CHAPTER IV

AGRICULTURE AND IRRIGATION

47. Introduction

Out of the total area of 2,569,000 acres the district has a forest area of 560,000 acres and the net area sown is 1,053,000 acres of which 129,000 acres are being irrigated. The area sown more than once is 113,000 acres. The barren and unculturable land and land put to non-agricultural use comes to 485,000 acres. There is however a large extent of culturable waste and fallow lands, some of which were once cultivatable but after abandonment have remained uncultivated for a long time. The area under culturable waste, current fallows and other fallows comes to 147,000 acres, 134,000 acres and 22,000 acres respectively. The land under permanent pastures, grazing land and tree groves comes to 168,000 acres.

It is thus seen that a large area not utilised for cultivation at present can be reclaimed for agriculture. So far no large scale reclamation has been undertaken in the district either by manual or mechanised means. Reclamation work is taken up mostly by individual cultivators who by their personal initiative take leases of land for reclamation. There is provision in Community Development Block for loans for reclamation of lands in the ayacut of irrigation projects.

During 1949 to 1965 nearly 60,000 acres of land have been leaser out to the people of the district for agricultural reclamation and other purposes. Lands have been given on Amalnama Lease for the purpose of clearing and bringing the unwanted forest lands under cultivationr.

48. Irrigation

(*i*) The average annual rainfall of 65″ in the district is adequate to feed the crops. But its uneven distribution causes uncertainty in cultivation. Artificial irrigation could alone solve this difficulty, but has not been worked out in such measure as to provide an assured supply of water all the year round. The area getting irrigation facilities from various types of irrigation is 3·5 per cent of the total cultivable area.

The ex-State Government had undertaken two notable irrigation projects, one at Balidiha and the other at Haldia. These two projects are at present irrigating 12,200 acres. Details of these two projects are given below.

(*ii*) Balidiha Irrigation Project

Under this Project a diversion weir has been erected across the hill-stream Palpala in the village Balidiha 10 miles from Baripada. The Palpala emerges from the Similipal hills and near Balidiha cuts through two hillocks where the passage has been bunded. The weir is 600 feet long 40 feet high and has a crest of 5 feet. It has a catchment area of about 50 sq. miles. Two canals take off from the reservoir, the one at the right side 8 miles in length and the left one 4 miles with 7 distributaries extending up to 30 miles. The original cost of the project was 4·56 lakhs. It irrigates 6,200 acres. On account of the silting of the bed of the reservoir, the dead storage has been so reduced that the dam has had to be raised. The reservoir has served for 60 years. Time is not far off when engineers have to examine its further utilisation.

(*iii*) Haldia Irrigation Project

Construction of this reservoir along with canals was completed in 1921. The dam constructed across the river Chipot is about 2,580 feet long and the irrigation canals are 12½ miles in length. There are 13 distributaries covering 28 miles. The original cost of the project was 6·52 lakhs. This project has a catchment of 30 square miles and it irrigates about 6,000 acres.

(*iv*) Minor Irrigation Project

There are 370 Minor Irrigation Projects in the district. Out of these, 164 projects having ayacut of above 60 acres each are being maintained by the Rural Engineering Organisation. 206 projects have ayacut of less than 60 acres each and are being maintained by the Panchayat Samitis. The total potential of these projects is 57,250 acres during *khariff* and 6,535 acres during *rabi*. At present they irrigate 33,849 acres during *khariff* and 1,129 acres during *rabi*.

The following table gives details of the Minor, Irrigation Project during 1964-65.

Class of projects	No. of projects	Present irrigation		Additional area to be irrigated on renovation		Total potential after improvement	
		Khariff	Rabi	Khariff	Rabi	Khariff	Rabi
Existing Minor Irrigation Projects in good condition.	44	8,824	35	..	...	8,824	35
Partly derelict projects ..	48	6,941	30	5,850	50	12,791	80
Completely derelict projects	28	..	..	5,925	..	5,925	..

Class of projects	No. of projects	Present irrigation		Additional area to be irrigated on renovation		Total potential after improvement	
		Khariff	Rabi	Khariff	Rabi	Khariff	Rabi
Projects completed by Rural Engineering Organisation.	11	2,890	..	..	..	2,890	..
Projects in progress ..	33	11,037	1,100	12,037	5,250	19,954	6,350
Projects in charge of Community Development Blocks.	206	4,157	27	2,709	43	6,866	70
Total (all figures are in acres)	370	33,849	1,192	26,521	5,343	57,270	6,535

(*Source*—Rural Engineering Organisation)

(*v*) Wells

Sinking of wells for the purpose of irrigation is not common. Deep well is not possible in the district, particularly in the Panchpir sub-division, because of the presence of Kaolin. In the lowlying plains where the level is higher shallow wells are dug in winter and the water is utilised for vegetable crops.

(*vi*) Lift Irrigation

Lift Irrigation is practised to a limited extent. It is mostly confind to river-side fields where *tendas* and pumps are used to lift water from the river and to irrigate vegetable crops on *Pal* lands.

(*vii*) Water potential and possibility of further exploitation

There is possibility of exploitation of water potential throughout the district. The irrigation potential through its major and medium rivers is nearly 766,000 acres. The major sources which can be tapped for irrigation are Burhabalanga, Kharkai, Subarnarekha, Salchua, Tangana and Khair Bhandan rivers. These projects are in the stage of investigation.

