

## CHAPTER I GENERAL

### Origin of the Name of the District

The district is named after the headquarters town of Kurukshetra. According to *Mahabhartata*<sup>1</sup>, it came to be called Kurukshetra after the sage King Kuru who is said to have cultivated this land with passionate devotion. Kuru, a simple and pious man was the son of Samvarna and Tapati, the ancestor of the Kauravas and the Pandavas. The *Vamana Puran* ascribes the origin of Kurukshetra to courage, intensive devotion and asceticism of Kuru. It elaborates on the King's cultivation of the eight-fold ethical conduct of austerity (*tapas*), truth (*satya*) forgiveness (*Kshama*), kindness (*daya*), purity (*saucha*), charity (*dana*), yoga and continence (*brahmcharya*)<sup>2</sup>. There are many references to Kuru's association with Kurukshetra in the Puranas: *Vayu*, *Vishnu*, *Markandeya*, *Matsya*, *Agni*, *Narada*, *Brahmand* and *Bhagyata*. Al-Biruni, the Arab Historian of the early 11<sup>th</sup> century A.D., also elaborates on Kuru's association with Kurukshetra<sup>3</sup>.

Yet, according to another tradition, the name of Kurukshetra derives from Kurus, an Aryan tribe, who were initially a priestly class connected with the composition of and recital of the Vedas and the performance of Yajanas<sup>4</sup>.

### Location, Boundaries, Area and Population

**Location and boundaries.-** The district lies between 29°55'0" and 30°15' 15" north latitude and 76°27'0" and 77°17'0" east longitude. It is bounded in the north by Ambala district, on the east and northeast by Yamunanagar district, on south by Karnal district and on the west

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<sup>1</sup> Mahabhartata (Gorakhpur Ed.), Text Salya, 53,VI-26.

<sup>2</sup> Vamna Purana, Ed. Ananda Swarup Gupta, Varanasi, 1968, XXII, pp.126-28

<sup>3</sup> V.N. Datta and H.A.Phadke, History of Kurukshetra, 1984, p.4.

<sup>4</sup> H.Williams, A Sanskrit-English Dictionary, 1899,pp.294,747,V.S. Apte, Sanskrit-Hindi kosa,1966, p.286.

and southwest by Kaithal district and on the northwest by Patiala district of Punjab.

**Area.-** With an area of 1,530 square kilometers, it occupies 3.46 percent of the total area of the State. It is the third smallest district of the State in terms of area.

**Population.-** According to 2001 Census, the district had a population of 8,25,454 (4,42,328 males and 3,83,126 females). Of the total population, rural population accounted for 6,09,943 and urban 2,15,511 persons. The district had 3.92 percent of the total population of the state and ranked 14<sup>th</sup> amongst the district of Haryana in terms of population.

#### **History of the District as an Administrative Unit.**

Kurukshetra region is an area of great antiquity and remained an important centre of political activity during ancient period. During the Gupta period, it developed into a seat of political power. In Pali religious literature, Kurukshetra frequently finds mention as one of the sixteen *Mahajanapadas* of the time<sup>1</sup>. In 6<sup>th</sup> century A.D., Pushpabhuti founded a new dynasty in Thanesar *bhukti* (administrative division), a part of Kurukshetra, then known as Srikantha *Janapada*. But, with the transfer of Pushpabhuti's capital to Kanauj during Harsha's time, the political importance of the region was somewhat declined.

During the reign of Iltutmish the present district of Kurukshetra was covered into *iqta* (an administrative unit, akin to a division) of Pipli. An Officer called *mukti* controlled the total affairs of the *iqta* under the supervision of the Sultan.

This administrative set up continued under Balban's rule also<sup>2</sup>. The first Mughal Emperor Babar administered the district by placing it in the *Sarkar Sirhind*<sup>3</sup>. Akbar established an effective administrative system and divided his kingdom into *subaas*, *sarkars* and *parganas*. During his regime, the district was included in *sarkar Sirhind*.

<sup>1</sup> V.N. Datta and H.A. Phadke, History of Kurukshetra, 1984, p.38.

<sup>2</sup> K.C. Yadav, Haryana Ka Itihas, Vol. II, 1981, PP.32-34

<sup>3</sup> Ibid, p.67

Thanesar and Shahabad were among 19 *parganas* of this *sarkar*<sup>1</sup>. This administrative set up remained intact during the regime of Jahangir, Shahjahan and Aurangzeb.

During 18<sup>th</sup> century, most of the areas now forming Kurukshetra district were parceled out among various Sikh Chiefs, who formed independent principalities of Thanesar and Ladwa. Both the principalities were gradually lapsed to the British Government. A part of Thanesar (held by Bhag Singh) lapsed in 1832 because of the death of Sardar Jamiat Singh without male heir and the rest of it (held by Bhanga Singh) in 1850 on account of the death of Rani Chand Kaur, widow of Sardar Fateh Singh.

Ladwa was lapsed to the British Government in 1845 on account of misconduct of Raja Ajit Singh. The British Government organized these lapsed territories alongwith lapsed principality of Kaithal into Thanesar district in 1849. The district had three Tehsils, namely, Pipli, Thanesar and Kaithal. The Collector Magistrate was incharge of the district. Thanesar district was broken up in 1862 and the areas were distributed between districts of Karnal and Ambala. Pehowa *pargana* was included in Karnal district and *parganas* of Shahabad. Ladwa and a part of Thanesar were included in Ambala and converted into Pipli tehsil. In 1866, Pehowa *pargana* of Karnal district having 103 villages was transferred to Pipli tehsil of Ambala district. But 14 of these villages in 1876 and remaining 89 villages in 1889 were again transferred from Pipli tehsil to Kaithal tehsil of Karnal district. In 1897, Pipli tehsil was transferred to Karnal district. The headquarters of Pipli tehsil were also shifted to Thanesar in the same year.

