Chapter I

INTRODUCTION

Karnataka has a rich heritage, inspiring its people to create a bright future. With its special geographical location full of variety-its rivers, hills, valleys, plains, forests and resources-the State is known for its tourist and industrial potential. Its long history of over 2,000 years has left many beautiful forts, tanks, temples, mosques and towns of historical importance to the posterity. These old towns have grown to be industrial, commercial and educational centres. They are provided with all modern facilities. Bordered by the Western Ghats with tall peaks and lush greenery in the west, the tableland is fertile because of its black soil and river and tank irrigation facilities. The coastal strip to the west of the Ghats is renowned for its silvery beaches and rich green paddy fields.

Karnataka has rich religious and artistic traditions. The land has been described by a poet in a stone record in the 15th Century in following words:

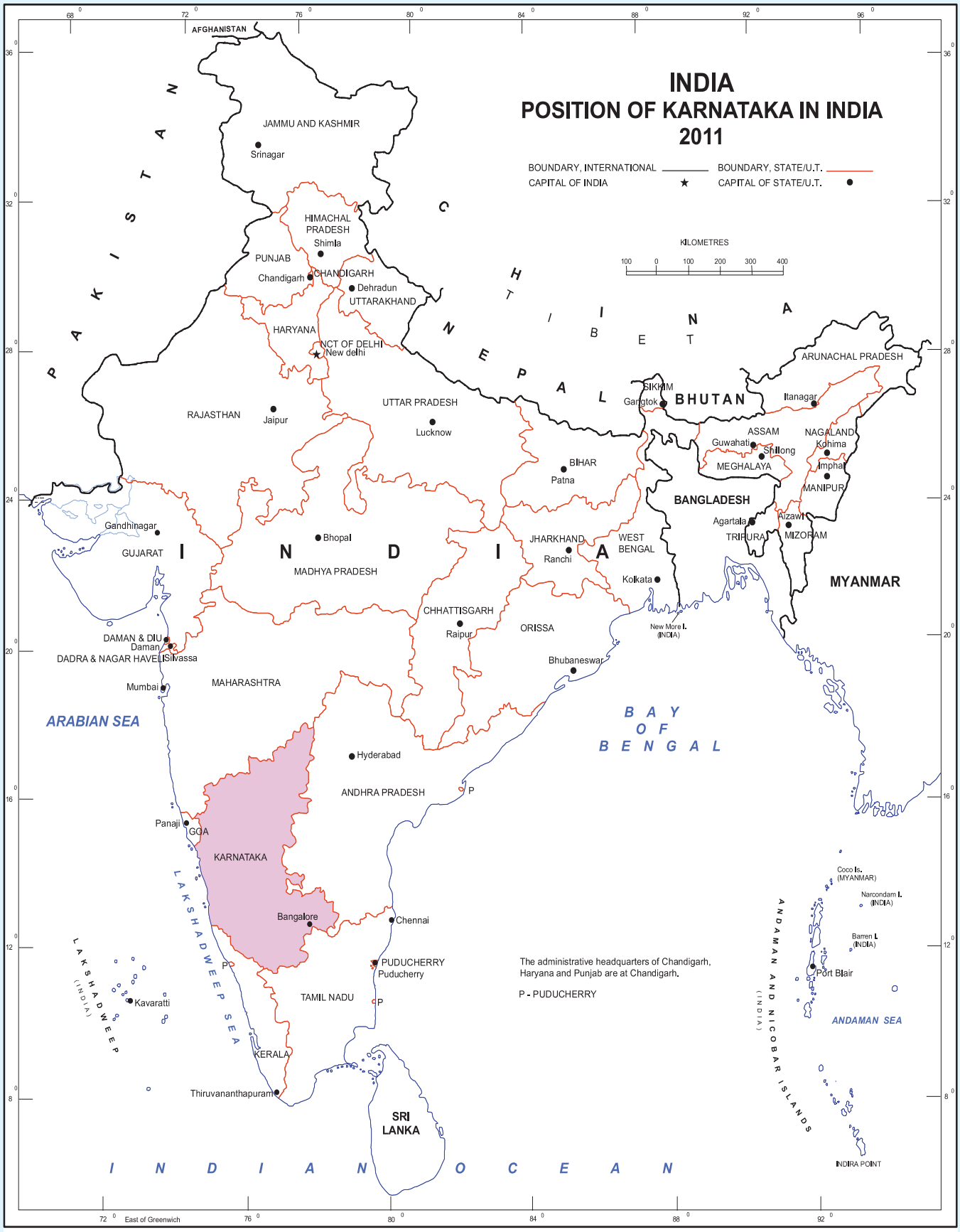
A mine of good discipline,
The dwelling place of Brahma,
The land which had acquired great fortune,
The birthplace of learning and wealth,
The true home of unequalled splendid earnestness
Thus distinguished in many ways
Shone the lovely Karnataka Country.

The temples of antiquity speak of the piety of their devotees. The *agraharas* and *mathas* spread all over vouch to the scholarly pursuits to which people were attached. The hero stones strewing the land speak of the heroic traits of the warrior race of antiquity. Long traditions of growing cotton are clear evidence to once flourishing rich textile industry. The ports along the coast remind one of the rich overseas trades that flourished through them. The State's human resources with racial and religious varieties and professional skills promise to make it a hub of industriousness.

With an antiquity that dates to the Paleolithic, Karnataka has also been home to some of the most powerful empires of ancient and medieval India. The philosophers and musical bards patronized by these empires launched socio-religious and literary movements which have endured to the present day. Karnataka has contributed significantly to both forms of Indian classical music, the Carnatic (Karnataka Music) and Hindustani traditions. Writers in the Kannada language have received the most number of Jnanapith awards(Eight)in India. Bengaluru is the capital city of the State and is at the forefront of the rapid economic and technological development that India is experiencing.

Karnataka's pre-history goes back to a paleolithic hand-axe culture evidenced by discoveries of, among other things, hand axes and cleavers in the region. Evidence of neolithic and megalithic cultures have also been found in the state. Gold discovered in Harappa was found to be imported from mines in Karnataka, prompting scholars to hypothesize about contacts between ancient Karnataka and the Indus Valley Civilization. Prior to the third Century BC, most of Karnataka formed part of the Nanda Empire before coming under the Mauryan Empire of Emperor Ashoka. Four centuries of Satavahana rule followed, allowing them to control large areas of Karnataka. The decline of Satavahana power led to the rise of the earliest native kingdoms, the Kadambas and the Western Gangas, marking the region's emergence as an independent political entity. The Kadamba Dynasty, founded by Mayurasharma, had its capital at Banavasi; the Western Ganga Dynasty was formed with Talakad as its capital.

These were also the first kingdoms to use Kannada in administration, as evidenced by the Halmidi inscription and a fifth-Century copper coin discovered at Banavasi. These dynasties were followed by imperial Kannada empires such as the Badami Chalukyas, the Rashtrakuta Empire of



The responsibility for the correctness of internal details rests with the publisher.

The territorial waters of India extend into the sea to a distance of twelve nautical miles measured from the appropriate base line.

The external boundaries and coastlines of India agree with the Record/Master Copy certified by Survey of India.

The state boundaries between Uttarakhand & Uttar Pradesh, Bihar & Jharkhand and Chattisgarh & Madhya Pradesh have not been verified by the Governments concerned.

The administrative headquarters of Chandigarh, Haryana and Punjab are at Chandigarh.

The interstate boundaries amongst Arunachal Pradesh, Assam and Meghalaya shown on the map are as interpreted from the North-Eastern Areas (Reorganisation) Act. 1971," but have yet to be verified.

Manyakheta and the Western Chalukya Empire, which ruled over large parts of the Deccan and had their capitals in what is now Karnataka. The Western Chalukyas patronised a unique style of architecture and Kannada literature which became a precursor to the Hoysala art of 12th Century. Parts of modern-day Southern Karnataka (Gangavadi) were occupied by the Chola Empire at the turn of 11th Century. The Cholas and the Hoysalas fought over the region in the 12th Century before it eventually came under Hoysala rule.

At the turn of the first millennium, the Hoysalas gained power in the region. Literature flourished during this time, which led to the distinctive Kannada literary metres and the construction of temples and sculptures adhering to the Vesara style of architecture. The expansion of the Hoysala Empire brought minor parts of modern Andhra Pradesh and Tamil Nadu under its rule. In the early 14th Century, Harihara and Bukka Raya established the Vijayanagara Empire with its capital, Hosapattana (later named Vijayanagara), on the banks of the Tungabhadra River in the modern Ballari district. The empire rose as a bulwark against Muslim advances into South India, which it completely controlled for over two Centuries.

In 1565, Karnataka and the rest of South India experienced a major geopolitical shift when the Vijayanagara Empire fell to a confederation of Islamic sultanates in the Battle of Talikota. The Vijayapura Sultanate, which had risen after the demise of the Bahmani Sultanate of Bidar, soon took control of the Deccan; it was defeated by the Moghuls in the late 17th Century. The Bahamani and Vijayapura rulers encouraged Urdu and Persian literature and Indo-Saracenic architecture, the Gol Gumbaz being one of the high points of this style. During the sixteenth Century, Konkani Hindus migrated to Karnataka, mostly from Salcette, Goa, and while during the 17th and 18th Century, Goan Catholics migrated to Dakshina Kannada, especially from Bardes, Goa, as a result of food shortages, epidemics and heavy taxation imposed by the Portuguese.

In the period that followed, parts of northern Karnataka were ruled by the Nizam of Hyderabad, the British, and other powers. In the south, the Mysuru Kingdom, former vassals of the Vijayanagara Empire, was briefly independent. With the death of Krishnaraja Wodeyar II, Hyder Ali, the commander-in-chief of the Mysuru army, gained control of the region. After his death, the kingdom was inherited by his son Tippu Sultan. To contain European expansion in South India, Hyder Ali and later Tipu Sultan fought four significant Anglo-Mysuru Wars, the last of which resulted in Tipu Sultan's death and the incorporation of Mysuru into the British Raj in 1799. The Kingdom of Mysuru was restored to the Wodeyars and Mysuru remained a princely state under the British Raj.

As the "*doctrine of lapse*" gave way to dissent and resistance from princely states across the country, Kittur Chennamma, Sangolli Rayanna and others spearheaded rebellions in Karnataka in 1830. Other uprisings followed, such as the ones at Supa, Bagalkot, Shorapur, Nargund and Dandeli. These rebellions, which coincided with the 1857 war of independence, were led by Mundargi Bhimarao, Bhaskar Rao Bhave, the Halagali Bedas, Raja Venkatappa Nayaka and others. By the late 19th Century, the freedom movement had gained momentum; Karnad Sadashiva Rao, Aluru Venkata Raya, S. Nijalingappa, Kengal Hanumanthaiah, Nittoor Srinivasa Rau and others carried on the struggle into the early 20th Century.

After India's independence, the Maharaja, Jayachamarajendra Wodeyar, allowed his kingdom's accession to India. In 1950, Mysuru became an Indian state of the same name; the former Maharaja served as its Rajpramukh (head of state) until 1975. Following the long-standing demand of the *Ekikarana* Movement, Kodagu and Kannada speaking regions from the adjoining states of Madras, Hyderabad and Bombay were incorporated into the Mysuru state, under the States Reorganization Act of 1956. The thus expanded State was renamed Karnataka in 1973. In the early 1900s through the post-independence era, industrial visionaries such as Sir M Visvesvarayya played an important role in the development of Karnataka's strong manufacturing and industrial base.

Karnataka is the manufacturing hub for some of the largest public sector industries in India. Many of India's premier science and technology research centers are also headquartered in Karnataka. *Mangaluru Refinery and Petrochemicals Limited* is an oil refinery located in Mangaluru. Since the 1980s, Karnataka has emerged as the pan-Indian

KARNATAKA
ADMINISTRATIVE DIVISIONS 2011

BOUNDARIES:

STATE.....

DISTRICT.....

TALUK.....

HEADQUARTERS:

STATE..... ★

DISTRICT..... ◉

TALUK..... •

T - TUMKUR

State/District headquarters are also taluk headquarters.

Where the district/taluk name differs from its headquarters name, the latter is given within brackets.

Bangalore is the headquarters for Bangalore North,Bangalore South & Bangalore East taluks and also for Bangalore and Bangalore Rural districts.

leader in the field of Information Technology(IT). As of 2007, there were nearly 2,000 firms operating out of Karnataka. Many of them, including two of India's biggest software firms, Infosys and Wipro are also headquartered in the State. Exports from these firms exceeded 50,000 crores in 2006-07, accounting for nearly 38 per cent of all IT exports from India. . All this has earned the state capital, Bengaluru, the sobriquet Silicon Valley of India.

Karnataka also leads the nation in biotechnology. It is home to India's largest biocluster, with 158 of the country's 320 biotechnology firms being based here. The state accounts for 75 per cent of India's floriculture, an upcoming industry which supplies flowers and ornamental plants worldwide. Seven of India's leading banks, Canara Bank, Syndicate Bank, Corporation Bank, Vijaya Bank, Karnataka Bank, Vysya Bank and the State Bank of Mysuru originated in this state. A majority of the silk industry in India is headquartered in Karnataka State.

Air transport in Karnataka, as in the rest of the Country, is still a fledgling but fast expanding sector. Karnataka has airports at Bengaluru, Mangaluru, Hubli, Belagavi, Hampi, Ballari and Mysuru with international operations from Bengaluru and Mangaluru airports. Major airlines such as Kingfisher Airlines and Kingfisher red are based in Bengaluru.

Karnataka has a railway network with a total length of approximately 3,089 kilometres. Until the creation of the South Western Zone headquartered at Hubballi in 2003, the railway network in the state was in the Southern and Western railway zones. Several parts of the state now come under the South Western Zone, with the remainder under the Southern Railways. Coastal Karnataka is covered under the Konkan railway network which was considered India's biggest railway project of the Century. Bengaluru is extensively connected with Inter-State destinations while other important cities and towns in the state are not so well-connected.

Karnataka has 11 ports, including the New Mangaluru Port, a major port and ten other minor ports. The New Mangaluru port was incorporated as the ninth major port in India on 4 May 1974. This port handled 32.04 million tonnes of traffic in the fiscal year 2006-07 with 17.92 million tonnes of imports and 14.12 million tonnes of exports. The port also handled 1015 vessels including 18 cruise vessels during the year 2006-07. The inland water transport within the State is not well developed.

The total length of National Highways and State Highways in Karnataka are 3,973 km and 9,829 km, respectively. The KSRTC, the State public transport corporation, transports an average of 2.2 million passengers daily and employs about 25,000 people. In the late nineties, KSRTC was split into three corporations, viz., The Bengaluru Metropolitan Transport Corporation, The North-West Karnataka Road Transport Corporation and The North-East Karnataka Road Transport Corporation with their headquarters in Bengaluru, Hubballi and Kalaburgi respectively.

The diverse linguistic and religious ethnicities that are native to Karnataka combined with their long histories have contributed immensely to the varied cultural heritage of the State. Apart from Kannadigas, Karnataka is home to Tuluvas, Kodavas and Konkanis. Minor populations of Tibetan Buddhists and tribes like the Soligas, Yeravas, Todas and Siddhis also live in Karnataka. The traditional folk arts cover the entire gamut of music, dance, drama, storytelling by itinerant troupes, etc. *Yakshagana* of *Malnad* and coastal Karnataka, a classical dance drama, is one of the major theatrical forms of Karnataka. Contemporary theatre culture in Karnataka remains vibrant with organizations like *Ninasam*, *Ranga Shankara*, *Rangayana* and *Prabhat Kalavidaru* continuing to build on the foundations laid by Gubbi Veeranna, T. P. Kailasam, B. V. Karanth, K V Subbanna, Prasanna and others. *Veeragase, Kamsale, Kolata* and *Dollu Kunitha* are popular dance forms. The Mysuru style of *Bharatanatya* nurtured and popularised by the likes of the legendary Jatti Tayamma continues to hold sway in Karnataka and Bengaluru also enjoys an eminent place as one of the foremost centers of *Bharatanatya*.

Karnataka also has a special place in the world of Indian classical music with both Karnataka (Carnatic) and Hindustani styles finding place in the State and Karnataka has produced a number of stalwarts in both styles. While referring to music the word '*Karnataka*', the original name given to the South Indian classical music does not mean the State of Karnataka. The *Haridasa* movement of the 16th Century contributed seminally to the development of Karnataka (Carnatic) music as a performing art form. Purandara Dasa, one of the most revered Haridasas, is known as the

Karnataka *Sangeeta Pitamaha* (Father Carnatic music). Celebrated Hindustani musicians like Gangubai Hangal, Mallikarjun Mansur, Bhimsen Joshi, Basavaraja Rajaguru, Sawai Gandharva and several others hail from Karnataka and some of them have been recipients of the *Kalidas Samman*, *Padma Bhushan* and *Padma Vibhushan* awards.

Gamaka is another classical music genre based on Carnatic music that is practiced in Karnataka. Kannada *Bhavageete* is a genre of popular music that draws inspiration from the expressionist poetry of modern poets. The Mysuru school of painting has produced painters like Sundarayya, Tanjavur Kondayya, B.Venkatappa and Keshavayya. *Chitrakala Parishat* is an organisation in Karnataka dedicated to promoting painting, mainly in the Mysuru painting style.

Saree is the traditional dress of women in Karnataka. Women in Kodagu have a distinct style of wearing the saree, different from the rest of Karnataka. *Dhoti*, known as *Panche* in Karnataka is the traditional attire of men. Shirt, Trousers and Salwar kameez are widely worn in urban areas. Mysuru *Peta* is the traditional headgear of southern Karnataka, while the *pagadi* or *pataga* is preferred in the northern areas of the State.

Jowar is staple to Northern Karnataka and Ragi to Southern Karnataka. *Bisi bele bath, Jolada rotti, Ragi mudde, Uppittu, Masala Dose* and *Maddur Vade* are some of the popular food items in Karnataka. Among sweets, *Mysuru Pak*, *Karadantu* of Gokak and Amingad, Belagavi *Kunda* and Dharwad *pedha* are popular. Apart from this, coastal Karnataka and Kodagu have distinctive cuisines of their own. Udupi cuisine of coastal Karnataka is popular all over India.

Adi Shankaracharya chose Sringeri in Karnataka to establish the first of his four *mathas* (monastery). Shri Madhvacharya (1238–1317) was the chief proponent of *Tattvavāda* (Philosophy of Reality), popularly known as *Dvaita* or Dualistic school of Hindu philosophy - one of the three most influential Vedānta philosophies. Madhva was one of the important philosophers during the Bhakti movement. He was a pioneer in many ways, going against standard conventions and norms. The *Haridasa* devotional movement is considered as one of the turning points in the cultural history of India. Over a span of nearly six Centuries, several saints and mystics helped shape the culture, philosophy and art of South India and Karnataka in particular by exerting considerable spiritual influence over the masses and kingdoms that ruled South India.This movement was ushered in by the *Haridasas* and took shape in the 13th to 14th Century period, prior to and during the early rule of the Vijayanagara empire. The main objective of this movement was to propagate the *Dvaita* philosophy of Madhvacharya (*Madhva Siddhanta)* to the masses through a literary medium known as *Dasa Sahitya* (literature of the servants of the Lord). Purandaradasa is widely recognized as the *Pithamaha* of Carnatic Music for his immense contribution. Ramanujacharya, the leading expounder of *Vishishtadvaitha*, spent many years in Melukote. He came to Karnataka in 1098 AD and lived here until 1122 AD. He first lived in Tondanur and then moved to Melkote where the Cheluvanarayana Temple and a well organised Matha were built. He was patronized by the Hoysala king, Vishnuvardhana.

In the 12th Century, Veerashaivism emerged in northern Karnataka. Leading names of this movement were Basava, Akka Mahadevi and Allama Prabhu, who established the *Anubhava Mantapa* which was the center of all religious and philosophical thoughts and discussions pertaining to Lingayats. These three social reformers did so by the literary means of '*Vachana Sahitya*' which is very famous for its simple, straight forward and easily understandable Kannada language. Veerashaivism preached women equality by letting women wear *Ishtalinga* i.e. Symbol of god around their neck. Basava shunned the sharp hierarchical divisions that existed and sought to remove all distinctions between the hierarchically superior master class and the subordinate, servile class. He also supported inter-caste marriages and *Kaayaka Tatva* of Basavanna. This was the basis of the Lingayath faith which today counts millions among its followers.The Jain philosophy and literature have contributed immensely to the religious and cultural landscape of Karnataka.

Islam, which had an early presence on the west coast of India as early as the 10th Century, gained a foothold in Karnataka with the rise of the Bahamani and Vijayapura sultanates that ruled parts of Karnataka. Christianity reached Karnataka in the sixteenth Century with the arrival of the Portuguese and St. Francis Xavier in 1545.

Buddhism was popular in Karnataka during the first millennium in places such as Kalaburgi and Banavasi. A chance discovery of edicts and several Mauryan relics at Sannati in Kalaburgi district in 1986 has proven that the Krishna River basin was once home to both *Mahayana* and *Hinayana* Buddhism.

Mysuru Dasara is celebrated as the *Nada habba* (state festival) and this is marked by major festivities at Mysuru. *Ugadi* (Kannada New Year), *Makara Sankranti* (the harvest festival), *Ganesh Chaturthi, Nagapanchami, Basava Jayanthi, Deepavali* and *Ramzan* are the other major festivals of Karnataka.

The Kannada language serves as the official language of the state of Karnataka, as the native language of approximately 65 per cent of its population and as one of the classical languages of India. Kannada played a crucial role in the creation of Karnataka: linguistic demographics played a major role in defining the new state in 1956. Tulu, Kodava and Konkani are other minor native languages that share a long history in the state. Urdu is spoken widely by the Muslim population. Less widely spoken languages include *Beary bashe* and certain dialects such as *Sankethi*.

Kannada features a rich and ancient body of literature covering topics as diverse as Jainism, Veerashaivism (such as Vachanas), Vaishnavism (such as *Haridasa Sahitya*) and modern literature. Evidence from edicts during the time of Ashoka the Great suggest that Buddhist literature influenced the Kannada script and its literature. The Halmidi inscription, the earliest attested full-length inscription in the Kannada language and script, dates from 450 CE, while the earliest available literary work, the Kavirajamarga, has been dated to 850 CE. References made in the Kavirajamarga, however, prove that Kannada literature flourished in the native composition meters such as *Chattana, Beddande* and *Melvadu* during earlier centuries. The classic refers to several earlier greats (*purvacharyar*) of Kannada poetry and prose.

Kuvempu, the renowned Kannada poet and writer who wrote *Jaya Bharata Jananiya Tanujate*, the state anthem of Karnataka was the first recipient of the "*Karnataka Ratna*" award, the highest civilian award bestowed by the Government of Karnataka. Contemporary Kannada literature has received considerable acknowledgement in the arena of Indian literature, with Eight Kannada writers winning India's highest literary honour, the Jnanpith award - the highest tally for any language in India.

Tulu is spoken mainly in the coastal districts of Udupi and Dakshina Kannada. *Tulu Mahabharato*, written by Arunabja in Tulu script, is the oldest surviving Tulu text. The Tulu language now uses the Kannada script due to the gradual decline of the Tulu script, which was in use until a few centuries ago. The Kodavas who mainly reside in the Kodagu district, speak *Kodava Takk*. Two regional variations of the language exist, the northern *Mendale Takka* and the southern *Kiggaati Takka*. Konkani is mostly spoken in the Uttara Kannada district and in some parts of the Udupi and Dakshina Kannada districts. Both Kodava Takk and Konkani use the Kannada script for writing. English is the medium of education in many schools and widely used for business communication in most private companies.

All of the State's languages are patronised and promoted by Governmental and quasi-governmental bodies. The *Kannada Sahitya Parishat* and the *Kannada Sahitya Akademi* are responsible for the promotion of Kannada while the Karnataka Konkani Sahitya Akademi, The Tulu Sahitya Akademi and the Kodava Sahitya Akademi promote their respective languages.

Location and Boundaries

The State of Karnataka, confined roughly within $11^0 35'$ North and $18^0 30'$ North latitudes and $74^0 5'$ East and $78^0 35'$ East longitudes, is situated on a tableland where the Western and Eastern Ghat ranges converge into the Nilgiri hill complex. Karnataka is a State in the southern part of India. It was created on November 1, 1956, with the passing of the States Reorganization Act. Originally known as the State of Mysuru, it was renamed Karnataka in 1973. Karnataka is bordered by the Arabian Sea to the west, Goa State to the northwest, Maharashtra State to the north, Telangana State and Andhra Pradesh State to the east, Tamil Nadu State to the southeast, and Kerala State to the southwest. The State extends to about 750 km from North to South and about 400 km from East to West.

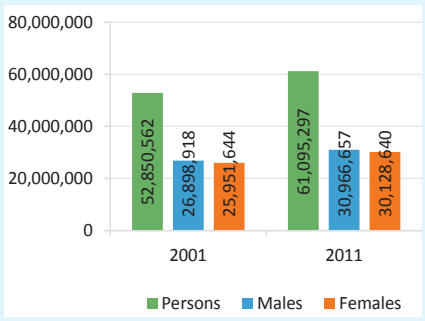
Karnataka Profile

Population size	61095297
Population size (Males)	30966657
Population size (Females)	30128640
Population size (Rural)	37469335
Population size (Urban)	23625962
Population size (Rural Males)	18929354
Population size (Rural Females)	18539981
Population size (Urban Males)	12037303
Population size (Urban Females)	11588659
Population density (Total, Persons per sq km)	319
Sex ratio (Females per 1000 males)	973
Sex ratio (Rural)	979
Sex ratio (Urban)	963
Population size, 0 - 6 yrs	7161033
Population size, 0 - 6 yrs (Males)	3675291
Population size, 0 - 6 yrs (Females)	3485742
Population size, 0 - 6 yrs (Rural)	4517645
Population size, 0 - 6 yrs (Urban)	2643388
Population size, 0 - 6 yrs (Rural Males)	2317069
Population size, 0 - 6 yrs (Rural Females)	2200576
Population size, 0 - 6 yrs (Urban Males)	1358222
Population size, 0 - 6 yrs (Urban Females)	1285166

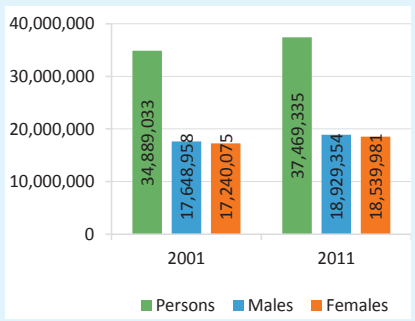
Sex ratio, 0 - 6 yrs (Females per 1000 males)	948
Sex ratio, 0 - 6 yrs (Rural)	950
Sex ratio, 0 - 6 yrs (Urban)	946
Literates, 7+ yrs	40647322
Literates, 7+ yrs (Males)	22508471
Literates, 7+ yrs (Females)	18138851
Literates, 7+ yrs (Rural)	22649176
Literates, 7+ yrs (Urban)	17998146
Literates, 7+ yrs (Rural Males)	12893437
Literates, 7+ yrs (Rural Females)	9755739
Literates, 7+ yrs (Urban Males)	9615034
Literates, 7+ yrs (Urban Females)	8383112
Literacy rate, 7+ yrs (Persons, Per cent)	75.36
Literacy rate, 7+ yrs (Males, Per cent)	82.47
Literacy rate, 7+ yrs (Females, Per cent)	68.08
Literacy rate, 7+ yrs (Rural, Per cent)	68.73
Literacy rate, 7+ yrs (Urban, Per cent)	85.78
Literacy rate, 7+ yrs (Rural Males, Per cent)	77.61
Literacy rate, 7+ yrs (Rural Females, Per cent)	59.71
Literacy rate, 7+ yrs (Urban Males, Per cent)	90.04
Literacy rate, 7+ yrs (Urban Females, Per cent)	81.36

Population size Number

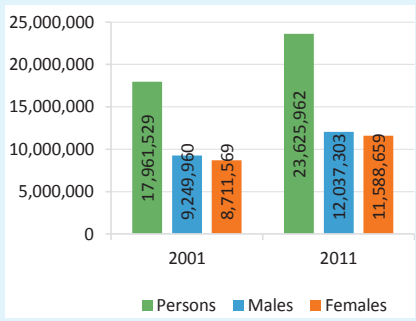
Total



Rural

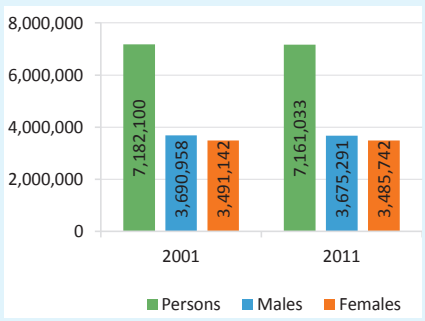


Urban

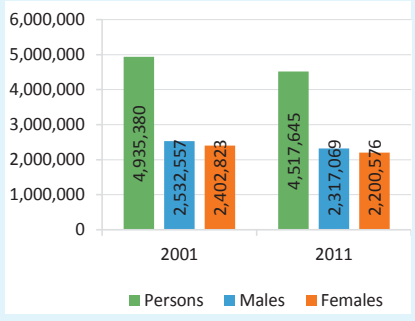


Population size, 0-6 yrs Number

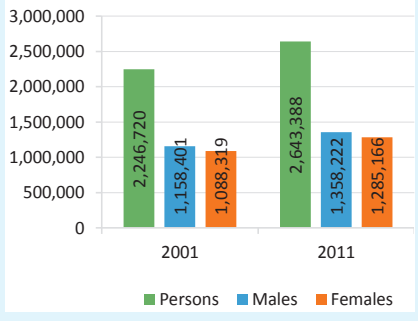
Total



Rural

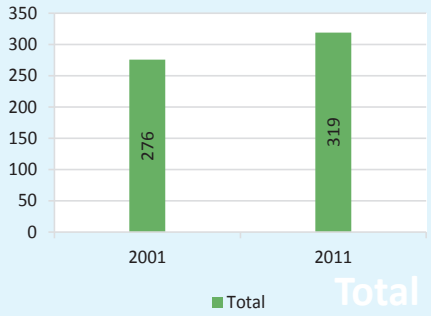


Urban

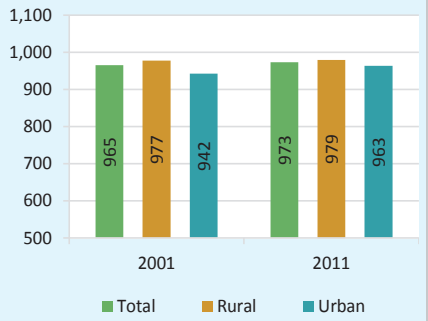


Karnataka Profile

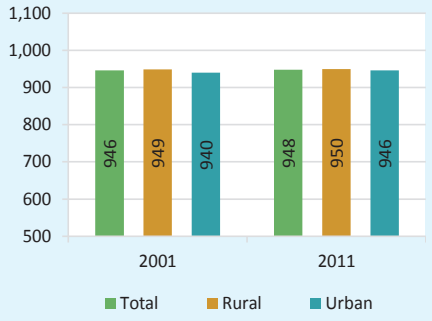
Population density
Persons per sq km



Sex ratio
Females per 1000 males

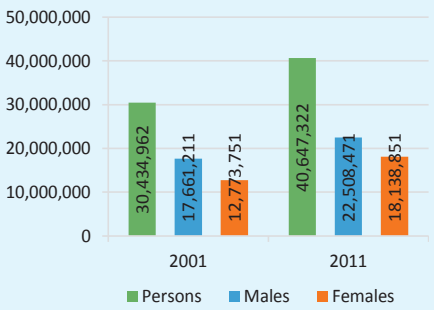


Sex ratio, 0-6 yrs
Females per 1000 males

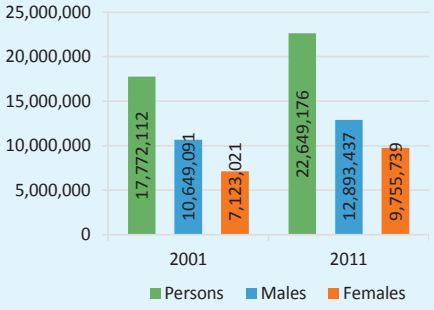


Literates, 7+ yrs
Number

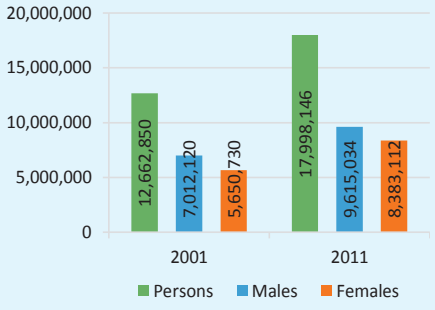
Total



Rural

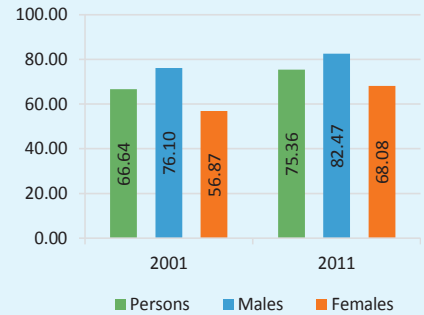


Urban

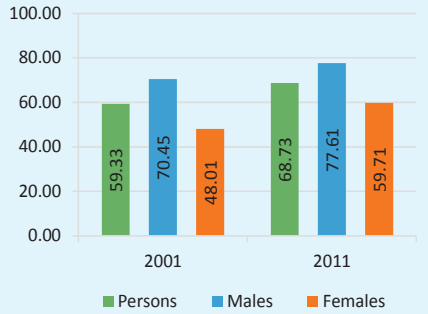


Literacy rate, 7+ yrs
Percent

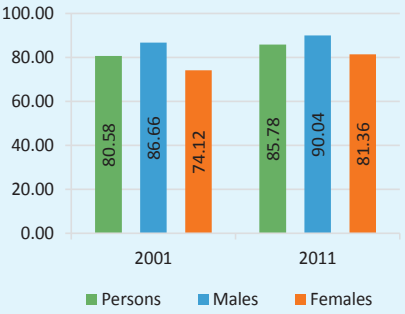
Total



Rural



Urban



General Notes:

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i) a minimum population of 5,000;
ii) at least 75 per cent of male working population engaged in non-agricultural pursuits; and
iii) a density of population of at least 400 per sq. km. (1,000 per sq. mile).