The irrigation potential of each of these projects is given below—

Name of the Project		Irrigation potential
1. Kharkai	..	65,000 acres
2. Subarnarekha	..	510,000 acres
3. Burhabalanga	..	78,000 acres
4. Salchua-Tangana	..	44,000 acres
5. Khair Bhandan	..	56,000 acres

(*viii*) **Area under wet and dry cultivation**

Area irrigated by different sources in 1964-65 is given below

Source of irrigation		Area irrigated (in acres)
Perennial canal	..	2,900
Fractional canal	..	41,200
Tanks	..	28,500
Wells	..	2,600
Others	..	53,800

The irrigated area comes to 9·9 per cent of the net cropped area. High, medium and low lands comprise 48 per cent, 30 per cent and 22 per cent respectively. Of the total land area of the district, the major portion of the high land is under dry cultivation growing koda, gundli, bajra, maize and jowar. About 92 per cent of the cultivated area depends upon rainfall.

49. Soil Erosion

There has been no detailed survey. Rapid reconnaissance done by the Soil conservation staff in 1961 reveals that soil erosion in the form of sheet and gully erosion is prevalent all over the district. The uplands classified as '*Dahi*' are the foci of such erosion. *Nayabadi* lands are also subjected to sheet and gully erosion. Gully erosion is generally located near the lower lands, the upper catchment of which has not been terraced. They are generally more prevalent in the soil of heavy clay type and with Kankar nodules. This soil is characteristically sticky and swells high when wet. But in summer when it is dry it cracks heavily like black cotton soil. This aggravates gully erosion.

50. Soil

(*i*) **General soil Condition**

The soil which covers the greater part of the district is apparently derived from the underlying igneous metamorphic rocks and the difference in it is mainly due to classification and transformation effected by the surface drainage. The finer particles have been carried into the low-lying areas along the drainage lines rendering the soil a clayey or silty texture and leaving the uplands light and sandy. The most usual classification of the soil of this area is based on its position or level. The area is mainly undulating except along the few rivers and it comprises ridges, slopes and depressions.

The top soil is shallow, the average depth being 4" to 9". It is from sandy loam to silty loam in character, but at places, the top soil goes as deep as 9 feet. Generally the bottom soil is either of lateritic nature or of non-calcareous gritty silt and may be as deep as 9 feet.

The cultivators recognise for themselves a few classes of soil, such as (1) Balimati, (2) Dorasa mati, (3) matial or Chikita mati, (4) Tilak mati and (5) Lalmati.

Balimati contains more than 2/3rd of sand and is very poor in fertility. Chikita mati is strong sticky clay which gets water logged as water is poorly drained. Dorasa is a kind of mixed soil of sand and clay. It is retentive of moisture and easy to work. Tilak mati is gray in colour and has a very sticky texture. It shrinks and cracks when dried. Lalmati is red in colour and is sandy. It is of lateritic origin. It has the least fertility.

It may be stated that no soil survey has yet been made in the district. From the general observation of the soils collected from different parts of the district, this may broadly be classified into two groups: (1) Red soil and (2) Laterite soil.

(*ii*) Red Soil

The colour of the soil is generally red, sometimes grading to brown, chocolate, yellow or gray. The redness is due more to a general diffusion than to a proportion of iron contents. This soil grades from the poor thin gravelly and light coloured varieties of the uplands to the more fertile and deep dark varieties of the plains and valleys. It is generally poor in nitrogen, phosphorus and humus. The clay fraction of the soil is rich Kaolin type of mineral. In this district three sub-groups of the soil is also noted.

(*a*) The typical red soil is found mostly about the hill areas of Bamanghaty and Panchpir subdivisions. Mostly *Aus* paddy, gunduli niger, lesser millets, sabai grass and other minor crops are grown there. With the availability of irrigation facilities, ideal orchards can be developed in this soil.

(*b*) The red-loam soil is found near the river-banks. Early paddy, groundnut, til, castor, black mung and kulthi are grown.

(*c*) Clayed loam type of soil is mostly found in Kaptipada and Baripada subdivisions. Medium and late varieties of paddy are grown in this soil. After paddy, it remains fallow and in some cases it is followed by the cultivation of gram, linseed and lentils, etc.

(*iii*) Laterite Soil

This soil is found in hill and plateau. Two types of laterites have, so far, been distinguished. They are laterite morum and laterite rock. For agricultural purposes, the soil has no productive value.

51. Classification of Land

The main three classifications of agricultural land are *Pal, Jal* and *Dahi.*

The *Pal* lands consist of the lands on the river-banks and can be irrigated with river-water lifted by *tenda* or pumps. The *Jal* lands are those that are in the depressions and prepared in the course of valleys by putting earth bunds and thus the whole course is converted into *Jal* paddy lands. The soil is rich in fertility and moisture is always retained. Medium and late deep-water heavy-yielding varieties are grown here. This type of land is suitable only for paddy whereas the *pal* lands generally grow early paddy, vegetables, spices, cereals and sugar-cane. *Dahi* lands consist of high lands on some water-shed, that is, the up-lands which are dependent for moisture on rainfall. They are sandy Generally oil seeds, pulses and early *Aus* paddy are cultivated. The *Pal* and *Jal* lands grow paddy, whereas Dahi lands grow crops requiring less moisture. Throughout the district, there is variation in the *Dahi* land growing light miscellaneous crops and paddy. So, the soil in a closely cultivated tract is little better than exhausted sand or gravel. In hilly wooded tracts it is more fertile but the crops usually suffer from depredations of wild animals.

The other classes of land are known as *Khatra* or *Khari* and *Palua* or *Bari. Khari* is the term used for land situated near the village which receives the drainage of streets and houses. *Bari* denotes vegetable gardens, generally occupying high land close to the homestead lands, which are enriched by the village drainage and can grow two or more vegetable crops every year.

