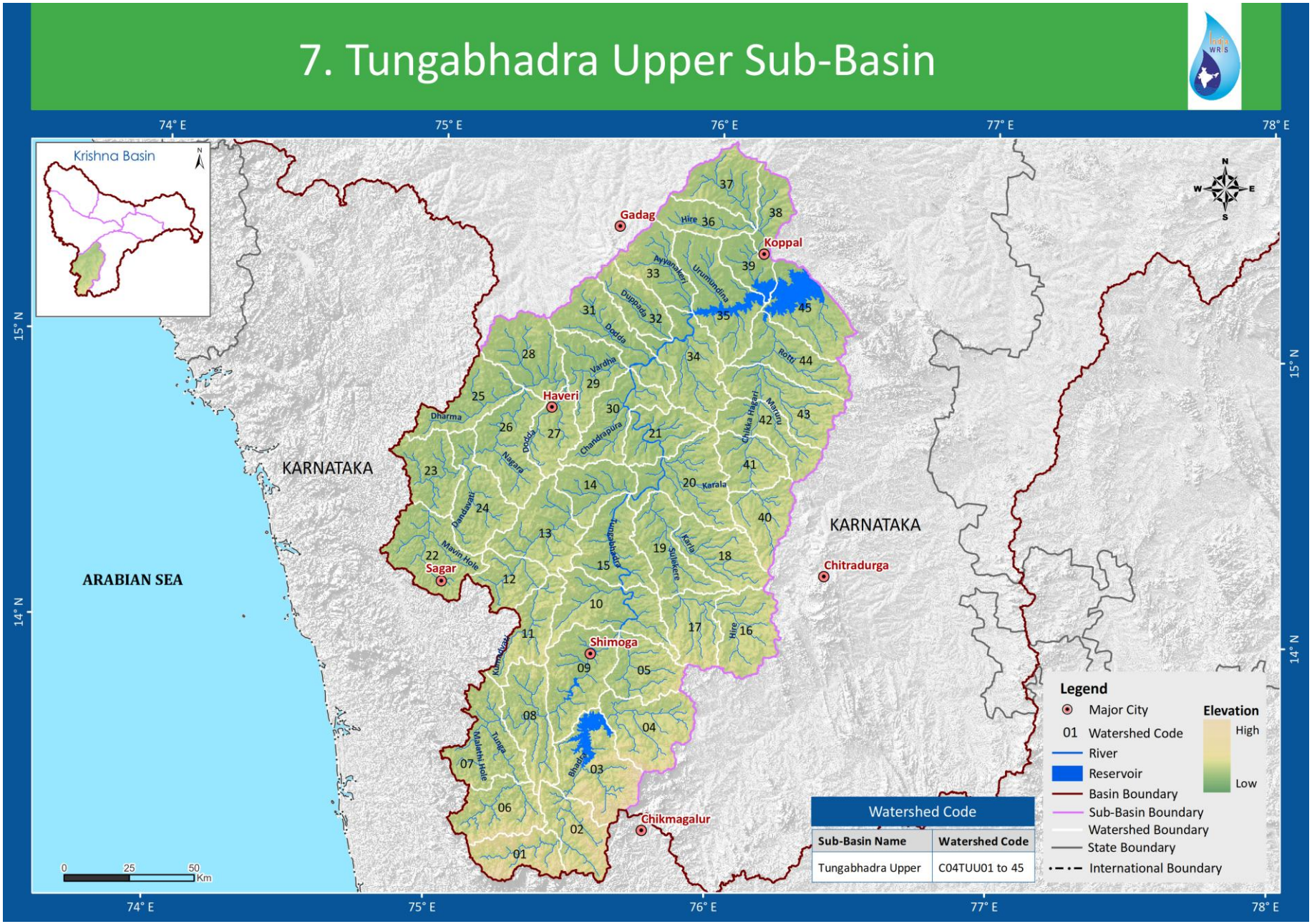
Map 13d. Krishna middle sub-basin and watersheds



Map 13e. Krishna upper sub-basin and watersheds



Map 13f. Tungabhadra lower sub-basin and watersheds



Map 13g. Tungabhadra upper sub-basin and watersheds

3. Surface water resources

3.1 Surface waterbodies

Surface water bodies have traditionally played an important role in the lives of common people in India by providing water for irrigation, drinking water supply, ecology, tourism and domestic uses. But water bodies (total number, capacity as well as quality) are decreasing day by day due to mainly siltation and disposal of untreated waste into it.

According to the assessment, the total utilizable Surface Water Resource in Krishna Basin is 58.0 BCM. Reported Live Storage capability of Krishna Basin is 49.55 BCM. Maximum number of surface water bodies in Krishna basin falls in size range 0-25 Ha. Details of number of water bodies according to their water spread area are given in Table 6. There are reportedly 536 major reservoirs in the basin. Srisailam reservoir is the biggest surface waterbody falling under the basin followed by Almatti, Ujjani, Nagarjuna sagar, Tungabhadra and Bhadra reservoirs. Most of the area of basin is covered by Tanks, followed by Lakes/Pond, Abandoned quarry, Reservoirs, Aquaculture Pond, Cooling Pond and Salt pans respectively (Figure 5).

Table 6. Number and size of waterbodies

S. no.	Size Range (ha)	No. of Waterbodies
1	0 - 25	36875
2	25 - 50	1496
3	50 - 100	696
4	100 - 250	339
5	250 - 500	84
6	500 - 1000	32
7	1000 - 2500	35
8	More than 2500	18

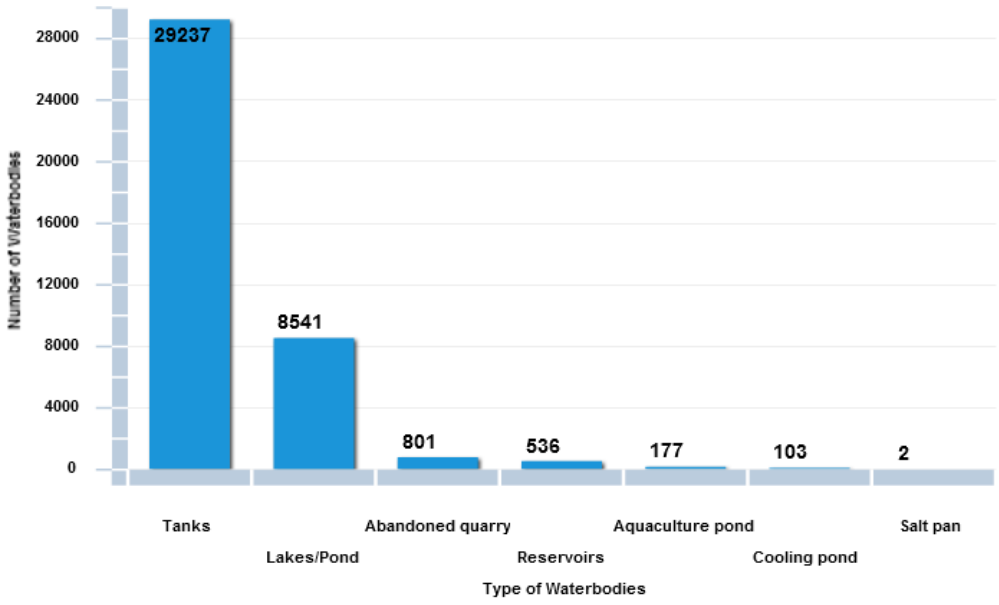


Figure 5. Type and number of waterbodies

3.2 Water resource projects

Water resources projects are broadly categorized into irrigation projects and hydroelectric projects. There is a vast potential for irrigation development and hydropower generation in the basin. Total number of Major and Medium Irrigation projects, ERM projects, Lift Irrigation Projects and Hydro-Electric Projects of the Krishna basin is given in Table 7.

Table 7. Number of water resources projects

S.no.	Type of Projects	Number of Projects
1	Major Irrigation Projects	76
2	Medium Irrigation Projects	135
3	ERM Projects	10
4	Hydro-Electric Projects	30
5	Lift Irrigation Projects	119

3.2.1 Major and medium irrigation projects

Though few major projects like Krishna delta were in existence prior to independence, planned development of water resources of Krishna basin started after independence. There are 76 Major and 135 Medium irrigation projects in the basin.

Radhanagari, Ghod, Khadakwasla Stage-I, Vir Dam, Konya Dam,Tungabhadra, Bhadra, Ghataprabha Stage-I and Stage-II, Upper Krishna, Musi Project,Nagarjuna Sagar, Sri Sailam, P.D.Jurala and Prakashan Barrage are the major projects in the catchment areas of the river basin. Krishna Barrage, Kurnool Cuddaph Canal, Tungabhadra Right Bank Lower Level Canal, Tungabhadra High Level Stage-I and Rajouli Bunda Diversion major projects and fifteen other minor irrigation project of Andhra Pradesh are in the catchment areas of the river basin. Similarly Vijaynagar Channels, Vanivilas Sagar, Ghataprabha Stage-I and Stage-II, Tungabhadra RBC & LBC and Bhadra LBC Major Irrigation projects and 29 other medium irrigation projects of Karnataka are also in the catchment areas of the river basin. Neera RBC & LBC, Ghod, Vir, Radhanagari and Tulsi major irrigation projects and 39 other minor irrigation projects of Maharashtra are in the catchment areas of the river basin. *(Source: Integrated Hydrological Data Book, 2012, CWC-New Delhi)*
Some of the major and medium irrigation projects in the Krishna basin are given here.

A. **Krishna Major Irrigation Project:** The Krishna major irrigation project is a completed irrigation project of Maharashtra having GCA, CCA & UIP values 103.556, 74 and 74 Th.ha. respectively. Associated water resources structures are Dhom dam and Kanher dam.Satara and Sangli districts are benifited by this project.
B. **Hippargi Irrigation Project:** It is a major ongoing irrigation project envisages construction of Hippargi barrage on the river Krishna in Karnataka state. Bagalkot and Belgaum districts are benefited by this project. GCA, CCA & UIP of the Hippargi major irrigation project are 93.427, 59.69 and 59.69 Th.ha. respectively.
C. **Ghatprabha medium irrigation Project**: The Ghatprabha Medium Irrigation project comprises of construction of earthen dam on the Ghatprabha river for irrigation and hydroelectric purpose with CCA 5.46 th. Ha., UIP 4.78 th.ha. and Ghatprabha Powerhouse with installed capacity of 8 MW.

D. **Upper Krishna project stage-I:** Upper Krishna project stage-I is basically an irrigation project with GCA, CCA & UIP 549 ,425, and 458.89 th.ha respectively. The project provides water for irrigation to the drought prone areas of Bijapur, Bagalkot, Gulbarga and Raichur districts. A major part of Upper Krishna command is covered under the Narayanpur canals for which, the main supplementing storage would be at Almatti. The first stage of this project comprises of two components. i) Almatti dam across the Krishna river near Almatti village in Bagewadi taluk of Bijapur district ; ii) Narayanpur or Upper Krishna Stage-I dam, across the Krishna River, at Narayanpur (downstream of Almatti dam) near Bachihal and Siddapur village in Muddebihal taluk of Bijapur district.

E. **Upper Krishna project stage-II:** The 2nd stage of the project envisages raising FRL of Almatti Dam to 524.26 m for providing irrigation to more areas. District beniffited by this project are Bijapur, Gulbarga, Raichur and Bagalkot. The GCA, CCA & UIP of this project are 268.17, 197.12 and 226.69 respectively.

F. **Malaprabha Major Irrigation Project:** The Malaprabha major irrigation project envisages construction of Malaprabha Dam on the Malaprabha river of Krishna basin. Mysore district is benefited by this project. GCA, CCA & UIP of the Malaprabha major irrigation project are 344.77, 196.13 and 196.13 Th.ha. respectively.

G. **Tungabhadra Right Bank High Level Canal Stage-I & II (Andhra Pradesh) and Tungabhadra Right Bank High Level Canal (Karnataka):** Stage I of the Major irrigation project is completed and stage II is ongoing.Associated water resource structure is Tungabhadra dam. CCA & UIP of the major irrigation project are 214.27 and 214.27 Th.ha. respectively.

H. **Tungabhadra Right Bank Low Level Canal (Karnataka, Andhra Pradesh):** Tungabhadra Right Bank Low Level Canal is a completed major irrigation project with associated Tungabhadra dam. CCA & UIP of the major irrigation project are 98.60 and 98.60 Th.ha. respectively.

I. **Tungabhadra Left Bank Low Level Canal (Karnataka):** Tungabhadra Left Bank Low Level Canal is a completed major irrigation project with associated Tungabhadra dam. CCA & UIP of the major irrigation project are 244.20 and 244.20 Th.ha. respectively.

J. **Khadakwasla Major Irrigation Project:** It is a completed major irrigation project. Associated water resource structures are Khadakwasla dam, Warasgaon dam and Panshet dam. Pune District is benefited by this project. GCA, CCA & UIP of the Khadakwasla major irrigation project are 97.10, 88.46 and 62.1460 Th.ha. respectively.

K. **Bhima Major Irrigation Project:** The Bhima major irrigation project envisages construction of Ujjani Dam on the Bhima river of Krishna basin. Districts benefited by this project are Solapur, Pune and Ahmednagar. GCA, CCA & UIP of the Bhima major irrigation project are 205.2770, 199.1050 and 259.5390 Th.ha. respectively.

L. **Jurala Major Irrigation Project:** The Jurala major irrigation project envisages construction of Priyadarshini Jurala / Jurala Dam on the river Krishna. Mahboobnagar district is benefited by this project. GCA, CCA & UIP of the Jurala major irrigation project are 74.35, 41.26 and 41.30 Th.ha. respectively.

M. **Bhadra Major Irrigation Project:** The Bhadra major irrigation project envisages construction of Bhadra Dam on the Bhadra river.The CCA and UIP of the Bhadra major irrigation project are 121.50 and 105.57 Th.ha. respectively. Districts benefited by this project are Chickmagalur and Shimoga.

N. **Srisailam project:** The Srisailam project was originally planned as hydroelectric project by the Govt. of Andhra Pradesh. Subsequently, the domestic water supplies to Chennai and

irrigation benefits to upland areas have been included. The project involves the construction of earthen dam of straight gravity type with an overall length of 512 m and a maximum height of about 145 m from the deepest foundation level. The Srisailam dam is located at about 869 km downstream of the origin of the Krishna, near the famous shrine 'Srisailam' after the confluence of Tungabhadra and Bhima rivers with Krishna. Srisailam Right Bank Canal Major Irrigation Project has UIP 100.87 Th.ha. with command spreading in Nalgonda, Kurnool, Cuddapah districts.

O. **Srisailam Right Bank Canal Major Irrigation Project**: The Srisailam Right Bank Canal Major Irrigation Project is a completed major irrigation project with associated Water resources structures Gorakallu Dam, Paleru Dam and Srisailam(N.S.R.S.P.) Dam.GCA, CCA & UIP of the Srisailam Right Bank Canal Major Irrigation Project are 115.68, 76.89 and 100.87 Th.ha. respectively. Districts benefited are Nalgonda, Kurnool and Cuddapah.

P. **Srisailam Left Bank Canal Major Irrigation Project**: The Srisailam left Bank Canal Major Irrigation Project is a ongoing major irrigation project of Andhra Pradesh with associated Water resources structures Nagarjuna Sagar dam and Srisailam(N.S.R.S.P.) dam.

Q. **Telugu ganga major irrigation project (Andhra Pradesh, Tamil Nadu):** Telugu ganga project is a prestigious on-going project in this basin. Associated Water resources structures of this project are Kandaleru, Somasila, Srisailam, & Velugodu dams. District benifited by this project are Kurnool, Cuddapah, Nellore and Chittoor. The GCA, CCA & UIP of the telugu ganga project are 386.88, 233 and 233 respectively.

R. **Nagarjunasagar project:** The Nagarjuna Sagar dam is an earthen with length 4865 m and height 125 m. It is situated downstream of Srisailam reservoir on the main Krishna river near guruzala city in Guntur district of Andhra Pradesh. It is a multipurpose project with irrigation, hydropower and flood control components. District benifited by the Nagarjunasagar project are Nalgonda, Khammam, Krishna, Guntur, Prakasam and West Godavari. U.I.P of the project is 868 Th.ha.

S. **Krishna Barrage (including old Krishna Delta system):** The Krishna Barrage (including old Krishna Delta system) is a major Irrigation project with GCA, CCA & UIP 714.44, 475.65 and 529 Th.ha. respectively. Krishna and Prakasam districts are benifited by this project.

T. **Warna Major Irrigation Project:** The Warna major irrigation project is a major on-going project in Krishna basin. Wakurde Dam and Warna Dams are associated Water resources structures of this project. GCA, CCA and UIP of Warna major irrigation project are 128.7030, 109.70 and 121.92 Th.ha. respectively.

U. **Chandrampalli Medium Irrigation Project:** Chandrampalli medium irrigation project comprises of construction of Chandrampalli earthen dam on the Sarnala river for irrigation purpose. The Chandrampalli medium irrigation project is having GCA, CCA & UIP values 8.5460, 5.22 and 8446 Th.ha. respectively .Gulbarga district is benifited by this project.

Salient features of other major medium irrigation projects with their GCA, CCA and U.I.A are listed in Annexure IV: C.

The Krishna basin has total 119 Lift irrigation and 10 ERM projects as listed in Table 7. The Lift Irrigation Projects in the basin includes the projects Handri Neeva Sujala Sravanti (HNSS) lift Irrigation Scheme, Krishna Koyna Lift Irrigation Project , Shirapur Lift Irrigation Project,Rajiv Bhima Lift Irrigation Scheme – I, Sigatalur Left Side First Lift Irrigation Scheme etc.

The ERM projects in the basin include Modernization of Neera Left Bank Canal, Extension of Krishna Canal, Modernisation of Hattikuni Canal, Ghataprabha Project Stage-III, Modernisation of Bhadra canal etc.

3.2.2 Hydro Electric projects

The Krishna basin has total 30 hydroelectric projects as listed in Table 7. The Hydro-electric schemes presently in operation in the basin are Srisailam Hydroelectric Project (900 MW Srisailam Left bank Power House), Nagarjunasagar Hydroelectric Project (815.6 MW Nagarjunasagar Power House), Almatti Hydroelectric Project (275 MW Almatti II Power House), Priyadarshini Jurala Hydroelectric Project (234 MW Priyadarshini Jurala Project Power House), Pulichintala Hydroelectric Project (120 MW Pulichintala Project Power House) etc.

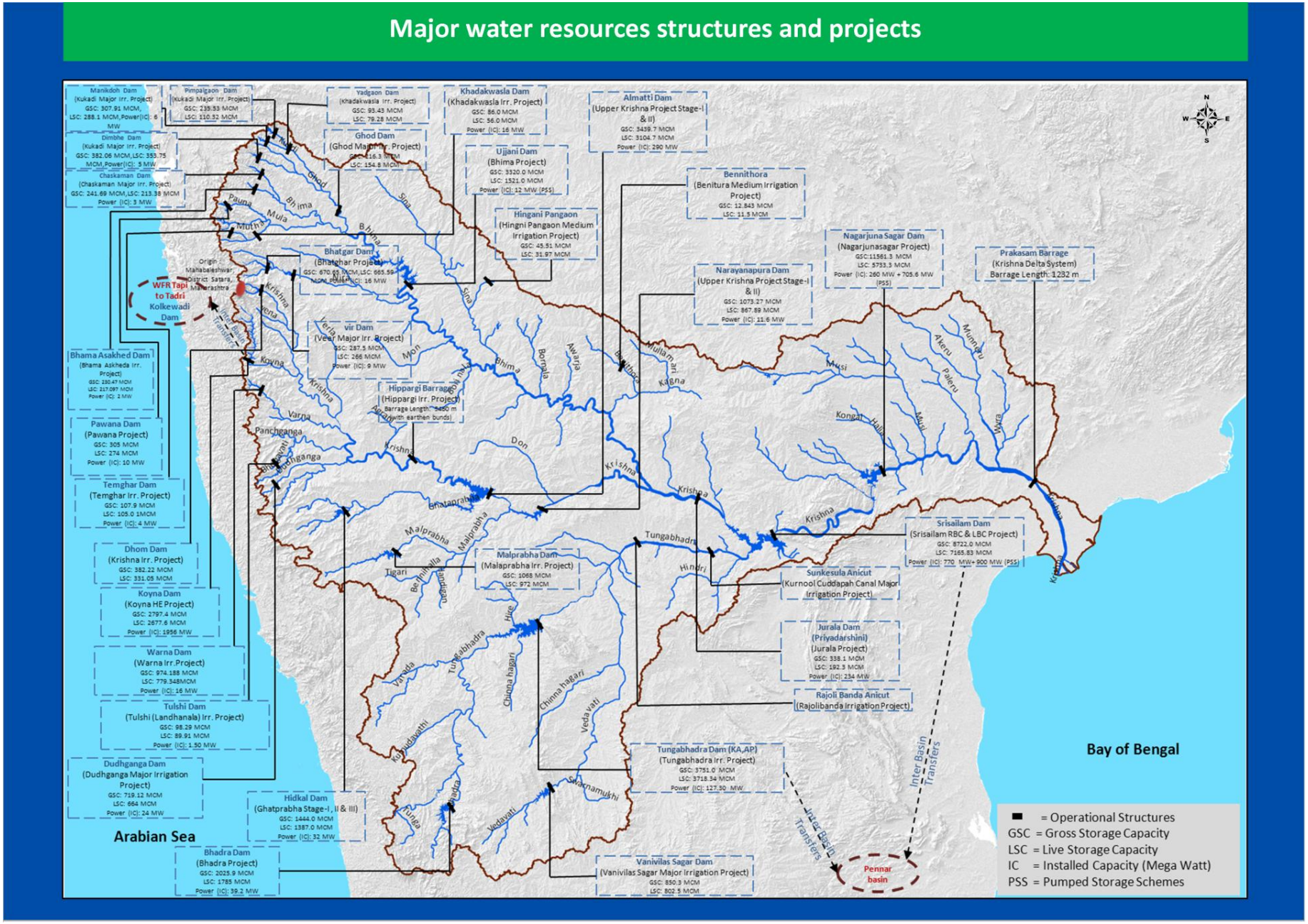
3.2.3 Dams, Barrages/Weirs/Anicuts

Water resources structures are manmade structures to store the water for hydropower, irrigation, drinking water supply etc. So far nearby 855 Nos. of structure (Dams/Barrages/Weirs/Anicuts and lifts) is constructed providing irrigation, diversion, storage purpose and other facilities in the basin. The dependable yield for the basin is utilized under number of major, medium and minor irrigation projects of the basin. Irrigation is being carried out in the area under these projects viz., dams, barrages, diversion structures and other lift irrigation systems.There are 660 Dams, 12 Barrages, 58 Weirs, 6 Anicuts and 119 lifts are situated in the Krishna . Majority of dams (81.36%) have storage capacity below 25 MCM (Figure 6). Around 90% dams are used for the purpose of irrigation (Figure 7). Sub-basin wise distribution of these structures has been given in Table 8.The longest dam in the basin is Narayanapura Dam on Ghataprabha river in Belgaum District of Karnataka with a total length of 10.64 km and height 29.72 m. Srisailam (N.S.R.S.P) Dam, the highest in the basin is located in Kurnool district of Andhra Pradesh on river Krishna with a height of 145 meters. Major dams in the basin are Priyadarshini Jurala / Jurala Dam, Srisailam (N.S.R.S.P) Dam, Nagarjuna Sagar Dam, Hidkal Dam, Arsoli Dam and Budhpur Dam etc.

Srisailam Dam is constructed across the Krishna River at Srisailam in the Kurnool district in the state of Andhra Pradesh in India and is one of the 12 largest hydroelectric projects in the country.
Detailed information of the dams/barrages/weirs/annicuts has been given in Annexure IV: A & B. Map 14 gives a detailed view of the important water resources structures with their salient features (GSC, LSC, structure Length, capacity of power house) of Krishna basin.

Table 8. Sub - Basin wise number and type of water resources structures

S.no.	Sub-basin	Dams	Barrages	Weirs	Anicuts	Lifts	Power House
1	Bhima lower	68	5	0	0	2	0
2	Bhima upper	273	0	1	0	30	9
3	Krishna lower	29	2	0	2	1	4
4	Krishna middle	34	0	0	0	8	4
5	Krishna upper	188	4	57	0	61	10
6	Tungabhadra lower	37	0	0	3	4	3
7	Tungabhadra upper	31	1	0	1	13	5



Map 14. Major water resources structures and projects

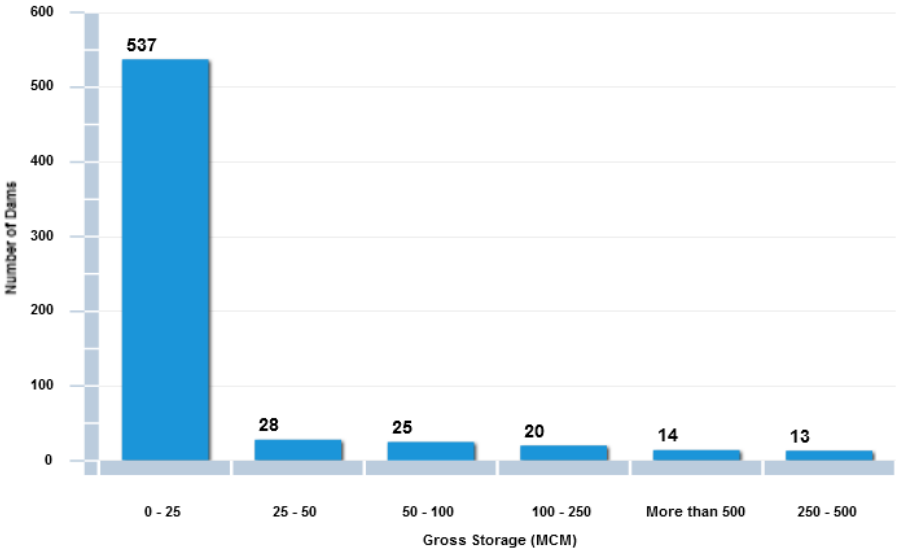


Figure 6. Dam classification based on storage

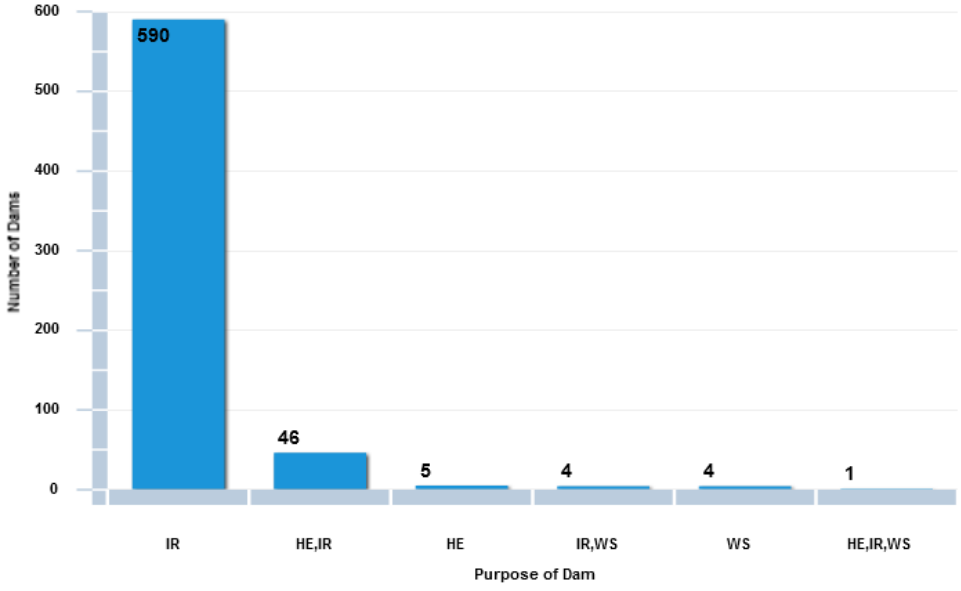
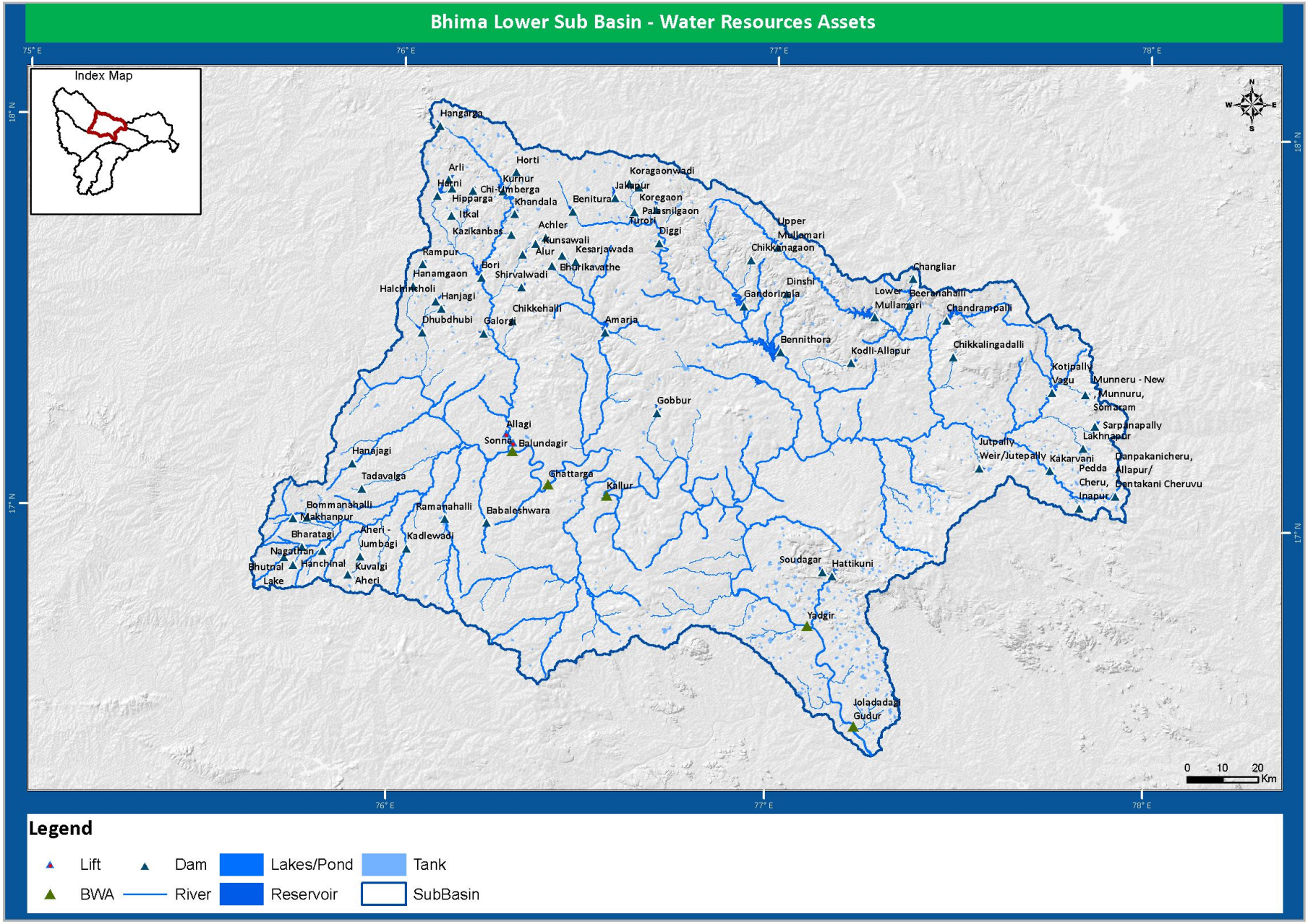
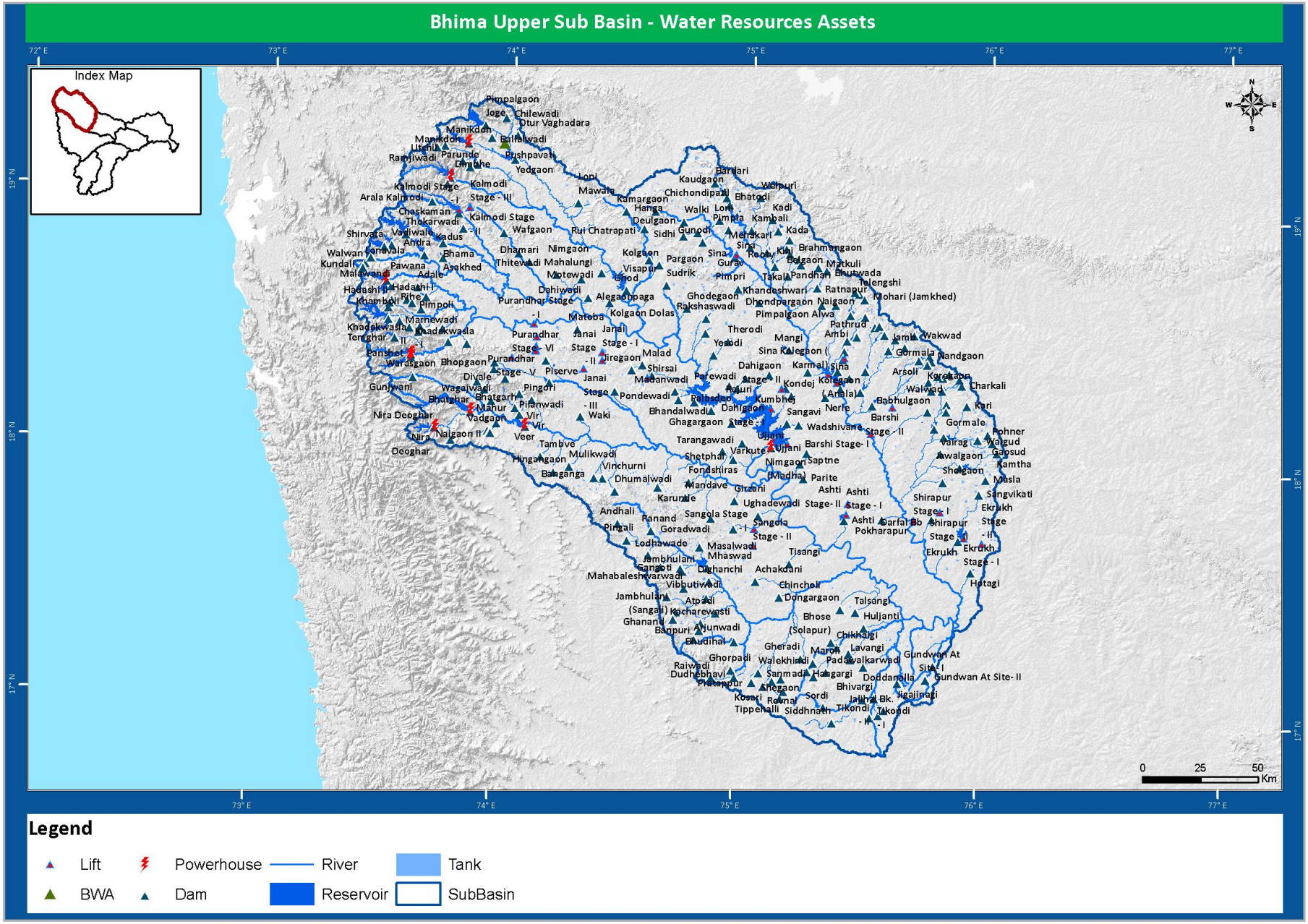


Figure 7. Dam classification based on purpose

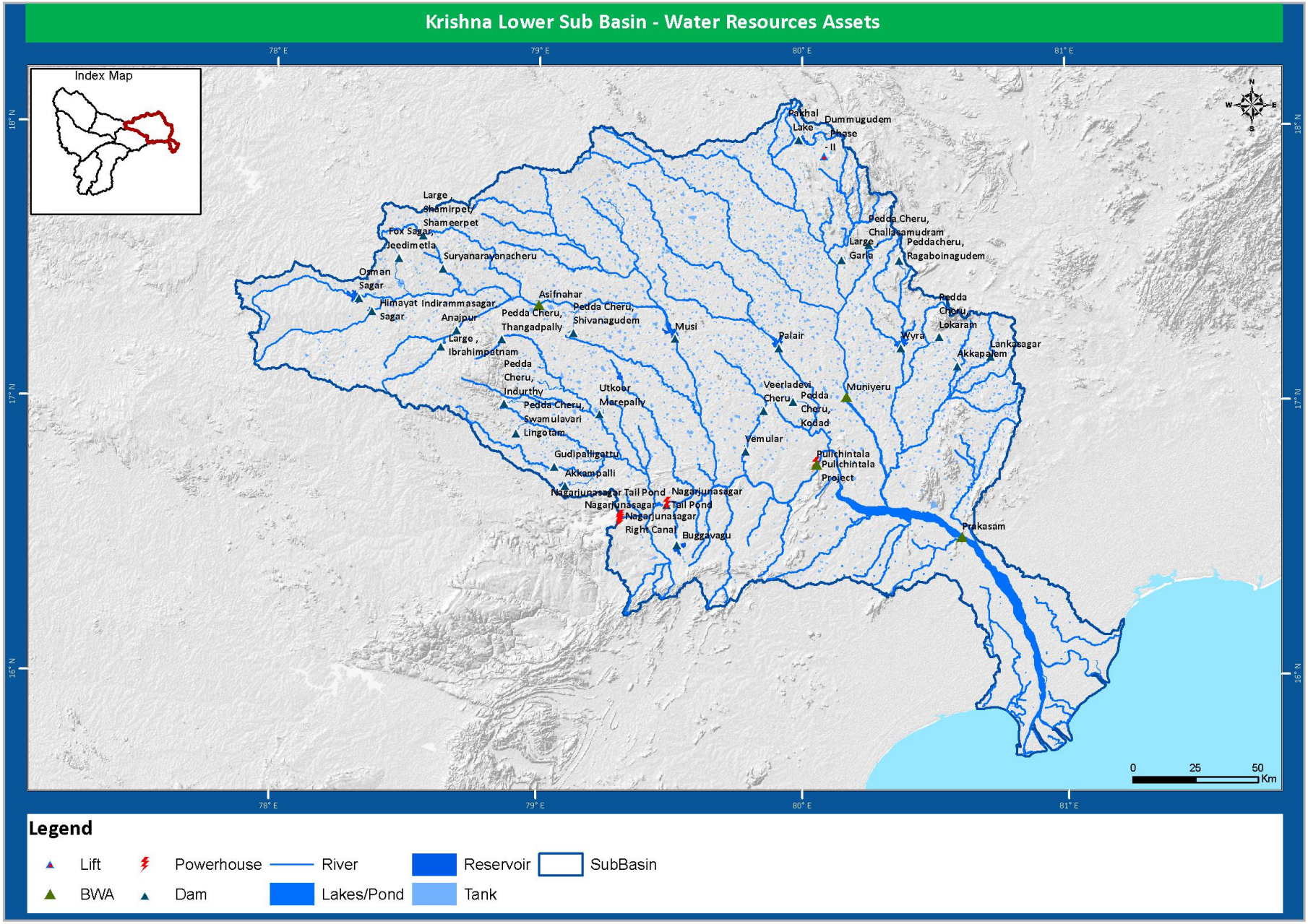
Bhima upper sub-basin is having highest number of dams followed by Krishna upper, Bhima lower, Tungabhadra lower, Krishna middle, Tungabhadra upper and Krishna lower sub-basins.Sub-basin wise spatial distribution of water resources assets has been shown in Maps 15a-15g respectively.



