CHAPTER—I

GENERAL

ORIGIN OF THE NAME OF THE DISTRICT

The present Faridabad district comprising the tahsils of Ballabgarh and Palwal was created on 2nd August, 1979 which took effect from 15th August, 1979[1]. The tahsils of Palwal and Ballabgarh forming the Faridabad district were part of Gurgaon district.

The district is named[2] after the town Faridabad which is said to have been founded in 1607 by Shaikh Farid, treasurer of Jahangir, with the object of protecting the highway which passed through the town in those days[3].

LOCATION, BOUNDARIES, AREA AND POPULATION.

Location and boundaries.—The district lies between 27° 51' 15" and 28° 30' 52" north parallels of latitude and 77° 04' 30" and 77° 32' 50" east meridians of longitude.

On its north is the Union Territory of Delhi, to its north-east, east, south and south-east is the state of Uttar Pradesh. On its south-west and west is the district of Gurgaon.

Area.—As per Census of 1991, the area of the district is 2,105 sq. kilometres.

HISTORY OF THE DISTRICT AS AN ADMINISTRATIVE UNIT

During the period of Akbar the Great, (1550-1605), the Palwal tahsil of the present district of Faridabad was a *paragana* of Delhi Suba while the sub-tahsil of Hodal was a part of Pahari sarkar of Agra Suba[4]. No major territorial change seems to be occurred upto the downfall of Mughal empire (1707). After the decay of the Mughal, empire, the area remained disturbed due to the fighting of neighbouring Chiefs. So it is very difficult to trace the minute sequence of historical events upto 1803.

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1. *Vide Haryana Government Notification No.* 3313-*E* (*iv*)-79/32194.
2. *Gurgaon District Gazetteer*, 1983, *p.* 741.
3. *District Census Handbook, Faridabad*, 1981, *p.* 9.
4. *Har yana Ka Itihas* (1000-1803), Volume-II by K.C. Yadav, p. 78.

After the defeat of Marathas in the battle of Patpargang, General Lord Lake captured Delhi and brought the Mughal Emperor, Shah Alam under his control. The city of Delhi alongwith the neighbouring territory known as the assigned tract comprising (subject to certain exceptions) the then districts of Hisar, Delhi, Karnal and Gurgaon with the present Palwal tahsil was placed under the charge of an officer designated as Resident and Chief Commissioner of Delhi.

Northern portion of Ballabgarh tahsil was included in the Delhi district when the regular division of Delhi territory was made into districts in 1819[1]. In 1832, the office of Resident and Chief Commissioner was abolished and the territory was added to the North-West Provinces. After the War of Independence of 1857, the Delhi territory was annexed to the newly formed Lt. Governorship of Punjab.

In 1861, the Gurgaon district was re-arranged; as a result, Palwal tahsil of present Faridabad district was one of the tahsils of Gurgaon district. On December 12, 1911 when the change of national capital from Calcutta to Delhi was announced, the Delhi tahsil including the areas of Ballabgarh was separated from Punjab and organised into a separate 'Province of Delhi' headed by a Commissioner. With effect from October 1, 1912, in pursuance of the decision to shift the imperial capital to Delhi, the Delhi district was remodelled[2]. It had three tahsils Sonipat, Ballabgarh and Delhi. Sonipat was transferred to Rohtak district and a part of Ballabgarh to the Gurgaon district. The Delhi tahsil including the remaining portion of the Ballabgarh tahsil, an area of 547 square miles (1,457 square kilometres) was made into a separate province[3].

Upto 1974, no major change took place in the boundaries of Palwal and Ballabgarh tahsils. In 1974, thirty four villages were excluded from the Palwal tahsil. Of these, 31 villages were included in the Ballabgarh tahsil and 3 in the Gurgaon tahsil.

On the formation of Faridabad district, 98 villages were also transferred to Palwal tahsil from Nuh tahsil of Gurgaon district. Hathin sub-tahsil was upgraded as full-fledged tahsil during 1980. Some other changes took place in the territory of the Faridabad district on 4th December, 1980[4]. The Government varied the limits of Faridabad and Gurgaon districts by excluding and including the areas, the details

1. *Delhi Gazetteer*, 1976, p. 3.
2. *Gurgaon District Gazetteer*, 1983, p. 3.
3. *Census of India*, 1961, *Volume* XIII, Part II-A, *General Population Tables*, p. 9.
4. *Haryana Government Notification* No. 6920-E (VI)-80/42751.

of which are given below :—

Revenue Estates	Hadbast number	Excluded from the tahsil	Excluded from the district	Included in tahsil	Included in district
1. Pundri	215	Nuh	Gurgaon	Hathin	Faridabad
2. Bejehra	130	Hathin	Faridabad	Nuh	Gurgaon
3. Kalinjar	135	Do	Do	Do	Do
4. Babipur	—	Do	Do	Do	Do
5. Devla-Nangli	133	Do	Do	Do	Do
6. Sulanpur	—	Do	Do	Do	Do

As per 1981 Census, tahsil Ballabgarh had 210 villages including 4 villages added due to riverain action from Uttar Pradesh during the decade 1971-81 and one town of Faridabad Complex whereas tahsil Palwal comprised 295 villages and 4 towns of Palwal, Hathin, Hodal and Hassanpur. According to 1981 Census, there were 505 villages in the district. Hathin sub-tahsil was upgraded after the census operations were taken up; hence it was not included as tahsil in 1981 Census.