For the purpose of soil classification in Mayurbhanj the following descriptions are adopted for revenue purposes. The inferior kinds of wet land popularly known as *Jal soyem* (third class wet land) lie along the newly reclaimed hill side, jungle lands or on uplands which have been ridged round to hold the water at the proper level which is so essential to wet cultivation. Lands of this kind also lie along the outskirts of more fertile (*Bari* or *Khamar*) lands met with in abundance in flat valleys scattered all over the plains. Of these, such portions as are satisfactorily watered by natural or artificial means of irrigation are called *Jal awal,* or first class wet land, while the remaining portions which are less benefited by irrigation go under the name of *Jal doyem* or second class wet land. The soil of the third class *jal* land may be described as generally rocky and gravelly, while that of the flat valleys as sandy loam of varying quality. Besides these, alluvial (*Pal* or *gadi*) lands can be traced along the banks of the principal rivers. A special tract of such land on the bank of Burhabalanga near Baripada town has, by reason of its richness and fertility, attracted a good number of

professional vegetable growers who have formed a small colony of their own and on whom the vegetable-supply of the town mainly depends

52. Principal Crops

The principal crops are—Paddy, pulses, oil-seeds, fibre crops, sugarcane, cotton, tobacco and vegetables.

(*i*) Paddy

Paddy is the major crop and has a coverage of about 70 per cent of the total cropped area. The coverage of other crops is given in (Appendix I). About 300 varieties of paddy are grown. But it is broadly divided into three classes. (1) Aus or Ashu (early), (2) Aman (Winter) and (3) Dalua.

Aus paddy is sown in May and harvested in August. Though the yield varies from 8 to 9 maunds per acre, the cultivators prefer this crop as they get the harvest during the lean months, i. e. in August and September. About 48 per cent of the paddy land in the district is high land and so all cultivators possess major portion of their holding under this category.

Aman (Bad dhana) paddy is sown in May and June and harvested during November and December. This crop covers an area of about 315,000 acres and the yield is roughly 11 to 12 maunds per acre.

Dalua paddy is transplanted in January-February and harvested in April-May. The per acre yield varies from 8 to 9 maunds. This crop covers an area of about 133 acres due to limited irrigation facilities. The existing projects are not in a position to supply water for this crop which has to be heavily watered in the dry season.

(*ii*) Pulses

Mung (Muga), Biri, Kulthi (Kolatha) and Arhar (Harada) are the major pulses. The total area covered by these crops was 53,629 acres in 1964-65. Mung, Biri and Kulthi are sown in September-October and harvested in December-January. They follow Aus paddy and normally yield 3 to 4 maunds per acre. Arhar is grown in *kharif* season and harvested in March. The normal yield per acre varies from 10 to 11 maunds. Of the pulses following Aman paddy, gram is the most important. It occupies an area of about 6,820 acres. The crop is sown in November and harvested in March. The normal yield is 7 to 8 maunds per acre. The pulses are generally raised on high-lands.

(*iii*) Oil-Seeds

The oil-seeds include niger, mustard, til, castor and groundnut. All these oil-seeds are grown in uplands. The newly reclaimed

lands give a good yield of these oil-seeds. Castor is grown on the sandy river banks as a *rabi* crop and on home-stead lands as a *kharif* crop.

(*iv*) Fibre Crops

The important fibre crops of the district are Jute, mesta and sun-hemp, which occupied an area of 5,421 acres in 1964-65. They are sown in June and cut in August. The normal yield is about 8 to 9 maunds of fibre per acre. Recently line sowing of jute is being encouraged as it gives good yield. Acreage under jute cultivation is gradually increasing. This is due mainly to demand for export.

Sun-hemp is grown mainly as green manuring. Cultivation of cotton in small patches is found particularly in Panchpir and Bamanghaty subdivisions. It covered an area of about 300 acres in 1964-65.

(*v*) Sugarcane

Sugarcane covered an area of 1,040 acres in 1964-65 mostly in river side villages.

The varieties of sugarcane previously cultivated were Dhubh (white) Khari and Samsara. At present, sugarcane of Coimbatore improved varieties is grown, the most common being co-421. Planting is normally done in January-February after a thorough preparation of the field. It is ploughed for about 6 to 8 times Till the break of monsoon, it is irrigated by *tenda* or pump. Chemical fertilisers are applied before the rains set in. When the sets germinate, the cultivators take up hoeing and weeding. Harvesting and crushing of sugarcane are generally done in January and Gur prepared before "Makara" festival, when the demand is great. The average yield is 30 maunds of Gur per acre. As there is no sugar factory in the neighbourhood the cane is utilised only in Gur-making.

(*vi*) Tobacco

Cobden Ramsay wrote in 1907 : "Tobacco of inferior quality is cultivated by the poorer classes of the Bamanghati subdivision on home-stead land for their own consumption. Five maunds of dry tobacco leaf on the average, is said to be obtained by the cultivators from one *man* (0·69 acres) of land but a well-grown crop is expected to yield 10 to 12 maunds per *man*". Now tobacco is mostly grown on the river-side land for domestic use, i. e. for smoking and chewing. Only local varieties (Rustica) are grown. The area under cultivation was 500 acres in 1964-65. It normally yields 8 maunds of dry leaf.

(vii) **Tea**

During the Durbar Administration experimental tea plantation was started in the south-eastern slope of the Similipal hill. This experiment was not continued after merger. But tea bushes still stand at Pithabata although no tea is produced.

53. Fruits and Vegetables

(i) The light red soil of the district is suited to orchards. Mango-groves are to be seen in many parts of the district. Banana and papaya are common in Panchpir subdivision. Tamarind is found also in this region. The villages Kulipal and Patia Simili in Kuliana Police Station are notable for lemons, where almost every house-holder possesses a small lemon orchard and derives good income from it. This lemon, at times, reaches Jamshedpur and Calcutta markets. There is no cocoanut cultivation in this district. Fruits like orange, pine-apple, pomalo, pomegranate, lemon, jack fruit, lichu and rose-apple are to be seen in some orchards. The produce of the above fruits are usually marketed in the locality.

The most favourite tree of the aboriginal tribes is Mohua (Mohul). They use the flowers for food and drink. For use during periods out of season, they dry the flowers and store. The flowers are also used as cattle-feed, while the thick oil produced from the seeds is used for lighting as well as cooking medium.

