

CHAPTER I

GENERAL

INTRODUCTION

Origin of the name of the district

The district is named after Ganjam, the old port-township which is situated on the northern bank and near the mouth of the river Rushikulya. It was also the headquarters of the district during early British administration up to 1815. The name of the town Ganjam or Ganja, as is locally pronounced, has probably been derived from the word 'Gunj' of Iranian (Persian) origin which means the granary. There is also another meaning of this word i.e., 'the market'. As an important port of bygone days, Ganjam must be handling paddy, rice and other foodgrains of the region. It was also a great trade centre.

Location, general boundaries, total area and population

The district of Ganjam lies in the southern part of Orissa, bounded by North latitude $18^{\circ}46'$ and $20^{\circ}17'$, and East longitude $83^{\circ}48'$ and $85^{\circ}10'$. It is bordered on the north by the districts of Phulabani and Puri, on the south by Srikakulam district of the state of Andhra Pradesh, on the west by Phulabani and Koraput districts and on the east by Puri district and the Bay of Bengal.

The district covers an area of 12,531 sq. km. (according to the Surveyor General of India) out of which 12,255.4 sq. km. belong to rural areas and 275.6 sq. km. belong to urban areas. It had a population of 3,158,764 comprising 2,688,242 rural population and 470,522 urban population as per 1991 Census. The district stands third in the state in respect of both area and population.

History of the district as an administrative unit

During the early period of British administration Ganjam was the northernmost district of the division of the then Madras Presidency called the Northern Circars. It lay between $18^{\circ}12'45''$ and $20^{\circ}25'40''$ North latitude and between $83^{\circ}33'20''$ and $85^{\circ}15'$ East longitude. Nizam Ali, the Subedar of Mughal Emperor, Delhi, confirmed the Treaty of 1759 of his brother Salabat Jung with Colonel Forde and by a Firman of the emperor, the Northern Circars (of which Ganjam also formed a part) were given as Inam or free gift to the English from April 1762. It was not, however, until another treaty dated the 12th November, 1766 had been concluded between English and Nizam Ali, that the former determined to take

actual possession of the grant. The district of Ganjam after British occupation was first placed under the charge of a Resident. In 1774, a Chief with a council to assist him in administrative affairs was appointed in place of Resident. This system of administration continued till 1794 when the office of the Resident and Chief of all British settlements along the coast was abolished and the office of the Collector was established. The boundary of the district of Ganjam was demarcated in 1803. Its area was 21,605.84 sq. km. (8 313 sq. miles) and population according to the Census of 1871 was 1,520,088. The district was divided into three divisions (as it was called in Madras and not subdivision), namely, Ghumusar, Chicacole and Brahmapur. Each of these divisions contained a Government Taluk, besides a number of zamindari estates. Subsequently, two more divisions, namely, Chhatrapur division consisting of portions of Brahmapur and Ghumusar divisions, and Baligurha division comprising the whole of Ganjam Agency excepting the Paralakhemundi Agency were created.

Consequent upon the creation of the province of Orissa on the 1st April 1936, Ganjam district was separated from Madras and merged with Orissa. The district then comprised the whole of Ghumusar division, Chhatrapur division, Baligurha division, part of Brahmapur Taluk and part of Ichhapur Taluk in Brahmapur division, part of Paralakhemundi plains and the whole of Paralakhemundi Agency in Chicacole division. The Paralakhemundi Taluk consisting of a part of Paralakhemundi plains and the whole of Paralakhemundi Agency was included in the district of Koraput on the formation of Orissa for seven months only and was then transferred to Ganjam.

Prior to the creation of Orissa as a separate province, the whole of Ganjam Agency area was divided into three *taluks*, namely, Ramagiri-Udayagiri, Ghumusar-Udayagiri and Baligurha and was known as Baligurha division. After the creation of Orissa, Ramagiri-Udayagiri *Taluk* was transferred to Brahmapur division and Baligurha division was left with the two *taluks* of Ghumusar Udayagiri and Baligurha with headquarters as before at Russelkonda (present Bhanjanagar). The Agency areas were then administered under a set of special rules of administration framed under the provisions of the Ganjam and Vizagapatam Act, 1839 and the Collector of Ganjam as "Agent" to the Governor (from which the word "Agency" has been derived) was in charge of enforcing the special rules of administration. On the formation of Orissa, the Khondmals subdivision, which was separated from Anugul by the ex-state of Boudh, was formed into a separate district for the purpose of the Khondmals Laws Regulation, 1936 but was tagged in to Ganjam with the Collector of the district as its *ex officio* Deputy Commissioner for administrative purposes. The

Special Assistant Agent, Baligurha, with headquarters at Russelkonda (present Bhanjanagar) was appointed as *ex officio* Subdivisional Officer of the Khondmals subdivision of Ganjam district with a Second Officer stationed at Phulabani to assist him in discharging routine duties. From the 26th January 1941, the office of the Special Assistant Agent, Baligurha, together with his headquarters, was shifted to Phulabani.

In consequence of the merger of the princely states of India on the 1st January 1948, the ex-feudatory state of Boudh merged in the state of Orissa and a new district called Boudh-Khandmals (now Phulabani) emerged comprising the Khondmals district and the ex-state of Boudh. Later on the *taluks* of G. Udayagiri and Baligurha of Baligurha division were separated from Ganjam to be tagged with the district of Phulabani. A separate Deputy Commissioner was appointed for Khondmals and the Collector, Ganjam, ceased to function as the Deputy Commissioner of the former. However, Baligurha continued to remain under the judicial control of the Collector, Ganjam, as per the provisions of the Ganjam and Vizagapatam Act, 1839, which specifically provided that the Collector of Ganjam would be the Agent for enforcing the special rules of administration. Subsequently, in February, 1949 the Deputy Commissioner of the Khondmals-Phulabani was appointed as the Additional Agent of Baligurha division with powers to function as the Agent to the Governor with only a few limitations till the designations of 'Agent' and 'Special Assistant Agent' were abolished, due to the repeal of the Ganjam Agency (Repealing and Extension Laws) Regulation, 1951 (Regulation V of 1951) which came into force on the 1st January 1953. Therefore, there was *de jure* separation of Baligurha division from the district of Ganjam only on the 1st January 1953. Since then there has been no changes in the boundaries of the district.

On the 1st April, 1936 when Orissa was created a separate province, the area of Ganjam district was 19,160 sq. km. (7,398 sq. miles : 6,619 sq. miles out of old Ganjam district, 779 sq. miles consisting of Khondmals division). After the merger of the ex-states with Orissa necessitating creation of the district of Boudh-Khondmals, the area of Ganjam was reduced to 12,527 sq. km. (4,835 sq. miles)*. This excluded the area of Baligurha division which was 4,905 sq. km. (1,894 sq. miles).

Besides Rayatwari and the agency areas, the old Ganjam district comprised 24 ex-estates, namely, 1. Khallikot, 2. Athagarh, 3. Palur, 4. Biridi, 5. Huma, 6. Dharakot, 7. Badagad, 8. Seragad, 9. Pratapgiri (or Chinakimedi) or Sanakhemundi, 10. Vijayanagar

*According to the Surveyor General of India, the area of the district is 12,531 sq. km.

(or Pedakmedi) or Badakhemundi, 11. Chikiti, 12. Surangi, 13. Jarada, 14. Asika, 15. Kurla, 16. Debabhumi, 17. Katinga, 18. Paralakhemundi, 19. Jalantar, 20. Budarsing, 21. Mandasa, 22. Karla, 23. Barua and 24. Urlam. After the formation of the province of Orissa in 1936 out of these ex-estates, the ex-estates of Khallikot, Athagarh, Sanakhemundi, Badakhemundi, Surangi, Jarada, Asika, Kurla, and Debabhumi and Katinga remained fully in Ganjam district. A part of Chikiti estate named as Tampara Mutha consisting of 43 villages having an area of 10 sq. miles (26 sq. km.) which was in Sompeta Taluk was excluded from Ganjam district and the area remaining in Ganjam district was 10.82 sq. miles (28 sq. km.). The area of Paralakhemundi as it had existed in the old Ganjam district was 639 sq. miles (1,655 sq. km.), besides Paralakhemundi Agency, which covered an area of 333 sq. miles (862 sq. km.). The portion of Paralakhemundi estate that remained in Ganjam after creation of Orissa had an area of 201 sq. miles (521 sq. km.), besides the whole of Paralakhemundi Agency. The estate of Katinga was placed solely in Ganjam Agency.¹

Administrative set-up

Excluding Baligurha division, Ganjam district was first divided into three revenue subdivisions, namely, Chhatrapur, Brahmapur and Ghumusar. The agency portion of the district comprised an area of 1,410 sq. miles (3,652 sq. km.) while the area of the plains was 3,315 sq. miles (8,586 sq. km.). Chhatrapur subdivision with an area of 827 sq. miles (2,142 sq. km.) consisted of the Taluks of Chhatrapur and Kodala. Brahmapur subdivision had at first an area of 2,207 sq. miles (5,716 sq. km.) comprising Brahmapur, Digapahandi, Ramagiri-Udayagiri and Paralakhemundi Taluks. Ghumusar subdivision at first had an area of 1,619 sq. miles (4,193 sq. km.) including the Taluks of Ghumusar, Asika and Sorada. In 1956, Paralakhemundi subdivision was created with Paralakhemundi and Ramagiri-Udayagiri Taluks excepting Goudagotha, Merikot and Jarrou Agency Muthas which were included in Sorada Taluk of Ghumusar subdivision. Sanakhemundi estate was taken away from Asika Taluk and included in Digapahandi Taluk.

Subdivisions, Tahsils and Police-stations

The district* of Ganjam is divided into four subdivisions, namely, Brahmapur, Chhatrapur, Ghumusar and Paralakhemundi and fourteen Tahsils, viz., Brahmapur, Chikiti, Digapahandi, Kanisi, Chhatrapur, Purusottampur, Kodala, Khallikot, Asika, Ghumusar,

1. Final report on the Major Settlement Operation in Ganjam ex-estate areas 1930-62 by N. C. Behuria, OAS (I), Settlement Officer.

*The district was divided on the 2nd October, 1992, into two districts, namely, Ganjam and Gajapati vide Revenue and Excise Department, Government of Orissa, Notification No. 49137, dt. 1-10-1992.

Sorada, Buguda, Paralakhemundi and Ramagiri-Udayagiri. The Tahasils of Kanisi, Khallikot and Purusottampur are the new creations. There are twenty-eight police-stations in the district, viz., Chhatrapur, Rambha, Purusottampur, Kodala, Khallikot, Brahmapur town, Baidyanathpur, Badabazar, Brahmapur Sadar, Gopalpur, Nuagan, Jarada, Asika, Patapur, Hinjili, Sorada, Badagad, Bhanjanagar, Gangapur, Buguda, Tarasingi, Paralakhemundi, Garabandha, Kashinagar, Serang, R. Udayagiri of Ramagiri and Mohana. The number of towns in the district is 20 which is a record in the state. The towns are Buguda, Bhanjanagar, Belaguntha, Sorada, Asika, Digapahandi, Kashinagar, Paralakhemundi, Chikiti, Brahmapur, Gopalpur, Hinjili, Chhatrapur, Ganjam, Rambha, Khallikot, Purusottampur, Kabisuryanagar, Polasara and Kodala. Among these, Brahmapur is the most populous township. It is a city with a population of more than two lakhs. Out of the four subdivisions of the district, Ghumuser is the biggest and Chhatrapur is the smallest.

Chhatrapur subdivision occupies mostly the eastern part of the district. It constitutes four Tahasils and five police-stations. The subdivision has as many as nine towns, the highest number, while compared to other subdivisions of the district. The nine towns in this subdivision are Hinjili, Chhatrapur, Ganjam, Rambha, Khallikot, Purusottampur, Kabisuryanagar, Polasara and Kodala. Chhatrapur is the headquarters of the district and is situated in this subdivision.

Brahmapur subdivision lies in the eastern-southern portion of the district and is situated in between the subdivisions of Chhatrapur and Paralakhemundi. The subdivision comprises four Tahasils and seven police-stations. There are four towns in this subdivision, viz., Brahmapur, Digapahandi, Gopalpur and Chikiti. Brahmapur is the headquarters of this subdivision.

Ghumuser subdivision occupies mostly the southern part of the district. It is divided into four Tahasils. There are nine police-stations in this subdivision. The five urban areas of the subdivision are Buguda, Bhanjanagar, Belaguntha, Sorada and Asika.

Paralakhemundi subdivision lies in the southern-western part of the district. It consists of two Tahasils and seven police-stations. Paralakhemundi and Kashinagar are the two towns of the subdivision.

All the subdivisions (except Ghumuser) are named after their respective headquarters town.