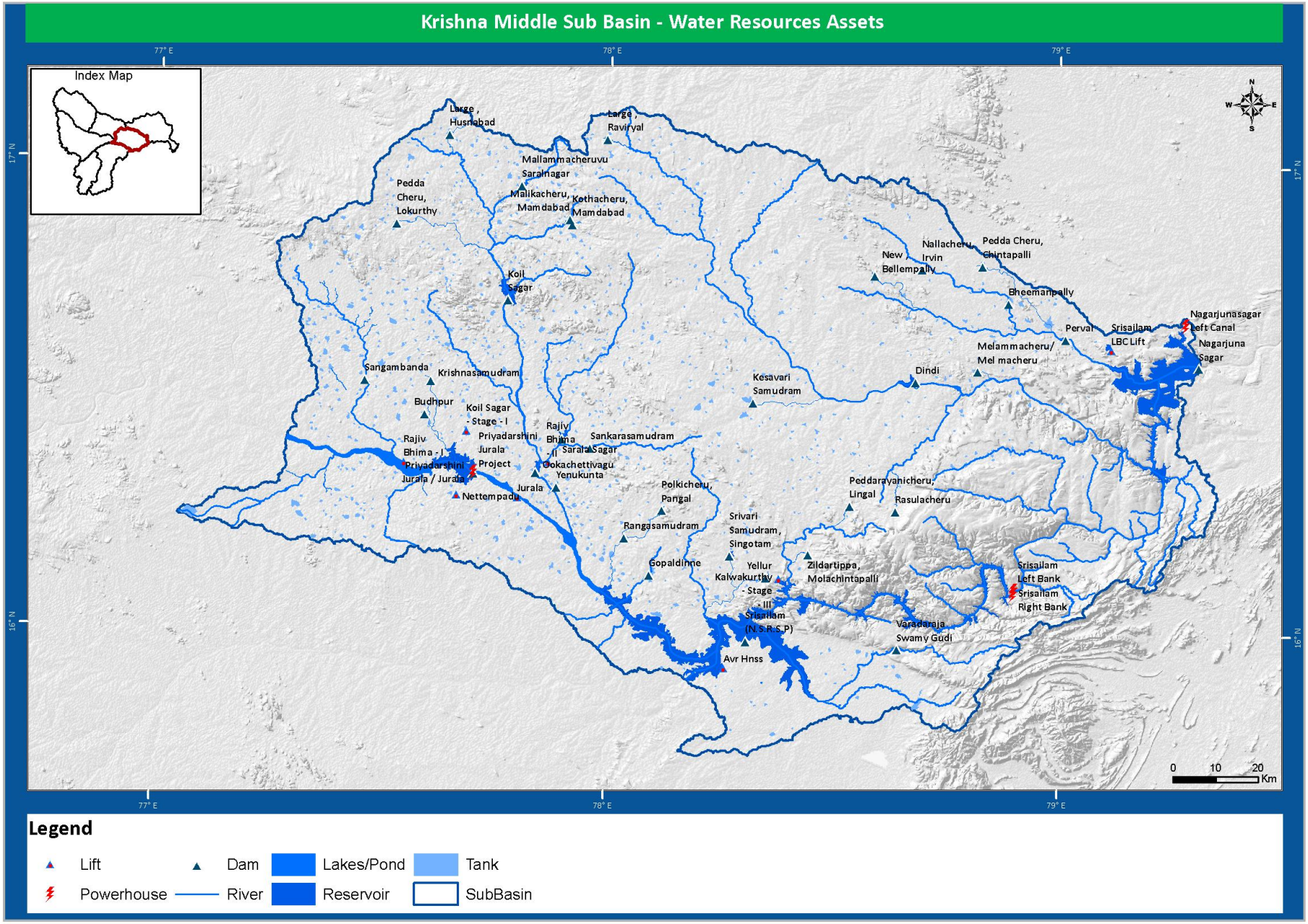
Map 15a. Bhima lower sub-basin and water resources assets



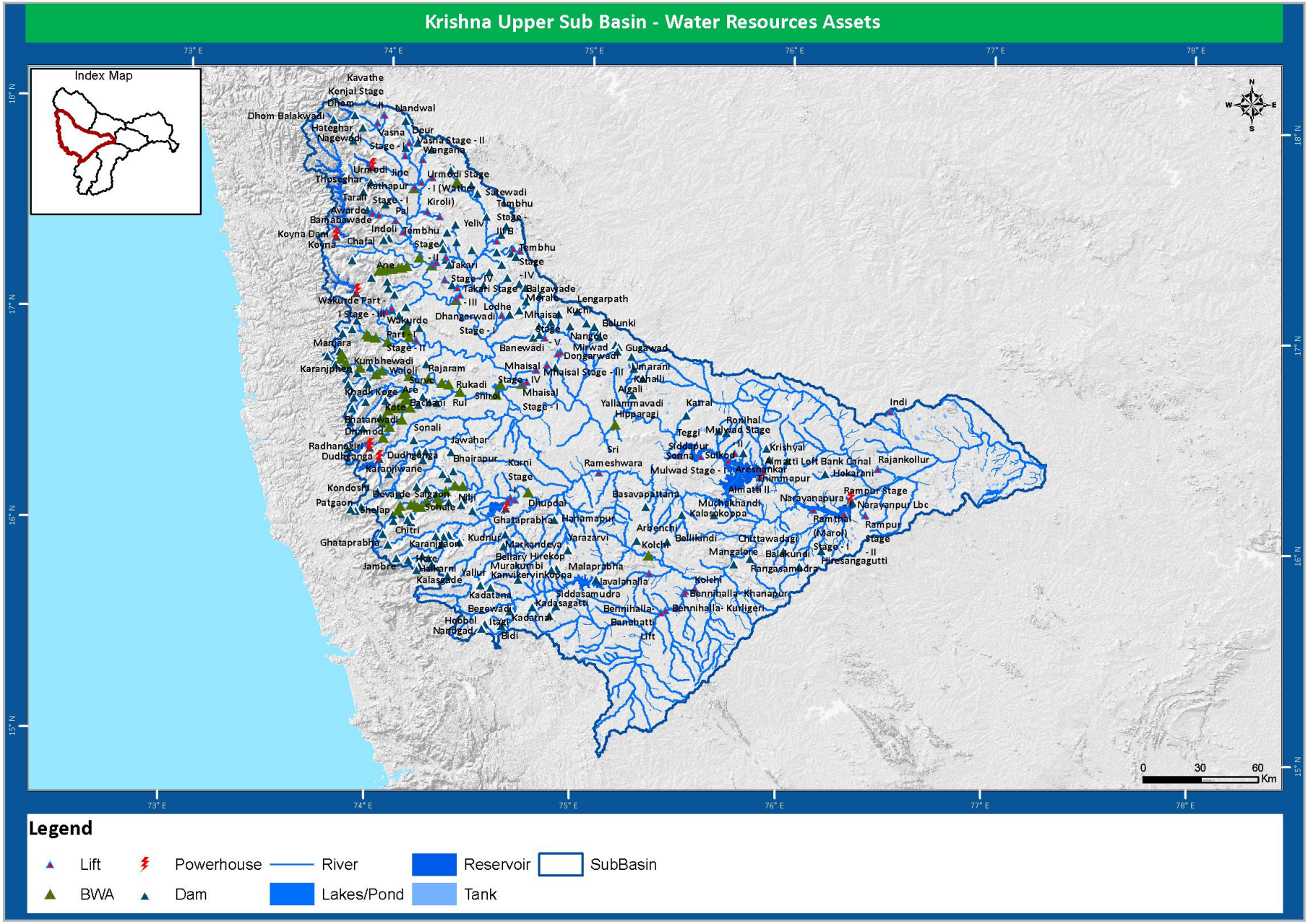
Map 15b. Bhima upper sub-basin and water resources assets



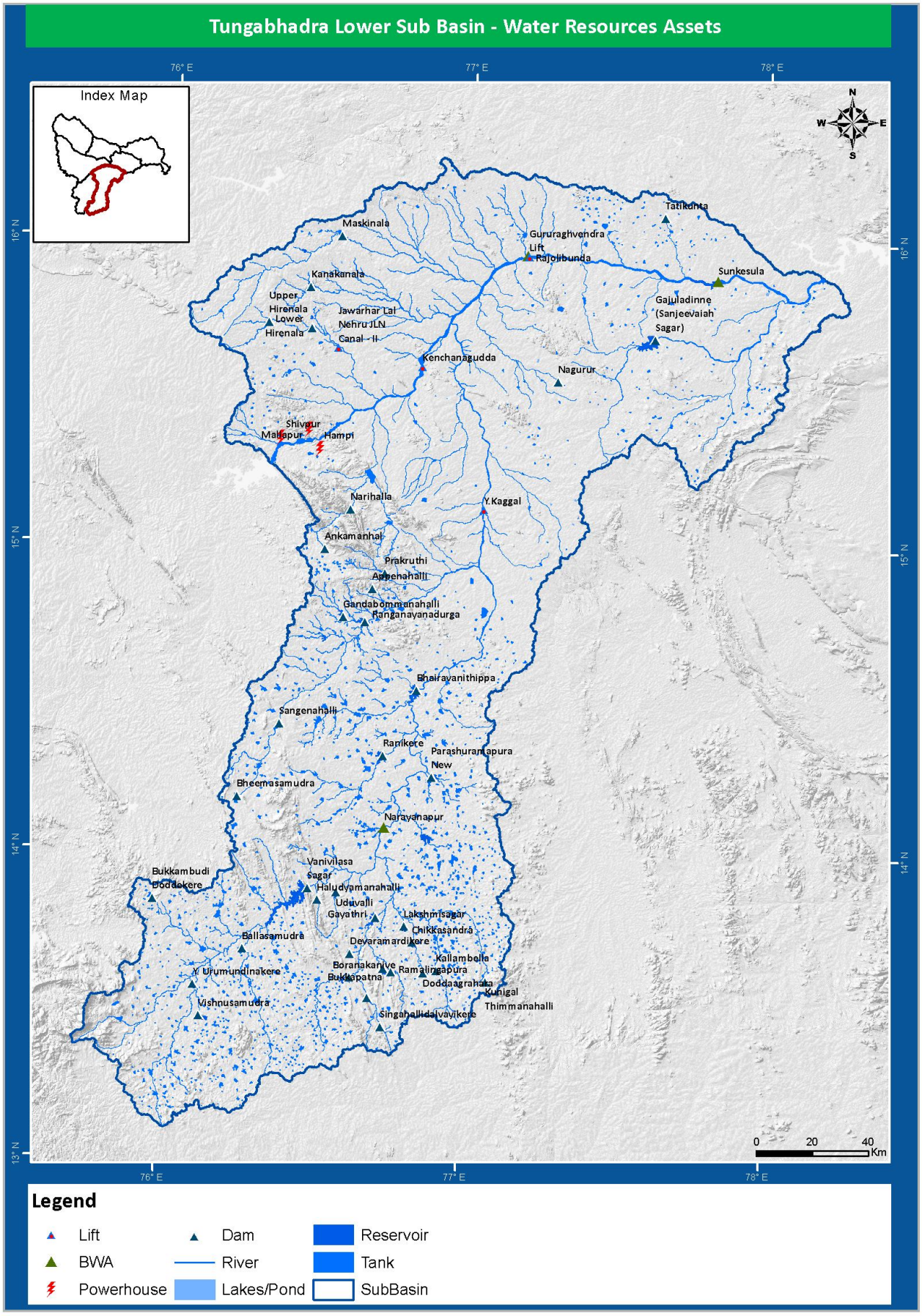
Map 15c. Krishna lower sub-basin and water resources assets



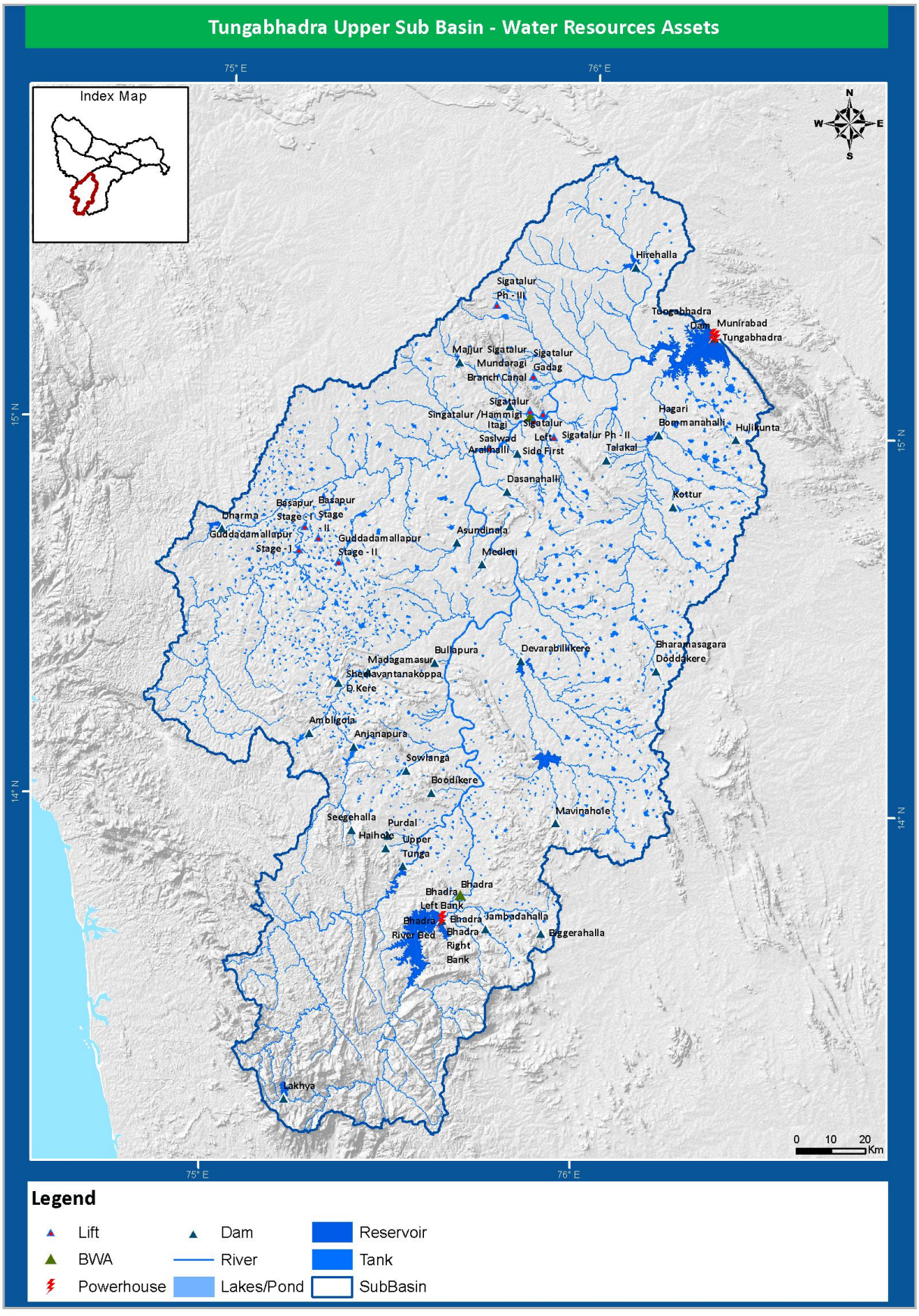
Map 15d. Krishna Middle Sub-basin and water resources assets



Map 15e. Krishna upper sub-basin and water resources assets



Map 15f. Tungabhadra lower sub-basin and water resources assets



Map 15g. Tungabhadra upper sub-basin and water resources assets

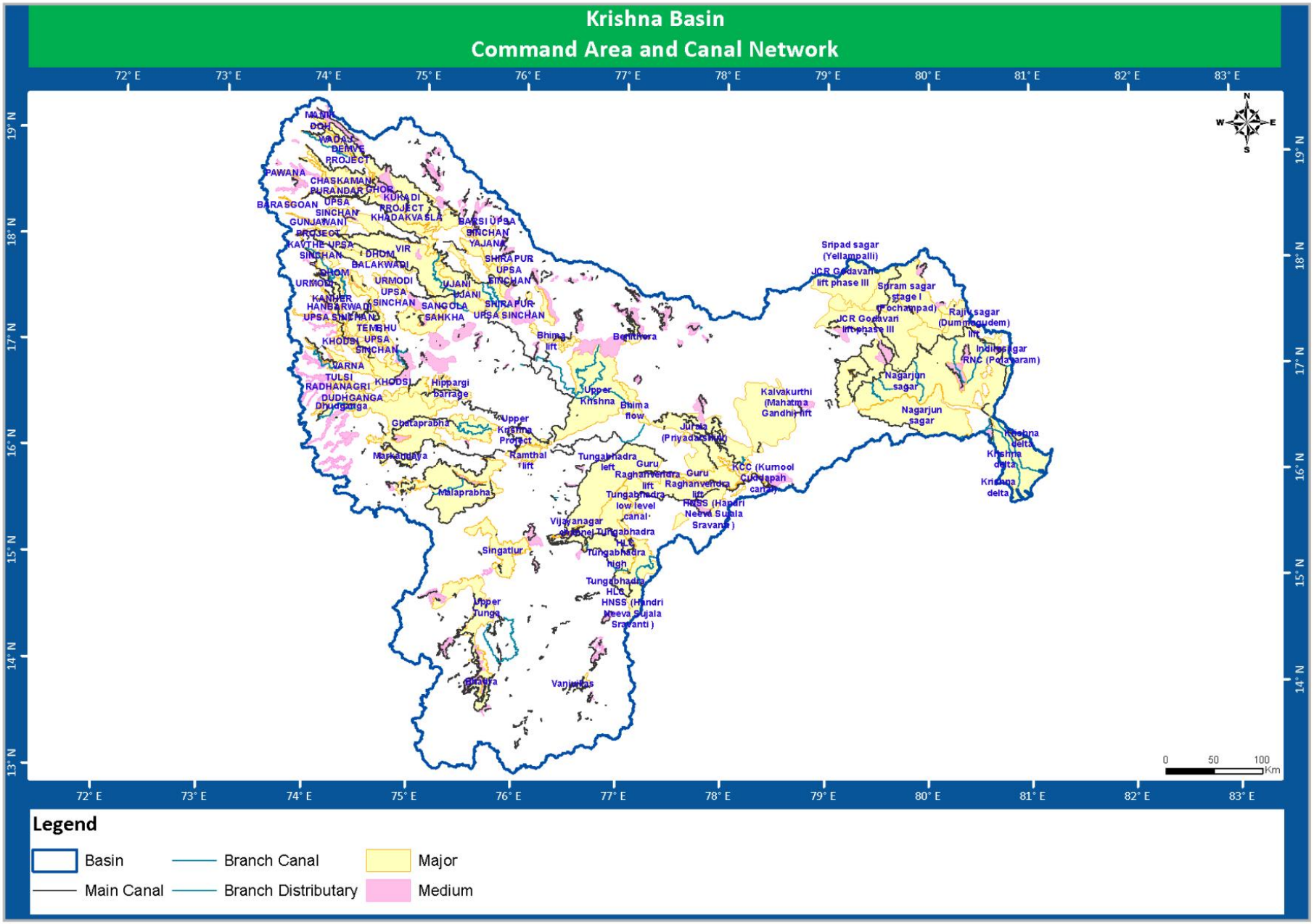
3.2.4 Command area and canals network

Canals are man-made channels for conveyance of water. When the water is to be transported across landscape to deliver the water to the respective command areas by canal network, construction of various irrigation structures are necessary to negotiate with different terrain including drains, road, rail lines. Important Irrigation structures are Regulators, Bridges, Aqueducts/Syphon Aqueducts, Super passages/Syphons, Level crossings/Inlets and Outlets, and other cross drainage structures. Regulators control the supply to an off taking channel from the parent channel. Irrigation has been practiced in the basin from historic times.The most important irrigation work in the Krishna basin is the Krishna Delta system at the mouth of the river. The project, constructed in the year 1855, provided for the irrigation of a part of the deltaic plains, with headworks located at Vijayawada, where the Krishna attains a width of about 1.19 km.

Main AIBP projects falling under the basin are Bhima (Sangambanda) Project, Nagarjuna sagar left Project, Sriram Sagar stage I (Pochampad), Sriram sagr stage II, Chaskman Project, Ghataprabha Stage-III Project, Jurala (Priyadarshini) Project, Kukadi Project, Malaprabha Project and Upper Krishna Project Stage-II.

Among the other important irrigations projects are the Kurnool-Cuddapah Canal Scheme comprised a masonry anicut at Sunkesula, in two lengths across two arms of the river Tungabhadra with an island in between, the project was completed in 1866 and the Nira Canal Project, constructed in 1885-86, consisted of a 1625 m long and 49.7 m high dam across the river Yelvandi at Bhatghar, a 693 m long masonry pick-up weir on the Nira river at Vir and canal system on either bank to irrigate an area of 82730 hectares. The major and medium Command Area spread over the basin along with the canal network has been shown in Map 16.

A study was carried out jointly by CWC & ISRO to assess the existing status of the irrigation commands. IRS P4 LISS III data of two different seasons namely, pre monsoon (2005) and post monsoon (2004) were used for delineation of waterlogged and salt affected areas of major and medium irrigation commands of Krishna basin. Total waterlogged area within these occupies 13798.88 Sq. Km ha whereas salt affected area has been extended to 168.57 Sq. km.



Map 16. Command area and canal network

3.2.5 Multipurpose projects

There are 16 multipurpose projects in the Krishna basin as listed in Table 9.

Table 9. Multipurpose projects

Multipurpose project	Irrigation project	Hydroelectric project	ERM Project
Srisailam Multi Purpose Project	1. Galeru Nagari Sujala Sravanthi (GNSS) Major Irrigation Project 2. Handri Neeva Sujala Sravanti (HNSS) Major Irrigation Project 3. Mahathma (Kalwakurthy) Lift Irrigation Project 4. Srisailam Right Bank Canal Major Irrigation Project 5. Telugu Ganga Major Irrigation Project 6. Veligonda (Polsubbarai) Major Irrigation Project 7. Srisailam Left Bank Canal Major Irrigation Project	Srisailam Hydroelectric Project	
Juarla Multi Purpose Project	1. Jurala (Priyadarshini) Major Irrigation Project 2. Jawahar (Nettampadu) Lift Irrigation Project	Priyadarshini Jurala Hydroelectric Project	
Nagarjuna Sagar Multi Purpose Project	1. Nagarjuna Sagar Major Irrigation Project 2.Tarakarama Krishnaveni Lift Irrigation Project	Nagarjunasagar Hydroelectric Project	
Tungabhadra Multi Purpose Project	1. Tungabhadra High Level Canal Stage I Irrigation Project Andhra Pradesh 2.Tungabhadra Right Bank High Level Canal Major Irrigation Project Karnataka 3. Tungabhadra Left Bank Canal & Dam Major Irrigation Project 4. Tungabhadra Right Bank Low Level Canal Major Irrigation Project Karnataka	1. Shivpur Hydroelectric Project 2. Munirabad Hydroelectric Project 3. Tungabhadra Hydroelectric Project 4. Mallapur Hydroelectric Project 5. Hampi Hydroelectric Project	
Neera Deoghar Multi Purpose Project	Nira Deoghar Major Irrigation Project	Nira Deoghar Hydroelectric Project	
Bhima Multi Purpose Project	1. Sina Madha Lift Irrigation Project 2.Barshi Lift Irrigation Project 3. Bhima Sina Link Canal Lift Irrigation Project 4. Dhaigaon Major Irrigation Project 5. Bhima Major Irrigation Project	Ujjani Hydroelectric Project	
Ghatprabha Multi Purpose Project	Ghatprabha Medium Irrigation Project	Ghatprabha Hydroelectric Project	
Bhadra Multi Purpose Project	Bhadra Major Irrigation Project	Bhadra Hydroelectric Project	Modernisation of Bhadra canal
Dudhganga Multi Purpose Project	1. Dudhganga Major Irrigation Project Karnataka 2. Dudhganga Major Irrigation Project Maharashtra	Dudhganga Hydroelectric Project	
Bhatgar & Vir Multi Purpose Project	1. Neera Right Bank Canal Major Irrigation Project 2. Neera Left Bank Canal Major Irrigation Project 3. Veer Major Irrigation Project	1. Bhatgarh Hydroelectric Project 2. Veer Hydroelectric Project	Mod. of Neera LBC
Radhanagri Multi Purpose Project	Radhanagri Major Irrigation Project	Radhangiri Hydroelectric Project	

Khdakwasla Multi Purpose Project	Khadakwasla Major Irrigation Project	1. Khadakwasla Hydroelectric Project 2. Warasgaon Hydroelectric Project	
Krishna Multi Purpose Project	(Krishna Major Irrigation Project	Kanher Hydroelectric Project	
Kukadi Multi Purpose Project	Kukadi Major Irrigation Project	1. Manikdoh Hydroelectric Project 2. Dimbhe Hydroelectric Project	
Warna Multi Purpose Project	Warna Major Irrigation Project	Warna Hydroelectric Project	
Upper Krishna Stage - I &II Multi Purpose Project	1. Tegi Siddapur Medium Irrigation Project 2. Rolli Manikeri Medium Irrigation Project	1. Almatti Hydroelectric Project 2. Narayanpur Lbc Hydroelectric Project	

3.2.6 Interstate projects

Irrigation projects which are Interstate projects in Krishna basin are listed below.

1. Rajolibandh Interstate Project (Rajolibanda Irrigation Project Andhra Pradesh)
2. Tungabhadra Interstate Project (Tungabhadra High Level Canal Stage I Irrigation Project Andhra Pradesh)
3. Tungabhadra Interstate Project (Tungabhadra Low Level Right Bank Canal Major Irrigation Project Andhra Pradesh)
4. Dudhganga Interstate Project (Dudhganga Major Irrigation Project Karnataka)
5. Rajolibandh Interstate Project (Rajolibanda Irrigation Project Karnataka)
6. Tungabhadra Interstate Project (Tungabhadra Right Bank High Level Canal Major Irrigation Project Karnataka)
7. Tungabhadra Interstate Project (Tungabhadra Left Bank Canal & Dam Major Irrigation Project)
8. Tungabhadra Interstate Project (Tungabhadra Right Bank Low Level Canal Major Irrigation Project Karnataka)
9. Dudhganga Interstate Project (Dudhganga Major Irrigation Project Maharashtra)

Hydroelectric projects which are Interstate projects in Krishna basin are listed below.

1. Tungabhadra Hydroelectric Project (Tungabhadra Hydroelectric Project)
2. Tungabhadra Hydroelectric Project (Hampi Hydroelectric Project)

4. Ground water resources

4.1 Ground water observation wells

Ground water level data is temporal and dynamic in nature. It is mainly controlled by rainfall pattern in relation to the aquifer material. A large part of India is irrigated agricultural depends on ground water availability. Water level data have been grouped according to four seasons viz. post-monsoon rabi (January to March), pre monsoon (April to June), Monsoon (July to September) and post-monsoon kharif (October to December).In Krishna basin, there are 1957 observation wells. These wells show four seasonal water level data viz., pre-monsoon, monsoon, post-monsoon and post-monsoon (rabi). As shown in Table 10 the Krishna Lower Sub-basin comprises of the highest number of observation wells (453).The spatial distribution of these ground water observation wells has been shown in Map 17.