Faridabad appeared as sub-tahsil during 1984-85. At that time, there were 3 tahsils and two sub-tahsils. The Government made some changes in the territory of Ballabgarh tahsil on the 17th October, 1989. The Government hereby varied the limits of the areas of Ballabgarh tahsil in Faridabad district by excluding the area comprising sub-tahsil Faridabad except the following revenue estates so as to form a new tahsil as Faridabad[1] :—

Sr. No.	Revenue Estates	Hadbast No.
1.	Sihi	80
2.	Murtzapur	97
3.	Barauli	116
4.	Pahladpur Majra	117
5.	Gonchhi	26
6.	Sarurpur	27

1. Government Notification No. S.O. 163/PA 17/1887/S.S./89, dated the 17th October, 1989.

During 1990-91, there were 2 sub-divisions (Ballabgarh and Palwal); 4 tahsils, i.e. Ballabgarh, Faridabad, Palwal and Hathin and Hodal as sub-tahsil and 5 blocks—Ballabgarh, Faridabad, Hathin, Hodal and Palwal. The position of tahsils and sub-tahsils during 1979 to 1991 is as under :—

Year	Position of tahsils	Position of sub-tahsils
31-12-1979	(i) Ballabgarh	(i) Hathin; sub-tahsil of Palwal
	(ii) Palwal	(ii) Hodal, sub-tahsil of Palwal
31-12-1980	(i) Ballabgarh	
	(ii) Palwal	[(i) Hodal
	(iii) Hathin	
31-12-1981	No change	No change
31-12-1982	No change	No change
31-12-1983	No change	(i) Hodal
31-12-1984	No change	(ii) Faridabad
31-12-1985	Do	Do
31-12-1986	Do	Do
31-12-1987	Do	Do
31-12-1988	Do	Do
31-12-1989	Do	Do
	(i) Ballabgarh	(i) Hodal
	(ii) Palwal	
	(iii) Hathin	
	(iv) Faridabad	

As per Census of 1981, the district had 505 villages. During the period (1979 to 1991), only 32 villages were excluded from the district and 1 village was included in the district. The position of

villages as on March 31, 1991 is as follows :—

Tahsil	Inhabited	Uninhabited	Total
1. Ballabgarh	85	10	95
2. Palwal	140	8	148
3. Hathin	78	8	86
4. Faridabad	87	10	97
5. Hodal (Sub-tahsil)	46	2	48
	436	38	474

Population.—As per Census of 1991, total population of Faridabad district is 14,77,240 (7,59,727 rural population and 7,17,513 as urban population). The population consists of 8,08,223 males and 6,69,017 females. In rural area male population is 4,12,556 whereas female population is 3,47,171. The male population in urban area is 3,95,667 whereas the female population is 3,21,846.

The total number of literate and educated persons in the district as per Census of 1991 was 7,03,869 (Male educated literates-4,81,290 and female educated literates-2,22,579).

FLORA

There is not much difference between the flora of this district and that of the rest of Haryana. *Kikar* is found all over the district. In Palwal and Ballabgarh tahsils, besides private and village shamlat lands, it has been grown successfully in the notified areas by the Forest Department. *Khair* has been grown mostly on hilly areas. *Neem* is generally found growing along the roads, mainly Nuh-Palwal and Palwal-Rewari. It is also found around villages where *pipal* and *barh* occur frequently. The *jand* tree growing everywhere in the district is very useful. Besides other uses, it is used as fodder for cattle during lean period.

Ballabgarh is the most wooded inspite of large scale cutting and removal of trees. Greater part of vegetation found in reserve forests consists of *Karir, hins, Jal, ratunj, Khair* and *Kikar, Dhak, Gular, Papri* and *Iasura* are also found. *Kadam* is fairly common in Palwal and Hodal areas. *Barana, Odora, Imli,* and *Amaltas* are also met with though not very commonly. *Ber,* mostly planted in orchards for fruit, is also

found in the district. *Shisham* and *Siris* are confined to road sides. *Bakin* and *Arjan* are also seen along the roads.

The special tree of the hill range is *Dhak*. Now the Government protects the *Dhak* tree. As a result, the natural regeneration of *dhak* has come up. Here and there, especially in the Palwal tahsil a few scattered *Semul* trees are also found. One of the most characteristic plants of the district is *Jharberi*. This is common all over the district. In September and October, the fields are often thickly covered with this prickly shrub. It is very valuable plant. Its leaves are thrashed and given as fodder to the cattle. Its fruit is eaten, the thorny branches are used for hedges or as fuel and the roots for dyeing the leather. *Munj* is very useful and is found all over the district. It flourishes both in high sandy lands and low flooded tracts.