A detailed list of the Subdivisions, Tahasils and Tahasilwise Police-stations is given in the following table :—

Subdivisions	Tahasils with area* in sq. km. and population	Police-stations
(1)	(2)	(3)
Brahmapur	1. Brahmapur A. 224.7 sq. km. P. 3,47,747	1. Brahmapur Sadar (part) 2. Brahmapur Town 3. Hinjili (part) 4. Badabazar 5. Nuagan (part) 6. Baidyanathpur
	2. Chikiti A. 870.2 sq. km. P. 1,54, 839	1. Nuagan (part) 2. Jarada 3. Golanthara (part) 4. G. Nuagan
	3. Digapahandi A. 1,067.1 sq. km. P. 2,82,835	1. Pattapur (part) 2. Nuagan (part) 3. Hinjili (part) 4. Digapahandi 5. Brahmapur Sadar (part)
	4. Kanisi A. 208.8 sq. km. P. 1,18,673	1. Brahmapur Sadar (part) 2. Golanthara (portion) 3. Nuagan (part) 4. Digapahandi (part) 5. Gopalpur
2. Chhatrapur	1. Chhatrapur A. 307.1 sq. km. P. 1,62,005	1. Chhatrapur (part) 2. Rambha (part) 3. Purusottampur (part)
	2. Kodala A. 259.9 sq. km. P. 2,65,124	1. Kodala (part) 2. Purusottampur (part) 3. Kabisuryanagar (part)
	3. Khallikot A. 505.5 sq. km. P. 2,06,465	1. Rambha (part) 2. Kodala (part) 3. Khallikot (part)

A. for area in Col. 2

P. for population in Col. 2

* The total area figures of the Tahasils will not tally with that of district figures (12,531 sq. km.) because the former represent the 'land use' area and derived from the figures supplied by the local revenue authorities. See—Census of India, 1991, Series—19 (Orissa). Provisional Population Totals, pp. 73-74.

Subdivisions	Tahasils with areas in sq. km. and population	Police-stations
(1)	(2)	(3)
	4. Purusottampur A. 562.2 sq. km. P. 2,87,662	1. Purusottampur (part) 2. Hinjili (part) 3. Rambha (part) 4. Chhatrapur (part) 5. Pattapur (part) 6. Khallikot (part) 7. Kabisuryanagar (part)
3. Ghumusar (Bhanjanagar)	1. Asika A. 947.4 sq. km. P. 3,13,765	1. Asika (part) 2. Badagad (part) 3. Gangapur (part) 4. Pattapur (part) 5. Hinjili (part)
	2. Ghumusar (Bhanjanagar) A. 1,174.2 sq. km. P. 2,15,005	1. Bhanjanagar (part) 2. Gangapur (part) 3. Tarasingi
	3. Sorada A. 958.3 sq. km. P. 1,49, 086	1. Badagad (part) 2. Gangapur (part) 3. Sorada
	4. Buguda A. 952.4 sq. km. P. 1,81,173	1. Buguda 2. Gangapur (part) 3. Bhanjanagar (part)
4. Paralakhemundi	1. Paralakhemundi A. 1,179.0 sq. km. P. 2,80,403	1. Paralakhemundi 2. Ramagiri (part) 3. Kasinagar 4. Serang (part) 5. Garabandha
	2. Ramagiri-Udayagiri A. 1,877.3 sq. km. P. 1,78, 338	1. Mohana 2. Ramagiri-Udayagiri 3. Ramagiri (part) 4. Serang (part) 5. Nalaghat

TOPOGRAPHY AND HILL SYSTEM

The district of Ganjam is one of the most beautiful districts in the state of Orissa. The Eastern Ghats running on its western side approach to within 39 km. (15 miles) of the sea at Barua. Behind it rises one of the highest peaks in the district, the Mahendagiri 1500.53 metres (4,923 ft.). The hills for the most part are beautifully wooded and the land between them and the sea is undulating interspersed with rocky hills.

Physiographically the district is divisible into the eastern coastal plains and the western table lands rising to heights above 1,400 m. The east and north frontiers of the coastal plains are wild with thick forests and nearly half of its areas are covered with much of its fine Sal wood forests. Towards the centre and south it is hilly with beautiful well-watered and fertile valleys running towards the sea. The south-eastern portion is fertile and contains extensive multi-cropped areas, well served by many major and minor irrigation projects. The extreme south-east is occupied by a portion of the Chilka lake, its immediate vicinity being good for fishery and salt manufacture, though not so good for cultivation.

The table-land of the western sector of the district is a continuation of the great line of the Eastern Ghats and is chiefly formed by two plateaus conspicuously featured by some of the highest mountains of Orissa. The northern plateau lies between the hill ranges of Baligurha in the north and R. Udayagiri in the south, covering over an area of 2 590 sq. km. (1,000 sq. miles) and containing hills ranging from 609.6 metres (2,000') to 1,364.28 metres (4,476') in heights. The southern plateau which lies between Ramagiri-Jayagiri and Paralakhemundi plains is higher in elevation and contains some of the noted mountains stretching eastwards from the boundary of Andhra Pradesh. Some of the highest hills ranges in the district are Singaraju Parbat 1,515.57 m. (4,973'), Mahendragiri 1,500.53 m. (4,923'), Devagiri 1,381.96 m. (4,534'), Chandragiri 1,269 m., Tingiri Parbat 1,155 m., Dandamera Parbat 1,103 m., Gindabadi 1,035 m., Khundabala 949 m., Raigarha 881 m. The two plateaus are chiefly inhabited by many tribes, the Khonds predominating in the north and the Savaras in the south. The Mohini or the Kerandi hills which rise to an height of 762 metres lie at a distance of 12 km. from Brahmapur. Some of the isolated hillocks like Valleri hill range 364 m. and Tarini hill 225 m. have religious importance.

RIVER SYSTEM AND OTHER WATER RESOURCES

Since the hills of the district are close to the sea, the rivers flowing from the hills are not very large and so they are subject to sudden flood. The main rivers of the district are the Rushikulya, the Bahuda and the Vamsadhara.

Rushikulya

This is the largest river in the district being 146 km. long. It originates from Rushimal hills of Daringibadi area in Balgurha sub-division of Phulabani district at an elevation of about 1000 m. at north latitude $19^{\circ} 59'$ and east longitude $84^{\circ} 13'$ and flows in a generally south-easterly direction to drain into the Bay of Bengal near Ganjam. The river, which may be called as the life-line of the district, passes through narrow strips of cultivable lands and then emerges into the plains below the South-Eastern railwayline. The Dhanei, the Baghua, the Badanadi (Mahanadi) in the left and the Jorou, the Ghodahada on the right are the major tributaries. Maximum flood discharge of the river is 3,962 cusecs at the bridge site near Ganjam town prior to November 1990. During 1979, a medium flood in the river Badanadi (Mahanadi) caused damage to properties in Belaguntha, Jagannathprasad, Madhaborida, Buguda, Balipader and Asika areas. Again after a decade during the month of November 1990 the river Rushikulya experienced a heavy flood of 14,150 cusecs at the bridge site near Ganjam town. This flood caused much devastation to life and properties in Sorada, Asika, Dharakot, Seragad, Purusottampur, Ganjam, Hinjili, and Kabisuryanagar Community Development Blocks. The river is not navigable except during rains when it may be used for navigation below Asika. However, before introduction of road transport, wood rafts were floated down the river during monsoon period.

Bahuda

The river Bahuda rises near Ramagiri village in the district of Ganjam at an elevation of 600 m. at north latitude $15^{\circ} 3'$ and east longitude $84^{\circ} 20'$ and runs first in a north-easterly and then in a south-easterly direction for a total length of 73 km. to join the Bay of Bengal.

Vamsadhara

The river originates from Kalahandi district, crosses Koraput and before passing entirely to Andhra Pradesh to fall into the Bay of Bengal, serves as boundary between Ganjam and Srikakulam districts for some distance. The Mahendratanya is its principal tributary. The Vamsadhara basin witnessed a devastating flood on 16th September, 1980 and was the highest ever recorded. The flood was due to a depression which was located on 16th September, 1980 in the north-west Bay of Bengal. This had resulted in an unprecedented flood water of 1,7642 cusecs through the river causing loss of life and extensive damages to properties of Gudari and Gunupur areas of Koraput district and Kashinagar area of Ganjam district.

Small streams between the Mahanadi and Rushikulya

Out of six small streams between the Badanadi (Mahanadi) and the Rushikulya draining into the Chilika lake the fifth stream (counted from north) rises east of Sumandal village in Ganjam district at an elevation of 100 m. at north latitude $19^{\circ}42'$ and east longitude $85^{\circ}6'$ and flows for a total length of 10 km. The sixth stream rises west of Rambha in the district at an elevation of 100 m. and north latitude $19^{\circ}32'$ and east longitude $85^{\circ}3'$ for a short distance in a generally south-easterly direction and drains into the lake.

Small streams between the Rushikulya and the Bahuda

A small stream rises south-west of Brahmapur in the district at an elevation of 300 m. at north latitude $19^{\circ}15'$ and east longitude $84^{\circ}40'$ and flows for a total distance of 24 km. in a south-easterly direction to join the Bay of Bengal.

Small streams between the Bahuda and Vamsadhara

There are five small streams flowing between the rivers Bahuda and Vamsadhara. Out of these, the northern-most stream rises near Andanda village north latitude $19^{\circ}0'$ and east longitude $84^{\circ}22'$ and runs for a total length of 33 km. The second stream rises north-west of Taralokola village in Srikakulam district of Andhra Pradesh at an elevation of 450 m. at north latitude $18^{\circ}51'$ and east longitude $84^{\circ}20'$ and runs for a total length of 26 km. The third stream rises east of Gandavedha village in Srikakulam district at an elevation of 300 m. at north latitude $18^{\circ}40'$ and east longitude $84^{\circ}9'$ and runs for a total length of 20 km. The fourth and fifth streams rise also east of the Gandavedha village. The fourth stream rises at an elevation of 200 m. at north latitude $18^{\circ}40'$ and east longitude $84^{\circ}9'$ and runs for a total length of 20 km. The last stream rises at an elevation of 200 m. at north latitude $18^{\circ}40'$ and east longitude $84^{\circ}7'$ and runs for a total length of 48 km. All the streams flow generally south-easterly direction and join the Bay of Bengal.

ISLANDS

Breakfast Island

The 'Breakfast Island', formed of a mass of rocks, lies at a distance of about 5 km. north of Rambha in the Chilika lake. A room and a conical pillar was reported to have been built on it as per the instructions of Mr. Seydgrass, the Collector of Ganjam during the regime of the East India Company. The Collector was having his local office in this island and was also residing there. The pillar was intended to have a light on its top.

Barkud

Barkud is a small island inside the Chilika lake, about 50 km. from Rambha. The island covers an area of 21.85 hectares of land. It is a good picnic spot and the place abounds in deer and stags. There is an old palace of the ex-ruler of Khallikot. The beauty of the Chilika is well perceived from here.

LAKES AND TANKS

Chilika Lake

It is believed that, the Chilika lake might have formed by an inrush of the sea. However, it is probable that the lake was a part of the Bay of Bengal. In course of time it was separated from the sea by formation of sand ridges. The lake belongs to Puri and Ganjam districts. It is about 72 km. long (north to south) of which the northern half has a mean breadth of 32 km. while the southern half tapers into an irregularly carved point barely averaging 8 km. in width. It is shallow, seldom exceeding 1.8 metres in depth. The water is brackish. There is very slight tide at the southern end. The sea runs into it at Manikapatna in Puri district. This keeps the lake distinctly salty during the dry months from December to June. The mouth of the lake is being silted up preventing free migration of fish into and out of the lake. During rains the rivers come pouring down upon its northern extremity, the sea water is gradually driven out and its water becomes fresh.

The unparallel scenic beauty of the Chilika has caught the eyes of many poets, philosophers and naturalists from remote past. In the winter season the lake becomes an abode of birds of different species from every direction of the world, even from the distant Siberia. In recent years a Naval Boys Training Centre has been established under the administrative control of the Indian Navy. A boat race is being conducted here every year.

A detailed account on Chilika has been given in Puri District Gazetteer (1977).

Tanks

There are tanks in almost all the villages and towns of the district. These tanks are used for bathing as well as drinking purposes. Many of the tanks are also utilised for pisciculture and irrigation.

Many big tanks are found in and around Paralakhemundi, amongst which mention may be made of the Ram Sagar and Sita Sagar near Kimedi, Brundaban Sagar near Upalada, Krushna Sagar near Gopili and Chaitanya Sagar to the north-west of Paralakhemundi. Another notable tank is Radha Sagar of this region. All these tanks serve as sources of irrigation.

Springs

About 40 km. from Brahmapur on the road to Lohagudi there is a celebrated spring called Taptapani ($19^{\circ}29'$: $84^{\circ}04'$) from which spouts a copious and constant flow of hot water in temperature about 115°F . It evolves sulphurous vapour but no incrustation of sulphur is noted. It is at the headwaters of the Taptapani river in porphyroblastic granitic-gneiss.

A hot spring is found on the eastern bank of the Vamsadhara river near Bamini ($19^{\circ}11'$: $83^{\circ}48'$). It flows for about 300 metres before its confluence with the Vamsadhara. The temperature recorded is 84°F . There is no escape of gas nor does it smell sulphur. There is also a perennial spring called "Nirmal Jhar" at Khallikot and a waterfall at Budhakhol hill near Buguda.

