

CHAPTER IV

AGRICULTURE AND IRRIGATION

Boudh-Khondmals is primarily an agricultural district, agriculture accounting for 81.9 per cent of the total working force (1971 Census). This is not because agriculture is well developed in the district but due to the fact that opportunities of gainful employment outside agriculture are extremely limited. The district is in a high rainfall zone but several areas are chronically drought-prone due to the uneven distribution of rainfall and the hilly terrain. Boudh area is agriculturally prosperous to some extent due to irrigation facilities. Ordinarily, rainfall is adequate for a fairly good *kharif* crop and for light crops in the *rabi* season. But heavy rainfall in the earlier part of the rainy season and long spells of drought towards the end cause frequent failure of crops. The water holding capacity of the soil is very poor in the hilly tracts which is yet another factor for crop failure.

INTRODUC-
TION

Agricultural practices in the district are primitive and very backward, specially in Khondmals, Baligurha and G. Udayagiri *tahsils*. There is very little artificial irrigation. Manure is little used. Implements are of a crude type. The district presents mostly a picture of single crop agricultural economy. A second crop is hardly raised due to the absence of assured irrigation facilities.

The climate and topography in Baligurha, G. Udayagiri, and Khondmals Tahsils are suitable for horticulture. The district is noted for mango and jack-fruit which are mainly grown in Chakapad, Phulabani and Khajuripatha Community Development Block areas.

Land utilisation in the district is conditioned by its topographical features. In the plains of Boudh Tahsil, the land is fertile and suitable for intensive cultivation and the area is fairly well provided with small irrigation works, tanks and wells. The land under utilisation in Boudh Tahsil area is therefore comparatively more. The Khondmals, Baligurha and G. Udayagiri Tahsils, however, consist of a net work of hills and forest, interspersed here and there with small villages with patches of cultivated land around them. The area available for cultivation in these Tahsils is comparatively less.

LAND
UTILISATION

The statement below gives a picture of land utilisation in hectares in 1977-78. *

Total cropped area	..	2,62,000
Net area sown	..	2,11,000
Fallow	..	34,000
Forest	..	8,29,000
Other uncultivated land including groves and pastures	..	9,000
Culturable waste	..	5,000
Area not available for cultivation	..	16,000

Shifting
Cultivation

Shifting cultivation or 'Podu Chas' is widely practised by the local tribal farmers. Among various factors responsible for denudation of forest wealth in the district shifting cultivation has played no minor role. Shifting cultivation is mostly carried on in Khondmals, Baligurha and G. Udayagiri Tahsils. Under this harmful system, the vegetation on the hill tops and slopes are cut and burnt during the months from February to May. The felled materials are left on the field to dry out. These are later burnt and the ash is spread over the soil. On the approach of rains, the patch of land is ploughed if the slope is moderate or worked by manual labour if the slope is steeper. Various crops often in a mixed pattern are grown on the fields so prepared. Generally, rice, turmeric, minor millets, maize, tur, black-gram, castor, niger, mustard, etc., are grown on these lands. The fertility of the piece of virgin land so reclaimed lasts for about two or three years after which its cultivation is given up and the farmer shifts to a fresh patch and repeats the process. This is a wasteful method of cultivation which has caused acute soil erosion in the area and depleted valuable forest wealth which also affects environmental conditions. The hill tribes are being constantly pursued to take up settled cultivation in place of shifting cultivation. But it is difficult to change this habit of the tribals because of their deep-rooted traditions in this regard.

Soil Conser-
vation

The land everywhere is undulating, cultivated level land is scarcely found. So the tribal people who predominantly inhabit the district, practise shifting cultivation described earlier in the chapter. Due to this pernicious practice of agriculture not only the valuable forest wealth is destroyed, but the vegetative cover of land is disturbed and soil is exposed to the ill effects of heavy run off. Rain water rushes down with high speed from barren hill slopes carrying the fertile top soil and also causing rill and gully erosion. A net-work of gullies is formed breaking the cultivated land into pieces and making cultivation quite difficult. Being subjected to severe erosion, the water regime of the area gradually decreases and perennial streams get dried up. The district suffers from all these ill effects resulting from soil erosion.

* SOURCE—Director of Agriculture and Food Production, Orissa.

In order to combat this evil, the Soil Conservation Organisation started its activities in the district from 1959-60. Two water-shed management units were established, i.e. one around G. Udayagiri in the Kakalabeki catchment and the other around Baligurha in the Kodogo catchment. These areas were menacingly affected by shifting cultivation. Comprehensive soil conservation works were also taken up in small water-sheds covering the catchment areas of the tributaries of river Mahanadi. Steep hill slopes were covered by tree plantation, mild slopes terraced by stone walls, uplands contour-bunded, cultivated land field-bunded, gullies protected by check dams and erodable stream-banks stabilised by growing vegetation.

To prevent erosion and to maintain soil fertility, sloping cultivated lands of farmers covering 10,574.47 hectares in the eroded catchment of rivers Salki, Raul, Kodogo and Chauldhua have been contour-bunded and stone-terraced. Several measures, such as putting up of check dams, diversion bunds and periphery bunds have been taken up to control gully erosion in 210.44 hectares of land. Also 274 earthen and stone check-dams were constructed to prevent eating of gully into the cultivated land and arrest speedy run off of rain water, thereby increasing silt deposit in the gully bed. The medium lands suitable for paddy cultivation covering an area of 321.32 hectares have been field-bunded so as to retain rain water. Water impounding structures like farm pond in 65 selected sites have been constructed across the gullies to serve as reservoirs for future irrigation.

Large areas of culturable land are lying fallow on account of soil erosion and poor fertility. Till 1977-78, 3,299.41 hectares of such type of land were reclaimed around Belaghar in Baligurha subdivision and were made cultivable.

River-bank erosion is also a serious problem especially on the river Mahanadi. The erodable bank of this river at village Marzakud near Boudh has been stabilised by turfing it with soil-binding grass, and by creating fringe forests. The hillocks cleared by burning of forests are being covered under vegetation by plantation of mango, jack-fruit, cashew-nut, sisal and eucalyptus. Such plantations have been done in about 499.38 hectares of land with a view to get economic return also. The soil and the climate being favourable, coffee has been grown over 37.13 hectares. Experiments show that coffee can be successfully grown in the district on higher altitudes, especially on hill slopes. As an inducement for tribal cultivators to take to settled agriculture, orchards have been developed by growing pineapple, banana and guava. Sisal plantations cover 95.10 hectares. Over

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and above this, more than 809.37 hectares of eroded land suitable for sisal plantation have been selected to be worked upon in a gradual manner.

Through the Agricultural Refinance Corporation, land shaping and land development programme is being undertaken in the ayacut area of Salki Irrigation Project covering parts of Boudh and Harabhanga Community Development Blocks. Needy cultivators desirous of developing their lands with assured irrigation facilities are being given long term loans through Land Development Bank. Since 1970-71 to 1977-78, 410 farmers have been given Rs. 8.68 lakhs as loan and about 1084.56 hectares of land have been developed by the farmers under the technical guidance of the Soil Conservation Organisation.

A soil conservation demonstration centre was established at G. Udayagiri in 1960-61 on a barren land covering 29.16 hectares to demonstrate various measures of anti-erosion and suitable land use. The Divisional Soil Conservation Officer has his office at Phulabani. He is assisted by two Assistant Soil Conservation Officers stationed at Phulabani and G. Udayagiri.

Land
Reclamation

Waste land is being leased out every year to landless persons for cultivation. These people are also granted loan for this purpose under the Agriculturists Loan Act and other State-aids. Besides, the poor cultivators are being provided with loan from the Land Development Bank and Government subsidy for reclamation. This constitutes a part of the accepted policy of the Government to encourage people to cultivate waste lands for growing crops.

The position of distribution of Government waste land since 1974-75 is as follows:

Year of distribution	Extent of Land distributed (in hectares)	No. of persons benefited			
		Scheduled Tribes	Scheduled Castes	Others	Total
1974-75	11,369.40	12,660	4,377	2,266	19,303
1975-76	9,503.30	7,775	3,290	2,457	13,522
1976-77	3,607.76	4,693	1,629	1,020	7,342
1977-78	2,891.59	771	368	297	1,436
Total	25,369.04	25,899	9,664	6,040	41,603

Compared with some other districts of the State, Boudh-Khondmals is rather deficient in irrigation facilities. The district has a satisfactory rainfall, but it is frequently affected by droughts due to untimely rain and its uneven distribution. Canals are the only dependable sources of irrigation. Other sources of irrigation available in the district are tanks, wells, minor irrigation projects and lift irrigation from rivers.

Almost all the areas of the district are prone to frequent recurrence of drought condition which affect agriculture very badly. At present cultivation is largely confined to the Kharif season. Most of the irrigation currently available is used during the rainy season. Of the total net sown area of 2,11,000 hectares in 1977-78, only 31,000 hectares (14.69 per cent) were under irrigation. During the Kharif season 30,636 hectares of land were irrigated. Irrigation facility in Rabi season was negligible (3,880 hectares). Irrigation facilities are somewhat developed in Boudh subdivision, but such facilities are scanty in Khondmals and Baligurha subdivisions which are worst affected in the years of drought.