For identification of places which would qualify to be classified as 'urban' all villages, which, as per the 2001 Census had a population of 4,000 and above, a population density of 400 persons per sq. km. and having at least 75 per cent of male working population engaged in non-agricultural activity were considered. An area is considered 'Rural' if it is not classified as 'Urban' as per the above definition.

* The area figure exclude 78,114 sq. km. under the illegal occupation of Pakistan, 5,180 sq. km. Illegally handed over by Pakistan to China and 37,555 sq.km. under the illegal occupation of China in Ladakh district.

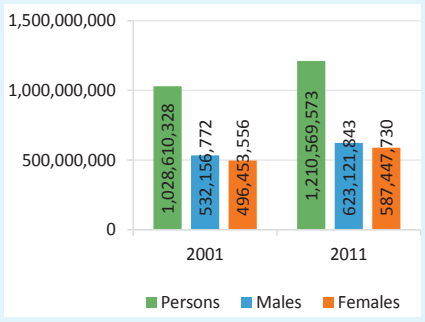
India Profile

Population size	1210569573
Population size (Males)	623121843
Population size (Females)	587447730
Population size (Rural)	833463448
Population size (Urban)	377106125
Population size (Rural Males)	427632643
Population size (Rural Females)	405830805
Population size (Urban Males)	195489200
Population size (Urban Females)	181616925
Population density (Total, Persons per sq km)	382
Sex ratio (Females per 1000 males)	943
Sex ratio (Rural)	949
Sex ratio (Urban)	929
Population size, 0 - 6 yrs	164478150
Population size, 0 - 6 yrs (Males)	85732470
Population size, 0 - 6 yrs (Females)	78745680
Population size, 0 - 6 yrs (Rural)	121285762
Population size, 0 - 6 yrs (Urban)	43192388
Population size, 0 - 6 yrs (Rural Males)	63064665
Population size, 0 - 6 yrs (Rural Females)	58221097
Population size, 0 - 6 yrs (Urban Males)	22667805
Population size, 0 - 6 yrs (Urban Females)	20524583

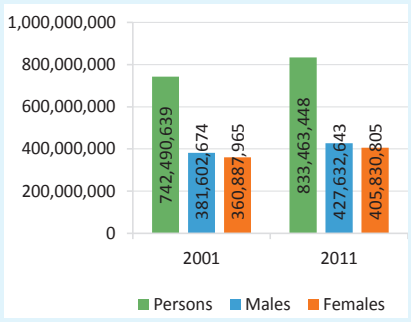
Sex ratio, 0 - 6 yrs (Females per 1000 males)	919
Sex ratio, 0 - 6 yrs (Rural)	923
Sex ratio, 0 - 6 yrs (Urban)	905
Literates, 7+ yrs	763498517
Literates, 7+ yrs (Males)	434683779
Literates, 7+ yrs (Females)	328814738
Literates, 7+ yrs (Rural)	482653540
Literates, 7+ yrs (Urban)	280844977
Literates, 7+ yrs (Rural Males)	281281531
Literates, 7+ yrs (Rural Females)	201372009
Literates, 7+ yrs (Urban Males)	153402248
Literates, 7+ yrs (Urban Females)	127442729
Literacy rate, 7+ yrs (Persons, Per cent)	72.99
Literacy rate, 7+ yrs (Males, Per cent)	80.89
Literacy rate, 7+ yrs (Females, Per cent)	64.64
Literacy rate, 7+ yrs (Rural, Per cent)	67.77
Literacy rate, 7+ yrs (Urban, Per cent)	84.11
Literacy rate, 7+ yrs (Rural Males, Per cent)	77.15
Literacy rate, 7+ yrs (Rural Females, Per cent)	57.93
Literacy rate, 7+ yrs (Urban Males, Per cent)	88.76
Literacy rate, 7+ yrs (Urban Females, Per cent)	79.11

Population size — Number

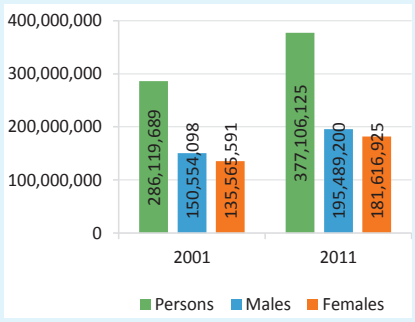
Total



Rural

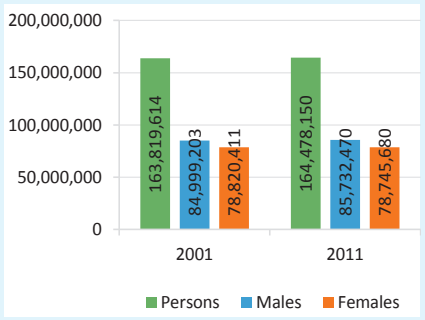


Urban

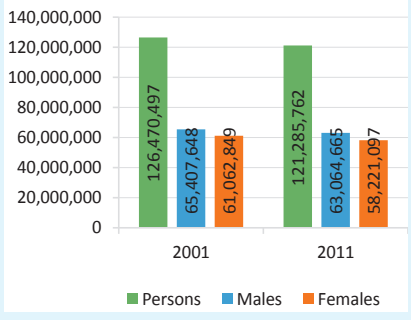


Population size, 0-6 yrs — Number

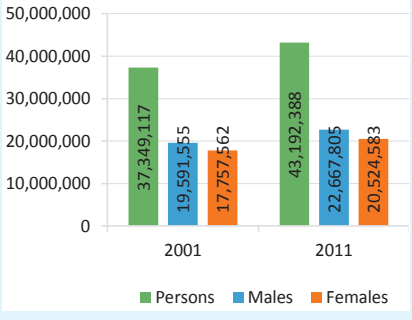
Total



Rural

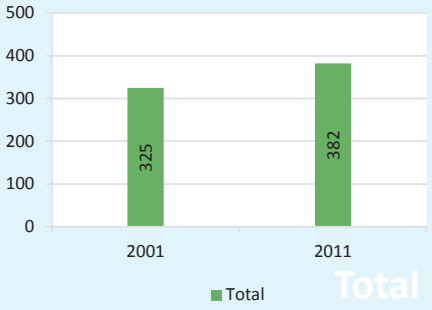


Urban

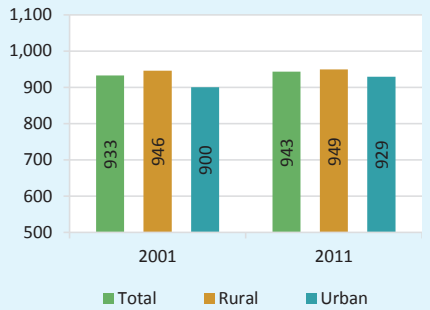


India Profile

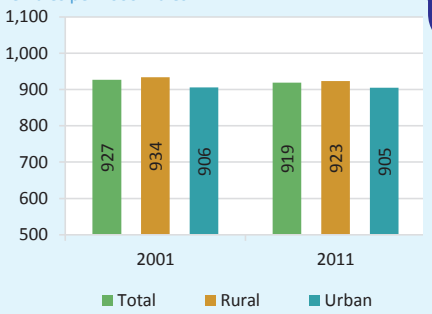
Population density
Persons per sq km



Sex ratio
Females per 1000 males

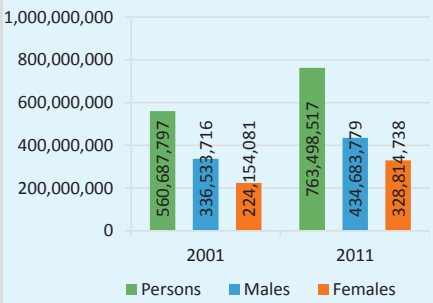


Sex ratio, 0-6 yrs
Females per 1000 males

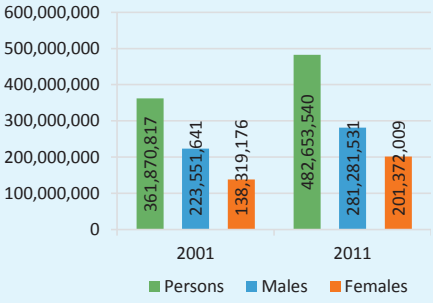


Literates, 7+ yrs
Number

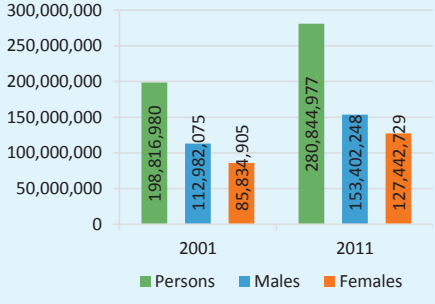
Total



Rural

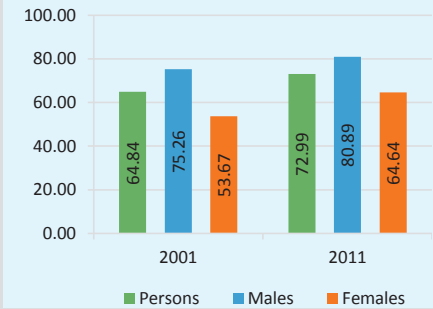


Urban

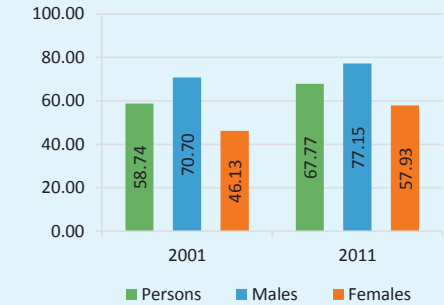


Literacy rate, 7+ yrs
Percent

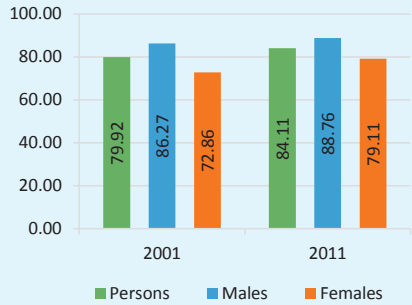
Total



Rural



Urban



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Area and Population

The State covers an area of 191,791 Sq.km, (74,122 sq miles) or 5.83 per cent of the total geographical area of India. It is the eighth largest Indian State by area, the ninth largest by population and comprises 30 districts. Kannada is the official and most widely spoken language. Though several etymologies have been suggested for the name Karnataka, the generally accepted one is that Karnataka is derived from the Kannada words *karu* and *nadu*,meaning elevated land. *Karunadu* may also be read as *Karu* (black) and *nadu* (Region), as a reference to the black cotton soil found in the *Bayaluseeme* region of Karnataka. The British used the word *Carnatic* (sometimes Karnatak) to describe both sides of Peninsular India, south of the Krishna River.

The provisional results for the Census of India 2011, reveals that population of Karnataka at the reference point of time is 6,11,30,704 with 3,10,57,742 males and 3,00,72,962 females. In absolute terms, the population of Karnataka has in creased by 82,80,142 persons during the decade 2001-2011 and in terms of per cent age it has registered adecadal growth rate of 15.67 per cent, which is below the national average of 17.64. The net addition in population over the decade consistently increased from1901to 2011, except in the decade 1911-1921. However, from1981-1991onwards the decadal growth rates have shown a declining trend, which implies that even though the population of the State is steadily growing, the pace of its growth is on the decline. The total progressive growth rate of the State population since 1901 to 2011 is 368.26 per cent. In absolute terms, the population of the State which stood at 1,30,54,754 in 1901 has in creased to 6,11,30,704 over the last 110 years with a net increase of 4,80,75,950 that Bengaluru district, home to the State head-quarters, with its share of 15.69 per cent population is the most populous district in the State.

In other words, for every six person in the State one belongs to Bengaluru district. Belagavi with a share of 7.82 per cent occupies the second place, followed by Mysuru (4.90), Tumakuru (4.39), Kalaburgi (4.20)and Ballari (4.14) districts. All these five districts have more than 2.5 million population each and together contribute one fourth to the State's total population. Among these five districts, four districts have Municipal Corporations with in their jurisdiction, which is a factor for them to have more population. Kodagu with a population of just 0.55 million is the least populous district in the State, preceded by Bengaluru Rural district with 0.98 million. Except for these two districts in the State, all other districts have more than one million population. In terms of ranking, Bengaluru district with a share of 15.69 per cent ranks first, followed by Belagavi district (7.82 per cent), Kodagu district with 0.91 per cent share occupies the last rank preceded by Bengaluru Rural district (1.61per cent). The percentage decadal growth of population in the inter-censal period 2001-2011 varied from a negative rate of -0.28 per cent in Chikkamagaluru district to the highest of 46.68 per cent in Bengaluru district. The average decadal growth rate for the State stands at15.67.

In Karnataka, the proportion of children in the age group 0-6 decreased from 13.59 per cent in 2001 to 11.21 per cent in 2011. Incase of males, the percentage dropped by 2.36 per cent age points and for the females by 2.38 percentage points. Among the disticts the highest proportion of child population (0-6) is found in Yadagiri district (15.83 per cent) which incidentally had the highest proportion of child population (0-6)in 2001 also. The least proportion of child population (0-6) is recorded in Udupi district (8.54 per cent) which also had the lowest proportion in 2001 Census. The proportion of child population (0-6) is above the State average of 11.21 per cent in only 12 districts of the State.

One of the important indices of population concentration is the density of population. It is defined as the number of persons per square kilometre. The population density of Karnataka in 2011 was 319 persons per square kilometre an increase from 276 in 2001. It means that, on an average 43 more people inhabit every square kilometre area in the State than the numbers that lived a decade ago. At the begining of the twentieth Century, the density of Karnataka was as low as 68 and this has steadily increased from one decade to another to reach 319 in 2011. The percentage increase in 2011 is 15.58 per cent compared to 17.45 per cent in 2001. Bengaluru district with 4,378 persons per square kilometre is the most densely populated and ranks first in the State. Bengaluru district which includes the Bruhat Bengaluru Mahanagara Palike limits in its jurisdiction has increased its habitants by

1,393 per square kilometre during the decade. Kodagu is the least populated district in the State with the density of 135 persons per square kilometre. Kodagu which ranked at the 29th place in 2001 Census has slipped to the last position. Kerala is the most densely populated State in the Southern Region,which ranks at 8th place. From the statement it can be seen that Karnataka which ranked 20th in 2001 has moved up to19th rank in 2011 Census.

As per the provisional figures of Census of India 2011, the sex ratio for the country as a whole is 940 as against 933 in 2001. On the other hand, the sex ratio for Karnataka has witnessed a marginal increase of three points during the decade. The sex ratio for the State as per provisional figures of Census 2011 is 968 compared to 965 in 2001 Census. The State figures are however more than the national average. Among the Southern States, Karnataka and Goa's sex ratio are identical and are the second lowest next to Maharashtra which has recorded 925 females per 1,000 males. The sex ratio in the State ranges from 1,093 inUdupi district to 908 in Bengaluru district. Though Udupi district has registered the highest sex ratio of 1,093, the ratioin facthasdeclinedfrom1,130 in2001.A similiar trend is observed in Dakshina Kannada district. Bengaluru district has recorded the lowest sex ratio in the state.

As per Census 2011 Provisional Population Totals, the literacy rate of the State stands at 75.60 per cent , the male literacy rate at 82.85 per cent and the female literacy rate at 68.13 per cent . Out of the 10,594,361 added to the literate population during 2001-2011Census, 5,147,257 were males and 5,447,104 were females. Further, during this period the contribution of the total decrease of 1,987,920 among illiterates is dominated by females (1,162,601) as compared to males (825,319).

When the districts arranged in descending order according to 2011 literacy rates, Dakshina Kannada tops the rank list in respect of over all literacy and male literacy rate followed by Bengaluru district. In respect of female lite rates, Bengaluru ranks first followed by Dakshina Kannada. Yadagiri which has returned less than 60 per cent literacy ranks last among the districts in the State.Ten districts have the same rank for both the sexes. Mysuru ranks at 13th place in female literacy and 20th in male literacy rate. In Gadag district the female literacy is at 17th place where as the male literacy is ranked at 10th place.

Territorial Changes

The erstwhile princely State of Mysuru came into existence after the Fourth Anglo-Mysuru war in 1799 A.D. and it formed the Nucleus State for the New State of Mysuru under the States' Reorganization Act of 1956. The area reported corresponding to the unit was 75,412 sq.km. In 1881 this unit consisted of only seven districts namely Bengaluru, Tumakuru, Kolar, Kadur, Mysuru, Chitradurga and Shivamogga . In 1886, Hassan district was carved out as eighth district and in 1939, Mandya district was created as the ninth district and in 1953, the Ballari district of Madras State (excluding Adoni, Alur and Rayadurga taluks) was transferred to Mysuru State when the State of Andhra Pradesh was formed, resulting in an addition of 9,897 sq. km. to the area of the State.

Political movements for the creation of new, linguistic-based states developed around India in the years after independence. The movement to create a Telugu speaking State out of the northern portion of Madras State gathered strength in the years after independence, and in 1953, the 16 northern, Telugu speaking districts of Madras State became the new State of Andhra. In December 1953, Prime Minister Jawaharlal Nehru appointed the States Reorganization Commission to workout the modality for the creation of states on linguistic lines. This was headed by Justice Fazal Ali and the commission itself was also known as the Fazal Ali Commission. The efforts of this commission were overseen by Govind Ballabh pant, who served as Home Minister from December 1954. The commission created a report in 1955 recommending the reorganization of India's States.

The States Reorganization Act of 1956, which went into effect on November 1st, eliminated the distinction between part A, B, and C States. It also reorganized the State boundaries and created or dissolved States and union territories. On November 1st, 1956, India was divided into states and union territories. The Mysuru State was enlarged by the addition of Kodagu State and the Kannada speaking districts from southern Bombay State and western Hyderabad State.

The State of Mysuru (rechristened as Karnataka with effect from 1.11.1973) with its territorial content as it exists now was formed on 1st November, 1956 under the States' Reorganization Act. It comprised of a) the old Mysuru State including Ballari district; b) Vijayapura, Dharwad and Uttara Kannada district and Belagavi district excluding Chandgad taluk with an area of 54, 347 sq. km. c) Kalaburgi (Except Kodangal and Tandur taluks)- 17,274 sq. km; Raichur (except Alampur and Gadwal taluks)-14,078 sq. km; and Bidar district (except Ahmedpur, Nilanga and Udgir taluks, Nayalkar Circle of Bidar taluk, Zahirabad taluk except Nirna circle and three villages of Humnabad taluk and Narayankhed taluk) with an area of 5,363 sq. km. from former Hyderabad State; d) Dakshina Kannada (except Kasargod taluk and Amindivi islands) with an area of 8,385 sq.km; and Kollegal taluk of Coimbatore district with an area of 2,786 sq.km. from former Madras State; and e) former part C State of Coorg (Kodagu) district with an area of 4,131 sq.km. In 1969, Savanur taluk was created and in 1974, Haghari bommanahalli taluk was created by the abolition of the former Mallapuram taluk of Ballari district. During 1986, Bengaluru Rural district was carved out of the former Bengaluru district. The jurisdiction of Karnataka state extends over portions land-locked within Maharashtra i.e. Dhamne S. Bailur and Kudrimani of Belagavi taluk land Mukhed of Aurad taluk of Bidar district.

In August 1997, seven more districts were newly formed raising the number of district in the State to 27. During August 2007, Ramanagara and Chikkaballapur districts were created Bengaluru Rural and Kolar District districts. Yadagiri forms the youngest district carved out of Kalaburgi district on 10th April, 2010 and was officially declared as 30th district of Karnataka. There have been a few jurisdictional changes in the boundaries of the districts after 2001 Census due to the creation of three new districts. The boundaries of the following three districts and change in the number of taluks in these districts are given at the end of this page.

Administrative Divisions

Karnataka State has been divided into four Revenue divisions, 52 sub-divisions, 30 districts, 177 taluks including the recently formed Kittur Taluk and 747 hoblies/Revenue Circles for administrative purposes. The district-wise area, population and administrative divisions of Karnataka State are given in Table 1.1 The Bengaluru Division comprises of Bengaluru, Bengaluru Rural, Ramanagara, Tumakuru, Kolar, Chikkaballapura, Chitradurga, Shivamogga and Davanagere districts with headquarters at Bengaluru. The Mysuru Division consists of the districts of Mysuru, Mandya, Hassan, Chikkamagaluru, Dakshina Kannada, Kodagu, Udupi and Chamarajanagara districts with headquarters at Mysuru. The Belagavi Division has Belagavi, Vijayapura, Dharwad, Gadag, Haveri, Uttara Kannada and Bagalkot districts under its jurisdiction with headquarters at Belagavi, and Kalaburgi division with headquarters at Kalaburgi covers the districts of Bidar, Kalaburgi, Yadagiri, Ballari, Raichur and Koppal districts. The State has 29,340 villages, 220 Statutory towns and 127 Census towns as per 2011 Census.

Sl No	District	Number of Taluks in 2001	Number of Taluks in 2011	Reasons for the difference
1	Bengaluru Rural	8	4	Four taluks were transferred to newly created Ramanagara District
2	Kolar	11	5	Six taluks were transferred to newly created Chikkaballapura District
3	Kalaburgi	10	7	Three taluks were transferred to newly created Yadgiri District

Area and Administrative Divisions (Numbers)

Sl.No.	Year	Area in Sq.km	Taluks	Hoblies	villages inhabited	villages un-inhabited	Cities and Towns
1	1961	1,91,757	175	662	26,377	NA	231
2	1971	1,91,773	175	739	26,826	2,707	245
3	1981	1,91,791	175	745	27,024	2,362	281
4	1991	1,91,791	175	745	27,066	2,127	254
5	2001	1,91,791	176	745	27,481	1,925	270
6	2011	1,91,791	176	747	27,397	1,943	347

Table 1.1 :Area, Provisional Population and Administrative Divisions of Karnataka

District	Area (Sq.km)	per cent of State	Population (2011)	per centof State	Density (2011)	No. of Taluks	No. of Hoblies
Bengaluru	2,196	1.14	95,88,910	15.69	4,378	4	17
Bengaluru Rural	2,298	1.20	9,87,257	1.61	441	4	17
Ramanagara	3,516	1.83	10,82,739	1.77	303	4	18
Chitradurga	8,436	4.40	16,60,378	2.72	197	6	22
Davangere	5,924	3.09	19,46,905	3.18	329	6	24
Kolar	3,979	2.07	15,40,231	2.52	384	5	27
Chikkaballapura	4,244	2.21	12,54,377	2.05	298	6	26
Shivamogga	8,478	4.42	17,55,512	2.87	207	7	40
Tumakuru	10,597	5.53	26,81,449	4.39	253	10	50
Chikkamagaluru	7,202	3.76	11,37,753	1.86	158	7	34
Dakshiuna Kannada	4,861	2.53	20,83,625	3.41	457	5	17
Udupi	3,582	1.87	11,77,908	1.93	304	3	9
Hassan	6,814	3.55	17,76,221	2.91	261	8	38
Kodagu	4,102	2.14	5,54,762	0.91	135	3	16
Mandya	4,962	2.59	18,08,680	2.96	365	7	31
Mysuru	6,307	3.29	29,94,744	4.90	437	7	33
Chamaraja nagar	5,648	2.94	10,20,962	1.67	200	4	16
Belagavi	13,433	7.00	47,78,439	7.82	356	10	35
Vijayapura	10,498	5.47	21,75,102	3.56	207	5	18
Bagalkot	6,552	3.42	18,90,826	3.09	288	6	18
Dharwad	4,260	2.22	18,46,993	3.02	434	5	14
Gadag	4,657	2.43	10,65,235	1.74	229	5	11
Haveri	4,823	2.51	15,98,506	2.61	331	7	19
Uttara Kannada	10,277	5.36	14,36,847	2.35	140	11	35
Ballari	8,461	4.41	25,32,383	4.14	300	7	27
Bidar	5,448	2.84	17,00,018	2.78	312	5	30
Kalaburgi	10,954	5.71	25,64,892	4.20	233	7	32
Raichur	8,442	4.40	19,24,773	3.15	228	5	37
Koppal	5,570	2.90	13,91,292	2.28	250	4	20
Yadagiri	5,270	2.75	1172985	1.92	224	3	16
State	1,91,791	100	611,30,704	100	319	176	747

Table 1.1: Area –Population and Administrative Divisions of Karnataka

District	Gram panchayats 2012-13	Cities/ Towns/ Urban 2001	Urban Local Bodies 2013	Inhabited villages 2001	Uninhabited villages 2001	No. of V.A Circles 2013	Number of Nada Offices 2013
Bengaluru	86	19	2	669	30	223	31
Bengaluru Rural	98	6	5	949	101	182	17
Ramanagara	130	4	4	770	53	242	18
Chitradurga	185	6	6	946	113	314	22
Davangere	230	6	6	810	113	865	84
Kolar	156	6	6	1,598	199	261	27
Chikkaballapura	151	6	6	1,321	193	250	26
Shivamogga	260	9	9	1,443	87	359	37
Tumakuru	321	11	10	2,574	134	572	50
Chikkamagaluru	226	9	9	1,034	83	238	34
Dakshina Kannada	203	20	8	354	-	264	17
Udupi	146	6	4	248	-	203	10
Hassan	258	9	8	2,394	165	411	38
Kodagu	98	5	4	291	5	110	16
Mandya	232	8	7	1,369	110	435	45
Mysuru	235	11	9	1,216	124	450	34
Chamarajanagar	120	4	5	424	85	232	16
Belagavi	485	22	17	1,255	15	817	36
Vijayapura	199	6	6	660	17	237	18
Bagalkot	161	12	12	623	4	251	18
Dharwad	127	6	6	361	18	221	15
Gadag	106	9	9	329	8	180	10
Haveri	208	9	8	691	7	272	19
Uttara Kannada	207	13	11	1,246	43	358	38
Ballari	189	11	10	524	30	310	27
Bidar	175	6	6	599	22	322	29
Kalaburagi	220	17	10	873	45	377	32
Raichur	164	9	7	830	53	280	37
Koppal	134	5	4	594	35	164	20
Yadagiri	117	-	5	487	32	173	16
State	**5,627**	**270**	**219**	**27,482**	**1,924**	**9,573**	**777**

CENSUS OF INDIA 2011
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KARNATAKA