Waterways

As mentioned earlier, the rivers in the district do not have a perennial flow and thus are not navigable. However, wood rafts are floated down rivers Vamsadhara and Rushikulya. Sometimes there is boat traffic on them. Traders of Ganjam with their heavy loads of bamboo, rice, Mandia and other commodities go to the neighbouring district Puri through the Chilika lake.

GEOLOGY

Geological Antiquity

The rock formations encountered in the district include khondalite, basic pyroxene granulite, amphibolite, porphyroblastic and non-porphyroblastic granite gneiss, garnetiferous granite and gneisses, granodiorite, leptynite, pegmatite and quartz veins. Of all these rocks, khondalite suites of rocks are considered to be the oldest from the available field relations. Pyroxene granulite, and its metavariants and hypersthene granite constitute the charnockite group; the definite or absolute stratigraphic position of which is not yet established. But for the present, they are considered to be younger in age than the khondalite group of rocks.

Geological Formation

From the available information the following stratigraphic sequence has been arrived at:

Recent to Sub-recent .. Coastal sands, alluvium and soil

Pleistocene to recent .. Laterite

Intrusives pegmatites and quartz veins:

{ Garnetiferous granite gneiss
{ Leptynites

Archæans	Eastern Ghats	}	Charnockite Group	}	Hypersthene granite and gneisses
	Super Group		Khondalite Group		Basic pyroxene granulite
					Amphibolite
					Quartz-garnet-sillimanite gneisses and schists
					Quartz-garnet rocks, Garnetiferous quartzites, Calc-silicate rocks

Khondalite Group

The khondalite forms a very conspicuous feature of the geology of Ganjam and the khondalite group of rocks consists of quartz-graphite-sillimanite schists and gneisses, quartz-garnet rock, garnetiferous quartzite and calc-silicate rocks. These occur as conformable bands and inclusion within the granite gneiss and hypersthene granite. In length, these may vary from a few metres to several kilometres. Quartz-sillimanite rock with or without graphite is best developed among the khondalite group of rocks; garnetiferous quartzite is the transition between this and quartzite.

Quartz-sillimanite (+graphite) rock in hand specimen is fawn to buff coloured, medium to fine grained contains lots of garnet and flakes of graphite, at places garnets are surrounded by clusters of fibrous sillimanite. Quartz garnet rock and garnetiferous quartzite are of same mineralogical composition and vary in colour from greyish to brown. The calc-silicate rocks are white to grey coloured, extremely fine grained and compact and consists of pyroxene, feldspar, scapolite, garnet spene and sometimes spinel. The plagioclase-composition varies from albite to aligoclase. K-feldspar occurs as irregular grains with perthitic intergrowth.

Charnockite Group

Charnockite group comprises pyroxene granulite and its metavariants (amphibolite) and hypersthene granulites (Acid charnockite).

Pyroxene granulite occurs as bands, lenticles and patches within acid charnockite. It is dark coloured, hard and compact equigranular and consists of pyroxene, feldspar, biotite and garnet.

Amphibolite occurs as inclusions within the garnetiferous granite gneiss. The rock is dark coloured medium grained with faint schistosity. Amphibole is of dark green variety here and is formed probably from pyroxene by retrogression.

Acid Charnockite (Hypersthene granulite)

The rock is medium to fine grained. Light greasy green to greasy grey in colour, hard compact non-fissile, massive of homophenous with spheroidal weathering and sometimes displays a crude foliation. It is composed essentially of hypersthene, plagioclase, orthoclase and sometimes diopside, biotite, garnet, microcline and Parthetes are rare. Apatite and zircon constitute the accessories.

Leptynite

Leptynite rock essentially consists of quartz which are speared and elongated. Besides quartz, it contains biotite, garnet, k-feldspar, plagioclase, sillimanite, magnetite, apatite and zircon.

Garnetiferous granite gneiss

The rock is leucocratic with minor coarse grained, porphyroblastic, with feldspar porphyroblasts garnets evenly distributed and biotite arranged in linear fashion giving a gneissese structure.

Laterite

Laterite occurs as capping over granite gneiss and charnockite at many places. It is highly cavernous and ferruginous. The thickness of the laterite profile varies from 3 m. to 15 m.

MINERAL RESOURCES

Bauxite

Sporadic bauxite occurrences have been reported from Paralakhemundi ($18^{\circ} 47' : 85^{\circ} 05'$), Ramagiri ($19^{\circ} 05' : 84^{\circ} 17'$), Koipuram ($18^{\circ} 56' : 84^{\circ} 29'$), Idomgiri ($18^{\circ} 54' : 84^{\circ} 19'$) and Mahendragiri ($18^{\circ} 38' : 84^{\circ} 22'$). Investigations have not been carried out so far to prove the grade and reserve of these deposits.

Clay

Pockets of kaoline derived from the weathering of gneisses have been noticed near Samtarpalli ($19^{\circ} 42' : 84^{\circ} 51'$) and Jillinda ($19^{\circ} 42' : 84^{\circ} 57'$). The occurrence of clay at Samtarpalli is slightly gritty and is whitish grey in colour. The linear shrinkage is roughly about 12.5 per cent and it turns to yellowish grey.

Iron-ore

Iron-ore has been reported between Gochhapara and Katrangla. The deposit is of little commercial importance.

Manganese

Pockets and lensoid bodies of manganese occurring within the khondalite suite of rocks has been reported at Chandipalli Kabisuryanagar, Purusottampur and Kodala.

Mica

Blocks of mica up to 10 cm. in width have been reported at Nadiguda, Dwaragram, Mohana, Raising, Adaba and Budiamba.

Monazite, ilmenite, etc. (Sand concentrates)

Large number of small deposits of natural black sand concentrates consisting of monazite, ilmenite, zircon, sillimanite and rutile have been reported between the Rushikulya river mouth (Agasthi-Nuagan) to Gopalpur spreading in 2,887.76 hectares. The Indian Rare Earth, Ltd., is utilising these raw materials for its use.

Rock Crystals

Rock crystals are found in the plane area, about 1.6 km. east of Turubudi where these are scattered over an area about 25 metres long and 21 metres wide. The crystals are of small size and range from 1.2 cm. to 5 cm. in length and are up to 6 mm. across. These are transparent to translucent but not very useful for radio oscillator.

Calc Nodules

Occurrence of lime-kankars or calc-nodules are reported from around Mohana and Nuagada. These are used for extraction of lime mainly for use as mortar in building houses. These are dirty white to light yellowish grey in colour; diameter varies from 2 cm. to as large as 12 cm. The nodules are restricted to a depth of 5 cm. to 15 cm. of the soil cover.

Building material

All the rock types occurring are used for building purposes in this district. Khondalites are used for building purposes whereas quartzites and charnockites are used for the construction of bridge, road and railway ballast.

FORESTS**Area under forests**

Out of total geographical area of 12,527* sq. km. of the district, the total forest area of the district is reported to be 7,011.66 sq. km. as on 1st April 1981 representing 55.97 per cent of its geographical area against 38.48 per cent of the state average, and 22.75 per cent of the national average. But this is all on paper. The devastation caused to forests by Government policy of giving land to landless and due to interference of the local people like Podu cultivator and unscrupulous forest contractors, encroachments and unrestricted exercise of Nistar rights, development projects like irrigation, power, industry, resettlement of refugees and displaced persons, etc., does not appear to have been taken into account in calculating the actual forest cover that exists in the state. The National Remote Sensing Agency (N. R. S. A.) reports that not more than 25 per cent of the total geographical area of the state is now under forest cover and this gross area also includes the open forests which can be about 30 per cent of such forest area. The Forest Survey of India have, however, assessed the forest area of the state to be 34 per cent of its geographical area of which dense forests constitute 18 per cent, open forests 15 per cent and the remaining 1 per cent is mangrove forest. So, the state as a whole does not seem to have more than 18 per cent of the total land surface under good forest cover having a crown density of 40 per cent and above. The district consists of both plains and hilly areas and according to the National Forest Policy of 1952, 20 per cent of the plain areas and 60 per cent of the hilly areas should be kept reserved under perpetual forest cover (i.e., as reserved forest) in the interest of ecology and environment. National Forest Policy of 1988 envisages a minimum of one-third of the geographical area including two-third in the hilly and mountainous regions under such cover in order to prevent erosion and land degradation and to ensure stability of the fragile eco-system of the country. The reserved forest area of the district is 1865.45 sq. km., i.e., only 14.89 per cent of its geographical area. Proposals have since been submitted for reservation of an additional area of 1038.68 sq. km. under the Orissa Forest Act, 1972 which are now under various stages of reservation. On completion of the reservation proceedings, the percentage would increase to 23.18 per cent.

The forest area of the district may be much less than what appears on paper of the Forest Department. But, all the same, it appears higher than the state average and may closely approximate the minimum forest cover prescribed under the National Forest Policy of 1988 for the plain areas.

* 12,531 sq. km. according to the Surveyor General of India.

The forest areas in square kilometres of different Forest Divisions of the district as on 1st April 1981 is reported to be as follows:

Name of Forest Division	Reserved forests	DPF including Reserved Lands and Protected Lands	UDPF	Other forests	Total	Area pending for reservation
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Paralakhemundi ..	4,46.116	2,053.17	1,869.172	0.16	4,368.618	407.72
Ghumusar (North) ..	9,09.687	8.14	..	0.53	918.357	8.14
Ghumusar (South) ..	5,30.230	5,17.62	697.740	0.30	1,745.890	622.82
Total ..	1,886.033	2,578.93	2566.912	0.99	7032.865	1038.68

In Paralakhemundi Division the area deforested due to Hadabhangi Irrigation Project was 10·282 sq. km. In Ghumusar South Division, only 33·75 hectares (0·337 sq. km.) were deforested for minor irrigation projects and in Ghumusar North Division only 693·5 hectares (6 932 sq. km.) of reserved forests were deforested for Daha Irrigation Project and for 132 K. V. Line from Bhanjanagar to Phulabani. So, the official loss of forests between 1981 and 1986 may be taken to be 17·21 sq. km.

In the report of the Forest Enquiry Committee, Orissa, published in 1959, however, the forest area of the district (including Chakapad Khandam which is now in Phulabani district) is shown as follows:

Total forest area	..	4,248·40 sq. km.
Reserved forest area	..	1,988·93 sq. km.
Reserved land (Protected forest)	..	85·05 sq. km.
Ex-zamindari forests, both reserved land and unreserved forests.		1,381·09 sq. km.
Total	..	<u>7,703·47 sq. km.</u>

This indicates that there has not been much forest loss between 1958 and 1981 according to official information. But if the figures furnished by the Divisional Forest Officers indicating the position by the end of 1986 are believed, about 4000 sq. km. of forests appear to have been lost during the last thirty years due to various factors mentioned above. But no firm conclusion can be derived as the official figures available at different times are not based on actual verification of the position on the spot and appear at times confusing and contradictory. (For instance, the Director of Agriculture in his statement on "Land Utilization pattern in Orissa during 1982-83" reports the forest area of the district to be 5,690 sq. km. and geographical area of the district to be 12,200 sq. km.)

Forest laws and Administrative set-up

Unlike other parts of Orissa (except Koraput district minus Kshipur Tahasil) the forest management in the district of Ganjam was governed by the Madras Forest Act, 1882. This Act did not automatically apply to the Agency area of the district which was called Scheduled District under the Scheduled District Act, 1872. The Madras Forest Act was extended to Sorada and Sanakhemundi Maliahs in 1901 and to other Agency areas in 1906. So far as forests in the Raiyatwari areas of the district are concerned, they were brought under the forest administration for the first-time in the year

1850 but regular reservation did not start till the year 1885-86 until enforcement of the Madras Forest Act. By 1900 almost all the blocks in the Raiyatwari areas were reserved under the Madras Forest Act, 1882. Attempts for systematic working were made only in 1901 through two forest divisions when regular working plan was compiled for the management of Ganjam forests. Unlike the Bihar and Orissa Forest Divisions they were larger units and were rather unwieldy. These two divisions were, therefore, reorganized with effect from 3rd January 1938 and four divisions, namely, Russelkonda, Chhatrapur, Paralakhemundi and Baligurha were formed (Baligurha was then in Ganjam district). This was in pursuance of the policy of having smaller charges for efficient management. The names of Chhatrapur and Russelkonda divisions were subsequently changed to Ghumusar South and Ghumusar North divisions with effect from the 1st April 1941. There has been no further change in the administrative set-up except that Baligurha division now administers only parts of forests of Phulabani district.

The management of territorial forest has been put under three Divisional Forest Officers, one stationed at Paralakhemundi who is in charge of Paralakhemundi Forest Division which is co-terminous with Paralakhemundi Territorial Subdivision, and two stationed at Bhanjanagar, who are in charge of Ghumusar North and Ghumusar South having jurisdiction over Bhanjanagar Territorial Subdivision and Chhatrapur-Brahmapur Territorial Subdivisions respectively. The entire area has been divided into 15 ranges. There are 6 ranges in Paralakhemundi, 4 in Ghumusar North and 5 in Ghumusar South Forest Divisions.