Irrigation facilities available in the district are discussed below.

The river Salki is one of the major tributaries of the river Mahanadi. It takes its origin in Baligurha subdivision and after traversing 130 km. in hilly area finally falls in the Mahanadi at about 16 km. west of Boudh.

Medium
Irrigation
Project
Salki
Irrigation
Project

The construction of a diversion weir across river Salki was started during 1958-59 and completed in the year 1966-67. It has two canals on both the sides which irrigate 16,000 hectares during Kharif season and 2,000 hectares during Rabi season in Boudh subdivision. Subsequently an extension programme was taken up in the right canal system to further irrigate 3,640 hectares during the Kharif season. The extension portion of the project has been completed during 1976-77 and the project is irrigating 19,870 hectares during Kharif season and 2,020 hectares during Rabi season.

The revised estimate of the project is Rs. 2.29 crores.

The Pila Salki Irrigation Project in Khondmals subdivision near village Burupada is under execution. This project was started in 1974-75 with an estimated cost of Rs. 167.8 lakhs. The designed irrigation potential of this project is 1,791 hectares in Kharif season and 1,056 hectares in Rabi season. The project is expected to be completed by 1980-81. After its completion 26 villages of Khajuriparha and 8 villages of Phulbani Community Development Blocks will be benefited.

Irrigation
Projects
under
execution

**Bandapipli
Irrigation
Project**

The Bandapipli Irrigation Project envisages construction of a dam across a tributary to Chauldhua Nala near village Bandapipli in Baligurha subdivision. It has been sanctioned under the Drought Prone Area Programme with an estimated cost of Rs. 1.49 crores. After the completion of the project it will provide irrigation to 1,500 hectares in Kharif season and 750 hectares in Rabi season.

**Bagh
Irrigation
Project**

The Bagh Irrigation Project envisages the construction of a masonry dam across the river Bagh near village Kanapa to utilise the potentiality of 1,098 sq. kms. at the dam site and to irrigate an area of 20,000 hectares during Kharif season and 9,200 hectares in Rabi season. Moreover, this project will feed the Salki river through its right main canal with an adequate water supply to the pick up weir of the Salki Irrigation Project to irrigate about 9,936 hectares of Salki ayacut during Rabi season. The estimated cost of the project is Rs. 12.91 crores.

**Gumedi
Irrigation
Project**

The main features of the project is the construction of a masonry dam across the river Gumedi at about 11 km. away from Baligurha to utilise the potentiality of 491 sq. km. at the dam site and to irrigate an area of 3,992 hectares in Kharif season and 1,743 hectares in Rabi season in the Baligurha subdivision.

The survey and investigation of the project has been completed. The anticipated cost of the project is about Rs. 2.70 crores.

**Irrigation
Projects
under investi-
gation**

The following irrigation projects are under investigation.

**Sambari
Irrigation
Projects**

It is proposed to construct a dam across the Daramanda Nala near village Sambari of Baligurha subdivision. The project will provide irrigation to 2,023 hectares during Kharif season and 910 hectares during Rabi season in Kotagarh Community Development Block which is a chronically drought affected area.

**Simanbarhi
Irrigation
Project**

It is proposed to construct a dam across the Sundiajajodi Nala 6 km. away from the village Simanbarhi of Baligurha subdivision. After completion, it will submerge an area of 244 hectares and will irrigate 1,230 hectares during Kharif season and 810 hectares during Rabi season.

**Lambaku-
mpa
Irrigation
Project**

It has been proposed to construct a dam across Salki river near village Lambakumpa. The project will provide irrigation for 2,832 hectares during Kharif season and 1,416 hectares during Rabi season.

**Kodogo
Irrigation
Project**

The Kodogo Project is a major irrigation project. There is proposal for a reservoir scheme which envisages construction of a dam across the Kodogo river near village Chaunribali of Baligurha subdivision. It

will provide irrigation to an area of 46,580 hectares during Kharif season and 23,290 hectares during Rabi season. The anticipated cost of the project is Rs. 17,284 crores.

The district at present has 42 completed minor irrigation projects which irrigate 6,371.80 hectares during Kharif and 1,034.78 hectares during Rabi season. Most of these projects provide seasonal irrigation. Construction of 11 more projects are now in progress which are proposed to irrigate about 5,665.62 hectares in Kharif season and 3,035.15 hectares in Rabi season.

Minor
Irrigation
Project

The entire district, excepting an area of about 20 sq. km. in Phiringia Community Development Block, comes under consolidated Archean formation. Narrow valley fills occurring between hills and high land can have open wells for irrigation purpose in this tract.

Lift
Irrigation

The district has been covered by the preliminary phase of geohydrological survey. It has been estimated that annual recharge received into the ground water reservoir is 1,29,000 hectare metres which can sustain 14,580 numbers of standard irrigation wells to create irrigation potential for 29,160 hectares.

At present 25 river lift irrigation projects have been started in the district which irrigate 730 hectares in Kharif and 440 hectares in Rabi season. There is moderate scope for the installation of more Kharif oriented river lift projects in the district.

The district has a large number of tanks of varying sizes which are used for irrigation. Wells irrigate only small plots of land and their water level goes down in the Rabi season and in summer. Tanks are utilised for irrigation mostly in Boudh and Khondmals Tahsils while irrigation from wells are prevalent mostly in G. Udayagiri Tahsil.

Tanks and
Wells

The district has mostly red soil which is generally deficient in nitrogen, humus and lime. The soil in Khondmals, Baligurha and G. Udayagiri Tahsils is of sandy loam and of red laterite type which is poor in organic contents. The Boudh Tahsil has got black soil and has rich deposits of alluvial soil and the best arable lands are found in its riverine plains.

SOIL

The red soil favours growth of maize, jowar, *bajra*, ragi, turmeric, *arhar*, niger, groundnut, early paddy and fruits like guava, mango, papaya, lemon and pine-apple.

In lateritic soils, jowar, maize, paddy, niger and fruit plants like mango, jack-fruit, guava, pine-apple, papaya and sapeta are grown.

Alluvial soil suits the cultivation of paddy, maize, groundnut, *til*, castor, *arhar*, *mung*, *biri*, gram, wheat, jowar, cotton, sugarcane, vegetables, and fruit plants like guava, orange, lemon, mango, litchi, sapeta and banana.

Black soil is congenial to the growth of cotton, castor, *til*, mustard, groundnut, paddy, wheat, maize, sugarcane, corriander and pulses. Fruit trees, such as, orange, palm, guava and pomegranate are also suitable to this soil.

Land
Classification

The land in the district is highly uneven and undulating comprising hill slopes, plateaus, valleys and plains with varying slopes. The agricultural land of the district has been classified into four broad divisions depending on the gradients of the land (i) Att, (ii) Mal, (iii) Berna and (iv) Bahal. Berna and Bahal are low-lying lands which are mostly used for paddy cultivation. Mal (locally called Majhikhandia) is medium land and Att (locally called Dhepaketa or Dhipa) is high land. Att and Mal are suitable for light crops like pulses, millets, oil-seeds and root crops. In the hilly areas of Khondmals, Baligurha and G. Udayagiri Tahsils, the high lands lying on the hill tops or on the slopes of the hills are known as 'Dongar' and are used for cultivation of dry crops like turmeric, oil-seeds (niger, castor, mustard, gingelly, etc.) and minor millets like maize, *barra*, ragi, etc. The low-lying land in the valley between two hill ranges are called 'Jhola' where water is available for wet crops like paddy. Jhola lands are the best cultivable lands in these areas.

Crops

The principal crops grown in the district are paddy, ragi, maize, wheat, minor millets (jowar, bazra, kudo, gurji, etc.) and pulses like arhar, Mung and blackgram. Among the commercial crops, turmeric, potato, tobacco, fruits and vegetables are important. Turmeric is the chief commercial crop; the district is noted for turmeric cultivation in the State. The Khonds of Khondmals, Baligurha and G. Udayagiri tahsils widely cultivate turmeric which is their hereditary crop. The district is also noted for some oil-seeds like niger, mustard, ginjelly, groundnut and castor. Boudh tahsil is the chief rice-growing area of the district where soil is fertile and irrigation facilities are available. The plains of Boudh tahsil area is agriculturally most prosperous and is considered as the principal granary of the district. While rice, potato, sugarcane, tobacco, groundnut and vegetables are mostly grown in Boudh tahsil area; ragi, millets, oil-seeds and turmeric are extensively grown in the other three tahsils.