(ii) **Vegetables**

Among winter vegetables, cabbage, cauliflower, knolkhol, potato, lady's finger (Bhendi), peas, radish and turnips are note-worthy. Among the *kharif* vegetables, pumpkin, brinjal, chillies, etc. deserve mention.

54. Area under Cash Crop, Rabi Cultivation and Vegetable Cultivation.

(i) Under cash crops, oil seeds top the list followed by Jute, sugar-cane and chillies. Cotton has not yet risen to the level of other crops because of unsuitability of climate.

In 1964-65, 2,248 acres were under chillies, 1,700 acres under jute, 3,421 acres under mesta, 37,000 acres under oil-seeds and 1,040 acres under sugar-cane. Area under vegetable cultivation is also rapidly rising. As against 5,230 acres in 1959-60, 28,659 acres was covered under vegetable during 1964-65.

(ii) **Orchards and Gardens**

The following are some notable orchards of the district:

1. Sir Daniel Hamilton Garden at Katpal
2. Swarup Villa Orchard and Garden at Machabandha

3. Missionary Orchard at Rajabasa
4. Takatpur Fruit Orchard and Garden
5. Pratappur Farm
6. Derha Farm

55. Agricultural Implements

A list of principal implements of agriculture used in the district is given below:

1. Langala (wooden country plough).
2. Mai (beam) used for breaking clods and levelling lands.
3. Bida (harrow) used to conserve the soil moisture by breaking the water capillary of soil and soil mulching.
4. The Sagad or disc wheeled cart for carrying manure to the field and for carrying unthreshed paddy to the farmyard (this was common in the past but is now rarely used).
5. Bahangi—It is a carrying rod made of an elastic piece of wood or bamboo and is used for carrying seeds, etc.
6. Buria (small axe) used for cutting wood.
7. Kuradi (big axe) used for cutting wood.
8. Bindhani or Nihan, an iron rod used for boring holes in wood.
9. Barshi—It is a kind of axe used for making carts and plough.
10. Sabal—It is a heavy iron rod used for making holes in soil.
11. Gainti or Gainch (pick axe) used for digging trenches and removing small stones.
12. Da (sickle) used for reaping paddy, etc.
13. Kodali (spade) used for levelling soil and digging soil and to remove it.
14. Ghachikata—It is a small spade used for removing paddy plants, after the weeding, from congested parts of the field to parts less thickly planted. It is rarely used.
15. Basket—Used for carrying manures, etc.

The cultivators are well acquainted with these implements. These are simple in make, easy to operate and cheap to purchase. Attempts to replace the less efficient implements are gradually meeting with success. Japanese weeders, sprayers, dusters and to certain extent iron ploughs are becoming popular. Of the heavy implements, tractors and pumps are in use at places. Most of the Grama Panchayats possess pumps which they hire out for purpose of irrigation. The Agricultural Department also maintains pumps and cane-crushers to be hired out to

the cultivators. The Census of 1961 enumerated 165,256 wooden ploughs,777 iron ploughs, 47,371 carts, 20 tractors, 192 sugar-cane crushers worked by bullocks and 65 worked by power.

56. Seeds and Manures

(*i*) Improved paddy seed saturation scheme

During 1964-65, 190,000 acres were brought under improved paddy seed. To saturate the above area under improved seeds, 2,231 tonnes of nucleus paddy seeds were distributed. Besides paddy seeds, wheat, pulses, gram, millets, vegetable seeds are also supplied at subsidised rates to cultivators through Agricultural Department.

(*ii*) Consumption of Fertiliser

From the report on soil analysis it is observed that soil of the district is mostly deficient in nitrogen, which is an essential element for growth of any crop. Before the introduction of scientific method of agriculture, cultivators were using only cowdung manure and oil cakes. At some places the silt of old tanks was being used. At present cultivators are getting accustomed to the use of chemical fertilisers, viz., both nitrogenous and phosphatic which contribute a good deal towards enhancing the yield. Fertiliser consumption is gaining popularity year to year. A statement showing the consumption of chemical fertilisers during 1959-60 to 1963-64 is given below (All figures in tonnes).

Year	Amonia Sulphate	Amonia Sulphate Nitrate	Calcium, Amonia Nitrate	Super Phosphate
1959-60 ..	51·50	..	7·20	31·70
1960-61 ..	108·50	..	17·05	68·30
1961-62 ..	128·8	2·1	21·0	104·9
1962-63 ..	142·0	4·8	18·6	142·6
1963-64 ..	114·20	23·40	93·30	234·40

(*iii*) Production and use of Compost and Green manure

Like chemical fertiliser, compost plays a vital role in agriculture. The cultivators do not apply required quantity of compost. As a result, the production does not become attractive. With the introduction of chemical fertilisers the application of compost has become a necessity. Through the medium of Community Development Blocks the cultivators are taught its utility. In 1964-65, 122,000 acres were covered by compost and quantity of compost produced was roughly 275,000 tonnes. During the same year 18,200 acres were green manured.

57. Rotation of crops

It is commonly found that after paddy, the land is left fallow. During this period, land recoups its fertility. Rotation of crops is practised on a limited scale. What Cobden Ramsay said in 1907 holds good today. [1]

"Rotation of crop is seldom practised by the people. It is confined to uplands (*gora*). On *berha* lands some well-to-do and industrious cultivators sow *khesari* in September before the paddy crop has been reaped. On *jal* lands which are very fertile, mustard or *muga* is sometimes sown after harvesting the rice crop. Double crops are, however, raised by very few tenants of the State. The fertile uplands (*gora*) are alternately cultivated with *gora* paddy in one year and mustard, *Surguja* and *till* in the next. Maize or *maka* is sown with cotton, *arhar* with *gora* paddy and *gangi* with *maka*. On very fertile *gora* lands containing a large proportion of clay, gram is sown with mustard, but gram cultivation is extremely limited".