		2001	2011	Increase			
No. of Districts		27	30	3			
No. of Sub districts		175	176	1			
No. of Towns		270	347	77			
No. of Statutory Towns		226	220	-6			
No. of Census Towns		44	127	83			
No. of Villages		29,406	29,340	-66			
No. of inhabited villages		27,481	27,397	-84			
No. of Un-inhabited villages		1,925	1,943	18			
Total population		Absolute			Percentage		
		Total	Rural	Urban	Total	Rural	Urban
	Persons	6,10,95,297	3,74,69,335	2,36,25,962	100.0	61.3	38.7
	Males	3,09,66,657	1,89,29,354	1,20,37,303	100.0	61.1	38.9
	Females	3,01,28,640	1,85,39,981	1,15,88,659	100.0	61.5	38.5
Decadal change 2001-2011		Absolute			Percentage		
		Total	Rural	Urban	Total	Rural	Urban
	Persons	82,44,735	25,80,302	56,64,433	15.6	7.4	31.5
	Males	40,67,739	12,80,396	27,87,343	15.1	7.3	30.1
	Females	41,76,996	12,99,906	28,77,090	16.1	7.5	33.0
Sex Ratio		973	979	963			
Child Population in the age group 0-6 years		Absolute			Percentage to total population		
		Total	Rural	Urban	Total	Rural	Urban
	Persons	71,61,033	45,17,645	2,643,388	11.7	12.1	11.2
	Males	36,75,291	23,17,069	13,58,222	11.9	12.2	11.3
	Females	34,85,742	22,00,576	12,85,166	11.6	11.9	11.1
Child Sex Ratio		948	950	946			
Literates		Absolute			Literacy rate		
		Total	Rural	Urban	Total	Rural	Urban
	Persons	4,06,47,322	2,26,49,176	1,79,98,146	75.4	68.7	85.8
	Males	2,25,08,471	1,28,93,437	96,15,034	82.5	77.6	90.0
	Females	1,81,38,851	97,55,739	83,83,112	68.1	59.7	81.4
Scheduled Caste population		Absolute			Percentage to total population		
		Total	Rural	Urban	Total	Rural	Urban
	Persons	1,04,74,992	74,95,763	29,79,229	17.1	20.0	12.6
	Males	52,64,545	37,71,506	14,93,039	17.0	19.9	12.4
	Females	52,10,447	37,24,257	14,86,190	17.3	20.1	12.8
Scheduled Tribe population		Absolute			Percentage to total population		
		Total	Rural	Urban	Total	Rural	Urban
	Persons	42,48,987	34,29,791	8,19,196	7.0	9.2	3.5
	Males	21,34,754	17,23,762	4,10,992	6.9	9.1	3.4
	Females	21,14,233	17,06,029	4,08,204	7.0	9.2	3.5

Total Workers		Absolute			Work Participation Rate		
		Total	Rural	Urban	Total	Rural	Urban
	Persons	2,78,72,597	1,85,02,230	93,70,367	45.6	49.4	39.7
	Males	1,82,70,116	1,13,11,426	69,58,690	59.0	59.8	57.8
	Females	96,02,481	71,90,804	24,11,677	31.9	38.8	20.8
Main Workers		**Absolute**			**Percentage to total workers**		
		Total	**Rural**	**Urban**	**Total**	**Rural**	**Urban**
	Persons	2,33,97,181	1,50,60,905	83,36,276	83.9	81.4	89.0
	Males	1,63,49,837	1,00,03,021	6,346,816	89.5	88.4	91.2
	Females	70,47,344	50,57,884	1,989,460	73.4	70.3	82.5
Marginal Workers		**Absolute**			**Percentage to total workers**		
		Total	**Rural**	**Urban**	**Total**	**Rural**	**Urban**
	Persons	44,75,416	34,41,325	10,34,091	16.1	18.6	11.0
	Males	19,20,279	13,08,405	6,11,874	10.5	11.6	8.8
	Females	25,55,137	21,32,920	4,22,217	26.6	29.7	17.5
Marginal Workers (3-6 months)		**Absolute**			**Percentage to total marginal workers**		
		Total	**Rural**	**Urban**	**Total**	**Rural**	**Urban**
	Persons	39,31,647	30,36,548	8,95,099	87.8	88.2	86.6
	Males	16,68,094	11,40,372	5,27,722	86.9	87.2	86.2
	Females	22,63,553	18,96,176	3,67,377	88.6	88.9	87.0
Marginal Workers (Less than 3 months)		**Absolute**			**Percentage to total marginal workers**		
		Total	**Rural**	**Urban**	**Total**	**Rural**	**Urban**
	Persons	5,43,769	4,04,777	1,38,992	12.2	11.8	13.4
	Males	2,52,185	1,68,033	84,152	13.1	12.8	13.8
	Females	2,91,584	2,36,744	54,840	11.4	11.1	13.0
Total Cultivators		**Absolute**			**Percentage to total workers**		
		Total	**Rural**	**Urban**	**Total**	**Rural**	**Urban**
	Persons	65,80,649	63,40,930	2,39,719	23.6	34.3	2.6
	Males	47,53,708	45,65,677	1,88,031	26.0	40.4	2.7
	Females	18,26,941	17,75,253	51,688	19.0	24.7	2.1
Total Agricultural Labourers		**Absolute**			**Percentage to total workers**		
		Total	**Rural**	**Urban**	**Total**	**Rural**	**Urban**
	Persons	71,55,963	67,37,213	4,18,750	25.7	36.4	4.5
	Males	32,83,279	30,47,116	2,36,163	18.0	26.9	3.4
	Females	38,72,684	36,90,097	1,82,587	40.3	51.3	7.6
Total Household Industry workers		**Absolute**			**Percentage to total workers**		
		Total	**Rural**	**Urban**	**Total**	**Rural**	**Urban**
	Persons	9,13,227	5,22,600	3,90,627	3.3	2.8	4.2
	Males	4,38,983	2,30,486	2,08,497	2.4	2.0	3.0
	Females	4,74,244	2,92,114	1,82,130	4.9	4.1	7.6
Total Other Workers		**Absolute**			**Percentage to total workers**		
		Total	**Rural**	**Urban**	**Total**	**Rural**	**Urban**
	Persons	1,32,22,758	49,01,487	83,21,271	47.4	26.5	88.8
	Males	97,94,146	34,68,147	63,25,999	53.6	30.7	90.9
	Females	34,28,612	14,33,340	19,95,272	35.7	19.9	82.7

CENSUS OF INDIA 2011
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INDIA

	2001	2011	Increase
No. of States/UTs	35	35	-
No. of Districts	593	640	47
No. of Sub districts	5,463	5,924	461
No. of Towns	5,161	7,933	2,772
No. of Statutory Towns	3,799	4,041	242
No. of Census Towns	1,362	3,892	2,530
No. of Villages	638,588	640,930	2,342

Total population		Absolute			Percentage		
		Total	Rural	Urban	Total	Rural	Urban
	Persons	1,21,05,69,573	83,34,63,448	37,71,06,125	100.0	68.8	31.2
	Males	62,31,21,843	42,76,32643	19,54,89,200	100.0	68.6	31.4
	Females	58,74,47,730	40,58,30,805	18,16,16,925	100.0	69.1	30.9

Decadal change 2001-2011		Absolute			Percentage		
		Total	Rural	Urban	Total	Rural	Urban
	Persons	18,19,59,458	9,09,73,022	9,09,86,436	17.7	12.3	31.8
	Males	9,09,65,182	4,60,30,080	4,49,35,102	17.1	12.1	29.9
	Females	9,09,94,276	4,49,42,942	4,60,51,334	18.3	12.5	34.0
Sex Ratio		943	949	929			

Child Population in the age group 0-6 years		Absolute			Percentage to total population		
		Total	Rural	Urban	Total	Rural	Urban
	Persons	16,44,78,150	12,12,85,762	4,31,92,388	13.6	14.6	11.5
	Males	8,57,32,470	6,30,64,665	2,26,67,805	13.8	14.7	11.6
	Females	7,87,45,680	5,82,21,097	2,05,24,583	13.4	14.3	11.3
Child Sex Ratio		919	923	905			

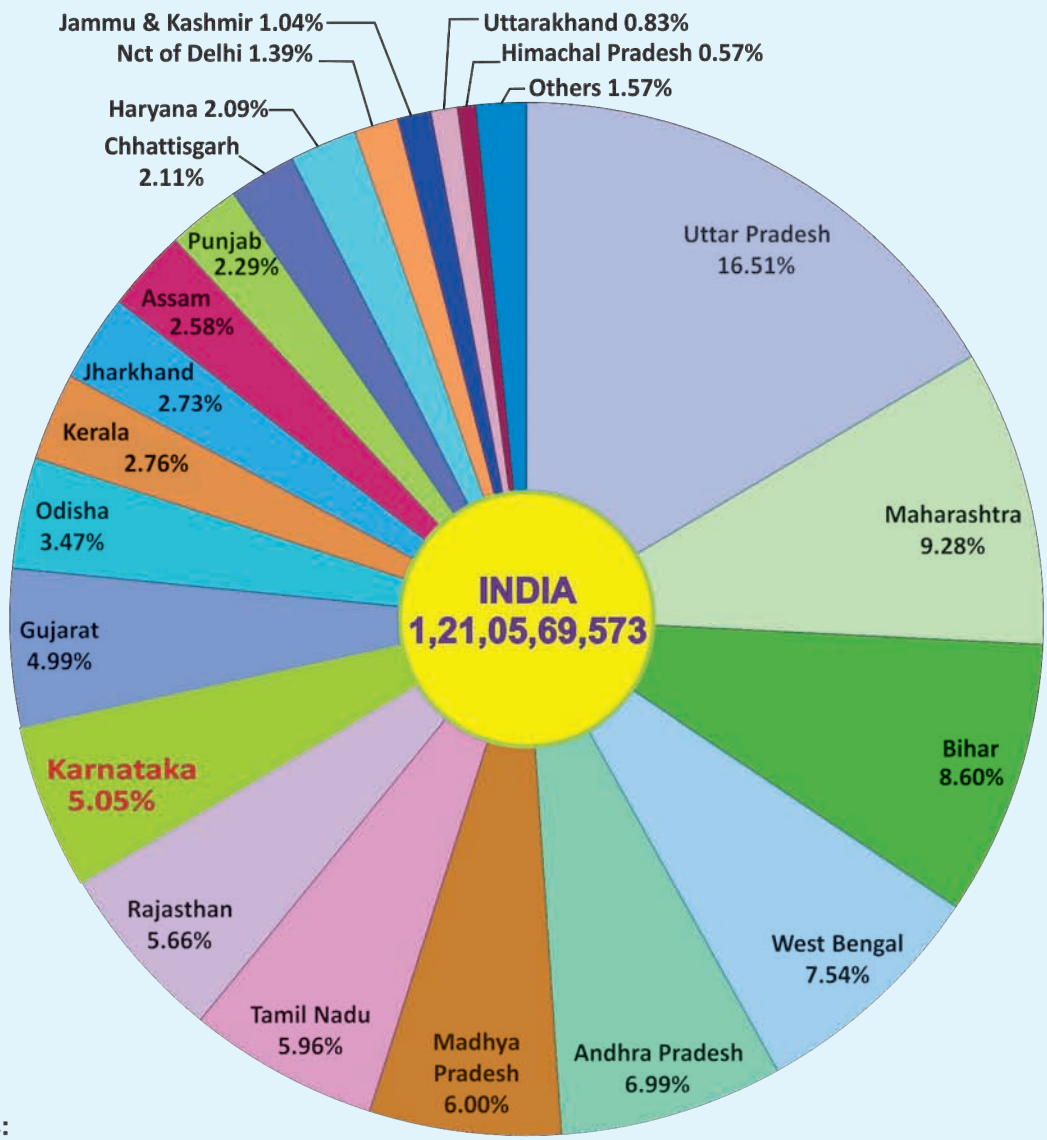
Literates		Absolute			Literacy rate		
		Total	Rural	Urban	Total	Rural	Urban
	Persons	76,34,98,517	48,26,53,540	28,08,44,977	73.0	67.8	84.1
	Males	43,46,83,779	28,12,81,531	153,402,248	80.9	77.2	88.8
	Females	32,88,14,738	20,13,72,009	12,74,42,729	64.6	57.9	79.1

Scheduled Caste population		Absolute			Percentage to total population		
		Total	Rural	Urban	Total	Rural	Urban
	Persons	20,13,78,086	15,38,50,562	4,75,27,524	16.6	18.5	12.6
	Males	10,35,35,165	7,91,18,138	2,44,17,027	16.6	18.5	12.5
	Females	9,78,42,921	7,47,32,424	2,31,10,497	16.7	18.4	12.7

Scheduled Tribe population		Absolute			Percentage to total population		
		Total	Rural	Urban	Total	Rural	Urban
	Persons	10,42,81,034	9,38,19,162	1,04,61,872	8.6	11.3	2.8
	Males	5,24,09,823	4,71,26,341	52,83,482	8.4	11.0	2.7
	Females	5,18,71,211	4,66,92,821	51,78,390	8.8	11.5	2.9

Total Workers		Absolute			Work Participation Rate		
		Total	Rural	Urban	Total	Rural	Urban
	Persons	48,17,43,311	34,85,97,535	13,31,45,776	39.8	41.8	35.3
	Males	33,18,65,930	22,67,63,068	10,51,02,862	53.3	53.0	53.8
	Females	14,98,77,381	12,18,34,467	2,80,42,914	25.5	30.0	15.4
Main Workers		**Absolute**			**Percentage to total workers**		
		Total	**Rural**	**Urban**	**Total**	**Rural**	**Urban**
	Persons	36,24,46,420	24,57,49,270	11,66,97,150	75.2	70.5	87.6
	Males	27,31,49,359	17,80,34,713	9,51,14,646	82.3	78.5	90.5
	Females	8,92,97,061	6,77,14,557	2,15,82,504	59.6	55.6	77.0
Marginal Workers		**Absolute**			**Percentage to total workers**		
		Total	**Rural**	**Urban**	**Total**	**Rural**	**Urban**
	Persons	11,92,96,891	10,28,48,265	1,64,48,626	24.8	29.5	12.4
	Males	5,87,16,571	4,87,28,355	99,88,216	17.7	21.5	9.5
	Females	6,05,80,320	5,41,19,910	64,60,410	40.4	44.4	23.0
Marginal Workers (3-6 months)		**Absolute**			**Percentage to total marginal workers**		
		Total	**Rural**	**Urban**	**Total**	**Rural**	**Urban**
	Persons	9,70,44,107	8,30,31,670	1,40,12,437	81.3	80.7	85.2
	Males	4,85,79,387	4,00,34,385	85,45,002	82.7	82.2	85.6
	Females	4,84,64,720	4,29,97,285	54,67,435	80.0	79.4	84.6
Marginal Workers (Less than 3 months)		**Absolute**			**Percentage to total marginal workers**		
		Total	**Rural**	**Urban**	**Total**	**Rural**	**Urban**
	Persons	2,22,52,784	1,98,16,595	24,36,189	18.7	19.3	14.8
	Males	1,01,37,184	86,93,970	14,43,214	17.3	17.8	14.4
	Females	1,21,15,600	1,11,22,625	9,92,975	20.0	20.6	15.4
Total Cultivators		**Absolute**			**Percentage to total workers**		
		Total	**Rural**	**Urban**	**Total**	**Rural**	**Urban**
	Persons	11,86,92,640	11,49,68,498	37,24,142	24.6	33.0	2.8
	Males	8,27,06,724	7,98,39,098	28,67,626	24.9	35.2	2.7
	Females	3,59,85,916	3,51,29,400	8,56,516	24.0	28.8	3.1
Total Agricultural Labourers		**Absolute**			**Percentage to total workers**		
		Total	**Rural**	**Urban**	**Total**	**Rural**	**Urban**
	Persons	14,43,29,833	13,69,94,451	73,35,382	30.0	39.3	5.5
	Males	8,27,40,351	7,79,30,236	48,10,115	24.9	34.4	4.6
	Females	6,15,89,482	5,90,64,215	25,25,267	41.1	48.5	9.0
Total Household Industry workers		**Absolute**			**Percentage to total workers**		
		Total	**Rural**	**Urban**	**Total**	**Rural**	**Urban**
	Persons	1,83,36,307	1,19,47,619	63,88,688	3.8	3.4	4.8
	Males	97,75,635	58,63,891	39,11,744	2.9	2.6	3.7
	Females	85,60,672	60,83,728	24,76,944	5.7	5.0	8.8
Total Other Workers		**Absolute**			**Percentage to total workers**		
		Total	**Rural**	**Urban**	**Total**	**Rural**	**Urban**
	Persons	20,03,84,531	8,46,86,967	11,56,97,564	41.6	24.3	86.9
	Males	15,66,43,220	6,31,29,843	9,35,13,377	47.2	27.8	89.0
	Females	4,37,41,311	2,15,57,124	2,21,84,187	29.2	17.7	79.1

Percentage share of population of India and States/UTs - 2011



Others:

Tripura	0.30%
Meghalaya	0.25%
Manipur	0.21%
Nagaland	0.16%
Goa	0.12%
Arunachal Pradesh	0.11%
Puducherry	0.10%
Mizoram	0.09%
Chandigarh	0.09%
Sikkim	0.05%
Andaman & Nicobar Islands	0.03%
Dadra & Nagar Haveli	0.03%
Daman & Diu	0.02%
Lakshadweep	0.01%

Physiography

Physiographically Karnataka State forms part of two well defined macro regions of Indian Union; the Deccan Plateau and the Coastal plains and Islands. The State has four physiographic regions which are as follows:

Northern Karnataka Plateau: Northern Karnataka Plateau comprises of the districts of Belagavi, Bidar, Vijayapura, Bagalkot Kalaburgi and Yadgir. It is largely composed of Deccan Trap. It represents a monotonous treeless extensive plateau landscape with a general elevation of 300 to 600 metres from the mean sea level. However, the river plains of the Krishna, the Bhima, the Ghataprabha and the Malaprabha with the intervening watersheds, the step like landscapes, lateritic escarpments, residual hills and ridges break the monotony of this extensive plateau. The general slope is towards east and this region is largely covered with rich black cotton soils.

Central Karnataka Plateau: Central Karnataka Plateau covers the districts of Ballari, Chikkamagaluru, Chitradurga, Davanagere, Dharwad, Gadag, Haveri, Raichur, Koppal and Shivamogga . The region represents the transitional surface between the Northern Karnataka Plateau of Deccan Trap and Southern Karantaka Plateau with relatively higher surface. By and large, this region represents the area of Tungabhadra basin. The general elevation varies between 450 and 700 metres. However, this transitional ground is broken by several sets of parallel ridges mainly made up of Dharwar system of rocks. The height of such residual hills is about 900 metres above sea level. The general slope of this region is towards the east.

Southern Karnataka Plateau: The Southern Karnataka Plateau covers the districts of Bengaluru, Bengaluru Rural, Hassan, Kodagu, Kolar, Mandya, Mysuru, Chamarajanagar and Tumakuru. This region largely covers the area of the Cauvery river basin lying in Karnataka. It is bounded by 600 metres contour and is characterized by a higher degree of slope. In the west and south it is enclosed by the ranges of Western Ghats and the northern part is an interrupted but clearly identifiable high plateau. In the east, the valleys of the Cauvery and its tributaries open out to form undulating plains. The general elevation of the region varies from 600 to 900 metres. However, residual heights of 1,500 to 1,750 metres are found in the Biligirirangan hills of Mysuru district and the Brahmagiri range of Kodagu district.

Karnataka Coastal Region: The Karnataka Coastal Region, which extends between the Western Ghats edge of the Karnataka Plateau in the east and the Arabian Sea in the west, covers Dakshina Kannada, Udupi and Uttara Kannada districts. This region is traversed by several ridges and spurs of Western Ghats. It is a difficult terrain with full of rivers, creeks, water falls, peaks and ranges of hills. The coastal region consists of two broad physical units, the plains and the Western Ghats. The Coastal plains, represent a narrow stretch of estuarine and marine plains. The abrupt rise at the eastern flanks forms the Western Ghats. The northern parts of the Ghats are of lower elevation (450-600 metres) as compared to the Southern parts (900-1,500 metres). The coastal belt with an average width of 50 to 80 km covers a distance of about 267 km. from north to south. At certain places the crest of adjoining Western Ghats reach the sea as close as 13 km near Karwar. The average height is generally 75 metres from the mean sea level.

Topography

Karnataka has representatives of all types of variation in topography – high mountains, plateaus, residual hills and coastal plains. The State is enclosed by chains of mountains to its west, east and south. It consists mainly of plateau which has higher elevation of 600 to 900 metres above mean sea level. The entire landscape is undulating broken up by mountains and deep ravines.

Plain land of elevation less than 300 metres above mean sea level is to be found only in the narrow coastal belt, facing the Arabian Sea. There are quite a few high peaks both in Western and Eastern Ghat systems with altitudes more than 1500 meters. A series of cross-sections drawn from west to east across the Western Ghat generally exhibit, a narrow coastal plain followed to the east by small and short plateaus at different altitudes, then suddenly rising upto great heights. Then follows the gentle east and east-north-west sloping plateau. Among the tallest peaks of Karnataka are the Mullayyanagiri (1,925 m), Bababudangiri (Chandradrona Parvata 1,894 m.) and the

Kudremukh (1,895 m) all in Chikkamagaluru district and the Pushpagiri (1,908 m) in Kodagu district. There are a dozen peaks which rise above the height of 1,500 metres. The per cent age of area coming under different elevations is as follows : less than 150 metres -5.16; 150 to 300 metres-1.95; 300to 600 metres -43.51; 600 to 1,350 meters -48.81 and more than 1,350 metres -0.57.

GEOLOGY

Karnataka is one of the five major Archaean Cratons of the Indian shield preserving within it rocks ranging in age from 3.4 billion years to 2.6 billion years. In geological literature, this craton is referred to as the Dharwar Craton which extends beyond the geographical boundary of the state. In general, the geological formations of the state are grouped under these categories: The Archean complex consisting of both older and younger schist belts, granitic gneiss, the Proterozoic sedimentary formations, the Deccan Traps, the Tertiary and Recent formations. Of these, the major part (about 60 per cent) of the State is composed of the Archean complex consisting of gneisses, granites and high grade rocks.

Division of Dharwar Craton : Dharwar Craton is divided into two major blocks designated as The Western Dharwar Craton and The Eastern Dharwar Craton, considering the regional changes, lithological variations, differences in volcano sedimentary environment, magmatism and grade of metamorphism. The western Dharwar craton is characterized by large schist belts showing evidences of being accumulated in distinct sedimentary basins, while, the Eastern Dharwar craton is characterized by voluminous juvenile granites and remobilized gneiss along with the remnants of schist belts. The north-south trending Closepet Granite demarcates the boundary between the two blocks. In the latest classification, the term Peninsular Gneiss is restricted to the grey gneiss complex of the Western Dharwar Craton, while, the dominantly gneissic terrain to the east of the Eastern Dharwar Craton is designated as the Dharwar Batholith.

Western Dharwar Craton: the Western Dharwar Craton contains three major components namely, the schist belonging to the older Sargur Group (3,100 to 3,300 million years) under which are included Sargur, Holenarsipur, Krishnarajpet, Nagamangala, Hadanur, Nuggehalli, Karighatta and other minor belts, which are made up of diverse lithological assemblages ranging from mafic to ultramafic rocks, aluminous sediments, most of which show high grade metamorphism. Rocks belonging to this group are rich in deposits of gold, chromite and vanadium bearing titaniferous magnetite, besides other economically important non-metallic minerals like asbestos, barites, corundum, kyanite, sillimanite and garnet.

Peninsular Gneissic Complex (2,500 million years – 2,400 million years) : The larger part of the Karnataka State is composed of granite, granodiorite and gneissic granite along with banded gneiss and migmatite which are collectively known by the name Peninsular Gneissic Complex. The variations shown by Peninsular gneisses are the results of the intimate mixing and interaction of tonolitic materials with pre existing mafic – ultramafic components and associated sedimentary rocks of earlier greenstone belts. Peninsular gneiss is believed to be the basement for the Dharwar Supergroup. The term is now restricted to the gneisses occurring west of Closepet granite.

Dharwar Supergroup: (2,500 to 2,000 million years) Dharwar Supergroup consists of volcanic and sedimentary sequences accumulating in geosynclinals basin extending in north north west direction and are traceable continuously along the strike for over more than 300 km. Dharwar supergroup is sub divided into two main groups, lower is designated as the Bababudan Group named after the Bababudan range and consist mainly of quartzite, banded iron formation and volcanic flows resting on the eroded edges of the gneissic complex.

Economically, this group is important for its rich accumulations of iron ore. Reserves run into several billion tonnes. The rich iron ores of Ballari district have contributed substantially to the export trade in iron ore. The magnetite quartzites of Kudremukh were earlier mined on a large scale, but, now considering the importance of bio-diversity of Western Ghats, the mining has been abandoned. The conglomerate at the base of the Bababudan Group carries values of gold and copper and also shows high radio activity. In this respect, these conglomerates show similarities to the famous Witwatersrand conglomerates of South Africa.

The upper Chitradurga Group overlies the Bababudan Group and represents geosynclinals pile with sedimentary rocks dominating over the volcanics. The greater part of the Shivamogga schists belt is made up of rocks belonging to Chitradurga Group. The unconformity at the base of the Dharwar Supergroup is well demonstrated at many places. Rocks belonging to the Group are economically important, being the host rocks for rich accumulations of iron and manganese. The limestones of Hosadurga, Chikkanayakanahalli, Banasandra, Kudrekanive and Bhadigund are exploited for production of cement., The basic volcanic rocks and their differentiates contain economic concentration of gold, as at Bellara, Ajjanahalli, Kudurekonda, Palavanahalli and Nyamti and of copper at Ingaldhal. Ranibennur sequence is considered as a sub group and is presently classified as the top most formation within the Chitradurga Group.

High grade terrain:The high-grade granulite terrain is confined to the southern extremity of the State. Structural and metamorphic continuity is observed between the low-grade and the high-grade terrain which extends further south into Tamil Nadu and Kerala. The high-grade terrain is considered to represent a laterally situated but more deeply eroded level of the crust. The commonest rocks are granulite to upper amphibolites gneisses. Remnants of some of the earliest sediments and volcanics and also layered anorthosite complexes are found within the gneisses.

Closepet granite (2,600 million years) Closepet Granite (after the town of Closepet, named for Major Close, a British Army officer) is the name given to a younger set of coarse-grained potassic granites which form a chain of rounded bosses and domes running north-south, right through the middle of the State from near Sivasamudram in the south to past Ballari in the north, a length of over 400 km. These coarse-grained granites are confined to a belt of about 10-20 km. wide. The magnificent hill masses of Savanadurga, Magadi, Closepet (present Ramanagaram), Shivaganga, Devarayanadurga, Madhugiri, Molakalmuru and Pavagada are formed of these granites.

Closepet granite is believed to be a major geosuture joining the Western Dharwar Craton and the Eastern Dharwar Craton, the two distinct crustal blocks of late Archean age.

Eastern Dharwar Craton : Unlike the western Dharwar Craton, where the basement-cover relationship could clearly be established, the schistose belts of Eastern Dharwar Craton are made up of almost a thick pile of basalt with subordinate clastic and chemical sediments with no clear indication of gneissic basement. Similarly, the tectonic settings of Eastern Dharwar Craton seems to be in contrast with the Western Dharwar Craton. The gneissic rocks, mostly of granodioritic and granitic composition represent remobilised parts of an older crust with large-scale addition of newer granitic material (2500-2600 m.y). This has been largely referred to as Dharwar Batholith. The distinguishing feature of the schist belt occurring to the east of Closepet Granite are the absence of ultramafic rocks and the layered complex, large scale mafic volcanism, high grade metamorphism and predominance of potash-rich granitic intrusion.

The schist belts of Eastern Dharwar Craton belonging to Dharwar Supergroup include the Kolar Schist belt, Siruguppa Schist belt, Hutti-Maski schist belt, Mangalur schist belt, Hunagund-Kustagi schist belt, Deodurga schist belt. Of these, the Kolar and Hutti schist belts are well known for their gold mineralisation and have been extensively mined. Sometimes, these two belts are called gold-bearing schist belts of Eastern Karnataka and the province is called Eastern Gold Field Province. Most Archaean gold mineralisation is found in rocks which are 2700-2600 m.y. old and perhaps this corresponds to a period of crustal thickening and stabilisation.

Darwar Batholith: The terrain east of Closepet Granite is made up of granite, granodiorite, monzonite, diorite and older migmatitic gneiss and extends over hundreds of kilometer parallel to the green schist belts. The term `Peninsular Gneiss' now is restricted to the older gneisses of Western Dharwar Craton.

The plutonic belts of Eastern Dharwar Craton have been grouped under Dharwar Batholith. The Dharwar Batholith, in contrast to the tonolitic and trondhjemitic gneissic complex, is mainly granodioritic and granitic in composition. It is a product of remobilisation of the crust during late Archaean and early Proterozoic time with abundant addition of juvenile granitic material around 2600 my.

Proterozoic Basins

(1,600 to 542 million years)

Kaladgi basin : The basin covers over 8,300 sq.km. extending from Belagavi on the west, to Bagalkot and beyond to the east. The rock assemblages include quartzite, limestone and shale. These formations are least affected by subsequent metamorphism. The sediments of the Kaladgi basin is covered by overlying Deccan traps on the west as well on the north. Though Kaladgi sediments were considered as unfossiliferous, nevertheless stromatolites have been reported indicating the beginning of life in the early part of earth's history.

Badami Group : Badami Group occupies an area of about 2,600 sq.km. in Bagalkot and Belagavi districts. The red coloured quartzite is characteristic of this group. The rocks are confined to the southern part of the Kaladgi basin. The renowned rock cut temples of Badami and Aihole are carved out of the red coloured Badami sandstone.

Bhima Group: Rocks of this group are exposed on either side of the Bhima river covering the districts of Vijayapura, Kalaburgi and partly Yadgir and is covered by the Deccan Trap on the north. The rock assemblages include conglomerate, sandstone, shale and limestone. The Bhima Group of rocks show evidences of having been deposited in a shallow marine environment.

The limestone deposits of the proterozoic basins in the northern part of Karnataka have supported large scale cement factories.

Deccan Volcanics: (63 to 68 million years) Deccan volcanism occurred at the close of the Cretaceous and dawn of the Tertiary period in earth's history. The northern part of Karnataka and more particularly the districts of Belagavi, Vijayapura, Bidar and Kalaburgi are covered over by extensive spreads of Deccan Trap. The episode coincided with the uplift of Western Ghats. Deccan traps occur mainly as volcanic piles forming a gently rolling country presenting a monotonous landscape with very little vegetation. However, these rocks have given rise to the extensive development of black cotton soil.