Jhao is used for making baskets. *Bansa* grows abundantly near the hills; the cylinders of temporary wells are ordinarily made by weaving together its branches. *Khip* grows on salt land. *Bathus* and *Chaulai* are common pot herbs; the former grows chiefly in irrigated lands. Both are used as vegetables. The *Chaulai* is mixed in the mixture for preparation of *Curry*.

There often grows *Kans* grass and *Bhurt* with its troublesome and prickly burs. *Wilayati akra* is also grown along field boundaries to serve as a hedge. It has also come up along some roads. *Kachri* and *ban Karela* are eaten by the people. *Bana* and *ak* are also found at many places.

The grasses like *anjan, dub, dab* are also found in the district. *Anjan* is very nutritious for cattle.

The botanical and local names of the noteworthy trees and shrubs are given below :—

BOTANICAL NAME	LOCAL NAME
(i)	(ii)
Mangifera indica L.	*Am*
Calotropis procera	*Ak*
Leptadenia pyrotechnica	*Khip*
Tecomella Undulata	*Rahira*

(i)	(ii)
Cordia dichotoma	*Lassura*
Commiphora wightii	*Gugal*
Opuntia dellenii	*Nag Phani*
Capparis decidua	*Karir*
Capparis zeylanica	*Hins*
Anogeissus pendula	*Dhauak*
Terminalia arjuna	*Arjan*
Diospyros montana	*Kaindu*
Euphorbia reyleana	*Thor*
Ricinus communis	*Arind*
Acacia Leucophlaea	*Raunj*
Acacia nilotica	*Kikar*
Albizia lebeck	*Siris*
Butea monosperma	*Dhak*
Dalbergia sissoo	*Shisham*
Prosopis cineraria	*Jand*
Tamarindus indica	*Imli*
Azadirachta indica	*Nim*
Ficus benglensis	*Barh*
Ficus religiosa	*Pipal*
Ziziphus mauritiana	*Ber*
Ziziphus mummularia	*Jharberi*
Salvadora oleoides	*Jal*
Tamarix aphylla	*Farash*

Fauna

Regarding the wild life in the early twentieth century, an extract

explaining the details from the Gurgaon District Gazetteer, 1910, is reproduced here :—

> "The days when tigers abounded in Gurgaon district on the then woody banks of the Jamna, are now long since gone by. The panther (*taindwa*) is now the largest representative of the feline family. They occasionally appear in the hills, wandering in from the adjacent hilly tracts of Alwar. A large wild cat (*banbilla*) is also commonly found in the jungles near the hills. Hyenas have a representative in the striped hyena (*jarag*) not common, and found only in the neighbourhood of the hills. Wolves (*bheria*) formerly numerous, are now only scarce, but foxes (*lomri*) and Jackals (*gidar*) are common in all parts of the district. The mongoose (*niola*) is common. A larger animal of the same species is found in the hills. It is about twice the size of the ordinary mongoose and instead of brown, has a dark grey fur. Hares are very plentiful in all parts of the district, and the porcupine is common, generally found in the neighbourhood of the hills. Rats and mice are very common, and the bandicoot infests some of the towns. Dormice are found in all parts, but chiefly in sandy and saline tracts burrowing in the ground and living in large communities, and frequently causing damage to extensive patches of cultivation. In gardens and groves, the striped squirrel is always to be found. Musk rats are common, and so also is the little hedge-hog. Flying foxes are chiefly seen about Gurgaon, where they infest some of the gardens. The common bat inhabits old ruins and *khangahs* in great numbers. The sacred monkey is to be found in great numbers about Hodal."

The principal wild animals to be found are antelope (Black buck), the gazelle (Chinkara), pig, hyena, wolf, fox, jackal, hare, monkey and porcupine while leopards are occasionally found in the stony ravines. Black bucks, usually in small herds, are found in the south of Ballabgarh tahsil. Wolves can also be seen occasionally in Ballabgarh. Hog-deer and *nilgai* exist in small number. The blue bull is found in the west of Palwal tahsil and Yamuna *Khadar*. They are shy of man, however, they are seldom seen. Foxes, jackals and hares are common.

The birds of the district are of many kinds. The resident game birds consist of partridge (mostly grey, a few black), blue rock pigeons

in countless flocks and sandgrouse, which as usual prefer to sandy expanses in the poorer tracts of the district. Bush quails are found at all seasons; but grey quails being migratory birds are more plentiful in cold weather; peafowls are numerous about Hindu villages, especially.

In the winter, teal and duck are found wherever there is any suitable water on which they can pitch. Geese, both bar-headed and grey leg are not very common but appear in considerable numbers along the water places. When the gram crop is ripe, they are out-numbered by the cranes which resemble them at a distance.