58. Diseases and Pests

Outbreaks of crop pests and diseases in virulent forms are regarded by the Adibasi cultivators as a manifistation of divine displeasure. As soon as these are observed 'Pujas' and animal sacrifice are resorted to. With modern methods of control of pests and diseases, the cultivator's outlook to these problems is gradually changing. Insecticides and fungicides with sprayers and dusters are being stocked at Block and Grama Panchayat Headquarters for supply to the cultivators. Experience shows that Gammaxane is gaining popularity in the fight against pests and crop diseases. The common pests are: (1) Rice bug, (2) Leaf hopper (Jassida), (3) Leaf eating caterpillar, (4) Rice hispa, (5) Stem-borer, (6) Epilachna beetles, (7) Lady bird beetles, (8) Top-shop beetles.

59. Agricultural Farms

In the pre-merger period, there was only one farm at Samakhunta. Later during the Second Plan period (1956-57 to 1956—61) Government started seed multiplication farms at Dalki, Sandeuli and Dhanapana. Short accounts of these farms are given below.

(*i*) Samakhunta Farm

Situated in the village of the same name in the Baripada subdivision, it is an old farm established in 1935. It was started primarily for the purpose of multiplication of seeds. It has a total area of 69·85 acres of which 62 acres are under cultivation and the rest occupied by roads, buildings and drains. Water is provided mainly by the Balidiha Irrigation Project. A small patch of land is put under *rabi* cultivation. One Agricultural Overseer holds charge of the farm. He is assisted by an Agricultural

[1] Cobden Ramsay, *Feudatory States of Orissa*, P. 247.

Sub-Overseer and two Fieldmen Demonstrators. The total outturn of paddy, on an average, is 1,200 maunds a year and the average yield per acre is 19 mds.

(*ii*) Dalki Farm

This is a seed multiplication farm, situated in Bamanghaty subdivision. It was started in 1957. The total area covered is 41·30 acres of which 30 acres are under cultivation. Principally, paddy is grown here. The farm gets its water from the Dalki-Jarda Irrigation Project. In absence of regular and adequate supply of water, *rabi* cultivation has not been taken up. Only vegetable cultivation on a small scale has been done. The total paddy-yield per year is 255 mds. It gives a low average yield of 10 mds. per acre because of the soil and physical situation of the farm. Steps are being taken to increase fertility through green manuring. The staff of the farm consists of one Overseer and two Fieldmen Demonstrators.

(*iii*) Sandeuli Farm

It was established in 1957. It is situated in Sandeuli village in Panchpir subdivision. The farm covers an area of 44·89 acres of which 32·14 acres are under cultivation. It is irrigated from the Jharada Irrigation Project during rainy season. Cultivation of *rabi* crops has been rendered difficult for want of water. The total paddy yield per year on an average is 530 mds. and the average yield per acre is 18 mds. The farm is managed by one Agricultural Overseer and two Fieldmen Demonstrators.

(*iv*) Dhanpana Farm

It was started in 1958. It is in Dhanapana village, in Kaptipada subdivision. The farm covers an area of 43·06 acres of which 39 acres are under cultivation. Paddy is the principal crop. It yields about 660 mds. of paddy a year. An acre yields on an average 19 mds. of paddy. One Agricultural Overseer holds charge of the farm and is assisted by two Fieldmen Demonstrators.

60. Training Centre

Two-Field man Demonstrator Training Centres have been started at the Samakhunta and Sandeuli Farms from the 1st January 1961. They impart training to eight candidates each.

61. Agricultural Shows

Every year two Agricultural Exhibitions are held in each of the four subdivisions. The District Show is held annually at the district headquarters at Baripada.

62. State Assistance

The State Government is advancing Tacavi loans under the Agriculturists' Loans Act and Land Improvement Loans Act to the cultivators for construction of wells, tanks, other works for storage of water, reclamation of land for agricultural purpose and other purposes for improvement of agriculture.

The amount of loans advanced under these Acts from 1960-61 to 1964-65 is given below :

Year	Under Agriculturists' Loans Act (in rupees)	Under Land Improvement Loans Act (in rupees)
1960-61 ..	1,31,530	29,990
1961-62 ..	1,14,590	27,600
1962-63 ..	1,00,000	22,800
1963-64 ..	4,990	10,000
1964-65 ..	3,000	2,840

As loans are being advanced through the Co-operative Credit Societies since 1963-64 the amount shown above for the years 1963-64 and 1964-65 has marked a decrease. 1965-66 is the year of drought and Government have sanctioned full remission of land rent in the areas where more than 75 per cent of crops have been damaged. Government have also provided a sum of Rs. 2,18,000 which includes Rs. 1,00,000 for purchase of fertilisers to be advanced to the agriculturists.

63. Natural Calamities

The district is not generally susceptible to floods. However, the Subarnarekha valley, which is on the north-east border and the east of the district, is the only part which gets flooded in some years. The flood in almost all the rivers in the year 1927 was the highest in living memory. That year, flood in the Burhabalanga river exceeded the highest level recorded in the year 1900 by 8¾ inches.

Though the district adjoins the coastal area lying in the cyclonic zone, it has not experienced much damages due to the effect of cyclone. The great cyclone of May 1887 which passed over Orissa causing much damage to coastal districts was not so destructive in Mayurbhanj.

But drought and famine are not so rare. The great Orissa famine of 1866 (Na-Anka) had its effect in this area along with other parts of Orissa.

Brief accounts of Natural Calamities in Mayurbhanj from 1900 A. D. onwards are given below.