As described in the chapter XI (Revenue Administration), besides the Raiyatwari areas, there were zamindari and agency areas in Ganjam district. Most of the zamindari areas were vested in Government in 1952. But the management of zamindari forests continued to be under the Anchal Sasan, under the Revenue Department till 14th November 1957. On the 15th November 1957 these forests were transferred to the control of the Forest Department. The extent of these forests is not correctly known but it is estimated that the total ex-zamindari forests in the district could be to the tune of 1,380 sq.km. There is no authentic record regarding management of these forests. But there is no doubt that these were exploited most irregularly with the object of realising maximum revenue without any scientific working plan or scheme except those in Dharakot zamindari. This has resulted in gradual depletion of these forests. The Orissa Preservation of Private Forests Act, 1947 was extended to many of the ex-zamindari forests prohibiting leasing of any forest land without prior permission from the Collector. But the provision was not effective and the proprietors continued to allow such irregular exploitation

which appears to have taken serious proportion in the wake of the talk of zamindari abolition. In some of these forests no forest rule was in force. They were managed under the rules framed by the proprietors. But in certain other ex-zamindaris like Khallikot, Athagarh, Paralakhemundi and Dharakot, rules were framed under the Madras Forest Act for management of the forests, but their enforcement was ineffective. Under the Madras Forest Act there were two classes of forests, i.e., reserved forests and unreserved forests. Chapter II of the said Act deals with reserved forests and rules framed under section 26 of the Madras Forest Act which governed the management of unreserved forests. They were known as reserved lands or protected lands like the protected forests under the Indian Forest Act or the Orissa Forest Act. The Madras Forest Act continued to be in force until this was repealed by the Orissa Forest Act, 1972 with effect from the 14th July 1972. Under the savings clause 91 of the Act, any reserved forests or protected forest under the Madras Forest Act shall be deemed to be a reserved forest or protected forest, as the case may be, under the Orissa Forest Act. All rules and orders made, notifications, notices issued, licences, fees, and permits granted, fees levied, imposed or assessed, proceedings instituted and all actions taken and things done under the Madras Forest Act shall be deemed to have been respectively made issued, granted, levied, imposed or assessed, instituted or taken or done under the Orissa Forest Act and shall continue to be in force until provisions are made under the Orissa Forest Act. Therefore, all rules regarding sale, disposal and transit of forest produce framed under the Madras Forest Act still continue to be in force as new rules under the Orissa Forest Act for such purposes have not been framed.

Rights and Concessions

The following rights and concessions are available to the inhabitants of the district in their neighbouring forests as given in the Report of the Forest Enquiry Committee, 1959.

Ghumusar North Division—In the reserved forest there are no rights to forest produce except those admitted to the Kandhas. The latter are allowed substantial concessions in lieu of the services rendered by them to protect against injury by fire.

Grazing fee

	In all ranges except Agency (per head)	Outsiders grazing in Agency areas (per head)
Buffalo	Re. 0-3-0 or Re. 0-19	Re. 0-6-0 or Re. 0-37
Cow and bullock	Re. 0-2-0 or Re. 0-12	Re. 0-4-0 or Re. 0-25
Sheep	Re. 0-1-0 or Re. 0-06	Re. 0-2-0 or Re. 0-12
Goat	Re. 1-0-0	Re. 2-0-0

The Kandhas are permitted for free removal of any unreserved tree or forest produce for their actual home consumption from the unreserves. Plough timber is also allowed free by the Divisional Forest Officer. They are not allowed to practice Podu cultivation.

Ghumusar South Division

(1) Only commutation fee at a fixed rate (annually) is realised in Chandragiri Range.

(2) In Reserved Forests—No right to forest produce has been given except those admitted to Kondhs. The Kondh residents are allowed free removal of timber, dry firewood and bamboos required for their own *bona fide* use and also free removal of minor forest produce in lieu of certain services, like fire protection to be rendered by them.

(3) In Unreserved Forest—The concessions admitted in general to local tribes are free removal of timber, dry firewood, bamboo, minor forest produces for domestic use only. Free grazing is also allowed in Agency areas.

Grazing fee in other areas:—

	In all ranges except Agency area (per head)	For outside grazier in Chandragiri (per head)
Buffalo	Re. 0-3-0 or Re. 0-19	Re. 0-6-0 or Re. 0-37
Cow and bullock	Re. 0-2-0 or Re. 0-12	Re. 0-4-0 or Re. 0-25
Sheep	Re. 0-1-0 or Re. 0-06	Re. 0-2-0 or Re. 0-12
Goat	Re. 1-0-0	Rs. 2-0-0

In Chandragiri Agency the genuine inhabitants are allowed free removal of timber of unreserved species and other produce from the unreserves for their actual home consumptions and are also allowed to practice Podu cultivation.

Paralakhemundi Division

Reserved species (1) Siris, (2) Dhau, (3) Panas, (4) Sunari, (5) Mahua, (6) Mahilimba, (7) Bheru, (8) Sisoo, (9) Jamu, (10) Sidha, (11) Amba, (12) Sundargundi, (13) Karanja, (14) Piasal, (15) Sal, (16) Tentuli, (17) Teak, (18) Harida, and (19) Terminalia tomentosa.

Reserved forests—No concessions are allowed except that bamboos can be taken free by the Agency people. The Divisional Forest Officer may make free grants of timber and bamboos to the extent

of Rs. 50/-in the case of individual and Rs. 250/-in case of communities. This free grant can be given either from the reserves or unreserves.

Unreserved forests—Bamboos and grazing are free to the Agency inhabitants.

Grazing—The Agency inhabitants (except professional grazier) free from both reserved forests and unreserved forests.

	Agency professional graziers (per head)	Estate graziers (per head)
Buffalo	Re. 0-3-0 or Re. 0-19	Re. 0-6-0 or Re. 0-37
Cow	Re. 0-2-0 or Re. 0-12	Re. 0-4-0 or Re. 0-25
Sheep	Re. 0-1-0 or Re. 0-06	Re. 0-2-0 or Re. 0-12
Goats	..	Re. 0-4-0 or Re. 0-25

The Agency inhabitants of Paralakhemundi Maliahs and of Thumba Mutha enjoy the same concessions as are allowed in the Chandragiri Agency of Ghumusar South Division.

The Divisional Forest Officer, Paralakhemundi, however, reports that the entire forest area remaining unsurveyed, no rights and concessions were recorded. But the following customary rights are available to the inhabitants of the Agency area:

- (i) Collection and removal, free of charge, of minor forest produce for domestic consumption.
- (ii) Collection and removal, free of charge, of timber for house building and for plough up to a maximum of 15 poles inclusive of 3 cft. of timber for plough or 10 cft. of timber of *sal* and other species per householder per annum.
- (iii) Felling and removal, free of charge, of dry fuelwood not exceeding 8 headloads per family per month.
- (iv) Free grazing of their own cattle other than goats with certain restrictions with regard to area.
- (v) Felling and removal, free of charge, of 30 bamboos per year per householder.

DHARAKOT EX-ESTATE

Reserved species-(1) Teak, (2) Sisoo, (3) Plasal, (4) Harida, (5) Tentuli, (6) Salua, (7) Mohula, (8) Amba, (9) Panas, (10) Bheru, (11) Muktamunj, (12) Karanja, (13) Sahaj, (14) Khalr, (15) Kendu and (16) Sahan.

Cess .. Nil

In reserved lands there is no rights or concessions. In unreserved land, the people have right to remove unreserved species free of royalty for their domestic and agricultural use.

Grazing—Grazing in unreserved forests is free and in reserved forests on payment of fees as given below:

Buffalo	Re. 0-3-0 or Re. 0·19
Cow and bullock	Re. 0-2-0 or Re. 0·12
Sheep	Re. 0-1-0 or Re. 0·08
Goat brought from outside the Dharakot Ex-estate.	Re. 1-0-0

PARALAKHEMUNDI

Reserved species-(1) Teak, (2) Sandal, (3) Blackwood, (4) Red Sanders, (5) Kino, (6) Myrobalan, (7) Tamarind, (8) Sal, (9) Mango, (10) Jack, (11) Ebony, (12) Satin wood, (13) Aran wood, (14) Soapnut, (15) Cutchu, (16) Widnut-mung, (17) Poonpur, (18) Cinaman, (19) Jallani, (20) Jhamao, and (21) Ippa.

Cesses .. Nil

Rights and Concessions—No rights and concessions

Grazing—Grazing is allowed only in unreserved forests at the rates below:

Cow	..	Re. 0-3-0 or Re. 0·19
Buffalo	..	Re. 0-6-0 or Re. 0·37
Goat	..	Re. 1-0-0
Sheep	..	Re. 0-1-6 or Re. 0·10

KHALLIKOT AND ATHAGARH EX-ESTATES**Reserved species**

- (1) Teak, (2) Blackwood, (3) Kino, (4) Myrabalan, (5) Tamarind, (6) Sal, (7) Mahua, (8) Mango, (9) Jack, (10) Satin-wood, (11) Soap-nut, (12) Iron wood, (13) Karanja, (14) Khair, (15) Guharia, (16) Babul, (17) Sahaj, (18) Kusum, (19) Kendu, (20) Siris, (21) Halanda, (22) Dhau, (23) Phasi, (24) Ventek, (25) Mundimundi (26) Saun, (27) Arjun, (28) Saropam (29) Waodapple, (30) Palmyra, (31) Date palm, (32) Jambo, (33) Kora, (34) Kataka, (35) Borokoli, (36) Coconut, (37) Charo, (38) Embliomyrobalan, (39) Neem, (40) Mankingnut, (41) Sundaragundi, (42) Sunari, (43) Mahalimba, (44) Bandhan, (45) Kheri, (46) Kasi, (47) Sarupatri, and (48) Korada.

Cesses : Nil

Rights and Concessions—The villagers of the neighbouring forests in respect of Athagarh and Khallikot ex-estates are allowed to take fuel and other materials required for agricultural or domestic purposes free of royalty from the unreserved forests. Besides, fire afflicted persons are allowed to take one cart-load of "Madhur" wood (miscellaneous wood) and one cart-load of bamboos for re-roofing of each house free of royalty. Further raiyats are allowed other forest materials at concessional rates for their domestic purposes.

Grazing—Unreserved forests free. Reserved forests at the rates furnished below:

Goats	..	Re. 0-2-0 or Re. 0-12
Sheep	..	Re. 0-1-0 or Re. 0-06
She-buffalo	..	Re. 0-6-0 or Re. 0-37
She-calf	..	Re. 0-3-0 or Re. 0-19
Cow	..	Re. 0-3-0 or Re. 0-19
Call	..	Re. 0-1-6 or Re. 0-10

BADAKHEMUNDI EX-ESTATE

Reserved species (1) Bahada, (2) Harida, (3) Amba,
(4) Muktamunja, (5) Kanya, (6) Mohua,
(7) Panas, (8) Sundargundi, and (9) Kaitha

Cesses .. Nil

Rights and Concessions—The tenants have the right to remove forest materials from any place in the forests on payment of prescribed royalty. The tenants have no specific right or concessions for use of timber or firewood.

Buffalo Re. 0-3-0 or Re. 0·19

Cow and bullock Re. 0-2-0 or Re. 0·12

Horse, Ass Re. 0-4-0 or Re. 0·25

Goat, sheep Re. 0-1-0 or Re. 0·06

Calf under one year Nil

SANAKHEMUNDI EX-ESTATE

Reserved species (1) Mango, (2) Tamarind, (3) Mahua,
(4) Sal, (5) Bija, (6) Sisoo, (7) Asan,
(8) Karam (Halanda), (9) Jamu, (10) Teak,
(11) Gambhari, and (12) Mundi.

Cesses .. Forest cess at Rs. 1-8-0 (Rs. 1·50) for Rs. 100/
of land revenue.

Rights and Concessions The tenants who possess land and pay forest annual royalty (*nistar* cess) have got right to remove fuel, bamboo, *kanika* and *jhat* only on payment of concessional royalty of Re. 0-0-9 to Re. 0-1-9 (Re. 0·9 to Re. 0·11) in different places.