Other birds are so numerous that an exhaustive list can not be made; their varieties and their gay plumage are noticed. The following birds are considered important:—

Barbets of several kinds, and especially the crimson breasted barbet or copper smith; the sun bird; the Indian roller or *nilkantha* commonly known as the blue jay; several kinds of kingfisher, the horn-bill, hoopoe, night-jar, hawk, cuckoo, or brain-fever bird, *koil*, crow pheasant, owls and owlets of several descriptions; eagles, vultures, falcons and harriers. There are birds such as kites, shrikes, the black king-crow, tree pies, *mainas*, starlings, tailor-birds, crows, doves, weaver-birds, bee eaters, fly catchers, blue-throats, robins, swallows, swifts, martins, babblers, bulbuls and several kinds of chats, larks and wagtails.

Among the water birds may be recorded the *naras* and other herons, coot, moorhen couser, the Indian darter or snake bird, bittern, cormorants, sand pipers, plovers, terns, spoonbills and several varieties of storks and egrets.

A list of birds having economic importance and other animals with their zoological names is given here :

ENGLISH NAME	ZOOLOGICAL NAME
(i)	(ii)
Scavenger or Black Kite	*Milvus migran*
White Backed Vulture	*Gyps bengalensis*
Tawny Eagle	*Aquaila rapax*
House Crow	*Corvus splendens*
Egyptian Scavenger Vulture	*Neophron percnopterus*

(i)	(ii)
Black Winged Kite	*Elanus caeruleus*
Shikara	*Accipiter bodius*
Lagger Falcon	*Falco bairmicus*
Kestrel	*Falco tinnunculus*
Spotted Owlet	*Athene brama*
Eagle Owl	*Bubo buba*
Grey Pelican	*Pelacanus pphilippensis*
Large Cormorant	*Phalacrocorax carbo sinensis*
Little Cormorant	*Phalaero corax niger*
Snake Bird	*Ahhinga rufa melanogaeter*
Eastern Grey Heron	*Ardea cinerea rectirasris*
Paddy Bird	*Ardeola grayii grayii*
Eastern Large Egret	*Egretta alba modesta*
Little Egret	*Egretta garzetta garzetta*
Painted Stork	*Ibis leuco cephalus*
Openbill Stork	*Anastomus oscitans*
White Necked Stork	*Ciconia episcopus episcopus*
Eastern Common Crane	*Gurs grus lilfordi*
Indian Sarus Crane	*Grus antigone antigone*
Slaty Legged Banded Crake	*Rallina eurizonoides amauroptera*
Indian Moorhen	*Callinula chloropus indica*
Coot	*Fulica atra atra*
Dusky Red Shank	*Tringa erythropus*
Marsh Sandpiper	*Tringa stagnatilis*
Pintail Snipe	*Capella stinura*
Indian River Tern	*Sterna aurantia*
Indian Biack Partridge	*Francolimus francolinus astai*

(i)	(ii)
Grey quail	*Coturnix coturnix coturnix*
Large Pintail Sandgrouse	*Pterocles alchata*
Bengal Green Pigeon	*Treron phoenicoptera*
Indian Ring Dove	*Streptopelia decaocta*

The national bird of India, the Common Peafowl, *Pavo cristatus* is quite common and can be seen in orchards, fields and gardens. Besides, such attractive birds as Hoopoee *Upupa cpops* and white Checked Bulbul, *Pvcnonotus leucojenvs* are seen in the garden and lawns around the villages.

Snakes and lizards of various species are also seen in the district. The *naja naja* or Cobra *Uromastix hardinckii* or Bissandda, *Viprera russelli* or Doboia are quite common. The largest of the lizards is *varanus* monitor or Goh and the smaller kind of the same genus is known as Bis-cobra. The house lizards, *Hemidaetylus flaviviridis* and the garden lizards, *Calotes versicolor* or blood sucker are very common.

CLIMATE

The climate of this district is characterised by the dry-ness of the air except in the monsoon season, a hot summer and a cold winter. The year may be divided broadly into four seasons. The cold season starts late in November and continues upto the beginning of March. The summer season is from March to the end of June. The period from July to mid-September is the south-west monsoon season. Mid-September to the end of November constitutes the post-monsoon or transition period.

Rainfall.—Records of rainfall in the district are available for four stations for sufficiently long periods. The details of excessive rainfall years, highest annual rainfall with year occurrence and the same expressed as percentage of normal are as follows :—

District	Years of excessive rainfall	Highest amount of rainfall (expressed as % of normal rainfall with year)
Faridabad	1904,1906,1908,1910, 1914,1916,1917,1919, 1924,1933,1942,1944, 1948,1949,1955,1958, 1964,1970,1977	104.8 cm in 1917 186%

The normal annual rainfall in the district is 564.3 mm. The rainfall varies from 489.5 mm. at Hassanpur to 657.0 mm. at Ballabgarh. The rainfall in the district increases from south towards north. About 79% of the annual rainfall in the district is received during the south-west monsoon months July to September, July and August being the rainiest months. There is some rainfall in the pre-monsoon month June, mostly in the form of thunder-showers. The variation in the annual rainfall from year to year is appreciable. In the 80-81 year period, (1901-1980) the highest annual rainfall which was 186% of the normal occurred in 1917 while the very next year the annual rainfall was the lowest in the 80 years, amounting to only 26% of the normal. In this 89-year period the annual rainfall in the district was less than 80% of the normal in 19 years. Two consecutive years of such low rainfall occurred three times in this period. The details of frequency of annual rainfall are as follows :—

Range in mm	No. of years	Range in mm	No. of years
101—200	1	601—700	7
201—300	5	701—800	12
301—400	8	801—900	3
401—500	12	901—1000	2
501—600	18	1001—1100	2

On an average there are 27 rainy days (i.e. days with rainfall of 2.5 mm or more) in a year in the district. The number of rainy days varies from 20 at Hassanpur to 35 at Palwal.