Out of the gross cropped area of 262,000 hectares in 1977-78, food-grains covered the largest proportion at 68.16 per cent (178,592 hectares). Paddy is the principal crop which alone accounted for 32.81 per cent (85,960 hectares) of the gross cropped area. Next to paddy, maize was also widely cultivated which covered 5.35 per cent (14,014 hectares). Besides paddy and maize, other cereals and millets accounted for 12.16 per cent (31,864 hectares) of the gross cropped area, whereas pulses which were grown rather extensively accounted for 17.85 per cent (46,754

hectares). Turmeric which is the main commercial crop of the district accounted for 5.26 per cent (13,783 hectares) of the gross cropped area in 1977-78. Oil-seeds which are also important commercial crops in the district covered 16.07 per cent (42,112 hectares) of the gross cropped area. Other commercial crops like sugarcane, tobacco, mesta, vegetables, chilli, fruits, etc. are grown to a limited extent and the area under each of these crops is below one per cent of the gross cropped area. Major part of the arable land is single cropped, excepting some areas where irrigation is available. The area under different crops and their yield rates are given in Appendix I.

L.S.S.O.'Malley has stated the following in his Angul District Gazetteer, (1908) which relates to cultivation in Khondmals subdivision in the beginning of the present century--"The Khonds grow but little rice except on the slopes of the hills, the majority of the good embanked rice lands being in the hands of Oriyas. They cultivate maize, millets, and oil-seeds; but the crop which they chiefly affect is turmeric, generally grown on the hill slopes in sandy soils. It takes two years to come to maturity, but it suits the disposition of the Khonds, as it requires little labour. The growth of this crop is almost a religious rite with these wild people and it was to improve its colour and outturn that human sacrifices* used to be performed. It is their chief source of income, as they export it in large quantities, bartering it for grain and salt to drivers of pack-bullocks, who come from Ganjam, Sambalpur, Cuttack, Puri and the Tributary States. Of late, however, they themselves have begun to take turmeric to other places for sale and thereby obtain fair money prices".**

Rice is the most important crop and is extensively grown in the district. During 1977-78 it covered an area of 85,960 hectares and 82,320 tonnes of rice was produced. The average yield being 10.38 quintals (in terms of cleaned rice) per hectare.

Rice

There are three regular rice crops, namely, Autumn, Winter and Summer. Generally the monsoon sets in during the last part of May or the early part of June. Before the onset of monsoon the cultivators prepare their high land (Dhipa) to grow the Autumn rice which is also a short duration variety. Mostly they broadcast the local varieties of paddy like Punia in the month of June and the crop is harvested in September. During the last five years special care have been taken for improvement of agriculture and the farmers of the district are being persuaded to grow short duration high-yielding varieties of rice like CRM-13, Annapurna, Pusa, Kaling, Kaberi, etc., in the high lands.

* During the past 75 years many changes have taken place. No human sacrifice is reported at present. Considerable progress has been made both in the mode of cultivation and in the marketing of agricultural products.

** L.S.S.O.'Malley-Bengal District Gazetteers, Angul, 1908, p. 96

The cultivators are also encouraged to grow drought resistant varieties of millets like ragi, jowar and maize in the high lands in place of Autumn rice.

The Winter rice is grown on medium low lands. In June-July the cultivators make their field ready for transplanting and broadcasting of the favourable local varieties like Jhalka, Gurumi, Chinamali, Nadiasuta, Sunakhadi, etc. The rice crop is harvested in November and December. During recent years the local varieties are being gradually replaced by high yielding varieties like Jagannath, Padma, Jaya, Hema, Rajeswari, Bijaya, Ratna, etc.

The cultivators of Boudh-Khondmals grow summer rice as a second crop near perennial streams and in the ayacut areas of irrigation projects. The irrigation potentiality is also very poor, which is about 12 per cent of the total cultivated area of the district. Mostly the high-yielding varieties are cultivated. The seedlings are transplanted in January and the crop is harvested in April and May.

Although high-yielding varieties of improved paddy have been introduced in the district, its scope is now limited due to lack of assured irrigation facilities. It has not yet been popular with the tribal farmers who cultivate only traditional crops of local varieties. During 1977-78 high-yielding varieties were grown in only 13,307 hectares in Kharif season and in 920 hectares as summer rice.

Wheat

Wheat is grown as a second crop during the Rabi season. Its cultivation is confined to the areas having irrigation facilities specially in the Community Development Blocks of Boudh, Harabhanga and Kantamal which are irrigated by the Salki Irrigation Project and some Lift Irrigation points. Wheat is also grown in G. Udayagiri, Raikia and Tumudibandha areas where there is facility for irrigation from irrigation projects and perennial streams. During the last five years high yielding varieties of wheat like Janak, Sonalika, etc., have been introduced in the district. Introduction of the improved varieties have completely replaced the common varieties cultivated earlier. In 1977-78, wheat cultivation covered an area of 1,848 hectares, the production was 2,772 tonnes and the yield was 15 quintals per hectare.

Maize

Maize is a very important crop of the district. Most of the high lands of the district are covered by millets, out of which maize occupies 14,014 hectares (1977-78). The introduction of composite maize varieties, viz., Vikram, Vijaya, Jowahar, Protina, etc., have helped the cultivators in getting a higher yield by using their own seed stock. But still the local varieties are extensively cultivated in the district. During 1977-78 an area of 2,573 hectares was put under hybrid maize, whereas the common local varieties were cultivated in 11,441 hectares. Maize is mainly grown as a

Kharif crop. Its cultivation in Rabi season is very much limited. The total production of maize during 1977-78 was 8,293 tonnes and the yield was 5.92 quintals per hectare.

Ragi is cultivated fairly extensively in the district. It is mainly grown during the Kharif season and the area covered in the Rabi season is negligible. During 1977-78 an area of 12,865 hectares was put under this crop. The total production was 9,846 tonnes with an yield rate of 7.65 quintals per hectare.

Jowar was grown in an area of 1,463 hectares in 1977-78, the production was 774 tonnes and the yield rate was 5.29 quintals per hectare. High-yielding varieties of Jowar have been introduced in the district which covered 144 hectares during 1977-78.

Pulses like *biri* (black gram), *mung* (green gram), *arhar*, cow pea, etc., were extensively cultivated throughout the district in the Kharif season. During recent years measures are being taken by the Agriculture Department for pulse cultivation twice or thrice in a year. The medium and low lands which remained fallow after the harvesting of paddy are now grown with various pulses. The cultivators are being encouraged to grow the short duration and high-yielding variety Pusa-Baisakhi *mung* and T. 9 *biri* thrice in a year. Every year a large area is covered with *kulthi* in fallow lands during Kharif season and also as a 2nd crop after the harvest of oil-seeds and millets. Pusa-Baisakhi *mung* is being grown in summer as the 3rd crop where there is irrigation facility. The improved strains are gradually replacing the local varieties. The modern methods of cultivation are being conducted in the fields of the farmers for demonstration. *Mung*, *biri*, *kulthi*, field pea, gram, etc. were cultivated as 2nd crop in an area of about 27,070 hectares in 1977-78. The total area under pulses was 46,754 hectares in 1977-78. Production was to the tune of 18,692 tonnes with an yield rate of 4 quintals per hectare. Among the pulses *kulthi* is the most important crop which covered 16,844 hectares followed by *mung* covering 8,494 hectares and *biri* covering 6,458 hectares in 1977-78.

The district is noted for some oil-seeds like niger, mustard, gingelly, groundnut and castor. The oil-seeds are extensively cultivated during the Kharif season. During Rabi season the cultivators grow mustard, niger, sunflower, safflower, gingelly, castor, etc., either as a single crop or as a 2nd crop. Niger and mustard are cultivated as single crop during the middle of August or in early part of September when there is scope for receiving rainfall. Usually these lands are left fallow during the Kharif season. In some cases these oil-seeds are also grown as a 2nd crop in rice fields and other high lands after the harvest of paddy and millets. The farmers are being advised to take up these cash

crops in irrigated pockets by adopting the modern and scientific methods. The improved and high-yielding varieties of oil-seeds like Ak-12-24 groundnut, M-27 and TJSEL-14 mustard, NPH-1 castor, etc., are gradually becoming popular among the farmers of the district. To popularise the improved seeds demonstrations are being conducted every year during Kharif season and Rabi season in the farmers' fields. During 1977-78, oil-seeds covered an area of 42,112 hectares. The production figure was 13,169 tonnes with an yield rate of 3.13 quintals per hectare.

Sugarcane

Sugarcane is an important cash crop of the district. Its cultivation is more conspicuous in Boudh subdivision due to the availability of irrigation facility. This crop is grown in compact patches in Boudh subdivision whereas it is scattered in other two subdivisions. Its cultivation is gradually increasing in the Boudh area due to easy transport facility of sugarcane to the Bargarh Sugar Factory. Improved varieties of sugarcane like Co-997, Co-62172, etc., have been popularly introduced among the cultivators for more yield. During 1977-78, sugarcane fields covered an area of 900 hectares and 36,000 tonnes of *gur* was produced.

Vegetables

The main vegetables cultivated in the district are sweet potato, onion, cole crops, tomato, pumpkin, ridge gourd, bottle gourd, bean, etc. Generally vegetables are grown in lands lying close to the habitation and with easy irrigation facility. The climate of this district is congenial to the growth of cole crops and other vegetables. During 1977-78 sweet potato was cultivated in 1,823 hectares and onion in 810 hectares. The total area under vegetable cultivation was 14,324 hectares.