The areas now forming the district, remained a part of Karnal district till Kurukshetra was carved out of it as a separate district on January 23, 1973, comprising the tehsils of Thanesar, Kaithal and Guhla<sup>2</sup>. At the time of formation of Kurukshetra as a separate district, tehsilwise position of village was as follows:-

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<sup>1</sup> Ibid p.77-79

<sup>2</sup> Haryana Govt. notification No. 454-E(IV)-73/2212, dt. 23<sup>rd</sup> Jan.1973.

<u>Tehsil</u>	<u>No. of villages</u>
Thanesar	429
Kaithal	143
Guhla	171
<b>Total</b>	<b>743</b>

In 1979, a new tehsil of Pehowa was created by transferring 56 villages from Guhla tehsil, 9 villages from Kaithal tehsil and 33 villages from Thanesar tehsil.<sup>1</sup> Besides, Radaur was constituted as sub-tehsil of Thanesar tehsil. In 1979, the tehsilwise position of the villages was as follow.-

<u>Tehsil</u>	<u>No. of villages</u>
Thanesar	278
Radaur sub-tehsil	120
Kaithal	134
Guhla	115
Pehowa	98

On April 1,1981, Shahabad, *Kanugo* circle (Thanesar tehsil) was converted into a sub-tehsil comprising 76 villages. Ladwa sub-tehsil was created on May 18,1987 in Thanesar tehsil comprising 75 villages.

Major changes in the boundaries of the district and existing tehsils took place on November 1,1989<sup>2</sup> with the formation of Kaithal district taking out Kaithal and Guhla Sub-divisions from Kurukshetra District. Radaur sub-tehsil of Thanesar tehsil was included in newly carved out Yamunanagar district. Besides, 15 villages from Nilokheri sub-tehsil of Karnal district were added in Thanesar tehsil, one village from Shahabad sub-tehsil was included in Ambala district, two villages of Pehowa tehsil were included in Guhla tehsil of Kaithal district, three villages of Kaithal tehsil were included in Pehowa tehsil, four villages of Ladwa sub-tehsil were included in Radaur sub-tehsil

<sup>1</sup> District Census Handbook, Kurukshetra District, 1981.

<sup>2</sup> Haryana Govt. Gazettee (Extraordinary), Oct 16, 1989.

of Yamunanagar district and one village of sub-tehsil Radaur was included in Ladwa sub-tehsil of Kurukshetra district. Similarly, 12 villages taken out from Thanesar tehsil were transferred to Pehowa tehsil and 2 villages excluded from Shahabad sub-tehsil were included in Pehowa tehsil in 1989. At present, the district comprises of three tehsils, namely, Thanesar, Shahabad and Pehowa. Thanesar tehsil has three sub-tehsils, namely Ladwa, Ismailabad and Babain. As on March 31,2004, tehsilwise position of the villages in the district was as follows:-

<b>Tehsil<sup>1</sup></b>	<b>Villages</b>		<b>Total</b>
	<b>Inhabited</b>	<b>uninhabited</b>	
Thanesar	240	5	245
Pehowa	88	4	92
Shahabad	79	-	79
<b>Total</b>	<b>407</b>	<b>9</b>	<b>416</b>

## TOPOGRAPHY

Kurukshetra district forms a part of the vast aggradational alluvial terrain of the Indo-Gangatic plain. The Indo-Gangatic plain represents deposition of alluvium in a tectonic platform of fore deep between the Himalayan region in the north and the peninsular region in the south. The alluvium was deposited in the quarter nary. The average elevation of the plain is about 245 metres above the mean sea level. The general slope of the land is southwest wards. There are many shallow topographical depressions in the area.

The deep bore-hole data from the district suggests that the alluvium overlying the rock bed exceeds 600 metres at places. A preliminary study involving a large number of 75 to 90 metres deep logs obtained from tubewell drillings in Ladwa and Thenesar development blocks suggest 6 to 8 cycles of deposition within this depth in the fore-deep. The cyclic deposition is in the form of alternating layers of clay, silt, sand and gravel. The clay and silt layers are usually characterized by calcium carbonate concretions. Usually 2 to 3 gravel horizons are also present at depth.

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<sup>1</sup> Sub-tehsilwise villages may be seen in Chapter X-General Administration.

The information on alluvial terrain in the district is scanty. On an empirical classification, the two types of terrain, the *bangar* and the low arrears called *bet* are inferred. The *bangar* or the older alluvium makes as upland tract of 8 to 16 kilometres wide. It is characterized by massive beds of rather yellowish to red coloured clays with calcareous concretions *Kankar* scattered throughout. Major part of the district falls under *bangar*. The low lying area alongside Markanda is called *naili*.

### Drainage and River System

Natural drainage of the northern parts of the district sloping towards southwest is determined by streams emerging from the lower Shiwalik foothills. The main drainage is represented by Markanda, Umla and Dangri streams. There are matured streams having seasonal runoff. Most of the older river/*nalas* viz. chautang, Saraswati, khand *nala*, Umla *nala* as well as parts of the Dangri river and Lenda *nala* have been claimed and now exist as drains. Old channels of the Markanda have been used as excess drainage ways at Jalbehra.

The district is traversed by important seasonal streams viz. Saraswati, Markanda, Chautang and Rakshi.

**The Saraswati.-** River Saraswati has been referred to as river par excellence and occurs most frequently in the *Rigveda*. It seems to have been the holy stream of the Vedic age. It is possible that it was as large as the Sutlej in the Vedic age, and actually reached the sea, as the *Rigveda* describes it as going down to the ocean<sup>1</sup>. On the holy banks of Saraswati were kindled sacred fires, and *vedic* hymns composed and recited. It played a dominant role in the growth of the culture and civilization in ancient India. The archaeological explorations of the Saraswati-Ghaggar-Hakra bed further prove the Vedic and epic tradition that the Saraswati was once a mighty river with a continuous and perennial flow down to the Arabian Sea. The river seems to have dried up because of serious seismic disturbances towards the close of the Vedic period<sup>2</sup>.