The rainfall in 24 hours recorded at any station in the district was 398.8 mm at Palwal on September 9, 1875. The heaviest one day rainfall on record at any station in the state was 508 mm at Ballabgarh on Ist February, 1933. The successive years of excessive rainfall are 1916, 1917, 1948 and 1949.

Temperature.—There is no meteorological observatory in the district. Hence, the description which follows is mainly based on records of the observatories in the neighbouring districts where similar conditions exist. From about the beginning of March, temperature begins to increase rapidly. May and June are the hottest months with the mean daily maximum temperature at about 41°C and the mean daily minimum at about 27°C. The heat in summer is intense with the maximum temperature on individual days sometimes reaching 45°C. The hot, dry and dust laden winds add to the discomfort of the already intensely hot summer days. With the onset of the

monsoon by about the end of June there is appreciable drop in the day temperature and the weather becomes cooler, but nights continue to be as warm as during the latter part of the summer season. After the monsoon withdraws from the district by about the third week of September, there is a slight increase in the day temperatures but the nights become rapidly cooler. After the end of October, day temperatures also decrease rapidly. January is generally the coldest month with the mean daily maximum temperature about 21°C and the mean daily minimum at about 8°C. Cold waves effect the district in the wake of passing western disturbances. The minimum temperature on such occasions drops down occasionally to about the freezing point of water and frosts occur.

Humidity.—The air is generally dry during the greater part of the year. Humidity is high in the south-west monsoon season. April and May are the driest months when the relative humidities in the afternoons become less than 20 per cent.

Cloudiness.—Skies remain almost overcast during the monsoon season and for brief spells of a day or two in association with passing western disturbances. In the rest of the year skies are mostly clear or lightly clouded.

Winds.—Winds are generally light with some increase in speed during summer and monsoon seasons. During the monsoon season winds are mostly from the east or south-east. During the rest of the year the winds are predominantly from the west or north-west.

Special Weather Phenomena.—In association with depressions during the monsoon season which move across the central parts of the country, the district gets widespread heavy rain. In the cold season western disturbances affect the district. In association with them, thundershowers, sometimes accompanied with hail occur and this may form in the wake of the passing western disturbances. Dust-storms occur occasionally in the hot season. Fogs occur at times during the cold season.

GEOLOGY

The area exposes Pre-Cambrian rocks of Delhi Supergroup in the form of narrow linear ridges in the western side. A thick pile of fluvial aeolian sediments covers most of the eastern and central parts of the district. The fluvial sediments consist of Ambala Older Alluvium and Yamuna Younger Alluvium. A generalised lithostratigraphic succession is given below :—

TABLE—I

Yamuna younger alluvium	Medium to coarse grey sand, fine micaceous sand, silt and clay layers;

Recent	Aeolian sandy facies	Yellowish to dark brownish fine grained sand ;
Mid to Up. Pleistocenl	Ambala Older Alluvium	Polycyclic sand-silt-clay alternations with nodular *kankar* at places;
Delhi Super group (Proterozoic)	Ajabgarh Group	Fine grained quartzite, gritty quartzite with interbands of greyphyllite, mica schist, intruded by quartz and pegmatite veins.

AJABGARH GROUP

It essentially consists of quartzite with interbands of mica schist and grey phyllite exposed in low flat topped hills. The quartzite is grey, dark-grey, creamish, pinkish to pinkish white in colour, compact, hard and highly jointed. It is mostly silicified and charty. Two types of quartzites occur in the area, viz. fine grained quartzite and coarse gritty quartzite, occasionally with pyrite cubes and specks of chalcopyrite. The coarse gritty quartzite is felspathic and at places, it assumes granitic texture. On disintegration it forms coarse sand locally called 'Badarpur'. Fine to medium grained quartzite contains impersistent lenses of impure graphite.

Mica-schist intercalations within quartzite occur near Mohabatabad, Gurukul and Lakarpur. At Mohabatabad it contains staurolite. The phyllite bands occurring as lensoid bands, are greyish to blackish in colour and occasionally carbonaceous in nature. The thickness of these bands varies from 40 cm to 1.5 m. These have been observed at Ankher, Nawada and Balgram. Doubtful ash beds have also been reported from grey phyllite.

Pegmatite and quartz vein traverse the quartzites, though much less in Faridabad district than in the adjoining Gurgaon district. One of the pegmatite veins on alterations has given rise to clay. These are being quarried at two places near Arangpur. The quarries measure 30m x 17m and 54 m x 18m.