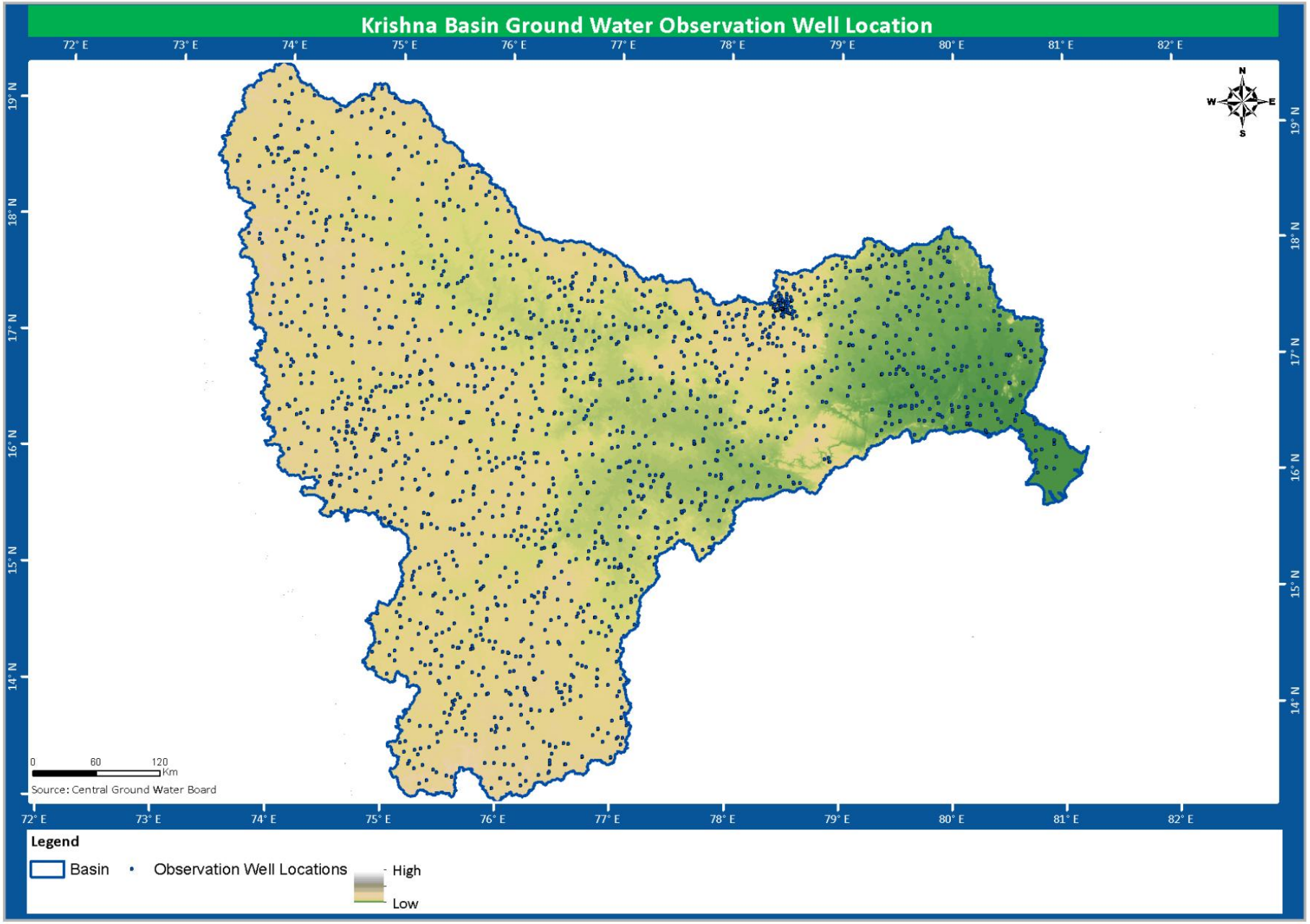
Table 10. Sub-basin wise number of ground water observation wells

S.no.	Sub-basin	No. of Observation Wells
1	Bhima Lower	200
2	Bhima Upper	234
3	Krishna Lower	453
4	Krishna Middle	145
5	Krishna Upper	379
6	Tungabhadra Lower	337
7	Tungabhadra Upper	209

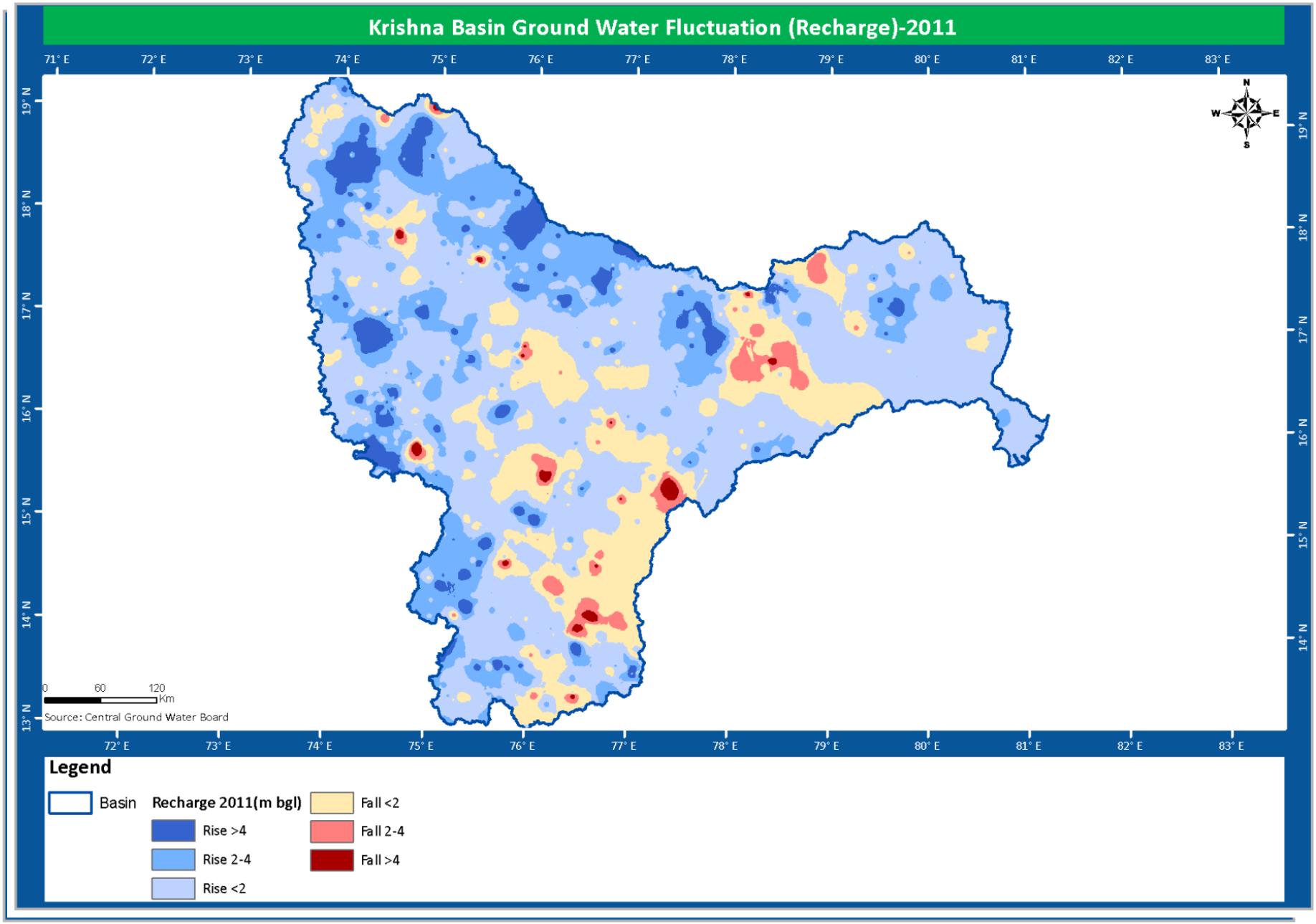
4.2 Ground water level fluctuation

The occurrence of ground water generally depends upon the rainfall, drainage, topography and the geological conditions of the area. Ground water fluctuation in the Krishna basin is assessed for recharge and draft conditions based on the available groundwater level in four different seasons. Groundwater recharge is estimated by the difference between pre and post monsoon seasons. Similarly, groundwater draft is estimated by the difference between post-monsoon and post-monsoon (rabi) seasons data. Interpolated maps for groundwater recharge and irrigation draft (rabi) are prepared based on the available groundwater fluctuation data in the basin.

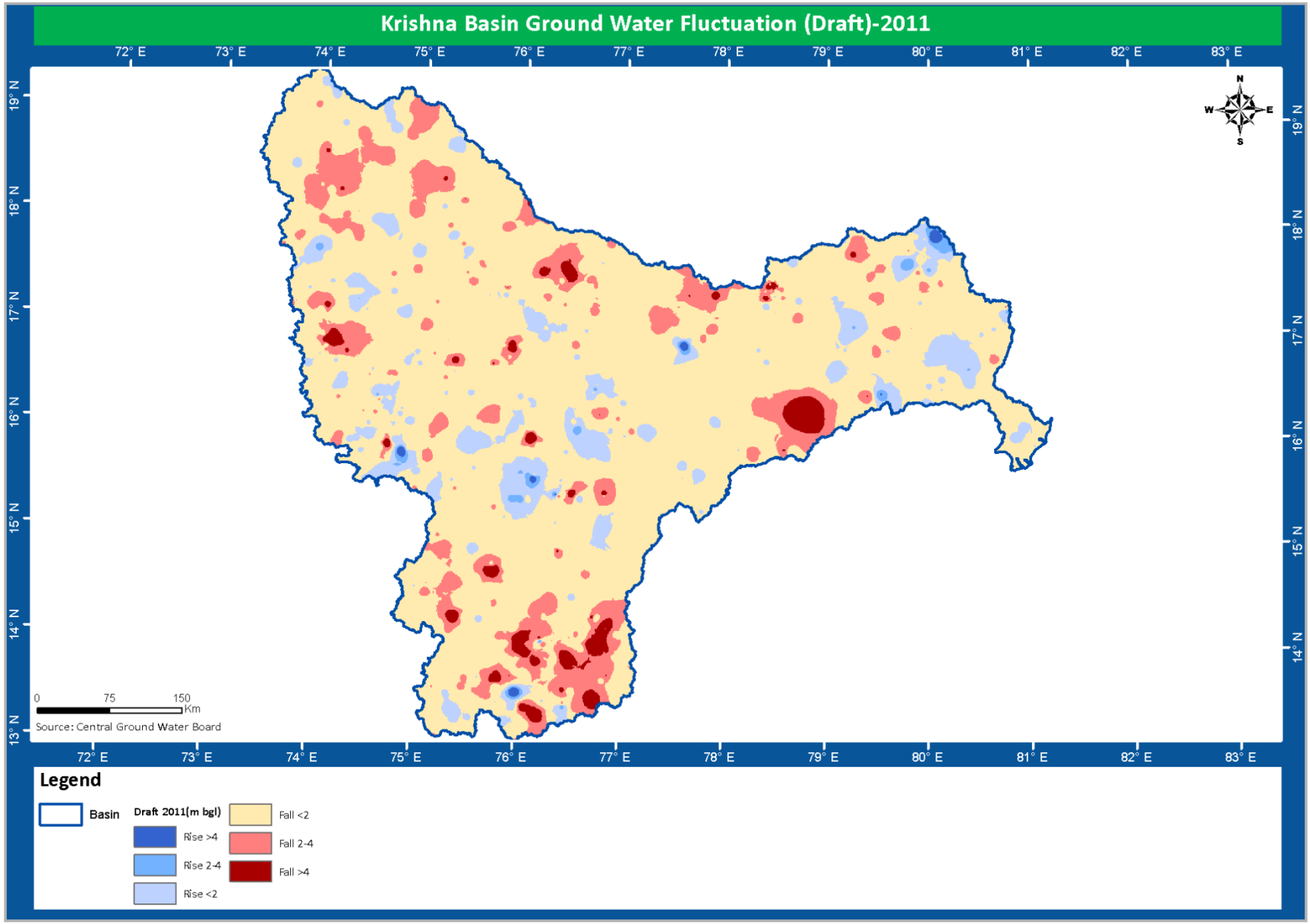
The ground water level fluctuation maps Recharge (2011) in Map 18 shows that there is a rise of <2 meters in majority of parts of the basin, however a fall of <2 meters is also observed in some parts of the basin. There are some areas where positive fluctuation (Rise>4 m) has also been observed.The ground water level fluctuation maps Draft (2011) in Map 19 shows that there is a fall of <2 meters in most of the parts of the basin.



Map 17. Location of ground water observation wells



Map 18. Ground water level fluctuation (Recharge)



Map 19. Ground water level fluctuation (Draft)

5. Hydro-met observations

5.1 Hydrological observation sites

These stations carry out observations about various hydrological parameters as gauge (river water level), discharge (amount of water released from a cross section in the river in a given time period), sediment (concentration of solid particles in water) and river water quality pertaining to different quality parameters.

72 Hydro-observation stations of CWC (Central Water Commission) are located in the basin .The spatial distribution of these sites has been shown in Map 20. These sites are categorized as 'GDSQ', where the abbreviation stands as: G-Gauge, D-Discharge, S-Sediment and Q-Water Quality. RF stands for rainfall measuring station. The Central Water Commission maintains 22 gauge-discharge sites in the basin. At 5 stations, sediment observations are also made.Water quality is measured at 10 stations in the basin as given in Table 11. Salient features of hydro-observation stations which includes Station Name, Station type, Independent River, Regional office, Division, Section office, Drainage area, Zero of Gauge, Station bank and status has been given in Annexure V: A.The basic data of gauge, discharge, suspended sediment & bed material, water quality collected at CWC sites are processed at various levels and published in the form of Water Year Books.

Table 11. Hydrological observation sites of CWC

S.no.	Station Type	Number of Stations
1	G	17
2	GD	22
3	GQ	1
4	GDQ	10
5	GDS	5
6	GDSQ	17
7	RF	0
8	Snow	0

5.2 Flood forecasting sites

Central Water Commission, Ministry of Water Resources has set up a network of flood forecasting stations covering all important flood prone rivers. Flood forecasting indicates the forecast or inflow level with its time of occurrence. Two kinds of forecasts are issued based on the utility of the forecast. Inflow forecasts assist in reservoir regulation (full reservoir level & maximum water level) and the level forecast is used for predicting water level (warning level & danger level) well ahead of its occurrence. Salient features of Flood-Forecasting Stations which includes Site Name, Met Sub Division, River, Type of Forecast, Base Station-1, Travel Time Base Station-1, Base Station-2, Travel Time Base Station, FRL(m), Max Reservoir Level (m), HFL, (m), Year of HFL, Mode of Collection has been given in Annexure V: B.

The spatial distribution of the stations across the basin is shown in Map 20. At present, there are 9 flood forecasting stations (6 Inflow and 3 Level forecast) are in the Krishna basin as shown in Table 12.

Table 12. Types of flood forecasting stations of CWC

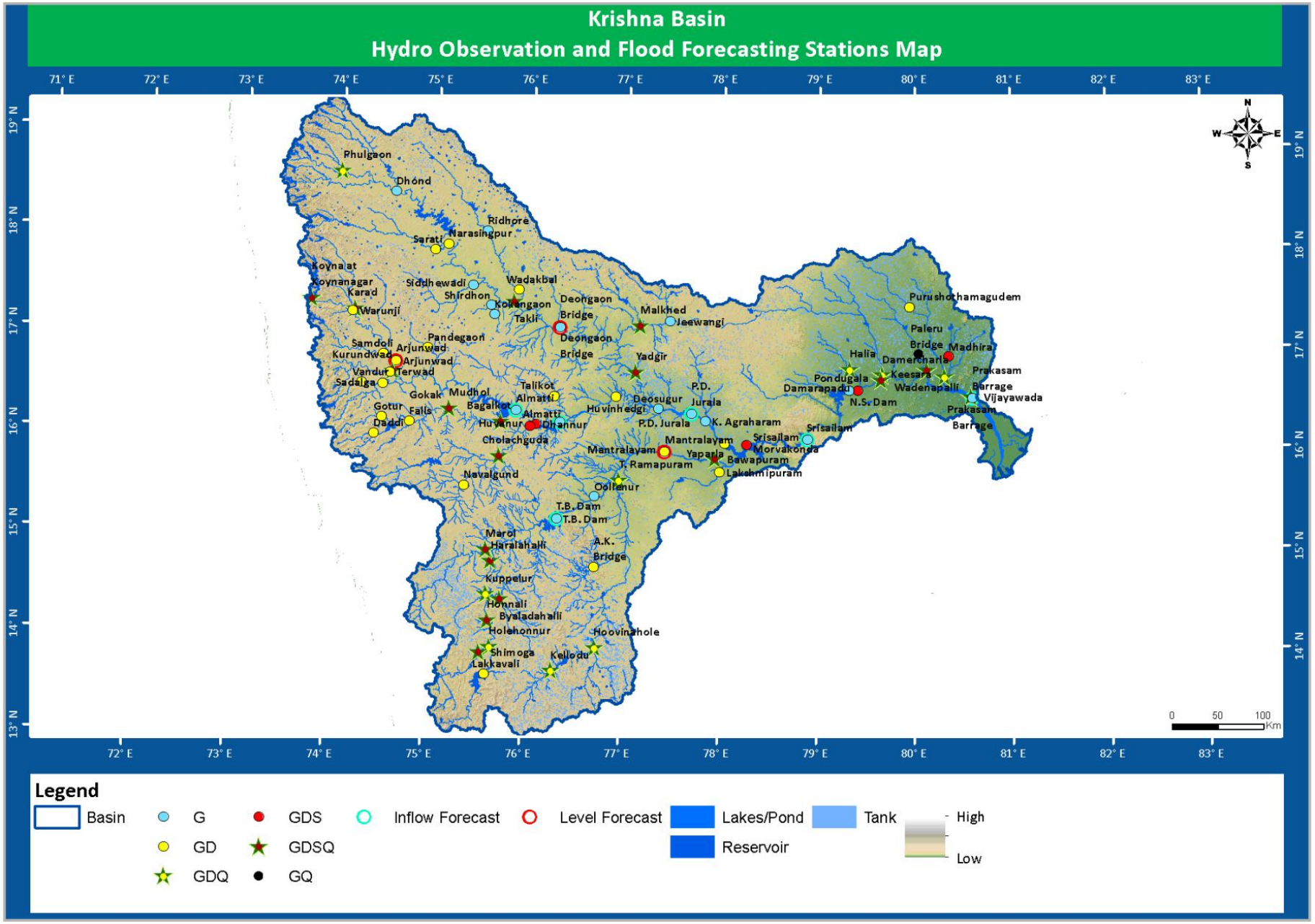
S.No.	Station Type	Number of Stations
1	Level Forecast	3
2	Inflow Forecast	6

5.3 Meteorological stations

There are 3 main organizations in the country which records meteorological parameters viz., India Meteorological Department (IMD), Central Water Commission (CWC) and ISRO (Automatic Weather Stations). 47 meteorological stations of CWC (Central Water Commission) are located in the basin (Table 13). These stations are established to understand the relationship between meteorological parameter and river dynamics. The stations carry out observations pertaining to meteorological parameters viz., Rainfall, Temperature, Pan Evaporation, Relative Humidity, Wind Speed, Sunshine etc. 312 Indian Meteorological stations (IMD) are also functional in the basin. The integrated approach of measuring meteorological parameter using automated weather stations (AWS) is helpful in the remote region. AWS stations require minimum maintenance and the data is generated on temporal basis. Under the supervision of ISRO, 78 AWS station have been established in the basin.

Table 13. Meteorological stations

S.no.	Meteorological Stations.	
1	Total Number of CWC Observation Stations	47
2	Number of IMD Stations	312
3	Number of AWS Stations	78



Map 20. Hydro observation and flood forecasting stations

6. Water quality

6.1 Surface water quality observations

CWC stations carry out observations for testing the surface water quality pertaining to sixty eight water quality parameters which are considered to be the 'Standard Hydrology Project Water Quality Parameters'. All physical, chemical and biological water quality parameters are categorized further under sub categories like field determinations, nutrients, organic matter, alkalinity, hardness, other inorganics, major ions, coliforms and others. Water Quality observations are taken at 28 Surface water quality observation sites of CWC in Krishna basin.

The river basin survey report communicates that the most populous cities in the basin are Hyderabad Aggomeration in Andhra Pradesh, Pune aggomeration in Maharashtra and Bhadravati complex in Karnataka. Bhadravati in Karnataka and Patancheru- Bolaram in Andhra Pradesh are the critically polluted areas identified in the basin area of Krishna. For Bhadravati the major source of water pollution is the waste water generated from industries besides the untreated sewage of the town, which is being discharged into Bhadra. It is suggested that sewage treatment plant may be provided for the sewage of the town and ETPs of the existing industries need modifications to comply with prescribed standards for restoration of water quality of the Bhadra river.In the Patancheru - Bolaram area in Andhra Pradesh the effluent generated by industries is the main sources of water pollution in the rivers Manpera and Nakkvagu. The water quality of river Krishna with respect to pH, Conductivity, Dissolved oxygen(DO), Biochemical Oxygen Demand (BOD), Total Coliform (TC) and Faecal Coliform(FC) is being observed. The criteria for pH is 6.5 to 8.5. pH is observed in the range of 6.7 to 9.0. Higher values of pH are found at Gadwal Bridge (9.0), Vijaywada (8.7), Vedadri at Guntoor and Wadapally A/c to river Musi (8.6) in Andhra Pradesh, Ankali Bridge along Chikkodi Kagwad Road, U/s of Ugarkhurd Barrage (8.7)and D/s of Devsagar Bridge (8.6) in Karnataka and Sangli (8.7) and Islampur (8.6) in Maharashtra.

The criteria of conductivity for irrigation is 2250 µmhos/cm. Conductivity in the basin varies from 75 to 19960 µmhos/cm. Conductivity is not meeting the criteria at Hamsala Deevi in Andhra Pradesh due to estuarine region.

The criteria for DO should be more than 4 mg/l. DO in the basin ranges from 0.0 to 12.6 mg/l. The lower value of DO is observed at Gadwal Bridge (0.0 mg/l), Wadapalli A/c with Musi (3.1 mg/l) in Andhra Pradesh, Kurunwad in Kolhapur (3.6 mg/l), Rajapur Weir (3.8 mg/l) in Maharashtra.

The criteria for BOD should be less than 3 mg/l. BOD ranges from 0.3 to 9.6 mg/l. High values of BOD are observed in Kshetra Mahuli (9.6 mg/l), Krishna-Venna Sangam at Mahuli (9.5 mg/l),Wai (9.2 mg/l), Krishna Bridge at Karad (9.1 mg/l), Mahabaleshwar Dhom Dam near Koyna Dam (6.7 mg/l) in Maharashtra, Wadapally A/c with Musi (6.8 mg/l), Amravati Guntoor (5.3 mg/l), U/s of Ugarkhurd Barrage (5.1 mg/l) in Andhra Pradesh, D/s of Devsagar Bridge (5.8 mg/l) in Karnataka.

Faecal Coliform should be less than 2500 MPN/100ml. Faecal Coliform (FC) ranges from 0 to 1400 MPN/100 ml and is meeting the criteria.Total Coliform should be less than 5000 MPN/100ml. The Total Coliform count varies from 8 to 170000 MPN/100 ml. High values are observed at A/c of Tungabhadra in Maharashtra.

The River Bhima is not meeting the criteria at Pune D/s of Bundgarden, the lower value of Do is observed Pune D/s of Bundgarden (0.0 mg/l), Pune U/s of Vithalwadi (1.1mg/l) and Narsinghpur D/s after confluence with river Nira (3.1 mg/l), Panchganga at D/s of Kolhapur Town (3.6 mg/l) and Shirole (3.7 mg/l). High values of BOD are observed in Bhima at Pune D/s, Bundgarden (28.5 mg/l), Pune U/s Vithalwadi (22.4 mg/l),Narsinghpur D/s after confluence with river Nira (15.2 mg/l), Pargaon A/c with Mula- Mutha (11.8 mg/l), Takli (11.3 mg/l) and A/c with Daunt (6.9 mg/l), Panchganga at Shirol (4.2 mg/l) Kolhapur Town D/s (3.8 mg/l) and Kolhapur Town U/s (3.2 mg/l).
Regarding the water quality of other tributary streams including Ghatprabha,Malprabha, Mula,Tunghabhadra, Tungha, Bhadra, Musi, Palleru rivers-Low value of pH is observed in Bhadra at Malleswaram D/s of KIOCL in Karnataka. Higher values are observed in Ghatprabha at D/s of Mudhol Rd. Cross Bdg. Malprabha at D/s of Aihole Town, Tunghabhadra at Haralahalli Bridge and Ghatprabha at W.A. Point to Gokak Town (8.7) in Karnataka, Musi U/s at Hyderabad (8.7), Palleru B/c with Krishna, Jaggayyapet (8.6) in Andhra Pradesh.

The higher values of conductivity are observed in River Malprabha at D/s of Aihole Town (3800 µmhos/cm) in Karnataka and River Musi at Nagole (3220 µmhos/cm) and River Nakkavagu at Bachugudem Medak (2700 µmhos/cm) in Andhra Pradesh.

The lower value of DO is observed in River Musi D/s at Hyderabad & Nagole in Rangareddy, River Pawana at Sangavigaon Pune, River Mula at Harrison Bridge near Mula-Pawana Sangam & Aundh Bridge Aundgaon, River Mula-Mutha at Mundhawa Bridge (Nil), River Nakkavagu at Bachugudem, Medak (1.8 mg/l) and Indrayani River at D/s of Alandigaon, Pune (2.8 mg/l).

High values of BOD are observed in River Bhadra at Bhadravathi D/s (5.8 mg/l), River Ghatprabha at W.A. Pointto Gokak Town (5.4 mg/l), River Tungabhadra at Ullanur (5.2 mg/l), Haralihalli Bridge (3.7 mg/l) &Honnali Bridge (3.4 mg/l), River Tunga at D/s of Shimoga Town (4.3 mg/l) & D/s of KIOCL Road Bridge, Near Holehunnur (3.4 mg/l), River Malprabha at D/s of Khanapur Town & D/s of Aihole Town (3.4 mg/l)and Confluence point of Tunga & Bhadra at Kudli (3.1 mg/l) in Karnataka.

The maximum number of Faecal Coliform (9000 MPN/100ml) is observed in River Tunghabhadra at Ullanur in Karnataka & River Kagina at Sewage Disposal Point in Andhra Pradesh.

Total Coliform is observed higher than the criteria in River Bhadra at Bhadravati and Tungabhadra at Ullanur (16,000 MPN/100 ml), Tungha at D/s of Shimoga Town and Bhadra at D/s of KIOCL Bridge near Holehunnur (9000 MPN/100ml) in Karnataka. *(Source:Status Of Water Quality in India-2009, Central pollution Control Board).*

6.2 Ground water quality observations

Ground water monitoring system in the Kishna Basin recordings are done in 231 observation wells. The main parameters monitored at these observation wells are Magnesium, pH, Nitrate, Potassium, Sulphate, Electrical Conductivity (EC), Total Dissolved Solids (TDS) , Calcium, Sodium, Carbonate, Bicarbonate, Chloride, Fluoride, Sodium Absorption Ratio(SAR) and Residual Sodium Carbonate(RSC).

Based on the systematic sampling of river water at many locations in the basin, its suitability for various purposes is determined by Central Pollution Control Board and as per the results, the quality is not as per the desired class and BOD remains the most critical parameter.
Industries are polluting ground water in the region. Central Ground Water Board has been monitoring the chemical quality of ground water in the country since 1974. One of the main objectives of the ground water quality monitoring is to assess the suitability of ground water for drinking purposes. The physical and chemical quality of ground water is important in deciding its suitability for drinking purposes.

Salinity is the saltiness or dissolved salt contents of a water body. Salt content is an important factor in water use. Salinity can be technically defined as the total mass in grams of all the dissolved substances per Kilogram of water. Salinity always exists in ground water but in variable amounts. It is mostly influenced by aquifer material, solubility of minerals, duration of contact and factors such as the permeability of soil, drainage facilities, quantity of rainfall and above all, the climate of the area. The salinity of ground water in coastal areas may be due to air borne salts originating from air water interface over the sea and also due to over pumping of fresh water which overlays saline water in coastal aquifer systems.
The districts affected by salinity in Ground Water are Anantapur, Kurnool, Guntur, Krishna, Khammam, Warangal and Visakhapatnam in Andhra Pradesh districts Bijapur, Bagalkot, Belgaum, Bellary, Chitradurga, Chikmagalur, Davanagere, Dharwad, Gulburga, Hassan, Haveri, Raichur and Udupi in Karnataka and districts Ahmadnagar, Bid, Satara, Solapur and Raigarh in Maharashtra.

Chloride is present in all natural waters, mostly at low concentrations. It is highly soluble in water and moves freely with water through soil and rock. In ground water the chloride content is mostly below 250 mg/l except in cases where inland salinity is prevalent and in coastal areas. BIS (Bureau of Indian Standard) have recommended a desirable limit of 250 mg /l of chloride in drinking water this concentration limit can be extended to 1000 mg/l of chloride in case no alternative source of water with desirable concentration is available. However ground water having concentration of chloride more than 1000 mg /l are not suitable for drinking purposes.The districts affected by high chloride water(>1000 mg/litre) are Prakasam, Guntur, Mahbubnagar, Nalgonda, Krishna, Khammam, Kurnool, Medak, Warangal and Srikakulam in Andhra Pradesh and Bagalkot, Belgaum, Bellary, Dharwad, Gulbarga in Karnataka.

Fluoride Most of the fluoride found in groundwater is naturally occurring from the breakdown of rocks and soils or weathering and deposition of atmospheric particles. Most of the fluorides are sparingly soluble and are present in ground water in small amounts. The occurrence of fluoride in natural water is affected by the type of rocks, climatic conditions, nature of hydrogeological strata and time of contact between rock and the circulating ground water. Presence of other ions, particularly bicarbonate and calcium ions also affects the concentration of fluoride in ground water. Districts Showing Localized Occurrence of Fluoride (>1.5mg/litre) in Ground Water are Anantpur, Guntur, Hyderabad, Karimnagar, Khammam, Krishna, Kurnool, Mahbubnagar, Medak, Nalgonda, Prakasam, Warangal in Andhra Pradesh,districts Bagalkot, Belgaum, Bellary, Bidar, Bijapur, Chikmagalur, Chitradurga, Davangere, Dharwad, Gulburga, Haveri, Koppal, Raichur and Tumkur in Karnataka.

Iron is a common constituent in soil and ground water. The concentration of iron in natural water is controlled by both physico chemical and microbiological factors. It is contributed to ground water mainly from weathering of ferruginous minerals of igneous rocks such as hematite, magnetite and sulphide ores of sedimentary and metamorphic rocks. The permissible Iron concentration in ground water is less than 1.0 mg/litre as per the BIS Standard for drinking water.

Districts Having Localized Occurrence of Iron (>1.0 mg/litre) in Ground Water are Guntur, Hyderabad, Karimnagar, Krishna, Kurnool, Mahbubnagar, Medak, Nalgonda in AndhraPradesh, districts Bagalkot , Belgaum, Bellary, Bidar, Bijapur,Chikmagalur, Chitradurga, Dakshina Kannada, Davangere, Gulburga, Hassan, Haveri, Koppal, Raichur, Shimoga, Tumkur, Udupi and Uttara Kannada in Karnataka and districts Ahmednagar, Bid, Kohlapur, Latur, Osmanabad, Ratnagiri, Satara and Thane in Maharashtra. Nitrate is a naturally occurring compound that is formed in the soil when nitrogen and oxygen combine. The primary source of all nitrates is atmospheric nitrogen gas. Dissolved Nitrogen in the form of Nitrate is the most common contaminant of ground water. Nitrate in ground water generally originates from nonpoint sources such as leaching of chemical fertilizers & animal manure, ground water pollution from septic and sewage discharges etc.The districts where nitrate has been found in excess are Anantpur,Guntur, Hyderabad, Karimnagar, Khammam, Krishna, Kurnool, Mahbubnagar, Medak, Nalgona, Prakasam, Ranga Reddy and Warangal in Andhra Pradesh, districts Bagalkot, Belgaum, Bellary, Bidar, Bijapur, Chikmagalur, Chitradurga, Davangere, Dharwad, Gulburga, Hassan, Haveri, Koppal, Shimoga, Udupi and Uttara Kannada in Karnataka and districts Ahmednagar, Bid, Kohlapur, Latur, Osmanabad, Pune, Sangli, Satara and Solapur in Maharashtra. *(Source: Ground Water Quality in Shallow Aquifers of India. Central Ground Water Board, Faridabad 2010)*

7. Inter-basin transfer links

Inter-basin transfer link proposes river water transfer from the region of surplus to deficit areas. This may provide an effective ways to enhance irrigation potential, to mitigate floods and droughts and reduce regional imbalance by way of additional irrigation, domestic and industrial water supply, hydropower generation and navigational facilities etc. There are seven important interbasin transfer links proposed in Krishna basin as shown in Map 21. Details of the proposed water transfer links are given below.

1. The Almatti-Pennar Link will divert 1,980 Mcum water from Krishna River (Almatti Dam) to Pennar Basin(Maddileru river-Tributary of Pennar River), to irrigate 2.58 lakh hectares area (1.76 lakh hectares in Andhra Pradesh and 0.82 lakh hectares in Karnataka).The length of link canal 587 km., which includes 5 tunnels of total length of 35.66 km.

2. The Srisailam-Pennar Link proposes to transfer 2,310 Mcum of water from Srisalam Reservoir (Krishna Basin) to Pennar Basin. The water transferred will be used in four mini hydel schemes utilizing the natural falls of the streams with total installed capacity of 17 MW of power. The total length of the link canal will be 204 km.

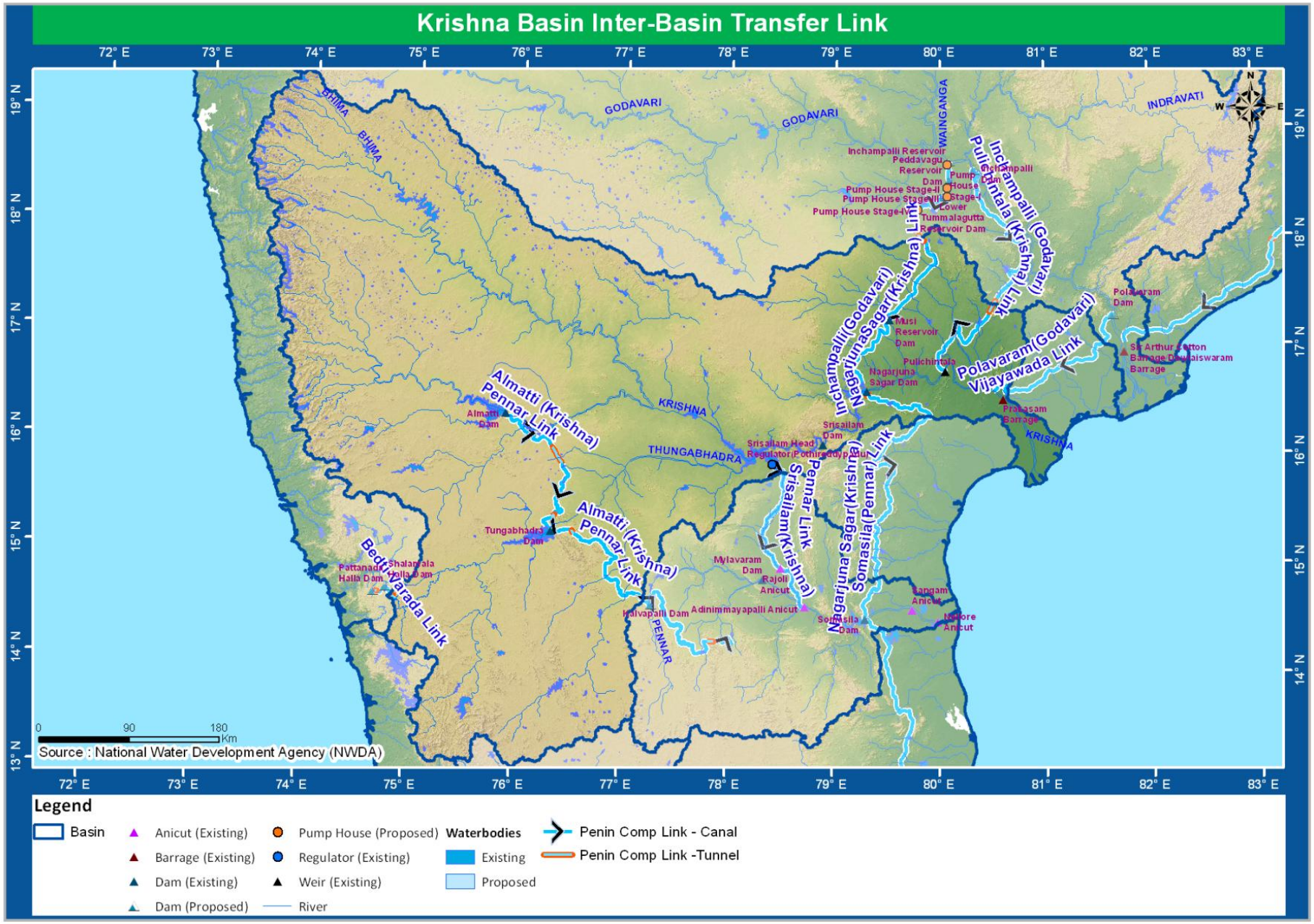
3. The Nagarjunasagar-Somasila link proposes to divert 12,146 Mcum of water from Nagarjunasagar (Krishna Basin) to Pennar Basin to irrigate 5.81 lakh hectares entirely in the State of Andhra Pradesh. The total length of the link canal is about 393 km.