The present Saraswati which enters the district from Yamunanagar district is a mere shadow of its former self through most

<sup>1</sup> Karnal District Gazetteer, 1976, p.9.

<sup>2</sup> H.A.Phadke, Haryana Ancient and Medieval, 1990, PP 10-11

of its course in the district has no defined bed. The Saraswati and its numerous small tributaries drain a large part of the Thanesar tehsil and overspill their waters in the low-lying *Naili* circle though their floods rarely extend to any distance. It outfalls into Bibipur lake, wherefrom through Saraswati drain, it joins Para, a tributary of the Ghaggar.

**The Markanda.-** It is a seasonal stream and originates in the lower Shiwalik hills, it enters the district near Damli in Thanesar tehsil and passes near Shahabad. It has width ranging from 15 to 40 metres. After flowing in the south-westerly direction for about 48 kilometres, it joins Ghaggar. When in spate during the rainy season, it poses a serious threat to villages along its banks and causes considerable damage to standing crops.

*Chautang* and *Rakshi* are other Seasonal streams which pass through the district.

### **Lake**

Bibipur lake is an important lake of the district. The lake has been created as a result of 12 kilometres long Thanesar Bund designed to protect certain villages from the floods of the Saraswati river. It is filled up during the rainy season. It has a maximum capacity of 12.3 million cubic metres of water. The accumulated water is later released into the Saraswati canal.

### **Groundwater**

The district falls in upper Ghaggar river groundwater basin. The depth of water table in the district varies from 3 to 15 metres and is comparatively shallow in the northern part as compared to southern part. Groundwater in the district occurs in unconfined as well as confined aquifers. The unconfined aquifers are recharged from rainfall, seepage from unlined canal network and infiltration from seasonal streams. The deeper confined aquifers at places reportedly get recharged from the sub-surface flow taking place from the Shiwalik hills and adjacent areas.

### **GEOLOGY**

The area falling in the district is a part of the vast Indo-Gangetic alluvial plain and comprises sediments of Pleistocene to recent age. The major part of the district is occupied by the Ganga

older alluvial deposits comprising of horizontally bedded sand, silt and clays of variable proportions, minor- *Kankar* and gritty zones. The newer alluvial deposits of the area comprise of the sediments laid down in the narrow or fairly wide terrace zones of the Markanda.

The thickness of the older alluvial sediments is about 300m in the southern part and increases steadily towards north. It occupies most of the district basement, though not exposed in Kurukshetra district, probably comprised of the Shiwalik rocks occurring to the north. Deep tubewell data reveal that the older alluvium comprises of six sedimentation cycles within 300m depth from the surface. Each cycle is represented by a sequence of sand-silt-clay of varying thickness (1 to 12m). *Kankar* occurs as beds as well as concretions, the latter being predominant.

Younger alluvial sediments are exposed along the channels of the Ghaggar and Markanda rivers only.

The alluvial deposits are both channel filled as well as over-bank deposits. The river Markanda has changed its course several times due to formation of terminal fans. The Ghaggar river has also abandoned a part of its course due to avulsion during its recent geomorphic history.

Analysis of data shows that aeolian deposits are formed by wind blown sands derived from nearby channels and are not the extension of desert. Some sediments show glacial features later on reworked by aeolian and fluvial agencies.

### **Mineral Resources**

*Kankar*, grey sand, saltpeter and brick making silt, among other resources, are available in the district. *Kankar* occurs as fragmentary as well as massive calcareous deposits in older alluvium. The fragmentary type, better known as nodular or concretionary, is widely distributed throughout the district. High grade workable deposits of *Kankar* area are yet to be explored in the district.

Medium to coarse grained micaceous grey sand obtained in the present day rivers and in palaeo channels is being quarried for use as construction material. Important deposits of grey sand are near Jalbehra (Pehowa tehsil) and in the Markanda river.



*Kallar/reh* in the form of full white encrustations over soil are extensively present in the western part of the district. Minor isolated patches are scattered all over the district. The encrustations contain essentially, sodium bicarbonate, potassium bicarbonate, sodium sulphate, at few places and magnesium chloride, potassium chloride and potassium carbonate salts in varying proportions. Efforts have to be made for extraction of the salt from *Kallar* land, so that the local population get some income from these otherwise barren land.

Salt peter, though not extensively developed in the district, has important occurrences at Thanesar, Kakrala Gujran, Rasulpur and Dehan where it is extracted from soil. It is used for making crackers and in the match industry etc. Deposits of clay (potter's earth) are reported in Thanesar tehsil. Salt ammonia used to be obtained as a byproduct in the brick kilns is found in Thanesar tehsil.

### **Seismicity**

History of last more than 200 years for which records are available, show that the Kurukshetra region has been affected by earthquakes of moderate intensity. The area came under the influence of the strong earthquakes near Delhi on July 15, 1720, Kangra on April 4, 1905 and Dharchulla on August 28, 1916. The maximum intensity experienced in the area due to these earthquakes was during the Kangra earthquake of April 4, 1905. It reached VI M.M.<sup>1</sup>

According to tectonic map, the area is not very far off from some active faults and thrusts. Prominent among these are the Himalayan thrust towards the north and the Aravali feature which ends on the surface near Delhi and extends below the alluvium towards Haridwar and Moradabad fault. Earthquakes are possible along these faults. In view of this, the actual observed intensity of VI M.M. will have to be revised. Further consideration of the earthquake potential of the three features mentioned above and their distance from Kurukshetra region show that the expected intensities could exceed VII M.M. and reach VIII M.M. for which provision may have to be made.

In the seismic zoning map of India prepared under the auspices of Indian Standard Institution, the area has been shown on the border

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<sup>1</sup> Modified Mercalli Intensity.

of zone III and IV which corresponds to maximum seismic intensity of VII M.M. for zone III and VIII M.M. for zone IV. However, intensity VIII may occur at longer intervals of time. Hence, provision of seismic intensity between VII and VIII may be sufficient for this region.