Ambala Older Alluvium overlies the proterozoic hard rock basement and consists of polycyclic sequence of sand-very fine sand-silt and silty clay. It is a featureless plain with a few palaeo-channels and topographic depressions. *Kankar* occurs as concretions and as 10—15 cm thick bands.

Aeolian sandy facies is well developed and represented by stabilished sand dunes and sandy flates. There are a few obstacle dunes at the foot of some of the ridges. The aeolian sand is mainly composed of brownish yellow, medium to fine grained sand with a little silt. Occasionally *kankar* also occurs in some dunes.

Yamuna Younger Alluvium is exposed along the present day channel. It consists of grey to dark greyish micaceous, medium to fine grained sand with silt.

MINERAL RESOURCES

Building Material.—Quartzites in the area are extensively worked for use as building material and road metal. There are a number of stone crushers in operation in Ballabgarh and Faridabad area. A large number of stone quarries exist in Badkhal-Arangpur area where from 'Badarpur' is being quarried from a number of places. It is used extensively as construction material.

Clay.—Clay is available in pockets within the altered pegmatites at Arangpur and near Maujar. It is used in potteries, refractory and insulator industries, and after washing-in the paper and textile industries. At present, Maujar clay is being utilised as refractory material. Two quarries exist near Delhi border.

Foundry and Silica Sand.—A number of quarries of foundry and silica sand exist near Arangpur, north of Pali, west of Badkhal and Maujar. These sands are the weathering product of Delhi quartzites. It is at present being used as construction material.

Rock Crystal.—Rock crystal, a variety of semi-precious stone, used to be extracted from a pegmatite vein near Arangpur.

Saltpetre.—Saltpetre is extracted from Hodal and south of Palwal. It is the main source of nitrate of potassium, which is used for making crackers, gun powder and fertilizers as well as in match and sugar industries.

Groundwater conditions.—The depth of water in the different parts of the district varies greatly, from less than two metres to more than 24 m. The shallow groundwater in the area is generally alkaline. The water in the western southern and eastern parts is generally more mineralised than in the central part.

In Palwal, Ballabgarh and Faridabad areas, tubewells within a depth of 91 m. are known to yield 91,000 to 113,000 litres per hour.

Fossil Finds.—Remains of the genus Elephas (Elephant) was found at village Autha (about 20 km from Hodal), situated north of Hodal-Nagina road. The remains belong to the Recent to Sub-Recent period.

Recently in the area south-west of Anangpur, stone implements have been found. This site is of archaeological interest.

ENVIRONMENTAL PROBLEMS

Salt efflorescence, water logging and sand spreading are the environmental hazards. Salt efflorescence is effectively controlled by lowering water table, using gypsum in the affected lands and pumping out of excess water. Water logging usually exists along unlined canals. Planting of eucalyptus trees along such canals can be useful in removing water logging. Various methods to irrigate dunal sands by spraying techniques can be helpful in restricting sand spreading. The western bank of river Yamuna needs reinforcement at certain places so as to avoid bank erosion by river. Indiscriminate quarrying of quartzite along Badkhal-Surajkund ridge (Delhi ridge) and other places is a major hazard for the people living in nearby villages. It is equally disturbing to the natural eco-balance of the area.

TOPOGRAPHY

PHYSIOGRAPHY

Faridabad district is a part of the southern Haryana. From relief point of view, the district is a plain area with a perennial Yamuna river on its eastern part which has formed its flood plain. Soils particularly loam (*Bhangar* and *Nardak*) and silty loam (*Khadar*) are found in the district. The soils as classified by NBSS and LUP (ICAR), Nagpur, and district has Aquents—Fluvents and Ochrepts types of soils.

The district represents a flat alluvial plain in the eastern part while longitudinal ridges pass through western part, the plain comprises older alluvium blown sand, newer alluvium while the ridges consists of narrow flat topped hill ranges trending almost in north-south direction.

The alluvial plains in the eastern side consist of two parts, viz. one delimited by Yamuna river, is called "*Khadar*". It forms a narrow belt along the river course. Second one called "*Bangar*", is the plain between "*Khadar*" and the hill ranges in the western part. "*Khadar*" is variable in width and the sediments consist mostly of fine silt. Since the water table is near the surface, most of the irrigation is done by digging wells. This land is suitable for wheat, gram and barley cultivation.

The alluvial plain between the Yamuna and hill ranges in the west "*Bangar*" has an altitude of 205 m. above the mean sea level. It slopes towards the south and south-west and comprises the fertile soil of the district. It is extensively cultivated and densely populated. Mostly, the irrigation is done by dugwells but canal water is also utilized in some parts. The "Bangar" surface is pitted by past fluvial accumulations, palaeochannels and palaeotals which occur as depressions, at present.

The hill range forms a part of Aravalli system. These extend from the south to north upto Delhi. These rocks have been subjected to weathering and other forms of denudation. Most of the ridges are flat topped, bare and without any soil cover. The height of ridges decreases northwards. The eastern slopes are steeper than the western slopes. The highest point of the hill ranges is 314 m, above the mean sea level, east of Gothra Mohabatabad. These are mostly strike ridges and are controlled by the structure of the rocks. After entering Gothra Mohabbatabad area these turn north-east wards before entering Delhi.