Grazing .. Unreserved lands free, reserved forests at the following rates:

Goat and sheep .. Re. 0-1-0 or Re. 0·06

Buffalo .. Re. 0-3-0 or Re. 0·19

Cow and bullock .. Re. 0-2-0 or Re. 0·12

JARADA EX-ESTATE

Reserved species ..	(1) Sal, (2) Piasal, (3) Sisoo, (4) Khalasahai, (5) Tangini, (6) Bheru, (7) Kasi, (8) Harida, (9) Mahua, (10) Gambhari, (11) Sunari, (12) Halanda, (13) Kendu, (14) Amba, (15) Tamarind, (16) Soapnut, (17) Teak, (18) Jack, (19) Babul and (20) Kusum.
Cesses ..	Plough tax Rs. 1-8-0 (Rs. 1.50) per annum.
Rights and Con-cessions.	The raiyats paying plough tax are enjoying 4 cart-loads of fuel, 4 head-loads of bamboos, 4 <i>bharas</i> of <i>kanika</i> and 2 ploughs.
Grazing ..	In unreserved forests free, reserved forests at the rates below:
Sheep ..	Re. 0-1-0 or Re. 0.06
Cow ..	Re. 0-2-0 or Re. 0.12
Buffalo ..	Re. 0-3-0 or Re. 0.19

CHIKITI EX-ESTATE

Reserved species ..	Nil
Cesses ..	Knife tax Re. 0-5-4 (Re. 0.33) per annum
Rights and Con-cessions.	The raiyats paying annual knife tax are enjoying 4 cart-loads of fuel, one cart-load of <i>kanika</i> , 6 <i>khandias</i> or <i>muli</i> and 6 <i>khandias batta</i> bamboos.
Grazing —	
Goat ..	Re. 0-1-0 (Re. 0.06)
Buffalo ..	Re. 0-4-0 (Re. 0.25)

SURANGI EX-ESTATE

Reserved species ..	Nil
Cesses ..	Plough tax Re. 0-13-0 (Re. 0.81) per annum
Rights and Con-cessions.	The raiyats paying plough tax are enjoying 2½ cart-loads of fuel, 2 head-loads of <i>kanika</i> , 2 head-loads of bamboos and one plough.

PALUR AND BIRIDI EX-ESTATES

Reserved species .. Nil

Cesses .. Nil

Rights and Con- Privilege has been given to the Raiyats residing
cessions. in Biridi and Palur ex-estates to remove
firewood annually for their domestic
consumption on payment of Re. 0-12-0
(Re. 0-75) and Re. 1-0-0 respectively
per year and to take maximum of 6 cart-
loads. Concession has also been given
to the Raiyats in Biridi ex-estate to take
bamboos at half the rate, i.e., Re. 1-12-0
(Rs. 1-75) per cart-load on permit basis
as was existing during prevesting period.

Grazing (Palur ex-estate) per head

Buffalo .. Re. 0-6-0 or Re. 0-37

Cow or ox Re. 0-2-0 or Re. 0-12

Goat or Re. 0-1-0 or Re. 0-06
sheep. per head

Grazing (Biridi ex-estate)

Buffalo .. Re. 0-4-0 or Re. 0-25

Cow or ox Re. 0-2-0 or Re. 0-12

Goat or Re. 0-1-0 or Re. 0-06
sheep.**BADAGAD EX-ESTATE**Reserved .. Nil
species.

Cesses .. Nil

Rights and .. Nil
Concessions

The fees prescribed in respect of forest produce in the rights and concessions of different areas have since been modified by the "Schedule of Rates for Forest Produce in Orissa (Amendment) Rules, 1978", framed under section 36 (d) of the Orissa Forest Act, 1972. The Orissa Forest Contract Rules which were framed in 1966 for making contracts for sale and purchase of forest produce etc., and for the protection of rights of private persons in Government forests continues to be in force. So far as Transit Rules are

concerned, they were framed under rules 35, 36, and 64 of the Madras Forest Act of 1940, which regulates matters concerning transit of timber in all the forest divisions of Ganjam district.

Podu or shifting cultivation is widely practised in the hilly areas of the district. A sizeable proportion of the population of Kandhas and Saoras in the Agency areas of the district depend on this method of raising crops for their livelihood. Podu cultivation was permitted in Chandragiri and Paralakhemundi Malias and in Thumba Mutha under certain conditions. In the ex-estates it was prohibited inside the reserve lands but was allowed in unreserved lands with the permission of the Collector. But nowadays no permission is taken and the evil of shifting cultivation continues unabated and unhindered in spite of several anti-poverty programmes like weaning the tribal people away to settled cultivation and encouraging them to grow fruit bearing trees like orange, etc., inside the hills launched under Integrated Rural Development Programme, Integrated Tribal Development Project, Economic Rehabilitation of Rural Poor, Micro Projects, etc., programmes with subsidies and inputs. The extent of forests affected by Podu cultivation is not exactly known as no survey has been taken up to ascertain this area.

In the raiyatwari areas, Sivajama Rules under the Board's Standing Orders (B. S. O.) gave preferential claims for settlement of land in favour of persons encroaching on forest lands which were not reserved forests until the Rules were amended in 1954 as has been pointed out in the Chapter XI, Revenue Administration.

Grazing by cattle and goats is detrimental to forest growth. The National Commission on Agriculture has strongly recommended for prohibition of grazing by goats in all forests. For grazing of cattle it has recommended that instead of unlimited and continuous grazing, it should be controlled and restricted, so that it does not interfere with productive and protective function of the forest. The resources of the forest areas should be utilised for feeding the essential livestock only.

FLORA AND FAUNA

Paralakhemundi Division

Vegetation—Sal is the main species in this division. The other species met with are Piasal, Asan, Dhaura, Sidha, Sisoo, Kusum, Jamu, Haldu, Gambhari, Arjun, Karla, Tangini, Bheru, Mohul, Amba, Tentuli, Harida, Bahada, Amala and Teak (Planted). Salia bamboo occurs mostly under northern tropical moist and dry deciduous forests of the division. Daba bamboo occurs along the banks of the rivers and nalas. A large number of medicinal plants are also available in the division. Elephants, leopards, Sambar,

deer, and bear are generally found in the forests of Chandragiri, R. Udayagiri, Mahendragad, Badagad and Sauntiapali ranges of the division.

Another interesting point worth mentioning of the district about flora is that Red Sander trees have been successfully planted in Labanyagad of Mahendra Range over an area of 31 acres in the year 1920 and it is being maintained as a preservation plot of this species which is special to Orissa. The Forest Department has also preserved and developed a sandalwood patch which has grown naturally at Seranga under Devagiri Range. In Chandragiri, coffee, cinnamon and blackpeper are being grown on experimental basis. Some scenic, religious and tourist spots in this division are —

- (1) Taptapani Hot water spring
- (2) Gandahati waterfall
- (3) Mahendragiri Parbat
- (4) Geranga waterfall
- (5) Lakhari valley elephant sanctuary

Ghumusar South Division

On the basis of classification adopted in the revised survey of forest types in India (1962), the forests of the division can be divided into the following types and sub-types:—

- (1) Moist Peninsular high level Sal
- (2) Moist Peninsular low level Sal
- (3) Moist mixed deciduous forest without Sal
- (4) Moist Sal savanah
- (5) Terminalia tomentosa forest
- (6) Dry bamboo brakes
- (7) Dry Sal bearing forest
- (8) Riparian fringing forest
- (9) Northern dry mixed deciduous forest

(10) Dry deciduous scrub

(11) Euphorbia scrub

(12) Dry bamboo brakes

(13) Dry tropical riverine forest

Ghumusar North Division

The working plan of the division describes the following flora of the division.

Achu (*Morinda Citrifolia*, *Morinda tinctoria*), Acula (*Antidesma Ghoosombilla*), Ambata (*Bauhinia recemosa*), Ambo (*Mangifera Indica*), Amla (*Emblca officinalis*), Ankulo (*Alangium Lemarckii*), Arjuno or Arjuna (*Terminalia arjuna*), Ashadua (*Capparis horrida*, *Capparis zeylanica*), Bahada (*Terminalia belerica*), Bailo (*Pterospermum acrifolium*), Barada (*Bauhinia purpurea*), Balli Baincho (*Flacourtia indica*), Kuruda (*Gardenia turgida*), Gūruda (*G. Gummifera*), Bandhano (*Ougeinia dalbergiades*), Bonia (*Hibiscus tiliaceus*), Belo (*Aegle marmalos*), Khar Khari (*Clerodendrum serratum*), Bhadalia (*Olax scandens*), Bhailia (*Semicarpus anacardium*), Bhuidimiri (*Ficus hispida*), Bhenta (*Limonia accidissima*), Bheru (*Chloroxylon swietenia*), Bichhuati (*Tragia involucrata*), Bodaka (*Hymenodictyon orixensis*), Baincha (*Flacourtia Cataphracta*), Banabilli (*Cipadessa fruticosa*), Bonamolli (*Jasminum arborescens*), Bonarago (*Gelohium lanecolatum*), Boro (*Ficus bengalensis*), Borokoti (*Zizyphus jujuba*), Buro (*Bombax malabericum*), Paldua (*Erythrina suberosa*), Chandano (*Santalum album*), Charo (*Buchanania latifolia*), Chona (*Setaria glauca*), gilo (*Coesalpinia sepiari*), Danturi (*Acacia pinnata*), Devakondudia (*Combretum ovalifolium*), Dhalasinga (*Gauthium didymum*), Dhamana (*Grevia tiliacfolia*), Dhau (*Anogeissus latifolia*), Dhobi (*Dalbergia paniculata*), Dimiri (*Ficus glomerata*), Denkari (*Mallotus ropandus*), Dudukarvain (*Wrightia tinctoria*, *wrightia tomentosa*), Dusarakendu (*Diospyros embryopteris*), Gojpippoli (*Scindaspus officinalis*), Gambhari (*Gmelina arborea*), Gondopoloso (*Miliusa tomentosa*), Gondhan (*Premna latifolia*), Goppumamum (*Cryptolepia buchaunai*), Gopagombari (*Gmelia asiatica*), Gotto (*Ziziphos xylocarpus*), Goufyedoin (*Gloriosa superba*), Guachipa (*Ehretia canavesis*), Guharia (*Acacia leucophloea*), Gulichi (*Plumeria acufifolia*), Katrang or Jhuntia (*Gardenia latifolia*), Haudiamohi (*Garuga pinnata*), Hanmiroho (*Glycosmis pentaphylla*), Hancirooho (*Toddalia aculeata*), Harital (*Capparisopiaria*), Hattianchuso (*Pisonia aculeata*), Hingolo (*Barringtonia cutangulata*), Holondo (*Adina Coordifolia*), Holondomohi

(*Garugapinnata*), Harida (*Terminalia chebula*), Jamo (*Eugenia Jambolona*), Jatti (*Eugenia bracteata*), Jhattiko (*Wccdfordia fruticosa*), Jhoko-jhoko (*Webera corymbosa*), Jiridi (*Caescaria tomentosa*), Jojangi (*Phyllanthus reticulatus*), Kaluchia (*Diospyroa sylvaticos*), Kamoco (*Derris scandns*), Kania (*Flueggia microcarpa*), Karuda (*Cleistanthus collinus*), Kattapandu (*Pavetta indica, pavetta, Tomentosa, Colastrus paniculotus*), Kattanarangi (*Atalantia monophylla*), Kstoparakhia (*Erycibe paniculata*), Kendu (*Diospysos melonoxylon*), Kherua (*Potro-kerwa Holarrhena antidysenterica*), Khirokali (*Mimusops hexandra*), Khaira (*Acacia catechu, Acacia sundra*), Khajuri (*Phoneix sylvestria*), Kilakerwa (*Ixora parviflora*), Kodalo (*steroulia urens*), Koia (*Tamarindus indica*), Koitha or Koito (*Feronia elephantum*), Kokundia (*Calycopteris floribunda*), Kolandrmuli (*Cuscuta reflexa*), Koniary (*Ochana suarrosa*), Kanicho (*Abrus precatorius*), Kontaikoli (*Zizyphus Oenoplia*), Konta Bamso (*Bambusa arundinaceæ*), Kopasia (*Kydia calycina*), Kora (*Strychnos nuxvomica*), Korandus (*Carissa carandas*), Koranjo (*Pongamia globra*), Korasano (*Ficus parasitica*), Kosi (*Bridelia retusa*), Kossa (*Diospyros chloroxlon*), Kossakoli (*Diospyros montana*), Kotokol (*Strychnos Potatorim*), Kotobhongonoi (*Vitis tomentosa*), Kujjipano (*Fheretia buxifolia*), Kulo (*Grewia pilosa*), Kukundia (*calycopteris floribunda*), Kumbhi (*Careya arborea*), Kuradia (*polyathea suberosa*), Kuradia (*Dichrostachya cinelea*), Kusumo (*Schleichera oleosa*), Limbo (*Melia audirachta*), Lankasidds (*Euphorbia nivulia*), Mahajolo (*Asparagus racemosus*), Mahalimbo (*Cedrela toona*), Mendu (*Tylophora esthmatica*), Mirsingapatra (*Murraya koenigii*), Mohi (*Lannea grandis*), Mohula (*Madhuca latifolia*), Malabhangonoi (*Vitis carnosia*), Morda, (*Argyreia speciosa*), Muktamanji (*Sapindus trifoltus*), Mundimundi (*Mitragyna parviflora*), Munika, (*Moringa terygosperma*), Hurimuri (*Helicteres isora*), Muthuri (*Smilix spp.*), Nairingi (*Citrus acerantium, Cirtus auranliumnobilis*), Niraso (*Memecylon edule*), Nobunisora (*Polyathia cersioides*), Nolasidds (*Sarcost Bravisligmao*), Nuniari (*Antidesma ghaesembilla*), Odibhongo (*Azimatatra cantha*), Orugana (*Cycas circinalis*), Palaso (*Batea monospeoma*), Palaso moi (*Butea superba*), Panijambo (*Homonía ribaria*), Pasi (*Anogeissus acuminata*), Pattuli (*Stereospermum susveolens*), Pendro (*Ardibia bumilis*), Pholancokryti (*Croten caudatus*), Piasal (*Pterocarpus marsupium*), Piribi (*Randia malaberica*), Pilchuli (*Dalbergia volubilis*), Pittapotala (*Trichosanthes cucumenina*), Poboso-konieri (*Cochlospevnum goseypium*), Phan phania (*Oroxylum indicum*), Potua (*Randia dumetorum*), Rai (*Dillenia pentagyna*), Rakhto-Chandan (*Piterocarpus santalinus*), Ronobilli (*Ciphadesa fruticose*), Saguani (*Tectona grandis*), Sahada (*Strablus asper*), Sahaja (*Terminalia tomentossa, Terminalia Alata*), Salia bamso (*Dendrocalamus striotus*), Sal or Salua (*Shorea robusta*), Shiali (*Bauhinia vahlii*), Shika (*Acacia concinna*), Sidha (*Lagotstroemia*