Condiments and spices

Chilli, corriander, garlic, ginger and turmeric are cultivated in the district. Next to paddy which is cultivated mostly in the plains, turmeric is widely cultivated in the hilly tracts of Raikia, Baligurha and G. Udayagiri, which are the main turmeric growing areas. During 1977-78 turmeric cultivation covered an area of 13,783 hectares and 6,891 tonnes were produced. Ginger was cultivated in 803 hectares and the production was to the tune of 401 tonnes. Chilli cultivation was done in 1,154 hectares and 635 tonnes were produced.

Fruits

The climate and topography of Baligurha, G. Udayagiri and Khondmals Tahsils are suitable for horticulture. These areas grow mostly mango, jack-fruit and banana. Other fruits grown in the district are papaya, citrus fruits, pine-apple, cashew-nuts, etc., the area under each being nominal. Jack-fruit and mango are extensively found throughout the district. Chakapad, Phulabani and Khajuriparha Community Development Blocks are noted for these fruits.

The tribals of this district are quite familiar with fruits like mango, jack-fruit, guava, jujube, banana and what is needed is to improve its quality and extend its area so that horticulture can substantially supplement grain farming which is often susceptible to drought.

The Agriculture Department maintains four transport nurseries in the Departmental farms at Boudh, Phulabani, G. Udayagiri and Kotagarh. Grafts and seedlings of various fruit bearing trees, are being raised in these nurseries for sale and distribution to the farmers of the district. In 1977-78 about 100 hectares were planted with mango, 10,000 lemon seedlings were raised for distribution to the farmers. Besides, sufficient number of papaya seedlings were raised for backyard plantation by the tribal and other poor farmers of the district.

Tobacco is grown throughout the district during the Rabi season where there is facility for irrigation. Generally this crop is cultivated near wells and streams in small pockets. Local varieties are usually cultivated for internal consumption. In 1977-78, it was grown in 872 hectares and 349 tonnes of tobacco was produced.

Tobacco

Generally the cultivators of the district grow mesta in high lands under rainfed conditions. Attempts are being made to introduce improved varieties of mesta and Jute for cultivation in compact patches by replacing the local varieties. In 1977-78, 907 hectares of land was under mesta cultivation and 3,463 bales were produced.

Fibre crops

Cotton has been introduced in this district for last 4 years. Its cultivation is concentrated in Harabhanga, Boudh and Kantamal Community Development Block areas. Bikanery Norma, which is a dry land cotton, was introduced in the district in 1978. About 120 quintals of improved cotton seeds have been supplied to the cultivators. In 1977-78, cotton covered 680 hectares and 750 bales were produced.

The soil of the district is considered very suitable for growing tapioca. With the low cost technology, it pays much profit in comparison to other crops. So to educate the farmers about the method of cultivation of tapioca, 64 demonstrations have been conducted in Baligurha subdivision.

Tapioca

Agricultural practices in the district are primitive and very backward, specially in Khondmals, Baligurha and G. Udayagiri Tahsils. There is practically no provision for artificial irrigation. Manure is scarcely used. Implements are of crude type. Crops are often raised in a mixed pattern. Cultivation is somewhat progressive in Boudh Tahsil whereas it is carried on in the sketchiest manner in the other four Tahsils, the

Improvement of Agriculture

1 bale=180 kg.

most typical form being the 'shifting cultivation' locally known as *podu chas* (discussed earlier in this chapter). Most of the farming communities of this district are small and marginal farmers. Their socio-economic condition being very poor they need ample assistance to follow improved agricultural practices. Generally the yield rates of different crops in the district are low due to poor soil conditions, lack of assured irrigation and ignorance of the majority of the cultivators to switch over to scientific method of farming. Yield rates also vary widely within the district depending on the above factors. The plains of Boudh subdivision give higher yield than the hilly areas. But the most important factor adversely affecting the yield rates is the small extent of irrigation facility available in the district which restricts the introduction and efficacy of improved agricultural inputs like high yielding seeds and fertilisers.

Use of tractors and pumps are increasing. Other plant protection implements like sprayers and dusters are being used by the farmers for applying insecticides. The traditional wooden plough has been replaced by iron plough in many places. Improved agricultural implements like mould board plough, seed drill, garden rake, trench hoe, sprayers, etc., are being supplied at subsidised rates to the poor farmers of the district. Demonstrations in the cultivator's fields are being conducted by the Agriculture Department to convince them about the modern farming methods. The local farmers are accustomed to growing long duration paddy varieties for good harvest under favourable weather conditions. But due to uncertainty of monsoon they sustain heavy loss to the extent of total crop failure. So it has become necessary to introduce and popularise short duration, drought resistant and high yielding varieties of different crops. With the success of crop demonstrations the farmers are gradually giving up the primitive method of cultivation and taking two crops with residual moisture in rainfed areas and three crops in irrigated areas. Farmers training camps are also being organised to acquaint them with all the aspects of scientific agriculture.

In order to help the cultivators to take to improved agricultural practices, cash loans under the Agriculturists' Loans Act and Land Improvement Loan Act are regularly given to deserving tenants. There are 24 large sized Agricultural Multipurpose Co-operative Societies and 40 Service Co-operative Societies in the district to cater to the agricultural credit needs of the agriculturists in the area who are mostly tribal and Scheduled Castes people. There are 119,295 agricultural families in the district of which, so far, 80,547 families (68 per cent) have been enrolled as members of the co-operatives. Out of the total members enrolled, the number of small and marginal farmers comes to 63,518 and the rest 17,029 are big farmers. About Rs. 50 lakhs

were made available to the agriculturists for agricultural operations during 1977-78 by the Central Co-operative Bank and the Land Development Bank.

Government have implemented special projects like Drought-Prone Area Programme, Integrated Tribal Development Programme, Tribal Development Agency, Kutia Khond Development Agency and Integrated Rural Development Scheme to help the small and marginal farmers in the district to move away from their subsistence farming and achieve a better socio-economic standard. The aims and achievements of these projects in the district are briefly discussed below.

The D. P. A. P. (Drought-Prone Area Programme Agency) project covers the entire district excepting the Boudh Block. The expenditure on various sectors pertaining to agriculture, soil conservation, animal husbandry, pisciculture and forest is indicated below.

D. P. A. P.
Agency

Name of the Programme	Expenditure incurred (in lakhs) (up to July, 1978)
Minor Irrigation	Rs. 219.67
Lift Irrigation	Rs. 34.68
Agriculture	Rs. 32.51
Soil Conservation	Rs. 18.60
Animal Husbandry	Rs. 16.50
Pisciculture	Rs. 3.51
Afforestation	Rs. 37.68

Besides implementation of minor irrigation projects, lift irrigation projects and dug wells, the agency has given subsidy to 564 small and marginal farmers for successful completion of dug wells. Under agriculture, crop demonstrations are being taken up to educate the farmers about improved technology. They are also supplied with agricultural implements at subsidised rates. This being a dry area, horticulture is being encouraged on high lands. In-situ plantation over 604 hectares has been done so far. Vegetable development and backyard plantations are encouraged by sanctioning subsidy for these programmes. Land development and land reclamation works are being taken up on farmers' land. The small and marginal farmers are also sanctioned subsidy. In addition, gully control, nullah bunding, etc. are being taken up and in Podu devastated areas, coffee, cashew-nut and sisal plantation are also being made. Rehabilitation of degraded forests as well as new plantations of economic species are being taken up in addition to pasture development, avenue plantation and social forestry. For improvement of domestic animals and poultry, the small and marginal farmers are supplied with diary, poultry, pig, goat and sheep units on subsidy basis.

to raise their level of income. Besides artificial insemination and bull centres for natural service, fodder farms have been established and the farmers are also encouraged to grow fodder on their own land.

I. T. D. P.,
Phulabani

The Phulabani I. T. D. P. (Integrated Tribal Development Project, Phulabani) started functioning from the year 1975-76 and the area of its operation covers the entire Khondmals subdivision excluding the Phulabani N. A. C. area. The main objective of the scheme is to improve the socio-economic conditions of the Adibasis and Harijans and to attract the small, and marginal farmers to take up modern type of agriculture and farming by way of supplying them modern agricultural implements, bullocks and improved seeds and fertilisers. Goats are also given to them at subsidised rates. Subsidy is also sanctioned for land reclamation and land development work.

The total outlay for the project under special central assistance under different sectors is Rs. 97.48 lakhs.

Tribal
Development
Agency,
Baligurha

Almost all similar development works discussed earlier have been taken up by the Tribal Development Agency, Baligurha. It started functioning from July, 1974. The total outlay for 5 years i. e. from 1974-75 to 1978-79 was Rs. 150.00 lakhs. A sum of Rs. 89.56 lakhs was spent by the end of June 1978. The expenditure under different programmes concerning agriculture and irrigation are given below—

Name of Programme	Expenditure
Land Development	Rs. 10,73,104
Agriculture	Rs. 11,74,759
Horticulture	Rs. 1,21,334
Minor Irrigation	Rs. 15,02,874
Animal Husbandry	Rs. 3,30,398
Forestry	Rs. 3,35,000

I. T. D. P.,
G. Udaya-
giri

The I. T. D. P. was started in 1976-77 and the area of its operation covers 4 Community Development Blocks of G. Udayagiri, Raikia, Tikabali and Chakapad. In the project area there is only one tribal community i. e., Khond. Among the Scheduled Castes, Panas constitute the majority of the total population. The I. T. D. P. programme constitutes both individual assistance scheme and development of infrastructure. The individual assistance programme are designed to assist the tribal and the Harijan, and the small and marginal farmers in increasing their productive capacity and improving their economic condition. The form of assistance is partly subsidy and partly loan.