4. The Inchampalli-Nagarjunasagar Link will transfer 16,426 Mcum of water from Godavari Basin to Krishna Basin to irrigate 2.87 lakh hectares in Andhra Pradesh. Total length of Link Canal is about 299 km that includes 9 km. long tunnel.

5. The Inchampalli –Pulichintala Link envisages diversion of 4,370 Mcum of water from Mahanadi and Godavari Basins to Krishna Basin to irrigate 6,13,442 ha in Andhra Pradesh. The Length of link canal is about 312 km including 12.50 km long tunnel.

6. The Polavaram-Vijayawada Link proposes to transfer 5,325 Mcum of water from the Right Bank of Godavari at the proposed Polavaram reservoiruptoexisting Prakasam Barrage on Krishna River at Vijayawada to irrigate about 5.82 lakh hectares in Andhra Pradesh. Total length of link canal is about 174 km.

7. The Bedti - Varada Link envisages diversion of 242 Mcum of surplus waters of Bedti basin to water short Tungabhadra Sub-Basin to irrigate 60,200 hectares in the drought prone Raichur district of Karnataka. The Conveyance System is divided into two main components of length 8.5 km (2.2 km long tunnel) and 14.83 km (6.8 km long tunnel).



Map 21. Inter-basin transfer links

8. Inland navigation waterways

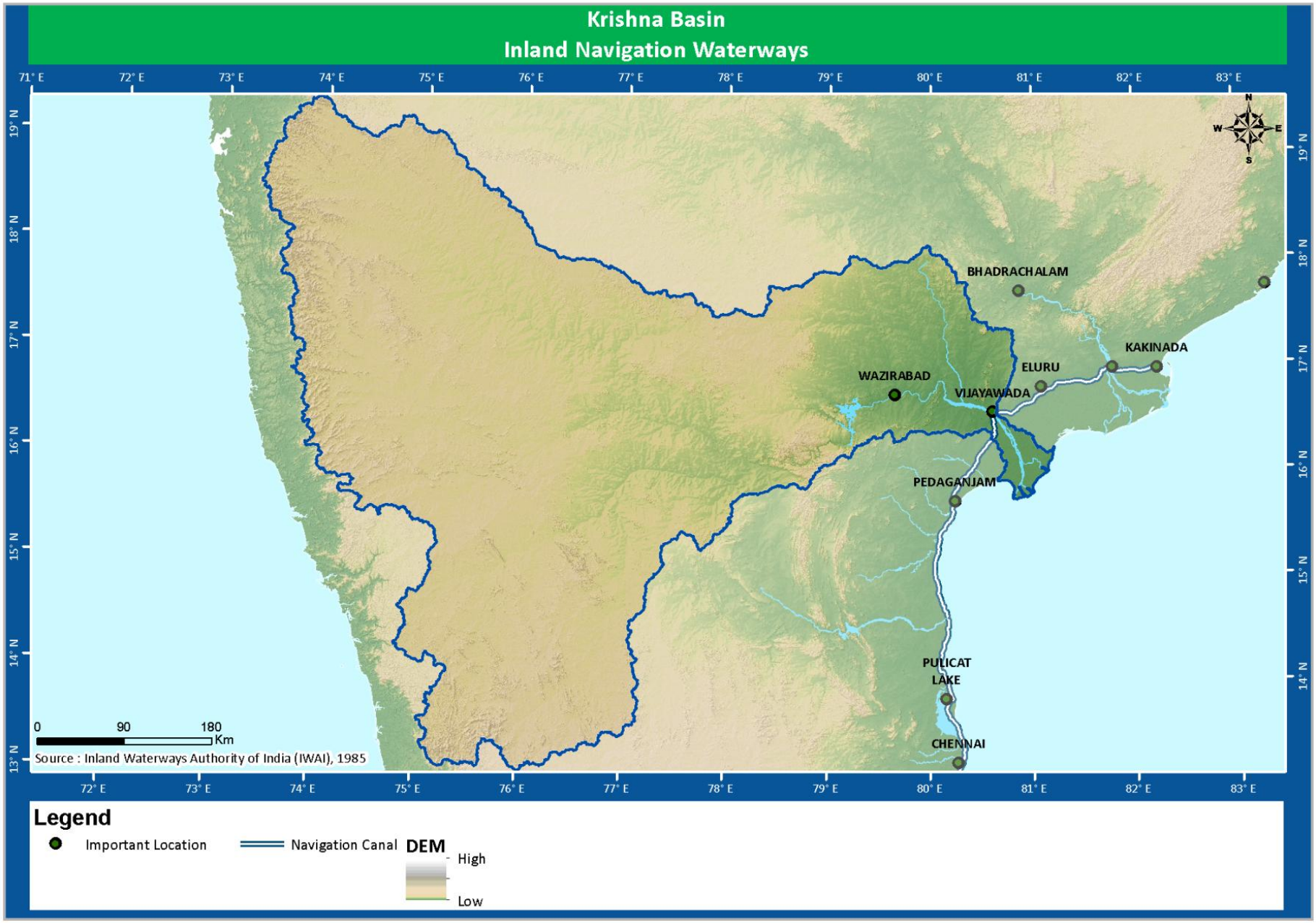
Inland Water Transport (IWT) is a fuel efficient, environment friendly and cost effective mode of transport. Navigable inland waterways in India, comprising of river systems, canals, backwaters, creeks and tidal inlets extends to about 14500 km. At present about 5200 km of major rivers and 485 km of canals are suitable for mechanized crafts. The total cargo moved by IWT is about 16 million tonnes which is very less as compared to the total cargo movement by road and rail. Geodatabase has been prepared for the 192 published inland navigational maps for three National Waterways (NW-1, NW-2 and NW-3) in accordance with Section 14(2) (c) of the Inland Waterways Authority of India Act, 1985 (82 of 1985). Other three proposed Inland waterways (NW-4, NW-5 and NW-6) are mapped by the Inland Waterways Authority of India.

The Kakinada-Puducherry Canals system along with Godavari and Krishna rivers i.e., the National Waterway-4 falls in Krishna Basin (Map 22). Total length of NW-4 is 1095 km. The total length of the canal stretch is 767 Km, out of which 171 km is along the Godavari river stretch between Bhadrachalam and Rajhamundry. The Krishna river stretch is 157 km between Wazirabad and Vijaywada. This waterway has 328 km as river portion, 302 km as irrigation canals and 397 km as salt water canals.

A network of irrigation cum navigation canal linking Chennai and Ennore Ports in Tamil Nadu with the Kakinada Port, and Machlipatnam Ports in Andhra Pradesh runs through a distance of 618 kms. The Kakinad canal and Eluru canal and Commamur canal which are irrigation cum navigation canal also interlink the two major river systems of Godavari and Krishna. The Buckingham canal which interlinks the Commamur canal with Chennai port runs through a distance of 315 Km is tidal. Further integrated canal also connect the Chennai city with the Mercunam through the south Buckingham canal and Cooum river runs through a distance of 103 kms. In view of the port hinterland connection, interstate and inter city traffic potential and the historic data on IWT movement, development of this waterway into an efficient IWT system is envisaged during the 9th Five Year Plan.

Transport of about 11 million tonne per annum (Coal on Godavari river, Cement on Krishna river, Rice in both Krishna and Godavari) is reported. In this canal waterway, the major commodities used to be transported were coal, rice, food grains, cement, salt, sand, forest products, paddy, pulse, building materials and other bulk cargo etc. by country crafts of 30 to 40 tonnes capacity.

Marina beach, Adyar, Muthukadu, Kalpakkam (Ediyuru), Palar, Paramankani Kuppam and Markanam are the sea openings related to the waterway. The waterway consists of total 48 locks (Kakinada Canal-6 nos; Godavari Eluru Canal-1; North and South Buckingham Canal-29 nos; Krishna river-1; Krishna Eluru Canal-4 nos; Commamur Canal-7 nos). Techno-economic studies for establishment of National Waterways NW-4 was done by Water And Power Consultancy Services (WAPCOS), a subsidiary of Ministry of Water Resources. The developmental works for NW-4 involve the widening of canal, dredging, excavation, bank protection, construction and repair of locks, modification of bridges and roads, navigational aids, and setting up of IWT terminals.



Map 22. Inland navigation waterways

9. Water tourism sites

There are 57 main tourist places including many pilgrim places, wildlife sanctuaries, waterfall, hill station, forts and lakes in Krishna basin (Table 14). Some of the famous places of attraction are Srisailam Temple and Dam, Charminar, Ettipotala Waterfall, Nagarjuna Sagar Dam, Sirimane Falls, Bhadra Wildlife Sanctuary, Bellary Fort, Bhimashankar Jyotirlinga, Mahabaleshwar, Lonavala etc. Tourism Site Name, type/category, waterbody realted to the site, district and state has been given in VI: A. Wildlife Sanctuaries / National Parks in the Krishna Basin has been given in Annexure VI: B.Spatial distribution of these tourism sites has been shown in Map 23.Some of the tourist places in Krishna basin is given here:

Srisailam Temple The ancient and sacred temple of Srisailam is of great historical and religious significance. The shrine of Lord Mallikarjuna picturesquely situated on a flat top of Nallamalai Hills, On a 457 meter high hill is the Bhramaramba Mallikharjunaswamy temple.One of the state's three famous Linga Kshetrams (Draksharamam and Nagarjunamo are the other two), it is also known as "Sri Mallikharjunam" and "Sri Parvatham". It is one of the 12 Jyotirlingas, and one among the 18 Mahashakthis in India. It is said that Vrishabha, the sacred bull of Lord Shiva performed penance here. Lord Shiva appeared before him, with his consort Goddess Parvati in the form of Mallikarjuna and Bhramaramba.

Golconda Fort The Golconda Fort is situated on the Western outskirts of Hyderabad city about 11 Km away. Golconda consists of four distinct forts with a 10 km long outer wall with 87 semicircular bastions (some still mounted with cannons), eight gateways, and four drawbridges, with a number of royal apartments & halls, temples, mosques, magazines, stables, etc. inside the fort which attracts tourists most.

Charminar A splendid piece of architecture standing in the heart of the city Charminar is a striking monument that acts as a major landmark in Hyderabad. Marvelous monument is a true picture of elegance, a great tribute to the fighting spirit of human race. Enormous in its size, this imposing monument exudes a charm that is more than 400 years old. Charminar is the pictogram of Hyderabad.

Hebbe Waterfall Hebbe Falls is situated about 10 km away from the famous hill station Kemmangundi in Karnataka.

Mahabaleshwar Mahabaleshwar is the source of the Krishna River that flows across Maharashtra, Karnataka and Andhra Pradesh. The legendary source of the river is a spout from the mouth of a statue of a cow in the ancient temple of Mahadev in Old Mahabaleshwar. Legend has it that Krishna is Lord Vishnu himself as a result of a curse on the trimurtis by Savitri. Mahabaleshwar is a popular holiday resort and an important pilgrimage site for Hindus. It is the site of Mahabaleshwar Temple. Many tourists visit nearby Panchgani. After the construction of a new highway, it is only a five-hour drive from Mumbai. Mahabaleshwar is also known for the honey and strawberries produced here. It is said that the climate of Mahabaleshwar is ideal for Strawberries and Mulberries.

Lumbini Park Lumbini Park is a small public, urban park of 7.5 acres adjacent to Hussain Sagar in Hyderabad, India. Since it is geographically located in the center of the city and is in close proximity

to other tourist attractions, such as Birla Mandir and Necklace Road, it attracts many visitors throughout the year.

Bhimashankar Jyotirlinga Bhimashankar temple is near Pune in Maharastra, which was referred to as Daakini country.

Bellary Fort Situated in Karnataka, it was built on top of the Ballari Gudda or Fort Hill, during Vijayanagar times by Hanumappa Nayaka. Hyder Ali took possession from the Nayaka's in 1769, got the fort renovated and modified with the help of a French engineer.

Prakasam Barrage It was named after Sri Tanguturi Prakasam, the first Chief Minister of the state. One of the first major irrigation projects of South India, the Prakhasam Barrage in Vijayawada was successful in its mission. The reservior made by this dam is a good attraction for tourism and it is considered to be official pilgrim lake (called in Telugu as Koneru) of Goddess 'Kanaka Durga'.The barrage serves also as a road bridge and spans over a panoramic lake. The three canals associated with the barrage, run through the city of Vijayawada criss crossing it and giving it a Venetian appearance.

Hidkal Dam Constructed across Ghataprabha River, Hidkal Dam is situated in Belgaum district in the state of Karnataka. Also known as Raja Lakhamgowda Dam, this dam site is important because many fossils have been revealed in nearby areas. The dam site draws not only tourists but also archeologists.

Table 14. Water tourism sites

S.no.	Tourist Site Category	No. of Places
1	Wild Life Sanctuaries	5
2	Lake	9
3	National Park	1
4	Dam	3
5	Fort	6
6	Tourist Spot	5
7	Museums / Monument	2
8	Pilgrimage (Masjid)	1
9	Caves	2
10	Barrage	1
11	Pilgrimage (Temple)	14
12	Island	1
13	Waterfall	6
14	Hill Station	1

Map 23. Water tourism sites

10. Conclusion

This report provides valuable information related to the topographic, demographic, climatic, surface and ground water resources, hydro-meteorological and water quality scenario of Krishna basin. The basin is comprised of seven sub-basins; Bhima Lower Sub-basin, Bhima Upper Sub-basin, Krishna Lower Sub-basin, Krishna Middle Sub-basin, Krishna Upper Sub-basin, Tungabhadra Lower Sub-basin and Tungabhadra Upper Sub-basin.

The Krishna and its tributaries are an inter-state river system flowing through the states of Maharashtra, Karnataka and Andhra Pradesh. Its principal tributaries joining from right are the Ghatprabha, the Malprabha and the Tungabhadra whereas those joining from left are the Bhima, the Musi and the Munneru. The basin falls into four major Agro-Climatic Zones and six Agro-Ecological Zones. As per the assessment of LULC (2005-06), Major part of the basin (75.86%) is covered with Agricultural area. Approximately 10% of the basin area is covered by forest, wasteland covers around 7% of the total basin area and around 4% of the basin area is covered by water bodies.

Numbers of small and large projects have been constructed in the basin and some are under construction. The approach all along has been to construct projects for the benefit of the particular state concerned except in a few cases where the projects are being constructed jointly by two states.

The number and distribution of rainguage stations should be reviewed and new stations to fill whatever gaps exist should be established.It is also important that the daily rainfall data for all these stations should be published on a monthly basis, preferably by sub-basins.

A network of evaporation measuring stations in the basin, particulary at the sites of the existing and proposed reservoirs should be established.

Systematic and Scientific exploratory work is needed for a quantitative and qualitative assessment of the ground water resources in the basin so that these resources can be exploited in a national way either independently or in conjuction with surface waters.

There is need for inter-State co-operation and agreement in respect of soil Conservation measures to conserve the storage capacities of existing and proposed reservoirs in the basin.

As a large number of dams are situated in the basin, it is necessary for the systematic data to be collected of the sediment carried by the river waters, which would be of considerable use in working out dead storages and live of reservoirs. It will also reveal the effect of soil conservation works carried out in the basin.

Annexure I : State, district and parliamentary constituency in the basin

A. District Details						
Sl. No.	State Name	District (2011)	Population (2011)	Total Area (Sq. Km)	District Area in Basin (Sq. Km)	% of District Area in the Basin
1	Andhra Pradesh	Anantapur	4081148	18987.72	4185.59	22.04
2	Andhra Pradesh	Warangal	3512576	12447.42	6199.23	49.80
3	Andhra Pradesh	Rangareddy	5296741	7358.88	6853.56	93.13
4	Andhra Pradesh	Prakasam	3397448	17389.37	657.16	3.78
5	Andhra Pradesh	Nalgonda	3488809	13742.14	13742.14	100
6	Andhra Pradesh	Medak	3033288	9489.96	361.03	3.80
7	Andhra Pradesh	Mahbubnagar	4053028	17974.02	17974.02	100
8	Andhra Pradesh	Kurnool	4053463	17503.31	9696.79	55.40
9	Andhra Pradesh	Krishna	4517398	8365.25	4686.80	56.03
10	Andhra Pradesh	Khammam	2797370	15646.02	4864.63	31.09
11	Andhra Pradesh	Karimnagar	3776269	11539.77	8.83	0.08
12	Andhra Pradesh	Hyderabad	4517398	173.43	173.43	100
13	Andhra Pradesh	Guntur	4887813	11186.51	6545.38	58.51
14	Karnataka	Gadag	1064570	4563.79	4563.79	100
15	Karnataka	Gulbarga	2566326	10687.27	10687.08	100

Sl. No.	State Name	District (2011)	Population (2011)	Total Area (Sq. Km)	District Area in Basin (Sq. Km)	% of District Area in the Basin
16	Karnataka	Yadgir	1174271	5163.02	5163.02	100
17	Karnataka	Bagalkot	1889752	6432.04	6432.04	100
18	Karnataka	Belgaum	4779661	13120.75	12113.73	92.33
19	Karnataka	Bellary	2452595	8311.09	8311.09	100
20	Karnataka	Bidar	1703300	5293.88	824.76	15.58
21	Karnataka	Bijapur	2177331	10261	10261	100
22	Karnataka	Chikmagalur	1137961	7167.73	6264.50	87.40
23	Karnataka	Chitradurga	1659456	8360.22	8360.22	100
24	Karnataka	Dakshina Kannada	2089649	4578.68	1.09	0.02
25	Karnataka	Davanagere	1945497	5875.62	5875.62	100
26	Karnataka	Dharwad	1847023	4202.26	2780.03	66.16
27	Karnataka	Raichur	1928812	8276.99	8276.99	100
28	Karnataka	Uttara Kannada	1437169	10048.65	664.06	6.61
29	Karnataka	Hassan	1776421	6789.18	1384.62	20.39
30	Karnataka	Haveri	1597668	4743.98	4623.62	97.46
31	Karnataka	Koppal	1389920	5468.71	5468.71	100
32	Karnataka	Shimoga	1752753	8361.30	5694.09	68.10
33	Karnataka	Tumkur	2678980	10543.89	3897.56	36.97
34	Karnataka	Udupi	1177361	3841.79	3.06	0.08
35	Maharashtra	Solapur	4317756	14495.87	14495.87	100
36	Maharashtra	Latur	2454196	7009.52	2.45	0.03
37	Maharashtra	Sindhudurg	849651	4966.78	124.14	2.50
38	Maharashtra	Pune	9429408	15185.75	14790.56	97.40
39	Maharashtra	Raigarh	2634200	6942.67	2.53	0.04
40	Maharashtra	Kolhapur	3876001	7500.31	7237.44	96.50
41	Maharashtra	Ahmadnagar	4543159	16510.41	6130.16	37.13
42	Maharashtra	Sangli	3003741	8349.99	8346.19	99.95
43	Maharashtra	Ratnagiri	1615069	8050.94	14.49	0.18
44	Maharashtra	Osmanabad	1657576	7347.20	4366.70	59.43

Sl. No.	State Name	District (2011)	Population (2011)	Total Area (Sq. Km)	District Area in Basin (Sq. Km)	% of District Area in the Basin
45	Maharashtra	Bid	2585049	10244.73	1446.56	14.12
46	Maharashtra	Thane	11060148	9208.22	2.55	0.03
47	Maharashtra	Satara	3003741	10223.37	10187.31	99.65

Source : Survey of India and Census Data 2011, Population is mentioned for the complete district

B. Parliamentary Constituency Details

Sl. No.	State Name	Parliamentary Constituencies (2009)	Total Area (Sq. Km)	Area Falling in Basin (Sq. Km)	% Area in the Basin
1	Andhra Pradesh	Zahirabad	7564.94	177.21	2.34
2	Andhra Pradesh	Malkajgiri	1183.70	1120.17	94.63
3	Andhra Pradesh	Hyderabad	64.76	64.76	100
4	Andhra Pradesh	Warangal	4973.04	2695.89	54.21
5	Andhra Pradesh	Vijayawada	3030.11	2948.80	97.32
6	Andhra Pradesh	Mahbubnagar	6910.76	6910.76	100
7	Andhra Pradesh	Hindupur	9644.92	666.50	6.91
8	Andhra Pradesh	Mahabubabad	14326.67	3966.94	27.69
9	Andhra Pradesh	Nandyal	10437.27	3030.53	29.04
10	Andhra Pradesh	Anantapur	9342.80	3519.09	37.67
11	Andhra Pradesh	Kurnool	7066.04	6666.26	94.34
12	Andhra Pradesh	Bapatla	4472.69	815.09	18.22
13	Andhra Pradesh	Ongole	13223.24	657.16	4.97
14	Andhra Pradesh	Guntur	2544.72	1237.50	48.63
15	Andhra Pradesh	Machilipatnam	3744.40	1715	45.80
16	Andhra Pradesh	Narasaraopet	7072.58	4492.80	63.52
17	Andhra Pradesh	Nagarkurnool	11063.26	11063.26	100
18	Andhra Pradesh	Nalgonda	7731.69	7731.69	100
19	Andhra Pradesh	Secunderabad	84.77	84.77	100
20	Andhra Pradesh	Eluru	5726.10	23	0.40
21	Andhra Pradesh	Karimnagar	5643.41	8.83	0.16

Sl. No.	State Name	Parliamentary Constituencies (2009)	Total Area (Sq. Km)	Area Falling in Basin (Sq. Km)	% Area in the Basin
22	Andhra Pradesh	Chevella	5124.01	4682.23	91.38
23	Andhra Pradesh	Khammam	7740.39	3917.10	50.61
24	Andhra Pradesh	Bhongir	8138.86	7569.44	93
25	Andhra Pradesh	Medak	5992.81	183.82	3.07
26	Karnataka	Udupi Chikmagalur	8397.83	5108.90	60.84
27	Karnataka	Bagalkot	7698.31	7698.31	100
28	Karnataka	Bellary	7297.76	7297.76	100
29	Karnataka	Bidar	8174.83	3705.52	45.33
30	Karnataka	Hassan	7947.83	2543.27	32
31	Karnataka	Belgaum	5318.64	5303.52	99.72
32	Karnataka	Gulbarga	9241.17	9241.17	100
33	Karnataka	Dakshina Kannada	4926.18	1.09	0.02
34	Karnataka	Chitradurga	10868.57	9749.17	89.70
35	Karnataka	Chikkodi	5344.74	5344.74	100
36	Karnataka	Haveri	7189.71	7175.69	99.80
37	Karnataka	Dharwad	5035.72	3507.15	69.65
38	Karnataka	Shimoga	9523.03	5694.12	59.79
39	Karnataka	Koppal	8866.66	8866.66	100
40	Karnataka	Uttara Kannada	12524.30	2147.82	17.15
41	Karnataka	Davanagere	5875.79	5875.79	100
42	Karnataka	Bijapur	10261.06	10261.06	100
43	Karnataka	Raichur	9620.48	9620.48	100
44	Karnataka	Tumkur	7043.62	2508.45	35.61
45	Maharashtra	Pune	248.21	248.21	100
46	Maharashtra	Satara	6670.75	6634.69	99.46
47	Maharashtra	Solapur	6106.37	6106.37	100
48	Maharashtra	Sangli	6864.92	6864.92	100
49	Maharashtra	Shirdi	6344.26	74.06	1.17
50	Maharashtra	Biwandi	4057.54	2.55	0.06
51	Maharashtra	Ahmadnagar	10166.14	6056.11	59.57

Sl. No.	State Name	Parliamentary Constituencies (2009)	Total Area (Sq. Km)	Area Falling in Basin (Sq. Km)	% Area in the Basin
52	Maharashtra	Shirur	5770.14	5621.78	97.43
53	Maharashtra	Beed	10243.78	1446.56	14.12
54	Maharashtra	Maval	3021.92	1155.82	38.25
55	Maharashtra	Raigarh	8326.82	3.10	0.04
56	Maharashtra	Madha	10455.61	10455.61	100
57	Maharashtra	Hatkanangle	3843.22	3818.41	99.35
58	Maharashtra	Kolhapur	5142.17	4900.30	95.30
59	Maharashtra	Ratnagiri - Sindhudurg	9666.51	138.06	1.43
60	Maharashtra	Baramati	7914.42	7764.74	98.11
61	Maharashtra	Osmanabad	10343.18	5855.32	56.61

Source : Election Commission of India

Annexure II : Climate – Rainfall (1971-2004) and Temperature (1969-2004) profile in the basin

A. Sub-Basin Wise Annual Average Rainfall (mm) (1971-2004)

Sl. No.	Year	Annual Rainfall (mm)						
		Bhima Lower Sub-basin	Bhima Upper Sub-basin	Krishna Lower Sub-basin	Krishna Middle Sub-basin	Krishna Upper Sub-basin	Tungabhadra Lower Sub-basin	Tungabhadra Upper Sub-basin
1	1971	590.77	851.79	776.74	565.46	1121.48	698.4	1122.19
2	1972	382.88	475.76	668.47	453.34	841.35	649.27	1063.96
3	1973	768.68	1050.43	865.79	712.65	1302.74	802.32	1144.93
4	1974	832.83	993.17	793.66	746.67	1500.13	852.84	1307.98
5	1975	1106.74	1158.51	1073.53	1053.69	1614.47	1125.57	1649.26
6	1976	610.03	986.65	978.79	694.47	1199.61	537.66	964.82
7	1977	746.9	979.02	875.51	734.49	1400.93	903.05	1270.93
8	1978	937.94	930.36	1248.83	999.51	1399.29	992.41	1470.15
9	1979	819.02	992.27	758.67	696.99	1257.96	786.6	1219.79
10	1980	594.62	964.12	833.11	555.36	1287.6	758.94	1434.03
11	1981	913.53	1008.03	969.54	914.37	1434.63	899.45	1197.87
12	1982	629.28	741	826.9	705.63	1276.48	755.74	1343.12
13	1983	839.75	1011.58	1189.37	966.44	1574.26	848.37	1272.14
14	1984	573.36	771.26	677.66	589.32	1180.41	673.99	1136.45
15	1985	534.01	672.72	759.77	565.46	1272.74	592.14	968.48
16	1986	592.61	677.03	883.54	586.17	1053.22	677.09	1075.26
17	1987	853	813.78	938.16	901.77	1303.36	786.84	1046.44
18	1988	948.81	1096.72	1165.79	870.21	1479.44	863.64	1432.51
19	1989	832.51	929.2	1112.33	789.1	1184.75	736.84	1098.31
20	1990	821.72	1095.68	1243.15	918.2	1422.79	828.93	1357.02
21	1991	663.25	870.54	978.56	750.35	1279	908.3	1395.63
22	1992	573.86	751.4	759.28	634.93	1289.66	835.45	1415.52
23	1993	723.44	1033.66	840.65	716.09	1555.27	864.03	1235.32

24	1994	507.09	965.8	889.57	655.64	1275.21	843.43	1424.98
25	1995	730.19	800.76	1148.92	955.31	1374.96	871.57	1306.72
26	1996	825.16	1005.41	1109.74	913.3	1413.62	977.75	1319.06
27	1997	593.89	882.31	910.03	712.01	1373.16	776.35	1253.82
28	1998	1050.93	1207.92	592.24	1065.46	1510.67	1060.06	1453.83
29	1999	649.93	903.2	833.89	561.8	1335.22	844.32	1439.25
30	2000	746.24	803.5	1070.17	833.99	1152.9	907.95	1360.13
31	2001	685.87	833.98	949.51	867.09	1035.08	809.42	1054.23
32	2002	586.44	661.95	678.33	627.17	919.87	625.77	1051.92
33	2003	506.13	582.15	915.09	644.35	921.14	577.27	1048.15
34	2004	627.84	932.4	819	636.37	1363.12	625.68	1176.09

B. Temperature profile in the basin (36 Years Average for the period 1969-2004)

Sl. No.	Month	Maximum Temperature (°C)	Minimum Temperature (°C)	Mean Temperature (°C)
1	January	30.12	16.02	23.07
2	February	34.17	19.98	27.08
3	March	35.38	20.8	28.09
4	April	37.25	23.59	30.42
5	May	37.4	24.74	31.07
6	June	33.11	23.67	28.39
7	July	30.28	22.73	26.51
8	August	29.51	22.31	25.91
9	September	30.63	22.07	26.35
10	October	31.24	21.15	26.19
11	November	30.41	18.57	24.49
12	December	29.54	16.05	22.8

Annexure III : Sub-basin wise population and drinking water facilities

A. Demographic Details

Sl. No.	Sub-basin	No. of Districts	No. Villages	Total Population	Male Population	Female Population	No. of Households
1	Bhima Lower	10	2213	3986938	2034323	1952615	706033
2	Bhima Upper	11	4648	13793138	7156164	6636974	2787019
3	Krishna Lower	11	3704	15594812	7970171	7624641	3391965
4	Krishna Middle	8	1851	4203377	2136256	2067120	825125
5	Krishna Upper	18	6313	14750672	7502047	7248625	2838562
6	Tungabhadra Lower	12	4889	8013034	4066969	3946064	1527092
7	Tungabhadra Upper	12	4349	5999712	3058100	2941612	1156075

Source : Census Data 2001;

B. Drinking Water Facilities

Sl. No.	Sub-basin	District	Wells	Tubewells	Handpumps
1	Bhima Lower	Osmanabad	NA	NA	NA
2	Bhima Lower	Bidar	NA	NA	NA
3	Bhima Lower	Latur	NA	NA	NA
4	Bhima Lower	Solapur	NA	NA	NA
5	Bhima Lower	Bijapur	NA	NA	NA
6	Bhima Lower	Medak	384	651	1135
7	Bhima Lower	Mahbubnagar	247	440	1396
8	Bhima Lower	Gulbarga	NA	NA	NA
9	Bhima Lower	Sangli	554	444	587
10	Bhima Lower	Rangareddi	NA	NA	NA
11	Bhima Upper	Ahmadnagar	1432	454	1310
12	Bhima Upper	Belgaum	NA	NA	NA
13	Bhima Upper	Osmanabad	NA	NA	NA
14	Bhima Upper	Pune	1712	647	1284

Sl. No.	Sub-basin	District	Wells	Tubewells	Handpumps
15	Bhima Upper	Thane	1623	492	1439
16	Bhima Upper	Solapur	NA	NA	NA
17	Bhima Upper	Bid	846	480	983
18	Bhima Upper	Satara	NA	NA	NA
19	Bhima Upper	Bijapur	NA	NA	NA
20	Bhima Upper	Raigarh	1765	272	973
21	Bhima Upper	Sangli	554	444	587
22	Krishna Lower	Hyderabad	NA	NA	NA
23	Krishna Lower	Krishna	511	118	509
24	Krishna Lower	Prakasam	621	80	803
25	Krishna Lower	Khammam	747	254	958
26	Krishna Lower	Karimnagar	797	149	956
27	Krishna Lower	Nalgonda	NA	NA	NA
28	Krishna Lower	Warangal	699	206	904
29	Krishna Lower	Medak	384	651	1135
30	Krishna Lower	Mahbubnagar	247	440	1396
31	Krishna Lower	Guntur	452	149	540
32	Krishna Lower	Rangareddi	NA	NA	NA
33	Krishna Middle	Prakasam	621	80	803
34	Krishna Middle	Kurnool	298	165	791
35	Krishna Middle	Nalgonda	NA	NA	NA
36	Krishna Middle	Raichur	NA	NA	NA
37	Krishna Middle	Mahbubnagar	247	440	1396
38	Krishna Middle	Gulbarga	NA	NA	NA
39	Krishna Middle	Guntur	452	149	540
40	Krishna Middle	Rangareddi	NA	NA	NA
41	Krishna Upper	Belgaum	NA	NA	NA
42	Krishna Upper	Bagalkot	NA	NA	NA
43	Krishna Upper	Dharwad	NA	NA	NA
44	Krishna Upper	Haveri	NA	NA	NA

Sl. No.	Sub-basin	District	Wells	Tubewells	Handpumps
45	Krishna Upper	Pune	1712	647	1284
46	Krishna Upper	Sindhudurg	734	414	440
47	Krishna Upper	Kolhapur	911	348	724
48	Krishna Upper	Ratnagiri	1491	384	672
49	Krishna Upper	Solapur	NA	NA	NA
50	Krishna Upper	Koppal	NA	NA	NA
51	Krishna Upper	Raichur	NA	NA	NA
52	Krishna Upper	Satara	NA	NA	NA
53	Krishna Upper	Bijapur	NA	NA	NA
54	Krishna Upper	Mahbubnagar	247	440	1396
55	Krishna Upper	Raigarh	1765	272	973
56	Krishna Upper	Gadag	NA	NA	NA
57	Krishna Upper	Gulbarga	NA	NA	NA
58	Krishna Upper	Sangli	554	444	587
59	Tungabhadra Lower	Bellary	NA	NA	NA
60	Tungabhadra Lower	Hassan	NA	NA	NA
61	Tungabhadra Lower	Anantapur	158	247	881
62	Tungabhadra Lower	Bagalkot	NA	NA	NA
63	Tungabhadra Lower	Chitradurga	NA	NA	NA
64	Tungabhadra Lower	Davanagere	NA	NA	NA
65	Tungabhadra Lower	Chikmagalur	NA	NA	NA
66	Tungabhadra Lower	Kurnool	298	165	791
67	Tungabhadra Lower	Koppal	NA	NA	NA
68	Tungabhadra Lower	Raichur	NA	NA	NA
69	Tungabhadra Lower	Mahbubnagar	247	440	1396
70	Tungabhadra Lower	Tumkur	NA	NA	NA
71	Tungabhadra Upper	Bellary	NA	NA	NA
72	Tungabhadra Upper	Chitradurga	NA	NA	NA
73	Tungabhadra Upper	Dakshina Kannada	NA	NA	NA
74	Tungabhadra Upper	Dharwad	NA	NA	NA