parviflora), Simanonkakhollo (*Jatropha glandulifera*), Sirisi (*Albizia lebbek*, *Albizzia Odoreatissima*), Sisua (*Delbergia latifolia*), Sitaphala, (*Annona squamosa*), Solopo (*Caryota urena*), Soma (Somi) (*Soymida fabrifuga*), Sarupotrimahi (*Bursera serrata*), Sukhalamadevi (*Heptaplerurum venuloasum*), Suginodi (*Hemidesmus indicae*), Sunaurogundi (*Mallotus philippinensis*), Sunnari (*Cassia fistula*), Sundi (*prema tomentosa*), Tangin (*xylia xylocarpa*), Tasliunia (*Allophylus cobbe*), Taqua (*Vitis latifolia*), Tuthuddi (*Ganthium parvifolium*), Uruko (Orkillo), Ustho (*Ficus religiosa*), Otruli (*pergularia daima*) and Virinchi (*canthium angustifolium*).

Forest Development

Forests play a vital and important role in the economy and ecology not only of this district but also of the entire country as a whole. Until recently there was no consciousness either on the part of the administration or on the part of the society that forests have an intrinsic right to land. 'Forest' as such was permitted on residual land not required for any other purpose. This led to large scale deforestation. The damages caused by such improvidence has been realised somewhat lately. This has led to the change in the Government policy from mere consolidation, protection and conservation to development which includes afforestation and plantation activities on a large scale not only by the Forest Department but also by other departments like Soil Conservation, Horticulture and state undertakings such as Orissa Forest Corporation, Orissa Plantation Development Corporation, etc. Plantation is no longer confined to reserved forests through territorial forest divisions, but is also extended to community and road-side lands and marginal lands which are not suitable for agricultural purposes through afforestation and social forestry divisions and Plantation and Forest Development Corporations. A special project with international Assistance (Swedish International Development Authority-SIDA) is operating in this district from the year 1985. In the year 1971, the Cyclone Distress Mitigation Committee, Orissa, recommended to the Government of India to raise coastal belt plantation along the entire coastal belt of the state to a width of about 1 km. from the high tide line to prevent sand dunes, cyclone and tidal water damaging agricultural fields and villages. According to the decision of Government of India, the coastal shelter belt scheme was taken up in this district along with the districts of Cuttack, Puri and Baleshwar. The National Commission on Agriculture had suggested remedial measures against destruction of forests to take up social forestry on a big scale to meet the needs of the society for small timber and firewood, etc. So far as Ganjam district is concerned, a social

Forestry Division was created from 16th July 1962 and plantation (SIDA assisted) raised from the year 1984-85 to 1989-90 (ending December 1989)* in reserved and unreserved forests and the expenditure incurred thereon by this division is given below:

Year	Area in hectares		Expenditure incurred (In lakhs of Rs.)
	Plantation	Rehabilitation	
(1)	(2)	(3)	(4)
1983-84	Preplanting work		1.175
1984-85	812	650	23.725
1985-86	1,010	340	35.38
1986-87	1,191	250	46.17
1987-88	1,484	250	91.17
1988-89	1,099	..	72.09
1989-90	953	..	46.64
			(Ending December 89)

Besides, the territorial divisions have also taken up afforestation/plantations in the reserved forests on a limited scale according to funds available to them from year to year. The plantation figures for the period from 1975-76 to 1990-91, in the three divisions are given below:

Name of the Organization	Area in hectares	Expenditure incurred in Rs.
Paralakhemundi Division ..	5,727.80	71,48,256
Ghumusar South Division ..	4,765	63,77,668
Ghumusar North Division ..	4,723	62,89,159
Total ..	15,215.80	1,98,15,083

*During the period from 1984-85 to 1990-91 the total area brought under plantation was 8,950.10 hectares and expenditure incurred was Rs. 3,73,90,308/-.

The afforestation / plantations done through S. I. D. A. Project and by Plantation Development Corporation and the Forest Development Corporation from 1985-86 to 1988-89 are given below:

Name of the Organisation	Period	Area in hectares	Expenditure incurred in Rs.
(1)	(2)	(3)	(4)
(a) Orissa Plantation Development Corporation Ltd.	From 1986-87 to 1990-91.	8,925	1,71,01,506
(b) Forest Development Corporation.	From 1978-79 to 1990-91.	7,984	3,68,32,000

Besides, the Orissa State Cashew Development Corporation (incorporated in 1979) has taken up new plantation of 11,418 ha. and rehabilitated old plantation over 13,622.57 ha., Soil Conservation Department and the Horticulture Department have also taken up plantation of trees as per details given below:

Name of the Organisation	Period	Area in hectares		Expenditure incurred (Rs. in lakhs)
		New Plantation	Rehabilitation	
(1)	(2)	(3)	(4)	(5)
(a) Orissa State Cashew Development Corporation.	1987-88	263	1424.85	3.80 + 4.57 (New (Rehabilitation). plantation). tion).
(b) Soil Conservation Department.	1986-87	1,666.00		27.18
	1987-88	735.00		15.25
	1988-89	172.00		5.89
(c) Horticulture Department.	1985-86	2,262.5		33.66
	1986-87	1,651.8		37.17
	1987-88	1,625.0		40.95
	1988-89	348.8		47.15

To motivate and give technical advice, assistance and inputs to farmers regarding plantation/afforestation, Forest Extension Officers have been appointed and posted under Block Development Officers (now F. E. Os. are working under S. I. D. A. projects) like the Agricultural Extension Officers. Funds for the afforestation/ plantations are provided by the Central and State Governments in the schematic budgets of the respective departments. Besides, additional funds for plantation work are also provided for the Integrated Tribal Development Projects, District Rural Development Agency and Micro Projects and other special schemes meant for weaker section of the society and for tribal people.

Forest Exploitation

Major sources of income from forest produce are timber, bamboo and firewood. A lot of firewood in shape of dry and wind-fallen trees, shrubs, branches of small trees and faggots are taken away by the poor villagers, either in exercise of their Nistar rights or for sale in the neighbouring towns and villages on payment of small fees as prescribed in the Schedule of Rate Rules. One can see rows of females carrying headloads of firewood or rows of cycles and bullockcarts carrying loads of small timber and firewood for sale in the neighbouring towns and villages surreptitiously or on payment of small fees at forest check-gates through the State Highways while passing from Brahmapur to Koraput or to Phulabani. Timber from the forests was being taken by the contractors mostly through auction sale and by the Orissa Forest Corporation on royalty basis. The system of auction sale of forest coupes to contractors proved ruinous to forest wealth. So timber coupes are being settled only with the Orissa Forest Corporation with effect from 1962 from which year timber exploitation has been gradually nationalised. Following the national guidelines issued by the Government of India, the State Government have also taken a decision to gradually phase out exploitation of timber from forests and in a year or so cutting of trees from forests will be completely prohibited. Forest contractors are no longer allowed to work out any forest coupe in the district. Bamboo coupes were leased out to some paper mills of the state, i.e., M/s Orient Paper Mills, Brajarajnagar and Straw Products Ltd., Rayagarha, on long term leases on royalty basis. But this has also since been nationalised under the Orissa Forest Product (Control of Trade) Act with effect from October 1988. Similarly right for collection of Sal seeds was being given to private contractors or co-operative societies on long term lease basis. But this has been discontinued as Sal seed trade was nationalised with effect from 1983 crop-year in the interest of revenue and for giving remunerative price to tribal people. Kendu leaf in this district is being collected by the Forest Department and its marketing, all over the state, is organised by the Forest Corporation.

Wildlife Protection

Poaching of wild animals in the forest was rampant. Killing of wildlife in the name of crop protection or sale of meat, trophy, tusk, hides and skins and organized Akhanda Shikar by the tribal people was rather frequent. In spite of various rules and protective measures this pernicious practice still continues in some places of Agency areas. Now the lowest point in wildlife population has been reached. Efforts have been made during the past decade to afford protection to the fauna and check wanton destruction of wildlife throughout the district. Issue of shooting licences has been prohibited and the State Wildlife Organization is taking steps to create more sanctuaries. The Territorial Forest Divisional Officers have been declared as Wildlife Warden to exercise statutory powers under the "Wildlife Protection Act, 1972". The entire Chilika lake has been declared as "closed" area under the Wildlife Protection Act and "Nalabana" which is in Ganjam district inside this lake as a sanctuary in the year 1973. Lakhari Valley of Chandragiri Range extending over the whole of Chandragiri reserved forest area along with Alara, Ramaguda and Dhobadhobani protected reserved forests covering an area of 185 sq. km. has been declared as an elephant sanctuary.

An interesting phenomena of Ghumusar South Division is in connection with the symbiotic relation of about 500 black-bucks, an endangered species, with the villagers in Balipadar-Bhetnoi zone. These blackbucks have completely adopted themselves in the villages and the villagers are tolerating the damages caused to their crops by the blackbucks with religious sentiment. At Taptapani a deer park has been established over an area of ten acres.

FAUNA

The outstretching deep woods of the district form the ideal abode for many big games and wildlives. The dense forests of Ghumusar forest divisions South and North are rich with wild lives while compared to the less deep forest of the Paralakhemundi forest division.

Mammals

A good number of elephants (*Elophas maximus indicus*) are found in the deep forests of Ghumusar South Division. Elephant population in the Paralakhemundi forest division is confined to the Chandragiri reserved forests. While moving in a group from one part of the forests to another at times they are very harmful to the nearby standing crops especially to the rice fields.

Tigers (*Panther-tigers*), panthers, black panthers and leopards are seen throughout the district, but chiefly in the hilly parts of Ghumusar and along the lines of the hills. The tiger population of the district was seven in Ghumusar South Forest Division as per the Census of 1984. The Census in 1979 revealed that there were four and two tigers in the Paralakhemundi Forest Division and Ghumusar North Forest Division, respectively. Sometimes these tigers turn to man-eaters. Generally, in the hills and about the foot are found the leopards (*Panthera pardus*). Leopards are very dangerous and cause grave concern specially to the lives of the domestic animals in their occasional visits to the local human habitats. Wolves are not uncommon.

It is worth the while to mention about the two kinds of wild dogs (*Cuon alpinus*) that are occasionally seen in the hills. These are Balia Kukura which hunt in pairs, and the Khogo which hunt in packs. The deer are much afraid of these wild dogs. Their very appearance or even their sound cause the deer desert that part of the forest. Even tigers are said to be afraid of them. It would be more likely that the tiger abandons the forest in search of his prey driven away by the dogs. It is mentioned in the Ganjam District Manual written by T. J. Maltby that one instance was known where a tiger was really killed by them.

The jackal (*Canis aureus*) and the fox (*Vulpes bengalensis*) are very often met in the shrub jungle near the villages throughout the district. Normally, they are not found in the deep forests. Jackals are seen in the bushy areas of the villages and towns. These are very dangerous for the game birds.

Jungle cat and fishing cat are noticed in good numbers in the whole of the district.

The black bear (*Melursus ursinus*) and wild bear (*Sua acrofa oristtus, wagner*) are noticed in small as well as big forests of the district. Cases of bear attack on human lives sometimes leading to fatality are nothing new.

Of the deer type, Sambar (*Carvus unicolor olgarBlainville*), muntjak) spotted deer (*Axis axis*) and barking deer (*Muntiacus*) are noticeable in the forests.

Nilgai (*Boselaphus tragocamelus*) once found in the slopes of the hills and antelope (*Tetracerus quadricornis*) in the plain are rarely seen nowadays.

Deer are found in large number in the Taptapani reserved forests, Chandragiri reserved forests and forests of Tumba Agency in Chikiti Tehasil. Bison (*Bibos Gaurus*) are also found in the forests of the district.

The blackbucks (*Antelope cervicapra*) abound in the forest areas of Kodala, Asika and Buguda.