### FLORA<sup>1</sup>

Due to extensive cultivation, very little of the natural forests are left over. Tree plantations can be seen along the roads and canals. Open dry deciduous scrub type of flora dominates in the district. Flora is scant and sparse. Tree and shrub species found in the district are *dhak*, *hingot Jal*, *Kaindu*, *Jand*, *Jhar*, *Kikar*, *babul*, *kair*, *neel*, *kalandana*, etc. Associated with these trees and shrubs are found shrubby climbers such as *dhutlata gui* and *jangli parwal*. During the monsoon a number of herbaceous plants appear as under growth swampy in the *jungles*. These include *Kana*, *Kansura*, *Gokhru*, *Lotak*, *bishkapra* and *latjora*. *Kikar* and *Khajur*, are very common in swampy or marshy localities and in low lying areas. *Farash* is very common in saline areas where hardly any other tree can grow. *Matilana* and *lana* are the common herbs in saline areas.

Since most of the area in the district is devoid of natural forests, extensive plantation of trees like *shisham*, *aruna*, *jand*, *kandu*, *wilayati*, *imli*, *nimber*, *siris*, *neem*, *amaltas*, *tut* and species like of eucalyptus, *peepal* and *barh* are often planted near the villages. The people look upon *peepal* and *barh* with religious fervor. *Aam* and *ber* are the chief fruit trees. Other common trees which are either planted or self-sown include *semal*, *kachnar*, *sainjan*, *gulmohar*, *arjun*, etc. *Aak*, *chota dhartura*, *dhatura* and *satyanashi* are found in waste lands

Among the medicinal plants, which are of local repute and are generally found throughout the district, include *cunarnva*, *bala*, *aswagandh*, *nigundu*, *tulati*, *patti*, *gulabi*, *gwal*, *kakri*, *dhutlata*, *jara*, *amla*, *gokhurru* and *adulasa*.

The aquatic plants are poorly represented. In ponds, lakes and canals are found *swala*, *Sval*, and *jala*. *Azolla pinnata*, an aquatic fern, is seen sometimes covering ponds and lakes surface.

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<sup>1</sup> The botanical names can be seen in Table-I at the end of this chapter.

In the cultivated fields *Aeshynomene indica*, *convolvulus aryensis*, *labi*, *kangi* and *piazi* among others, are found as weeds.

There are also a few parasite species of plants which have been causing considerable damages to the standing crops. Among these is *sarsum bandas* causing damage to mustard crop. *Cistanche tubulosa* is also a root parasite commonly found on *calotropis procera*. Other parasitic angiosperms include *nilagthari*, *zarbuti* and *Cuscuta hvalina*.

There are also quite a number of species of grass found in the district. Among these *sardara*, *Munja* and *dab* are of economic importance and are used for thatchig huts, making baskets, chairs, screens, ropes and matting, etc. The common fodder grasses include *dubh*, *anjan*, *palwa*, *sarola* and *sanwak*. In waterlogged areas and along canal banks, *Veteyeria zizanoides* and *Eypha elephantiana* are also found.

Ponds within the district are suitable for cultivation of *Trapo bispiosa* (*singara*) and serves as a sources of food for the people.

#### FAUNA<sup>1</sup>

The district is inhabited by various groups of mammals. Primates are represented by *bandar* or *langur*. The carnivorous animals found in the district are the Bengal fox, jackal and small-Indian mangoose.

Two species of bats i.e. Indian flying fox and greater yellow bat are found in the district.

The Indian palm squirrel or *gilheri*, the common field mouse and the Indian hare comprise the rodent fauna of the district.

The forest department is engaged in protecting endangered species like black buck and crocodile. The Govt. has set up a Block-buck Breeding Centre at Pipli and a Crocodile Sanctuary at Bhor Saidan. A brief description of these is as under:-

#### **Black Buck Breeding Centre**

Black buck is the State Animal of Haryana. During the last decade, its population has decreased in most parts of the State and

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<sup>1</sup> The zoological names can be seen in Table-II at the end of this chapter.

even in the entire country as hunters indulge in its hunting despite ban. The Central Government had declared it as an endangered species and included in the Schedule-I appended to the Wild Life (Protection) Act, 1972.

During the Seventh Plan, breeding programme of black buck in captivity for multiplication was undertaken at Pipli on the National Highway, 1 kilometre from Pipli Bus Stand. The total area of this centre was 8 acres. The project was initiated during the year 1981-82 and fifteen black-bucks were released therein. The results of breeding are very encouraging as their population has increased. From this stock, Haryana has also supplied six pairs to Tripura Government, three pairs to N.F.L. Panipat, two pairs to Chandimandir Cantonment and one pair to Chhatbir Zoo in Punjab.

A Mini Zoo has also been established for recreation and study of wildlife. Canteen facilities have also been provided.

#### **Crocodile Farm, Bhaur Saidan**

There was a tank in village Bhaur Saidan situated on Pehowa-Kurukshetra road, 22 kilometre from Kurukshetra where good number of crocodiles lived in. The area of this farm was 15 acre, 6 kanal and 2 marla. The area of this tank was acquired and its management was taken over by the Forest Department during 1982-83.

The Habitat of this farm has been increased and the periphery fenced. Four pairs of crocodile were obtained from Crocodile Bank, Madras and have been released therein. The present population is 25.

A high mound inside the tank has been erected for watching the reptiles from close range.

#### **BIRDS**

**Game birds.-** A large number of game birds are found in the district, some of which are residential while others visit the district in winter. These birds are brahminy duck, pintail, common teal, mallard, wigeon blue winged teal, common pochard common teal, spotbill duck and tree duck. Whenever there are sizeable tanks and other stretches of water and lakes, these birds can be seen alongwith kingfishers and waders like sand-pipers and stints. Other game birds like Indian black partridge, which has been declared a State bird, grey partridge and jungle bush quail are also common.

In addition to water birds, other game birds like pigeons and doves are common in the district. Bengal green pigeon is found in the vicinity of villages chiefly on *Ficus* trees and blue rock pigeon occurs in almost all the villages. Indian ring dove, Indian turtle dove, Indian spotted dove and Indian little brown or Senegal dove are generally found in cultivated fields.