Sl. No.	Sub-basin	District	Wells	Tubewells	Handpumps
75	Tungabhadra Upper	Davanagere	NA	NA	NA
76	Tungabhadra Upper	Haveri	NA	NA	NA
77	Tungabhadra Upper	Udupi	NA	NA	NA
78	Tungabhadra Upper	Chikmagalur	NA	NA	NA
79	Tungabhadra Upper	Shimoga	NA	NA	NA
80	Tungabhadra Upper	Uttara Kannada	NA	NA	NA
81	Tungabhadra Upper	Koppal	NA	NA	NA
82	Tungabhadra Upper	Gadag	NA	NA	NA

Source : Census Data 2001

Annexure IV : Inventory of surface water resources

A. List of Dams with surrogate information												
Sl. No.	Name of Dam	River	Type of Dam	Year of completion	Catchment Area (Sq. Km.)	Length of dam (m)	Max height above foundation (m)	GSC (MCM)	LSC (MCM)	Type of spillway	Submergence Area (Th Ha)	Purpose
1	Achakdani	Local Nallah	Earthen	1970		628	11.15	1.35	1.35			IR
2	Achler	Local Nallah	Earthen	1978		135	13.5	1.13	0.96		0.03	IR
3	Adale	Local Nallah	Earthen	1985		365	19.17	1.27	0.97		0.02	IR
4	Aheri - Jumbagi	Aheri-jumbagi	Earthen / Gravity / Masonry	1989		1018	10.59	1.8	1.5		0.65	IR
5	Aigali	Local Nala Krishna / Malaprabha Sub-basin	Earthen	1969		526.5	15.66	1.44	1.19		0.04	IR
6	Akkampalli											
7	Akkapalem		Earthen			433	11.1	1.85	1.85			IR
8	Alegaonpaga	Ambi	Earthen	1971		289	15.24	2.03	1.81			IR
9	Almatti	Krishna	Earthen / Gravity / Masonry	2000	33375	1564.83	52.24	1196	861	Ogee	54.01	HE, IR
10	Alsund	Local Nallah	Earthen	1989		771	13.98	0	0		0.05	IR

11	Alur	Local Nallah	Earthen	1975		934	11.99	1.12	0.97		0.02	IR
12	Amarja	Amarja	Earthen / Gravity / Masonry	1998	530.95	960	31.85	44.01	40.07	Ogee	0.64	IR
13	Ambegaon		Earthen	1979		575	21.78	1.93	0.19		0.03	IR
14	Ambeohal	Ambeohal			33.84	2185	27.585	35.11	32.63		0.33	IR
15	Ambi	Local Nallah	Earthen	1972		418	11.6	1.53	1.29		0.04	IR
16	Ambligola	Vrushbhavathi	Earthen	1964	144	881	20.77	12.2	11.7	Ogee	0.45	IR
17	Amboli	Local Nallah	Earthen	1979		390	27	1.78	1.73		0.12	IR
18	Anala	Local Nallah	Earthen	1972	20.2	1290	23.34	8.99	7.8	Ogee	0.05	IR
19	Andhali	Man	Earthen	1997	129.5	2040	18.6	9.27	7.42	Ogee	0.21	IR
20	Andra	Andra	Gravity / Masonry	2003	214.46	330	40.45	82.75	82.19	Ogee	1.07	IR
21	Andur		Earthen	1982		430	24.51	5.75	5.69		0.06	IR
22	Anjanapura	Kumudavathy	Earthen	1936	520	1600	21.33	39.76	20	Ogee	0.11	IR
23	Ankamanhal	Krishna /T.Bhadra	Earthen	1988		278	21.29	1.93	1.72		0.04	IR
24	Antri (Bk)	Local Nallah	Earthen	1989		907	22.79	2.82	2.65		0.06	IR
25	Appenahalli	Krishna /T.Bhadra	Earthen	1981		525	13.75	1.78	1.78		0.04	IR
26	Arabwadi	Baba	Earthen	1977		870	17.95	1.89	1.75		0.04	IR
27	Arala Kalmodi	Arala	Gravity / Masonry		40.61	295	36.8	42.67	42.47	Ogee	0.27	IR
28	Aralihalli	Krishna /T.Bhadra	Earthen	1983		1920	11.86	3.45	3.01		0.25	IR

29	Arbenchi	Arbenchi Nala	Earthen	1980		312	17.65	1.57	1.27		0.02	IR
30	Areshankar	Areshankar	Earthen/ Gravity	1957	177	1189	19.2	8.58	7.22	Ogee	0.23	IR
31	Arjunwadi	Local Nallah	Earthen	2002		459	17.52					IR
32	Arli	Local Nallah	Earthen			771	12.35	0.89	0.81		0.04	IR
33	Arsoli	Local Nallah	Earthen	1990		6561	23.3	9.23	7.33		0.18	IR
34	Ashti (Nimgaon Choba)	Kadi	Earthen	2000		2291	14.67	8.15	6.55			IR
35	Ashti	Ashti	Earthen	1883	238.28	3871	17.6	23.01	23.01		1.18	IR
36	Asundinala	Local Nala	Earthen	1989		1595	15.7	5.5	4.57		0.23	IR
37	Atpadi	Local Nallah	Earthen	1972		1139	16.5	8.67	7.95			IR
38	Babaleshwara	Sindi Halla	Earthen	1961		975	12.11	1.91	1.36		0.73	IR
39	Babhulgaon	Local Nallah	Earthen	2003		16.5	16.93	56.1			0.23	IR
40	Bagalwadi	Local Nallah	Earthen	1972		662	15	1.57	1.33		0.05	IR
41	Balakundi	Balakundi	Earthen / Gravity / Masonry	1979		1640	14.15	7.46	4.78		0.25	IR
42	Balgawade	Local Nallah	Earthen	1987		950	13.4	1.13	1.03		0.05	IR
43	Ballalwadi	Ramnagar	Earthen	1996		430	20.16	0				IR
44	Ballasamudra		Earthen	1940		785	12	5.09	4.75		0.2	IR
45	Banganga	Banganga	Earthen	1955		1631	16.76	6.5	6.49		0.26	IR
46	Banganga	Banganga	Earthen	1975	56.64	1170	19.2	5.93	4.96		0.17	IR
47	Banpuri	Local	Earthen	1971		510	13.8	1.41	1.23			IR

		Nallah										
48	Bardari	Mehakari	Earthen	1973		420	16.18	1.86	1.54		0.04	IR
49	Barki	Local Nallah	Earthen	2005		335	25.66	1.64	1.58		0.02	IR
50	Basavapattana	Basavapattana	Earthen / Gravity / Masonry	1964		90	14.16	1.37	1.26		0.05	IR
51	Bassappawadi	Local Nalla (Agrani)	Earthen	1980	133	1770	16.9	7.77	6.27		0.28	IR
52	Beeranahalli	Local / Mullamari (K-6)	Earthen	1988		485	30.02	6.93	5.8		0.07	IR
53	Belgaon	Local Nallah	Earthen	1981		181	14.8	2.85	2.8		0.01	IR
54	Bellary	Bellary Nalla	Earthen / Gravity / Masonry		253.82	440.6	36.55	37.26	33.92	Ogee	0.33	IR
55	Bellikindi	Bellikindi	Earthen / Gravity / Masonry	1972		457	11.91	1.08	0.99		0.04	IR
56	Belunki	Local Nallah	Earthen	1997		970	14	0.07	0.06			IR
57	Benikre	Local Nallah	Earthen	1973		595	20.99	0			0.03	IR
58	Benitura	Benitura	Earthen	1994	179.58	1797	13.38	12.84	11.5		0.64	IR
59	Bennithora	Bennithora	Earthen / Gravity / Masonry	2001	2204.09	2340	31.39	149.98	145.78	Ogee	3.05	IR
60	Bhadra	Bhadra	Earthen / Gravity / Masonry	1965	1968	1708	76.81	2025.87	1785	Ogee	11.25	HE, IR

61	Bhairapur	Local Nala Krishna / Malaprabha Sub-basin	Earthen	1991		600.5	15.3	1.36	1.18		0.03	IR
62	Bhairavanithippa	Pedda Hagari(Vedavathi) River	Earthen	1961	14	2235	20	74.31	65.32	Ogee	1.55	IR
63	Bhakuchiwadi	Local Nallah	Earthen	1989		1770	19.7	0.01	0.01		0.02	IR
64	Bhama Asakhed	Bhama	Earthen		198.08	1425	51.125	230.47	217.1	Ogee	2.16	IR
65	Bhambarde	Local Nallah	Earthen	1972		635	22	1.32	0.96			IR
66	Bhandalwadi	Local Nallah	Earthen	1966		796	13.2	4.56	4.54			IR
67	Bharamasagara Doddakere	Kattahalla	Earthen			1220	12	4.05	3.68		0.2	IR
68	Bharatagi	Bharatagi	Earthen / Gravity / Masonry	1975		1076	13.02	2.8	2.27		0.11	IR
69	Bhatghar		Gravity / Masonry	1927	331.5	1625	57.92	670.65	665.59	Ogee	3.19	HE, IR
70	Bhatodi	Mehekari	Earthen	1892		706	15.24	2.9	2.52		0.08	IR
71	Bheemanpally	Bheeman pally	Earthen	1954		2019	16	6.26	5.69			IR
72	Bheemasamudra	Jinigi halla	Earthen		118.11	840	14.2	25.62	20.5		0.86	IR
73	Bhivargi	Patan	Earthen	2001		1606	15.85	11.2	8.63			IR

74	Bhopgaon	Chambali	Earthen	2004		875	14.5	0				IR
75	Bhose (Sangli)		Earthen	1974		456	15.18	1.03	0.94			IR
76	Bhose (Solapur)	Local Nallah	Earthen	1977		925	11.58	2.18	1.73			IR
77	Bhudihal	Belwan	Earthen	1966		2975	18.5	32.05	27.95			IR
78	Bhugaon	Local Nallah	Earthen	1983		550	21.19	1.9	1.8		0.42	IR
79	Bhurikavathe	Local Nallah	Earthen	1991			14.8	1.84	1.84			IR
80	Bhutnal Lake											
81	Bhutwada	Wincharn a	Earthen	1973		305	23.46	3.06	2.49		0.03	IR
82	Bidi	Local Nala Krishna / Malaprab ha Sub-basin	Earthen	1989		580	11.67	1.21	1.05		0.03	IR
83	Biggerahalla	Tungabha dra Basin	Earthen	1986	9.71	450	15.16	0.63	0.58		0.19	IR
84	Billur (Arwali)	Local Nallah	Earthen	1995		621	16.25	0			0.01	IR
85	Bilur (Kesaral)	Local Nallah	Earthen	1995		420	14.31	1.47	1.44		0	IR
86	Birnal	Local Nallah	Earthen	1977		403	18.6	2.43	2.13			IR
87	Bommanahalli	Bommana halli	Earthen / Gravity / Masonry	1981		770	12.7	2.55	2.02		0.09	IR
88	Boodikere	Local halla	Earthen	1950		540	12	1.49	1.35		0.03	IR

89	Boranakanive	Suvarnamuki SS VI	Gravity / Masonry	1892		39.6	24	6.43	6.18		1.35	IR
90	Borgaon (Sangli)	Local Nallah	Earthen	1987		469	13.79	1.63	1.48		1.16	IR
91	Borgaon (Solapur)	Local Nallah	Earthen	1984		435	14.7	2.11	0.06		0.01	IR
92	Bori	Bori Nalla	Earthen	2005	1253	960	17.23	19.25	17.14	Ogee	0.65	IR
93	Brahmangaon	Local Nallah	Earthen	1978		1097	15	1.66	1.46		0	IR
94	Budhpur		Earthen		15.5	4976	15	37.19	34.16			IR
95	Buggavagu	Buggavagu	Earthen	1961	828.8	2576	31					IR
96	Bukkambudi Doddekere	Local Halla / Veda Series	Earthen		9.14	1160	13	0.35	0.32		0.16	IR
97	Bukkapatna	Suvarnamukhi SS	Earthen			500	11.5	3.74	3.37		0.16	IR
98	Bullapura	Kumadavati River	Earthen	1952		114.6	18	0.71	0.64		0.01	IR
99	Chafal	Local Nallah	Earthen	1983		576	21.5	1.45	1.32		0.05	IR
100	Chalkewadi	Local Nallah	Earthen	1991		366	21.53	0			0.02	IR
101	Chandani	Chandani	Earthen	1965	606	1920	17.18	23.78	21.58		0.96	IR
102	Chandoli	Local Nallah	Earthen	2001		313	22.66	1.76	1.4		0	HE, IR
103	Chandrampalli	Sarnala	Earthen	1973	440	926.54	28.65	34.19	31.4	Chute	0.36	IR
104	Changliar	Local /	Earthen	1988		505	17.89	1.8	1.65		0.04	IR

		Mullamari (K-6)										
105	Chare	Local Nallah	Earthen	1983		512.5	16.5	1.5	1.34		0.04	IR
106	Charkali	Local Nallah	Earthen	1995		472	17.37	3.43	3.16		0.04	IR
107	Chaskaman	Bhima	Earthen / Gravity / Masonry	1999	305.56	956	46.28	241.69	213.38	Ogee	1.89	HE, IR
108	Chichondipatil	Kal	Earthen	1977		590	15.06	2.8	2.17		0.31	IR
109	Chikhalgi	Dodda	Earthen	1990		1290	18.19	8.94	5.95			IR
110	Chikkalingadalli	Local / Mullamari (K-6)	Earthen	1982		701.04	14.48	4.26	3.57		0.07	IR
111	Chikkanagaon	Local / Mullamari (K-6)	Earthen	1981		365	15.95	0.97	0.88		0.02	IR
112	Chikkasandra	Suvarnamukhi	Earthen			960	9	7.51	6.25		0.21	IR
113	Chikkehalli	Local Nallah	Earthen	1983		608	11.15	1.89	1.71			IR
114	Chikotra	Chikotra	Earthen	2001	29.03	983	64.8	43.12	43.05	Ogee	0.26	HE, IR
115	Chilewadi	Mandvi	Earthen	2000	103.94	440	62.56	27.17	24.61	Ogee	6.74	IR
116	Chinchani (Ambak)	Local Nallah	Earthen	1989		1447	17.46	0			0.12	IR
117	Chincholi	Local Nallah	Earthen	1966		793	15.24	2.71	2.71			IR
118	Chinchwad	Local	Earthen	1984		610	20.92	1.53	1.45		0	IR

		Nallah										
119	Chitri	Chitri	Earthen	2001	27.85	1569	55.1	53.41	52.48	Ogee	0.29	IR
120	Chittawadagi	Chittawadagi	Earthen / Gravity / Masonry	1971	145.04	481	12	5.79	5.2	Ogee	0.21	IR
121	Chi-Umberga	Local Nallah	Earthen	1975		1381	14	2.82	2.47		0.15	IR
122	Dafalapur	Local Nallah	Earthen	1992		930	12.8	1.78	1.13		0	IR
123	Dahiwadi	Local Nallah	Earthen	1973		350	17.68	1.35	1.03			IR
124	Danpakanicheru, Allapur/ Dantakani Cheruvu	Lower Krishna	Earthen			671	12.04	2.58				IR
125	Darfal Bb	Local Nallah	Earthen	1983			12.15	2.89	2.89			IR
126	Daruj	Daruj	Earthen	1956		869	16.46	2.88	2.65		0.09	IR
127	Dasanahalli	Krishna /T.Bhadra	Earthen	1986		780	11.83	1.24	1.12		0.16	IR
128	Deulgaon Sidhi	Bongari	Earthen	1972		732	15.4	2.32	1.71		0.07	IR
129	Deur	Local Nallah	Earthen	1994		966	18.6	0			0.04	IR
130	Devarabillikere	Shagalihalla & Sulekere Halla	Earthen	1985		1204	17.4	2.62	2.36		0.65	IR
131	Devaramardikere	Suvarnamukhi SS	Earthen	1980		407	10.67	1.41	1.27		0.07	IR
132	Dhakani	Local Nallah	Earthen	1994		820	18.5	3.05	2.66		0.07	IR

133	Dhamani	KUMBHI	Earthen		44.36	1290	74.64	109.1	105.91	Ogee	0.69	IR
134	Dhamari	Local Nallah	Earthen	1978		450	14.34	1.15	0.87			IR
135	Dhangarwadi	Local Nallah	Earthen	1999		518	19.28	2.64	2.33		0.06	IR
136	Dharma	Dharma Nala	Earthen	1964	97.77	1448.2	23.25	23.24	22.24	Ogee	0.65	IR
137	Dhavaleshwar	Local Nallah	Earthen	1996		806	14.09	0.09	0.08		0.01	IR
138	Dhom Balakwadi	Krishna	Earthen	2006	42.77	1211	65.1	115.53	112.13	Ogee	0.56	HE, IR
139	Dhom	Krishna	Earthen / Gravity / Masonry	1977	217.56	2478	50	382.32	331.05	Ogee	2.5	HE, IR
140	Dhondpargaon	Nandini	Earthen	1977		720	18.35	2.48	2.18		0.04	IR
141	Dhubdhubi	Dhubdhubi	Earthen	2005		1520	11.83	7.3				IR
142	Dhumalwadi	Local Nallah	Earthen	1975		348	11.63	1.34	1.25			IR
143	Diggi	Local Nallah	Earthen	1997			15.16	1.6	1.43		0.03	IR
144	Dighanchi	Local Nallah	Earthen	1976		880	15.8	4	3.33			IR
145	Dimbhe		Gravity / Masonry	2000	412	852	67.65	382.06	353.75	Ogee	1.75	HE, IR
146	Dindi		Earthen	1943	3920	2329	25	59.07	38.51	Ogee	0.7	IR
147	Dinshi	Dinshi Nala	Earthen	1986		360	17.1	0.93	0.84		0.02	IR
148	Divale	Gunjawan	Earthen	1985		490	20.83	2.14	2		0.04	IR

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149	Doddaagrahara											
150	Doddanalla	Dodda Nallah	Earthen	1987	106	1870	16.2	6.5	4.78		0.23	IR
151	Dongargaon	Veer	Earthen	1977		1362	10.06	1.52	1.21			IR
152	Dudhebhavi	Local Nallah	Earthen	1983		480	19.33	3.98	3.45		0	IR
153	Dudhganga	Dudhganga	Earthen / Gravity / Masonry		196	1280	75	719.12	664	Ogee		HE, IR
154	Ekrukh	Adela	Earthen	1871	411.78	2360	21.45	61.17	61.16		1.79	IR
155	Erandol	Local Nallah	Earthen	1999		442	30.27	4.21	3.94		0.05	IR
156	Fondshiras	Local Nallah	Earthen	1991		430	16.03	2.92	2.39			IR
157	Fox Sagar, Jeedimetla		Earthen			1610	10	0.93				IR
158	Gaddavane (Shindewadi)	Local Nallah	Earthen	2007		260	26.2	1.86	1.81		0.01	IR
159	Gajuladinne (Sanjeevaiah Sagar)	Handri	Earthen	1979	1300	4400	19	148.78	121.2	Ogee	2.79	IR
160	Galorgi	Local Nallah	Earthen	1977		564	12.75	2.07	2.07			IR
161	Gandabommanahalli	Krishna /T.Bhadra	Earthen	1970		1104	23.15	7.32	7.32		0.18	IR
162	Gandorinala	Gandorinala	Earthen / Gravity /	2002	371	1813.5	24.27	53.45	49.45	Ogee	0.66	IR

			Masonry									
163	Gangoti	Local Nallah	Earthen	1978		890	14.4	1.79	1.35			IR
164	Gantenahalli	Suvarnamuki SS VI	Earthen	1987		1020	22.25	3.99	3.6		0.11	IR
165	Gaosud	Local Nallah	Earthen	1995		773	16.75	1.7	1.51		0.04	IR
166	Garade	Karha	Earthen	1979		373	18.82	1.65	1.56		0.05	IR
167	Gavase	Local Nallah	Earthen	2006		290.5	23.87	1.21	1.15		0.02	IR
168	Gayathri	Suvarnamuki	Earthen / Gravity / Masonry	1963	1831	1021.53	17.07	27.6	18.1	Ogee	0.79	IR
169	Ghagargaon	Local Nallah	Earthen	2003		323	11.93	1.31	1.18			IR
170	Ghanand	Local Nallah	Earthen	1986		812	15.46	0			0	IR
171	Ghataprabha	Ghatprabha	Earthen	2009	58.33	1088	48.3	42.75	42.74	Ogee	0.3	HE, IR
172	Gheradi	Local Nallah	Earthen	1943		500	13	2.82	2.82			IR
173	Ghod	Ghod	Earthen	1965	3628	3300	29.6	216.3	154.8	Ogee	3.09	IR
174	Ghodegaon		Earthen	1975		892	16.4	2.51	2.29		0.06	IR
175	Ghorpadi	Local Nallah	Earthen	1988		390	13.62	1.5	1.28		0.01	IR
176	Ghorvadi	Ghorwadi	Earthen	1996		960	19.81	1.91	1.59		0.05	IR
177	Girzani	Local Nallah	Earthen	1989		385	17	1.55	1.46		0.04	IR

178	Gobbur	Gobbur Nala	Earthen	1993		1525	10.3	3.02	2.39		0.15	IR
179	Gohe	Local Nallah	Earthen	1996		140	17.49	1.29	1.11		0.03	IR
180	Gopaldinne		Earthen			975		10.48		Other		
181	Goradwadi	Local Nallah	Earthen	1976		530	11.94	1.1	0.95			IR
182	Gormala	Local Nallah	Earthen	1985		127	12.9	1.29	1.15		0.04	IR
183	Gormale	Local Nallah	Earthen	1983		660	10.87	1.74	1.4			IR
184	Gudipalligattu	Krishna										IR, WS
185	Gugawad	Local Nallah	Earthen	1987		580	14.4	1.58	1.03			IR
186	Gundwan At Site- I	Gundwan - I	Earthen / Gravity / Masonry	1979		973	13.05	2.18	1.77		0.1	IR
187	Gundwan At Site- II	Gundwan -II	Earthen / Gravity / Masonry	1962		690	11.21	1.84	1.72		0.07	IR
188	Gunjwani	Kanandi	Earthen / Gravity / Masonry		50.61	1730	52.82	104.69	104.48	Ogee	0.64	HE, IR
189	Gunodi	Shanala	Earthen	1955		793	14.93	6.38	5.68		0.02	IR
190	Gurav Pimpri	Bhokri	Earthen	1954		945	14.33	3.85	3.14		0.01	IR
191	Hadashi I	Walki	Earthen	1990		720	21.83	3.07	2.98		0.35	IR
192	Hadashi II	Local Nallah	Earthen			390	20.45	1.41	1.31		0.02	IR

193	Hagari Bommanahalli	Hagari	Earthen	1972	2347	1759	15.24	6.37	5.62	Chute	1.35	IR
194	Haihole	Haihole	Earthen	1979		688	21	5.11	3.72		0.1	IR
195	Halchincholi	Local Nallah	Earthen	1979		622	13.3	2.33	2.18			IR
196	Halkarni	Local Nallah	Earthen	2005		504	14	0			0.02	IR
197	Haludyamana halli	Kattehole	Earthen	1975		690	13.7	1.38	1.14		0.05	IR
198	Hanabarwadi	Local Nallah	Earthen	1998		304	23.65	2.67	2.4		0.03	IR
199	Hanajagi	Hanajagi	Earthen / Gravity / Masonry	1968		785	12.81	1.5	1.42		0.07	IR
200	Hanamapur	Local Nala	Earthen	1978		375.75	14.33	1.12	0.97		0.05	IR
201	Hanamgaon	Local Nallah	Earthen	1974			11.1	2.9	2.9			IR
202	Hanchinal	Hanchinal	Earthen / Gravity / Masonry	1973		655	11.05	1.59	1.25		0.06	IR
203	Hanga	Hanga	Earthen	1978		390	15.84	1.85	1.34		0.05	IR
204	Hangarga	Local Nallah	Earthen	1973		1506	12.81	2	1.88		0.09	IR
205	Hangargi	Local Nallah	Earthen	1977		975	12.3	1.83	1.33			IR
206	Hanjagi	Local Nallah	Earthen	1983		811	12.1	1.63	1.42			IR
207	Harinala	Harinala	Earthen	2004	101	3120	19.41	13.81	12.08	Ogee	0.39	IR
208	Harni	Harni	Earthen	1965	188.42	3059	16.55	12.58	11.18	Ogee	0.72	IR

209	Haroli	Local Nallah	Earthen	1987		818	13.96	1.32	1.21			IR
210	Hateghar	Hateghar Nala	Earthen	2011	7.74	1048	38.55	7.37	7.29	Ogee	0.09	HE, IR
211	Hattikuni	Hattikuni stream	Earthen	1973	137.89	923	22.88	9.97	7.93	Ogee	0.12	I R
212	Hebbal	Local Nala Krishna / Malaprabha Sub-basin	Earthen	1989		530	12.64	0.64	0.55		0.01	IR, WS
213	Here	Local Nallah	Earthen	1998		523	27.32	3.88	3.81		0.04	IR
214	Hidkal	Ghataprabha	Earthen / Gravity / Masonry	1977	1412	10183	62.48	1444.32	1387	Chute	6.34	HE, IR
215	Himayat Sagar	Eesa	Earthen / Gravity / Masonry	1927	1307.94	2256	34	189.65	182.18			WS
216	Hingangaon (Sangali)	Mandani	Earthen	1998		2010	16.02	0.6			0.06	IR
217	Hingangaon	Ardeshi	Earthen	1975		1032	17.53	1.48	1.24		0.01	IR
218	Hingani (Pangaon)	Bhogawati	Earthen	1977		2193	21.87	45.51	31.97			IR
219	Hingani	Kumbhar	Earthen	1974		750	16.6	2.22	1.85			IR
220	Hipparga	Local Nallah	Earthen			850	12.27	1.71	1.56		0.05	IR
221	Hirehalla	Hirehalla & Veerapur	Earthen / Gravity / Masonry	2002	937.5	3606.6	17.62	47.6	37.95	Ogee	1.25	IR

		halla										
222	Hirekop	Local Nala	Earthen	1966		785.4	12.39	1.47	1.2		0.04	IR
223	Hiresangagutti	Hiresangagutti	Earthen / Gravity / Masonry	1993		260	11.45				0.03	IR
224	Hivare	Wangang a	Earthen	1974		740	18.14	2.74	2.3		0.07	IR
225	Hokarani	Hokarani	Earthen / Gravity / Masonry	1966		755	11.72	1.18	1.11		0.05	I R
226	Horti	Local Nallah	Earthen	1978		607	14.7	1.35	1.24		0.04	IR
227	Hotagi	Local Nallah	Earthen	1944		350	12.5	5.27	5.27			IR
228	Hulikunta	Tungabhadra	Earthen	1979		550	28.65	2.72	2.58		0.05	IR
229	Huljanti	Local Nallah	Earthen	1980		807	12.25	1.35	1			IR
230	Ijoli	Local Nallah	Earthen	2005		207	19.65	0.81	0.69		0.01	IR
231	Indirammasagar, Anajpur	Musi	Earthen			1189	11.87	1.33				IR
232	Itagi	Malaprabha	Earthen	1979		757	15.25	0.99	0.86		0.02	IR
233	Itkal	Local Nallah	Earthen	1985		88	10	1.19	1.07		0.05	IR
234	Jadhavwadi		Earthen	2001		1215	35.52	12.03	11.53		0	IR
235	Jakapur	Local Nallah	Earthen	1977	121.73	1768	14.8	10.18	7.45		0.4	IR
236	Jalgaon Supe	Local Nallah	Earthen	2002		527	10.34	0.56	0.45			IR

237	Jalihal Bk.	Local Nallah	Earthen	1984		648	14.05	2.23	1.91		0.01	IR
238	Jamb	Local Nallah	Earthen	2000		823	17.3	2.21	1.87		0.04	IR
239	Jambadahalla	Jambadahalla	Earthen / Gravity / Masonry	1968	155.4	838.1	31.7	9.69	6.91	Ogee	0.16	IR
240	Jambhulani (Sangali)	Local Nallah	Earthen	1975		1285	15.87	2.85	2.15			IR
241	Jambhulani	Local Nallah	Earthen	1982		1040	15.21	2.42	2.27			IR
242	Jambre		Earthen		19.97	1018	38.06	23.23	23.2	Ogee	0.13	HE, IR
243	Jangamhatti	Honhal	Earthen	1995	21.4	960	28.9	34.21	33.21	Ogee	0.01	HE, IR
244	Jawahar	Shiruguppi	Earthen / Gravity / Masonry	1961		676.16	21.64	1.84	1.27		0.04	WS
245	Jawalgaon	Nagzari	Earthen	2005	223	1229	21.71	34.75	29	Ogee	0.67	IR
246	Jigajinagi	Jigajinagi	Earthen / Gravity / Masonry	1982		1420	11.93	4.04	3.77		0.17	IR
247	Jiregaon	Local Nallah	Earthen	2002		515	11.44	1.24	0.84			IR
248	Julugade - I	Local Nallah	Earthen	2000		198	29.98	4.86	4.72		0.05	IR
249	Jutpally Weir/Jutepally	Jutepalli vagu	Earthen	1966		1177	22	8.72	7.94			IR
250	Kacharewasti	Local Nallah	Earthen	1974		1238	18.75	3.13	1.88			IR

251	Kada	Local Nallah	Earthen	1965	169.08	2374	15.45	9.99	8.85	Other	0.2	IR
252	Kadasagatti	Local Nala	Earthen	1991		706	10.68	0.34	0.29		0.04	IR
253	Kadatana Begewadi	Local Nala	Earthen	1965		594.5	13.55	1.04	0.91		0.03	IR
254	Kadatnal	Local Nala Malaprabha Sub-basin	Earthen	1970		470	13.75	1.29	1.12		0.05	IR
255	Kadavi	Potphuji	Earthen	2000	23.32	1519	36.05	71.24	70.56	Ogee	0.46	IR
256	Kadegaon	Local Nallah	Earthen			915	11.1		1.38			IR
257	Kadi	Kari	Earthen	1970	96.2	697	21.18	7.64	6.38		0.22	IR
258	Kadlewadi	Kadlewadi	Earthen / Gravity / Masonry	1990		1080	11.52	2.45	2.16		0.08	IR
259	Kadus		Earthen	1986		890	18.5	3.62	2.26		0.03	IR
260	Kakarvani		Earthen			2378	12.96					IR
261	Kalamba		Earthen	1983		1237	16.26	2.75			0.06	IR
262	Kalambwadi	Local Nallah	Earthen	1983		653	14.7	0.71	0.59			IR
263	Kalasakoppa	Kalasakoppa	Earthen / Gravity / Masonry	1960	130	585	15.8	6.82	6.48	Ogee	0.2	IR
264	Kalasgade	Local Nallah	Earthen	2000		524	16.26	1.91	1.84		0.05	IR
265	Kallambella	Suvarnamukhi	Earthen			1920	8.77	7.02	6.32		0.29	IR

266	Kamargaon		Earthen	1969		488	13.33	2.24	1.92		0.01	I R
267	Kambali	Kambali	Earthen	1958	130.25	1500	15.6	3.8	3.1		0.16	IR
268	Kamtha	Local Nallah	Earthen	1970		643	14.8	1.38	1.24		0.04	IR
269	Kanakanala	Kanakanala	Earthen	1975	192	975.65	20.12	6.37	5.61		0.19	IR
270	Kandalgaon	Local Nallah	Earthen	1980		670	19.41	1.7	1.65			IR
271	Kaneriwadi	Local Nallah	Earthen	1974		907	17.5	2.6	2.22		0.06	IR
272	Kanher		Earthen / Gravity / Masonry	1986	204.69	1955	50.34	286	271.68	Ogee	2	HE, IR
273	Kankatrewadi	Local Nallah	Earthen	1978		726	19.51	1.24	1.04		0.04	IR
274	Kanvikervinkoppa	Local Nala Krishna / Malaprabha Sub-basin	Earthen	1982		454	16.76	0.49	0.42		0.02	IR
275	Karambali	Local Nallah	Earthen	2007		549	27.44	2.91	2.79		0.03	IR
276	Karandewadi	Local Nallah	Earthen	1995		124	18.45	1.36				
277	Karanjgaon	Local Nallah	Earthen	1998		615	30.7	3.44	2.55		0.03	IR
278	Karanjiwane	Local Nallah	Earthen	1989		495	21	0			0.02	IR
279	Kari	Local	Earthen	1973		945	15.72	1.7	1.47			IR

		Nallah										
280	Karunde	Local Nallah	Earthen	1972		881	13.05	2.2	1.97			IR
281	Karve	Local Nallah	Earthen	1974		1099	16.86	1.64	1			IR
282	Kasari	Kasari	Earthen	1990	33.28	297	44.24	78.56	77.96	Ogee	0.77	HE, IR
283	Kasarsai	Kasarsai Nalla	Earthen	1995	39.45	1170	29.36	17.37	16.25	Ogee	0.2	IR
284	Katral	Katral	Earthen / Gravity / Masonry	1979		1240	11.22	2.38	2.26		0.12	IR
285	Kaudgaon	Jamb	Earthen	1973		450	15.55	2.49	2.11		0.05	IR
286	Kazikanbas	Local Nallah	Earthen	1989		805	19.8	0			0.07	IR
287	Kesakarwadi	Local Nallah	Earthen	1998		633	29	5.68	5.62		0.05	IR
288	Kesarjawada	Local Nallah	Earthen	1997		620	13.27	1.25	1.17		0.02	IR
289	Kesavari Samudram	Nallavagu	Earthen			1389	10.02	8.15	7.33			IR
290	Khadakwasla	Mutha	Earthen / Gravity / Masonry	1880	501.8	1539	32.9	86	56	Ogee	1.48	IR
291	Khairy	Khar	Earthen	1989	207.8	1210	18.91	15.11	14.34	Ogee	0.05	IR
292	Khamboli	Local Nallah	Earthen	2000		308	25.34	1.68	1.61		0.03	IR
293	Khamkarwadi	Local Nallah	Earthen	2004		204	26.34	1.09	1.09		0	IR