The Sambar are seen in the thick forests and the spotted deer and the barking deer mostly inhabit in the forest border where they get crop plants.

Among other smaller mammals mention may be made of wild pigs, hares which are noticed in the small forests.

Mammal like mongoose are seen even in the bushy regions of villages and towns. The black-faced monkey (*Presbytes entellus*) and the red-faced monkey (*Macaca mulatta*) inhabit in the forest as well as in the rural and urban areas. There are also hyaena, fox, Malbar squirrel, rat and percupine and G. Guiter seen in different jungles.

Besides, there are varieties of other mammals in the district.

Birds

Birds of heterogenous type with their beautiful plumage are noticeable around the district. The game birds found in the forests include peafowl, peacock, red jungle fowl (*Gallus gallus*), red spurfowl (*Galloperdix spacicea*), partridges, black partridge (*Francolinus francolinus*), grey partridge (*Francoloinus pondicerianus*), quail (*Coturnix*). The hill Myna (*Gracula religiosa*) and the *bhianraj* famous for their talking and whistling powers are met within the hills.

A good variety of migratory and other birds add beauty to the Chilika lake. The plover snipe in fair profusion and wild fowl of all kinds, the flamingoes, pelican and aquatic birds of all types make good their resort to the Chilika lake and the Tampras.*

Among other birds common in the district are the striated weaver bird (*Ploceus manngar*), shikra (*Accipiter badius*), little egret (*Egretta grazetta*), roseringed parakeet (*Psittacula kramer*), common house swift (*Apus offinis*), common pariah kite (*Milvus migrains*), white-breasted water hen (*Amaurornis phoenicurus*), blacknecked stork (*Xenorhynchus asiaticus*), common

*The shallow depressions close to the coast and also further inland sometimes filled with fresh and sometimes with brackish water, are known as Tampras.

green pigeon (*Treron phoeni coptera*), golden oriole (*Oriolus oriolus*), racket-tailed drongo (*Dicrurus paradiseus*), Malbar pied horn-bill (*Antra coceros coronatus*), koel (*Eudyanays scolopacia*), house crow (*corvus splendens*), jungle crow (*corvus macrorhynchos*), coucal (*centropus sinensis*), brown headed stork billed kingfisher (*pelargopsis Capensis*), Panikua or the little cormirant (*Phalacrocorax-niger*), black or king vulture (*Torgos calvus*). Most of these birds are found near rivers and reservoirs.

Birds like owls and doves are found all over the district.

Reptiles

The Godhi or monitor lizard (*Varnus monitor*) is nearing extinction. Because of commercial importance of its skin people kill them. They are mostly found in the bushy areas of the villages of the district. The Pohala Enduas or Chameleons (*Chamaeleon Zeyalanicus*) are very common in the wooded areas. The Jhitpitis are met with in almost every house.

Snakes belonging to different species are found in the district. Poisonous snakes are not very few. Ahiraja or king cobra (*Naja hannah*) is one of the most poisonous snakes. It occurs both in hill tracts as well as in the plains. The two species of cobra known as the Nag or Gokhar (*Naja naja*) and the Tampa (*Naja Naja Kaouthia*) are also very poisonous. The Rana or branded krait is very poisonous and people hardly survive from its bite. The Kaudia Chiti or the common krait (*Bungarus caeruleus*) is of the former type. In addition to this a good number of other poisonous snakes are found in the district. Death due to snake bites is no less negligible.

Among the non-poisonous snakes of the district mention may be made of the Ajagar (*Phython molurus*), the Dhamana (*Ptyas mucosus*), Kandana (*Natrix stolata*), Dhanda (*Natrix piscator*), Domundi (*Eryx conicus*), the Telia Sape (*Typhlops brahminus*) etc. The Ajagars are normally seen in the forests and hills. At times they visit human settlements, and swallow domestic animals like sheep, goat, etc. Human life also is not safe where an Ajagar is met with.

Other reptiles like tortoise and crab occur in the sea and the Chilika lake.

The wild animals and the reptiles are of grave concern for the human lives. People die every year due to their attacks. In the seventies a total of 145 persons were reported to have been killed by them.

Death caused by different wild animals and reptiles from 1985 to 1989 in the district is furnished below:—

Year	Death due to snake bite	Death due to attack of wild animals				Total
		Elephant	Tiger/ Leopard and others	Bear and wolves	Other wild animals	
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1985 ..	5	2	..	5	1	13
1986 ..	2	3	2	5	2	14
1987 ..	5	1	2	8
1988 ..	14	6	..	5	..	25
1989 ..	11	4	..	1	..	16
Total ..	37	16	2	16	5	76

Fish

The sea and the Chilika lake abound in varieties of fish. Fish of the species of the pomfret (white and black), the Roba, the mullet and the turtles are caught in the nets at Gopalpur, Chhatrapur and in Chilika lake. The deep pools in the river beds, the tanks, and other reservoirs also carry in them fish of rich varieties big and small which give good taste.

The varieties of fish found in the district may broadly be categorised as fresh water fish, brackish water fish and marine fish according to their habitation. A list of fishes of each category with their local names are given below ;—

(a) Fresh water fish: *Labeo rohita* (Rohi), *Catla catla* (Bhakar), *Cirrhinus unjigala* (Mirkali), *Labeo calbasu* (Kalabansi), *Cyprinus carpio* (Bilati Rohi), *Labeo bata* (Pohala), *Anabas testudineus* (Khu), *Clarias batrachus* (Magur), *Channa striatus* (Seulo), *Notopterus chitala* (Chital), *Silonia silondia* (Jalanga), *Wallago attu* (Balua), *Machrobrachium rosen bengri* / *Machrobrachium unalcomsonni* (Chungudi), etc.

(b) Brackish water fish : *Mugil cephalus* (Khainga), *Mugil speigleri* (Mengia), *Lates calcarifer* (Bhekhti), *Sparus sarla* (Khuranti), *Arius coillatus* (Kantia), *Eleutheranama tetradactylum* (Sahala), *Hilsailisha* (Ilishi), *Kowala caval*, (Patua), *penacus monodon/penacus seumisulcatus* (Bagada), *penacus indicus* (Chapda), *Metapenaeus* spp. (Chungudi), *Tricanthus brevirostris* (Sukura) *Pangasius pangasius* (Jalanga), etc.

(c) Marine fish: *Hilsa ilisha* (Ilishi), *pampus chinensis* (Dhala chandi), *Parastromatus niger* (Kala chandi), *Lates calcarifer* (Bhekhti), *Megalops cyprinoides* (Paniakhia), *Elcutheronama tetradactylum* (Sahalo), *Johnius dussumieri* (Borei), *Anchoviella Indica* (Kokili), *Carcharhinus gangaticus* (Magara), *Harpodon neherius* (Bummalo), *Penacus monoon* (Bagda) *Penacus indicus* (Chapda), *Metapenaeus* sp. (Khopra), *Acetes indicus* (Chingudi), *Arius arius* (Kantia), etc.

CLIMATE

The climate of the district is pleasant and is characterised by an equable temperature all the year round particularly in the coastal regions and high humidity. The cold season from December to February, which is very pleasant, is followed by the hot season from March to May. During the rains, which last from June to November, it is stingy but the heat is tempered by the rains. The period from June to September is the south-west monsoon season, October and November constitute the post-monsoon transition period.

Rainfall

Records of rainfall in the district are made available for thirteen rain-gauge stations for periods ranging from 22 to 81 years. Appendices I and II of this chapter furnish the details of the rainfall at these stations and for the district as a whole. The average annual rainfall in the district figures at 1295.6 mm. The rainfall generally increases from the coast towards the interior hilly areas of the district. R. Udayagiri near the western border of the district records an annual rainfall of 1551.6 mm. while Gopalpur on the coast receives only 1148.6 mm. of rainfall a year. The south-west monsoon commences in the district by about the second week of June and withdraws early in October. About 66 per cent of the annual rainfall is received during the south-west monsoon season. There is heavy rainfall in the

July-August. The variation in the rainfall from year to year is not much. During the first half of this century the highest annual rainfall in the district (amounting to 147 per cent of the normal) occurred in 1919. The lowest annual rainfall was 68 per cent of the normal occurred in 1935. Taking into account the district as a whole there were only three years in which the rainfall was less than 80 per cent of the normal. Two consecutive years with the rainfall less than 80 per cent of the normal occurred at a few stations once in a period of fifty years. It is seen from Appendix II of this chapter that in 38 years out of 49 cases the rainfall was between 1000 and 1500 mm.

On an average there are 65 rainy days (i.e., days with rain of 2.5 mm. or more) a year in the district. This figure varies from 51 at Rambha to 84 at R. Udayagiri.

The heaviest rainfall in twenty-four hours that occurred at any station in the district was 317.0 mm. on the 10th October 1938 at Mohana. The rainfall figures given above are based on data available up to 1970. However, a comparative statement of rainfall (in mm.) of the district from 1985 to 1990 (November) is given in Appendix III. From the statement it is noticed that the annual rainfall for the year 1990 (up to 1st week of November) was 1875.3 mm. The rise in annual rainfall of this year was due to unprecedented rains in the district during 1st week of November.

Temperature

In the district there is only one meteorological observatory located at Gopalpur with records extending over a large number of years. On the basis of the records available from this observatory it is inferred that in the inland hilly tracts of the district temperature may be higher in the hot months and lower in winter by a few degrees. The period from March to May is one of continuous increase of temperature and June is the hottest month with the mean daily maximum temperature at 32.2°C and the mean daily minimum at 26.9°C. With the advent of monsoon by about the second week of June, day temperature decreases a little while night temperature continues to be as in summer. After the end of September, when the south-west monsoon withdraws, temperature decreases progressively, the drop in night temperature being more rapid. December is the coldest month with the mean daily minimum temperature at 16.6°C and mean daily maximum at 27.5°C.

The highest maximum temperature recorded at Gopalpur was 44.90°C on the 4th August 1972 and the lowest minimum temperature was 9.6°C on the 30th November 1970.

Humidity

Relative humidities are high about 75 per cent throughout the year specially in the coastal region while in the interior of the district these may be slightly lower, particularly in the afternoons in the non-monsoon months.

Cloudiness

In the cold season sky is clear or lightly clouded. Clouding is moderate in the summer months. Heavily clouded to overcast skies prevail during the south-west monsoon season. Thereafter cloudiness decreases.

Winds

Winds are fairly strong particularly in the coastal region in the summer and monsoon months. In the rest of the year they are generally moderate. In the post-monsoon and cold seasons winds blow from a northerly or north-westerly direction in the mornings. In the afternoons, winds are from directions between north-east and south-east in the months of October, November and December while changing to directions between east and south in January, and between east and south-west in February. In the summer and south-west monsoon months winds mainly blow from southerly or south-westerly directions.

Special Weather Phenomena

Depressions and cyclonic storms originating in the Bay of Bengal in the pre-monsoon, monsoon and post-monsoon months cross the east coast in the neighbourhood of the district, causing heavy rains and high winds in the district. Thunder-storms, sometimes violent, occur in the pre-monsoon months of April, May and June. During the monsoon period also, the rainfall is associated with thunder-storm. The thunder-storms are occasionally accompanied by squalls and hail stones.

Appendices IV, V and VI of this chapter give the temperature and humidity, mean wind speed and frequency of special weather phenomena respectively, for Gopalpur. The mean station level pressure of Gopalpur for different months is given in Appendix VII of this chapter.

APPENDIX I (Contd.)
Normals and Extremes of Rainfall

Station	No. of years of data	January	February	March
(1)	(2)	(3)	(4)	(5)
Mohana ..	20 a	10.4	17.5	20.1
	b	1.0	1.6	1.8
Asika ..	50 a	7.9	23.9	24.4
	b	0.8	1.7	1.8
Chhatrapur ..	50 a	11.7	23.6	11.9
	b	0.6	1.4	0.9
Brahmapur ..	50 a	9.9	27.9	13.2
	b	0.7	1.4	1.1
Kodala ..	19 a	20.6	17.3	20.3
	b	0.6	1.7	1.4
Purusottampur	49 a	8.9	18.3	14.2
	b	0.6	1.2	1.2
Sorada ..	50 a	15.0	29.5	30.0
	b	1.0	1.6	2.0
Rambha ..	47 a	8.9	21.1	10.2
	b	0.7	1.2	0.8
Gopalpur ..	50 a	8.6	28.2	15.5
	b	0.7	1.2	1.0
Paralakhemundi	50 a	6.9	18.0	26.2
	b	0.5	1.2	1.6
R. Udayagiri ..	49 a	8.6	22.3	36.8
	b	0.7	1.6	2.2
Gumma ..	50 a	7.9	16.8	23.9
	b	0.5	1.0	1.5
Bhanjanagar ..	50 a	15.5	24.4	30.7
	b	1.1	1.7	2.0
Ganjam District	a	10.8	22.2	21.3
	b	0.7	1.4	1.5

APPENDIX I (Contd.)