Laterite : Laterite is a peculiar type of residual porous clayey rock full of worm-like tubes, made up mainly of hydrated oxides of iron and aluminum, formed as the end product of the weathering of underlying rocks. The rock was first recognised along the west coast of India by Buchanan in 1807, who appropriately named it as laterite from `latera' which, in Latin, means brick. It is formed under special climatic condition of alternating wet and dry seasons. Much of the silica in the original rock is dissolved and carried away, leaving the weathered product rich in oxides of iron and aluminum. The laterite-cappings over bed-rock range in thickness from 15 to 60 m. The best development of laterite is seen in the Bidar, Humnabad and Basavakalyan taluks of Bidar district. The entire coastal belt from Kasargod right upto Karwar is covered by thick cappings of laterite. Cappings are common over the Deccan Traps in Belagavi and Uttara Kannada districts.

Recent Deposits and Alluvium: The coastal plain bordering the Arabian Sea for a length of over 300 km. from Mangaluru in the south up to Goa border in the north and over a width of 10 to 20 km inland is covered by laterite. There is no continuous exposure of recent sediments and alluvium as along the East Coast. Alluvium is exposed mostly along the river banks and estuaries. Blown sands occur along the coastal beaches. Thin beds of shell lime are seen in parts of Mangaluru, Udupi, Kundapur, Tadri and Karwar.

Mineral Output Quantity

Minerals	Unit	2010-11
1. Metallic Miners: a) Ferrous 1) Chromite	Tonnes	3152.00
2) Iron Ore	Tonnes	29958458.00
3) Manganese Ore	Tonnes	108222.00

1	2	3
b) Non Ferrous: 1) Bauxite	Tonnes	62325.00
2) Copper Ore	Tonnes	34330.00
3) Gold	gms	2598294.26
4) Silver	gms	205980.01
II Non-Metallic Minerals 1) Asbestos	Tonnes	-
2) Ochre (Red)	Tonnes	-
3) China Clay/Clay	Tonnes	36528.00
4) Corrundum	Kgs	10.00
5) Felsite	Tonnes	1063.00
6) Fire Clay	Tonnes	-
7) Kaolin	Tonnes	2,917.00
8) Kyanite	Tonnes	1,535.00
9) Magnesite	Tonnes	8558.00
10) Ochre (Yellow)	Tonnes	-
11) Quartz	Tonnes	20012.00
12) Steatite/Soap Stone	Tonnes	-
13) Selica Sand	Tonnes	123111.00
14) Shale	Tonnes	446568.00
I ii Building Materials 1. Dolomite	Tonnes	87001.00
2. Lime Shell	Tonnes	6044.00
3. Lime Stone	Tonnes	18970794.00
4. Moulding Sand	Tonnes	6181.00
5 Red Oxide	Tonnes	-

Source : Department of Mines and Geology

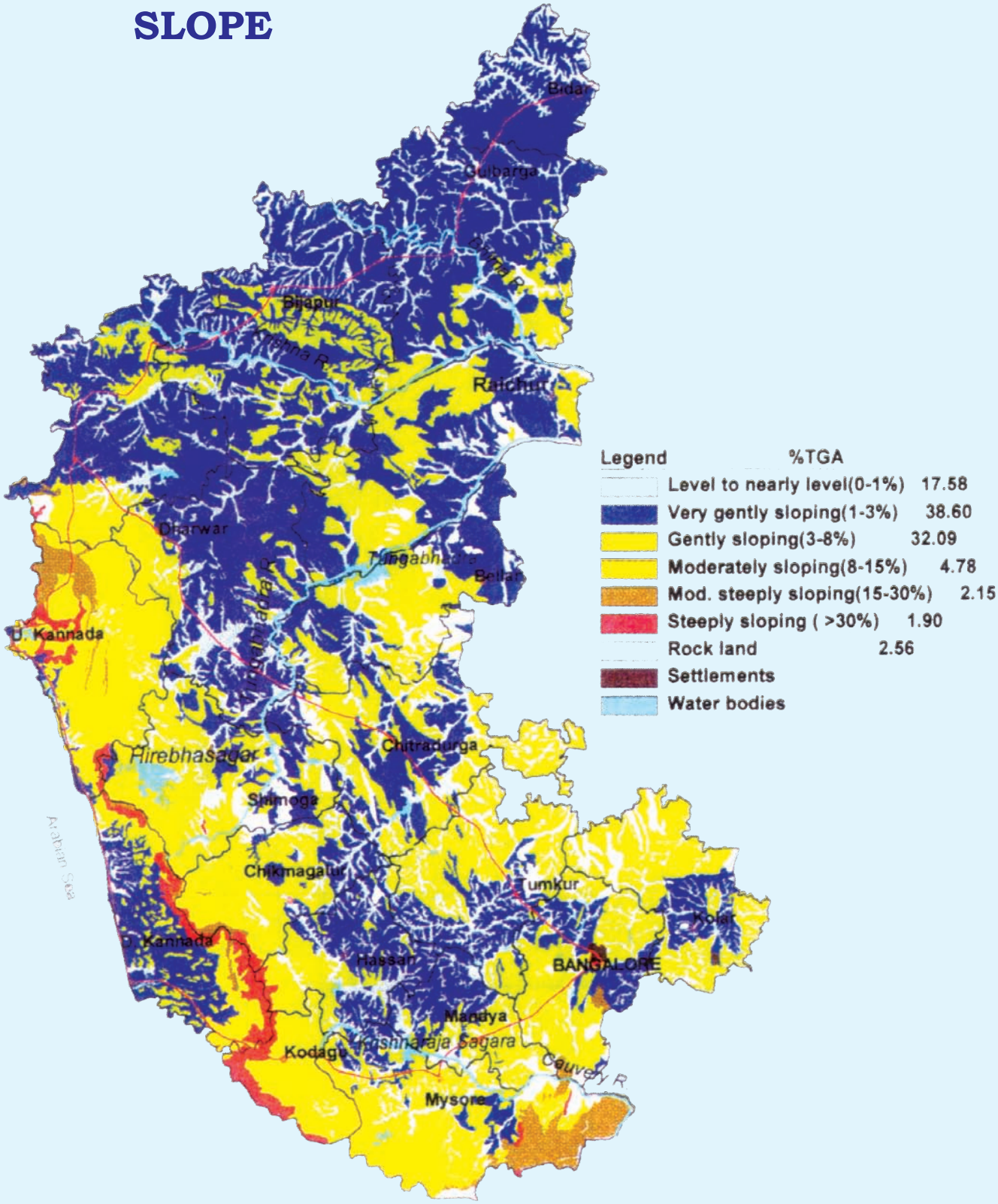
Output of Selected Minerals by District

Minerals	**District**	**Unit/Quantity**	**2010-11**
1	2	3	4
1. Asbestos	Hassan	Tonnes	=
	Mandya	Tonnes	-
	Total		0
2. Bauxite	Benlaum	Tonnes	31163
	D.Kannada	Tonnes	-
	Udupi	"	**31162**
	Total	"	**62325**
3. Chromite	Hassan	"	3152
4. Dolomite	Belagavi	"	50012
	Vijayapura	"	-
	Mysuru	"	-

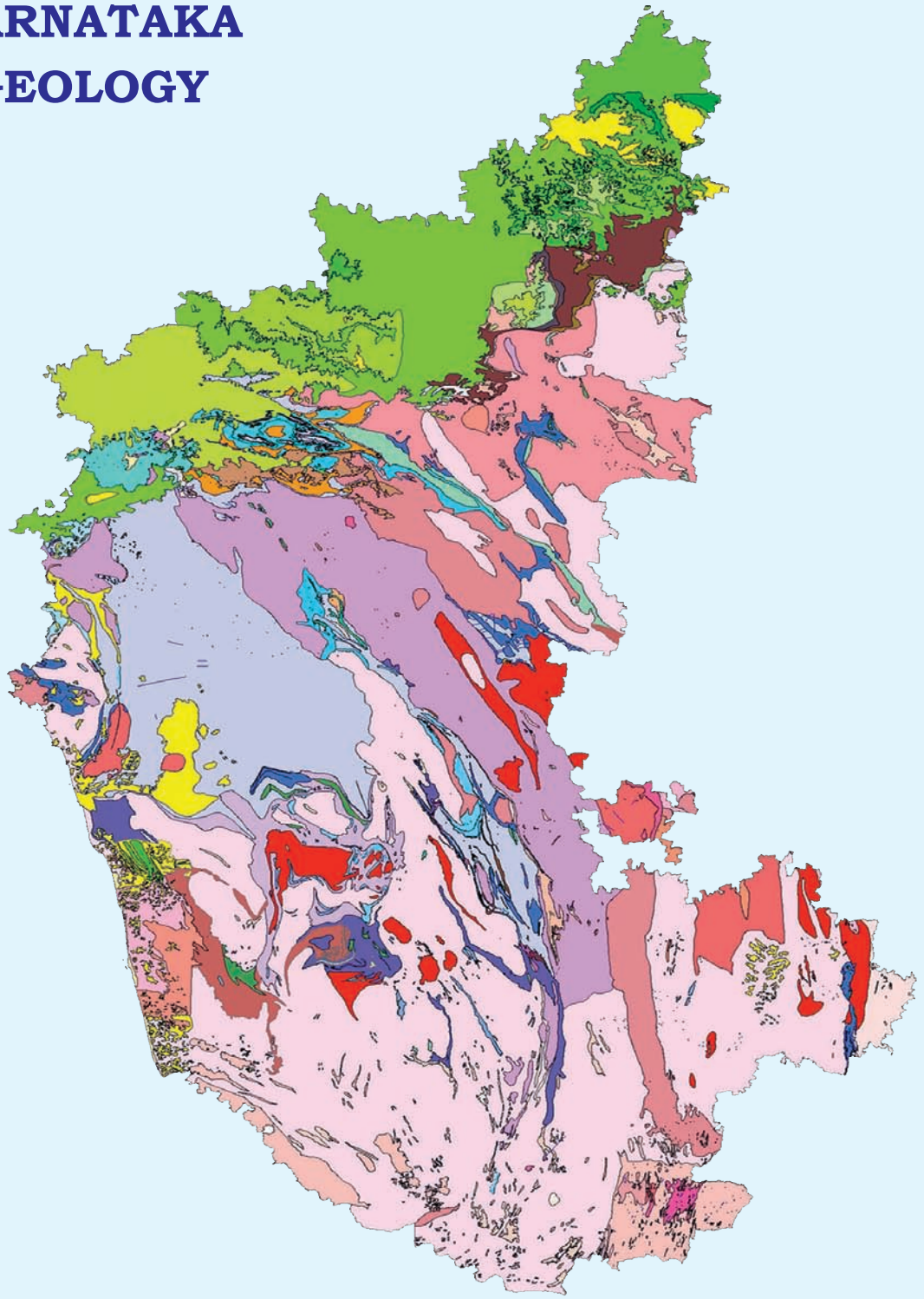
	Tumakuru	"	2090
	Bagalkot	"	34,899
	Total	**"**	**90153**
5. Gold	Kolar	gms	-
	Raichur	gms	2598294.26
	Total	**gma**	**2598294.26**
6. Iron Ore	Ballari	Tonnes	363336
	Vijayapura	"	-
	Chikkamagaluru	"	-
	Hospet	"	22143364
	Koppal	"	327260
	Chitradurga	"	5488407
	Dharwad	"	496
	Tumakuru	"	1272737
	Uttara Kannada	:	1166
	Bagalkote	"	306748
	Shivamogga	"	11500
	Gadag	"	22870
	Haveri	"	484
	Davanagere	"	20000
	Total	**"**	**29958458**
7. Lime stone	Belagavi	"	449163
	Vijayapura	"	-
	Kalaburgi	"	16251900
	Tumakuru	"	209419
	Uttara kannada	"	-
	Shivamogga	"	28000
	Chitradurga	"	155136
	Mysuru	"	-
	Bagalkote	"	2277176
	Total;	**"**	**18970794**
8. Manganese Ore	Belagavi	Tonnes	-
	Ballari	"	**-**
	Chitradurga	"	10468
	Shivamogga	"	-
	Tumakuru	"	12798
	Uttara Kannada	"	-
	Chikkamagaluru	"	-
	Haveri	"	110
	Davanagere	"	84846
	Total	**"**	**108222**
9. Magnasite	Mysuru	"	8558
	Total	**"**	**8558**

Source : Department of Mines and Geology

KARNATAKA SLOPE



KARNATAKA GEOLOGY



SYENITE
AMPHIBOLITE/HORN BLEND ESCHIST
BANDED FERROG INO US CHERT
DOLERITE & AMPHIBOLITE DYKES
FELSITE-PORPHYRY-DIORITE DYKE AND LAMP HROPHYRE DYKE
FERROGINOUS/MANGANIFERROUSCHERT=
FERRUGINOUSCHERT/B.H.Q/B.F.Q
GRANITE
IRON FORMATION
IRON STONE
MAGNATITE QUARTZITE
MANGANESE AND IRON FORMATION WITH PHYLLITE AND CHERT
META ULTRAMAFITE
METABASALT/META ANDESITE WITH FERROGENIOUS BANDS
PEGMATITE VEIN
PINK GRANULITE
PYROXENEGRANULITE
PYROXENEGRANULITE
PYROXENITE, GABBRO
QUARTIZITE
QUARTZ REEF
QUARTZ VEIN
QUARTZITE/SILLIMANITE./FUCHSITE

Water Resources

Karnataka accounts for about six per cent of the Country's surface water resources of 17 lakh million cubic meters (M.cum). About 40 per cent of this is available in the east flowing rivers and the remaining from the west flowing rivers.There are seven river basins which with their tributaries drain the State. The names of river system and the area drained by them are as follows:

River System		Drainage area		Estimated average Yield		
No.		000 sq.km	Per Cent	Mcum	TMC	Per Cent
1	Krishna	111.74	58.56	27,451	969.44	28.20
2	Cauvery	36.13	18.97	10,980	387.76	11.28
3	Godavari	4.43	2.32	1,415	49.97	1.45
4	West Flowing rivers	24.53	12.88	56,600	1,998.83	58.14
5	North Pennar	6.91	3.64	906	32	0.93
6	South Pennar	3.76	1.97			
7	Palar	2.97	1.56			
		190.50	100	97,352	3,438.00	100

Karnataka is blessed with water wealth in its numerous rivers and streams and to a limited extent in its groundwater. The development of water resources forms the very backbone of economic prosperity fof the State, especially of its rural areas. The rivers and river systems conform to the physiographic divisions, the principal water-divide being the Western Ghats stretching north-south, giving rise to west-flowing and east-flowing river systems. Nandidurg in the east is another source in which three river systems have their origin. The rivers of Karnataka swell in monsoons and many of them thin out thereafter to a mere trickle. The streams of the maidan are generally dry, but flow in flashy floods occasionally. The rivers of the coastal belt are west-flowing. The Sharavati, the Kalinadi, the Netravati, the Varahi, the Bedti (Gangavali) and the Aghanashini are the more important rivers all of which have considerable hydro-electric potential. They rise in the west of the Ghats and flow into the Arabian sea. It is an area of forests and hills with a rugged topography, characterised by deep ravines and steep hills rising to heights of 1,250 to 1,890 m which are the source of all the east-and west-flowing rivers of the State. The northern maidan, drained by the Krishna, the Ghataprabha, the Malaprabha, the Bhima and the Tungabhadra rivers is an extensive plateau with an average elevation of 610 m above mean sea level. The Krishna is the economic life-blood of the northern maidan. The southern maidan has a rolling topography, drained by the Cauvery, the Tungabhadra, the North Pennar, the Palar and the South Pennar of which the first two rise in the Western Ghats while the rest rise in Nandidurga hill ranges in Kolar district. All these rivers flow eastward into the Bay of Bengal.

Krishna Basin

The river Krishna is an Inter-State river in Southern India. It is the second largest river in Peninsular India, rises in the Western Ghats at an altitude of 1337 m. near Mahabaleshwar in Maharashtra State. It flows across the whole width of the peninsula, from west to east, for a length of about 1400 km, through Maharashtra, Karnataka and Andhra Pradesh. The Krishna Basin extending over 2,58,948 sq km is spread over three states viz., Maharashtra (69,425 sq km), Karnataka (113,271sq km)and Andhra Pradesh (76,252). About 43.74 per cent of the basin area lies in Karnataka, 26.81 per cent in Maharashtra and 29.45 per cent in Andlira Pradesh. The Krishna's course for 483 km lies in Karnataka State. Its major tributaries are the Bhima, the Koyna, and Panchganga, the Dudhganga, the Tungabbadra, the Hiranyakeshi, the Ghataprabha and the Malaprabha. Except for the Koyna and the Panchganga (barring 3 km along the State boundary), all these tributary rivers flow through Karnataka State. The Tungabhadra which has a drainage area of 66,237 sq km is the largest and the most important of the Krishna's tributaries.

Nearly 60 per cent of the area of the State lies in the Krishna basin. The high rainfall zone along the Western Ghats forms the western boundary of the Krishna basin for a distance of about 528 km. The width of this high rainfall zone, with an annual rainfall from about 300 cm to about 100 cm within the Krishna basin varies from almost nil to a maximum of about 56 km. At the east of the Western Ghats the annual rainfall decreases rapidly until it is less than 60 cm.

The Krishna : The river Krishna rises in the Western Ghats, at an altitude of 1,336.5 m just north of Mahabaleshwar, about 64 km from the Arabian Sea, and flows across the whole width of the peninsula, from west to east, for a length of about 1,400 km through Maharashtra, Karnataka and Andhra Pradesh. About 136 km from its source, the Krishna receives the waters of the river Koyna from the western side of the Mahabaleshwar Hills. Lower down, the Yerla falls into the Krishna from the left and then the Verna, the Panchganga and the Dudhganga from the right, the last three draining about 144 km length of the Western Ghats. Just near its confluence with Dudhganga and 299 km from its source, the Krishna enters Karnataka. At this point the river has come down to an altitude of about 533 m and has emerged from the heavy rainfall zone along and near the Western Ghats. After entering Karnataka, there is no major contribution to river flow for nearly 200 km until the Krishna receives from its right, the waters of the river Ghataprabha and 35 km lower down the waters of the river Malaprabha, both of which rise in the Western Ghats.

A short distance below the junction of the Malaprabha, the Krishna drops from the tableland of the Deccan proper, about 122 m down, to the alluvial lands of Raichur. The Chaya Bhagavati Falls in this reach is picturesque. Before the river enters Andhra Pradesh, at an altitude of about 343 m, it receives from its left at 782 km from its source, the waters of the river Bhima which brings down the drainage of Ahmadnagar, Pune, Sholapur and Kalaburgi. The Tungabhadra River falls into the Krishna about 128 km further down, near Kurnool. Both the Bhima and the Tungabhadra drain large areas of the Western Ghats and each is a major river in its own right.

The Ghataprabha : The river Ghataprabha rises in the Western Ghats at an altitude of 884 m and flows eastwards for a length of 283 km before joining the Krishna about 35 km north-east of Kaladgi, at an elevation of 500 m. The river flows for about 59 km in Ratnagiri and Kolhapur districts of Maharashtra before entering Belagavi district of Karnataka. Two of its tributaries, the Hiranyakeshi and the Markandeya, also rise in the Western Ghats and flow through Maharashtra and Karnataka. The river debouches by 53 metres at Gokak Falls (10 km from Gokak), a beauty spot of Belagavi district. The total catchment area of the river and its tributaries is 8,829 sq km in Maharashtra and Karnataka,

The Malaprabha: The river Malaprabba rises in the Western Ghats, at an altitude of 792.4 m, 16 km west of Jamboti in Belagavi district of Karnataka. The river flows first in an easterly and then in north easterly direction and joins the Krishna at Kudalasangama at an elevation of about 488 m, about 304 km from its source. The reach near Saundatti is through a deep gorge known as Navil Teertha or the Peacockgorge which is across colourful sandstone. Its principal tributaries are the Bennihalla, the Hirehalla and the Tas Nadi, all drain an area of relatively low rainfall. The total catchment area of the Malaprabha and its tributaries is 11,549 sq km wholly in Karnataka. Its principal source of supply is, however, only about 32 km length of the Western Ghats and a small area east of it, drained by the Malaprabha itself.

The Bhima: The river Bhima rises in the Western Ghats, at an altitude of about 945 m and flows south-eastwards through Maharashtra and Karnataka. It has a total length of 861 km and falls into the Krishna about 26 km north of Raichur at an altitude of about 343 m. About 136 km at the source, the Bhima receives, from its right the combined waters of the Mula and the Mutha from Pune and, about 29 km lower the Ghod joins the Bhima from the left. At this point the Bhima flows at an elevation of about 513.6 m and is well out of the heavy rainfall zone along near the Western Ghats. Lower down, it is joined on its right bank by the Nira, which also rises in the Western Ghats, and then by the Man. For a length of 83 km the Bhima runs along the boundary between Maharashtra and Karnataka. In this reach it receives the waters of the Sinal which rises near Ahmednagar. For the last 298 km of its course, the Bhima flows in Karnataka. No major tributary flows into the Bhima in this reach. The Bhima

has a drainage area of 70,614 sq km out of which 18,315 sq km lies in Karnataka.

The Tungabhadra: The Tungabhadra, an important tributary of the Krishna, is formed north sf Shivamogga, at an elevation of about 610 m by the union of the twin rivers, the Tunga and the Bhadra, which rise together inthe Western Ghats at Gangamula at an elevation of about 1,197.8 m, the united river Tungabhadra flows for nearly 531 km in a general north-easterly direction, through Karnataka and Andhra Pradesh and joins Krishna, beyond Kurnool, at an elevation of about 264 m. Among the tributaries of the Tungabhadra may be mentioned the Varada river which drains a large area of the western Ghats and falls into the Tunga, at an elevation of about 160 km. Another important tributary is the Hagari, called the Vedavati in its upper reach joining the Tungabhadra about 168 km above its junction with the Krishna. The Tungabhdra has a drainage area of 71,417 sq km out of which the catchment area in the State is 57,671 sq km and like the Bhima, drains about 206 km length of the Western Ghats.

The Vedavati: The river Vedavati known as the Hagari in lower reaches rises near Mullaiyyanagiri in the Western Ghats. It flows in the districts of Chikkamagaluru, Chitradurga and Ballari of Karnataka and Anantapur district of Andhra Pradesh covering a total catchment area of 23,498 sq km. It bas a total length of 391 km and of which the length in the State is 293 km and forms the common boundary between Karnataka and Andhra Pradesh for 26 km.

Cauvery Basin

The Cauvery basin extending over, 81,155 sq km is spread over three States viz., Karnataka, Kerala and Tamilnadu. A basin area of 42.2 per cent lies in Karnataka, 3.5 per cent in Kerala and 54.3 per cent in Tamilnadu. The river Cauvery has its origin in the Western Ghats in Kodagu district. Before it empties itself into the Bay of Bengal, it flows for a length of 804 km through the States of Karnataka and Tamilnadu. The river forms the boundary between these States for a length of 64 km. Of its total length, 320 km lies in Karnataka State. Its major tributaries in Karnataka are the Hemavati, the Lakshmanathirtha, the Harangi, the Kabini, the Suvarnavati, the Lokapavani, the Shimsha and the Arkavati. The area of the basin in Karnataka State is 34,273 sq km and its average annual flows are 11,000 M cum. The major contributions coming are from catchment areas in the districts of Kodagu, Chikkamagaluru and Hassan.

The Cauvery: The Cauvery is famous alike for its traditional sanctity, its picturesque scenery and its utility for irrigation. It is known as Dakshina Gariga or the “Ganges of the South” and the whole of its course is holy ground. The river rises in the Kodagu district of Karnataka, high up amid the Western Ghats. It flows in a generally south-east direction across the plateau of Karnataka and finally pours itself into the Bay of Bengal in Tamilnadu. The course of the Cauvery in Kodagu is tortuous; its bed is rocky; its banks are high and covered with luxuriant vegetation. In the dry season it is fordable almost anywhere, but during the rains it swells into a torrent 6 or 9 m deep. Before its confluence with the Kabini, a major tributary also rising in the Western Ghats, the Cauvery widens to an average breadth of from 300 to 400 m. From this point it swells to a much broader stream. Its bed continuos rocky.

There are a number of falls in the bed of the river and it forms three well-known islands-Srirangapatna, Shivasamudram and Srirangam. The first two are in Karnataka, the third at the head of the delta near Tiruchira- pally. Shivasamudram is famous as the site of the first major hydro-electric project constructed in Asia (1902). Not far from Srirangapatna, and up-stream of it, is the Kannambadi or Krishnarajasagara Dam (built in 1931) with the beautiful Brindavan gardens. From about 50 km below the power house at Shivasamudram, the Cauvery river forms the boundary between Karnataka and Tamilnadu for 64 km at the end of which the Cauvery enters Tamilnadu at the upstream of the Mettur reservoir. Three insportant falls along the course of the river are the Chunchana- katte Falls, the Shivasamudram Falls and the Hogenakal Falls. The Chunchanakatte Falls (about 20 m) is 60 km upstream of the Krishna- rajasagara Dam. At Shivasamudram, the river branches into two and each branch has a fall of more than 100 metres -the western fall is hown as Gaganachukki and the eastern fall as Bharachukki. The two branches then meet to pass through the Mekedatu gorge before the river forms the common boundary between Karnataka and Tamilnadu. In this reach

are the Hogenakal Falls (about 25 m) 60 km above the Mettur Dam.

The Hemavati : The Hemavati is one of the chief tributaries of the Cauvery. It rim on the Western Ghats at an elevation of 1,219 metres and runs south-east. After it is joined by some streams from the west, it turns east. Receiving the Yagachi from the north, it then winds round to Holenarasipur and runs south to the Cauvery near Krishnarajanagar. The catchment area is about 5,410 sq km. The approximate length of the river is 245 km.

The Kabini: The Kabini, a tributary of the Cauvery, rises in the Western Ghats at an elevation of 2,140 m in North Wynaad, as two streams, the Manantoddypuzha and the Panamrampuzha. About 16 km below their confluence, the Kabini forms the border between Kerala and Karnataka for nearly 12 km bofore entering the latter State. It turns east at 8 km above Kakanakote from where it receives the Nugu and at Nanjangud, the Gundal, both from the south. It joins the Cauvery at Tirumakudal Narasipur, the confluence being esteemed a spot of great sanctity. The Kabini is a fine perennial river, 137 m to 183 m wide and has a total course of about 230km. Its catchment area is about 7,040 sq km.

The Arkavati: The Arkavati in the Nandidurga hills is at an elevation of 1,480 m and joins the Cauvery after traversing 161 km. On it is built the Chamarajasagar reservoir for water supply to a part of Bengaluru City. Tt has got a drainage area of 4,351 sq km. The annual rainfall varies from 70 cm in the upper reaches to 80 cm in the lower reaches.

The Shimsha: The Shimsha rises in Tiptur taluk of Tumakuru district at an elevation of 914m. This is a tributary of the Cauvery joining on its left after traversing for 215 km. Its drainage area is about 8,470 sq km, The western half of the sub-basin receives an annual rainfall of Iess than 70 cm, while the eastern half gets 70 to 80 cm. Before joining the Cauvery, the Shimsha makes a descent of 94 m known as the Shimsha Falls.

The Moyar : The Moyar river forms the common boundary between Karnataka and Tamilnadu in Mysuru and Nilgiri districts respectively. It joins the Bhavani in Tamilnadu.

The Palar: The Palar river, a tributary to the Cauvery, forms the the common boundary between Karnataka and Tamilnadu in Mysuru district and Coimbatore district respectively.

Godavari Basin

A major part of the Bidar district lies in the basin of the Manjra, a tributary of the Godavari, Its catchment area in Karnetaka State, i.e 4,405 sq km. LikeKrishna basin, the Godavari also receives high rainfall in the Western Ghats. But only a small part of Godavari basin lies in Karnataka in Bidar district, in Manjra river sub-basin.

The Manjra: The river Manjra is one of the major tributaries of the Godavari river. It rises from Balaghat range of hills in Bhir district of Maharashtra State at an altitude of 823 m. The river flows through the Osmanabad district of Maharashtra, the Bidar district of Karnataka, Medak and Nizamabad districts of Andhra Pradesh. The length of the river from source to its confluence with the Godavari, at an altitude of 323 m is about 723 km of which 155 km lies in the Bidar district of Karnatalia. The Manjra river has a total catchment of 30,464 sq km in which 4,405 sq km lies in Karnataka.

The Karanja : The Karanja river is one of the principal tributaries of the Manjra, flowing in Bidar district of Karnataka State, It rises near Khir village in Medak district of Andhra Pradesh at an altitude of about 670 m. After flowing in Andhra Pradesh, it forms the boundary between Andhra Pradesh and Karnataka for nearly 16 km. It flows in Karnataka and joins Manjra at Naradasangam. It has a drainage area of about 2,839 sq km. The length of the river in Karnataka is 74 km, out of a total of 117 km from its source to confluence with the river Manjra.

Pennar and Palar Basins: The North Pennar, the South Pennar and the Palar rivers drain about onefifth of Tumakuru district, nearly one-third of Bengaluru district and the whole of Kolar district. The aggregate basin area of all these rivers in the State is 13,610 sq km and their average annual flow is 900 M cum. The basins of Palar and North and South.

The Uttara Pinakini : An inter-State river, the Uttara Pinakini, flowing in Karnataka and Andhra Pradesh rises in theChennakesha hills of the Nandidurga range in Karnataka. It is known as 'Pennar' in its lower reaches and is the fourth largest river of the Peninsula and next to the Cauvery.

DRAINAGE & RIVER BASINS

Flowing through the Kolar, Chikkaballapura and Tumakuru districts for a distance of 48 km it enters Andhra Pradesh in Hindupur taluk of Anantapur district. After flowing for 67 km through the Hindupur and Penukonda taluks of Anantapur district the river re-enters Karnataka and cuts across the Pavagada taluk of Tumakuru district for a distance of 13 km to emerge into Kalyanadurga taluk of Anantapur district in Andhra Pradesh. The total length of the river from its source to the Bay of Bengal is 597 km out of which 61 km are in Karnataka. The principal tributaries of the river in Karnataka are the Jayamangali in Tumakuru district, the Chitravati and Papaghni in Kolar District. Out of the total drainage area of 55,213 sq km it drains 6,937 sq km in Karnataka.