(*i*) Flood of 1900

"The unprecedented flood in the month of September, 1900 caused some damage to crops and large tracts of river-side lands were made uncultivable by deposit of sand. Great loss was caused to small bundhs created by raiyats and the irrigation bundh, which was being constructed across the Palpala river near Baldiha was totally destroyed" [1].

(*ii*) Famine of 1907

We get the following account about the scarcity that befell the ex-State in 1907, from the Administration Report. [2]

"The year was not a prosperous one for agriculturists and agricultural labourers in general. Owing to deficient and unevenly distributed rainfall, there was failure of winter paddy and *rabi* crops to a very great extent in almost the whole of the Bamanghaty Subdivision and in parts of the Sadar Subdivision, specially in Majhalbhag and Uperbhag perganahs. In the remaining portions of the State the people did not reap so good a harvest as in the year preceding.

"As the outturn of paddy and *rabi* crops in the whole of Mayurbhanj was comparatively poor there was a considerable rise in the prices of rice and other foodgrains. In the preceding year also high prices prevailed although the outturn of crops was satisfactory. But this was partly due to the great demand for rice and paddy from outside the territory owing to the scarcity prevailing in several parts of British India and the consequent export of rice and paddy in very large quantities. The cultivators of the soil were thus able to sell off their surplus produce to the best advantage. The sale proceeds enabled them to pay off their debts and to procure some comforts and luxuries and also to withstand, to some extent, the distress which the scarcity prevailing during the year inflicted. Some distress has been caused among the improvident aboriginal classes in the affected parts although it was not as acute as was anticipated. Cultivators in these parts found some difficulty in supporting themselves and the agricultural labourers went to other parts of the State for employment in harvesting operations where the conditions of the crops was better. ***Careful statistics were obtained to ascertain the

[1]. Report on the Administration of Mayurbhanj, 1900-01

[2]. *Ibed*, 1907-1908.

extent of the failure of crops and that of the relief that would be required to be given. Rice was generally selling at 8 seers per rupee. During "Makar" time, prices of all kinds of grains rose by more than 50 per cent. To add to the gravity of the situation the outturn of *Mahua* flower was only about four annas of the average crops and that of *Kendu* fruits which grow in abundance in the forest was almost nil. Owing to the long drought which prevailed from October to March (except in December land January when there were a few light showers) the supply of jungle fruits and roots was below the average. Edible jungle products specially *mahua* and *kendu* form a welcome and necessary addition to the food of aborigines in normal years and in a year of scarcity their absence naturally aggravates the situation. The Forest Department was however instructed to give every facility to those who would collect those forest produces that would be utilised as human food.

" It was evident by the middle of November, 1907 that scarcity would overtake some parts of the State in the near future. The first measure adopted was to advance about Rs. 5,000 from the granary accounts to the raiyats of Majhalbhaga and the south-western *pirs* of Uperbhag pergannah. It was apprehended that in the Sadar Subdivision scarcity would prevail in Majhalbhag, almost the whole of Uperbhag, Olmara certain *pirs* of Baghra, parts of Rasunia, Mantir and Banhari pergannah. An estimate of Rs. 1,68,500 exclusive of Rs. 6,500 specially provided for in the P. W. D. budget for Famine Relief works, was sanctioned for the purpose of affording relief to the people. The amount included Rs. 1,17,500 for the Bamanghaty Subdivision and Rs 51,000 for the Sadar Subdivision"

Construction of the Bundhs across the Gohirakhal was started with an original estimate of Rs 5,000 which later yielded canal revenue to the State. Out of the Relief Fund the schemes for construction of the Baidiha and Haldia Bundhs were prepared.

(*iii*) Other Scarcities

No famine occured in the subsequent years. Reports show that there has been scarcity in the years 1916, 1919, 1920 and 1942. Of these the scarcity of 1916 deserves mention. The rainfall during this year was not inadequate but due to its bad distribution scarcity overtook the district. The total rainfall in 1916 was 60·92″ against 67·47″ in the previous year. More or less, it affected the whole of Mayurbhanj. Bamanghaty Subdivision was the worst affected one.[1]

Export of rice was stopped. On the other hand rice had to be imported from outside.

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[1] *Report on the Administration of Mayurbhanj*, 1915-16

In other years, there was no all round scarcity and scarcity in any locality could be met by transport of rice from surplus areas.

The scarcity of 1916 coupled with recruitment for Labour Corps in France during World War I, gave rise to the Santal rising of 1917.

(iv) Flood of 1927

It was the highest of floods that ever occurred in Mayurbhanj. There was a cloudburst at Baripada on the 29th July,1927, with 7 inches of rain. A disastrous flood followed. It caused extensive devastation of crops and property in the riparian villages. Kaptipada subdivision suffered less. The other three subdivisions suffered heavily.

We get a graphic account of the calamity from the Administration Report of the corresponding year. This is quoted below.

"In the Sadar subdivision, the Burabalang river overflowed its banks and the riverside villages in pergannahs Upperbhag, Majhalbhag, Barpara, Kuradiha, Mantir and Gardeulia were much affected. On the 29th July 1927 the large embankment of Haldia Bandh on the Chipat river burst and its water had no out-let. The Chipat, the Sarali and the Jarali rivers all rose. This resulted in cutting of the Baripada station road from the town with 4 to 5 feet water on the road. There was four feet of water in the female ward of the Baripada Hospital. Considerable damage was caused to the houses lying on the low-lying parts of the own occupied chiefly by the poorer classes. The Ranibag garden was completely submerged and much damage was done to the huts and furniture.

"In the Sadar subdivision, no human life was lost in the floods. In 323 villages, crops to the extent of 6 to 8 annas and other properties were lost. Loss of cattle was nominal, 2,731 houses collapsed, roads, bridges, bundhs and tanks were damaged. The cost of repairs to these works was estimated at Rs. 38,216.