294	Khanapur (Kolhapur)	Local Nallah	Earthen	1988		240	21.35	0			0.02	IR
295	Khandala	Local Nallah	Earthen	1973	72.11	276	24.49	6.26	5.24		0.09	IR
296	Khandeshar	Vali	Earthen	1978	120.32	1257	17.14	10.84	8.82	Ogee	0.3	IR
297	Khasapur	Ulup	Earthen	1956	554.26	1882	13.78	13.59	13.04		0.43	IR
298	Kini	Local Nallah	Earthen	1967		648	11.43	1.36	1.24		0.05	IR
299	Kitwad	Local Nallah	Earthen	2000		270	30.5	5.53	5.23		0.05	IR
300	Kode	Local Nallah	Earthen	1989		530	24.77	0.01	0.01		0.08	IR
301	Kodli-Allapur	Local / Mullamari	Earthen	2000		510	16.93	5.01	4.51		0.1	IR
302	Kohalli	Hire Halla	Earthen	1975		659	14.63	2.47	2.14		0.1	IR
303	Koil Sagar	Peddavagu	Earthen / Gravity / Masonry	1955	1836.32	1037	16	64.45	59.89			IR
304	Kolgaon	Hanga	Earthen	1956		1038	12.74	2.88	2.49		0.01	IR
305	Kolgaon Dolas	Local Nallah	Earthen	1981		815	10.46	1.06	0.87			IR
306	Kondej	Local Nallah	Earthen	1974		945	10.82	1.79	1.49			IR
307	Kondoshi	Local Nallah	Earthen	2000		380	35.68	2.76	2.62		0.03	IR
308	Koragaonwadi	Local Nallah	Earthen	1974		1346	11.13	1.44	1.33		0.07	IR

309	Koregaon	Koregaon	Earthen	1988		437	21.64	1.96	1.9			I R
310	Koregaon	Local Nallah	Earthen			1818	11.95	4.61	3.68		0.14	IR
311	Kosari	Local Nallah	Earthen	1970		610	10.9	1.45	1.39			IR
312	Kothacheru, Mamdabad	Lower Krishna	Earthen			873	10.01	0.68				IR
313	Kotij	Local Nallah	Earthen	1993		796	14.6	1.47			0.05	IR
314	Kotipally Vagu	Kotepallyvagu	Earthen	1967	294	2189	26	44.51	36.87		0.72	IR
315	Kottur	Krishna /T.Bhadra	Earthen	1888		1777	15	4.91	4.87		0.27	IR
316	Koyna	Koyna	Earthen	1964	891.78	807.72	103.02	2980.68	2835.68	Ogee	1.15	Hydroelectric
317	Krishnasamudram	-	Earthen	1963		978	12.27	0.31				IR
318	Krishyal	Krishyal	Earthen / Gravity / Masonry	1964		730	10.91	1.62	1.46		0.07	IR
319	Kuchi	Local Nallah	Earthen	1961		551	13.3	2.23	2.2		0.3	IR
320	Kudnur	Local Nallah	Earthen	2005		316	20.99	11.93	1.06		0.02	IR
321	Kumari	Kumari Nalla	Earthen	1998		510	23.64	2.59	2.53		0.04	IR

322	Kumbhawade	Local Nallah	Earthen	1999		677	25.16	5.53	5.53		0.05	IR
323	Kumbhej	Local Nallah	Earthen	1982		1016	10.68	1.35	1.18			IR
324	Kumbhi	Kumbhi	Earthen	2007	21.2	906	42.58	76.88	76.5	Ogee	0	HE, IR
325	Kundali	Kundali	Earthen			205	38.26	6.34	6.34			H E
326	Kunigal Thimmanahalli	Thimman ahalli nala	Earthen	1980		330	14.2	2.17	1.96		0.07	IR
327	Kunsawali	Local Nallah	Earthen	1997		466	15.04	1.17	1.06		0.02	IR
328	Kuppakaddi	Kuppakad i	Earthen / Gravity / Masonry	1969		865	11.27	1.84	1.66		0.07	IR
329	Kurnur	Bori	Earthen	1968		1206	23.7	35.26	31.3		0.57	IR
330	Kuvalgi Aheri	Kuvalgi Aheri	Earthen / Gravity / Masonry	1981		518	13.55	1.44	1.3		0.05	IR
331	Lakhnapur	Pargi stream	Earthen	1968		1263	15.85	8.61	7.93			IR
332	Lakhya	Lakhya hole	Earthen	1994		1048	108	273.7 9	245		0.61	WS
333	Lakikatti	Local Nallah	Earthen	2000		535	36.34	9.24	8.98		0.08	IR
334	Lakshmisagar	Suvarnam ukhi	Earthen			960	10.5	6.7	6.09		0.21	IR
335	Landgewadi	Local Nallah	Earthen	1973		408	11.37	1.04	0.97		0.27	IR
336	Lankasagar	Kottaleru	Earthen /	1968	207.2	2718	11.6	20.38	17.29		2.98	IR

			Gravity / Masonry									
337	Large , Garla	Kamepalli Anicut	Earthen			1500	10.34	19.38				IR
338	Large , Husnabad	Local vagu	Earthen			1787	11.5	5.61	3.98			I R
339	Large , Ibrahimpatnam		Earthen			930	13	1.9	0.93			IR
340	Large , Raviryal		Earthen			2132	12	14.42				IR
341	Large , Shamirpet/ Shameerpet		Earthen			1680	12	15.96				IR
342	Lavangi	Local Nallah	Earthen	1977		1025	10	1.19	0.83			IR
343	Lengare		Earthen	1974		505	14.4	0.03	0.03			IR
344	Lengarpath	Local Nallah	Earthen	1979		660	14.8	2.21	1.96		0.01	IR
345	Lingnoor	Local Nallah	Earthen	1975		970	14.27	2.43	1.96			IR
346	Lodhawade	Local Nallah	Earthen	1975		555	16.03	0.99	0.07		0.07	IR
347	Lodhe	Kapur	Earthen	1996		1114	16.76	0			0.11	IR
348	Lonavala	Indrayani	Gravity / Masonry	1916	14	1544	15.35	11.73	11.5		0	HE, IR
349	Loni	Local Nallah	Earthen	1979		1194	14.13	1.49	1.34		0.05	IR
350	Loni Mawala	Local Nallah	Earthen	1981		958	10	1.08	0.88		0	IR

351	Lower Hirenala											
352	Lower Mullamari	Mullamari	Earthen / Gravity / Masonry	2001	730.68	1546	24.46	49.13	43.27	Ogee	0.85	IR
353	Madagamasur	Kumadavati	Earthen	1908		950	32.87	1.6	1.47		0.19	IR
354	Madanwadi	Local Nallah	Earthen	2003		985	12.58	5.7	4.84			IR
355	Mahabaleshwarwadi	Local Nallah	Earthen	1975		864	13.42	1.72	1.5			IR
356	Mahakoshi	Ambavade	Earthen	1998		455	24	2.28	1.96			IR
357	Mahu	Kudali	Earthen	2011	28.62	1250	54.35	31.05	30.88	Ogee	0.2	HE, IR
358	Mahur	Khopu	Earthen	1978		275	23	2.36	1.81			IR
359	Majjur	Dodda Halla Nala,T.B.Sub-basin	Earthen	1974		413.5	19.51	6.38	5.8		0.1	IR
360	Makhanpur	Makhanpur	Earthen / Gravity / Masonry	1961		951	13.75	2.69	2.53		0.1	IR
361	Malad	Malad	Earthen	1979		485	15.63	1.74	1.23		0.04	IR
362	Malaprabha	Malaprabha	Gravity / Masonry	1972	2564	154.52	43.13	1068	972	Ogee	13.58	HE, IR
363	Malatwadi	Local Nallah	Earthen	2004		325	18.07	1.52	1.11		0.02	IR
364	Malawandi	Local Nallah	Earthen	2000		410	20.45	3.68	3.29		0.02	IR

365	Malikacheru, Mamdabad		Earthen			472	11	1.44				IR
366	Malkapur	Local Nallah	Earthen	1995			22.8	2.37	2.22			IR
367	Mallammacheruvu Saralnagar		Earthen			929	11	0.55				IR
368	Mamdapur	Local Nallah	Earthen	1983		1189	14.5	2.52	1.83			IR
369	Mandave	Local Nallah	Earthen	1998		940	15.13	1.74	1.74		0.05	IR
370	Mandve (Satara)		Earthen	1994		1080	19.5	3.15	3.15		0.05	IR
371	Mangalore	Mangalore	Earthen / Gravity / Masonry	1970		124	16.38	1.59	1.29		0.03	IR
372	Mangi	Kanola	Earthen	1966		1475	22.95	32.72	32.72			IR
373	Manikdoh	Kukadi	Gravity / Masonry	2005	129	930	50.36	307.91	288.1	Ogee	1.84	HE, IR
374	Manoli	Local Nallah	Earthen	2000		308	29.5	5.2	4.91		0.04	IR
375	Manpadale	Local Nallah	Earthen	1971		612	20.8	1.43	1.29		0.03	IR
376	Markandeya	Markandeya	Gravity / Masonry	2005	432	475	47	113.27	93.73	Ogee	0.9	IR
377	Marnewadi	Local Nallah	Earthen	1998		430	18.33	0.87	0.84		0.01	IR
378	Maroli	Local Nallah	Earthen	1981		1050	11.3	1.98	1.53			IR
379	Masalwadi	Local	Earthen	1973		463	15.25	2.41	2.02		0.07	IR

		Nallah										
380	Maskinala	Maskinala	Earthen / Gravity / Masonry	2003	800.31	814	29.88	13.11	10.7	Ogee	0.17	IR
381	Masla	Local Nallah	Earthen			1380	10.95	1.56	1.36		0.06	I R
382	Matkuli	Local Nallah	Earthen	1997			15.39	1.76	1.49			IR
383	Matoba	Mulamut ha	Earthen	1978		1662	17.5	4.55	4.52		0.19	IR
384	Mavinahole	Local Halla	Earthen	1928		585	20.11	1.84	1.54		0.04	IR
385	Mayani	Chand	Earthen	1872		1098	18	1.46	1.45		0.15	IR
386	Medleri	Local Nala	Earthen			701.5	10.68	1.74	1.74		0.07	IR
387	Megholi	Local Nallah	Earthen	2000		495	32.9	2.79	2.66		0.03	IR
388	Mehakari		Earthen	1966	338.77	1308	27.63	16.13	13		0.35	IR
389	Melammacher u/ Mel macheru	Local Stream	Earthen			610	11	2.73				IR
390	Mhaiswadi	Local Nallah	Earthen	1945		780	12.23	2.04	1.53			IR
391	Mhaswad	Man	Earthen	1887	1243.15	2473	24.32	47.88	46.21		1.63	IR
392	Mirwad	Local Nallah	Earthen	1980		1130	14.4	1.58	1.39		0.01	IR
393	Mohari (Jamkhed)	Mujdul	Earthen	1968		427	14.1	1.77	1.52		0.09	IR

394	Morale	Local Nallah	Earthen	1971		381	16.1	0.65	0.54			I R
395	Morana (Gureghar)	Morna	Earthen	2010	55.94	560	47.02	39.55	36.99	Ogee	0.34	HE, IR
396	Morna (Shirala)	Morna	Earthen	1985	85.5	1015	31.2	21.2	16.51		0.23	IR
397	Motewadi	Local Nallah	Earthen	1976		533	13.07	1.09	0.83			IR
398	Muchakhandi	Muchakhandi	Gravity / Masonry	1984		158	18.3	1.89	1.64		0.36	IR
399	Mugaon	Local Nallah	Earthen	1975		623	11.2	1	0.82		0	IR
400	Mukherthihal	Mukherthihal	Earthen / Gravity / Masonry	1979		852	10.41	1.45	1.45		0.06	IR
401	Mulikwadi	Local Nallah	Earthen	2003		1350	13.44	1.65	1.35		0.03	IR
402	Mulshi	Mula	Gravity / Masonry	1927		1533.38	48.8	52.23			0.38	HE, IR
403	Mundawad	Shirahatti Nala	Earthen	1994		994	20.19	2.96	2.69		0.14	IR
404	Munneru - New , Munnuru, Somaram	Kagna	Earthen / Gravity / Masonry	1982		600	14		1.12			IR
405	Murakumbi	Local Nala	Earthen	1970		726	16.94				0.05	IR
406	Musi	Musi	Earthen	1963		4694	28	136.77	130.26			IR
407	Nagarjuna Sagar	Krishna	Earthen	1974	220000	4865	124.66	11561.3	5733.31		28.5	HE, IR

408	Nagarjunasagar Tail Pond	Krishna	Earthen			592	29	5.66	0.82			IR
409	Nagathan	Nagathan nala	Earthen / Gravity / Masonry	1961	68	1125	10.63	2.78	2.41	Ogee	0.13	IR
410	Nagewadi	Local Nallah	Earthen	1999	11.91	1090	40.02	6.47	5.99	Ogee	0.01	IR
411	Nagurur		Earthen	1971		800	28.05	1.14	1.14			IR
412	Naigaon	Khar	Earthen	1978		668	15.96	2.37	1.9		0.06	IR
413	Naigaon Deogaon	Gunjawani	Earthen	1979		272	22.49	1.33	1.07		0.02	IR
414	Naigaon I	Local Nallah	Earthen	1983		800	18	1.34	1.12		0.29	IR
415	Naigaon II	Local Nallah	Earthen	1983		520	16.46	0			0.03	IR
416	Nallacheru, Irvin		Earthen	1990		1480	10.05	0.39	0.34			IR
417	Nandari	Local Nallah	Earthen	1999		443	26.4	3.21	3.11		0.03	IR
418	Nandgad											
419	Nandgaon	Local Nallah	Earthen	1998		275	22.51	1.98	1.62		0.31	IR
420	Nandwal (Kolhapur)	Local Nallah	Earthen	2005		524.5	18.65	0.94	0.8		0.02	IR
421	Nandwal	Vasana	Earthen	1986		886	20.25	1.79	1.62		0.04	IR
422	Nangole	Local Nallah	Earthen	1978		636	15.45	1.85	1.29			IR
423	Narayanapura	Krishna	Earthen / Gravity / Masonry	1982	47850	10637.52	29.72	1066	863	Ogee	13.21	HE, IR

424	Narewadi	Local Nallah	Earthen	1981		455	23.75	2.22	2.07		0.04	I R
425	Narihalla	Narihalla	Earthen / Gravity / Masonry	1981	427	295	32.92	22.94	20.87	Chute	0.25	IR
426	Nazare		Earthen	1974	397.82	2021	22.54	22.32	16.65	Ogee	0.39	IR
427	Nerle	Local Nallah	Earthen	1977		1230	12.15	2.24	2.1			IR
428	New , Bellempally	Bollampal lyvagu	Earthen	1988		740	12.8	0.94	0.82			IR
429	Nhavi	Local Nallah	Earthen	1984		995	17.48	2.19	2.01		0	IR
430	Nher	Yerala	Earthen	1889	154.1	1470	22.5	9.12	1.17	Other	0.33	IR
431	Nimbawade	Local Nallah	Earthen	1986		1070	16.13	6.68	5.68		0.23	IR
432	Nimgaon (Madha)	Local Nallah	Earthen	1983		1202	10.4	1.72	1.46			IR
433	Nimgaon	Gumera	Earthen	1985		1279	19.3	5.06	4.4		0.15	IR
434	Nimgaon Mahalungi	Kamini	Earthen	1971		3140	17.3	3.37	2.97			IR
435	Nira Deoghar	Nira	Earthen	2008	114.48	2330	58.525	337.39	332.13	Ogee	1.6	HE, IR
436	Nittur - I	Local Nallah	Earthen	2000		425	22.55	1.9	1.87		0.03	IR
437	Nituur - II	Local Nallah	Earthen	2000		567	27.82	4.38	4.28		0.05	IR

438	Olwan	Local Nallah	Earthen	1996		327	24.74	1.88	1.79		0.02	I R
439	Ookachettivagu	Ookachettivagu	Gravity / Masonry	1980	4071.43	254.95		10.87		Ogee		IR
440	Osman Sagar	Musi	Earthen / Gravity / Masonry	1920		2630	41	15.7				IR, WS
441	Otur Vaghadara	Ramnagar	Earthen	1991		402	15.48	0				IR
442	Padasali	Local Nallah	Earthen	1997		450	29.15	6.9	3.83		0.1	IR
443	Padawalkarwadi	Koni Kunur	Earthen	1973	55.68	822.96	15.17	2.99	2.12		0.12	IR
444	Pakhal Lake	Pakhal vagu	Earthen / Gravity / Masonry	1902	21.76	1370	19	95.88			2.18	IR
445	Palair	paleru	Earthen / Gravity / Masonry	1928	0	3697	21	72.45	66.19			IR
446	Palasdeo	Local Nallah	Earthen	1953		518	15.55	2.67	2.53		0.08	IR
447	Palasnilgaon	Local Nallah	Earthen	1997			14.65	5.68	4.97		0.02	IR
448	Pandhari	Local Nallah	Earthen	1982		71	13.86	1.14	1.01		0.01	IR
449	Panshet	Ambi	Earthen / Gravity / Masonry	1972	120.3	1039	59.94	310.6	301.61	Ogee	1.56	HE, IR
450	Parashuramapura New	Malenurahalla	Earthen	1959		1650	12.19	5.2	4.27		0.27	IR

451	Pare	Local Nallah	Earthen	1972		498	18.4	1.53	1.29			IR
452	Parewadi	Local Nallah	Earthen	1966		1050	12.58	5.19	4.04			IR
453	Pargaon	Local Nallah	Earthen	1976		1200	13.65	1.08	0.9			IR
454	Pargaon Sudrik	Surswati	Earthen	1969		313	14.5	1.1	0.82		0	IR
455	Parite	Local Nallah	Earthen	1979		439	11.69	1	0.8			IR
456	Parunde	Local Nallah	Earthen	1989		345	20.02	0			0.02	IR
457	Patane	Local Nallah	Earthen	2001		364	27.39	4.55	4.45		0.04	IR
458	Patgaon	Vedganga	Earthen	1990	26.08	1101.5	39.19	105.24	104.77		0	HE, IR
459	Patgaon Saddle - I	Vedganga	Earthen		26.08	1155	21	105.24	104.77		0	IR
460	Patgaon Saddle - III	Vedganga	Earthen		26.08	610	7.85	105.24	104.77		0	IR
461	Pathari	Local Nallah	Earthen	1905		2070	18.43	11.88	11.62			IR
462	Pathrud	Local Nallah	Earthen	1997		960	13.8	2.35	2.04		0.02	IR
463	Pawana	Pawana	Earthen / Gravity / Masonry	1972	119.96	1329	42.37	305	274	Ogee	0.24	HE, IR
464	Ped	Local Nallah	Earthen	1972		489	19.04	1.57	1.34			IR
465	Pedda Cheru,		Earthen			700	12.2					IR

	Challasamudram											
466	Pedda Cheru, Chintapalli	Krishna	Earthen			1216	15	1.3	1.17			IR
467	Pedda Cheru, Inapur		Earthen			560	10	3.09	2.92			IR
468	Pedda Cheru, Indurthy	Local Stream	Earthen			1364	10	3.94				IR
469	Pedda Cheru, Kodad	Krishna	Earthen			2307.64	10	3.97	3.57			IR
470	Pedda Cheru, Shivanagudem	Krishna	Earthen			1364	20	3.94	3.55			IR
471	Pedda Cheru, Swamulavari Lingotam	Local Stream	Earthen			518	10	1.12				IR
472	Pedda Cheru, Thangadpally	Local Stream	Earthen			690	13	3.88				IR
473	Pedda Cheru,Lokaram	Lokaramvagu	Earthen	1968		1600	10.06					IR
474	Pedda Cheru,Lokurthy	Peddavagu	Earthen			1101	11	1.07	0.76			IR
475	Peddacheru, Ragaboinagudem	Ragaboinagudemvagu	Earthen	1942		1200	13.3	6.24	4.44			IR
476	Peddarayanicheru, Lingal		Earthen			326	17.3	1.35				IR
477	Perval		Earthen				15	4.28	3.17			IR
478	Phaye	Local Nallah	Earthen	2004		355.65	34.13	3.93	0.04		0.04	IR
479	Pilanwadi	Rudragan	Earthen	1978		320	22.77	1.94	1.82		0.04	IR

		ga										
480	Pimpalgaon (Dhale)	Sina Nalla	Earthen		288	2310	18.7	12.66	9.86	Ogee		IR
481	Pimpalgaon Alwa	Kanhuri river	Earthen	1979		660	14.03	2.85	2.42		0.06	IR
482	Pimpalgaon Joge	Pushpavati	Earthen	2001	91	1560	28.6	235.53	110.32	Ogee	3.07	IR
483	Pimpla	Local Nallah	Earthen	1972		680	11.91	0.86	0.74		0.03	IR
484	Pimpoli	Mula	Earthen	1984		401	22.13	1.53	1.41		0.03	IR
485	Pingali		Earthen	1978		1693	16	2.38	2.36		0.11	IR
486	Pingori	Local Nallah	Earthen	1969		221	22.13	0.61	0.56			IR
487	Piserve	Local Nallah	Earthen	1958		625	14.63	1.65	1.56			IR
488	Pohner	Local Nallah	Earthen			636	14.8	1.17	1.04		0.04	IR
489	Pokharapur	Local Nallah	Earthen	1981		1202	10.33	1.86	1.65			IR
490	Polkicheru, Pangal		Earthen / Gravity / Masonry			707	15.7	1.3				IR
491	Pombre	Local Nallah	Earthen	1985		488	24.11	6.5	6.36		0.08	IR
492	Pondewadi	Local Nallah	Earthen	2003		382	12.1	1.77	1.5			IR
493	Prakruthi	Gundirehalla	Earthen	1979		840	16.17				0.16	IR
494	Pratappur	Local Nallah	Earthen	1987		824	16.9	1.66	1.44		0.05	IR

495	Priyadarshini Jurala / Jurala	Krishna	Earthen / Gravity / Masonry	1996	130000	4534	40	338.1	192.3	Ogee	6.77	HE, IR
496	Punadi	Local Nallah	Earthen	1987		476	17	0			0	IR
497	Purdal											
498	Radhanagari	Bhogawati	Gravity / Masonry	1954	110.08	1036.58	38.41	236.79	219.97	Ogee	1.83	HE, IR
499	Raghuchiwadi	Local Nallah	Earthen	1976		646	16.55	5.67	1.34		0.06	IR
500	Raiwadi	Local Nallah	Earthen	1976		867	20.35	2.16	1.88			IR
501	Rajuri	Local Nallah	Earthen	1981		609	19.3	2.49	2.08			IR
502	Rakkaskop	Markandeya	Earthen / Gravity / Masonry	1962		358.37	26.34	16.62	16.12		0.35	WS
503	Rakshaswadi Bk	Local Nallah	Earthen	1986		840	12.27	1.23	1.06		0.01	IR
504	Rakshaswadi	Khosaranalla	Earthen	1979		648	12.88	1.6	1.6		0.06	IR
505	Ramalingapura	Suvarnamukhi	Earthen			830	12	6.74	6.07		0.22	IR
506	Ramanahalli	Navalli Nalla	Earthen	1958	368.5	1619	16.5	14.47	7.79		0.46	IR
507	Ramganga	Ulup	Earthen	1977	44.53	1217	29.97	6.14	5.35		0.14	IR
508	Ramjiwadi	Meena	Earthen	1983		314	21.48	1.72	1.55		0.02	IR

509	Rampur	Local Nallah	Earthen	1973		1646	10.64	3.06	2.76			I R
510	Ranand	Waghzai	Earthen	1958	158.7	1260	19.32	7.12	6.42		0.12	IR
511	Ranganayanadurga	Jinagihalla	Earthen			900	19.88	14.16	13.13		0.32	IR
512	Rangasamudra	Rangasamudra	Earthen / Gravity / Masonry	1978		317	23.8	4.69	3.7		0.07	IR
513	Rangasamudram		Earthen		120.69	2460	29	51.49	32.81			IR
514	Ranikere	Garnihalla	Earthen	1907	159	960	12.19	15.26	14.26		0.58	IR
515	Rasulacheru		Earthen			1558	11	1.29				IR
516	Ratnapur	Local Nallah	Earthen	1985		1135	17.2	2.37	1.38			IR
517	Revnal	Local Nallah	Earthen	1978		247	18.6	2.37	2.19			IR
518	Rihe	Local Nallah	Earthen	1977		285	21.94	1.58	1.2		0.03	IR
519	Ronihal	Ronihalla	Earthen / Gravity / Masonry	1979		689	13.02	1.35	1.22		0.05	IR
520	Rooty		Earthen	1939	147.2	2091	16.77	8.13	6.57		0.25	IR
521	Rui Chatrapati	Gopal Ganga	Earthen	1980		420	10.77	1.04	0.76		0	IR
522	Sakat	Dudhana	Earthen	1994	195.84	1805	19.8	14.43	13.44		0.34	IR
523	Sangambanda	Krishna			896	4287	19.45	93.93	48.82	Ogee	4.7	IR

524	Sangavi	Local Nallah	Earthen	1935			13.29	2.5	2.5			I R
525	Sangavi Shirval	Local Nallah	Earthen	1993		850	18	1.34	0.9			IR
526	Sangenahalli	Jinigehalla	Earthen	1968		1341	15.55	11.03	10.3		0.34	IR
527	Sangvikati	Local Nallah	Earthen			706	11.3	1.26	1.07		0.07	IR
528	Sankarasamudram	Krishna			284.1	3275	10.145		25.37	Ogee		IR
529	Sankh	Bor	Earthen	1995	520.6	3282	17.66	14.9	9.82	Ogee	0.08	IR
530	Sanmadi	Local Nallah	Earthen	1979		485	17.46	1.98	1.67			IR
531	Saptne	Local Nallah	Earthen	1965		1292	12.01	2.83	2.72			IR
532	Sarala Sagar	Chinnavagu	Earthen	1959	756.7	1524	12	14				IR
533	Sarfnalla		Earthen		11.88	1355	33.327	18.94	18.18	Ogee	0.26	HE, IR
534	Sarpanapally	Sarpanapallyvagu	Earthen	1989		1204	18.44	7.09	5.58			IR
535	Satewadi	Local Nallah	Earthen			730	13.6	1.04	0.84		0.04	IR
536	Seegehalla	Seegehalla	Earthen	1979		660	16.5	3	2.9		0.06	IR
537	Shalgaon	Local Nallah	Earthen	1976		900	15	2.28	2.06			IR

538	Sheelavantana koppa D.Kere	Jamboor Halla	Earthen			200	13.28	8.62	8.44		0.14	I R
539	Shegaon	Local Nallah	Earthen	1975		498	19.92	8.08	5.81			IR
540	Shelgaon	Local Nallah	Earthen	1983		1155	11.45	3.27	2.69			IR
541	Shendri	Local Nallah	Earthen	1981		625	20.14	1.81	1.74			IR
542	Shere	Local Nallah	Earthen	1998		205	22.98	1.76	1.68			IR
543	Shetphal	Shetphal Nalla	Earthen	1901		3211	20.11	21.18	20.47		0.35	IR
544	Shirsufal	Local Nallah	Earthen	1879		741	20.11	10.1	9.52		0.16	IR
545	Shirvalwadi	Local Nallah	Earthen	1978		600	16.1	3.28	2.95			IR
546	Shirvata	Indrayani	Gravity / Masonry	1920	28	2212	38.71	185.98	185.11	Ogee	0	HE
547	Shivani	Local Nallah	Earthen	1991		1014	16.23	0			0.04	IR
548	Siddasamudra	Local Nala Under Malaprabha River Sub-basin	Earthen	1967		712	13.72	2.16	1.88		0.1	IR
549	Siddhewadi	Agrani	Earthen	1981	168.35	959	19	8.57	6.1		0.15	IR
550	Siddhnath	Local Nallah	Earthen	1977	302.95	784	18.81	6.43	4.89			IR
551	Sidewad	Local Nallah	Earthen			810	10.15	0.75	0.57		0.04	IR

552	Sina	Sina	Earthen	1986	1582.48	1580	28.5	67.95	52.3	Ogee	1.39	IR
553	Sina Kolegaon	Sina	Earthen	2007	5569	1770	26.1	150.49	89.34	Ogee	3.13	IR
554	Singahallidalvayikere	Suvarnamukhi SS	Earthen			870	11.45	3.18	2.87		0.12	IR
555	Sir Pirajirav Talav	Local Nallah	Earthen	1923		1295	21.95	2.91				IR
556	Sonali	Local Nallah	Earthen	1979		638	12.15	1.08	1.06		0.03	IR
557	Sonari	Local Nallah	Earthen	1965		938	16.5	1.49	1.3		0.05	IR
558	Sordi	Local Nallah	Earthen	1983		620	18.08	4.4	3.35		0.07	IR
559	Soudagar	Soudagar Nala	Earthen	1987	55.58	600	27.03	8.12	7.41		0.15	IR
560	Sowlanga	Hirehalla	Earthen	1928		900	12	9.44	8.99		0.18	IR
561	Srisailam (N.S.R.S.P)	Krishna	Earthen	1984	206000	512	145	8722	7165.83			HE, IR
562	Srivari Samudram, Singotam	Kalawakolevagu	Earthen			1105	14	0.02	0.01			IR
563	Sulkod	Sulkod Nala	Earthen / Gravity / Masonry	1964		762.2	10.9	1.34	1.22		0.06	IR
564	Suryanarayanacheru	Musi	Earthen			1142	10.35	1.21	0.76			IR
565	Tadavalga	Tadavalga Nala	Earthen / Gravity / Masonry	1965		1070	11.02	1.84	1.32		0.07	IR
566	Takali	Local	Earthen	1981		1100	10.9	1.27	0.96		0.01	IR

	Khandeshwari	Nallah										
567	Takave	Local Nallah	Earthen	1989		837	24.81	0			0.01	IR
568	Talakal	Krishna / T.Bhadra	Earthen	1983		1200	14.02	1.15	0.98		0.07	IR
569	Talegaonghogaon		Earthen	1980		740	21.18	1.59	1.38			IR
570	Talsangi	Bhavani	Earthen	1976		792	15.24	2.42	2.42			IR
571	Talwar	Talwar	Earthen	1958	89.9	1584	14.36	3.78	3.24		0.17	IR
572	Tambve	Sharand	Earthen	1968		1310	18	5.42	4.85		0.15	IR
573	Tarali	Tarali	Gravity / Masonry		81.45	1096	73.41	165.71	165.46	Ogee	0.56	HE, IR
574	Tarangawadi	Local Nallah	Earthen	1953		593	14.3	1.76	1.74			IR
575	Tatikunta	-	Earthen			55	17.9					IR
576	Tawadi	Local Nallah	Earthen	1983		1811	11.9	1.23	1.04			IR
577	Telengshi	Kharnalla	Earthen	1975		622	17.12	1.07	0.96		0.03	IR
578	Temghar	Mutha	Earthen / Gravity / Masonry	2010	37.7	1075	42.5	107.9	105.01		5.55	HE, IR
579	Terni	Local Nallah	Earthen	1996		960	20.66	3.48	3.17		0.02	IR
580	Therodi		Earthen	1977		1106	11.97	3.12	2.49		0.14	IR
581	Thitewadi	Vel	Earthen	2003		1320	21.1	9.86	7.15		0.19	IR
582	Thokarwadi	Indrayani	Gravity / Masonry	1922	124.32	741	59.44	363.7	321.2	Ogee	0	Hydro ele

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583	Thoseghar	Tarali	Earthen	1989		259	18.05	0			0.03	IR
584	Tikondi - I	Local Nallah	Earthen	1980		1077	14.65	3.24	2.81		0.01	IR
585	Tikondi - II	Local Nallah	Earthen	1986		879	14.45	2.45	2.2		0.01	IR
586	Tintraj	Local Nallah	Earthen	1982		535	15.5	1.39	1.14	Ogee		IR
587	Tippehalli	Local Nallah	Earthen	1975		444	18.12	2.02	1.47	Ogee		IR
588	Tisangi	Local Nallah	Earthen	1966	10.4	2866	20.82	24.46	22.76	Ogee	0.56	IR
589	Tulshi	Tulshi		1978	34.92	1512	48.68	98.29	89.91	Ogee	0.05	HE, IR
590	Tungabhadra	Tungabhadra	Earthen / Gravity / Masonry	1953	28180	2443	49.39	3766	3700	Ogee	34.92	HE, IR
591	Turori	Local Nallah	Earthen	1983	88.47	1192	17.5	7.66	5.74		0.22	IR
592	Uduvalli											
593	Ughadewadi	Local Nallah	Earthen	1994		594	12.5	1.38	1.08	Ogee	0	IR
594	Ujjani	Bhima	Earthen / Gravity / Masonry	1980	14850	3141.4	56.4	3320.01	1520.87	Ogee	29	HE, IR
595	Umarani	Local Nallah	Earthen	1999		220	15.33			Ogee		IR
596	Upavade	Marhol	Earthen	1996	3.5	415	32.31	2.85	2.83		0.03	IR
597	Upper	Hirenala	Earthen	1989	191.66	1935	18.27	6.54	5.66		0.17	IR

	Hirenala											
598	Upper Mullamari	Mullamri	Earthen	1984	207	810	28.4	21.22	18.88		0.63	IR
599	Upper Tunga	Tunga	Earthen / Gravity / Masonry	2005	94700	791.39	17.5	91.86	50.24	Other	1.63	HE, WS, IR
600	Urmodi	Urmodi	Earthen	2001	135.85	1860	50.1	282.14	273.27	Ogee	0.02	HE, IR
601	Urwade	Local Nallah	Earthen	1983		693	23.48	2	1.9	Ogee	0.1	IR
602	Utchil	Local Nallah	Earthen	2001		454	17.01	3.06	2.94	Ogee	0.09	IR
603	Utkoor Marepally											
604	Uttarmand	Uttarmand	Earthen	2001	43.69	1420.5	46.45	24.93	24.59	Ogee	0.24	HE, IR
605	Vadgaon	Mand	Earthen	1980		526	21.7	2.97	2.56	Ogee		IR
606	Vadiwale	Kundali	Earthen	1999	46.88	488	29	40.87	30.39	Ogee	0.36	IR
607	Vairag	Local Nallah	Earthen	1963		534	10.65	1.46	1.44	Ogee		IR
608	Vairagwadi	Local Nallah	Earthen	1984		845	20.34	1.5	1.25	Ogee	0.03	IR
609	Vanivilasa Sagar	Vedavathy	Earthen / Gravity / Masonry	1907	1554	405.4	43.28	850.3	802.5		8.76	IR
610	Varadaraja Swamy Gudi	Munimadugulavagu	Earthen	2000		588	22	11.02	10.21	Ogee		IR