The Dakshina Pinakini : Another inter-State river, the Dakshina Pinakini flowing in Karnataka and Tamilnadu and Union Territory of Pondicherry, rises near Harvashettyhalli village in Kolar district at an elevation of about 900 m in the hill ranges of Nandidurga. After flowing for a distance of 79 km in Kolar and Bengaluru districts it enters Tamil nadu where it is known as 'Ponnaiyar'. It joins the Bay of Bengal near Cuddalore.

The Palar:Flowing in Karnataka, Andhra Pradesb and Tamilnadu, the Palar rises beyond Talagvara village in Kolar district at an elevation of 900 m in the hill ranges of Nandidurga. After flowing in a generally south-easterly direction for a length of 93 km in Kolar district, it enters Andhra Pradesh and joins the Bay of Bengal near Sadras in Tamilnadu.

West-Flowing Rivers

There are numerous west-flowing rivers, chief among which are Sharavati, the Kali, the Gangavali (Bedti), the Aghanashini and the Netravati which rise on the western side of the Ghats and drain into the Arabian Sea through the districts of Uttara Kannada and Dakshina Kannada. A small part of the catchment area of these rivers however lies in Dharwad, Shivamogga , Chikkamagaluru, Hassan, Belagavi and Kodagu districts also. The total catchment area of all west-flowing rivers is 26,214 sq km and their average annual flow is 57,000 M cum. The basin of these rivers comes under the direct influence of the south-west monsoon and receives heavy and assured rainfall between June and August.

The Netravati : The Netravati is the biggest river in the Dakshina Kannada district with a total length of 96km and catchment area of 3,355 sq km. It takes its birth near Same in Charmadi range of hills legendarily known as Varaha Parvata and is supposed to have originated from the Netra or eyes of Varaha, an avatara of Lord Vishnu, The main tributaries of the Netravati are the Neriyahole, the Kumaradhara, the Belthangadihole and the Shishilahole. It joins the Arabian Sea in the vicinity of Mangaluru.

The Kali : The Kali, a major west-flowing river takes origin in the Western Ghats in Uttara Kannada district, with a catchment area of 4,841 sq km. It joins the Arabian Sea at Karwar after covering a total length of 184 km. As the river flows through black rocks, the river appears black and the name of Kali (Black) is derived. The major tributaries of this river are the Pandari, the Tattihala, the Kaneri and the Vaki. A gigantic hydro-electric complex is under construction on the river Kali and its tributaries.

The Sharavati : The river Sharavati takes its origin in the Western Ghats near Ambutirtha in Tirthahalli taluk of Shivamogga district. This is supposed to have originated by the hitting of Lord Sri Rama's shara meaning arrow. Its length is about 128 km and has a drainage area of 2,771 sq km. The river drops to a vertical fall of about 253 m near Jog which is world famous. The Sharavati Hydro-Electric Project has the major contribution in the power generated in Karnataka. It joins the Arabian sea at Honavar in Uttara Kannada.

The Bedti: The river Bedti known as Gangavali in its lower reaches, takes its origin in the range of hills round about Dharwad-Hubli at an elevation of 700 m above the mean sea-level. The river has a length of about 161 km and a drainage area of 4,446 sq km. It joins the Arabian Sea near Gangavali Village in Ankola taluk of Uttara Kannada district. The river drops with a clear fall of 137 m near Magod, popularly known as Magod Falls at a distance of about 72 km from the source.

The Mahadayi : The Mahadayi river takes its origin near Degaon village in Khanapur taluk of Belagavi district. It is an interatate river flowing in Karnataka and Goa. The length of the river in Karnataka is 35 km and in Goa 45 km. The total catchment area of the river is 2,008 sq km; 455 sq km in Karnataka and 1,553 sq krn in Goa. It

joins the Arabian Sea near Panjim in Goa where the river is known as the Mandavi,

The Aghanashini : The river Aghanashini (meaning destroyer of sins) originates in Sirsi taluk of Uttara Kannada district at an elevation of 732 m above mean sea level. It flows entirely in Karnataka State for a length of 121 km before joining the Arabian Sea. The catchment area is 1,470sq km,

The Varahi : The Varahi river known as the Halady river in lower reaches takes its origin near Guddekoppa in Hosanagar taluk of Shivamogga district at an altitude of 762 m above the mean sea level. The bed level of the river drops suddenly in cascades by 457 m in a short distance and is known as Kunchical Falls. The river joins the Arabian Sea near Kundapur in Dakshina Kannada District,

The Barapole: The Barapole, an inter-State river flowing in Karnataka and Kerala, originates in the Western Ghats in Kodagu district. The name Barapole is derived from the word bara which means steep and pole means river. This river flows in the deep valleys forming either side very steep almost vertical precipice.

The total length of the river is about 105 km and of which about 31 km is in Karnataka, 64 in Kerala the remaining length of 10 km forming the common boundary. The catchment area of the river is 1,905 sq km (608 sq km in Karnataka and 1,297 sq km in Kerala).

The Chakra: The West-flowing Chakra rivel: passes through Dakshina Kannada district and discharges into the Arabian Sea near Kundapur. The length of the river is 72 km. The waters of this river are being diverted to Sharavathy Valley for augmenting the inflow into Lingana- makki reservoir.

Ground Water Resources

Traditionally, groundwater in the State has been exploited by open dug wells, constructed in the weathered mantle. After fast drilling rigs became available, borewells have been drilled extensively tapping the water stored in rock fissures and fractures. The water stored in the fractures and fissures ultimately comes from rainfall infiltrating through the weathered mantle. The ground water in the weathered mantle flows in the direction of the slope of the underlying fresh rock. Groundwater tends to accumulate in the valley areas. If the rate of extraction exceeds recharge, ground water is said to be mined. Mining cannot be sustained for long as it empties the ground water store.

About 4.4 per cent of India's ground water resources (2.7 lakh mcum) lies in Karnataka. The total annual recharge of ground water estimated in the State is about 17,99,591 hectare metres (ham). Net annual utilization is estimated at 5,76,921 ham as on 31-3-1991.

In the Malnad region, the annual recharge is estimated to be 10per cent of the annual rainfall. In the region where the rainfall is less than 700 mm, the evapotranspiration is also high, and the re-charge is less than 5per cent, for the rest of the State, the recharge is estimated to be between 5per cent and 10per cent.

As per Minor Irrigation Census 1986-87, there were more than 3.5 lakh open dug wells in the State. The depth to water level in these wells from the surface ranges between 2 and 3.5 metres in valley regions and in some places the depth goes even upto 18 metres. A large majority of the wells dry up in summer. Nearly half of the open wells are in a poor state of maintenance.

There were 38,899 shallow and 6,673deep tube wells as per the above Census. During recent years, borewells are increasingly coming into prominence. These are generally 150 mm in diameter and drilled to depth ranging from 30 to 60 metres. The average yield ranges from 60 to 80 litres per minute. In Kolar, Bagalkot and Vijayapura districts, nearly all the available surplus ground water has been exploited. During 1993-94, there were 1,64,728 borewells, 4,70,981 wells used for irrigation purpose, 3,03,698 wells used for domestic purpose and 74,730 wells were not in use.

CLIMATE

The State enjoys three main types of climates. For meteorological purposes, the State has been divided into three sub-divisions namely (a) Coastal Karnataka (Dakshina Kannada, Udupi and Uttara Kannada districts), (b) North Interior Karnataka (Belagavi, Bidar, Vijayapura, Bagalkot, Dharwad, Gadag, Haveri, Kalaburgi, Yadgir, Raichuand Koppal districts), and (c) South Interior

Karnataka (the remaining districts of Bengaluru Rural, Bengaluru, Ballari, Chikkamagaluru,k Chitradurga, Davanagere, Kodagu, Hassan, Kolar, Mysuru, Chamarajanagar, Mandya, Shivamogga and Tumakuru districts. The Tropical Monsoon climate covers the entire coastal belt and adjoining areas. The climate in this region is hot with excessive rainfall during the monsoon season i.e, June to September. The Southern half of the State experiences hot, seasonally dry tropical savana climate while most of the northern half experiences hot, semi-arid, tropical steppe type of climate.

The climate of the State varies with the seasons. The winter season from January to February is followed by summer season from March to May. The period from October to December forms the post-monsoon season.

The period from October to March, covering the post-monsoon and winter seasons, is generally pleasant over the entire State, except during a few spells of rain associated with north-east monsoon which affects the south-eastern parts of the State during October to December.

The months April and May are hot, very dry and generally uncomfortable. Weather tends to be oppressive during June due to high humidity and temperature. The next three months (July, August and September) are some what comfortable due to reduced day temperature although the humidities continue to be very high..

Temperature : Both day and night temperatures are more or less uniform over the State, except at the coastal region and high elevated plateau. They generally decrease south-westwards over the State due to higher elevation and attain lower values at high level stations.

April and May are the hottest months. In May, mean maximum temperature shoots upto 400 C over the north –eastern corner of the State, decreasing south-westwards toward the Western Ghat region and the Coastal belt.

The highest temperature recorded at an individual station in the State is 45.6 o C. at Raichur on 1928 May 23 which is 60 higher than the normal for the warmest months. December and January are the coldest months. The lowest temperature at an individual station was 2.80 C on 1918 December 16 at Bidar. Temperatures at selected centres are given in next page.

Sub-Divisions	Mean daily temperature ^{0}C	
	Maximum	Minimum
Interior Karnataka		
a. North	32.0	20.4
b. South	29.7	19.2
Coastal Karnataka	30.7	23.3

Temperature at Selected Centres in Karnataka

Sl. No.	Location of the Observatory	2010 Highest	2010 Lowest
1	2	3	4
1	Bengaluru C.O.	37.6	12.9
2	Bengaluru AP	37.2	9.4
3	Sambre	39.1	7.8
4	Ballari	42.0	10.5
5	Vijayapura	43.0	6.0
6	Bagalkot	40.8	10.4
7	Balehonnur	36.4	11.5
8	Chikkamagaluru	35.5	12.6
9	Chitradurga	38.8	10.0
10	Bajpe	37.9	19.2
11	Gadag	40.3	9.8
12	Kalaburgi	46.1	7.2
13	Hassan	37.8	10.2
14	Madikeri	34.0	7.3
15	Mandya	38.2	10.2
16	Mysuru	36.9	9.8
17	Raichur	43.8	7.3
18	Agumbe	35.8	8.8
19	Honnavar	36.9	16.1
20	Karwar	37.7	16.9
21	Shirali	36.6	17.00
22	Chiukkanahalli	39.0	**
23	Chintamani	37.6	7.5
24	Panambur	35.7	19.6

***** Data Not Available***

Source : India Meteorological department, Bangalaore.

District-wise Monthly and Seasonal Normal Rainfall in mm in Karnataka (1901-1970)

Name of the District	No. of Taluks	Jan	Feb	Mar	April	May	Premon	June
Bengaluru	3	4.70	7.70	7.50	41.90	115.90	177.70	68.90
Bengaluru Rural	8	4.30	6.00	8.10	42.10	107.40	167.80	68.20
Chitradurga	6	3.20	4.10	4.60	21.30	62.70	95.90	48.50
Davanagere	6	2.40	3.50	8.40	34.70	78.00	127.00	65.90
Kolar	11	6.90	5.80	8.90	33.30	80.10	135.10	61.10
Shivamogga	7	1.60	1.70	8.20	44.00	88.80	144.30	310.50
Tumakuru	10	3.10	4.10	6.10	29.60	80.90	123.80	60.60
Bengaluru Division	**51**	**3.74**	**4.70**	**7.40**	**35.27**	**87.69**	**138.80**	**97.67**
Bagalkot	6	2.10	2.70	5.10	23.90	48.00	81.90	65.10
Belagavi	10	2.00	1.60	7.60	33.20	65.00	109.40	104.60
Vijayapura	5	2.90	4,00	6.10	18.70	35.80	67.50	79.40
Dharwad	5	0.80	3.20	7.00	45.20	84.80	140.90	95.20
Gadag	5	1.60	2.40	4.10	34.80	71.40	114.30	69.60
Haveri	7	1.70	1.60	4.60	39.60	77.40	124.90	95.70
Uttara Kannada	11	1.20	1.10	4.10	28.20	103.10	137.60	680.30
Belagavi Division	**49**	**1.76**	**2.37**	**5.51**	**31.94**	**69.36**	**110.93**	**169.99**
Ballari	7	1.80	3.20	3.70	27.40	64.60	100.70	65.70
Bidar	5	3.30	5.50	10.70	21.80	23.60	64.80	132.30
Kalaburgi	10	2.70	3.90	9.60	18.60	33.00	67.80	108.30
Koppal	4	0.90	0.40	1.90	22.90	50.30	76.30	61.60
Raichur	5	1.00	1.70	5.50	17.20	34.40	59.90	75.50
Kalaburgi Division	**31**	**1.94**	**2.94**	**6.28**	**21.58**	**41.18**	**73.90**	**88.68**
Chamarajanagar	4	4.40	4.50	11.20	66.10	139.80	225.90	47.50
Chikmagalur	7	3.10	3.50	9.20	55.40	102.00	173.20	300.50
Dakshina Kannada	5	4.80	2.50	10.40	47.20	172.20	237.10	940.40
Hassan								
Kodagu	8	3.80	4.50	8.30	57.60	112.00	186.00	119.60
Mandya	3	5.00	5.60	14.70	73.50	146.70	245.50	486.00
Mysuru	7	2.20	4.50	8.00	49.20	116.10	180.00	42.20
Udupi	7	3.50	5.50	12.50	65.90	138.70	226.20	65.20
	3	3.50	1.80	5.10	37.00	169.70	217.10	1055.00
Mysuru Division	**44**	**3.79**	**4.05**	**9.93**	**56.49**	**137.15**	**211.38**	**382.05**
STATE	**175**	**2.81**	**3.52**	**7.28**	**36.32**	**83.84**	**133.75**	**184.60**

Premon- Pre Monsoon, SWMON- Southwest Monsoon, NEMON- Northeast Monsoon

July	Aug	Sep	SWMON	Oct	Nov	Dec	NEMON	ANNUAL
99.40	122.70	148.70	439.60	168.20	64.30	16.90	249.40	866.80
84.00	111.90	151.20	415.30	157.50	62.60	13.40	233.50	816.60
62.90	67.60	99.40	278.30	123.90	45.80	11.80	181.50	555.70
97.50	79.90	86.70	329.90	119.90	42.40	10.00	172.30	629.10
81.00	100.00	145.60	387.80	135.80	68.20	16.50	220.60	743.50
686.40	352.60	134.30	1483.80	148.40	45.10	10.10	203.60	1,831.70
68.90	85.00	127.70	342.20	142.00	56.00	10.20	208.10	674.20
168.59	**131.39**	**127.66**	**525.27**	**142.24**	**54.91**	**12.70**	**209.86**	**873.94**
72.50	67.40	140.70	345.70	92.80	33.50	7.70	134.00	561.60
206.20	121.40	109.00	541.20	111.90	38.10	8.80	158.80	809.40
79.70	78.20	162.70	400.00	83.70	30.20	8.10	122.00	589.60
151.80	99.80	112.30	459.00	119.60	42.20	9.80	171.60	771.50
68.40	69.80	128.20	336.00	116.30	36.70	9.00	162.00	612.30
172.40	103.30	85.60	457.00	122.20	38.80	10.80	171.80	753.70
1,007.60	555.40	250.20	2,493.40	148.00	48.80	12.10	209.00	2,840.00
251.23	**156.47**	**141.24**	**718.90**	**113.50**	**38.33**	**9.47**	**161.31**	**991.16**
83.10	95.20	144.70	388.70	103.70	32.80	8.40	144.90	634.30
182.50	180.50	194.90	690.30	70.50	18.30	4.90	93.70	848.80
161.20	144.80	192.40	606.70	80.90	16.10	5.20	102.10	776.50
82.60	87.80	135.00	367.00	100.20	19.40	6.60	126.20	569.40
108.00	112.80	152.10	448.40	84.00	22.10	6.70	112.80	621.10
123.48	**124.22**	**163.82**	**500.22**	**87.86**	**21.74**	**6.36**	**115.94**	**690.02**
52.80	67.60	99.70	267.50	162.80	75.70	19.10	257.60	751.00
673.40	382.10	159.80	1,515.90	163.90	59.40	15.70	239.10	1,928.10
1,301.20	806.00	321.10	3,368.60	980.10	629.50	18.90	369.30	3,974.90
246.40	140.50	103.90	610.30	158.90	67.80	16.00	242.70	1.039.10
938.30	529.30	218.90	2,172.60	201.70	79.70	18.70	300.00	2.718.20
45.50	62.20	115.60	265.40	161.40	60.70	13.20	235.30	680.70
99.50	76.00	89.00	329.70	151.70	61.20	13.50	226.30	782.20
1.341.60	800.40	383.20	3,580.30	224.10	78.30	19.20	321.60	4,119.00
587.34	**358.01**	**186.40**	**1,513.79**	**275.58**	**139.04**	**16.79**	**273.99**	**1,999.15**
282.66	**192.52**	**154.78**	**814.54**	**154.79**	**63.51**	**11.33**	**190.27**	**1,138.57**

Rainfall

The annual rainfall in the State varies roughly from 50 to 350 cm. In the districts of Vijayapura, Bagalkot, Raichur, Koppal, Ballari, Yadgir and southern half of Kalaburgi, the rainfall is lowest varying from 50 to 60 cm. The rainfall increases significantly in the western part of the State and reaches its maximum over the coastal belt. The south west monsoon is the principal rainy season during which the State receives 80per cent of its rainfall. Rainfall in the winter season (January to February) is lessthan one per cent of the annual total, in the hot weather season (March to May) about 7per cent and in the post-monsoon season about 12per cent.South-west monsoon normally sets in over the extreme southern parts of the State by about 1st June and covers the entire State by about 10th of June. The rainy months July and August account individually to about 30per cent and 18per cent of annual rainfall. There are about 26 rainy days (with daily rainfall of atleast 2.5 mm) in Coastal Karnataka and 8 to 11 days in interior Karnataka in each of these months. The withdrawal of the southwest monsoon begins from the northern parts of the State around 2nd week of October and by the 15th October monsoon withdraws from the entire State. The retreating monsoon current i.e. the north-east monsoon (October to December) effects the eastern parts of South Interior Karnataka and accounts for about 30per cent of rainfall in this region during the above period.Out of the 14 heavy rainfall stations in India, with annual rainfall of more than 500 cm., four stations are located in Karnataka. They are Agumbe in Tirthahalli taluk of Shivamogga district (annual rainfall-828cm) and Bhagamandala (603 cm), Pullingoth (594 cm) and Makut (505 cm) in Kodagu district. Agumbe can be called as the Chirapunji of Southern India. (Source : Drought Monitoring Cell, Department of Science and Technology, Bengaluru.)

Normal and Actual Average Rainfall by District

(Unit : In millilmetres)

District	Normal	Actual Average 2010
1. Bagalkote	584	633
2 .Bengaluru	832	884
3. Bengaluru Rural	740	782
4. Belagavi	842	1190
5. Ballari	604	672
6. Bidar	886	1040
7. Vijayapura	632	588
8.Chamarajanagara	730	867
9.Chikkaballapur	677	934
10.Chikkamagaluru	2073	1998
11.Chitradurga	495	891
12.Dakshina Kannada	3519	4471
13.Davanagere	623	969
14.Dharwad	787	873
15.Gadag	631	696
16. Kalaburgi	842	881
17. Hassan	1148	1676
18. Haveri	782	1016
19. Kodagu	2692	2647
20. Kolar	614	806
21. Koppal	587	751
22. Mandya	648	864
23. Mysuru	730	873
24. Ramanagara	809	798
25. Raichur	654	653
26. Shivamogga	2421	2754
27. Tumakuru	585	841
28. Udupi	4252	5084
29. Uttara Kannada	2887	2879
30 Yadgir	832	830
Karnataka	1197	1500

Note : Normal 50 years average

Source : Directorate of Economics and Statistics

FAUNA

Wild animals that are found in Karnataka include the elephant, the tiger, the leopard, the gaur, the sambar deer, the chital or spotted deer, the muntjac, the bonnet macaque, the slender loris, the common palm civet, the small Indian civet, the sloth bear, the dhole, the striped hyena and the golden jackal. Some of the birds found here are the Great Hornbill, the Malabar Pied Hornbill, the Ceylon frogmouth, herons, ducks, kites, eagles, falcons, quails, partridges, lapwings, sandpipers, pigeons, doves, parakeets, cuckoos, owls, nightjars, swifts, kingfishers, bee-eaters and munias. Some species of trees found in Karnataka are Callophyllum tomentosa, Callophyllum wightianum, Garcina, cambogia, Garcina morealla, Alstonia scholaris, Flacourtia montana, Artocarpus hirsutus, Artocarpus lacoocha, Cinnamomum

zeylanicum, Grewia tilaefolia, Santalum album, Shorea talura, Emblica officinalis, Vitex altissima andWrightia tinctoria. Wildlife in Karnataka is threatened by poaching, habitat destruction, human-wildlife conflict and pollution.

The State of Karnataka has arich heritage of flora and fauna. The hill chain of Western Ghats is the only part of the State to retain some semblance of its natural biological heritage. This last refuge of the native fauna is subjected to rapid decimation with the coining up of several hydro-electric and irrigation projects, mining, the accelerated pace of forest exploitation and the increasing demand of land for plantation and crop husbandry. The area under forests in Karnataka today amounts to 43,356.45 sq.km i.e. 22 per cent of the total land area of the State. With the notable exception of Bonnet Macaque, which is under widespread religious protection throughout the State, the larger wild mammals are almost confined to the forest areas. The wildlife bearing forest areas of Karnataka are divided into six regions viz, Coastal region, crestline of the Western Ghats, Malnad, Old Mysuru Plateau, Kollegal hills and Maidan. The natural distribution of animals is largely determined by vegetation.

Region I – Coastal Region: The district of Uttara Kannada and parts of Belagavi constitute the northern-most sector of the hill tracts of Karnataka. These hilly tracts have vegetation ranging from evergreen to dry deciduous types. Due to Kalinadi hydroelectric project and a great deal of Iron and Manganese ore mining, the habitat is highly fragmented and the forest cover is greatly disturbed. In this region, as per observed data, the gaur are scattered, sambar are much more widely distributed. Wild pig is most abundant and spotted deer is seen in majority of areas. Elephants are found scattered over a wide region.

The Carnivores-tiger, panther and wild dog occur in low populations. This region was extremely rich in wild life in the past especially tiger and gaur and today have been recued in number substantially.

Region II – Crestline of Western Ghats: This region lies south of Uttar Kannada. There is a narrow belt of forest following this crestline of Ghats. The vegetation ranges from evergreen to moist deciduous. Most of the major animals occur in this region but their population on the whole is very poor. Only a few isolated herds of elephants are found here. The gaur and sambar are frequently seen while the spotted deer occurs sporadically. Barking deer and sloth bear are also reported to be present. Wild pig is omnipresent. The Carnivores – tiger, panther and wild dog are present but their occurrence rating is very low. This region is a poor habitat for most large herbivores and consequently for carnivores.

Region III – Malnad; This is characterized by dry and moist deciduous vegetation. The area is marked by conspicuous hills like Bababudangiri range. This region has one of the best wildlife concentrations only second to Mysuru plateau in the State, harbouring populations of elephants, gaur, sambar, spotted deer, wild pig etc. The anthropogenic pressures over this area are much less and hence the wildlife is somewhat less molested. The presence of perennial rivers, reservoirs and plenty of bamboos, grass and other fodder species with a moderate rainfall makes this region an ideal habitat for elephants.

Region IV – Mysuru Plateau: The western edge of Mysuru Plateau, flanked on three sides by the southern-most ranges of the Sahyadris, Nilgiris and eastern spur of hills towards the Biligirirangana Hills, is an undulating plain and is covered by moist and dry deciduous forests. This area has the richest wildlife concentrations in South India, harbouring large herds of elephants, spotted deer, wild pig, wild dog, sloth bear, gaur, sambar and occasionally tiger and cats.

Region V – Kollegal Hills : This hilly area is an eastern spur of the Western Ghats. Apart from the moist deciduous or semi-evergreen forests on these hills, the rest of the region is covered by dry deciduous forest mostly degraded into scrub. Elephant, sambar, spotted deer and wild pig occur throughout this region. The wild dogs have fairly extensive distribution, though tiger, gaur and panther are much more restricted. Almost all the wild life species occur in this region in small numbers except elephants.

Region VI Maidan : There is very little forest in the Maidan areas on the Deccan Plateau and whatever is left is in highly degraded form. Ranibennur is notable for the occurrence of good herds of black bucks. Wolves are becoming rare but have been reported from several places in this plains.

FLORA

Karnataka State has a rich and varied vegetation resulting from several lines of plant migration conditioned by climate, soil and topography. Biotic factors have in many areas modified the original climaxes evolved through the centuries. Considering topography, bio-climate and soil, the vegetation of Karnataka could be grouped under the following four categories viz. 1) Littoral vegetation, 2) West coast tropical vegetation 3) Upland deciduous vegetation and 4) Southern tropical montane vegetation.

Littoral Vegetation: There are two types of littoral vegetation in Karnataka. The first is terrestrial on the sand dunes and the second, halophytic along estuaries. The limitations imposed by the scorching sun, shifting sands and salt-laden winds are overcome by special plants called psammophytes. The dunes above the tide mark are held down by a number of sand binders. Sundews and bladder worts often form a seasonal carpet on the wet sands of the rear beach.

Limited mangrove formations occur in the riverine estuaries where the salinity gradient rises rapidly towards the sea. The best examples of halophytic vegetation are near Kundapur and Gokarna. It is mostly of the Rhizophora Avicenia – Bruguiera type. The trees and shrubs have to overcome the restrictions of a marshy saline habitat with strong tidal currents and fluctuations in water level as well as the asphyxiating conditions of a slushy soil. These littoral plant formations have ecological role in the balance of nature. The psammophytes help in preventing the sand of the beaches from being blown landwards on to agricultural lands and human habitations. They also protect the beaches for their recreational value. Mangroves stabilize the river embankments against erosion. They afford breeding ground to several fishes and other marine animals.

Moist Deciduous Coastal Vegetation: The natural vegetation in this region immediately to the east of the coastline is of the secondary moist deciduous type. It is sometimes considered a degraded stage of an evergreen climax.

In the broader coastal low land of Dakishina Kannada, the Hopea – Syzygium – Holigama series is usually found with dense understorey of shrubs like Grewia, lxora and Psychotria.lianasespecially Hugonia mystax and Uvaria riorum are frequent. The secondary moist deciduous forests are better preserved towards the foothill of the Ghats. The biotic factor which is high in the vicinity of the Coastal urban centres is less towards the Ghats.

West Coast Tropical Evergreens : The lower slopes and valleys of the Ghats present fine examples of the West Coast tropical evergreen forests. These close canopy forests are nurtured by the heavy seasonal precipitation to form a climax vegetation. Erect buttressed trunks, unbranched for 20 or more metres fan out to meet the contiguous tree tops. There are several variations in the dominant canopy trees. The commonest association is of Eupterocarpus – Kingiodendron-Vataria between 70 and 600 metres above the mean sea level. There are several other plant forms in these forests. The biological diversity and its spatial distribution within the forest apportions solar energy as effectively in the conversion of water and carbon dioxide into life sustaining organic compounds.

Upland moist Deciduous Vegetation: The decreasing rainfall on the leeward side of the mountain gives rise to another climax type – the upland moist deciduous vegetation. While in leaf, the canopy of these forests is dense, during the dry months there is a short period of leaf fall to avoid loss of water due to transpiration. Flowering of the trees occurs during the leafless period. This moist deciduous belt running from Belagavi toKodaguis the habitat of the Tectona – Dillenia – Lagerstroemia – Termitinalia series which include teak, matti, kanagalu, nandi, which areessentially local names. Extensive areas on the eastern fringe of the Ghats were once covered with clumps of bamboos.

Upland dry deciduous vegetation: The bioclimate of the eastern part of the Maidan permits a climax dry deciduous vegetation in several protected areas. The canopy is open and the trees leafless during the driest months. Flowering and fruiting are generally far advanced before the first flush of new leaves appears with the conventional showers in April-May.

Upland thorn and scrub: There are several parts of Chitradurga, Davanagere, Ballari, Racihur, Koppal, Kalaburgi, Yadgir and Bidar districts where broad leaved deciduous forests give place to armed trees with tiny leaflets. Some remaining patches of these forests are made-up of Acacia, Albizia and Hardwickia. (Jali, Bilwara, ennemara

being local names). The Maidan is dotted with numerous irrigation tanks usually supporting an interesting aquatic Jlora.

Southern Tropical Montane Vegetation: An altitudinal variation of the tropical evergreens, is found above 1,500 metres especially at Kudremukh, and in the Bababudan and Biligirirangana Hills. This vegetation of grassy meadows and low wooded patches forms the Southern Tropical Montane Vegetation. The grassy mountain meadows present a quick succession of herbs that appear in short lived profusion. A good part of the wet forests has been greatly altered by biotic factors.

The vegetation dynamics in Karnataka indicate several changes in the natural vegetation due to biotic factors especially human intervention. Inhabited coastal areas present a thick canopy of coconut tress. The climax formations of dry types of vegetation with a distinct canopy, an understorey of shrubs and a ground cover of herbs are confined to a few inaccessible pockets or to areas of reserved forests. Felling for fuel and grazing especially by goats threatened even these remnants of the original plant cover. The forest unless covered, is slowly converted into grasslands with scattered trees. In some areas forests have been cleared and low lying areas are converted into paddy fields while the hilly terrain is often planted with plantation crops.

FORESTS

Karnataka State has a geographical area of 1,91,791 sq. km of which 43356.45 sq. km (22per cent) is under the control of the Forests Department. The forests are classified as reserved (29550.19 sq.km), protected 3585.22 sq.km), unclassed (10,117.92 sq.km), village (49.05 sq.km), and private (54.07 sq.km) forests. The unclassed areas include C and D class lands which are mostly barren, transferred from the Revenue department. The per cent age of forest area to geographical area in the State is less the all-India average of about 23per cent, and 33per cent prescribed in the National Forest Policy. The area under forests in the neighbouring States is as follows: Andhrapradesh 62 lakh ha (9per cent of the total area of the Country), Maharashra 54 lakh ha (8per cent), Tamilnadu 22 lakh ha (3per cent) and Kerala 11 lakh ha (2per cent).