The financial outlay for the project period is furnished in the statement below—

Name of the Scheme	Outlay (Rs. in lakhs)
Soil Conservation	40·39
Agriculture	73·13
Animal Husbandry	13·75
Horticulture	25·59
Irrigation	120·34
Lift Irrigation	18·41
Fisheries	0·44
Forestry	15·40
Co-operation	32·68
Industry	8·18
Communication	26·67
Rural Water-Supply	18·02
Education	36·65

The Kutia Khond Development Agency was constituted in 1978 for the development of the Kutia Khond, a primitive tribe living in Belaghar area of Tumudibandha Block, to implement agricultural development programmes in that area. A sum of Rs. 1,60,000 was sanctioned for expenditure during 1978-79.

Kutia Khond
Development
Agency

Eight Blocks of this district, namely, Harabhanga, Khajuriparha, Phulabani, Tikabali, Chakapad, G. Udayagiri, Tumudibandha and Kothagarh have been selected to be covered under this scheme. It envisages taking up of various programmes like crop demonstration, dug wells, animal husbandry, soil conservation, pisciculture, social forestry, etc., as in the case of D. P. A. P., T. D. A., and I. T. D. Ps., but will not include schemes like minor irrigation, other items of infrastructural development like seed farms, godowns, regulated markets, afforestation, fodder cultivation, etc. An allocation of Rs. 16 lakhs at the rate of Rs. 2 lakhs per Block was received under this scheme for expenditure during the year 1978-79.

Integrated
Rural
Development
Scheme

Agricultural shows and exhibitions are being conducted every year in different places of the district and prizes are awarded to the winners. Crop competitions in paddy, potato, wheat, cotton, sugarcane, etc., are being conducted every year and prizes awarded to the successful farmers. Farmers' training programmes both in the fields and in camps are being conducted by the Agriculture Department to educate the cultivators on advanced methods of scientific cultivation with improved seeds, implements and fertilisers. Multiple cropping demonstrations in the farmers' fields have created a good impact on the agriculturists.

Agricultural
Exhibitions

Agriculture in the district is not mechanised. The age-old wooden plough and several other implements to suit to the local conditions of soil and crop are still in use. The country plough is the most commonly

Agricultural
Implements

used implement. In areas where shifting cultivation is done the land is usually ploughed with the help of spades and other primitive implements. Except in the case of a few progressive farmers in Boudh *tahsil* area, the use of improved implements is practically unknown. During 1978 there were 26 tractors registered in the district, out of which 13 belonged to private farmers and the rest 13 were owned by the State Government. Subsidy is also being given to the poor farmers to purchase improved agricultural implements which are gradually becoming popular among them. Servicing facilities of agricultural implements in the district is almost absent.

The number of various agricultural implements in use in the district is given below*.

Wooden plough	..	107,015
Iron plough	..	383
Sugarcane crushers—	{ Bullock driven	.. 246
	{ Power driven	.. 6
Carts (bullock driven)	..	15,225
Oil engines	..	28
Electric pumps and pumps for tube-wells	..	1
Tractors	..	4
Oil crushers (Ghani)	..	139

Paddy, ragi, maize, jower, mesta, vegetables, chilli, groundnut, etc., are mostly grown in the Kharif season. Crops usually grown in the rabi season are wheat, winter paddy, oil seeds, potato, tobacco, onion, garlic, corriender and some varieties of pulses. Generally only one crop is now being grown in the Kharif season.

There is hardly any second crop. Area under multiple cropping is also limited. In the irrigated areas paddy is followed by a second crop usually of pulses, oil seeds or wheat. In other areas paddy is the sole crop of the year. Absence of assured water supply has considerable impact on the district. In the non-irrigated areas crop pattern is hardly diversified and a second crop is seldom grown. Yet another method of increasing agricultural production is to introduce rational cropping pattern which are best suited to the local conditions. Such patterns have been developed for the district by the State Agriculture Department and during the past few years demonstrations have been conducted in the cultivator's fields under various schemes. Such demonstrations have a good impact on the cultivators and create initiative for intensive cultivation. Gradually the farmers are adopting double cropping, multiple cropping, mixed cropping, inter-cropping and relay cropping practices. These diversified and rotational methods of improved cultivation with high-yielding seeds have helped the cultivators to bear the loss from failure of a particular crop.

* Source—Statistical Abstract of Orissa, 1973

Traditionally the cultivators take particular care for the production of quality seeds and seedlings. After harvesting the crop is dried thoroughly and then threshed. It is further dried in the sun for a few days and then stored. Leaves of some indigenous plants and also ash are mixed with the seeds as a precaution against pest attack. During recent years increased attention is being given to the quality of seeds and seedlings for better production and for maintaining the quality of the high-yielding varieties. The nucleus seeds are generally supplied by the Agriculture Department and also by the Seed Corporation of India. Previously the tribal farmers did not pay much attention to the quality of seeds. However, of late, the use of improved seeds is gaining popularity among them.

Quantity of seeds supplied to the cultivators by the Agriculture Department during 1977-78 is given below—

Category of seeds	Quantity supplied (in quintals)
Paddy	1,249.00
Maize	34.88
Ragi	90.84
Green gram (Pusa Baisakhi)	15.78
Sunhemp	99.00
Cotton	13.86
Arhar	13.96
Groundnut	4.71
Turmeric	3.60
Cowpea	5.85
Black gram (T-9)	13.99
Sun flower	0.24
Til	28.86
Wheat	281.61
Jhai Mung	68.51
Gram	69.59
Lentil	0.60
Mustard	434.43
Kulthi	7.00
Safflower	29.00
Potato	687.00

The soil of the district is poor in humus content and acidic in nature. So, addition of adequate quantity of organic matter in terms of rural compost and super digest compost is necessary for better yield. Cow-dung still remains the principal manure. The farmers dump cow-dung

Manures and Fertilisers

refuses of the cattle shed and other left overs from the crop which form the farmyard manure. Oil-cake and silt of old tank are also applied in the fields. Green manuring of the fields is also done to some extent.

In order to educate the farmers about the proper and scientific method of composting it has been decided to give financial assistance to the poor farmers for the preparation of superdigest compost. Green manuring have been adopted throughout the district. With the efforts of the Agriculture Department the local cultivators are gradually adopting compost as a substitute for farmyard manure. During 1977-78, 3,81,407 tonnes of compost were prepared in the district and 2,420 hectares were green manured with sunhemp. Those who take to shifting cultivation burn the vegetation on the fields and the ash obtained is spread over the soil to fertilise the field. Leaving the land fallow for 2 to 3 years is another traditional method for restoring soil fertility.

The use of chemical fertilisers is confined to a few progressive farmers mostly in Boudh Tahsil area. The State Government is, however, encouraging the use of chemical fertilisers among the cultivators. But due to the high cost and comparatively less area being under improved seeds and crops their application has not been adequate. Another drawback for extensive use of chemical fertilisers is want of sufficient irrigation facilities. Generally nitrogenous, phosphatic and potassic fertilisers are used. Consumption of chemical fertilisers in the district during last 3 years is given below.

Year		Nitrogenous (in tonnes)	Phosphatic (in tonnes)	Potassic (in tonnes)
1975-76	..	204.626	74.594	47.649
1976-77	..	418.032	110.384	93.957
1977-78	..	556.710	144.720	139.900

Both co-operatives and private dealers supply fertilisers to the farmers. The Regional Co-operative Marketing Society at Boudh supplies fertilisers in Boudh Tahsil area. Almost all the private dealers are concentrated in Boudh Tahsil where the intake of fertilisers is the highest.

Plant Protection

There are number of diseases and pests that cause considerable damage to crops. To add to this, damage is also caused by wild animals and birds. Paddy crop is generally attacked by stem borer, rice bug, case worm, rice hispa, jassids, blast, blight, etc. *Pyrilla purpusila* is the common pest found in the sugarcane and it is also affected by stem borer

and top shoot borer. Potato is affected by early and late blight. Ginger and turmeric are affected by Ryhozone rat. Besides, grass hoppers, caterpillars, fungi and virus cause a lot of damage to different crops.

Use of modern insecticides and fungicides were unknown to the cultivators in the past. A number of superstitious practices were followed by the people to ward-off the pest and crop diseases. Leaves, barks and ash of some indigenous plants with very bitter taste and small are still used to prevent pests while storing grains.