611	Varkute	Local Nallah	Earthen	1978		1093	12.2	1.43	1.27	Ogee		IR
612	Veerladevi Cheru	Local Stream	Earthen / Gravity / Masonry			1918	11	5.16				IR
613	Veet	Local Nallah	Earthen	1974		390	10.21	2.52	2.04			IR
614	Vejegaon	Local Nallah	Earthen	1979		811	16.77	2.21	1.29			IR
615	Vemular	Vemular	Earthen	1959		2040	12	9.9	8.88			IR
616	Vesraf	Rupani	Earthen	1984		603	19.21	3.37	3.31		0	IR
617	Vibhutiwadi	Local Nallah	Earthen	1983		1027	16.21	0			0.03	IR
618	Vinchurni	Local Nallah	Earthen	1974			11.62	1.33	1.05			IR
619	Vir	Nira	Earthen	1965	1756	3629	35.81	287.5	266	Ogee	3.17	HE, IR
620	Vir	Rudra nalla	Earthen	1996		975	21.81	2.55	2		0.13	IR
621	Visapur	Hanga	Earthen	1936	412.59	2692	25.6	25.61	22.39	Other	0.62	IR
622	Vishnusamudra	Veda series	Earthen		24.6	1740	12.8	0.85	0.82		0.06	IR
623	Wadaj	Meena	Earthen / Gravity / Masonry	1983	155	1935	28	35.94	33.11	Ogee	0.05	IR
624	Wadgaon Tandli	Bangari	Earthen	1975		1005	13.75	1.9	1.45		0.01	IR
625	Wadji	Local Nallah	Earthen	1998		232	22.97	1.75	1.58		0.02	IR

626	Wadshivane	Local Nallah	Earthen	1902		984	14.56	4.35	4.26			IR
627	Wafgaon	Vel	Earthen	1978		426	14.25	3.12	2.69			IR
628	Wagajwadi	Local Nallah	Earthen	2001		370	20.47	1.66	1.58		0.03	IR
629	Waki	Local Nallah	Earthen	2002		465	12.8	2.83	2.31			IR
630	Wakurde	Morna	Earthen	1985		269	19.25	1.61	1.59			IR
631	Wakwad	Local Nallah	Earthen	1996			16.8	1	0.15		0.01	IR
632	Walekhindi	Local Nallah	Earthen	1973		800	16.18	4.13	3.1			IR
633	Walen	Walki	Earthen	1989		410	20.75	5.11	5.07		0.03	IR
634	Walgud	Local Nallah	Earthen	1969		1036	15	1.62	1.46		0.05	IR
635	Walki	Walumbe	Earthen	1977		1290	12.63	3.08	1.86		0.01	IR
636	Walunj	Local Nallah	Earthen	1977		883	17.86	1.69	1.42			IR
637	Walwad	Local Nallah	Earthen	1983		822	14.68	1.19	0.92			IR
638	Walwan	Indrayani	Gravity / Masonry	1916	14.2	1356	26.36	72.5	72.12	Ogee	1.43	Hydroelectric
639	Wang	Wang	Earthen		73.34	1200	50.63	77.29	77.06	Ogee	0.53	HE, IR
640	Warasgaon	Mose	Earthen / Gravity / Masonry	1993	130	780	66.6	375.36	363.13	Ogee	1.86	HE, IR

641	Warna	Varna	Earthen / Gravity / Masonry	2000	301	1580	88.8	974.19	779.35	Ogee	0	HE, IR
642	Watephal	Local Nallah	Earthen	2000		680	15.06	4.27	3.92		0.01	IR
643	Welpuri	Local Nallah	Earthen	1979		521	20.5	1.78	1.59			IR
644	Wyra	Munneru	Earthen	1930	709.66	1768.3	26.82	70	60	Other	7.04	IR
645	Y. Urumundinakere	Veda series	Earthen		5.19	1930	10	0.73	0.71		0.07	IR
646	Yallammavadi	Local Nala Krishna / Malaprabha Sub-basin	Earthen	1990		775	10.3	1.48	1.29		0.07	IR
647	Yallur	Local Nala of Markandaya Sub-basin (Ghatapraba)	Earthen	1965		393	15.5	0.44	0.43		0.01	IR
648	Yarazarvi	Local Nala	Earthen	1969		699	12.16	1.34	1.16		0.04	IR
649	Yedgaon	Kukadi	Earthen / Gravity / Masonry	1977	461	4470	24.6	93.43	79.28	Ogee	0.17	IR
650	Yelavi	Local Nallah	Earthen	1982		764	15.25	22.26	2.18			IR
651	Yeliv	Nanhi	Earthen	1975		1200	15.9	2.26	1.86		0.08	IR

652	Yellur	Krishna										IR, WS
653	Yenechiwandi	Local Nallah	Earthen	1996		611	21.65	1.55	1.43		0.02	IR
654	Yenere	Local Nallah	Earthen	1979		774	19.5	2.07	1.92			IR
655	Yenukunta	Krishna			1.75	1775	14	53.66	2.6	Ogee		IR
656	Yeralwadi	Yerla	Earthen	1973		2115	19.5	33.02	18.06			IR
657	Yermala	Local Nallah	Earthen	1998		237	15.27	1.41	1.29		0.2	IR
658	Yesodi	Local Nallah	Earthen	1999		625	12.8	1.63				IR
659	Yewati Masoli	Yeoti Nalla	Earthen	1989	31.99	973	36	7.05	6.8		0.09	IR
660	Zildartippa, Molachintapalli	Mahabubnagar	Earthen			288	10	1.58				IR

B. List of BWA with surrogate information							
Sl. No.	**Name of B/W/A**	**River**	**Length (m)**	**Height upto crest (m)**	**Catchment area (Th. ha.)**	**Design flood discharge (Cumecs)**	**Purpose**
1	Ainapur Weir	Chitri	14.15	4.46		0	IR
2	Ane Weir	Wang	81		320	2237.19	IR
3	Are Weir	Tulshi	49.09	6.43		0	IR
4	Asifnahar Barrage	Musi	0			0	IR
5	Bachani Weir	Tulshi	45	5.5		0	IR
6	Barjar Bhogaon Weir	Kasari	67.38	3.66		0	IR
7	Bhadra Anicut	Bhadra	250			3400	IR
8	Bhadwan Weir	Chitri	86.5	4.5		0	IR
9	Bhatanwadi Weir	Tulshi	38.5	6.17		0	IR
10	Biur K.T. Weir	Morna	0			0	IR
11	Chandewadi Weir	Chitri	56	4.1		0	IR
12	Dabhil Weir	Hiranyakeshi	0			0	IR
13	Devarde Weir	Hiranyakeshi	0			0	IR
14	Dhamod Weir	Tulshi	82	6.02		0	IR
15	Dhumalwadi K.T. Weir	Morna	0			0	IR
16	Dhupdal Weir	Ghataprabha	2084.98			0	HE
17	Gajargaon Weir	Chitri	77.05	4.25		0	IR
18	Ghattarga Barrage	Bhima	329			0	
19	Ghungurwadi Weir	Tulshi	35.31	5.4		0	IR
20	Gijwane Weir	Chitri	67.36	5.18		0	IR
21	Haldi Weir	Bhogawati	94	3.2		0	IR
22	Hipparagi Barrage	Krishna	5460	26	230000	19810	IR
23	Jarli Weir	Chitri	94.9	5.5		0	IR
24	Joladadagi Gudur Barrage	Bhima	550			0	IR
25	Kadhane Weir	Wang	70.5		570	3176	IR

26	Kallur Barrage	Bhima	253			0	IR
27	Kanchanwadi Weir	Tulshi	83.4	4.7		0	IR
28	Karanjphen Weir	Kasari	60	10.61		0	IR
29	Khadk Koge Weir	Bhogawati	126	4.57		0	IR
30	Khale Weir	Wang	74		240	1924.47	IR
31	Khodashi Weir	Krishna	345	7	3400	0	HE,IR
32	Koge Weir	Bhogawati	57	4.14		0	IR
33	Kolchi Weir	Malaprabha	0			0	IR
34	Kole Weir	Wang	65		91	3382	IR
35	Koparde Weir	Kadvi	54	4.5		0	IR
36	Kote Weir	Tulshi	45	6.95		0	IR
37	Krishna Barrage	Krishna	209			6809.44	IR
38	Kumbhewadi Weir	Kasari	46.4	6.2		0	IR
39	Maldan Weir	Wang	80		590	2470	IR
40	Manewadi Weir	Wang	38		270	2052.51	IR
41	Mangale K.T. Weir	Morna	0			0	IR
42	Manjara Weir	Kasari	40.2	5.03		0	IR
43	Mhaisal K.T. Weir	Krishna	0			0	IR
44	Muniyeru Anicut	Munniyeru	531	2.1	2400	2832.26	IR
45	Narayanapur Anicut	Vedavati	0			0	IR
46	Navalachiwadi Weir	Kasari	49.4	5.03		0	IR
47	Nher Weir	Yerala	0			0	IR
48	Nilji Weir	Chitri	91.8	3.65		0	IR
49	Potale Weir	Wang	74		320	2258.28	IR
50	Prakasam Barrage	Krishna	1138.73		250000	33984	IR
51	Pulichintala Anicut		0			0	HE,IR
52	Pushpavati Weir	Pushpavati	0			0	IR
53	Rajaram Weir	Panchganga	93	5.48		0	IR
54	Rajolibunda Anicut	Tungabhadra	820	332.232	35.32	21240	IR
55	Rashivade Weir	Bhogawati	82	3.2		0	IR
56	Rui Weir	Panchganga	81	4.67		0	IR

57	Rukadi Weir	Panchganga	80	7.36		0	IR
58	Salgaon Weir	Hiranyakeshi	0			0	IR
59	Sarud Patne Weir	Kadvi	45.17	4.5		0	IR
60	Satapewadi Barrage		0			0	IR
61	Shelap Weir	Hiranyakeshi	0			0	IR
62	Shirgaon Weir	Kadvi	43.4	4.5		0	IR
63	Shirgaon Weir	Bhogawati	82	3.15		0	IR
64	Shirol Weir	Panchganga	107	2.57		0	IR
65	Singatalur /Hammigi Barrage	Tungabhadra	387.5			14725	IR
66	Sohale Weir	Hiranyakeshi	0			0	IR
67	Sonna Barrage	Bhima	2250	18.4	53328	26274	IR
68	Sunkesula Anicut		633			14866.34	IR
69	Surve Weir	Panchganga	113	6		0	IR
70	Tarale Weir	Bhogawati	85	4.36		0	IR
71	Tembhu Barrage	Krishna	326	8.13	5500	5016	HE,IR
72	Terwad Weir	Panchganga	97	5.48		0	IR
73	Waloli Weir	Kasari	88	6.41		0	IR
74	Yadgir Barrage	Bhima	425			0	
75	Yelur Weir	Kadvi	55	4.5		0	IR
76	Yevluj Porle Weir	Kasari	48.46	5.8		0	IR

C. Major/Medium irrigation projects with surrogate information

Sl. No.	Name of Project	Type	River	Tributary	Status	Year of completion	GCA (Th ha)	CCA (Th ha)	Ultimate Irrigation Potential	District/s Benefitted
1	Amarja Medium	Medium	Amarja	Amarja	Completed		10.53	8.9	8.9	Gulbarga

	Irrigation Project									
2	Ambligola Medium Irrigation Project	Medium	Endigere	Vrushbhavathi	Completed	1964	4.35	2.95		Bijapur,Shimoga
3	Andhali Medium Irrigation Project	Medium	Man	Man	Ongoing		2.2	2.06	1.5	Satara
4	Andhrakhore Irrigation Project	Medium		Andra	Completed			2.59	2.33	Pune
5	Anjanapura Medium Irrigation Project	Medium	Kumudavathy	Kumudavathy	Completed	1936	10.52	6.07		Shimoga
6	Areshankar Medium Irrigation Project	Medium	Areshankar	Areshankar	Completed		10.19	1.24		Bijapur
7	Ashti Lift Irrigation Project	Major		Ashti	Ongoing		17.3	13.48	9	Solapur
8	Ashti Medium Irrigation Project	Medium	Ashti	Ashti	Completed	1883		6.81	9	Sholapur
9	Asifnahar Medium Irrigation Project	Medium			Completed	1908	13.39	5.06		Nalgonda
10	Bandardi (Banganga) Medium Irrigation Project	Medium	Banganga	Banganga	Completed			0.86		Osmanabad
11	Barshi Lift Irrigation Project	Major	Sina	Sina	Ongoing		29	23.2	15	Solapur, Osmanabad
12	Basappawadi Medium Irrigation Project	Medium		Local Nalla (Agrani)	Completed	1980	1.27	1.08	1.08	Sangli
13	Basapur Lift	Medium	Varada	Varada	Completed		6.67	2.27	2.27	Hassan

	Irrigation Project			River						
14	Bellaryanala Medium Irrigation Project	Medium	Bellary Nalla	Bellary Nalla	Ongoing		9.55	8.2		Belgaum
15	Benitura Medium Irrigation Project	Medium	Benitura Nallah	Benitura	Completed		2.83	2.55	2.29	Osmanabad
16	Bennihalla Lift Irrigation Project	Medium		Benni Halla	Ongoing			3.87	3.87	Gadag
17	Bennithora Major Irrigation Project	Major	Bennithora	Benithora	Ongoing		24.86	20.23	20.23	Gulbarga
18	Bhadra Major Irrigation Project	Major	Krishna	Bhadra	Completed			121.5	105.57	Chickmagaldr, Shimoga
19	Bhadra Anicut Medium Irrigation Project	Medium	Bhadra	Bhadra	Completed	1923	6.94	4.47		Chickamagalur
20	Bhairavanithippa Medium Irrigation Project	Medium	Krishna	Pedda Hagari(Vehavathi)	Completed		7.39	4.86		Ananthpur
21	Bhama Askheda Major Irrigation Project	Major	Bhama	Bhama	Ongoing		49.35	29.01	23.11	Pune
22	Bhima Lift Irrigation Project	Major	Bhima	Bhima	Ongoing		30.28	24.29	24.29	Gulgarga
23	Bhima Major Irrigation Project	Major	Krishna	Bhima	Completed	2009	205.28	199.11	259.54	Solapur, Pune, Ahmednagar
24	Bhima Sina Link Canal Lift	Major		Bhima	Completed			37.72	43.4	Solapur

	Irrigation Project									
25	Bori (S) Major Irrigation Project	Major	Bori Nalla	Bori Nalla	Ongoing		24.15	19.3	19.88	Solapur
26	Buddhiyal Medium Irrigation Project	Medium		Belwan	Completed			5.45		Solapur
27	Chandani Medium Irrigation Project	Medium	Chandani	Chandani	Completed			2.89	2.02	Osmanabad
28	Chandrampalli Medium Irrigation Project	Medium	Sarnala	Sarnala	Completed		8.55	5.22	8446	Gulbarga
29	Chaskaman Major Irrigation Project	Major	Bhima	Bhima	Completed		71.71	55.21	32.83	Pune
30	Chikotra Medium Irrigation Project	Medium	Chikotra	Chikotra	Completed	2008		5.41	5.63	Kolhapur
31	Chillewadi Medium Irrigation Project	Medium	Mandvi	Mandvi	Ongoing		7.96	7.17	7.14	Pune
32	Chitri Medium Irrigation Project	Medium	Chitri	Chitri	Completed	2001	13.09	9.16	5.85	Kolhapur
33	Chitwadgi Medium Irrigation Project	Medium	Kadalappana	Chittawadagi	Completed	1971	0.9	0.89		Bijapur, Raichur
34	Dhaigaon Major Irrigation Project	Major			Ongoing			0	13.3	Solapur
35	Dhamini Medium Irrigation Project	Medium		Dhamni	Ongoing			1.75	1.4	Kolhapur
36	Dhangarwadi Lift	Medium			Proposed			3.03	2.5	Satara

	Irrigation Project									
37	Dharma Medium Irrigation Project	Medium	Dharma	Dharma Nala	Completed		10.95	5.67		Dharwad, Uttara Kannada
38	Dhom Balkawadi Tunnel Major Irrigation Project	Major	Krishna	Krishna	Ongoing		48.45	28.1	12.67	Satara, pune
39	Dindi Medium Irrigation Project	Medium	Krishna	Dindi	Completed		12.72	5.18		Nalgonda
40	Doddanalla Medium Irrigation Project	Medium	Bor	Dodda Nallah	Completed	1987		1.25	1.22	Sangli
41	Dudhganga Major Irrigation Project_Karnataka	Major	Dudhganga	Dudhganga	Ongoing		24.48	12.86	13	Belgaum
42	Dudhganga Major Irrigation Project_Maharashtra	Major	Dudhganga	Dudhganga	Ongoing			68.24	68.98	Belgaum and Kolhapur
43	Ekrukh Lift Irrigation Project	Major	Adhela Nalla	Adela	Ongoing			30.3	23.44	Solapur
44	Ekrukh Medium Irrigation Project	Medium		Adela	Completed	1871	6.94	6.87	2.61	Sholapur
45	Feeder Canal To Ranikere Medium Irrigation Project	Medium	Garnihalla	Garnihalla	Completed			3.24		Chitradurga
46	Gajuladinne Medium Irrigation Project	Medium			Completed	1987	15.32	9.86	0.01	Kurnool
47	Galeru Nagari	Major	Krishna		Ongoing		204.31	105.22	105.22	Chittoor,

	Sujala Sravanthi (GNSS) Major Irrigation Project									Cuddapah
48	Gandipalem Medium Irrigation Project	Medium	Munneru		Completed	1986		6.48	6.48	Nellore
49	Gandorinala Medium Irrigation Project	Medium	Gandorinala	Gandorinala	Completed	2010	26.42	8.09	11.65	Gulbarga
50	Gayathri Medium Irrigation Project	Medium	Suvarnamukhi	Suvarnamuki	Completed	1963	2.96	2.31		Chitradurga
51	Ghataprabha Major Irrigation Project	Major	Ghataprabha	Ghatprabha	Completed			139.38		Belgaum, Bijapur
52	Ghatprabha Medium Irrigation Project	Medium	Ghatprabha	Ghatprabha	Completed			5.46	4.78	Kolhapur
53	Ghod Major Irrigation Project	Major	Ghod	Ghod	Completed	1965	52.37	41.46		Pune, Ahmednagar
54	Gokak Canals Medium Irrigation Project	Medium	Ghataprabha		Completed	1897	10.4	5.72		Belgaum
55	Guddada Mallapura Medium Irrigation Project	Medium	Varada	Varada	Ongoing		7.26	5.26	5.26	Haveri
56	Gunjawani Major Irrigation Project	Major	Kanand	Kanandi	Ongoing		31.42	19.48	16.5	Pune
57	Guntur Canal	Medium	Krishna	Krishna	Completed		41.34	10.93	9.56	Guntur

	Medium Irrigation Project									
58	Guru Raghanvendra Lift Irrigation Project	Major	Tungabhadra		Ongoing		39.56	20.75		Kurnool
59	Hagari Bommanahalli Medium Irrigation Project	Medium		Hagari	Completed	1978	4.4	2.98		Bellary
60	Hanbarwadi Lift Irrigation Project	Medium			Proposed			3.15	2.6	Satara
61	Handri Neeva Sujala Sravanti (HNSS) Major Irrigation Project	Major			Ongoing		705.21	243.83	243.77	Kurnool, Cuddapah, Ananthpur, Chittoor
62	Harinala Medium Irrigation Project	Medium	Harinala	Harinala	Completed	2004		3.48	3.46	Belgaum
63	Harni Medium Irrigation Project	Medium	Local Nallah	Harni	Completed			2.59		Solapur, Osmanabad
64	Hathikuni Medium Irrigation Project	Medium	Hathikonehalla	Hattikuni stream	Completed	1973		2.14		Gulbarga
65	Hatiz (Hingni) Medium Irrigation Project	Medium	Nagzari	Nagzari	Completed	2005		5.57	5.34	Solapur, Osmanabad
66	Hingni Pangaon Medium Irrigation Project	Medium	Bhogawati	Bhogawati	Completed			6.48	6.75	Solapur
67	Hippargi Major	Major	Krishna	Krishna	Ongoing		93.43	59.69	59.69	Bagalkot,

	Irrigation Project									Belgaum
68	Hiranyakeshi Lift Irrigation Project	Medium		Ghataprabha	Ongoing			0	0	Belgaum
69	Hiranyakshi (Ambeohol) Medium Irrigation Project	Medium	Ambeohol	Ambeohal	Ongoing			4.27	5.34	Kolhapur
70	Hiranyakshi (Surfnalla) Medium Irrigation Project	Medium	Sarfnalla	Sarfnalla	Ongoing			3.18	3.39	Kolhapur
71	Hirehalla Medium Irrigation Project	Medium	Hirehalla	Hirehalla	Ongoing		20.99	8.33	8.33	Raichur
72	Hodirayanhalla Medium Irrigation Project	Medium	Hodiravana		Ongoing			2.63	1.38	C.R. Nagar
73	Itagi Susalwad Medium Irrigation Project	Medium	Tungbhadra	Tungbhadra	Ongoing		3.01	1.98	1.98	Gadag
74	Jakapur Medium Irrigation Project	Medium	Local Nallah	Local Nallah	Completed	1977		2.12	1.67	Osmanabad
75	Jambadahalla Medium Irrigation Project	Medium	Jambadahalla	Jambadahalla	Completed		3.1	1.54		Chickamagalur
76	Jambre Medium Irrigation Project	Medium	Tamraparni		Ongoing			4.72	3.77	Kolhapur
77	Janai Shirsai Lift Irrigation Project	Major			Ongoing			0	14.08	Pune
78	Jangamhatti Medium Irrigation Project	Medium	Honhal	Honhal	Completed	2008		4.46	3.7	Kolhapur

79	Javalahalla Medium Irrigation Project	Medium		Haul Halla	Completed			0	1.92	Belgaum
80	Jawahar (Nettampadu) Lift Irrigation Project	Major	Krishna		Ongoing		84.7	80.94	80.9	Mahboobnagar
81	Jine Kathapur Lift Irrigation Project	Major		Krishna	Ongoing		59.45	35.54	27.5	Satara
82	Jurala (Priyadarshini) Major Irrigation Project	Major	Krishna		Completed		74.35	41.26	41.3	Mahboobnagar
83	JutapallIVagu Medium Irrigation Project	Medium	Kagna River	Jutepally vagu	Completed		2.58	0.84		Rangareddy
84	Kada Medium Irrigation Project	Medium	Local Nallah	Local Nallah	Completed			1.8		Beed
85	Kadavi Medium Irrigation Project	Medium	Kadvi	Potphuji	Completed		12.23	9.91	9.22	Kolhapur
86	Kadi Medium Irrigation Project	Medium	Local Nallah	Kari	Completed			0.95		Beed
87	Kalascope Medium Irrigation Project	Medium	Endigere		Completed		1.67	1.14		Bijapur
88	Kalmodi Medium Irrigation Project	Medium	Arala	Arala	Ongoing		7.04	5.63	5.07	Pune
89	Kambali Medium Irrigation Project	Medium		Kambali	Completed			1.05		Beed
90	Kanakanala	Medium	Kanakanal	Kanakanal	Completed	1975	2.06	2.06		Raichur

	Medium Irrigation Project		a	a						
91	Kasari Medium Irrigation Project	Medium	Kasari	Kasari	Completed		12.14	10	9.46	Kolhapur
92	Kasarsai Medium Irrigation Project	Medium	Kasarsai Nalla	Kasarsai Nalla	Completed			5.15	6.59	Pune
93	Kavathe Kenjal Lift Irrigation Project	Medium			Proposed		9.1	6.83		Satara
94	Kenchanagudda Lift Irrigation Project	Medium		Tungabhadra	Ongoing			0		Bellary
95	Khadakwasla Major Irrigation Project	Major	Mutha	Mutha	Completed	2005	97.1	88.46	62.15	Pune
96	Khairi Medium Irrigation Project	Medium	Kar	Khar	Completed	1989		3.25	3.08	Ahmednagar, Osmanabad
97	Khandala Medium Irrigation Project	Medium	Local Nallah	Local Nallah	Completed			2.02	1.33	Osmanabad
98	Khasapur Medium Irrigation Project	Medium	Local Nallah	Ulup	Completed			3.57		Osmanabad
99	Koil Sagar Lift Irrigation Project	Major	Peddavagu		Completed		22.36	8.51	177.26	Mahboobnagar
100	Kolchi Lift Irrigation Project	Medium		Bennihalla	Ongoing			0		Gadag
101	Kolchi Medium Irrigation Project	Medium	Endigere	Mallaprabha	Completed		8.01	1.27		Belgaum

102	Konnur Lift Irrigation Project	Medium			Ongoing			1.59		Gadag
103	Koornoor Medium Irrigation Project	Medium		Bori	Completed			6.48		Osmanabad
104	Kotipallivagu Medium Irrigation Project	Medium		Kotepallyvagu	Completed		12.19	3.72		Rangareddy
105	Krishna Barrage (including old Krishna Delta system)	Major			Completed		714.44	475.65	529	Krishna, Prakasam
106	Krishna Canal Medium Irrigation Project	Medium	Krishna	Krishna	Completed		16.67	14.39	11.29	Sangli, Satara
107	Krishna Koyna Lift Irrigation Project	Major	Krishna	Krishna	Ongoing		206.93	172.47	121.26	Satara, Sangli, Kolhapur
108	Krishna Major Irrigation Project	Major	Krishna	Krishna	Completed	2009	103.56	74	74	Satara and Sangli
109	Kudali Medium Irrigation Project	Medium		Kudali	Ongoing		6.96	5.98	6.96	Satara
110	Kukadi Major Irrigation Project	Major	Kukadi	Kukadi	Completed	2009	280.87	224.67	156.28	Pune, Ahmednagar and Solapur
111	Kumbhi Medium Irrigation Project	Medium	Kumbhi	Kumbhi	Completed	2007	10.19	9.17	8.71	Kolhapur
112	Kurnool Cuddapah Canal Major Irrigation Project	Major		Tungabhadra	Completed	1882		44.29		Cuddapah

113	Lakhnapur Medium Irrigation Project	Medium		Pargi stream	Completed		1.46	1.07		Rangareddy
114	Lankasagar Medium Irrigation Project	Medium	Kattalair River	Kottaleru	Completed			3.05		Krishna
115	Londhanala Medium Irrigation Project	Medium			Ongoing			0	0.67	Kolhapur
116	Lower Mullamari Medium Irrigation Project	Medium	Mullamari	Mullamari	Completed		11.52	9.72	9.3	Gulbarga
117	Mahathma (Kalwakurthy) Lift Irrigation Project	Major	Krishna		Ongoing		318.09	101.18	10.17	Mahboobnagar
118	Malaprabha Major Irrigation Project	Major	Malaprabha	Malaprabha	Completed		344.77	196.13	196.13	Mysore
119	Markendaya Major Irrigation Project	Major	Bhima	Markandeya	Ongoing		32.83	19.11	19.15	Belgum
120	Maskinala Medium Irrigation Project	Medium	Mullamari	Maskinala	Completed	2007	3.29	2.83	2.83	Raichur
121	Mehekari Medium Irrigation Project	Medium	Mehakari	Mehekri	Completed			5.08	4.05	Beed
122	Mhaswad Major Irrigation Project	Major	Man	Man	Completed	1897		17.08		Satara
123	Morana Gureghar	Medium	Morna	Morna	Ongoing		5.29	4.23	3.08	Satara

	Medium Irrigation Project									
124	Morna (WM) Irrigation Project	Medium	Morna	Morna	Completed	1987	2.31	2.08		Sangli
125	Mulshi Medium Irrigation Project	Medium	Mula	Mula	Ongoing			0	6.5	Pune
126	Muniyeru Medium Irrigation Project	Medium			Completed	1902	30.55	6.65		Krishna
127	Musi Medium Irrigation Project	Medium		Musi	Completed		26.68	13.36		Nalgonda
128	Nagarjuna Sagar Major Irrigation Project	Major	Krishna		Completed	1960	1769.93	868	868	Nalgonda, Khammam, Krishna, Guntur, Prakasam, W/Godavari
129	Nagathana Medium Irrigation Project	Medium	Kyadgihalla	Nagathan nala	Completed		0.95	0.65		Bijapur
130	Nagewadi Medium Irrigation Project	Medium	Local Nallah	Local Nalla	Ongoing		2.1	1.9	1.56	Satara
131	Narayanapur Anicut Medium Irrigation Project	Medium	Vedavathy	Vedavati	Completed	1997	13.39	1.62		Chitradurga
132	Narihalla Medium Irrigation Project	Medium	Narihalla	Narihalla	Completed		4.42	2.01		Bellary
133	Nazare Medium Irrigation Project	Medium	Karha	Karha	Completed		3.9	3.2	3.2	Pune

134	Neera Left Bank Canal Major Irrigation Project	Major	Neera	Nira	Completed	1928	81.38	68.77		Pune
135	Neera Right Bank Canal Major Irrigation Project	Major	Neera	Nira	Completed	1927		181.17		Satara, Solapur
136	Nher Tank Medium Irrigation Project	Medium	Yerala	Yerala	Completed	1889		4.32		Satara
137	Nira Deoghar Major Irrigation Project	Major	Nira	Nira	Ongoing		90.1	62.71	43.05	Satara, Pune, Solapur
138	Okachetti Vagu Medium Irrigation Project	Medium	Krishna	Ookachetti vagu	Completed			0	2.71	Mahboobnagar
139	Padwal Karwadi Major Irrigation Project	Major	Mangal	Koni Kunur	Completed			0.43	0.46	Sholapur
140	Pakhal Medium Irrigation Project	Medium	Munneru	Pakhal vagu	Completed	1923		7.36		Warangal
141	Patgaon Medium Irrigation Project	Medium	Vedganga	Vedganga	Completed			10	11.74	Kolhapur
142	Pimpalgaon (Dhale) Medium Irrigation Project	Medium	Sina Nalla	Sina Nalla	Completed		3.32	2.82	3.29	Solapur
143	Purandhar Major Irrigation Project	Major	Mula-Mutha	Mutha	Ongoing			25.1	25.1	Pune
144	Pushpavati Medium	Medium		Pushpavati	Completed			1.69	1.63	Pune

	Irrigation Project									
145	Radhanagri Major Irrigation Project	Major	Bhogawati	Bhogawati	Completed		59.11	47.29	26.56	Kolhapur
146	Rajiv Bhima Lift Irrigation Project	Major	Krishna		Ongoing		126.39	83.78		Mahabubnagar
147	Rajolibanda Irrigation Project_Andhra Pradesh	Major	Tungabhadra		Completed		74.5	35.41	35.41	Mahboobnagar
148	Rajolibanda Irrigation Project_Karnataka	Medium	Tungabhadra	Tungabhadra	Completed		7.78	2.39	2.39	Raichur
149	Ramanahalli Medium Irrigation Project	Medium	Krishna	Navalli Nalla	Completed	1958	5.53	1.94		Bijapur
150	Rameshwara Lift Irrigation Project	Medium		Ghatprabha	Ongoing		18.02	13.8	13.8	Belgaum
151	Ramthala Lift Irrigation Project	Major	Tungabhadra	Krishna	Ongoing		39.12	0	22.26	Bijapur
152	Ranand Medium Irrigation Project	Medium	Wagzari	Waghzai	Completed	1958		3.88	1.09	Satara
153	Rolli Manikeri Medium Irrigation Project	Medium			Ongoing			2.35	2.35	Bagalkot
154	Rooty Medium Irrigation Project	Medium	Bokdi	Bokdi	Completed	1938		2.33		Beed
155	Sakat Medium Irrigation Project	Medium	Dudhana	Dudhana	Completed			3.14		Osmanabad
156	Sankh Medium Irrigation Project	Medium	Bor	Bor	Completed	1997	4.07	3.54	3.1	Sangli

157	Sarala Sagar Medium Irrigation Project	Medium	Krishna	Chinnavagu	Completed			1.7		Mahboobnagar
158	Saudagar Medium Irrigation Project	Medium	Saudagar Nala		Completed	1987		1.42		Gulbarga, Bidar
159	Shahajani Aurad Medium Irrigation Project	Medium			Completed			0	1.27	Osmanabad
160	Shirapur Lift Irrigation Project	Major		Sina	Ongoing			16	10	Solapur,Osmanabad
161	Siddhewadi Medium Irrigation Project	Medium	Agrani	Agrani	Completed		1.33	1.16	1.7	Sangli
162	Sina (Bhosekhind) Irrigation Project	Medium		Sina	Ongoing			0	6.82	Solapur
163	Sina Kolegaon Major Irrigation Project	Major	Sina	Sina	Ongoing			14.11	12.1	Osmanabad, Solapur
164	Sina Madha Lift Irrigation Project	Major	Bhima	Sina	Ongoing		30.23	24.38	24.55	Solapur
165	Sina Medium Irrigation Project	Medium	Sina	Sina	Completed		14.04	9.68	8.45	Ahmednagar, Beed
166	Singatalur Major Irrigation Project	Major	Tungabhadra	Tungabhadra	Ongoing		125.53	67.58	47.75	Bellary, Gadag
167	Srisailam Left Bank Canal Major Irrigation Project	Major			Ongoing			0		
168	Srisailam Right Bank Canal	Major	Krishna		Completed	1981	115.68	76.89	100.87	Nalgonda, Kurnool,

	Major Irrigation Project									Cuddapah
169	Talwar Medium Irrigation Project	Medium	Local Nallah	Talwar	Completed	1961		0.67		Beed
170	Tarakarama Krishnaveni Lift Irrigation Project	Major	Krishna		Ongoing			0	22.66	Krishna
171	Tarali Major Irrigation Project	Major	Tarali	Tarali	Ongoing		23.3	18.13	19.5	Satara
172	Tegi Siddapur Medium Irrigation Project	Medium		Krishna	Ongoing			3	3	Bagalkot
173	Telugu Ganga Major Irrigation Project	Major			Ongoing		386.88	233	233	Kurnool, Cuddapah, Nellore, Chittoor
174	Tembhu Lift Irrigation Project	Major	Krishna	Krishna	Ongoing		197.02	149.63	80.47	Satara, Solapur, Sangli
175	Temghar Major Irrigation Project	Major	Mutha	Mutha	Ongoing		2	1.6	1.83	Pune
176	Thimmapura Lift Irrigation Project	Medium		Krishna	Proposed			0	1.69	Haveri
177	Tulshi (Landhanala) Major Irrigation Project	Major	Tulshi	Tulshi	Completed		4.58	4.5	5.71	Kolhapur
178	Tunga Anicut Medium Irrigation Project	Medium		Tunga	Completed		17.05	8.7	8.7	Shimoga
179	Tungabhadra High Level Canal	Major	Tungabhadra		Completed		358.42	45.82	45.82	Anantpur, Cuddapah