Distribution of Forest area by Legal Status and by Type as on 2010-11
(As per Reconstituted Expert Committee – Report)

(Area in Square Kilometres)

	Particulars	
1	By Legal Status (A to E)	
A	State/Reserve Forest	29,550.19
B	Minor or Protected Forests	3,585.22
C	Unclassified Forest	10,117.92
D	Village forests	49.05
E	Private Forests	54.07
	Total	**43,356.45**
2	By Type (A to F)	
A	Ever Green Forests	4,926.02
B	Semi Ever Green Forests	1,644.20
C	Moist Deciduous Forests	6,545.00
D	Dry Deciduous Forests	8,233.22
E	Scrub & Thorny Forests	9,264.01
F	Unwooded	12,744.00
	Total	**43,356.45**

Districtwise Forest Area By Legal Status As On 2010-11
(As per Reconstituted Expert Committee-I Report)

(Area in square Kilometres)

Sl.No.	District	Reserve	Protected	Unclassed	village	Private	Total
1	Bengaluru-U	24.92	2.74	94.59--	-	-	122.25
2	Bengaluru-R	980.51	83.04	101.30	-	-	1,164.85
3	Ramanagara						
4	Belagavi	1,890.97	10.30	159.60	2.33	-	2063.20
5	Ballari	947.80	321.69	109.03	-	-	1,378.52
6	Bidar	54.67	124.91	274.98	-	-	456,16
7	Vijayapura	17.22	0.11	63.78	-	-	81.11
8	Bagalkote	790.69	-	48.24	-	-	838.93
9	Chikkamagaluru	1,277.01	348.47	1,122.17	8.86	-	2,756.51
10	Chitradurga	765.11	72.59	449.48	-	-	1,287.18
11	Davanagere	460.94	27.64	55.76	-	-	544.34
12	Dakshina Kannada	1,311.74	0.15	647.82	-	52.47	2,012.18
13	Udupi	951.34	16.87	752.36	-	-	1,720.57
14	Dharwad	449.10	2.88	16.54	-	-	468.52
15	Gadag	320.93	3.56	8.88	-	-	333.37
16	Haveri	346.31	9.88	76.61	-	-	432.80
17	Kalaburgi	269.26	230.50	498.00	-	-	997.76
18	Yadgir						
19	Hassan	412.13	90.18	376.25	0.69	-	879.25
20	Kodagu	1,366.94	105.45	1,398.60	-	-	2,870.99
21	Kolar	832.79	84.51	145.80	3.12	-	1,066.22
22	Chikkaballapura						
23	Mandya	198.61	20.69	445.31	-	-	664.61
24	Mysuru	1,208.75	5.53	235.59	-	-	1,449.87
25	Chamarajanagara	2,698.47	63.88	29.11	-	-	2,791.46
26	Raichur	186.30	41.75	97.52	-	-	325.57
27	Koppal	151.71	55.54	223.41	-	-	430.66
28	Shivamogga	3,127.66	1,190.99	2,305.35	7.44	-	6,631.44
29	Tumakuru	780.60	129.24	381.40	0.43	-	1,291.67
30	Uttara Kannada	7,727.71	542.13	0.44	26.18	-	8,296.46
	Total	29,550.19	3,585.22	10,117.92	49.05	54.07	43,356.45

Out-Turn Of Major Forest Produce

Sl. No.	Type of Production	Unit	2010-11
1	2	3	4
1	Rosewood	Cubic Metres	2,305.410
2	Teak Wood	Cubic Metres	2,453.761
3	Sawn timber	Cubic Metres	1,668.985
4	Other Kinds of timber	Cubic Metres	30,214.028
5	Eucalyptus	Cubic Metres	4,526.159
6	Pulp wood (and match wood for 2010)		45,016.670
7	Soft Wood	Cubic Metres	1,380.523
8	Round poles	Cubic Metres	13,289.049
9	Fire wood	Cubic Metres	1,18,590.431
10	Sandal wood	Kiograms	8,093.809
11	Bamboo	Cubic Metres	33,907.213
12	Canes	Nos.	2,63,130

Source : Forest Department

Out-Turn Of Minor Forest Produce

Sl.No.	item	unit	2010-11
1	Charcoal	Tonnes	4
2	Cane	Tonnes	-
3	Rubber	Tonnes	-
4	Cashewnuts	Tonnes	-
5	Ivory	Kgs	47.04
6	Jpmeu	Tonnes	-
7	Wax	Tonnes	84.16
8	Tamarind	Tonnes	2.18
9	Seegekai	Tonnes	186.3779.442
10	Gums	Tonnes	-
11	Antavalakai	Tonnes	196.49
12	Halamaddi(Dhoopa)	Tonnes	190.70
13	Other seeds	Tonnes	2.00
14	Alalekai	Tonnes	183.54
15	Beedi leaves	Tonnes	8.71

Source : Forest Department

Revenue From Forests

(Unit in Lakhs rupees)

Year	Timber	Sandalwood	Bambaoo	Miscellaneous	Total
1	2	3	4	5	6
2010-11	5389.323	453.287	230.464	10394.849	16467.923

About two lakh ha. of forest area is lost for non-forestry purposes since 1956 to 1986-87 and the details are as follows : For hydroelectric purposes : 22,194 ha,. Electricity lines 1,688 ha, roads : 330 ha, tanks – 35,840 ha, townships m- 1,791 ha, mining – 42,676 ha, agriculture – 67, 217 ha, rehabilitation – 25,820 ha, other purposes 6,357 ha and total 2,03,913 ha. The outturn of major forest produce for the year 2010-11 is as follows : 1) Timber – a) Rosewood 2305.410 M3, b) Teak – 2459.382 M3 c) Other kinds of timber – 30344.176 M3, 2) Pulpwood – 51207.558 M3 3) Firewood – 120204.543 M3,4) Bambaoo – 33,907.204 M3 and 5) Sandalwood – 7719.61 M3.

Though 22per cent of the land area is classified as forests (43356.45 sq.km) in the State, only about 11per cent is well wooded. The remaining area is in different stages of degradation. The State is facing shortage of fuel wood, fodder and timber as the demand has increased considerably due to the increase in population of both human and cattle. The forests in the State are managed as per the prescriptions of the working plans which are prepared for periods of 10 to 15 years after taking into consideration the type of forests, the condition of the existing crop, the demand for various forest produce and the requirements of the area for maintenance of ecological balance.

Karnataka Government has established many National Parks and Wild Life Sanctuaries to protect important species. The following is the list of National Parks and Wildlife Sanctuaries (WS).There are five National Parks and 25 Wildlife sanctuaries covering an extent 8,384.19 sq.km. of the total forest area. They comprise of evergreen to scrub type of forests, thus forming a network of representative ecosystem to conserve endangered species of plants as well as animals and birds.

Project Tiger: Karnataka has 300 tiger population and are distributed in 5 Tiger Reserves, viz. Bandipur Tiger Reserve, Rajiv Gandhi National Park (Nagarhole) Tiger Reserve, Bhadra Tiger Reserve and Anshi-Dandeli Tiger Reserve. Tigers are under Project Tiger Reserves.

Project Elephant: Karnataka has nearly 5900 elephants distributed in 6724.87 sq.km. of area. The elephant reserve is consisting of Bengaluru Urban, Bengaluru Rural, Chamarajanagar, Mysuru, Kodagu, Hassan, Chikkamagaluru made Bhadra districts as MysuruElephant Reserves under the Centrally Sponsored Scheme Project Elephant.

Nilgiri Biosphere Reserve: The Nilgiri Biosphere Reserve development scheme is sponsored by Government of India to take up habitat and eco-development works. NBR of the State covers part of Nagarahole National Park, Bandipur National Park and Chamarajnagar Wildlife Division. During the year 2010-11, Rs.23,99,659 has been released by Government of India to take up habitat improvement works.

The details of 5 National Parks, 25 Wildlife Sanctuaries covering 8,384.19 sq.km. of Forest area in the State are shown below:

Sl. No.	Circle	Division	National Park/ Wildlife Sanctuaries	Area (Sq. km.)
1	2	3	4	5
1	Bengaluru	Banneghatta National Park	1. Bannerghatta National Park	260.51
		Ramanagar Division	2. Ramadevarabetta vulture Sanctuary	3.46
2	Mysuru	Mysuru	3.Adichunchanagiri Peacock Wildlife Sanctuary	0.84
			4. Ranganathittu Bird Sanctuary	0.67
			1. Arbithittu Wildlife Sanctuary	13.50
			2. Melkote Wildlife Sanctuary	49.82
			3. Nugu Wildlife Sanctuary	30.32

3	Chamarajanagar	4.Chamarajanagar	4. BRT Wildlife Sanctuary	539.52
		5. Cauvery Wildlife, Kollegal	9. Cauvery Wildlife Sanctuary	1,027.53
4	Kodagu	6. Madikeri	10. Pushpagiri Wildlife sanctuary	102.59
			11. Talacauvery Wildlife Sanctuary	105.59
			12. Brahmagiri Wildlife sanctuary	181.29
5	Mangaluru	7 Kudremukh Wildlife Divisio Karkala	13 Kudremukh National park	600.57
			14.Someshwara Wildlife Sanctuary	314.25
			15. Mookambika Wildlife sanctuary	370.37
6	Kanara	Dandeli	16 Dandeli Wildlife sanctuary	886.41
			15. Anshi National park	417.34
7	Shivamogga	Shivamogga	18 Shettihalli Wildlife sanctuary	395.60
			19 Sharavathi Wildlife sanctuary	431.23
			20.Gudavi Bird Sanctuary	0.73
8	Chikkamagaluru	Chickmagalur	21. Bhadra Wildlife sanctuary	500.16
9	Dharwad	Ranebennur	22 Ranebennur Blackbuck sanctuary	119.00
			23 Attivery Bird Sanctuary	2.23
10	CF, Ballari Circle	Kamalapura	24 Daroji Bear sanctuary	82.72
		Davanagere	25 Rangayyadurga Four Horned Antelope Wildlife sanctuary	77.23
11	Field Director, Project Tiger, Mysoe	Bandipur	26. Bandipur National Park	872.24
		Hunsur	27 Nagarahole National park	643.39
12	Belagavi Circle	Belgam	28. Bhimgad Wildlife sanctuary	190.42
		Gokak	29 Ghataprabha Bird sanctuary	29.78
13	Kalaburgi Circle	Kalaburgi	30. Chindholi Wilflife Sanctuary	134.88
			Total Area	8,384.19

Karnataka forests support 25per centof the elephant and 10per cent of the river population of India. Many regions of Karnataka are yet unexplored, and hence new species of flora and fauna are found periodically. The Western Ghats, a biodiversity hotspot, includes the western region of Karnataka. Two sub-clusters in the Western Ghats, viz. Talacauvery and Kudremukh, both in Karnataka, are on the tentative list of World Heritage Sites of UNESCO. The Bangdipur and Nagarhole National parks, which fall outside these sub-clusters, were included in the Nilgiri Biosphere Reserve in 1986, a UNESCO designation. The Indian roller and Indian elephant are recognized as the state bird and animal while sandalwood and the lotus are recognized as the state tree and flower respectively.

Anshi National Park: is located in Uttara Kannada district, in the Indian state of Karnataka, bordering the state of Goa. The 417.34 square kilometers park adjoins the Dandeli Wildlife Sanctuary, and together with six other protected areas in the states of Goa and Maharashtra, forms a protected forest area of over 2200 square kilometers. The park is a habitat of melanistic leopards, tigers and elephants, amongst other fauna. The forest in the area was declared the Dandeli wildlife sanctuary on 10 May, 1956. The state proposed carving out a section of the sanctuary to form the Anshi National Park, and the proposal was implemented on 2 September, 1987. The initial proposal covered 250 square kilometers. When the final notification of the partk area was issued in 2002, it was extended by another 90 square kilometers.

Anshi and Dandeli were granted the status of Project Tiger sanctuaries in January, 2007. Located in the Western Ghats range, Anshi's altitude varies from 200m to 925m above seal level. The park is situated in the North Western Ghats montane rain forests and North Western Ghats moist deciduous forests eco regions, both of which are deemed endangered by the World Wildlife Fund. Anshi National Park and the adjoining Dandeli wildlife sanctuary together form the Dandeli Wildlife Division of the Karnataka Forest Department, headed by a Deputy Conservator of Forests.The forests in the area are rich in flora and fauna. Trees and plants that can be found here include Bambaoo, Bautinia, Eucalyptus, Lantana, Silver Oak, Teak and Xylia xylocarpa. A variety of Bonnet Macaque, deer (barking, mouse and spotted), Indian bison, Malabar Civet, Malabar giant squired, pangolin and sloth bear make their home in the forests of the park.Reptiles spotted in the park include the King Cobra, Krait, Python, Rat snake and Viper. Around 200 species of birds are recorded in the park. These include the Adjutant Stork, Ashy Woodswallo, Black-crested Bulbul, Blue-headed Pitta, Brahminy Kite, Broad-billed Roller, Crested Serpent Eagle, Great Hornbill, Golden-backed Woodpecker, Malabar Pied Hornbill, Sri Lanka Frogmouth and Yellow-g\ footed Green Pigeon.

Bandipur National Park: is one of India's best known sanctuaries, and is an important Project Tiger reserve. It is located in the Chamarajanagar district of southern Karnataka in South India, and is contiguous with the Mudumalai National park in the neighbouring state of Tamil Nadu. The Wynad Wildlife Sanctuary in Kerala, and the Nagarhole National Park to the northwest. It is the home to around seventy tigers and over three thousand Asian elephants (as per the 1997 census), along with leopards, dholes, gaur and sloth bears. Bandipur is a part of the Nilgiri Biosphere Reserve. The Western Ghats, Nilgiri Sub-cluster(6,000+ km2), including all the Bandipur National park, is under consideration by the UNESCO World Heritage Committee for selection as a World Heritage Site. A sanctuary of 90 km2 was created at this site in the Bandipur Reserve Forests in 1931. As it was realized that this was too small for effective wildlife conservation, leading to the instituting of the Venugopala Wildlife Park at this site, extending over 872.24 km2.

The Bandipur Tiger Reserve was constituted in 1973 by carving out 880 km2 from the Wildlife Park. Recognized under Project Tiger in 1973 this park has boasted constant rise in Tiger population. Also famous for Sandalwood trees and the rate species of Flora. Bandipur National park's altitude is between 680 and 1454 meters and is situated south of the Kabini river at the foothills of the Western Ghats. The rivers of Kabini, Nagur and Moyar flow through the reserve. Climate – Winter minimum 10, Summer maximum 28 degrees, Monsoon from June to September and best time to visit is open throughout the year but preferably in monsoon when wildlife is plenty and forest is green, Greenery is quite lean when viewed from road but gets thicker as we proceed into the forest.

Major flora: Teak (Tectonagrandis), Dalbergia latifolas, Plerocarpus marsupium, Adina cordifolia, Grewia tiliaefolia, Emblica officinalis, Lagerstroemia lanceolata, Terminalia toemntosa, Anogeissus latifolia, Terminalia chebula, Schleichera trijuga, Odina wodiar, Butea monosperma, Cassia fistula, Dendrocalamus strictus, Bambusa arundinacea, Chloroxylon swetenai, Acacia catechu, Shortea talura, Randia uliginosa.

Major Fauna : Tiger, Leopard, Elephant, Gaur, Sambar (deer), Chital, Sloth Bear, Mouse deer, Wild dog, Wild boar, Barking deer, Four horned Antelope, Hyena.

Endangered species: Tiger, Four horned Antelope, Gaur, Elephant, Panther, Sloth Bear, Crocodiles, Mouse deer, Python, Osprey,

Birds: Grey Junglefowl, Pompadour Green Pigeon, Honey Buzzard, Red-headed Vulture, Grey-headed Fish Eagle, Brown Hawk Owl, Bay Owl, Malabar Trogon, Nilgiri Flycatcher, Malabar Pied Hornbill, Little Spiderhunter, Plain Flowerpecker, Reptiles; King Cobra, Common Cobra, Python, Adder, Viper, Rat Snake, Water Snake, Marsh Crocodile, Lizard, Chameleon, Monitor Lizard, Frog, Tree frog, Toad and Tortoise.

Bannerghatta National Park: Bannerghatta National Park is situated 22 km south of Bengaluru, Karnataka, India. The journey to the park takes nearly half an hour from Bengaluru. This hilly place is the home for one of the richest natural, zoological reserves. The 260.51 km2 zoological park makes this a major tourist attraction of Bengaluru. The Bannerghatta Tiger and Lion Reserve has a reserve of Indian tigers including white tigers, lions and other mammals. Safaris – Tiger and Lion Safari and Grand Safari (including herbivores) – conducted by the KSTDC, and aid in the funding of the reserve. The Tiger Reserve of the park has been recognized by the Forest Department of India. There is small museum in the zoo which showcases zoological exhibits. The zoo, which is a major attraction in this area, also has reptile park and a small theatre. The Zoo is closed on Tuesdays (Weekly holiday). The country's first Butterfly Park was established at the Bannerghatta Biological Park. The Butterfly Park is spread across 7.5 acres (30,000 m2) of land. It comprises a butterfly conservatory, museum and an audio-visual room. The butterfly conservatory has a polycarbonate roof and is a 10,000 sq. ft. (1,000 m2). circular enclosure, inside which the living environment has been carefully designed to support over 20 species of butterflies. The environment has a tropical setting – complete with the humid climate, an artificial waterfall, a narrow walking bridge and host plants and shrubs that attract butterflies. The conservatory leads to the second and third domes, which house the museum containing dioramas and exhibits of carefully preserved, exquisite butterflies. The collaborative agencies are the Zoo Authority of Karnataka, University of Agricultural Sciences and the Ashoka Trust for Research in Ecology and Environment ATREE).

The Kudremukh National Park: is the second largest declared Wildlife Protected area (600.57 km2) of a tropical wet evergreen type of forest in the Western Ghats. Kudremukh National park is located in Udupi and Chikkamagaluru districts of Karnataka state. The Western Ghats is one of the thirty four hot spots identified for bio-diversity conservation in the world. Kudremukh National park comes under the Global Tiger Conservation Priority-I, under the format developed jointly by Wildlife Conservation Society (WCS) and World Wide Fund-USA. The British Government declared Kudremukh region as a Reserved Forest in 1916, to stop rampant slash and burn cultivation practices from penetrating deeper into the Ghats. Well known environmentalist and Tiger expert Dr. Ullas Karanth, undertook a detailed and systematic survey of the distribution of the endangered Lion Tailed Macaque in Karnataka during 1983-84 with support from Government of Karnataka. He observed that suitable and extensive rainforest habitat for Lion-tailed Macaque existed in Kudremukh and that the tract probably harbored the largest contiguous population of lion tailed macaques in the Western Ghats outside the Malabar region. He further suggested that Lion Tailed Macaques could be effectively used as a `flagship' species to conserve the entire biotic community in the region and prepared a conservation plan for survival of wild population of Lion Tailed Macaques in the region delineating the present national park area as a proposed nature reserve. Based on his report, the Karnataka State Wildlife Advisory Board suggested to the Government that Kudremukh National Park be created. Subsequently, the first notification of the Kudremukh National park was issued. In 1987, the Government of Karnataka declared

these Reserved Forests as a National Park based on the above suggestion.

The town of Kudremukh is primarily an iron ore mining town. But now the mining has been abandoned permanently, where the government run Public Sector Kudremukh Iron Ore Company Ltd. (KIOCL) operates. It is noted for its scenic beauty. Owing to the dense forests, sighting wildlife can be challenging, though the area is rich in wildlife. Nonetheless the drive through the forest ranges can be enchanting and exhilarating. Three important rivers, the Tunga, the Bhadra and the Netravathi are said to have their origin here. A shrine of goddess Bhagavathi and a Varaha image, 1.8 m within a cave are the main attractions. The Tunga river and Bhadra river flow freely through the parklands. Kadambi waterfalls area is the definite point of interest for anyone who travels to the spot.

A diverse assemblage of endangered large mammals is found in the park supporting three large mammal predator species Tiger, Leopard and Wild Dogs. The important Tiger prey base found within the Park is Gaur, Sambar, Wild Pig, Muntjac, Chevrotain, Bonnet macaque, Common Langur and the Lion Tailed Macaque. The wet climate and the tremendous water retentive capacity of the shoal grasslands and forests has led to the formation of thousands of perennial streams in the region converging to form three major rivers of the region. Tunga, Bhadra and Nethravathi that form an important lifeline for people of Karnataka and Andhra Pradesh. Lobo house in an old abandoned house on top of Kudremukha

Nagarhole National Park: also known as Rajiv Gandhi National Park', is located 94 km. from Mysoe. It is spread between Kodagu and Mysuru districts. Located to the northwest of Bandipur National park, Kabini reservoir separates the two. The exclusive hunting reserve of the former rulers of Mysuru, the park has rich forest cover, small streams, valleys, and waterfalls. In 1975 its area stretched to 643.39 km2. The place derives its name from Kannada. Naga meaning snake and hole referring to streams. Set up in 1955, it is one of the best managed parks in the country.

The climate is tropical; summer is hot and winter is pleasant. The park boasts a healthy tiger-predator ratio, and tiger, bison, and elephant are much more populous here than in Bandipur. The park isa part of the Nilgiri Biosphere Reserve. The Western Ghats, Nilgiri Sub-Cluster(6,000+ km2), including all of Nagarhole National Park, is under consideration by the UNESCO World Heritage Committee for selection as a World Heritage Site. Mostly moist mixed deciduous forest (Tectoria grndis, Dalbegia latifolia) in the southern parts, dry tropical forest (Wrightia tinctoria, Acacia) towards the east, and Sub mountain hill valley swamp forest (Eugenia) are found in the park. **Mammals:** Elephant, Jackal, Tiger, Panther, Gaur, Muntjac, Sambar, Spoptted deer, Mongoose, Civet cat, Hyena. **Reptiles:** King Cobra, Krait, Python, Viper, Tortoise, Monitor Lizard, Toads etc. The main trees found are Rosewood, Teak, Sandalwood and Silver oak.

Western Ghats in Karnataka

The Nilgiri Biosphere is home to the largest population of Asian Elephants and forms an important Project Elephant and Project Tiger reserve. Brahmagiri and Pushpagiri wildlife sanctuaries are important elephant habitats. Karnataka's Ghat areas hold over six thousand elephants (as 2004) and ten per cent of India's critically endangered tiger population. The largest population of India's Tigers outside the Sundarbans is in the unbroken forests bordering Karnataka, Tamil Nadu and Kerala. The largest numbers and herds of vulnerable Gaur are found here with the Bandipur National park and Nagarahole together holding over five thousand Gaur. To the west the forests of Kodagu hold sizeable populations of the endangered Nilgiri Langur. Bhadra Wildlife Sanctuary and project tiger reserve in Chikkamagaluru has large populations of Indian muntjac. Many Asian Elephant, Gaur, Sambar, vulnerable sloth Bears, Leopard, tiger and Wild Boars dwell in the forests of Kerala.

Banneghatta National Park and Anekal reserve forest is an important elephant corridor connecting the forests of Tamil Nadu with those of Karnataka. Dandeli and Anshi National Parks in Uttara Kannada district are home to the Black Panther and normal variety of leopards and significant populations of Great Indian Hornbill. Bhimgad in Belagavi district is a proposed wildlife sanctuary and is home to the endemic critically endangered Wroughton's freetailed bat. The Krishnapur caves close by are one of only three places in the country

where the little-known Theobald's tomb bat is found. Large Lesser False Vampire bats are found in the Talevadi caves.

- **Reptiles –** The snake family Uropeltidae of the reptile class is almost entirely restricted to this region.
- **Amphibians –** The amphibians of the Western Ghats are diverse and unique, with more than 80per cent of the 179 amphibian species being endemic to the region. Most of the endemic species have their distribution in the rainforests of these mountains. The endangered Purple frog was discovered in 2003 to be a living fossil. This species of frog is most closely related to species found in the Seychelles. Four new species of Anurans belonging to the genus Rhacophorus, Polypedates, Philautus and Bufo have been described from the Western Ghats.
- **Fish –** 102 species of fish are listed for the Western Ghats water bodies. Western Ghats streams are home to several brilliantly coloured ornamental fishes like Red line torpedo barb, Red-tailed barb, Osteobrama bakeri, Gunther's catfish and freshwater puffer fish Tetraodon tranvancoricus, Carinotetraodon imitator and marine forms like Chelonodon patoca (Buchanan-Hamilton, 1822); mahseers such as Malabar mahseer.
- **Birds –** There are at least 508 bird species. Most of Karnataka's five hundred species of birds are form the Western Ghats region. Bhadra Wildlife Sanctuary is located at the northern end of the Malabar ranges and the southern tip of the Sahyadri ranges and bird species from both ranges can be seen here.
- **Insects –** There are roughly 6,000 insect species from Kerala alone. Of 334 butterfly species recorded from the Wv estern Ghats, 316 species have been reported from the Nilgiri Biosphere Reserve.
- **Molluscs** - Seasonal rainfall patterns of the Western Ghats necessitate a period of dormancy for its land snails, resulting in their high abundance and diversity including at least 258 species of gastropods from 57 genera and 24 families.

In 2006, India applied to the UNESCO MAB for the Western Ghats to be listed as a protected World Heritage Site. This will be composed of seven adjoining areas. The areas within the State of Karnataka are :

Western Ghats –Talacauvery Sub-cluster (with six Site Elements); All site elements in the Talacauvery region are situated in Karnataka state except the Aralam Reserved Forest (RF) in Kerala state. Pushpagiri Wildlife Sanctuary (102.59 km2) has dense evergreen and semi-evergreen vegetation, with shoal grassland in areas of higher elevation. The steep terrain of the Sanctuary has resulted in scenic waterfalls along its many mountain streams. Altitude varies from 160 to 1,712 m. the highest point being the Pushpagiri Peak in the north of the park. Temperatures ranges from 10-380 C, with annual rainfall exceeding 6,500 mm. Brahmagiri Wildlife Sanctuary (181.29 km2) also consists of evergreen and semi evergreen forests in the lower-lying areas with shoal grassland habitat in the higher altitudes. The eastern tip of the Sanctuary is adjacent to the north-western boundary of Rajiv Gandhi (Nagarhole) National park, separated by a narrow strip of coffee plantations. The highest point in the Sanctuary is the Brahmagiri Peak on the south-eastern boundary, while elevation varies between 65m and 1,607 m. Temperatures ranges from 50 – 320 C, and mean annual rainfall varies from 2,500 mm to 6,000 mm. Talacauvery Wildlife Sanctuary (105.59 km2) is located in the Kodagu (Coorg) district of Karnataka. Its forests are predominated by tropical evergreen forests. It is named after Talacauvery the origin of the Cauvery river which lies on the eastern edge of the Sanctuary. Altitudinal and temperature ranges are 64-1,659 m. and 100 -350 C, respectively. Annual rainfall is about 6,500 mm. The areas between Talacauvry and Pushpagiri sanctuaries have been excluded from the proposed area mainly due to the fragmentation and habitat degradation caused by the Mangaluru-Madikeri road. Tehre is no natural forest cover for about 2 km on either side of this road. There are some teak and rubber plantations near the road.

Western Ghats-Kudremukh Sub-Cluster : (with Five Site Elements) : The Kudremukh National Park, Someshwara Wildlife Sanctuary, and surrounding Reserved Forests of Someshwara, Agumbe and Balahalli of Karnataka state are situated centrally in the Western Ghats Biodiversity Hotspot. Kudremukh National park has one of the most beautiful landscapes in the Western Ghats, encompassing evergreen, semi-evergreen

and grasslandshola habitat characteristic of high altitude Western Ghats regions. Altitude varies from 120 to 1,892 m. the highest point being the Kudremukh Peak in the south of the Park. The Park has average temperatures ranging between 170 C and 280 C. Annual rainfall varies from 1,778 mm to 6,350 mm, with an average of 4,000 mm and a maximum recorded rainfall of 10,000 mm in 1994. The topography is mountainous with a central ridge running north-south through the Park. The park is dotted with crystal-clear streams and picturesque waterfalls. Kudremukh National Park isflanked by coffee and tea estates on the north and east, whereas, on the west, the land drops down to the Arabian Sea. In the northwest is a forest corridor that connects the Park with the Someshwara Wildlife Sanctuary. The Sanctuary, named after the famous Someshwara Temple located within it, and the adjoining 105.3 km2 of Reserved Forest are predominantly evergreen forests, along with semi-evergreen vegetation. These Reserved Forests are in the process of being included within the Sanctuary. Elevation ranges from 75-870 m and the temperature varies between 200 C and 300 C, with an average annual rainfall of 6,000 mm.

Environment Situation in Karnataka

Survival of life on the earth depends on the availability of natural resources. The use of these resources has an impact on the environment around us. Water usage leads to its pollution. Coal, oil, minerals and metals are being depleted by increasing usage. A high level of irrigation, unless accompanied by proper drainage, make the soil saline or waterlogged. Combustion of fuels results in greater accumulation of carbon dioxide leading to global warming. This use and depletion of resources has in impact on our environment.

About sixty per cent of the land area in the States is under one or other type of agriculture. This is above the national average of 51 per cent. A portion of this land is marginal for agriculture and requires higher inputs but gives lower yields. As subsistence farming is economically nonviable, this land is soon degraded and the soil is eroded. Land that cannot support agriculture could well be suitable for forestry and pasture. Irrigated land has been rendered saline or water-logged due to water use. Thus in the upper Krishna Project about 71,000 ha, have become either saline or alkaline. In the command area of the Tungabhadra reservoir about 33,000 ha, are either saline or water logged; 24,455 ha are saline or waterlogged in the Malaprabha and Ghataprabha (command) area and 16,500 ha, in the Cauvery basin. Remedial measures are being undertaken in some areas at a high cost. Pasture lands in the State have been steadily decreasing. During 1956 to 1983, pastures came down by 31 per cent while animal units increased by 30 per cent. Over grazing is bound to follow together with compacting of the land cattle paths.

As a result of the expansion of agriculture and its allied activities, the natural vegetation in the plains has suffered the most. In fact, the characteristic vegetation of this habitat namely the scrub forest has almost vanished. The wild life too has practically been wiped out in this tract except in isolated pockets. Similarly in the Western Ghats, the fragmentation of natural vegetation has already reached alarming proportions and this will have serious consequences on the rate of extinction of species. The wild life has been decimated in many parts of the State and its numbers are rapidly dwindling due to loss of habitat, constant fragmentation and illegal killing.

The forest areas in the Western Ghats are being converted into plantations of cardamom, cocoa, rubber, coffee and tea. Simultaneously timber and fuel wood species are replacing the rich tropical forests. These plantations while being commercially remunerative can cause great harm to the bio-diversity and habitat of the flora and fauna. Vast forest areas have been submerged by hydel projects on the west-flowing rivers. Resettlement of the people displaced by development projects has further reduced the forest area by honey combing the forests with human settlement.