Linear landforms made up of sand ridges and intervening undulatory interdunal valleys are formed by aeolian sand dunes overlying the "*Bangar*" surface while the sandy flats comprise unanchored sand. Various types of dunes as high as 15 m. have been recorded. These are aligned in NNW-SSE to NW-SE directions. Interdunal areas contain shallow water bodies at some places. Various types of dunes recognised are transverse, longitudinal and Barchans. Most of the dunes have stabilised. But active dunes are also observed.

The district is sub-divided into three sub-micro regions on the basis of soils, topography, climate and natural vegetation.

1. **Faridabad undulating Plain.**—The region spreads over the north-western parts of Ballabgarh tahsil and some villages of Palwal tahsil. It makes its boundaries with the Union Territory of Delhi in the north, Palwal, plain in the south and south-east and Yamuna *Khadar* and the state of U.P. in the east.

The physiography reveals the presence of residual off-shoots of Aravalli hills. The geological structure of this region consists of Alluvium and Delhi Group (Middle Proterozoic) formations. Soil found in the region is mainly loam except some rocky surfaces. Silty loam soil is found near the Yamuna river. Initially the north-eastern part of the region was *Khadar* area but now has come within the limits of Faridabad Complex Administration.

The physiography depicts the presence of residual offshoots of Aravalli hills in the north-western part where the maximum height of the region is 305 metres above M.S.L. near the border with Gurgaon district, while the minimum height is 197.7 metres above M.S.L. near the village Aghwanpur (52)[1]—in the north eastern part of the region. North-western part is relatively more high as compared to south- eastern part of the region. Contour lines of 229 metres and 305 metres fall often in the north-western part of the region.

1. Code numbers are written within brackets after village names.

2. Palwal Plain.—The region covers the central, western and south-western parts of the district. It makes its boundaries with the Faridabad undulating plain, in the north-west, the district Gurgaon in the west and south-west, the state of U.P. in the extreme south and Yamuna *Khadar* in the north-east and east.

The difference in relief is mainly due to the appearance of frenzy offshoots of Aravalli. The geological structure of this region is formed of Alluvium and Delhi Group (Middle Proterozoic) formations. The soils of the region are loam (*Bhangar*) and relatively sandy loam. Except north-western tip of Palwal tahsil, where the relatively sandy loam is found. Loam is the main soil of this region.

Physiographically, the region is a plain land with the maximum height of 231 metres near village Deola Nangli (224) and the minimum height of 188 metres at village Banchari (145). Both the heights fall in the south-western part of Palwal tahsil. The difference in relief is mainly due to the appearance of a frenzy offshoots of Aravalli in the southern-western part near village Deola Nangli (224); otherwise region is a plain area without any remarkable relief features.

3. Yamuna Khadar.—The region extends over the eastern side of the district along with Yamuna river. It makes its limits with the State of U.P. in the north-east, east and south, Palwal plain in the south-west of west and Faridabad undulating plain in the north-west. Its slope is towards south.

The geological structure of this region consists of Alluvium (Recent). Loam and silty loam soils are found in this region. The proportion of silt and clay components in silty loam is higher than in loam, hence it has a blocky structure which reduces its water holding capacity. The soil is difficult to work upon when dry and tillage needs more drought power per unit area.

The region as a whole, is plain land with a maximum height of 220 metres above M.S.L. near village Tilpat (53) of Ballabgarh tahsil in the north and minimum height of 185 metres near village Ramgarh (120) of Palwal tahsil in the extreme south. The variation in the height explains the slope of the region.

Natural Drainage, Rivers and Bunds

The drainage in the district is typical of semi-arid areas. There are no perennial streams except the Yamuna river which borders the district on the eastern side. The ephemeral streams draining from the hills are seasonal and do not have well defined channels. The existence of old channels is

inferred by accumulation of water near villages during rainy season. It dries up in hot season. With the construction of the Agra Canal the drainage has also been affected. Free flow of water from the west does not pass into the river Yamuna. There is an escape (aqueduct) dug south of Tilpat, where the water of the Bhuriya *nadi* comes in and flows at the surface. It joins the river Yamuna north-east of Kabulpur.

There are two lakes in Faridabad district. Both are artificial lakes created by the construction of dams across the *nala*. Badhkhal lake has been created by damming a seasonal stream north of Badkhal village.

Another lake has been created at Suraj Kund. It is called the Peacock lake. It also drains in an ephemeral stream. The bund at Badkhal was constructed in 1947 across a gorge upstream of the old Badkhal bund. A canal with a capacity of 15 cusecs was also constructed to utilise the stored water for irrigation. This bund was further raised and strengthened in 1971-72. A water weir was also provided in the bund. Both Badkhal and Surajkund lakes have been developed into places of tourist interest by the Haryana Tourism Development Corporation.