With wide propaganda and demonstrations the Agriculture Department have been able to impress upon the cultivators the benefits of modern technique of agricultural practices. Gradually the people have adopted scientific methods to control pests and crop diseases. Sufficient stocks of pesticides and plant protection equipments are maintained at the district headquarters and at Block level to ensure timely supply to the farmers. Some farmers have also their own sprayers and dusters. All Agricultural Extension Officers take pest surveillance work through the village Agricultural workers and intimate the appearance of pest and disease attack, if any, to the control room of the District Office for taking immediate action.

There are six agricultural farms in the district located at Boudh, Paljhar, Kothagarh, Phulabani, G. Udayagiri and Sarangagarh, maintained by the Agriculture Department of the State Government. These farms are meant for the production of improved seeds and grafts for supply to the cultivators. Scientific methods of agricultural practices are also demonstrated in these farms. Brief descriptions of these agricultural farms are given below.

AGRICUL-
TURAL
FARMS

Established by the Ruler of the ex-State, the Boudh Agricultural farm was taken over by the State Government in 1948. This seed multiplication farm is situated by the side of the river Mahanadi at Boudh and covers an area of about 16 hectares.

Boudh Farm

Established in 1942-43 the Paljhar farm is situated in village Paljhar at a distance of about 20 km. from Boudh near the head-works of Salki medium irrigation project. This paddy seed multiplication farm covers an area of 181.364 hectares.

Paljhar Farm

The Kotagarh farm is situated in Kotagarh village of Baligurha subdivision. It was established in 1958-59 to conduct experiments in growing some rainfed crops like tur, turmeric, groundnut, etc. in Kharif season. Seeds of potato and other winter vegetables and early variety paddy seeds are produced in this agricultural farm. It covers an area of 80 hectares.

Kotagarh
Farm

Phulabani Farm

Phulabani farm was established in 1948-49 near Phulabani town on the Phulabani Berhampur road. The total area of the farm is 26.30 hectares, out of which 16.40 hectares are now under cultivation of different crops. Irrigation is being done by two lift irrigation points from the Pilasalki river. It is primarily a vegetable seed producing farm. Some other crops, viz., high-yielding paddy, wheat, ragi, etc. are also cultivated for demonstration.

G. Udayagiri Farm

An agricultural farm was established at G. Udayagiri in 1938 on an area of about 24 hectares. Temperate vegetables like cauliflower, cabbage, bean, tomato, etc. and crops like wheat, rice, ragi, pulses and oil seeds are grown to cater to the requirement of seeds by the local tribal cultivators. The farm also educates the local farmers in improved methods of cultivation.

Sarangagarh Farm

Sarangagarh farm was established in 1958-59. The total area of the farm is 12.34 hectares and it is irrigated from the Tussbalamba minor irrigation project. It is mainly a seed producing farm. Rice, wheat, ragi, pea, pulses and oil seeds are grown in this farm.

NATURAL CALAMITIES

The district is at times affected by cyclonic disturbances and depressions in the month of September--October causing storms and widespread heavy rains. The rainfall decreases from the north-west to the south-east areas of the district. The variation in the annual rainfall from year to year is not large. Ordinarily, rainfall is adequate for a fairly good Kharif crop and for light crops in the Rabi season. But heavy rainfall in the earlier part of the rainy season and long spells of drought towards the end cause frequent failure of crops. Several areas are chronically drought-prone due to uneven distribution of rainfall and the hilly terrain. The district is generally free from floods excepting some river side areas in Boudh Tahsil.

No adequate records are available to throw light on the calamities visiting the district in old times. The accounts of the calamities of 1889 and 1900, available from the Angul District Gazetteer (1908), relate only to the Khondmals subdivision.*

Famine of 1889**

In the Khondmals, the distress caused by the famine of 1889 was far less severe than in the Angul Subdivision. The failure of crops was as great and there was absolutely no rain from November till about the end of May. About the end of April the trees and plants in the jungle began to wither, the heat became intolerable and tanks and reservoirs of water dried up. The supply of the jungle products upon which the mass of the people had mainly to depend, also began to fail, and it was apprehended that if the rains did not soon break, there would be a serious famine,

*L. S. S. O' Malley, Bengal District Gazetteer, Angul (1908)

**Ibid, pp. 99-101

Fortunately, however, before the end of May there was some rain which, though small and insufficient for agricultural purposes, revived the jungle plants and trees. In June there was a fall of rain which averaged 5 inches all over the Khondmals, and the pressure was relieved. In spite of this, it was found necessary to start relief works, such as the building of rest houses and *dharmasalas* and the cutting of jungle. There was, however, less pressure than in the Angul subdivision, and the condition of the people was very much better. This state of things was attributed to the fact that the forests in the Khondmals are not reserved or protected, and the people were able to fall back on the supplies of game, edible roots, wild fruit and other products of the jungle, which contribute so largely to the means of subsistence of aboriginal tribes.

Briefly, this, the greatest famine within the memory of the present inhabitants since the great Orissa Famine of 1866, was due partly to the short harvests of 1887 and 1888, partly to the failure of the mango and *mahua* crops in 1889, and partly to the effects of a long drought which prevailed from October 1888 to the end of May, 1889, on account of which all the grain was tightly hoarded for some months and the labourers were deprived of employment. In the Khondmals some difficulty was felt in selecting relief works, for the only one which the Khoads will take up readily is cutting down trees and jungles, which naturally can only be allowed to a limited extent, and though they do not object to digging of tanks and wells, that is a work difficult to carry on in many places during the rains. The measures organised for the relief of distress in this tract consisted chiefly in giving agricultural loans, giving advances, which after the field season were to be repaid not in cash but in labour, providing work on roads and tanks for those willing to perform it, giving advances to weavers and opening centres for gratuitous relief on a small scale. The total expenditure amounted to only Rs.7,620.

The people had a series of bad years owing to short crops which exhausted their resources and culminated in general scarcity in 1900-01. This was most felt in the Khondmals, especially by those who depended for their subsistence on jungle produce, such as, yams and edible bulbs, the supply of which grew scanty in July. Famine conditions prevailed, loans were given to cultivators, relief works had to be opened and gratuitous relief was given to the old and infirm and to those who were physically unfit to do any work. In the following year their condition generally improved, but in the next year there was a slight falling off. In the third year all signs of distress disappeared and there was a marked improvement in their condition which has continued to this day. They have mostly

Scarcity of
1900*

* L. S. S. O' Malley, Bengal District Gazetteer, Angul (1908), p. 102

paid off their debts, their condition and standard of living have improved, and the higher classes of agriculturists now expend larger sums on luxuries, social ceremonies and wearing apparel.

Famine of
1918-19

The disastrous epidemic of influenza appeared in Orissa. This was combined with the failure of monsoon resulting in reduction of stocks of food grains while price went on increasing due to war conditions. Repeated failure of crops led to severe famine in the southern parts of Boudh-Khondmals and the emigration of the local people to the Assam tea gardens in search of work, which had started many years before, went on increasing.

Drought of
1954-55

In 1954 the major portion of Boudh subdivision was affected by drought, the loss of early upland paddy was about 70 per cent and winter paddy was about 65 per cent in nearly 300 villages. Small pockets of 28 villages and 14 villages in Khondmals and G. Udayagiri areas respectively were also affected. The total rainfall was 1247mm. and the average of the period May—September was a little over 203mm.

The average annual rainfall in Phulabani and G. Udayagiri varies from 1320mm. to 1397mm. The same for Boudh is 1270mm. In 1955-56 the rainfall in Phulabani and G. Udayagiri were 532.4 mm. and 736.6 mm. respectively up to 15th August 1955 against 939.8 mm. and 1117.6 mm. in 1953, which was a normal year for the district. In Boudh it was 254 mm. against 812.8 mm. in 1953 till August. Boudh suffered from heavy flood in September, 1955 in addition. The loss was estimated at Rs. 38,30,000 covering an area of about 392 hectares of upland paddy and 36,000 people had been affected. In Khondmals the total area affected was about 120 hectares. The estimated loss in terms of money was Rs. 30,000. The average loss of crop was to the extent of about 40 per cent. The population affected was about 5,000. In Udayagiri area the area affected was about 100 hectares. The value of paddy crop damaged was Rs. 25,000 involving a population of about 3,000.

Possible relief measures were undertaken by the Government by providing employment to the affected people and 3 mid-day meal centres were opened in the district out of the Prime Minister's Relief Fund. Besides, 17 centres were opened by the State Government during 1955-56, and 12 centres in 1956-57. More than 23,000 children attended these centres daily. Loans in cash and kind (in shape of seeds) were advanced to the cultivators to raise a second crop to make good the loss as far as possible and the collection of land revenue was suspended.

ANIMAL
HUSBANDRY

Agriculture alone cannot improve the economic condition of the weaker section of the community as the fertility of the land is poor and the district which depends upon monsoon for agriculture is visited by drought frequently. In a largely agrarian society like the one in the district,

people can supplement their income by rearing live stock and developing diary farming. But very rarely this has been undertaken by the local people as a commercial proposition. Cattle rearing is prevalent among the local people, but only in a domestic scale. The tribals usually do not take milk and the cows and heifers are utilised in cultivation by many tribal farmers. Goats, sheep and pigs are reared only for table purpose. Piggery is widely prevalent mostly among the Scheduled Tribes and the Scheduled Castes. Pig meat is a favourite food of the local tribes and the Harijans. Poultry birds of local breed are common throughout the district. The cocks are usually sacrificed on ritual ceremonies and eaten by the tribal people.