Silting is the most serious problems with tanks and reservoirs. The capacity of the tanks goes on decreasing every year, the tank irrigating less and less land, ultimately becoming altogether useless for irrigation when the sluices can no longer be opened. The solution proposed for the silting problem is afforestation of the catchment to the extent possible, banning cultivation in the foreshore lands and construction of small checkdams upstream to trap the silt.

The exploitation of renewable and non-renewable natural resources is likely to have an environmental impact. Increased production of

minerals will vary with the location, method and magnitude of operations. Area surrounding the mines will also be affected by the works as well as workers. So the extent and mode of mining must be regulated by ecological considerations for the long term utilization of resources. Pollution is the introduction of extraneous materials into environment adversely affecting its normal use. Water pollution is caused mainly by discharge of waste waters into natural water courses and water bodies. Water is being polluted by industries and human habitations. Industrial effluents can cause organic, chemical and even hazardous pollution.

In order to control this pollution, effluent standards have been prescribed industry-wise. Thermal pollution caused by water with temperature above the ambient water temperature is also to be controlled. The Water (Prevention and Control of Pollution) Act was enacted by Parliament on 23rd March, 1974. The greatest water pollution in the State is caused by Urban Agglomerations. It is obligatory on the authorities to treat the sewage before discharging it. However 139 of the 172 Municipalities do not have functional underground drainage or sewage treatment plants.

Air Pollution

Stack emissions from industries also emits fumes containing both suspended particles and s abnoxious gases. Stack emission are to be controlled and have to conform to standards devices like cyclones, scrubbers, electrostatic precipitators and similar devices. The resultant particulate matter gives a sludge which again has to be disposed off. The Raichur Thermal Power plant produces around 3,000 tonnes of ash a day. The Mangaluru Super Thermal Power Plant is estimated to generate 20,000 tonnes of ash a day. A step towards controlling pollution and protection of our environment was taken by the Central enactment of Air (Prevention and Control Pollution) Act, 1981.

Noise pollution caused by 1) Industrial Noise, 2) Traffic Noise, 3) Cultural Noise is also under the purview of this Air (Prevention and Control of Pollution) Act of 1981. Noise is as harmful to the human being as polluted air and water. Noise pollution associated with urban life is on the increase. The vast majority of people are under the false impression that ears adapt to increased noise levels. The truth is that they never do, but silently surrender their functions, with increasing age of an individual.

More comprehensive legislation to provide for the protection and improvement of the environment was Centrally enacted and termed the Environment (Protection) Action 23rd May, 1986. The Department of Ecology and Environment was established in March 1981 to have an integrated approach to deal with, prevention and control of air and water pollution, preservation and development of forest wealth and other natural resources in the State. The Environment (Protection) Act came into force from November 1986 and the existing Water Act and Air Act have been amended over the last two years.

The new provisions of the environmental laws enable the general public to question the authorities involved in the environmental pollution control in a court of law. The Ecology and Environment department is now responsible for the management of hazardous chemicals and control of oil pollution in coastal waters. In addition beach management has also been given considerable importance.

Department of Ecology and Environment

The Mandate of the department is to preserve and enhance the quality of the natural environment, including water, air and soil quality; conserve and protect flora, fauna and other natural resources; enforce environmental Acts and Rules made by the Central Government and Government of Karnataka; coordinate various environmental policies and programs. The Department is under the Administrative Control of Minister of Cabinet rank for Forest, Ecology and Environment. The Department is headed by The Principal Secretary, Forest, Ecology and Environment and Secretary (Ecology & Environment).

Secretariat: The Department has a technical wing consisting of a Director and seven scientific officers and also an administrative section consisting of an Under Secretary and associated staff. **Field**: The department has recently decentralized itself and Six Regional Directors (Environment) are now posted at Kalburgi, Ballari, Belagavi, Dakshina Kannada, Uttara Kannada and Udupi. The Regional Directors posted at Dakshina Kannada, Uttara Kannada and Udupi will also be looking after the Coastal Zone Regulation aspects.

Activities of the Department: Enforcement of various Environment related Acts, Rules, Notifications etc., including Implementation of Air (Prevention and Control of Pollution) Act, 1981, Water (Prevention and Control of Pollution) Act, 1974, Environment Protection Act 1986 and notifications issued under the Environment Protection Act., Implementation of : National River Conservation Plan, National Lake Conservation Plan, To accord Environmental Clearances in respect of certain categories of industries, To take up activities for the protection of Bio-diversity in the State, To oversee the activities / functioning of Karnataka State Pollution Control Board, To oversee Coastal zone management of Karnataka Acts and Rules Administered by the Department; The Water (Prevention and Control of Pollution) Act, Rules, 1974-75; The Water (Prevention and Control of Pollution) Cess Act, Rules, 1977-78; The Air (Prevention and Control of Pollution) Act, Rules, 1981-83; The Environment (Protection) Act and Rules, 1986; The Hazardous Wastes (Management and Handling) Rules, 1989; Manufacture, Storage and Import of Hazardous Chemical Rules/ Amendment Rules, 1989, Amendment 1992 and 1994; Manufacture, Use, Import, Export and Storage of hazardous Micro-Organisms, Genetically Engineered Micro-Organisms or Cell Rules, 1989; Coastal Regulation Zone & Regulation of Activity in CRZ, 1991; Environmental Impact Assessment for Development Projects Notification, 1994, Amendment 1997; Bio-medical Waste (Management & Handling) Rules, 1998; Manufacture and Use of Recycled Plastics, Carry bags and Containers, 1999; Direction for Use of Fly Ash, Bottom Ash or Pond Ash in the Manufacture of Bricks & other construction activities, 1999; Municipal Solid Wastes (Management and Handling) Rules, 2000; Biological Diversity Act, 2002.

The Department of Ecology and Environment has a network of organisations working on various fields of environment. The network consists of Karnataka State Pollution Control Board (KSPCB); Environment Managament Policy Research Institute (EMPRI); Indo Norwegian Environment Programme (INEP); Lake Development Authority (LDA); Karnataka Biodiversity Board (KBB) and Regional Environment Offices.

Biodiversity of Karnataka: The state of Karnataka is a part of the highly biodiversity rich regions of India. The state is endowed with great diversity of climate, topography and soils. It spans the seacoast with rich aquatic biodiversity and mangrove swamps at the mouths of estuaries. It harbours verdant tropical evergreen forests, paddy fields, coconut and arecanut orchards on the narrow coast flanked by the hills of Western Ghats. It bears deciduous woods, scrub jungles, fields of sugarcane, cotton, groundnut, ragi and jowar in the Deccan plateau. The different environmental regimes support their own characteristic set of vegetation and animals. Karnataka supports ten per cent of total tiger population and 25 per cent of elephant population of the country. The state has around 4500 species of flowering plants, 600 species of birds, 160 species of mammals, 160 species of reptiles (turtles, snakes, lizards and crocodiles), 70 species of frogs, and 800 species of fish. These figures give a good account of the floral and faunal diversity of the state. The wealth of diversity of domesticated plants and animals in farms also holds much promise. The hill chain of Western Ghats is known to have greater diversity of wild relatives of cultivated plants than any other region of comparable size in the world. The aquatic biodiversity in Karnataka is very rich and harbors many endemic species.

Biological Diversity Act, 2002: The Biological Diversity Act, which came into force in February 2003, aims to promote conservation, sustainable use and equitable sharing of benefits of India's biodiversity resources. It provides for establishment of a National Biodiversity Authority at national level, State Biodiversity Boards at state level and Biodiversity Management Committees at the level of Panchayats and Municipalities. The National Biodiversity Authority shall play a regulatory role with regard to access to biological resources by foreign citizens and grant of intellectual property rights. It shall play an advisory role in matters relating to the conservation, sustainable use and equitable distribution of biological resources. As per the provisions of the Act, the state has set up the State Biodiversity Board, with the Hon'ble Minister for Forest, Ecology & Environment as chairperson, five ex-officio members and five non-official members.

The State Biodiversity Board is supposed to advice the state government on matters relating to conservation of biodiversity, sustainable use of its components etc. It shall also regulate access of biological resources by Indian citizens.

The Act provides for constitution of Biodiversity Management Committees that are to be constituted in each local body for the purpose of promoting conservation, sustainable use and documentation of biological diversity and chronicling of knowledge relating to biological diversity. The Act also envisages setting up of a local biodiversity fund, at every area notified by State Government, where any institution of self-government is functioning. This fund will include any grants and loans made by the National Biodiversity Authority, grants or loans made by State Biodiversity Boards, all sums received by the local committee from other sources etc.

Coastal Zone Management: About the Law: Central Government have declared the coastal stretches of seas, bays, estuaries, creeks, rivers and back waters which are influenced by tidal action (in the landward side) up to 500 mts. from the High Tide Line (HTL) and the land between the Low Tide Line (LTL) and the HTL as "Coastal Regulation Zone" (CRZ), on 19.2.1991.

Classification Criteria and Regulatory Norms: The coastal regulation zone has been classified as CRZ-I, CRZ-II and CRZ-II in the State for the purpose of regulation of the permitted activities. CRZ-I : Ecological sensitive area and the area between High Tide Line (HTL) and Low Tide Line (LTL). No new construction is permitted except for a few specified most essential activities like support activities for Atomic Energy Plants and Defense requirements, facilities required for disposal of treated effluents and other port related water front activities. CRZ-II : The area that have been developed up to or close to the shore line which includes the designated urban areas that are substantially built up. Buildings permitted only on the landward side of the existing road (or roads approved in the coastal zone Management Plan of the area) or on the landward side of the existing authorized structures as defined in the notification. Reconstruction of the authorized buildings permitted subject to existing FSI/FAR norms without change in the use. CRZ-III : The areas that are relatively undisturbed and those which do not belong to either CRZ-I or CRZ-II which includes mainly the rural area and those not substantially built up within designated urban areas. The area up to 200 mts. from HTL is earmarked as "No Development Zone". No construction is permitted within this zone except for repairs to the existing authorized structures without exceeding existing FSI, plinth area and density. Development of vacant plots between 200 and 500 mts. of HTL is permitted in CRZ III for the purpose of construction of dwelling units and hotels/beach resorts subject to certain conditions.

Karnataka State Coastal Zone Management Plan: Coastal Zone Management Plan (CZMP) of the state was prepared and was approved by Ministry of Environment and Forest in the year 1996. According to this areas covered under CRZ-I, CRZ-II and CRZ-III were identified using satellite imagery and prepared maps in the scale 1:25,000. As the enforcement of the law and the management of the zone from the point of view of protection of environment using this maps was difficult the following steps are taken. Demarcation of High Tide Line (HTL) and Low Tide Line (LTL) on the ground and fixing reference pillars all along the coast and rivers. Preparation of local level Coastal Regulation Zone Maps on the cadastral maps indicating HTL, LTL, 200 mt line, 100 mt line and other lines required for the purpose of enforcement of the law, the reference pillars and different zones of regulation.

The above task has been entrusted to National Hydrographic Office, Dehradun which is an organization under the Ministry of Defence of Government of India and an agency authorized by Ministry of Environment of Forest for this purpose at an estimated cost of Rs.2.34 crores. This project is funded by KUIDFC under KUDCEMP. Demarcation and fixing of reference pillars is completed in Dakshina Kannada District and the work is under progress in the other two districts. Preparation of local level maps for Dakshina Kannada District is in the final stage and mapping of other two districts has begun.

Karnataka State Coastal Zone Management Authority: Karnataka State Coastal Zone Management Authority, has been constituted vide notification No. S.O.21 (E), dated 04.01.2002 by MOEF, GOI as per sub section (1) and (3) of section 3 of Environment (protection) Act, 1986 for a period of three years. The Authority has the following the functions;– 1) The Authority has the power to take the following measures for protecting and improving the quality of the coastal environment and preventing, abating and

controlling environmental pollution in the coastal areas of the State of Karnataka namely:

I. Examination of proposals for changes or modifications in classification of Coastal Regulation Zone areas and in the Coastal Zone Management Plan (CZMP) received from the Karnataka State Government and making specific recommendations to the National Coastal Zone Management Authority therefor.

II. (a) Inquire into cases of alleged violations of the provisions of the said Act or the rules made thereunder, or under any other law which is related to the objects of the said Act and, if found necessary in a specific case, issuing directions under Section 5 of the said Act, insofar as such directions are not inconsistent with any direction issued in that specific case by the National Coastal Zone Management Authority or by the Central Government; (b) Review of cases involving violations of the provisions of the said Act, and the rules made thereunder, or under any other law which is related to the objects of the said Act, and if found necessary referring such cases, with comments, for review to the National Coastal Zone Management Authority: Provided that the cases under subclauses (a) and (b) of this sub-paragraph may either be taken up suo-moto or on the basis of complaint made by an individual or a representative body or an organisation. III. Filing complaints under Section 19 of the said Act in cases of non-compliance of the directions issued by it under sub-clause (a) of sub-paragraph (ii) of paragraph 11 of the Order. IV. To take action under Section 10 of the said Act to verify the facts concerning the issues arising from sub-paragraphs (i) and (ii) of paragraph 11 of this Order.

V. The Authority deal with environmental issues relating to Coastal Regulation Zone, which may be referred to it by the Karnataka State Government, the National Coastal Zone Management Authority or the Central Government. VI. The Authority identifies ecologically sensitive areas in the Coastal Regulation Zone and formulates area-specific management plans for such identified areas. VII. The Authority identifies coastal areas highly vulnerable to erosion or degradation and formulates area specific management plans for such identified areas.

VIII. The Authority identifies economically important stretches in Coastal Regulation Zone and prepares Integrated Coastal Zone Management Plans for the same. IX. The Authority submits the plans prepared by it under paragraphs IV, V and VI above and modifications thereof to the National Coastal Zone Management Authority for examination and its approval. X. The Authority examines all projects proposed in Coastal Regulation Zone areas and give their recommendations before the, project proposals are referred to the Central Government or the agencies who have been entrusted to clear such projects under the notification, of the Government of India in the Ministry of Environment and Forests vide number S.O.144(E) dated 19th February, 1991.

XI. The Authority ensures compliance of all specific conditions that are stipulated and laid down in the approved Coastal Zone Management Plan of Karnataka. XII. The Authority ensures that at least two-third members of the Authority are present during the meetings. XIII. The Authority furnishes report of its activities at least once in six months to the National Coastal Zone Management Authority. XIV. The foregoing powers and functions of the Authority shall be subject to the supervision and control of the Central Government. XV. The Authority has its headquarters at Bengaluru. XVI. Any matter specifically not falling within the scope and jurisdiction of the Authority will be dealt with by the statutory authorities concerned.

District Coastal Zone Management Committees: State Government has constituted district Coastal Zone Management Committee (DCZMC) in each of the coastal districts under the chairmanship the concerned Deputy Commissioner. A local Non-Government Agency and Chief Executive officers of the concerned Zilla Panchayath are the members of DCZMC and the concerned DCF, CRZ is the Member Secretary. The DCZMC assists the State Coastal Zone Management Authority in discharging the expected duties apart from attending to the local issues concerned with the Coastal Regulation Zones.

Karnataka State Pollution Control Board

The Karnataka State Pollution Control Board for Prevention and Control of Water Pollution was constituted by the Government of Karnataka on 21.9.1974 in pursuance of the Water (Prevention & Control of Pollution) Act, 1974. The Water Act will provide for the prevention and control of

water pollution and maintaining or restoring of wholesomeness of water. The Air (Prevention & Control of Pollution) Act, 1981 is an enactment to provide for prevention , control and abatement of air pollution. After the enactment of the Air (Prevention & Control of Pollution) Act, 1981. The enforcing responsibility has been entrusted to the Board.

The Board has its Central Office at Bengaluru . The enforcement of stated Acts and Rules are being implemented through eighteen Regional Offices. Five Regional offices are operating in Bengaluru city namely, Bengaluru City Bengaluru–South, Bengaluru-North, Region-VII and Peenya and one each at Mysuru , Kalaburgi , Dharwad Mangaluru, Raichur, Ballari ,Belagavi, Hassan, Bidar, Kolar, Mandya, Davanagere and Tumakuru.

The Central laboratory of the board is located at Bengaluru. Regional laboratories have been set up along with Regional Offices of Mangaluru, Hasssan, Dharwad, Raichur, Davanagere, Mysuru, Kalaburgi and Belagavi.

The Central Office of the Board is responsible for making general policies relating to enforcement of the above said Acts and Rules and it also carries out general administration and co-ordination with other agencies. The Central Laboratory of the Board is well - equipped and can take up analysis of water, waste water, stack emission samples, ambient air samples, bio-assay tests, bacteriological analysis, etc.

The Karnataka State Pollution Control Board for Prevention and Control of Water Pollution was constituted by the Government of Karnataka on The Twenty First of September Nineteen Seventy Four (21.9.1974) in pursuance of the Water (Prevention & Control of Pollution) Act, 1974 . The Water Act will provide for the prevention and control of water pollution and maintaining or restoring of wholesomeness of water. After the enactment of the Air (Prevention & Control of Pollution) Act, 1981 the enforcing responsibility was entrusted to the above Board. As such, the Board was later renamed as the Karnataka State Pollution Control Board in 1985 . The Air (Prevention & Control of Pollution) Act, 1981 is an enactment to provide for prevention , control and abatement of air pollution.

Apart from the above said Acts, the Board is also enforcing the following Acts & Rules : The Water (Prevention & Control of Pollution) Cess Act, 1977, and as amended from time to time.;The Water (Prevention & Control of Pollution) Cess Rules, 1978.; The following Rules and Notifications framed under Environment (Protection) Act, 1986 : Hazardous Waste (Management, Handling and Transboundary Movement) Rules, 2008.; Environmental Impact Assessment Notification, 2006.; Bio-Medical Waste (Management & Handling) Rules, 1998, and Amendment Rules 2000. ;Plastic Waste (Management & Handling) Rules, 2011.; The Noise Pollution (Regulation & Control) Rules, 2000.; Municipal Solid Wastes (Management & Handling) Rules, 2000.; E-waste (Management and Handling) Rules 2011; Batteries (Management and Handling) Rules, 2001; The Public Liability Insurance Act, 1991.

Organisation structure : The Board has its Central Office at Bengaluru. The enforcement of the above stated Acts and Rules are being implemented through forty four Regional Offices. fourteen Regional offices are operating in Bengaluru city namely, Bengaluru South, Bengaluru East, Bengaluru West, Bengaluru Mahadevapura, Bengaluru Sarjapura, Bengaluru Yelahanka, Bengaluru Bytarayanapura, Bengaluru Dasarahalli, Bengaluru Bommanahalli, Bengaluru Anekal,Bengaluru Rajarajeshwarinagar, Bengaluru Peenya, Bengaluru Hoskote, Bengaluru Doddaballapura, Bengaluru Nelamangala and one each at Bagalkot, Ballari, Belagavi-1, Belagavi-2 (Chikkodi Centre), Bidar, Vijayapura, Chamarajanagar, Chikkamagaluru, Chitradurga, Davangere,Dharwad, Kalaburgi, Hassan, Kolar,Karwar, Koppal, Mandya, Mangaluru, Mysuru-1(City),Mysuru-2 (Rural area),Raichur, Shivamogga,Tumakuru,Udupi, Ramanagara, Yadgiri, Haveri, Chikkaballapura, Kodagu and Gadag.

The Central laboratory of the Board is located at Bengaluru. Regional laboratories have been set up along with Regional Offices of Mysuru, Mangaluru, Hasssan, Dharwad, Raichur, Davanagere, Kalaburgi and Belagavi. The Central Office of the Board is responsible for making general policies relating to enforcement of the above said Acts and Rules and it also carries out general administration and co-ordination with other agencies.

The Central Laboratory of the Board is well - equipped and can take up analysis of water, waste water, stack emission samples, ambient air

samples, bio-assay tests, bacteriological analysis, etc.

Functions: The Important functions of the Board under Water (Prevention and Control of Pollution) Act, 1974, and Air (Prevention and Control of Pollution) Act, 1981, (Section 17) are:

a) To plan a comprehensive programme for the prevention, control or abatement of pollution of streams and wells in the State and to secure the execution thereof;

(b) To advise the State Government on any matter concerning the prevention, control or abatement of water pollution and air pollution.

(c) To collect and disseminate information relating to water pollution, air pollution and the prevention, control or abatement thereof;

(d) To encourage, conduct and participate in investigations and research relating to problems of water pollution and prevention, control or abatement of water pollution;

(e) To inspect sewage or trade effluents, works and plants for the treatment of sewage and trade effluents and to review plans, specifications or other data relating to plants setup for the treatment of water, works for the purification thereof and the system for the disposal of sewage or trade effluents or in connection with the grant of any consent as required by this Act;

(f) Laydown, modify or annul effluent standards for the sewage and trade effluents and for the quality of receiving waters (not being water in an inter-State stream) resulting from the discharge of effluents and to classify waters of the State;

(g) To evolve economical and reliable methods of treatment of sewage and trade effluents, having regard to the peculiar conditions of soils, climate and water resources of different regions and more especially the prevailing flow characteristics of water in streams and wells which render it impossible to attain even the minimum degree of dilution;

(h) To evolve methods of utilization of sewage and suitable trade effluents in agriculture;

(i) To evolve efficient methods of disposal of sewage and trade effluents on land, as are necessary on account of the predominant conditions of scant stream flows that do not provide for major part of the year the minimum degree of dilution;

(j) To laydown standards of effluents of sewage and trade effluents to be discharged into any particular stream and the tolerance limits of pollution permissible in the water of the stream, after the discharge of such effluents;

(k) To make, vary or revoke any order

(i) for the prevention, control or abatement of discharges of waste into streams or wells;

(ii) requiring any person concerned to construct new systems for the disposal of sewage and trade effluents or to modify, alter or extend any such existing system or to adopt such remedial measures as are necessary to prevent control or abate water pollution;

(l) To laydown effluent standards to be complied with by persons while causing discharge of sewage or sullage or both and to laydown, modify or annul effluent standards for the sewage and trade effluents;

(m) To advise the State Government with respect to the location of any industry the carrying on of which is likely to pollute a stream or well.

(n) To plan a comprehensive programme for the prevention, control or abatement of air pollution and to secure the execution thereof;

(o) To inspect, at all reasonable times, any control equipment, industrial plant or manufacturing process and to give, by order, such directions to such persons as it may consider necessary to take steps for the prevention, control or abatement of air pollution;

(p) To inspect air pollution control areas at such intervals as it may think necessary, assess the quality of air therein and take steps for the prevention, control or abatement of air pollution in such areas;

(q) To laydown, in consultation with the Central Board and having regard to the standards for the quality of air laid down by the Central Board, standards for emission of air pollutants into the atmosphere from industrial plants and automobiles or for the discharge of any

air pollutant into the atmosphere from any other source whatsoever not being a ship or an aircraft; Provided that different standards for emission may be laid down under this clause for different industrial plants having regard to the quality and composition of emission of air pollutants into the atmosphere from such industrial plants;

(r) To advise the State Government with respect to the suitability of any premises or location for carrying on any industry which is likely to cause air pollution;

(s) To perform such other functions as may be prescribed or may, from time to time, be entrusted to it by the Central Board or the State Government.

Indo Norwegian Environment Programme: Indo Norwegian Environment Programme in Karnataka was commenced in the year 1997 with a Norwegian Aid of Rs. 198.00 million , for a period of 5 years. The main objectives of the programme is to contribute towards sustainable management and utilization of natural resources and combat and reduce air, water and soil pollution. The programme also encompasses enhancement of technical and management knowledge including institutional capacity - building in the environment field to promote technically and financially sound and sustainable solutions. The main aspect of this programme is involvement of public participation during the implementation of programme. All the pilot projects financed under INEP has a component of public participation either by way of cash or kind. A number of pilot projects in the environment field have been initiated in the State to achieve the objectives.

The following are the projects taken up for implementation: Integrated Urban Environment Improvement Programme, Bengaluru.; Integrated Development of Madivala, Hebbal and Doddabommasandra Lakes, Bengaluru.; Integrated Ecological and Environmental Project for Mysuru (Chamundi Hills).; Demonstration of Decentralized Pico Hydel Power Projects as an eco-friendly technology to meet the energy needs of small communities in hill areas of Karnataka.; Centre for Ash Utilisation Technology & Environment Conservation at Raichur thermal Power Station.; Ex - Situ conservation of Plants of the Western Ghats with special reference to the 'endemic' and 'threatened' plants in an Arboretum in Pilikula Nisarga Dhama, Mangaluru.; Establishment of a Technology Development and Demonstration Cell for iron ore waste tailings based building products at Karnataka Regional Engineering College (KREC), Surathkal.; Bioreactors for Clean Coffee Effluentsreducing water pollution in Western Ghats with appropriate technology solutions.; Biomedical waste management for Kalaburgi City.; Eco-development through Urban Forestry Programme.; Empowerment of *Pourakarmikas* in Bengaluru City.; Cleaner and sustainable industrial development through Cleaner Production.

Lake Development Authority: The Lake Development Authority is an autonomous regulatory, planning and policy body for Protection, Conservation, Reclamation, Restoration, Regeneration and Integrated Development of Lakes, whether natural or man-made in the State of Karnataka. Deeply concerned with the unchecked deterioration of lakes in and around Bengaluru and conscious of their critical role in maintaining healthy environs and recharging of ground water, Lake Development Authority was created vide Government Order No. FEE/12/ ENG/02, Bengaluru, Dated. 10th July 2002. It was initially registered society under the Karnataka Societies Registration Act, 1959 and a non-profit organization working solely for the regeneration and conservation of lakes within BMRDA jurisdiction. However, from 30.04.2003 the Lake Development Authority's jurisdiction has been extended over the lakes in the other city municipal corporation of the State as well as lakes in the city municipalities which are the main sources for drinking water.

Since its inspection the Authority has drawn up the plans for the conservation of various lakes in the State in general and in Bengaluru in particular. This has resulted in getting the Government of India grant for Nagawara Lake (Rs.5.19 crores). Vengaiahnakere (Rs.2.55 crores), Bellandur lake (Rs.5.5. crores), Kottegere Lake, Belagavi (Rs.5.640 crores), Lalbagh (Rs. 1.66 crores) and Bhishma lake, Gagag (Rs. 2.50 crores). These proposals have been sent to Government of India for the 10th Five-year plan for about Rs.252 crores. Moreover the Authority has also taken up preparation of database of lakes in and around Bengaluru after physical verification of lakes and update about

the lakes, including the water quality monitoring and eviction of encroachment etc. The Authority has also launched public awareness campaign in order to sensitize people and the citizens of Bengaluru towards these lakes. The Authority has also co-ordinated with Bengaluru Development Authority. Bengaluru Mahanagara Palike, Karnataka, Forest Department, Minor Irrigation Department and other related Department to take up lake conservation works in such lakes as controlled by them. The developed/undeveloped lakes in Bengaluru and surroundings are also proposed to be maintained through public-private participation. Lake Development Authority is working on the Expression of Interest and Adopt a lake policy for the same.

Karnataka Biodiversity Board: The Karnataka Biodiversity Board has started functioning from 1-08-2003 as per provisions of Biological Diversity Act, 2002. The prime objective of the board is to foster the institutional setup for documentation, sustainable use and development of the rich biodiversity of the state. The Karnataka State is rich in Biodiversity of plant and animal species and bestowed with great diversity in climate, topography and soil. The major physiographic divisions are coastal plains, hill ranges (Western & Eastern Ghats) and Deccan Plateau. The Karnataka Biodiversity Board has initiated several measures to conserve and protect the rich biodiversity of the state as per the Act.

Functions of the Board: Advising the State Government on matters concerning conservation, sustainable use, fair and equitable sharing of benefits arising out of the use of Biological resources and knowledge. Regulation and granting of approvals for commercial utilization of Biological resources in consultation with Biodiversity Management Committees. Co-ordination and Technical assistance to Biodiversity Management Committees. Commissioning and sponsoring of studies, investigations and research related to Biological Resources. Identification and promotion of Heritage sites of Biodiversity importance. Devising methods for validation and certification of the information collected through Bio surveys.

Environmental Information System: The Environmental Information System (ENVIS) is a project of the Ministry of Environment & Forest, Government of India to facilitate generation & dissemination of information on Environmental issues. MoEF has signed an agreement with the World Bank for Environmental Management Capacity Building Technical Assistance Project. This sub-component aims to strengthen ENVIS by expanding its reach through networking various organizations in the Government, academic, NGO and corporate sectors. EMCB-ENVIS Node at the Department of Forest, Environment & Ecology, Government of Karnataka has been setup with the subject area of State Environment Issues.

The activities of the node include: Establishing linkages with users/organisations, Create and maintain databank on Urban Lakes-Bengaluru, Launching of website in the subject area allotted with regional language interface and develop linkages with ENVIS centres, Information on queries to Departments, Organisations, Scientific Institutions etc., Building up inventory of information material, Supply information to the ENVIS Programme, Identify data gaps and knowledge gaps in the subject area and take action to fill the gaps, Collect reports & journals in the subject area for requisite database

Directorate of Information Technology & Biotechnology (DIT)

Directorate of Information Technology & Biotechnology was established vide the Government Order No. ITD 02 PRM 2001 dated 19.09.2001.The Directorate was entrusted with the responsibility of implementing the various Information Technology and Biotechnology promotional activities besides its regular functions. *The Directorate of Information Technology and Biotechnology* is responsible for drawing the grants from the Treasury as and when released by Government on various on-going schemes allocated in the Budget and disburses to the implementing agencies. The following scientific institutions come under the Department of Science and Technology: 1) *Karnataka State Council for Science and Technology (KSCST); 2) Karnataka Science and Technology Academy.; 3) Jawaharlal Nehru Planetarium (JNP); 4) Karnataka State Drought Monitoring Cell (KSDMC); 5) Karnataka Rajya Vignana Parishat (KRVP); 6) Dharwad Regional Science Centre, and 7) Mangalore Pilikula Regional Science Centre*

Karnataka Biotechnology and Information Technology Services (KBITS): The Karnataka Information Technology Services (KITS) was

established on 7/12/2000 as a Society under the Karnataka Societies Registration Act, to achieve the objectives contained in the Millennium Information Technology Policy. To sustain and maintain the present pre-eminent position of Karnataka and Bengaluru in the field of Biotechnology, the Government of Karnataka announced the Millennium Biotech Policy in the year 2000. Karnataka Information Technology Services was renamed as *Karnataka Biotechnology and Information Technology Services (KBITS)* vide Govt. Order No.ITD 02 PRM 2001, dated.19.09.2001.