"In the Bamanghaty Subdivision, the Kharkai river over-flowed its banks and the enormous force of the water washed away the Railway bridge on the Rairangpur-Badampahar line and submerged a part of the Rairangpur bazar. In 282 villages, crops to the extent of 4 to 14 annas and other properties were lost. Nine human lives and 264 heads of cattle were lost. 205 houses were washed away and 375 collapsed. Rs. 18,463 was estimated by the P. W. D. for repair of roads, bridges, bundhs and tanks damaged by this flood. Considerable tracts of agricultural lands on the banks of rivers were either highly eroded or choked with sand. These tracts are being resurveyed by the Settlement Department to give relief to the owners of such lands. Rs. 1,626-9-6 was collected from the public to be given to the distressed. This was distributed and the State

grant of gratuitous relief was not touched, Rs. 1,679 was distributed as Taccavi loan, Rs. 5,182 was spent for construction and repair of bundhs and roads during the year under report. Out of the amount Rs. 4,407 was the State grant from the Sreeram Chandra Memorial Fund and the balance of Rs. 775 was contributed by the people.

"In the Panchpir Subdivision, the damage was along the banks of river Baitarani, Bhandan and Khairi. In the high floods, nine human lives and 487 heads of cattle were lost. In 199 villages crops varying from 4 to 15 annas and other properties were lost. The number of houses washed away was 464 and that broken was 541. The repair work of roads damaged by the floods estimated by the P.W.D. at Rs.1,032. Rs. 3,000 was advanced as Taccavi loan in consequence of damages by flood".

(v) Flood of 1940

Heavy flood came on the 1st July 1940 consequent on incessant downpour throughout the ex-State. Almost all the rivers and nullas were in spate but the Burhabalanga caused the greatest damage. The floods caused great deal of damage to property and lands in the riparian villages. They washed away roads, damaged causeways and bridges, endered people homeless and ruined standing crops.

Statistics show that the ex-State Administration gave doles to about 40,000 people affected by the floods. Private enterprise in this connection as also commendable.

Reconstruction of roads, bridges and culverts was taken up as a measure of additional relief in areas worst affected by the floods and this provided employment to a large number of people. The food situation was effectively controlled within a fortnight. Necessary precautionary measures were taken to check the outbreak, and spread of epidemics among men and cattle. Rs.12,000 was given as advance to poor tenants. An amount of Rs. 3,000 was given away as gratuitous relief to indigent agriculturists. Suitable advances in form of seeds were also given. Concession was granted for timber to meet the requirements of the people who had their houses either lost or damaged.

(vi) Flood of 1943

"Consequent on the heavy rainfall from the 3rd to the 5th August 1943 all rivers and streams were in spate. Though the floods in Burhabalanga were a few inches below the highest flood level of 1927 the floods in the Subarnarekha were unprecedented. Reports received from various sources showed that 844 families in 125 villages were affected by the floods. Loss of human life and cattle was 16 and 291

respectively. Crops standing on about 200 *mans* of land were affected besides the general damage done to the low-lying first class lands by their being covered with sand.

"With the rise of water level, officers were deputed to areas likely to be affected by the floods. For purposes of relief, the entire area was divided into four centres each being placed under the supervision of a responsible officer.

"Gratuitous relief was immedaitely given. Temporary shelter was arranged. Necessary medical facilities were given. Thousands of maunds of paddy were requisitioned from stockists and mahajans to relieve the distress and relief works were started wherever necessary. Free timber was supplied to those whose houses suffered damage.

"Private enterprise in this direction was commendable. The Dewan in his personal capacity inaugurated the Distress Relief Committee on the 17th August with 13 members of whom 11 were non-officials. On behalf of the Committee the President issued a printed appeal to the public for funds which evoked ready response. The collection of the Committee amounted to Rs. 3,545-5-0 out of which Rs. 1,600 was provided for distribution of cloth in addition to about 700 yards of cloth donated by a local merchant. Liberal help was also given by the Committee to local non-official organisations for carrying on relief work." [1]

(*vii*) Drought of 1954 and 1955

In 1954, the rainfall was 48·92 inches and an averege of 8·84 inches during May—September. In the aggregate about 425,000 acres of land and 237,930 people were affected. While people were looking forward for favourable conditions in 1955-56 after a year of suffering, drought conditions continued in the district shattering the hopes of the people. Although the intensity was not acute as in the previous year, it was enough to break the morale of the people who were victims of scarcity continuously for two years.

Out of 131 Grama Panchayats affected during 1954-55 sixty-four Grama Panchayats continued to remain under conditions of distress in 1955-56. In other areas crop condition improved to some extent. Out of 64 Grama Panchayats, 14 Grama Panchayats showed a yield of less than 4 annas to 6 annas and the remaining yielded 6 to 8 annas of crop. The Panchpir subdivision was worst affected by the drought in the year 1955-56.[2]

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[1] *Report on the Administration of Mayurbhanj* for 1943-44

[2] *Drought in Orissa during 1954 and 1955*—Final Report

(*viii*) Cyclone of 1959

There was a high flood in September, 1959 in some of the districts of Orissa which caused devastation. Soon after the flood, a severe cyclone accompanied by torrential rain started from the afternoon of the 29th September, continued unabated till the morning of the 1st October, and caused damage to certain parts of the district. As a result, 49 villages, 1,544 families and 3,000 acres of land in the district were affected. It took a toll of 3 human lives, 50 goats and damaged 1,623 houses[1].

The destruction was, however, not so large as in the neighbouring district of Balasore.