The live-stock population (according to Live-stock Census 1972) of the district, is as follows :

Cattle	..	4,35,777
Buffaloes	..	80,251
Sheep	..	62,879
Goats	..	1,89,465
Pigs	..	8,20,166
Horses and Ponies	..	424
Mules	..	30
Donkeys	..	7
Poultry	..	4,97,331

The pastures and grazing grounds available in the district are not sufficient for all categories of animals to graze for the whole year. There are extensive areas of forests and waste lands and plenty of green grass is available for the cattle to graze during the rains. Acute shortage of green grass is felt after the rains and the animals remain underfed during the summer months depending mostly on paddy straw.

Animal Feed

Cultivation of fodder crops was not known to the district. Only about a decade back demonstration plots for cultivation of fodder were laid out in most of the veterinary dispensaries of the district. Recently two fodder farms, one at Phulabani having 4 hectares, and another at Baligurha having 2.8 hectares have been started for demonstration purpose. Moreover, to cater to the needs of the district a fodder seed production farm has been started at Landibandha in Boudh subdivision on 12 hectares of land. Fodder seeds and slips and fertilisers are being supplied freely to encourage the farmers to take up fodder cultivation. Gradually fodder cultivation is becoming popular in the district. So far, 97 farmers have been supplied with fodder seeds like M. P. Chari, hybrid napier, jower, maize, Dinanath, Toosente, cow pea, barseem, Kulthi, etc., and with Koobabul seed.

Agricultural by-products like rice bran, wheat bran, edible oil-cakes and some varieties of pulses are also used as cattle feed.

Milk Supply

There were 65,143 milch cows and 7,669 milch buffaloes in the district according to 1972 live-stock census. Milk yield of the local breeds is very meagre and they remain dry for most part of the year. Till recently no systematic attention was given to the improvement of live-stock.

District Live-stock Breeding Farm

The District Live-stock Breeding Farm at Boudh was started by the ex-State administration and was taken over by the State Government on the 1st January 1948. Previously the farm maintained cattle of Haryana breed. The objective of the farm was to produce pure Haryana bulls to be supplied to different parts of the State for upgrading the indigenous breed. Formerly, in order to meet the requirement of milk at Phulabani town about 40 litres of milk were transported daily from this diary farm by public bus for sale. But it stopped from the year 1966-67 as demand for milk at Boudh increased.

At present the total strength of the live-stock in the farm is 63. During last 3 years (1975-76 to 1977-78) the average annual milk production in the farm was 19,732 litres. For the expansion of the farm an area of about 34 hectares has been taken at Landibandha, situated at a distance of 10 km. from Boudh. It is expected that this diary farm will meet the milk requirements of both Boudh and Phulabani towns.

Dadupaju Dairy Farm

A diary farm was started at Dadupaju near Phulabani town in July, 1977 with 10 graded Jersey cows. During 1977-78 about 10,000 litres of milk was produced and sold to the public.

During recent year steps are being taken by the Government through various development projects to develop dairy farming on commercial basis. It has been proposed to collect milk from rural areas through the dairy co-operatives at Phulabani, Purunakatak, Baligurha, Sarangagarh, Boudh and Manamunda for sale in the urban areas. A milk chilling plant has been purchased to be installed at Phulabani for preserving milk collected from the rural areas.

Cattle Breeding

The local breeds of cattle are generally stunted in growth and are poor in quality. For last 20 years the State Government have been implementing various schemes for the creation of graded cattle of improved progeny, particularly cross breed animals of exotic species of high yielding varieties. The breeding is done both by natural process and by artificial insemination.

In the past, steps were being taken to improve the local breeds of cattle by cross breeding with Haryana and Red Sindhi bulls. Formerly, 3 Red Sindhi bulls were stationed at Phulabani, G. Udayagiri and Harabhang. In 1955-56, an artificial insemination centre was started at the Boudh veterinary dispensary. Subsequently it was closed down as it could not prove to be much useful. In 1965-66, sixtyeight

bulls were supplied for upgrading the breed. Red Sindhi bulls were stationed up to 1968 in the hilly areas of Baligurha and Khordmals subdivisions and Haryana bulls in the plain areas of Boudh subdivision. The Community Development Blocks were maintaining them. Subsequently the Utkal Gomangal Samiti took over their maintenance by engaging hosts or keeping them at veterinary dispensaries. Only 23 of these bulls survived in 1971. During recent years Jersey breed has been introduced in the district. There are 34 artificial insemination centres located at different parts of the district and these centres are supplied with semen from the semen collection centre at Phulabani started in August, 1976 with 6 imported Jersey bulls.

Twenty natural breeding centres have been started with graded Jersey bulls in the interior parts of the district because of lack of bus communication facilities to these areas. Moreover, 10 bulls have been supplied to Daringbarhi, Nuagan, Baligurha, Tumudibandha and Kotagarh Blocks for the upgradation of the local breeds.

It has been decided by the Government to launch the scheme—the Integrated Project on Cattle Breeding and Social Forestry in the Community Development Block areas of Raikia and G. Udayagiri through the Orissa Agro Industries Corporation in collaboration with the Bharatiya Agro-Industry Foundation. Under the scheme 4,000 cows will be inseminated through frozen semen.

Four Murrah buffalo bull centres were started in 1976 at Kantamal, Purunakatak, Gumagarh and Tumudibandha for upgrading local buffalo population.

A large number of pigs of indigenous variety are found in the district and pork is consumed by a large section of the people. For the improvement of the local breed, graded Yorkshire boars are being supplied to the local farmers by the State Government from the Pig Multiplication Farm located at Bhanjanagar. So far, 229 cows and 248 cross breed boars have been supplied from this farm. In order to popularise pig-keeping as an ancillary occupation among the poor farmers of the district seventeen small units consisting of two sows and one boar each have been supplied to the poor and marginal farmers and pig rearers of the district.

Pigs

The local goats belong to the Ganjam and Black Bengal varieties. The quality of meat is good. But the local breed yield very little milk, barely sufficient for their kids. There is great scope for multiplication of goats in the district as enough browsing facility is available. For upgrading the indigenous stock, 589 Betal bucks were supplied to the district during 1965-66. It produced thousands of progenies. Community Development Blocks subsidised the scheme. From 1968

Goats

the Blocks stopped the subsidy and auctioned off many of these bucks. In 1971 there were only 42 bucks maintained by the Grama Panchayats or others without subsidy. Presently four goat multiplication units to produce Betal bucks have been established at Khajuriparha, Phiringia, Purunakatak and Nuagan where the goats are reared under browsing alone. From these farms 42 graded bucks have been supplied for goat development in different areas in the district. 407 goat units of 4 does each have been supplied to the local farmers and 275 buck centres with 'Ganjam' and 'Betal buck' breeds have been set up at different places of the district for upgradation.

Sheep

The local people of the district specially of Boudh area rear sheep only for meat purpose. To upgrade the local non-woolly type of sheep, Corridal rams are being supplied to the district. So far, 7 units, each having 25 ewes and a Corridal ram, have been supplied to the beneficiaries who are mostly small and marginal farmers. Some villages near Baligurha, G. Udayagiri, and Daringbarhi situated at high altitudes are suitable for rearing wool-bearing sheep.

Poultry

Poultry keeping is widely prevalent in the district especially among the Scheduled Tribes and the Scheduled Castes in the hilly areas. The local breed is extremely hardy and requires no special care for rearing. Being shy layers, these small sized birds are mainly used for table purpose. The cocks are usually sacrificed by the Adivasis on ritual ceremonies and also offered to the tribal deities.

In order to improve the local breed by cross-breeding with improved species and also to attract people for keeping poultry for profit, various schemes are now being undertaken by the Government. In 1952-53 a small unit of 22 white leghorn birds was started at the veterinary dispensary, Phulabani. Hatching eggs were sold from this unit. Forty white leghorn cocks were distributed in the interior of the district for upgrading the local stock. The second unit was established at Boudh and the third one at G. Udayagiri in 1954-55 and 1956-57 respectively. Another unit was started at Tikabali in 1958-59. These units function for six months, i.e., from October to March. During 1958-59, one 100—layer poultry unit was started at Phulabani. During 1962-63, 400 white leghorn cocks were distributed in different areas for upgrading the country birds. The All India Poultry Development Centre at Phulabani is supplying laying birds, breeding cocks, chicks and hatching eggs to the people. Another 100—layer unit was started during 1972 under the Applied Nutrition Programme. Besides, a chick rearing centre has recently been established at Phulabani to meet the requirement of the district. During last two years, 9,850 chicks were reared at this centre and 4,583 birds were supplied.

Thirty-eight units, each having 25 laying birds, have been started through the small and marginal farmers of the district. In three villages of Daringbarhi Community Development Block, sixty families have been supplied each with 5 hens and a cock of improved breed. One poultry co-operative society has been formed at Phulabani with the aim to facilitate marketing of birds and eggs and to supply premixed feed to the farmers conveniently.