Yamuna River.—The Yamuna has a great history mostly shrouded in mystery. The name Yamuna is mentioned in connection with *Dasarjana* the Battle of Ten-kings, mentioned in the Rigveda. According to some scholars the Yamuna in early times used to flow into the course of the *Saraswati*[1] and was a tributary, like the Satluj of the Ghaggar which was as independent river system. The Yamuna gradually drifted eastward to its present line of flow. The flow of water in the river is very little, hardly a few hundred cusecs, except during the rainy season when the average discharge, being over 40,000 cusecs floods about 40 villages in the eastern side of the district. The tract along the Yamuna is called *Khadar* as already mentioned. An island is also formed by a stream called *Jhar* or *Jair Nala* flooding.

Bordering the district on the east, the Yamuna is a perennial river with a narrow but consistent flood plain. It enters the Faridabad district about one kilometre north-east of village Basantpur and about ¼ kilometre south-west of village Asgharpur Jagir of the Bulandshahr district (Uttar Pradesh). It leaves the district 2¼ kilometres south-east of village Mahauli of the Faridabad district and one kilometre east of village Chaundras of the Mathura district (Uttar Pradesh). Its length in the district is 102 kilometres approximately and average breadth (i. e. distance between two high banks is about 200 metres. The Yamuna

1. R.C. Majumdar, *The History and Culture of Indian People*, Vol. I *The Vedic Age*, 1965, P. 87.

forms the boundary between the Faridabad district in Haryana and the Bulandshahr and Aligarh districts in Uttar Pradesh. Owing to the construction of the western Yamuna and Agra canals, the flow of water in the river is very little. The Jair Nala runs in a deep, narrow and dangerous channel and does a great deal of damage in years of heavy flooding; Whereas the floods tend to damage *kharif* crops, these often prove a boon to the *rabi* crops.

Bhurya Nadi—The *Bhurya nadi* (or Tilpat) drains the whole of the hills lying in the vicinity of Arangpur, and to its south-west and south. It is larger than the Takhand *nala*. During floods it used to be violent enough to stop the passage across Delhi-Mathura Road, and necessitated construction of a bridge. It originates from the hills at a distance of 2 kilometres south-west of village Meola Maharajpur of the Ballabgarh tahsil. This *nala* falls into the Yamuna river half a kilometre north-west of village Muzzamabad and 2 kilometres east of Akbarpur. It is 34 kilometres in length while the average width varies from 15 to 50 metres. Siphons have been constructed under the Gurgaon Canal Feeder and Agra Canal so that the water of the *nala* when in floods may flow into river Yamuna without causing damage to the adjacent area. But inspite of the Siphon, the area is flooded during the heavy rains. In order to discharge the water collected in the depressions into Agra Canal, Ballabgarh Drain was constructed. It subsequently was used for carrying water from the Agra canal in the Ballabgarh ponds. Currently, Ballabgarh Drain is being used for discharging water collected during rains into the Agra Canal.

Other smaller stream flowing into low grounds of Fatehpur Chandila, crosses the Delhi-Mathura Railway Line and road under the bridges and fills the tank at Old Faridabad. It originates from the hills south of village Meola Maharajpur. A much larger stream, the Parsaun stream, comes down from the Badkhal hill on the same low ground in Fatehpur Chandila, a little to the south of the above stream. Though the bulk of water is held up by the Badkhal bund, some excess water crosses the Delhi- Agra Railway Line and road under the bridges.

Another stream comes down from the hills between Bhaakri and Pali village on the Dadwa lowlands, Ghazipur and Nangla Gujran, touching the south-west corner of Saran and falls into Shamapur. It has two minor tributaries (1) Bahandwanbaj and the (2) Pali nala, which help to swell the volume of the torrent in rainy season. The flow of water has been regulated and it falls into Gaunchhi main drain.

Pakhal *nala* originates from hills near the Gothra Mohabatabad, and passes through Sarurpur, Madalpur. The water from this *nala* is now held up by the Pakal (Pakhal) bank (bund). The water is lifted into the Harchandpur distributary. A waste weir has been provided in Pakhal Bund. *Manger nala* which sweeps past Dhauj and Kabulpur Bangar, had a violent torrent and was causing great damage, especially to the village of Tikri Kalan. An embankment on a distributary having capacity of 35 cusecs has been built at Dhauj. A waste weir has been provided. A Siphon drains off excess water of the *nala* into Gaunchhi main drain.

The southern stream which descends from the hills near village Kot passes through the villages of Alampur, Sirohi, Benkhera, and finally falls into the marsh at Sarmatla (Sarmathla) in the Palwal tahsil. This too, has been blocked by a strong band (bund) to save the lower reaches from the damage caused by torrents at Benkhera village.

A small stream emerging from south of Dhauj passes through an aqueduct to Tikri Khera and is siphoned to Sikrona drain near Firozpur Kalan.

Bunds— The bunds are mainly built with the purpose of lessening the flood damage and for irrigational benefits. The British Government also took steps in early 20th century in this direction. Now bunds serve the purpose of checking the floods and extend irrigational facilities. There are a number of bunds in the district.