**Birds of economic importance.-** Scavengers like pariah kite, brahminy kite, white backed vulture, tawny eagle, greater spotted eagle, etc. keep the district cleared of dead animals by feeding on them. Predators like black-winged kite and spotted owl and eagle owl keep a check on the population of not only rodent pests but various other insects and pests by eating them.

The challenge of insects and pests is also met with the various insect eating birds. Swifts, such as Indian house swift, Indian palm swift and swallows like western swallow, Indian wire-tailed swallow and Indian striated swallow consume insects as their staple diet. Other insect eating birds are king crow, brahminy *myna*, Indian pied *myna*, bank *myna* and northern jungle *myna*. Babblers, warblers and flycatchers of various species feed on a considerable amount of worms in addition to insects.

**Colourful birds.-** The colourful birds add beauty to the varied wildlife of the district. The most common colourful birds are blue jay, Indian golden oriole, large Indian parakeet, rose-ringed parakeet, pied, crested cuckoo, *koel*, common crow pheasant, Indian pied kingfisher, redvented *bulbul*, *lal munia* and Indian spotted *munia*.

Besides, different types of storks, cranes, egrets and lapwings are also found in the district.

## REPTILES

**Snakes.-** Both the venomous and non-venomous species of snakes are found in the district. The venomous snakes are the common Indian Krait, the Cobra or *Nag*, the Russel's Viper and the saw-scaled Viper. The non-venomous snakes are the Blind snake and the John Sand Boa.

**Lizards.-** The common lizards of the district are the Garden Lizard or the *Girgit* and the House Lizard or the *Chipkali*. The former is found around the bushes in the garden or lawns of the bungalows whereas the latter inside the buildings.

**Tortoises.-** *Geoclemys hamiltoni* (Grey) is the commonly found *kachhua* of the district.

**Amphibians.-** The Amphibians comprise only the anuran species commonly called as frogs and todas. Almost all the water bodies inhabited by aquatic forms like common skittering frogs (*Rana cyanophlyctis*) and the water edges inhabited by common Paddy field frog (*Rana limnocharis*) as the large Indian Bull Frogs (*Rana tigrina*) usually occupied the muddy bushy banks. The more terrestrial species like common Indian Toad (*Bufo melanortishi*) resides in secluded areas under store or under logs near dilapidated house. The only microhliid or smallest Indian Ornate Frogs (*Mi crophyla ornate*) takes refuge under leaf litter and waste straw near human settlements.

**Frogs.-** The common frogs of the district are Indian bull frog, shipping frog and paddy field frog.

**Fish.-** The different watercourses of the district, lakes and ponds especially Bibipur Lake abound with many species of fish. The important species of fish found in the district are *Rohu*, *Kalbans*, *Thaila*, *Mori Chilwa*, *Singhara*, *Pori*, *Bhangan*, *Mirgal*, *Kandai*, *Sangi and Kangi*.

## CLIMATE

The climate of the district is characterized by the extreme dryness of the air, with an intensely hot summer and cold winter. It is only during the three monsoon months of July, August and September that moist air of oceanic origin penetrates into the district. The year may be divided into four seasons. The cold season from mid-November to about mid-March is followed by the hot season which continues upto about the end of June, July to about mid-September is the southwest monsoon season.

**Rainfall.-** Records of the rainfall in the district are available only for one station i.e. Thanesar for sufficiently long period. The details of the rainfall at this station are given in Table-III. The average annual rainfall at Thanesar is 656.6 mm. About 81 percent of the normal annual rainfall in the district is received during June to September-July being the wettest month. Some rain is also received during winter season in association with passing western disturbances. The variation in the annual rainfall from year to year is large. In the 100 years

period from 1901 to 2001 the highest annual rainfall amounting to 186 percent of the normal occurred in 1942. While the lowest rainfall which was only 49 percent of the normal occurred in 1918. In the same 100 years period, the annual rainfall in the district was less than 80 percent of the normal in 21 years. Consecutive, 2,3 and 4 years of such of low rainfall occurred once, twice and once respectively. On an average, there are 35 rainy days (i.e. days with rainfall of 2.5 mm or more) in a year in the district. The heaviest rainfall in 24 hours recorded in the district, was 217.0 mm at Thanesar on July 8, 1972.

**Temperature.-** There is no metrological observatory in this district. So the description which follows is mainly based on the records of the Observatories in the neighbouring districts where climatic conditions are somewhat similar to those in the district. The cold season generally starts by about mid-November when temperature begins to decrease rapidly. January is generally the coldest month with mean daily maximum temperature at about 20°C and mean daily minimum at about 7°C. In association with the eastward passage of western disturbances in the cold season, cold waves affect the district and the minimum temperature sometimes goes down by a degree or so below the freezing point of water. From about mid-March, temperature begins to rise rapidly. May and June are the hottest months with the mean daily maximum temperature at about 40°C. From about April hot westerly winds, locally known as '*Loo*' begin to blow and the weather becomes intensely hot. In May and June, the maximum temperature may sometimes go above 45°C. With the advancement of the southwest Monsoons into the district towards the end of June, there is appreciable drop in the day temperatures, while night temperatures continue to be nearly as high as in summer. Even during the southwest Monsoons, the weather is sultry and unpleasant due to the increased moisture in the Monsoons air. After the withdrawal of Monsoons by about mid-September, there is an increase in the day temperatures but night temperatures drop rapidly with the progress of the season.

**Humidity.-** The air is generally dry over the district during the greater part of the year. During the Monsoon season, the humidity is high, generally being between 60 to 85 percent. Humidity decreases in the post-monsoon season. April and May are usually the driest months, with relative humidity being about 20 percent or less in the Afternoon.

**Cloudiness.-** During the southwest Monsoon season and particularly during July and August sky becomes fully cloudy and overcast. In the rest of the year, sky is clear or generally highly cloudy. During the period January to early March, sky becomes cloudy and often overcast in association with passage of western disturbances.