	Stage I Irrigation Project_Andhra Pradesh									
180	Tungabhadra Left Bank Canal & Dam Major Irrigation Project	Major	Tungbhadra	Tungabhadra	Completed		366.89	323.74	244.2	Bellary, Raichur
181	Tungabhadra Low Level Right Bank Canal Major Irrigation Project_Andhra Pradesh	Major			Completed		214.74	61.1	63.52	Kurnool, Cuddapah
182	Tungabhadra Right Bank High Level Canal Major Irrigation Project_Karnataka	Major	Tungbhadra	Tungabhadra	Completed			100.77	80	Bellary, Raichur
183	Tungabhadra Right Bank Low Level Canal Major Irrigation Project_Karnataka	Major	Tungbhadra	Tungabhadra	Completed		150.2	104.03	37.5	Bellary
184	Turori Medium Irrigation Project	Medium	Turori	Local Nallah	Completed			0.97		Osmanabad
185	Ubrani Anruthapura Lift Irrigation Project	Medium		Bhadra	Ongoing			0	7.69	Chikkaamag-alur, Dhavangere
186	Upper Heranalla	Medium		Hirenala	Completed		2.85	1.9		

	Medium Irrigation Project									
187	Upper Krishna Stage - I Major Irrigation Project	Major	Krishna	Krishna	Ongoing		549	425	458.89	Bijapur, Gulbarga, Raichur, Bagalkot
188	Upper Krishna Stage - II Major Irrigation Project	Major	Krishna	Krishna	Ongoing		268.18	197.12	226.69	Bijapur, Gulbarga, Raichur, Bagalkot
189	Upper Mullamari Medium Irrigation Project	Medium	Mullamari	Mullamri	Completed		6.47	3.28	3.28	Gulbarga
190	Upper Tunga Major Irrigation Project	Major	Tunga	Tunga	Ongoing		163.98	94.69	80.5	Shimoga, Dharwad, Chitradurga
191	Urmodi Major Irrigation Project	Major	Urmodi	Urmodi	Ongoing		48	37	43.87	Satara
192	Uttarmand Medium Irrigation Project	Medium	Uttarmand	Uttarmand	Ongoing		6.67	6	5.28	Satara
193	Vadiwale Medium Irrigation Project	Medium	Kundali	Kundali	Completed		5	4.45	5	Pune
194	Vanivilas Sagar Major Irrigation Project	Major	Vedavathy	Vedavathy	Completed	1908	13.81	9.19		Chitradurga
195	Varadarajaswamy Gudi (DP) Medium	Medium	Krishna		Completed		20.22	5.35	5.35	Kurnool

	Irrigation Project									
196	Vasana Lift Irrigation Project	Medium			Ongoing			0	4.86	Satara
197	Veer Major Irrigation Project	Major	Nira	Nira	Completed		226.58	181.27	16.11	Solapur, Satara
198	Veligonda (Polsubbarai) Major Irrigation Project	Major			Ongoing		322.9	177.26	181.1	Prakasam
199	Vljayanagar Channels Major Irrigation Project	Major	Tungbhadra		Completed	1600	14.83	12.21		Bellary, Raichur
200	Vlsapur Medium Irrigation Project	Medium	Hanga	Hanga	Completed	1927	10.33	8.26		Ahmednagar
201	Wakurde Lift Irrigation Project	Major		Varna	Ongoing			33	38.52	Kolhapur
202	Wang Medium Irrigation Project	Medium	Wang	Wang	Ongoing		9.13	8.55	7.07	Satara
203	Wangana Lift Irrigation Project	Medium			Ongoing			0	4.2	Satara
204	Warna Major Irrigation Project	Major	Warna	Varna	Ongoing		128.7	109.7	121.92	Kolhapur, Sangli, Satara
205	Watephal Medium Irrigation Project	Medium	Local Nallah	Local Nalla	Completed			1.7	1.47	Osmanabad
206	Wyra Medium Irrigation Project	Medium	Munneru	Munneru	Completed	1933	9.5	7.04		Khammam
207	Y.Kaggal Major Irrigation Project	Major		Hagari	Ongoing			0	2.69	Bellary
208	Yeleru Reservoir Project Ph. I	Major			Completed		51.47	27.36	85.63	East Godavari,

										Vizag
209	Yeralwadi Medium Irrigation Project	Medium	Yerala	Yerla	Completed			3.92	3.45	Sangli, Satara
210	Yewati Masoli Medium Irrigation Project	Medium	Yewati	Yeoti Nalla	Completed	1994	2.27	1.93		Satara
211	Zurreru Medium Irrigation Project	Medium		Zurreru	Completed		1.66	0.61		Kurnool

Annexure V : Salient features of hydro-meteorological stations

A. Salient features of Hydro- meteorological Stations										
Sl. No.	Name	type	Independent River	Regional office	Division	Section office	Drainage area (Sq. Km.)	Zero of Gauge (m)	Station bank	Status
1	A.K.Bridge	GD	Krishna	C & S RO, Coimbatore	Cauvery Division, Bangalore	A.K.Bridge	1725	508.23	Right	Closed
2	Almatti	G	Krishna	K & G BO, Hyderabad	Upper Krishna Divn, Pune		36286	489.06	Left	Existing
3	Arjunwad	GD	Krishna	K & G BO, Hyderabad	Upper Krishna Divn, Pune	Arjunwad	12660	523.22	Right	Existing
4	Bagalkot	GDSQ	Krishna	K & G BO, Hyderabad			8610	506.05	Right	Closed
5	Bawapuram	GDSQ	Krishna	K & G BO, Hyderabad	Lower Krishna Div., Hyderabad	Bawapuram	67180	270.24	Right	Existing
6	Byaladahalli	GDSQ	Krishna	C & S RO, Coimbatore	Cauvery Division, Bangalore	Byladahalli	2300	530.4	Right	Existing
7	Cholachguda	GDSQ	Krishna	K & G BO, Hyderabad	Upper Krishna Divn, Pune	Cholachguda	9373	522.5	Left	Existing
8	Daddi	GD	Krishna	K & G BO, Hyderabad	Upper Krishna Divn, Pune	Daddi	1150	674.15	Left	Closed
9	Damarapadu	GDS	Krishna	K & G BO, Hyderabad	Lower Krishna Div., Hyderabad		215350	52.95	Right	Closed
10	Damercharla	GDQ	Krishna	K & G BO, Hyderabad	Lower Krishna Div., Hyderabad	Damercherla	11501	55	Right	Existing
11	Deongaon Bridge	G	Krishna	K & G BO,	Lower Krishna		50843		Left	Existing

				Hyderabad	Div., Hyderabad					
12	Deosugur	G	Krishna	K & G BO, Hyderabad	Lower Krishna Div., Hyderabad		129500	325.51	Right	Existing
13	Dhannur	GDS	Krishna	K & G BO, Hyderabad	Lower Krishna Div., Hyderabad		48900	478.49	Right	Closed
14	Dhond	G	Krishna	K & G BO, Hyderabad	Upper Krishna Divn, Pune	Dhond	11660	496	Right	Existing
15	Gokak Falls	GD	Krishna	K & G BO, Hyderabad	Upper Krishna Divn, Pune	Gotak Falls	2770	536	Right	Existing
16	Gotur	GD	Krishna	K & G BO, Hyderabad	Upper Krishna Divn, Pune	Gotur	1100	615.83	Left	Closed
17	Halia	GDQ	Krishna	K & G BO, Hyderabad	Lower Krishna Div., Hyderabad	Halia	3100	127.9	Left	Existing
18	Haralahalli	GDSQ	Krishna	C & S RO, Coimbatore	Cauvery Division, Bangalore	Harlahalli	14582	507.44	Left	Existing
19	Holehonnur	GDQ	Krishna	C & S RO, Coimbatore	Cauvery Division, Bangalore		2990	88.5	Right	Existing
20	Honnali	GDSQ	Krishna	C & S RO, Coimbatore	Cauvery Division, Bangalore	Honnali	7075	533.9	Left	Existing
21	Hoovinahole	GDQ	Krishna	C & S RO, Coimbatore	Cauvery Division, Bangalore		2585	93.5	Left	Existing
22	Huvanur	GDS	Krishna	K & G BO, Hyderabad			11400	486.46	Left	Closed
23	Huvinhedgi	GD	Krishna	K & G BO, Hyderabad	Lower Krishna Div.,	Huvinhedgi	55150	342.24	Right	Existing

					Hyderabad					
24	Jeewangi	G	Krishna	K & G BO, Hyderabad	Lower Krishna Div., Hyderabad	Jeewangi	1920	421.1	Left	Existing
25	K. Agraharam	G	Krishna	K & G BO, Hyderabad	Lower Krishna Div., Hyderabad	K.Agraharam	132920	270	Right	Existing
26	Karad	GDSQ	Krishna	K & G BO, Hyderabad	Upper Krishna Divn, Pune	Karad	5462	549.91	Right	Existing
27	Keesara	GDQ	Krishna	K & G BO, Hyderabad	Lower Krishna Div., Hyderabad	Keesara	9854	27.5	Left	Existing
28	Kellodu	GDQ	Krishna	C & S RO, Coimbatore	Cauvery Division, Bangalore	Kellodu	4320	647.75	Left	Existing
29	Kokangaon	G	Krishna	K & G BO, Hyderabad	Upper Krishna Divn, Pune	Kokangaon	1640	452	Left	Existing
30	Koyna at Koynanaga	GDSQ	Krishna	K & G BO, Hyderabad	Upper Krishna Divn, Pune	Koyna	920	568	Left	Closed
31	Kuppelur	GDQ	Krishna	C & S RO, Coimbatore	Cauvery Division, Bangalore	Kuppelur	1850	533.4	Left	Existing
32	Kurundwad	GDSQ	Krishna	K & G BO, Hyderabad	Upper Krishna Divn, Pune	Kurundwad	15190	519.46	Right	Existing
33	Lakkavali	GD	Krishna	K & G BO, Hyderabad	Cauvery Division, Bangalore		2095	593.5	Right	Closed
34	Lakshmipuram	GD	Krishna	K & G BO, Hyderabad	Lower Krishna Div., Hyderabad	Lakshmipuram	2400	286.3	Left	Closed
35	Madhira	GDS	Krishna	K & G BO, Hyderabad	Lower Krishna Div., Hyderabad	Madhira	1850	44.5	Left	Existing

36	Malkhed	GDSQ	Krishna	K & G BO, Hyderabad	Lower Krishna Div., Hyderabad	Malkhed	7650	390	Left	Existing
37	Mantralayam	GD	Krishna	K & G BO, Hyderabad	Lower Krishna Div., Hyderabad		60630	306	Right	Existing
38	Marol	GDSQ	Krishna	C & S RO, Coimbatore	Cauvery Division, Bangalore	Marol	4901	507.55	Right	Existing
39	Morvakonda	GDS	Krishna	K & G BO, Hyderabad	Lower Krishna Div., Hyderabad		210500	593.5	Right	Closed
40	Mudhol	GDSQ	Krishna	K & G BO, Hyderabad	Upper Krishna Divn, Pune	Mudhol	6734	520	Left	Closed
41	N.S. Dam	G	Krishna	K & G BO, Hyderabad	Lower Krishna Div., Hyderabad		215190		Left	Existing
42	Narasingpur	GD	Krishna	K & G BO, Hyderabad	Upper Krishna Divn, Pune	Narsingpur	22856	448.24	Right	Existing
43	Narayanpur Dam	G	Krishna		Lower Krishna Div., Hyderabad		47850		Left	Existing
44	Navalgund	GD	Krishna	K & G BO, Hyderabad	Upper Krishna Divn, Pune	Navalgund	2952	558	Right	Closed
45	Oollenur	G	Krishna	K & G BO, Hyderabad	Lower Krishna Div., Hyderabad		33018	370.01	Left	Existing
46	P.D. Jurala	G	Krishna	K & G BO, Hyderabad	Lower Krishna Div., Hyderabad		132800		Left	Existing
47	Paleru Bridge	GQ	Krishna	K & G BO, Hyderabad	Lower Krishna Div., Hyderabad	Paleru Bridge	2928	70.36	Right	Existing

48	Pandegaon	GD	Krishna	K & G BO, Hyderabad	Upper Krishna Divn, Pune	Pandegaon	690	576.78	Left	Closed
49	Phulgaon	GDQ	Krishna	K & G BO, Hyderabad	Upper Krishna Divn, Pune	Phulgaon	2205	81	Right	Existing
50	Pondugala	GDSQ	Krishna	K & G BO, Hyderabad	Lower Krishna Div., Hyderabad	Pondugala	221220	42.33	Right	Closed
51	Prakasam Barrage	G	Krishna	K & G BO, Hyderabad	Lower Krishna Div., Hyderabad		251360		Left	Existing
52	Purushothamagudem	GD	Krishna	K & G BO, Hyderabad	Lower Krishna Div., Hyderabad	P.S.Gudem	2720	144	Left	Closed
53	Ridhore	G	Krishna	K & G BO, Hyderabad	Upper Krishna Divn, Pune		7810	462.73		Closed
54	Sadalga	GD	Krishna	K & G BO, Hyderabad	Upper Krishna Divn, Pune	Sadalga	2322	525.16	Right	Existing
55	Samdoli	GD	Krishna	K & G BO, Hyderabad	Upper Krishna Divn, Pune	Samdoli	1948	528.59	Left	Existing
56	Sarati	GD	Krishna	K & G BO, Hyderabad	Upper Krishna Divn, Pune	Sarati	7200	466.13	Left	Existing
57	Shimoga	GDSQ	Krishna	C & S RO, Coimbatore	Cauvery Division, Bangalore	Shimoga	2831	556.5	Right	Existing
58	Shirdhon	G	Krishna	K & G BO, Hyderabad	Upper Krishna Divn, Pune	Shirdhon	630	437	Left	Existing
59	Siddhewadi	G	Krishna	K & G BO, Hyderabad	Upper Krishna Divn, Pune		4807	92	Left	Closed
60	Srisailam	G	Krishna	K & G BO, Hyderabad	Lower Krishna Div., Hyderabad		206040	162	Left	Existing
61	T. Ramapuram	GDQ	Krishna	K & G BO, Hyderabad	Lower Krishna Div.,	T.Ramapuram	23500	349.37	Right	Existing

					Hyderabad					
62	T.B. Dam	G	Krishna	K & G BO, Hyderabad	Lower Krishna Div., Hyderabad		28179		Left	Existing
63	Takli	GDSQ	Krishna	K & G BO, Hyderabad	Upper Krishna Divn, Pune	Takli	33916	409.28	Left	Existing
64	Talikot	GD	Krishna	K & G BO, Hyderabad	Upper Krishna Divn, Pune	Talikot	2486	48	Left	Existing
65	Terwad	GD	Krishna	K & G BO, Hyderabad	Upper Krishna Divn, Pune	Terwad	2425	520	Right	Existing
66	Vandur	GD	Krishna	K & G BO, Hyderabad	Upper Krishna Divn, Pune	Vandur	550	531	Right	Closed
67	Vijayawada	GDQ	Krishna	K & G BO, Hyderabad	Lower Krishna Div., Hyderabad	Vijayawada	251360	8.15	Left	Existing
68	Wadakbal	GD	Krishna	K & G BO, Hyderabad	Upper Krishna Divn, Pune	Wadakbal	12092	416.88	Right	Existing
69	Wadenapalli	GDSQ	Krishna	K & G BO, Hyderabad	Lower Krishna Div., Hyderabad	Wadanpalli	235544	22.05	Left	Existing
70	Warunji	GD	Krishna	K & G BO, Hyderabad	Upper Krishna Divn, Pune	Warunji	1890	549.44	Left	Existing
71	Yadgir	GDSQ	Krishna	K & G BO, Hyderabad	Lower Krishna Div., Hyderabad	Yadgir	69863	350.5	Left	Existing
72	Yaparla	GD	Krishna	K & G BO, Hyderabad			136620	246.55	Left	Closed

B. Salient features of Flood-Forecasting Stations												
Sl. No.	**Site Name**	**Met Sub Division**	**River**	**Type of Forecast**	**Base Station -1**	**Travel Time Base Station -1 (hrs)**	**Base Station -2 (hrs)**	**Travel Time Base Station -2**	**FRL(m)**	**Max Reservoir Level (m)**	**HFL (m)**	**Year of HFL**	**Mode of Collection**
1	Almatti Dam	North Interior Karnataka	Krishna	Inflow Forecast	Kurundwad	48	Sadalga	48	519.6	519.6	519.6	2004	Wireless
2	Arjunwad	Madhya Maharashtra	Krishna	Level Forecast	Karad	24	Samdoli	21			543.69	2005	
3	Deongaon Bridge	North Interior Karnataka	Krishna	Level Forecast	Takli	18	Wadakbal	18			407.34	2006	Wireless/ Telemetry
4	Mantralayam	Rayalaseema	Krishna	Level Forecast	Ollenur	18	T Ramapuram	18			318.77	2009	Wireless/ Telemetry
5	Narayanpur Dam	North Interior Karnataka	Krishna	Inflow Forecast	Kurundwad	54	Sadalga	54	492.25	492.25	492.11	1997	Wireless
6	Prakasam Barrage	Coastal Andhra Pradesh	Krishna	Inflow Forecast	Wadenapalli	24	Madhira	12	18.3		21.5	1903	Wireless
7	Priyadhars	Telanga	Krishna	Inflow	Huvina	18	Yadgir	18	318.52	318.52	318.2	2009	Wireless

	hini Jurala Project	na		Forecast	hedgi								
8	Srisailam Dam	Rayalaseema	Krishna	Inflow Forecast	Mantralayam	18	Krishna Agraharam	18	269.75	271.88	273.25	2009	Wireless
9	Tungabhadra Dam	South Interior Karnataka	Krishna	Inflow Forecast	Harlahalli	12	Marol	12	497.74	497.74	497.74	1992	Wireless

Annexure VI : Inventory of water tourism sites

A. Water Tourism Sites in the Basin						
Sl. No.	**Name**	**Type**	**Waterbody**	**WB Relation**	**District**	**State**
1	Aihole	Pilgrimage (Temple)	Malaprabha River	Near by	Bagalkot	Karnataka
2	Amaravathi	Tourist Spot	Krishna River	Near by	Guntur	Andhra Pradesh
3	Badami Caves	Caves	Agasthya Lake	Near by	Bagalkot	Karnataka
4	Bellary Fort	Fort	Kandhakam Lake	Near by	Bellary	Karnataka
5	Bhavani Island	Island	Krishna River	On	Guntur	Andhra Pradesh
6	Bhimashankar Jyotirlinga	Pilgrimage (Temple)			Pune	Maharashtra
7	Bhuikot Killa	Fort	Siddheshwar Lake	On	Solapur	Maharashtra
8	Charminar	Museums / Monument			Hyderabad	Andhra Pradesh
9	Chilkur Balaji Temple	Pilgrimage (Temple)	Osman Sagar	Near by	Rangareddi	Andhra Pradesh
10	Durgam Cheruvu	Lake	Durgam Cheruvu	On	Rangareddi	Andhra Pradesh
11	Ettipotala Waterfall	Waterfall	Krishna River	On	Guntur	Andhra Pradesh
12	Godachinmalki Waterfall	Waterfall	Markandeya river	On	Belgaum	Karnataka
13	Gokak Waterfall	Waterfall	Ghataprabha river	On	Belgaum	Karnataka
14	Golconda Fort	Fort	Musi Nadi	Near by	Hyderabad	Andhra Pradesh
15	Hampi	Tourist Spot	Tungabhadra River	Near by	Bellary	Karnataka
16	Hebbe Waterfall	Waterfall	Bhadra Reservoir	On	Chikmagalur	Karnataka
17	Hidkal Dam	Dam	Ghataprabha River	On	Belgaum	Karnataka
18	Hussain Sagar	Lake	Hussain Sagar	On	Hyderabad	Andhra Pradesh
19	Jama Maszid	Pilgrimage (Masjid)			Hyderabad	Andhra Pradesh

20	Kalhatti Falls, Kalahasti Falls	Waterfall	Bhadra Reservoir	Near by	Chikmagalur	Karnataka
21	Kanaka Durga temple	Pilgrimage (Temple)	Krishna River	Near by	Guntur	Andhra Pradesh
22	Koil Sagar	Lake	PeddaVagu Tributary of River Krishna	On	Mahbubnagar	Andhra Pradesh
23	Lakkundi	Pilgrimage (Temple)			Gadag	Karnataka
24	Lohagarh Visapur Fort	Fort	Pawana Reservoir	Near by	Pune	Maharashtra
25	Lonavala	Hill Station	Valvan Dam	On	Pune	Maharashtra
26	Lumbini Park	Tourist Spot	Hussain Sagar	On	Hyderabad	Andhra Pradesh
27	Madhava Gopla Swamy Temple	Pilgrimage (Temple)			Mahbubnagar	Andhra Pradesh
28	Mahabaleshwar	Pilgrimage (Temple)	Krishna River	On	Satara	Maharashtra
29	Mantralayam	Pilgrimage (Temple)	Tungabadhra	Near by	Kurnool	Andhra Pradesh
30	Nagarjuna Konda	Pilgrimage (Temple)	Krishna River	On	Guntur	Andhra Pradesh
31	Nagarjuna Sagar Dam	Dam	Krishna River	On	Nalgonda	Andhra Pradesh
32	Nehru Zoological Park	Tourist Spot	Mir Alam Tank	On	Hyderabad	Andhra Pradesh
33	Pakhal Lake	Lake	Pakhal Lake	On	Warangal	Andhra Pradesh
34	Panchamukhi Anjaney Swami Temple	Pilgrimage (Temple)			Kurnool	Andhra Pradesh
35	Pandharpur	Pilgrimage (Temple)	Bhima River	On	Solapur	Maharashtra
36	Panshet Lake	Lake	Panshet Lake	On	Pune	Maharashtra
37	Pashan Lake	Lake	Pashan Lake	On	Pune	Maharashtra
38	Pattadakkal	Pilgrimage (Temple)	Malaprabha River	Near by	Bagalkot	Karnataka
39	Prakasam Barrage	Barrage	Krishna River	On	Guntur	Andhra Pradesh
40	Purandar Fort	Fort	Ketkawale Reservoir	Near by	Pune	Maharashtra
41	Rankala Lake	Lake	Rankala Lake	On	Kolhapur	Maharashtra
42	Salar Jung Museum	Museums / Monument	Musi Nadi	Near by	Hyderabad	Andhra Pradesh
43	Sanjeeviah Park	Tourist Spot	Hussaiin sagar	On	Hyderabad	Andhra Pradesh
44	Shamirpet Lake	Lake	Shamirpet Lake	On	Rangareddi	Andhra Pradesh
45	Shivaneri Fort	Fort	Wadaj Reservoir	Near by	Pune	Maharashtra

46	Sirimane Falls	Waterfall	Tunga	On	Chikmagalur	Karnataka
47	Srisailam Dam	Dam	Krishna River	On	Kurnool	Andhra Pradesh
48	Srisailam Temple	Pilgrimage (Temple)	Krishna River	Near by	Kurnool	Andhra Pradesh
49	Undavalli Caves	Caves	Krishna River	Near by	Guntur	Andhra Pradesh
50	Venna Lake	Lake	Venna Lake	On	Satara	Maharashtra
51	Yadagiri Gutta Temple	Pilgrimage (Temple)			Nalgonda	Andhra Pradesh

B. Wildlife Sanctuaries / National Parks in the Basin

Sl. No.	Name	Type	Waterbody	WB Relation	District	State	Mammals	Birds	Reptiles
1	Bhadra Wildlife Sanctuary	Tiger Reserve	Bhadra River	Near by	Chikmagalur	Karnataka	Leopard Cat, Leopard, Elephant, Sloth Bear, Pangolin	Grey Hornbill, Peacock	
2	Chandoli National Park	Tiger Reserve	Chandoli Reservoirs	On	Sangli	Maharashtra			
3	Daroji Sloth Bear Sanctuary		Tungabhadra River	Near by	Bellary	Karnataka			
4	Ghataprabha				Belgaum	Karnataka		Waterfowl	
5	Great Indian Bustard				Bid	Maharashtra	Chinkara, Blackbuck	Falcons, Great Indian Bustard	Crocodile
6	Gudavi Bird Sanctuary	Bird Sanctuary	Linganamakki Reservoir	Near by	Shimoga	Karnataka			
7	Kudremukh Wildlife Sanctuary	Tiger Reserve	Lakhya Reservoirs	Near by	Chikmagalur	Karnataka			
8	Nagarjunasagar Srisailam	Tiger Reserve	Krishna River	Near by	Mahbubnagar	Andhra Pradesh			
9	Pakhal				Warangal	Andhra Pradesh			

10	Ranebennur Blackbuck Sanctuary		Tungabhadra River	Near by	Bellary	Karnataka			
11	Shettihalli		Tunga River	On	Shimoga	Karnataka			

Acronyms

AEZ	Agro-Ecological Zones
AIA	Annual Irrigated Area
AIBP	Accelerated Irrigation Benefits Programme
APGCL	Assam Power Generation Corporation Limited
AWS	Automatic Weather Stations
B&BBO	Brahmaputra and Barak Basin Organization
BB	Brahmaputra Board
BCB	Bansagar Control Board
BCM	Billion Cubic Metre
BIS	Bureau of Indian Standards
BOD	Biological Oxygen Demand
BR	Balancing Reservoir
BRB	Betwa River Board
BWA	Barrage Weir Anicut
C&SRO	Cauvery and Southern Rivers Organization
CAZRI	Central Arid Zone Research Institute
CBIP	Central Board of Irrigation & Power
CCA	Culturable Command Area
CEA	Central Electricity Authority
CGWB	Central Ground Water Board
Ch	Chainage
CIWTC	Central Inland Water Transport Corporation
CPCB	Central Pollution Control Board
CSMRS	Central Soil & Materials Research Station
cumec	cubic metre per sec
cusec	cubic foot per sec
CWC	Central Water Commission
CWPRS	Central Water and Power Research Station
D	Discharge
DEM	Digital Elevation Model
DOS	Department of Space
DVC	Damodar Valley Corporation
EC	Electrical Conductivity
EFR	East Flowing Rivers
ERM	Extension, Renovation and Modernization
ETP	Effluent Treatment Plant
EW	Exploratory Well
FAO	Food and Agriculture Organization
FC	Flood Control

FF	Flood Forecasting
FMP	Flood Management Programme
FRL	Full Reservoir Level
G	Gauge
GCA	Gross Command Area
GD	Gauge and Discharge
GDQ	Gauge, Discharge and Water Quality
GDS	Gauge, Discharge and Sediment
GDSQ	Gauge, Discharge, Sediment and Water Quality
GFCC	Ganga Flood Control Commission
GIS	Geographical Information System
GOI	Government of India
GPI	Grossly Polluting Industries
GSC	Gross Storage Capacity
ha	Hectare
HE	Hydro-Electric
HFL	Highest Flood Level
HO	Hydrological Observation
hrs	Hours
I&CAD	Irrigation and Command Area Development
IBO	Indus Basin Organization
IBTL	Transfer Link
IBWT	Water Transfer
ICAR	Indian Council of Agricultural Research
ICPO	Irrigation-Cum-Power Outlet
IM	Moisture Index
IMD	Indian Meteorological Department
India-WRIS	India-Water Resources Information System
IR	Irrigation
IRS	Indian Remote Sensing
ISRO	Indian Space Research Organization
IWAI	Inland Waterways Authority of India
IWT	Inland Water Transport
K&GBO	Krishna and Godavari Basin Organization
km	Kilometre
LBC	Left Bank Canal
LGBO	Lower Ganga Basin Organization
LGP	Length of Growing Period
LISS	Linear Imaging Self-scanning Sensor
lps	Litres Per Second

LSC	Live Storage Capacity
LULC	Land Use Land Cover
m	metre
M&ERO	Mahanadi and Eastern Rivers Organization
MAF	Million Acre Feet
MCM	Million Cubic metre
Mcum	Million Cubic metre
MDDL	Minimum Draw Down Level
mg/l	Milligram per Litre
MI	Minor Irrigation
MLD	Million Liters per Day
mm	Millimetres
MMIR	Major and Medium Irrigation
MOSDAC	Meteorological & Oceanographic Satellite Data Archival Centre
MoU	Memorandum of Understanding
MoWR	Ministry of Water Resources
MPN	Most Probable Number
MSL	Mean Sea Level
MU	Million Units
MW	Mega Watt
N&TBO	Narmada and Tapi Basin Organization
NA	Navigation
NBO	Narmada Basin Organization
NBSS & LUP	National Bureau of Soil Survey & Land Use Planning
NEEPCO	North Eastern Electric Power Corporation Limited
NEIC	North Eastern Investigation Circle
NF	No Flow
NGRBA	National Ganga River Basin Authority
NHPC	National Hydro Power Corporation Limited
NRLD	National Register of Large Dam
NRSC	National Remote Sensing Centre
NW	National Waterway
NWDA	National Water Development Authority
NWDT	Narmada Water Disputes Tribunal
NWMP	Northern Water Monitoring Programme
NWP	National Water Policy
OW	Observatory Well
P	Precipitation
PET	Potential Evapotranspiration
PH	Power House

pH	puissance de Hydrogen
ppm	parts per million
PS	Pisciculture
PW	Peizometre Well
Q	Water Quality
R&R	Rehabilitation and Resettlement
RBC	Right Bank Canal
RF	Rainfall
RRR	Repair, Renovation and Restoration
RRSC	Regional Remote Sensing Centre
RSC	Residual Sodium Carbonate
S	Sediment
SAC	Standing Advisory Committee
SAR	Sodium Absorption Ratio
SD	Sub Division
SMCS	Soil Moisture Control Section
SOI	Survey of India
Sq. km	Square Kilometres
SRTM	Shuttle Radar Topographic Mission
TAC	Technical Advisory Committee
TBO	Tapi Basin Organization
TC	Total Coliform
TDS	Total Dissolved Solids
Th ha	Thousand Hectare
THDC	Tehri Hydro Development Corporation
TW	Tube well
UGBO	Upper Ganga Basin Organization
UIP	Ultimate Irrigation Potential
UJVNL	Uttarkhand Jal Vidyut Nigam Limited
UNESCO	United Nations Educational, Scientific and Cultural Organization
UPJVNL	Uttar Pradesh Jal Vidyut Nigam Limited
UT	Union Territory
WB	Water Body
WFR	West Flowing Rivers
WMO	World Meteorological Organization
WS	Water Supply
YBO	Yamuna Basin Organization

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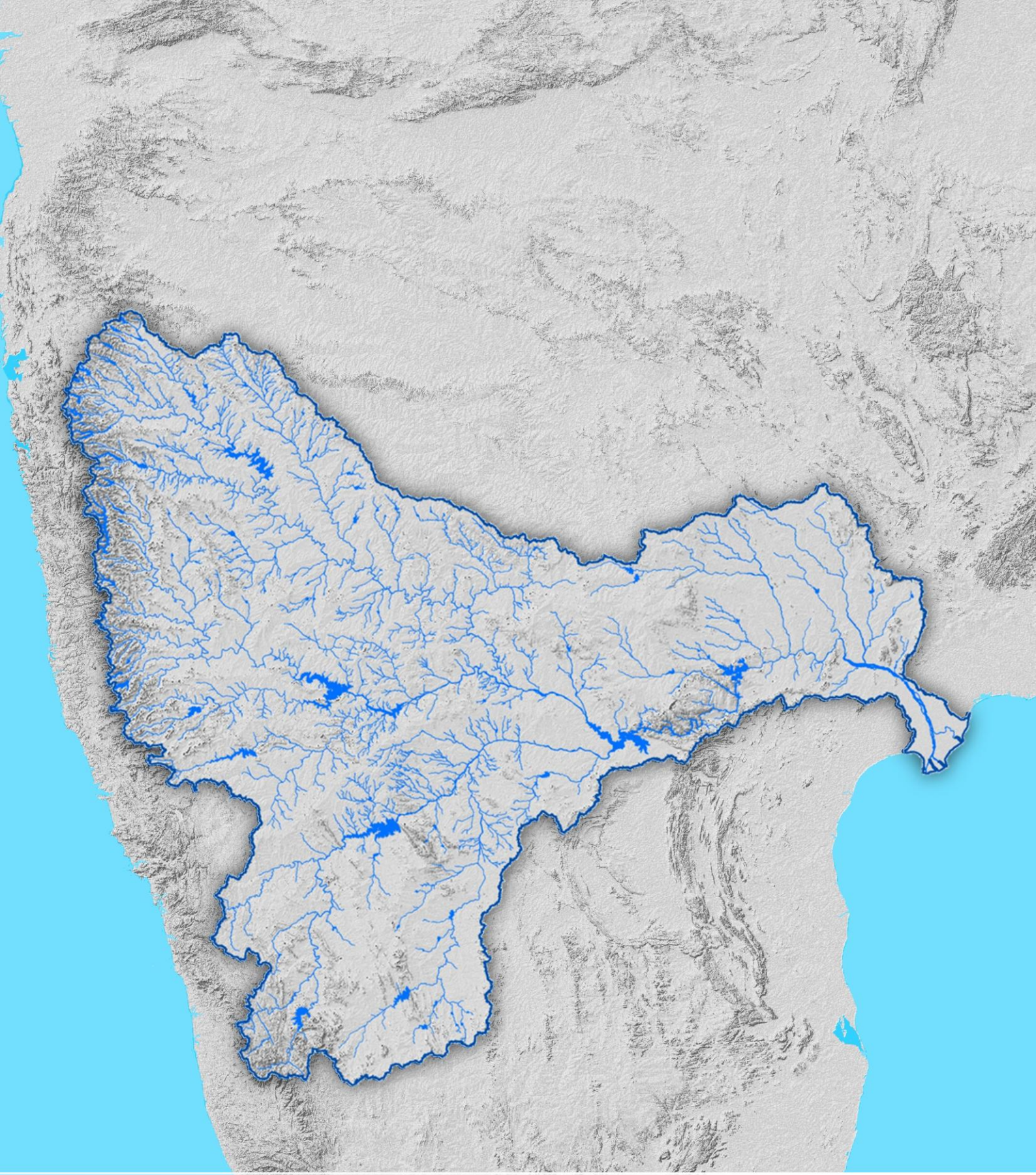

इंडिया-वारिस

India-WRIS

A Joint Project of CWC and ISRO

देश में जल संसाधन आँकड़ों का जनन व वेब सामर्थ्य
सूचना प्रणाली का क्रियान्वयन

Generation of Database and Implementation of Web Enabled Water Resources Information System (India-WRIS) in the Country