There is no poultry feed mixing centre in the district. The feed requirement is procured from the feed mixing centre, Bhanjanagar. For the convenience of the poultry rearers, feed sale centres have been opened at the veterinary dispensaries at Boudh, Purunakatak, Phulabani, Nuagan and Baligurha.

Cattle shows are organised regularly by the Animal Husbandry Department to encourage people to possess exotic breeds. Each year during the observation of the Gosambardhan week cattle shows are organised at different centres of the district and prizes are distributed to the deserving participants.

Cattle Shows

Transaction of cattle of the local breed takes place in the weekly markets at Tuleshwar, Palasagora, Dahya, Phulabani, Khajuriparha, Phiringia, Baligurha, Tikabali, Kotagarh, Chakapad and Raikia where bullocks are mainly transacted.

Cattle Market

Animal diseases common to the district are rinderpest, haemorrhagic septicaemia, black quarters, anthrax and foot and mouth disease. Besides, the cattle suffer from diseases caused by different parasites. Common poultry diseases are ranikhet and fowl pox. In former days the rate of mortality was high as benefits of treatment could not be made available in the inaccessible hilly areas which the district largely comprises. At present veterinary institutions have been opened throughout the district. Regular inoculations are given as a prevention measure. Besides, on the receipt of report of any outbreak immediate measures are taken to control the same. Generally cases of common ailments like wound, parasitic diarrhoea, pneumonia, indigestion, impaction, etc. come to the veterinary dispensaries for treatment. A statement showing the number of cases treated by the veterinary institutions along with the inoculations done during last 3 years is given below.

Animal and Poultry Diseases

		1975-1976	1976-1977	1977-1978
No. of cases treated	..	3,18,805	2,76,476	3,20,223
No. of castrations done	..	68,508	69,899	50,954
No. of inoculations done	..	6,05,943	4,90,504	4,16,022

Veterinary
Institutions

There is a veterinary hospital at Phulabani, 19 veterinary dispensaries, 3 veterinary minor dispensaries and 53 live-stock aid centres functioning in different parts of the district.

FISHERIES

The district has a number of hill streams and rivers which are the natural source of fish supply in the district. The river Mahanadi on its course passes through this district for about 100 km. Besides these streams and rivers, a water area of 2,034.56 hectares is available from tanks under different Grama Panchayats and 103.20 hectares owned by private persons. The irrigation projects of the district have also created a water area of 849.84 hectares. Pisciculture has been taken up in some Grama Panchayat tanks and also in tanks owned by private individuals. The Departmental fish farm at Phulabani has been remodelled to produce more spawn and fry for stocking in suitable minor irrigation projects.

Annually, about 47 tonnes of inland fish are produced in the district. Being insufficient for internal requirement a similar quantity of marine fish (both fresh and dried) is imported from Ganjam and other coastal districts.

The Fisheries Department of the State Government have established 4 fish farms in the district from which fish fry are supplied to different Grama Panchayats and private pisciculturists.

The Fisheries Department give demonstrations for the production of quality spawn by induced breeding technique, adopting modern scientific methods. The Government is also providing loans with subsidy to private pisciculturists for the improvement of pisciculture.

Fishing
Implements

Since fishery resources are limited, the introduction of improved types of costly implements have little effect on the fishermen of the district. Traditional fishing nets made of twine are in vogue. Some fishermen have also taken to nylon nets. Nowadays, people prefer nylon twine to cotton twine because of durability and facility. Generally, drag-net, cast-net, *Khadijal* and *bendha*, made of sticks, are used for catching fish.

A large number of people on the banks of the river Tel and Mahanadi in Boudh tahsil live on fishing. According to 1961 Census, the number of fishermen in the district was 760. They use traditional implements like cast-nets and small boats. This self-employed community of fishermen can improve in their occupation if they are properly organised and financial assistance is made available to them.

FOREST

The district is noted for its forests and forest products. During 1978 it extended over an area of about 8,122 sq. km. which covered nearly 70 per cent of the total geographical area of the district. Forests are found in all Tahsil areas, but Baligurha and Khondmals Tahsils have continuous stretches of dense forests.

Forests abound in valuable timbers like Sal, Teak, Asan, Bija, etc. Bamboos of good quality are also found specially in Baligurha and G. Udayagiri Tahsils. Bamboos from the district are supplied to the Titaghur Paper Mills at Chaudwar. Timber and firewood are the major products. The minor forest products are Bamboo, Kendu leaf, Mohua flower, Mohua seeds, tamarind, sabai grass, myrabolans, Sunaribark, hill brooms, Siali leaves, Siali fibre, thatch grass, Genduli gum, resins, medicinal plants, arrow root, honey, lac, Sal resin, etc. Of these, bamboo, Kendu leaf, tamarind and hill brooms are economically important.

Various factors are responsible for denudation of the forest wealth in the district. Shifting cultivation practised by the tribals has also contributed, not in an insignificant way, to the destruction of the forest wealth. Although the district is rich in forest resources, forest products are mostly exported outside and no important forest based industries have sprung up in the district. There is, however, a number of breweries in the district which use Mohua flower for the preparation of liquor. The Government tannery at Boudh use Sunari bark and myrabolans. Mohua flower is also used by the tribal people as food and also as cattle feed. Forests have provided subsidiary sources of income to the local people. Collection of minor forest products, specially of Kendu leaves, tamarind and hill brooms, cutting of timber and bamboo and burning of wood for charcoal are some of the important subsidiary occupations. A large number of local inhabitants fall back upon numerous species of fruits and roots obtained from the forest as their main source of subsistence. Forest products also constitute important items of export of the district.

The following statement shows the revenue earned from the forest during 1976-77.

Sources	Revenue (in rupees)
Major forest products (timber, fire wood and bamboos)	59,39,140
Kendu leaves	44,28,666
Minor forest products	4,07,001

APPENDIX I

Area, production and yield rate of different crops for the Agricultural year (1977-78) *

Sl No.	Crop	Area (in hectare)	Production (in tonnes)	Yield rate (quintals per hectares)
(1)	(2)	(3)	(4)	(5)
1	Rice	.. 85,960	82,320	9.58
2	Wheat	.. 1,848	2,772	15.00
3	Ragi	.. 12,865	9,846	7.65
4	Maize	.. 14,014	8,293	5.92
5	Jowar	.. 1,463	774	5.29
6	Bajra	.. 59	15	2.50
7	Small Millets	.. 15,629	6,251	4.00
	<i>Total cereals</i>	.. 1,31,838	1,10,271	8.36
8	Tur (Arhar)	.. 5,179	2,560	5.00
9	Gram	.. 668	267	4.00
10	Green gram (Mung)	.. 8,494	4,248	5.00
11	Black gram (Biri)	.. 6,468	2,853	4.41
12	Horse gram (Kulthi)	.. 16,844	5,053	3.00
13	Cowpea	.. 4,579	1,835	4.01
14	Field pea	.. 333	200	6.00
15	Other Rabi pulses	.. 4,189	1,676	4.00
	<i>Total pulses</i>	.. 45,754	18,692	4.00
16	Groundnut	.. 1,315	1,053	8.00
17	Til	.. 6,382	2,348	3.68
18	Caster	.. 1,188	516	4.34
19	Mustard	.. 15,040	3,760	2.50
20	Nizer	.. 17,999	3,599	3.00

* Source—Director of Agriculture and Food Production, Orissa

Sl. No.	Crop	Area (in hectare)	Production (in tonnes)	Yield rate (quintals per hectares)
(1)	(2)	(3)	(4)	(5)
21	Sunflower	.. 14	6	4.29
22	Safflower	.. 174	87	5.00
	<i>Total oilseeds</i>	.. 42,112	13,169	3.13
23	Potato	.. 283	772	27.28
24	Sweet Potato	.. 1,823	9,115	5.00
25	Onion	.. 810	3,240	40.00
26	Other Kharif Vegetables	.. 7,340	36,700	50.00
27	Other Rabi Vegetables	.. 4,068	20,340	50.00
	<i>Total Vegetables</i>	.. 14,324	70,167	48.99
28	Chillies	.. 1,154	635	5.5
29	Coriander	.. 390	39	1.0
30	Garlic	.. 400	800	20.00
31	Ginger	.. 803	401	5.00
32	Turmeric	.. 13,783	6,891	5.00
	<i>Total Condiments and Spices</i>	.. 16,530	8,766	5.30
33	Mango	.. 2,250	11,250	..
34	Banana	.. 250	881	..
35	Citrus fruits	.. 155	537	..
37	Papaya	.. 1,050	3,684	..
37	Cashew-nut	.. 180	48	..
38	Coconut	.. 97	2,54,000 (nuts)	..
39	Other fruits	.. 2,780	1,528	..
	<i>Total fruits</i>	.. 6,762
40	Sugarcane	.. 900	3,600	40.00
41	Tobacco	.. 872	349	4.00
42	Mesta *	.. 907	3,463	3.82
43	Cotton ‡	.. 680	160	1.10

* Production and yield rates in bales of 180 kg. each