Normals and Extremes of Rainfall

Station	No. of years of data	April	May	June
(1)	(2)	(6)	(7)	(8)
Mohana	.. 20 a	72.9	101.3	185.2
	b	5.9	6.2	9.9
Asika	.. 50 a	52.3	88.4	174.7
	b	3.3	5.3	9.7
Chhatrapur	.. 50 a	21.1	55.4	146.6
	b	1.6	3.2	7.2
Brahmapur	.. 50 a	26.4	56.6	150.4
	b	2.0	3.6	8.2
Kodala	.. 19 a	29.5	57.4	135.1
	b	2.3	3.3	7.8
Purusottampur	49 a	24.6	54.1	157.7
	b	1.7	3.7	8.7
Sorada	.. 50 a	61.0	90.7	209.0
	b	4.4	6.2	10.1
Rambha	.. 47 a	24.4	56.1	182.7
	b	1.5	2.9	8.7
Gopalpur	.. 50 a	18.3	50.0	133.1
	b	1.6	2.8	7.4
Paralakhemundi	50 a	50.3	88.7	160.5
	b	3.2	4.8	8.0
R. Udayagiri	.. 49 a	73.3	128.5	224.0
	b	5.1	7.3	11.3
Gumma	.. 50 a	48.8	87.4	188.2
	b	3.2	4.7	7.8
Bhanjanagar	50 a	47.0	84.3	192.8
	b	3.6	5.6	10.7
Ganjam District	a	42.3	76.8	169.2
	b	3.0	4.6	8.7

APPENDIX I (Contd.)
Normals and Extremes of Rainfall

Station	No. of years of data	July	August	September
(1)	(2)	(9)	(10)	(11)
Mohana ..	20 a	196.6	215.9	234.9
	b	11.5	12.6	12.2
Asika ..	50 a	242.8	261.6	228.1
	b	13.2	13.6	12.6
Chhatrapur ..	50 a	180.9	194.1	202.2
	b	10.2	10.7	9.9
Brahmapur	50 a	195.1	210.3	225.3
	b	10.1	11.7	11.0
Kodala ..	19 a	248.2	279.1	235.7
	b	11.5	12.1	10.6
Purushottampur	49 a	220.7	216.4	230.4
	b	11.6	12.1	11.4
Sorada ..	50 a	267.2	281.2	263.1
	b	13.3	14.1	12.7
Rambha ..	47 a	206.3	209.3	202.7
	b	9.6	10.2	9.1
Gopalpur ..	50 a	174.0	190.3	195.3
	b	9.4	10.2	9.2
Paralakhemundi	50 a	202.9	237.0	245.9
	b	11.1	12.4	11.7
R. Udayagiri ..	49 a	284.0	296.9	241.8
	b	14.9	16.3	13.3
Gumma ..	50 a	142.6	285.2	233.7
	b	10.8	11.9	10.3
Bhanjanagar ..	50 a	219.2	273.3	246.1
	b	14.6	15.0	13.5
Ganjam District	a	221.6	242.4	229.6
	b	11.7	12.5	11.3

APPENDIX I (Contd.)

Normals and Extremes of Rainfall

Station	No. of years of data	October	November	December
(1)	(2)	(12)	(13)	(14)
Mohana ..	20 a	192.3	57.1	14.0
	b	8.4	3.0	0.8
Asika ..	50 a	173.5	75.9	12.2
	b	7.5	2.5	0.6
Chhatrapur ..	50 a	201.7	97.5	14.5
	b	7.2	2.6	0.6
Brahmapur ..	50 a	183.9	89.4	14.5
	b	7.0	2.4	0.6
Kodala ..	19 a	188.5	47.2	8.4
	b	6.6	1.9	0.6
Purushottampur	49 a	181.9	63.0	11.4
	b	6.9	2.0	0.6
Sorada ..	50 a	169.4	56.9	12.9
	b	7.3	2.3	0.5
Rambha ..	47 a	183.4	78.0	8.6
	b	6.0	1.7	0.5
Gopalpur ..	50 a	220.5	101.0	13.7
	b	7.0	2.7	0.6
Paralakhemundi	50 a	164.1	58.2	8.4
	b	6.8	2.1	0.4
R. Udayagiri ..	49 a	170.2	55.9	8.9
	b	7.8	2.6	0.7
Gumma ..	50 a	163.6	57.1	8.4
	b	6.8	2.2	0.5
Bhanjanagar ..	50 a	144.3	53.9	6.9
	b	7.1	2.3	0.5
Ganjam District	a	179.8	68.6	11.0
	b	7.1	2.3	0.6

APPENDIX I (Contd.)

Normals and Extremes of Rainfall

Station	No. of years of data	Annual	Highest annual rainfall as % of normal and year **	Lowest annual rainfall as % of normal and year
(1)	(2)	(15)	(16)	(17)
Mohato	20 a	1,318.2	137	60
	b	74.9	(1933)	(1935)
Asika	50 a	1,365.7	198	67
	b	72.6	(1933)	(1918)
Chhatrapur	50 a	1,161.2	166	61
	b	56.1	(1919)	(1911)
Brahmapur	50 a	1,202.9	177	59
	b	59.8	(1919)	(1911)
Kodala	19 a	1,287.3	147	73
	b	60.4	(1933)	(1935)
Purusottampur	49 a	1,201.6	156	63
	b	61.7	(1919)	(1935)
Sorada	50 a	1,485.9	211	61
	b	75.5	(1919)	(1935)
Rambha	47 a	1,151.7	140	46
	b	50.9	(1903)	(1911)
Gopalpur	50 a	1,148.6	178	57
	b	53.8	(1936)	(1920)
Paralakhemundi	50 a	1,267.1	143	55
	b	63.8	(1932)	(1935)
R. Udayagiri	49 a	1,551.6	164	67
	b	83.8	(1925)	(1939)
Gumma	50 a	1,363.6	155	50
	b	61.2	(1914)	(1930)
Bhanjanagar	50 a	1,338.4	169	54
	b	77.7	(1933)	(1918)
Ganjam District	a	1,295.6	147	68
	b	65.4	(1919)	(1935)

** Year given in brackets.

APPENDIX I (Concl'd.)

Normals and Extremes of Rainfall

Station	No. of years of data	Heaviest rainfall in 24 hours*	
		Amount (mm.)	Date
(1)	(2)	(18)	(19)
Mohana	20 a b	317·0	1938 Oct. 10
Asika	50 a b	276·9	1875 Sep. 17
Chhatrapur	50 a b	280·9	1899 Oct. 14
Brahmapur	50 a b	313·9	1895 Oct. 27
Kodala	19 a b	150·1	1948 Aug. 14
Purusottampur	49 a b	226·1	1873 Oct. 10
Sorada	50 a b	281·7	1889 Nov. 20
Rambha	47 a b	254·0	1873 Oct. 10
Gopalpur	50 a b	281·7	1923 Oct. 30
Paralakhemundi	50 a b	279·1	1923 Nov. 18
R. Udayagiri	49 a b	292·1	1911 Sep. 24
Gumma	50 a b	271·8	1909 Jul. 09
Bhanjanagar	50 a b	219·7	1913 Aug. 31

(a) Normal rainfall in mm., (b) Average number of rainy days (days with rain of 2·5 mm or more).

* Based on available data up to 1970.

APPENDIX II
Frequency of Annual Rainfall in the District
(Data 1901—1950)*

Range in mm.	No. of years	Range in mm.	No. of years
(1)	(2)	(3)	(4)
801—900	1	1401—1500	8
901—1000	2	1501—1600	4
1001—1100	4	1601—1700	1
1101—1200	9	1701—1800	2
1201—1300	9	1801—1900	0
1301—1400	8	1901—2000	1

* Data available for 49 years only.

APPENDIX III

Comparative Statement of Rainfall (In mm. of the district from 1985 to 1990)

Month	Normal Rainfall	1985	1986	1987
(1)	(2)	(3)	(4)	(5)
January ..	10.8	28.3	17.5	20.5
February ..	22.2	40.7	32.4	0.0
March ..	21.3	17.1	9.6	44.9
April ..	42.3	23.1	31.3	50.8
May ..	76.8	49.1	92.1	61.1
June ..	169.2	169.4	169.9	103.2
July ..	221.6	171.1	234.7	180.2
August ..	242.4	225.5	240.8	133.0
September ..	229.6	298.5	144.8	120.0
October ..	179.8	249.5	259.1	202.6
November ..	68.6	1.0	253.0	238.1
December ..	11.0	0.0	7.7	1.1
Annual ..	1,295.6	1,273.3	1,492.9	1,155.5

Month	1988	1989	1990 (Up to November 1st Week)
(1)	(6)	(7)	(8)
January ..	0.0	0.0	0.0
February ..	63.7	0.0	103.1
March ..	12.5	32.0	115.4
April ..	60.8	6.4	27.6
May ..	73.9	59.1	275.4
June ..	165.8	317.6	485.0
July ..	244.7	211.8	120.2
August ..	191.5	350.4	318.4
September ..	365.9	151.4	204.9
October ..	134.5	44.0	269.8
November ..	0.7	0.3	255.5
December ..	0.2	1.3	..
Annual ..	1,314.2	1,174.3	1,875.3

N. B.—In the year 1990 the rainfall figures are taken into account up to 1st week of November.

APPENDIX IV

Normals of Temperature and Relative Humidity

GOPALPUR

Month	Mean Daily Maximum Tempera- ture °C	Mean Daily Minimum Tempera- ture °C	Highest Maximum ever recorded**	
			°C	Date
(1)	(2)	(3)	(4)	(5)
January	27.4	16.9	32.8	1946 Jan. 29
February	28.9	19.4	36.7	1954 Feb. 13
March	30.6	22.6	40.0	1956 March. 29
April	31.1	25.1	38.9	1940 April, 02
May	32.1	26.8	43.3	1915 May. 18
June	32.2	26.9	44.0	1965 June. 12
July	30.8	26.1	39.4	1979 July, 04
August	31.1	26.1	44.9	1972 Aug. 04
September	31.6	25.8	36.7	1920 Sep. 29
October	31.1	23.9	36.3	1957 Oct, 11
November	29.3	19.5	34.4	1970 Nov. 02
December	27.5	16.6	32.2	1951 Dec. 12
Annual	30.3	23.0		

Month		Lowest Minimum ever recorded**		Relative Humidity	
		°C	Date	08:30	17:30*
(1)		(6)	(7)	(8)	(9)
January	..	10.0	1899 Jan. 10	74	70
February	..	11.7	1934 Feb. 09	72	74
March	..	15.6	1925 March. 05	73	79
April	..	18.5	1967 Apr. 25	79	85
May	..	19.3	1977 May. 06	81	86
June	..	21.0	1971 June. 20	80	84
July	..	20.6	1929 July. 16	82	87
August	..	18.6	1976 Aug. 27	81	85
September	..	20.6	1917 Sep. 08	81	83
October	..	16.7	1897 Oct. 30	80	77
November	..	9.6	1970 Nov. 30	74	65
December	..	10.0	1902 Dec. 29	73	65
Annual	..			77	78

*Hours I. S. T.

**Based on available data up to 1979.

APPENDIX V

Mean Wind Speed in Km./Hr.

GOPALPUR

Jan.	Feb.	Mar.	Apr.	May	June	July
9.5	12.8	7.6	22.5	25.4	17.2	17.3
Aug.	Sep.	Oct.	Nov.	Dec.	Annual	
14.5	12.0	10.5	10.4	9.8	15.0	

APPENDIX VI

Special Weather Phenomena

* Mean No. of days with	Jan.	Feb.	Mar.	Apr.	May
Thunder	0.3	0.6	2.0	4.0	5.0
Hail	0.0	0.0	0.0	0.1	0.1
Dust-storm	0.0	0.0	0.0	0.0	0.1
Squall	0.1	0.1	0.1	0.3	0.6
Fog	0.1	0.3	0.4	0.5	0.2

Mean No. of days with	June	July	Aug.	Sep.
Thunder	6.0	4.0	5.0	6.0
Hail	0.0	0.0	0.0	0.0
Dust-storm	0.0	0.0	0.0	0.0
Squall	0.7	0.1	0.1	0.2
Fog	0.0	0.0	0.0	0.0

Mean No. of days with	Oct.	Nov.	Dec.	Annual
Thunder	4.0	0.7	0.3	38.0
Hail	8.0	0.0	0.0	0.2
Dust-storm	0.0	0.0	0.0	0.1
Squall	0.4	0.1	0.0	3.0
Fog	0.1	0.3	0.1	2.0

*No. of days 2 and above are given in whole numbers.

APPENDIX VII
Station Level Pressure
GOPALPUR

Month		I. S. T. 08·30	I. S. T. 17·30
(1)		(2)	(3)
January	..	1015·0	1011·6
February	..	1012·6	1009·2
March	..	1010·1	1006·5
April	..	1007·2	1003·5
May	..	1002·7	999·3
June	..	999·1	996·3
July	..	999·0	996·4
August	..	1000·5	997·7
September	..	1003·6	1000·6
October	..	1009·0	1006·0
November	...	1012·7	1009·5
December	...	1015·0	1011·7
Mean	..	1007·2	1004·0