**Winds.-** Winds are in general light over the district with some strengthening in force during the summer season. During the Monsoons, winds are mostly Easternly or South-easternly. During the rest of the year, winds are predominantly westerly or North-westernly.

**Special Weather Phenomena.-** April to June is the period with the highest incidents of thunderstorms and dust storms. Violent squalls (*andhis*) often accompanying such storms. Some of the thunderstorms do not give any appreciable rain, but others are accompanied by heavy rain and occasional hails. Thunderstorms also occur in the winter months in association with passing western disturbances. Fog, sometimes dense, occurs in the cold season.



**TABLE-I**  
**BOTANICAL NAMES**

**A-TREES**

<i>Dhak</i>	<i>Butea monosperma(L.)</i>
<i>Hingot</i>	<i>Dalanites aegyptiaca Del</i>
<i>Jal</i>	<i>Salvadora oleoides Done</i>
<i>Kaindu</i>	<i>Diospyros cordifolia Roxb.</i>
<i>Jand</i>	<i>Prosopis ceneriria(L.) Machr.</i>
<i>Jhar</i>	<i>Zizyphus nummularia</i>
<i>Kikkar, Babul</i>	<i>Acacia nilotica (L.) Wild</i>
<i>Khair</i>	<i>Capparis deciduas(Forsk.)Edgew.</i>
<i>Neel</i>	<i>Indigofera</i>
<i>Kaladana</i>	<i>Euphorbia Ipomoia</i>
<i>Dhatlata gui</i>	<i>Pergularia daemia(Forsk.) Chiov.</i>
<i>Jangli Parwal</i>	<i>Coceulus penonlus(Forsk.)Dietr.</i>
<i>Kana, Kansura</i>	<i>Commelina benghalensis L.</i>
<i>Gokhru, Lotak</i>	<i>Digera muricata (L) Mass Tephrosia</i> <i>Hamilton, Drumm. Tribulus terrestris L.</i>
<i>Bishkapra</i>	<i>Trianthema portulacostrum L.</i>
<i>Latjeera</i>	<i>Achyranthes aspera L.</i>
<i>Khajor</i>	<i>Phoenix syvestris (L.) Roxb.</i>
<i>Farash</i>	<i>Tamarix articulate Vahi.</i>
<i>Shisham</i>	<i>Dalbergia cissoo Roxb.</i>
<i>Arona</i>	<i>Ailanthes excelsa</i>
<i>Jand, Kaindu</i>	<i>Prosopis Juliflora</i>
<i>Wilayati imli</i>	<i>Inga dulcis.</i>

<i>Nimber</i>	<i>Acacia Leucophlaea</i>
<i>Sirish</i>	<i>Albizia Lebbeck Denth.</i>
<i>Neem</i>	<i>Azadiachta indica</i>
<i>Amaltas</i>	<i>Cassia fistula</i>
<i>Tut</i>	<i>Morus alba</i>
<i>Peepal</i>	<i>Ficus religiosa</i>
<i>Badh</i>	<i>Ficus benghalensis.</i>
<i>Ber</i>	<i>Zizyphus mauritiana Lamk.</i>
<i>Am</i>	<i>Mangifera Indica L.</i>
<i>Semal</i>	<i>Salmalia malabarica D.C.</i>
<i>Sainjana</i>	<i>Moringa olefera Lamk.</i>
<i>Gulmohar</i>	<i>Delonix regia (Boj.) Rof.</i>
<i>Kachnar</i>	<i>Bauhinia Variegata L..</i>
<i>Kanina</i>	<i>Terminalia arjuna (Roxb.)</i>
<i>Ak</i>	<i>Calotropis procera(Ait)</i>
<i>Chota dhatura</i>	<i>Xanthum strumarium L.</i>
<i>Dhatura</i>	<i>Datura stramonium L.</i>
<i>Satyanashi</i>	<i>Argemone mexicana L.</i>

#### **B-MEDICINAL PLANTS**

<i>Punarnva</i>	<i>Boerhoavia diffusa L.</i>
<i>Bala</i>	<i>Sida Cordifolia L.</i>
<i>Aswagandh</i>	<i>Withania Somnifera L.Dunal</i>
	<i>Vitex negundo L.</i>
<i>Tilati Patti</i>	<i>Bhysalis minima L.</i>
<i>Gulabi</i>	<i>Crotalaria medicaginea Lamk.</i>
<i>Gwal Kakri</i>	<i>Malothria maderaspatana Cong.</i>
<i>Dhutulata Ganmi</i>	<i>Oxylstoma esculentum(Luf.) Schuet</i>

*Jara amla**Phyllanthus asperulenus Hutch.P.**Niruri auct. non L.**Gokhuru**Tribulus terrestris L.**Adulasa**Adhotoda vasica Nees***C-AGUATIC PLANTS***Swala, syala**Vallisneria spiralis L.**Jala**Hydrilla verticillata (L.F.)Royle***GRASSES***Sarkara**Saccharum spontaneum**Munj**Erianthus munja**Dab**Desmostachya bipinnata**Dubh**Cynoden dactylon L. Pers**Anjan**Cymbopogan Jwarancusa**Palwa**Dichanthium annulatum**Sarola**Deteropogon Contortus**Sanwak**Fahinoehics Colomum*

**TABLE-II**  
**ZOOLOGICAL NAMES**

**MAMMALS**

Indian flying fox	<i>Pteropus giganteus</i> (Briuenich)
Greater yellow bat	<i>Scotophilus healthi</i> (Horsefield)
Rhesus machaque or bandar	<i>Macaca mulatta</i> (Zimmermann)
Langur	<i>Presbytis entellus</i> (Duffrense)
Asiatic jackal	<i>Canis aureus</i> Linnaeus
Bengal fox	<i>Vulpes benghalensis</i> (Shaw)
Small Indian Mongoose	<i>Herpestes auropunctatus</i> (Hodgson)
Indian Palm squirrel	<i>Funambulus Pennanti</i> Wroughton
Common field mouse	<i>Apodemus sylvaticus</i> (Linnaeus)
Indian hare	<i>Lepus nigrioullis</i> (Cuvier)