This organization helps the Department of Information Technology and Biotechnology in facilitating and promoting the Information Technology and Biotech sectors in the State by organizing as well as participating in Road shows, Trade shows, Conferences, Symposia, Seminars held at National and International levels. This enables to project the State and its potential for investments, implementation of its policies and programmes, assisting industries in getting quick clearances, administering incentives and concessions announced in state policies, etc. Vide Govt. Order No. ITD 02 PRM 2001, dated. 19.09.2001. Karnataka Information Technology Services has been renamed as"*Karnataka Biotechnology and Information Technology Services (KBITS)*".

KBITS provides secretarial services to the State Level Single Window Agency and High Level Committee, for quick clearance of the Information Technology and Biotechnology Projects in the State. KBITS assists the Directorate of Information Technology and Biotechnology, for administering incentives and concessions to Information Technology and Biotechnology companies. KBITS is made single point stop for providing all basic information that facilitates the establishment of IT & Biotech Industries in the State.

KBITS is the Nodal Agency for implementing the decisions of Vision Group on IT and Vision Group on Biotechnology. KBITS promotes the growth of IT & Biotech companies by way of organizing, sponsoring and participating in National/ International Workshops, Conferences, Exhibitions etc., KBITS has been instrumental in organizing the annual tradeshows viz BengaluruIT.biz (earlier called as BengaluruIT.in), Bengaluru BIO and Bengaluru Nano. KBITS coordinates promotional activities undertaken by institutions engaged in IT & Biotech area and work as a synergic liaison between Industry and Government.

Conferences, Exhibitions and Trade Fairs: KBITS promotes the growth of IT & Biotech companies by way of organizing, sponsoring and participating in National/International Workshops, Conferences, Exhibitions etc., KBITS has been instrumental in organizing the annual tradeshows viz BengaluruIT.biz (earlier called as BengaluruIT.in), Bengaluru BIO and Bengaluru Nano.

BengaluruIT.in, Asia's premier ICT event, is initiated by *the Department of Information, Biotechnology and Science & Technology, Government of Karnataka and STPI Bengaluru,* with the aim of facilitating business between Information, Communications, Media and Technology companies across the globe. BengaluruIT.biz is an ideal platform for ICT companies from across the globe to network with technology leaders in India. Bengaluru Bio the flagship Biotechnology Event in India is promoted by the Department of Information, Biotechnology and Science & Technology, Government of Karnataka and the Vision Group on Biotechnology has emerged as the largest congregation of India's Biotech community generating tremendous interest and response worldwide.*Bengaluru Nano* is being organized as an annual event to tap the emerging potential in the sector and strength of Bengaluru as 'Knowledge Capital' of the Country. The event is growing from strength to strength over the years under the able and dynamic leadership of Prof. C.N.R.Rao, Chairman, Vision Group on Nanotechnology, Government of Karnataka, Chairman, Scientific Advisory Coucil to the Prime Minister, National Research Professor, Linus Pauling Research Professor & Honorary President, Jawaharlal Nehru Centre for Advance Scientific Research

Karnataka State Electronics Development Corporation Limited (KEONICS): Karnataka State Electronics Development Corporation Limited (KEONICS) was incorporated as a Public Limited Company in September 1976 with the objective of promoting the development of electronic industry in the State and to create infrastructure for the rapid growth of electronic industries. It was envisaged to function both as manufacturer and as a facilitator as well as catalyst for the development of electronic industries and accordingly classified as development enterprise. The authorized capital of the company is Rs. 10.00 crores consisting of

10,00,000 equity shares of Rs. 100 each. The paid up capital as on 31.3.2008 is Rs. 787.20 lakhs. This entire share capital has been contributed by the Government of Karnataka at various points of time commencing from 1977.

Activities of Karnataka State Electronics Development Corporation Limited (KEONICS) : The present activities of Karnataka State Electronics Development Corporation Limited are broadly categorized as under: Training Services: Karnataka State Electronics Development Corporation Limited has network of 230 training centers throughout Karnataka. The computer training and Information Technology enabled services activities have been awarded with ISO 9001:2000 certifications. All the training centers are well equipped with latest Hardware and Software. Well-experienced faculty members are deployed in these centers. These centers will also act as point of presence for various other activities of Karnataka State Electronics Development Corporation Limited. Training programmers are also being conducted to staff of various Government Departments and organizations in addition to other candidates.

Infrastructure Facility Services: Karnataka State Electronics Development Corporation Limited has set up Electronics City on sprawling 332 acres of land on Hosur Road, Bengaluru. This Electronics City is today a major hub of Information Technology activities. With a view to encourage growth of Information Technology and Information Technology Enable Services industries in northern part of Karnataka, an Information Technology Park at Hubli with a total built up area of 3.55 lakh sq.ft. is established Software Technology Parks of India has already provided high speed connectivity at Information Technology Park, Hubli.

Marketing Services: *Karnataka State Electronics Development Corporation Limited (KEONICS)* is supplying EPABX systems to various Defense head Quarters. It has also undertaken projects of telecommunication networks by using Optical Fiber Cables and underground cables and is also marketing computer hardware, software and electronic equipments to various Government organizations.

It has also provided e-tendering solution 'Tender Wizard' to more than 30 Government organizations. In these projects Karnataka State Electronics Development Corporation Limited has partnered with companies like M/s Tata Telecom, Pair Cables, Simoco, HP, CMS, Antares, etc.,

Consultancy Services: Karnataka State Electronics Development Corporation Limited has developed in house competence in offering consultancy on project implementation to various Government Departments in the areas of Networking, Web creation and Software Development and Computerization plans. It has acquired these skills through re-orientation training programmes as system integrators, certified engineers and software developers. Karnataka State Electronics Development Corporation Limited has also signed Memorandum of Understanding with various organizations to market their products and services. To name a few are e-devalaya , tender wizard, works management system, drugs Logistics Smart Card, etc.

Karnataka State Remote Sensing Applications Centre (KSRSAC): Karnataka State Remote Sensing Applications Centre (KSRSAC) is an autonomous organization under the Department of Information Technology & Biotechnology and Science & Technology, Government of Karnataka. The Director, Karnataka State Remote Sensing Applications Centre is the head of the Centre. The activities of Karnataka State Remote Sensing Applications Center (KSRSAC) are guided and monitored by the Executive Committee, which is headed by the Principal Secretary or the Secretary to Government, as the case may be, Department of Information Technology, Biotechnology and Science & Technology.

Karnataka State Remote Sensing Applications Centre is the Nodal Agency for implementation of GIS and Remote Sensing (including Photogrammetry) for the State. Karnataka State Remote Sensing Applications Centre is harnessing the potentials of remote sensing and GIS techniques for developing the digital database of natural resources and urban sprawl in the State. Karnataka State Remote Sensing Applications Centre has been carrying out remote sensing and GIS base programmes for the Line Departments of the State on non-profit basis. Because of this, many Line Departments are coming forward to use remote sensing based data as an input for drawing up perspective management plan for developmental actives in the State.

Science and Technology Wing: Science has occupied the center stage in our lives and technology is shaping the way we live. The basic knowledge of Science and Technology is a pre-requisite for the over all prosperity of the human being. It is necessary to create a scientific temper among the community for the purpose of attaining a healthy society especially in the matters of environment and conservation of natural resources. The need of the hour isto educate the common man on Science and Technology. Keeping in view of this the Government has created Science and Technology Department in 1981. Administrative setup of the Science and Technology Unit: Earlier, the Science and Technology Unit was working under the administrative control of the Planning Department. Subsequently by Government Order No. DPAR 72 Sasivi 2003, dated:11/08/2003 this Unit was brought under the administrative control of Principal Secretary, Information Technology, Bio Technology, Science and Technology.

Karnataka State Council for Science and Technology (KSCST) was established in the year 1975. It is one of the first State S&T Councils to be set up in the country. KSCST is an autonomous S&T organization under Department of Science & Technology, Government of Karnataka. During the last three and half decades of its existence, KSCST has been pro-actively engaging itself to identify locale specific needs / problems in the broad areas of Agriculture, Water, Education, Energy, Ecology and Environment, Habitat, Health, Solid and Electronic waste and Infrastructure. In co-operation with the Indian Institute of Science and several other premier R&D institutions in the state, KSCST executes many projects and programmes, leading to find S&T based solutions such as providing access to energy for cooking and lighting, making available potable and safe drinking water, alternate building technologies, which prevail as the issues of highest priority even to this day thereby improving quality of life of people. Over the years, a number of technologies have been translated, from research and demonstration phase, to the implementation and operational phase. KSCST has also been providing necessary support to the Central and State Governments for the formulation S&T based policies and its wider acceptance by carrying out activities, like scientific survey, project implementation, co-ordination & monitoring, organization of scientific meets and awareness campaigns. The Department of Science and Technology, Government of India advocated KSCST as a model to all the states.

As early as 1977, *Karnataka State Council for Science and Technology (KSCST)* identified a project on "Popularisation of Science". Prof. M. A. Sethu Rao, the then Joint Secretary of the KSCST initiated the project as its convener. The objectives of the project were two fold: To bring together several individuals and groups in Karnataka already engaged in tasks of popularisation of Science, and To publish a science monthly in Kannada (Bala Vijnana). These objectives were fulfilled and Karnataka Rajya Vijnana Parishat (KRVP) was founded in 1980 as an autonomous registered society started with 25 units in the beginning and now it is an organisation of about 500 units, 4 large science centres and 42 small science centres spread across the length and breadth of Karnataka. Activists and promoters of KRVP include scientists, teachers, administrators, doctors and other professionals.

Karnataka State Natural Disaster Monitoring Centre

An Autonomous Body, Registered under Society Registration Act, Affiliated to Department of Science & Technology, Government of Karnataka. Karnataka State has the distinction of being first in the Country to establish Drought Monitoring Cell (DMC) in 1988 as an institutional mechanism to monitor the Drought. Activities broadened to also include monitoring other natural disasters and renamed as Karnataka State Natural Disaster Monitoring Centre (KSNDMC) in 2007. Executive Committee chaired by Principal Secretary, Dept., of IT, BT and S&T with Principal Secretary, Revenue as Vice Chairperson – Members from line department and scientific organizations. Governing Body headed by the Chief Secretary with Development Commissioner as Vice President – Members comprising line departments and Scientific organizations.

Natural Disasters Management heavily depends on inputs from Science and Technology. KSNDMC has been serving as a common platform to the various response players in the field of natural disaster management by providing timely proactive science and technology inputs. The Master Control Facility will strengthen the activities of the centre

in providing information, reports, advisories to the community, research organizations and the Government. The Centre provides inputs to the farming community, agriculture and horticulture based sector, fisherman, transport sector, power and electricity sector, State and District level Disaster Management Authorities in Karnataka through state of the art natural hazards monitoring sensors, information and communication system.

Natural Hazards in Karnataka: Climate Related Hazards Drought, Flood, Cloudburst, Hailstorm, Lightning, Coastal Erosion, Storm Surge, Cyclone, Geological Hazards Earthquake, Landslide, Tsunami, Hydrological Hazards Groundwater depletion and Aquifer Salinity, Biological Hazards Plant : Pest and Insect attack, Human: Plague (Kolar under highest risk), SARS, Bird Flu.

Karnataka States Vulnerability to Natural Disasters: 80 per cent of the Geographical area in the state is prone to Drought. 22 per cent of the Geographical area in the State is prone to moderate earthquake risks with possibility of earthquakes with magnitude of 5 to 6.9. 24 per cent of the Geographical area in the State is prone to cyclone and heavy winds. Land slides do affects the areas with slops of more than 30 per cent . The 359 km coastal line is prone to sea-erosion and Tsunami threat. Hailstorms are experienced almost every year and causes damages to crops, human life's and livestock's. All the districts in the state are vulnerable to more than one natural hazards. Thunder storms, cloud burst and lightening causes considerable damages and loss to lives and properties.

***Objectives of KSNDMC*:** Disaster Management depends heavily upon the inputs from Science and Technology. KSNDMC is providing a formal common platform to achieve synergy in the field of disaster management in Karnataka. The main Objectives are: Hazard mapping and vulnerability studies., Strengthening of information technology for Natural Disasters Management, Monitoring and impact assessment of natural hazards, Human Resource Development mainly by imparting training., Natural Disaster early warning system.

***Activities of KSNDMC*:** Core activities towards scientific studies related to Natural Hazards with existing monitoring system. Maintenance and strengthening the monitoring system related to Natural Disaster in the State.

Forecasting, Early Warning, Advisories And Preparedness In Management of Natural Disasters: Disaster Management is multidisciplinary and has complexity of information sharing and reporting It is common experience that information is not available on real/near real time to the community and response players. It takes long time to obtain the information and lot more time to integrate and generate information/reports/advisories. A study reports that 40per cent of the time is spent on searching for the source for information, 30per cent of time is spent on waiting for the information to arrive and another 30per cent of the time is spent in understanding and customizing to the users requirement. The Disaster Management Act 2005, Government of India reiterates paradigm shift in Disaster Management from rescue, relief centric approach to preparedness, early warning approach. It is said that one dollar spent on early warning and preparedness helps in reducing the cost on rescue, relief and rehabilitation by seven dollars.

The investment made on early warning and preparedness has high cost-benefit ratio. It comprises installation of field monitoring sensors - weather, geological, hydrological; collection of data on real time, transmission of the same to a central computational/analysis centre; data processing; analysis; alert recognition; simulation through appropriate mathematical models, customized report generation ; dissemination of the alerts/reports/advisories to the users. This requires Speedy Collaboration and close cooperation between stakeholders. What is needed for implementation: Sensing the pre-cursor, Transmission of raw data, Processing of data, Alert recognition, Dissemination of warning, Weather forecast & agriculture advisories to farming community.

Bengaluru Association for Science Education (BASE) is devoted to science popularisation and non formal science education. In addition to administering Jawaharlal Nehru Planetarium, BASE has established a Science Centre in the Planetarium. The Science Centre serves as a nucleus for non-formal science education at all levels. The activities of the Science Centre, along with those of the Planetarium, have made Bengaluru Association for Science Education (BASE) a unique institution for dissemination of science with diverse activities ranging from sky-

theatre shows, science exhibitions and lectures and workshops for Science Teachers and Students.

Jawaharlal Nehru Planetarium (Jawaharlal Nehru Planetarium), Bengaluru, was established in 1989 by the Bengaluru City Corporation, now known as the Bruhat Bengaluru Mahanagara Palike (BBMP). The administration of the planetarium was entrusted to Bengaluru Association for Science Education (BASE) which was formed in 1992. BASE is an Autonomous Body which is registered under Karnataka Societies' Registration Act. It is principally supported by annual grants from the Department of Science and Technology, Government of Karnataka.The BASE Governing Council consists of eminent scientists and educationists and senior officials of the Government of Karnataka.

Seismicity of Karnataka

Compared to the Extra-Peninsular region, representing the Himalayan Mountain-chain and the extensive plains at its foot which have been the sites of disastrous earthquakes in the past, the Peninsula, of which Karnataka forms a part, has remained comparatively quiet and has been least affected by earthquakes of great intensity. Greater part of Karnataka falls within zone I and Zone II which are affected only by mild tremors, not causing damage to life or property.

It is generally true that the Peninsula of India being composed of hard crystalline rocks is immune to major destructive earthquakes. This does not, however, mean that earthquakes are completely ruled out in this region. No part of the earth's crust is perfectly stable. The traditional view is that the Peninsular shield has remained as a rigid mass unaffected by earth movements. Recent geological, geomorphological and geophysical evidences do indicate that the Peninsula too has been affected by earth movements somewhat different from those that have affected the Extra Peninsula. These movements which have affected the peninsula are slow, upward and downward movements. Landsat imagery and aerial photographs show that the Peninsula is traversed by numerous fractures dividing it into a large number of crustal blocks. These, however, have not caused damage to life or property. There is evidence for the uplift of the Peninsula as a whole by over 1000 m in comparatively recent times giving it a plateau aspect.

The Indian Peninsula is considered as the remnant of a larger continent which got separated and submerged beneath the Arabian Sea causing profound changes in the distribution of land and sea. The long straight edge of the Western Ghats is inferred to be the scar which was left after the break and drifting away of the western part of the large continent. The area parallel to the Western Ghats is, for this reason, some what unstable and prone to be affected by earthquake shocks. The disastrous earthquake of Koyna on 10th December, 1967 was probably due to slippage along this fault line. Of the three well-defined zones, two zones run approximately parallel to the boundary between greenstone terrain in the north and high grade terrain in the south, commencing from Mangaluru in the west to Kolar Gold Field in the east. The third zone almost runs parallel to the western margin of Closepet Granite. Generally, it is these week zones which are prone to mild tremors.

South eastern Karnataka experienced a major tremor of 4.5 magnitude on Richter scale in 1984 and the epicenter was located close to Kelamangala near Hosur. The Latur earthquake of 30th September, 1993 was felt severely in parts of Kalaburgi and Vijayapura districts and the after shocks reached as far as south of Bengaluru. Subsequently, Bhabha Atomic Research enter installed Seismographs one each at Kalaburgi, Afzalpur and Jevargi and is continuously monitoring these areas ever since.

A powerful earthquake of 8.5 magnitude and a giant after shock of 8.2 magnitude struck Aceh, Indonesia on April 11, 2012. The epicenter was located off Western part of the Indo Australian subduction zone, about 434 km. south west of Aceh. Later it was inferred that the earthquake was due to strike-slip movement along the fault which could not generate any tsunami. The tremors were felt in neighboring Malaysia, Thailand, India, Srilanka and Singapore. A substantial part of Karnataka and more particularly Mangaluru, Udupi, Mysuru and Kolar districts experienced this tremor at about 2.00 p.m. which was followed by after shock at 4.11 p.m. which lasted for about 2 to 5 seconds.

The Bhabha Atomic Research Center installed an L-shaped array of 20 short-period seismometers at Gauribidanur in Chikkaballapur district in collaboration with U.K. Atomic Energy Authority

under the guidance of Homi J. Bhabha in 1965. These record continuously earthquakes of even low intensity. In addition to 20 short-period sensors in the L-shaped main array, three long-period sensors are also deployed. Signals from all the sensors are continuously recorded both in analog and digital form. The seismic center at Gauribidanur can record the nuclear explosions also, in addition to earthquakes of even smaller magnitudes.

Earthquake History: In recent years much of the seismic activity in the State of Karnataka has been in the south, in the Mysuru-Bengaluru region. Historically tremors have occurred in many other parts of the state such as Ballari. Recent studies (7) have identified several active faults in the region, in particular in the coastal plain near the towns of Bhatkal and Udipi, trending in an ESE-WNW direction. Many of the faults continue (2, 7) offshore into the Arabian Sea trending in the same direction. There is also no evidence (7) of the southward continuation of the West Coast Fault in the Konkan regions of the neighbouring state of Maharashtra as previously believed. However, it must be stated that proximity to faults does not necessarily translate into a higher hazard as compared to areas located further away, as damage from earthquakes depends on numerous factors such as subsurface geology as well as adherence to the building codes.

Seismic Hazard: The seismic hazard map of India was updated in 2000 (5) by the Bureau of Indian Standards (BIS). According to the new map, the state of Karnataka lies in Zones II and III. The coastal districts as well as the northern interior districts along the border with Maharashtra, lie in Zone III, where a maximum MSK intensity of VII can be expected. The remaining districts, as well as the city of Bengaluru lie in Zone II. Interestingly, the Ballari region, which experienced a strong earthquake in the 1840's has been downgraded to Zone II. The 1984 BIS Zoning map had placed it in Zone III. It must be noted that BIS estimates the hazard, based in part, on previous known earthquakes. Since the earthquake database in India is still incomplete, especially with regards to earthquakes prior to the historical period (before 1800 A.D.), these zones offer a rough guide of the earthquake hazard in any particular region and need to be regularly updated.

Significant Earthquakes in Karnataka & Goa: The following list briefly outlines known earthquakes in this region which either had observed intensities of V or higher (historical events) or had known magnitudes of M4.5 or more (instrumented events). General locations are provided for historical events for which "generalized" epicentral co-ordinates are available. Some events which were significant for other reasons are also included. This list will be updated whenever newer information is available. Please note that Magnitude and Intensity are NOT THE SAME. All events are within the state or union territory covered on this page unless stated otherwise. Acronyms Used: D=Depth, OT=Origin Time, Mw=Moment Magnitude, Ms=Surface Wave magnitude, Mb=Body Wave Magnitude, ML=Local Magnitude, M?=Magnitude Type unknown

This listing will be modified without notice. Please check back for the latest version when using it elsewhere. Additionally, please reproduce using appropriate CITATIONS/CREDITS.

1) August 1507 A.D. - Billankote area, Karnataka (4). Maximum observed intensity III (4). This is the earliest known earthquake in Karnataka. This information comes from a stone inscription (4) in the village of Billankote near Bengaluru.

2) 1653-54 A.D. - Vijayapura area, Karnataka (4). Maximum observed intensity III (4).

3) 22 August 1828 - Bantwal-Mudbidri area, Karnataka. 13.000 N, 75.000 E (2) Maximum observed intensity VII (7). This region lies to the east of Mangalore.

4) 12 March 1829 - Mangalore area, Karnataka, M? 5.7 (7). 13.000 N, 75.500 E (7) Maximum observed intensity VII (7). See also 8, 9. This might be the same event as one listed for 13 March 1829 near Bengaluru (2, 7).

5) 13 March 1829 - Bengaluru area, Karnataka, M? 5.8 (7). 13.000 N, 77.600 E (2) Maximum observed intensity V (2). This might be the same event as one listed for 12 March 1829 near Mangalore (7).

6) 01 April 1843-Ballari - Kolagallu area, Karnataka, M? 6.0 (3).15.200 N, 76.900 E (3) Maximum observed intensity VIII (3). There was some damage to civil structures (13) in the epicentral region. It was felt (13) in an area with a radius of 300 kilometres.

7) 23 August 1858 - Bengaluru area, Karnataka, M? 5.8 (7). 13.000 N, 77.600 E (2) Maximum observed intensity V (2).

8) 24 July 1861 - Raichur area, Karnataka. 16.400 N, 77.300 E (3) Maximum observed intensity V (3).

9) 13 January 1862 - Raichur area, Karnataka.16.400 N, 77.300 E (3)Maximum observed intensity V (3).

10) 08 February 1900 - Coimbatore area, Tamil Nadu, M? 6.0 (10) 10.800 N, 76.800 E (1)

Known as the Coimbatore earthquake, it was felt over a large section of south India and is the largest event during the historical period.

11) 07 January 1916 - Bengaluru area, Karnataka, Ms 5.0 (11). 13.000 N, 77.300 E (11) Maximum observed intensity V (2).

12) 12 February 1970 - Hassan area, Karnataka, Mb 5.0 (2).13.000 N, 76.100 E, OT=17:09:53 UTC (2) No comments.

13) 16 May 1972 - Malavalli area, Karnataka, Ms 4.6 (1).12.400 N, 77.000 E, OT=16:36:42 UTC (1) This region lies to the south of Mysuru.

14) 7 May 1972 - Malavalli area, Karnataka, Ms 4.5 (1).12.400 N, 77.000 E, OT=09:59:53 UTC (1) This region lies to the south of Mysuru.

15) 15 November 1973 - Almel-Sindgi area, Karnataka, Ms 4.0 (2).17.000 N, 76.300 E (2) Maximum observed intensity V (3). this earthquake was located in the district of Vijayapura in northern Karnataka.

16) 12 May 1975 - Shivamogga area, Karnataka, Mb 4.7 (2). 13.800 N, 75.300 E, OT=15:09:28 UTC (2) Maximum observed intensity V (2). Felt in Shivamogga and the surrounding areas, within a radius of 140 kilometres. This is the first known earthquake in this region (2).

17) 20 March 1984 - Denkanikota area, Karnataka, Ms 4.6 (1). 12.550 N, 77.770 E, T=10:45:22 UTC (2) Felt (14) in southern Karnataka at Bengaluru and Mysuru and in Tamil Nadu at Krishnagiri. Inteisity VI (15) was observed at Kelamangalam and Kowthalam in Karnataka. Cracks were seen in plaster and utensils were overturned at these places. A section of a mud wall also collapsed and a 2-metre tall papaya tree was uprooted (14).

18) 27 November 1984 - Masti-Berikal area, Karnataka, M? 4.5 (7). 12.870 N, 78.000 E (7) No comments.

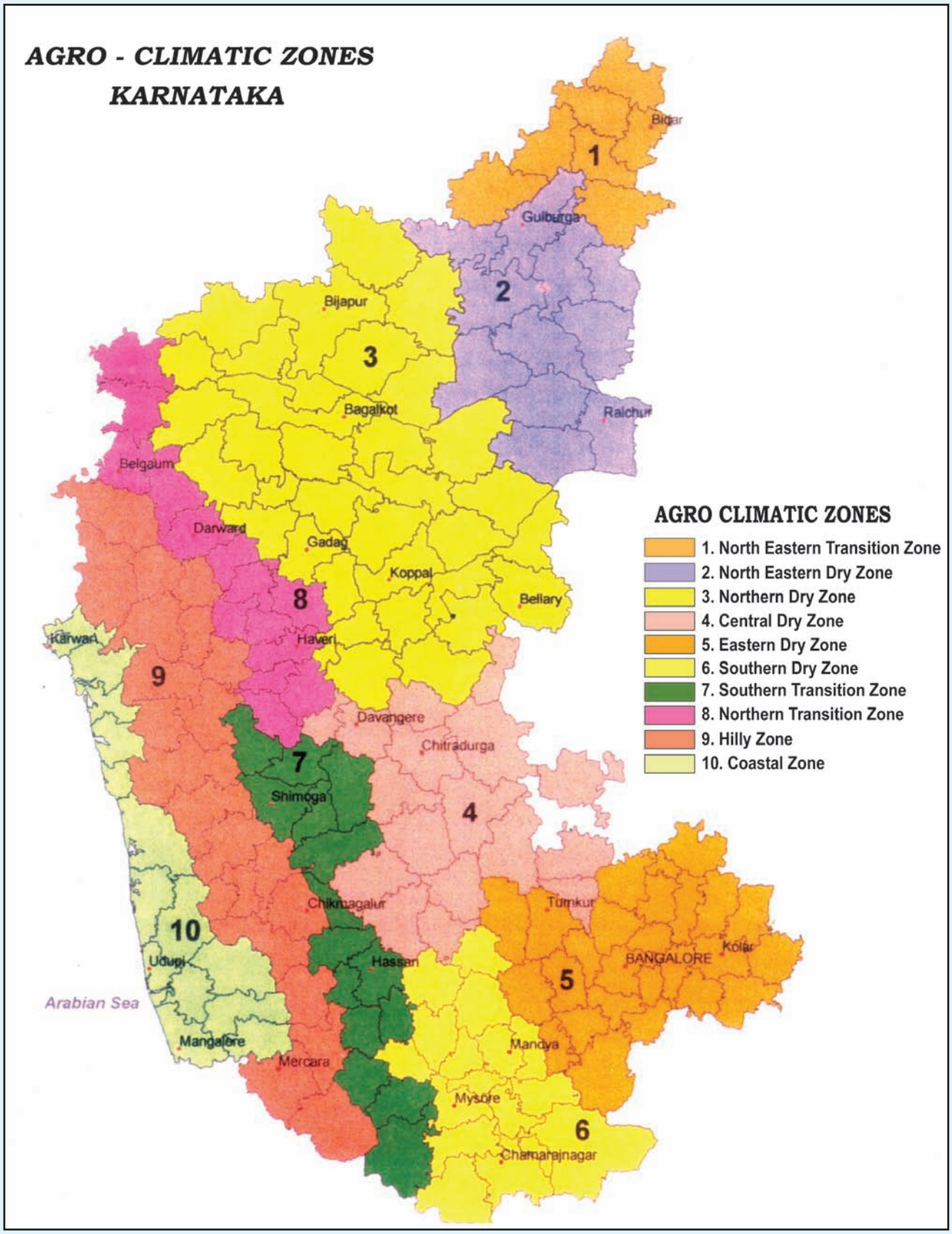
19) 03 May 1990 - Dharmasthala area, Karnataka, M? 4.6 (7). 13.000 N, 75.500 E (7) This region lies between Mangalore and Hassan.

20) 30 September 1993 - Killari area, Maharashtra, Mw 6.2 (12) 18.090 N, 76.470 E, OT=22:25:50 UTC (12) Among the deadliest intraplate earthquakes on record. Close to 8,000 people were killed and thousands injured in the pre-dawn earthquake. Many villages in the epicentral area, around Killari were razed to the ground. 55 people were killed in the neighbouring state of Karnataka, in Kalaburgi district. Strong tremors were experienced at Hyderabad, Pune and Mumbai and across much of Maharashtra, Karnataka, Andhra Pradesh and Goa. Tremors were felt as far as Chennai.

21) 14 November 1993 - Tallakad-Kollegal area, Karnataka, M? 4.5 (7).12.200 N, 77.050 E (7) This region lies to the south of Mysuru. 8,

22) 29 January 2001 - Bengalooru (Bengaluru)-South Karnataka region, ML 4.3 12.595 N, 77.220 E, D=015.0 kms, OT=02:37:47 UTC A light earthquake struck Bengalooru and the adjoining areas, on 29 January 2001 at 08:07 AM local time causing considerable panic and minor damage to property in southern Karnataka, India. The earthquake had a magnitude of ML=4.3.

23) 10 July 2002 - Koppal region, central Karnataka, ML 3.5 15.340 N, 76.175 E, D=011.0 kms, OT=14:09:06 UTC A mild earthquake struck central Karnataka, on 10 July 2002 at 19:39 PM local time. It had a magnitude of ML=3.5 and was felt in some parts of the districts of Ballari (Ballari), Koppal and Gadag.


AGRO - CLIMATIC ZONES
KARNATAKA
Bidar
Gulburga
Bijapur
Bagalkot
Raichur
Belgaum
Darward
Gadag
Koppal
Bellary
Karwar
Haveri
Davangere
Chitradurga
Shimoga
Chikmagalur
Tumkur
Kolar
BANGALORE
Hassan
Udupi
Arabian Sea
Mangalore
Mercara
Mandya
Mysore
Chamarajnagar
1
2
3
4
5
6
7
8
9
10
AGRO CLIMATIC ZONES
1. North Eastern Transition Zone
2. North Eastern Dry Zone
3. Northern Dry Zone
4. Central Dry Zone
5. Eastern Dry Zone
6. Southern Dry Zone
7. Southern Transition Zone
8. Northern Transition Zone
9. Hilly Zone
10. Coastal Zone