**BIRDS**

Spotbill duck	<i>Anas poecilorhyncha</i> (Forester)
Cotton teal	<i>Nettapus coromandelianus</i>
Tree duck	<i>Coroman-delianus</i> (Gmelin)
Dabchick	<i>Podiceps ruficollis capensis</i> (Salvadori)
Brahminy duck	<i>Tadorna ferruginea</i> (Pallas)
Pintail	<i>Anas ecata</i>
Common teal	<i>Anas crecca crecca</i> (Linnaeus)
Mallard	<i>Anas platyrhynchos</i> Linnaeus
Gadwall	<i>Anas strepera strepera</i> Linnaeus
Wigeon	<i>Anas Penelope</i> Linnaeus
Bluwinged teal	<i>Anas guerguedula</i> Linnaeus
Common pochard	<i>Aythya nyroca</i> (Guldenstadt.)

Black partridge (State bird)	<i>Francolinus Francolinus asiae</i> (Bona parte)
Grey partridge	<i>Francolinus pondicerianus interpositus</i> (Hartert)
Jungle bush quail	<i>Perdica asiatica Punjabi</i> (Whistler)
Large cormorant	<i>Phalacrocorax carbe sinensis</i> (Shaw)
Little cormorant	<i>Phalacrocorax niger</i> (Vieillot)
Median egret	<i>Egretta intermedia intermedia</i> (Wagler)
Cattle egret	<i>Bubulcus ibis coromandus</i> (Boddaert)
Little egret	<i>Egretta garzetta garzetta</i> (Linnaeus)
Eastern common crane	<i>Grus grus lilfordi</i> Sharpe
Painted stork	<i>Ibis leucecephalus</i> (Pennant)
White ibis	<i>Threskiernis melanocephala</i> (latham)
Indian moorhen	<i>Gallinula choropus indica</i> Blyth
Common sandpiper	<i>Iringa hypeleucos</i> Linnaeus
Indian Blackwinged stilt	<i>Himantopus himantepus himantepus</i> (Linnaeus)
Blackbellied tern	<i>Sterna acuticauda</i> Grey
Common peafowl	<i>Pavo oristatus</i> Linnaeus
Large Indian Parakeet	<i>Psittacula eupatria</i> (Linnaeus)
Rose ringed parakeet	<i>Psittacula eupatria</i> (Linnaeus)
Golen backed woodpecker	<i>Dinepium benghalense benghalense</i> (Linnaeus)
Blue jay	<i>Corais benghalense bengalensis</i> (Linnaeus)
Coppersmith	<i>Magalaima haemaeephala</i> (Mullar)
Indian golden oriole	<i>Oriolus oriolus</i> (Linnaeus)
Pied crested cuckoo koel	<i>Clamater iacebinus serratus</i> (Sparrman)

Common crow pheasant	<i>Centropus sinensis sinensis (Stephens)</i>
Redvented bulbul	<i>Pycnonotus cafer(Linnaeus)</i>
White eared bulbul	<i>Pycnonotus cafer(Linnaeus)</i>
Verditer-flycatcher	<i>Muscicapa Thalassina thalassina Swainson</i>
Koel	<i>Fudynampes scolpacea scolacla (Linnaeus)</i>
Indian Magpie robin	<i>Copsychus svacious svecious(Linnaeus)</i>
Lal munia	<i>Estrilda amandava amandava (Linn)</i>
Indian spotted munia	<i>Lonchura punctulata (Linn.)</i>
Hoopoe	<i>Upupa epops Linnaeus</i>
Indian white eye	<i>Zosterops paepebresa paepebresa (Tamminck)</i>
Pariah Kite	<i>Milyus migrans (Boddaert)</i>
Brahminy kite	<i>Haliastur indus indus</i>
Whitebacked vulture	<i>Cyps bengalensis (Gmelin)</i>
Tawny eagle	<i>Aquila rapa vinahiana Franklin</i>
Indian Jungle crow	<i>Corvus marcorhynchus Wagler</i>
Blackwinged kite	<i>Elanus calruleus vociferous (Latham)</i>
Kestrel	<i>Falco tinnunculus (Linnaeus)</i>
Spotted owlet	<i>Athena brama (Temminck)</i>
Western Swallow	<i>hirundo rustica rustica Linnaeus</i>
Indian wiretailed Swallow	<i>Hirundo smithi leach</i>
Brahminy myna	<i>Sturnus pagodarum (Gmelin)</i>
Indian pied myna	<i>Sturnus contra contra (Linnaeus)</i>
Indian myna	<i>Acridotheres tristis tristis (Linnaeus)</i>
Bank myna	<i>Acridotheres ginginianus (Latham)</i>
Indian pond heron	<i>Ardeela grevii grevii (Sykes)</i>
White stork	<i>Ciconia ciconia ciconia (Linnaeus)</i>

Indian shikra	<i>Accipiter badius dussunieri (Temminck)</i>
Indian griffon culture	<i>Gyps fulvus fulvascens Hum</i>
Egyptain vulture	<i>Neophren parchepterus perchepterus</i>
Coot	<i>Fulica atra atra Linnaeus</i>
Green plover	<i>Vanellus vanellus (Linnaeus)</i>
Redwattled lapwing	<i>Vanellus indicus indicus (Boddaert)</i>
Little ringed plover	<i>Charadrius dubius Scopoli</i>
Spotted redshank	<i>Tringa arythreus (Pallas)</i>
Green shank	<i>Tringa nebularia (Gunenes)</i>
Eastern redshank	<i>Tringa tetanus eurthinus (oberholser)</i>
Spotted sandpiper	<i>Tringa glarella Linnaeus</i>
Little stint	<i>Calidris minutus (Leisler)</i>
Stone curlew	<i>Burhinus Oedicnemus (Linnaeus)</i>
Bengal green pigeon	<i>treron phoaniceptera phoaniceptera (Latham)</i>
Blue rock pigeon	<i>Columba Livia Gmelin</i>
Indian ring dove	<i>Streptepelia decaoeto (Frivaldszky)</i>
Red turtle dove	<i>Streptepelia tranquebarica (Mermann)</i>
Spotted dove	<i>Streptepelia Chinensis (Scopoli)</i>
Little brown dove	<i>Streptepelia senegalensis (Linnaeus)</i>
Brainfever bird	<i>Cuculus varius Vahl.</i>
Indian cuckoo	<i>Cuculus micropterus Gould</i>
Sirkeer cuckoo	<i>Taceocus leschenaultil Lesson</i>
Great horned owl	<i>Bubo bubo bengalensis (Franklin)</i>
Indian nightjar	<i>Caprimulgus asiaticus Latham</i>
Pied kingfisher	<i>Cervle lugubris (Temminck)</i>
Indian Roller	<i>Coracias banghalensis (Linnaeus)</i>

White breasted kingfisher	<i>Halcyen smyrnensis (Linnaeus)</i>
Green bee-eater	<i>Merops orientalis Latham</i>
Mahratta woodpecker	<i>Picoides mahrattensis mahrattensis (Latham)</i>
Blackcrowned finchlark	<i>Eremopterix nigriceps (Gould)</i>
Creasted Lark	<i>Galerida cristata (Linnaeus)</i>
Striated Swallow	<i>Hirundo daurica Linnaeus</i>
Rufousbacked shrike	<i>Lanius schach Linnaeus</i>
Black Drongo	<i>Bicruruz adsimili Dechstain</i>
Jungle Myna	<i>Acridotheros fuskmus (Wagler)</i>
House crow	<i>Corvus apiandans Vilillot</i>
Wood shrike	<i>Taphrredornis pondicerianus (Gmelin)</i>
Small Minivet	<i>Pericrecetus innamomaus (Linnaeus)</i>
Yellow eyed babbler	<i>Chrysomma sinensia (Gmelin)</i>
Common babbler	<i>Turdoides caudatus(Dumont)</i>
Jungle babbler	<i>Turdoides striatus (Dumont)</i>
Plain wren warbler	<i>Prinia subflaya (Gmelin)</i>
Ashy wren warbler	<i>Prinia socialis Sykes</i>
Tailor bird	<i>Orthotomus sutorius (Pennant)</i>
Bluethroat	<i>Erithacus syecius (Linnaeus)</i>
Brown rock chat	<i>Cercomola fusca (Blyth)</i>
Pied bush chat	<i>Saxicola caprats (Linnaeus)</i>
Dark grey bush chat	<i>Saxicola ferra (Gray)</i>
Indian robin	<i>Saxicoloides fulicata (Linnaeus)</i>
Blckthroated thrush	<i>Turdus ruficillis Pallas</i>
Gray tit	<i>Parus major Linnaeus</i>
Paddyfield Pipit	<i>Anthus nevasseelandiae Gmelin</i>



Rock Pirit	<i>Anthus similes Jerdon</i>
Yellow wagtail	<i>Motacilla flava Linnaeus</i>
Grey Wagtail	<i>Motacilla cospica (Gmelin)</i>
White wagtail	<i>Motacilla alba Linnaeus</i>
Large pied wagtail	<i>Motacilla Lideraspatensis Gmelin</i>
Thickbilled flowerpaeker	<i>Dicaeum acgile (Tickell)</i>
Yellowheaded wagtail	<i>Motacilla cospica (Gmelin)</i>
Puple unbird	<i>Nectoriais asiatica (Latham)</i>
House sparrow	<i>Passer domesticus (Linnaeus)</i>
Yellowthroated sparrow	<i>Petronia zanthocolia (Burton)</i>
Baya	<i>Floceus philippinus (Linnaeus)</i>
Blackthroated weaver bird	<i>Ploceus benghalensis (Linnaeus)</i>
Streaked weaver bird	<i>Ploceus manyar (Horsfield)</i>

**REPTILES**

Common Indian Krait	<i>Bungarus caeruleus (Schneider)</i>
Indian cobra	<i>Naja naja (Linnaeus)</i>
Russels viper	<i>Vipers russelli (Shaw)</i>
Saw-scaled viper	<i>Echis carinata (Schneider)</i>
Blind snake	<i>Typhlops perrectus (Soliczke)</i>
Sand boa	<i>Eryx johnijohni (Russell)</i>
Girgit	<i>Calotes versicolour (Daudin)</i>
Chipkali	<i>Hemidactylus flaviviridis (Rueppell)</i>
Kachhua	<i>Geclamys hamiltoni (Gray)</i>

**AMPHIBIANS**

Indian bull frog	<i>Rana, tigrina (Daudin)</i>
Skippping frog	<i>Rana cyanophlyctes Schneider</i>
Paddy field frog	<i>Rana limncharis Boll</i>
Common toe	<i>Bufo melanestictus Schneider</i>

**FISHES**

Chilwa	<i>Esomus danricu</i>
Bhangan	<i>Puntius sarana sarana (Hamilton)</i>
Rohu	<i>Labeo rohita (Hamilton)</i>
	<i>Labeo calbasu (Hamilton)</i>
Kalabans	<i>Cirrhinus mrigala (Hamilton)</i>
Koimal	<i>Cirrhinus reba (Hamilton)</i>
Mori	<i>Catla catla (Hamilton)</i>
Thail	<i>Wallago attu (Schnider)</i>
Mallee	<i>Wallago attu (Schnider)</i>
Singhara	<i>Acrichihys seenghala (Sykes)</i>
Kandai	<i>Mystues bleekeri (Day)</i>
Sangi	<i>Heteropneustes fossilis (Bloch)</i>
Kangi	<i>Ophiopcephalus Sunctatus (Bloch)</i>