(*ix*) Drought in 1965

The Normal annual rainfall in the district is 60" but in 1965 there was only 46" of rain, as a result of which crops failed in 70 per cent of the high land and 10 to 15 per cent of the low land areas. As many as 289 villages in the district were affected by drought. Remission of Land Revenue was ordered in nine Block areas which were badly affected. These were Khunta-I, Bisai-I, Bisai-II, Bangiriposi, Badasahi, Thakurmunda, Karanjia, Tiring and Kusumi. The worst affected areas were Khunta Block-I and Bisai Block-I. In these two Block areas the villages Kendugudia and Baunskantia in Kendugudia Grama Panchayat, Kaduani in Bisoi Grama Panchayat, Mangalpur, Thudukuchanti and Parabhadi in Bautibeda Grama Panchayat had failure of crops of 70 per cent or above. So, full remission of Land Rent for the year 1965-66 was sanctioned for these villages. In villages where damage caused was less than 75 per cent and above 50 per cent collection of Land Revenue was suspended. Collection of loans from Agriculturists in all drought affected areas has also been suspended. Test relief works were undertaken providing for 80,000 people in these areas. An amount of Rs. 8 lakhs 50 thousands was allotted for Test Relief work and Rs.1 lakh for making provision for drinking water in the drought affected areas. Government also opened several fair price shops to meet the drought situation.

(B) ANIMAL HUSBANDRY

64. General Condition

The general condition of cattle is very poor. Adibasis who form the large majority of the population do not consume milk. Cows are, therefore, neglected. Bullocks which are used for ploughing and on carts are better looked after. There are very few buffaloes. A cow given

[1] *Final report on Flood and Cyclone during 1959*

on an average 1-2 pounds of milk a day. The livestock population (1961) is given below:

Cattle	..	677,358
Buffaloes	..	53,152
Sheep	..	118,854
Goats	..	334,827
Horses and Ponies	..	319
Pigs	..	33,818
Poultry (fowls)	..	184,906
Ducks	..	26,294
Others	..	56,412

65. Fodder

During the rainy and winter months sufficient grass is available in pasture and forest areas. But during the summer, scarcity of fodder is keenly felt. The principal fodder is straw, leguminous fodder and sugarcane tops. Special fodders are seldom cultivated and usually whatever crops people raise in their fields, they use it as fodder after harvest.

Total pasture available is 140,000 acres. With a view to popularising fodder cultivation, demonstration plots are raised in different Veterinary institutions and from these plots root slips are supplied to interested farmers for propagation. In all, there are 62 such demonstration plots. Fodder root slips were supplied in 1964-65 to 137 persons. In addition to the fodder demonstration plots there is a fodder farm at Pratappur under Key Village Scheme, measuring 7·8 acres, in which the following grasses are raised :—

(1) Guinea grass
(2) Elephant grass
(3) Para grass
(4) Cowpea
(5) Hybrid napier

66. Milk Supply

There is acute shortage of milk in the district. Milk supply to the towns is usually from the rural neighbourhood.

There are two Gosalas, one at Baripada and the other at Rairangpur. The Gosala at Baripada though an old institution is not yet registered. There are no pasture, fodder cultivation or suitable cowsheds. The average daily yield of milk is only 30 pounds. The Rairangpur Gosala though started recently (1960) has done good work in building construction and purchase of livestock. The milk-yield varies from 60 to 80 pounds a day. It is a registered institution.

67. Sheep and Goat

The sheep are of non-woolly type. They are reared mainly for the purpose of mutton. The goats are of Black Bengal type and yield very little milk, barely sufficient for their kids and they are also reared for table purpose.

Attention has been paid for improving the condition of goats. Artificial insemination for better type of progeny is in operation. In Badasahi key village, one buck was maintained, 27 goats were inseminated and 47 progenies were obtained during 1964-65. Out of 27 Community Development Blocks, 26 Blocks have taken up goat breeding with 75 Buck centres. Out of these, 33 Buck centres are maintained by Utkal Gomangal Samiti and rest by Blocks. In the year 1964-65, 5,954 bucks were served and 7,255 kids were born. In the same year Utkal Gomangal Samiti opened 2 zones, at Badasahi and Khunta-I Blocks.

68. Poultry

Indegenous poultry is available in abundance. But these are not good layers when compared to birds of improved breed. The reasons for their popularity among the Adivasis are that they need very little care for rearing and their demand for table purpose is high. In the various Community Development Blocks poultry units, artificial hatching centres deep litre poultry development scheme and UNICEF scheme are in operation.

Poultry units are functioning with pure breed white leg horn. Eggs are sold for hatching and consumption. There are altogether 9 units with 319 hens. To upgrade the local poultry population, cocks were supplied to interested poultry keepers on exchange basis.

But the practice of cock-fight and heavy toll by wild cats are the main hindrance to progress.

69. Expanded Nutrition Programme

In certain selected Community Development Blocks, Expanded Nutrition Programme Scheme is being taken up where Mahila Samitis are encouraged to take up poultry rearing for the benefit of expectant mothers and small children. On certain selected days in the week mid-day meals are given to expectant mothers and small children, consisting of either fish or eggs in the menu. The scheme is in operation in 5 Community Development Blocks, viz., Raruan, Kaptipada-I, Bahalda, Badasahi and Udala. Under Expanded Nutrition Programme 30 Mahila Samitis functioned during 1964-65.

To further intensify the poultry development work, the Tribal & Rural Welfare Department have also established poultry units in Ashram Schools and sub-units in villages. 20 Hens and 2 cocks are reared in the Ashram School Poultry units for supplying eggs to the sub-units.

Each sub-unit gets supply of wire-nettings and 90 eggs on condition that they give, in return, 15 birds to the unit. Similar scheme has also been taken up at the Special Multipurpose Block, Raruan, with large provision of funds.

70. Measures to improve quality of Breeds

For upgrading the non-descript type of cattle, breeding programme through artificial insemination and natural breedings have been taken up. There were 23 Bull centres in 1964-65 and that year 1,740 services were conducted and 1,440 progenies were born. Intensive breeding zones with Hariana bulls were started by Utkal Gomangal Samiti in 3 Blocks. Each Block was provided with 5 bulls which were distributed in 5 contiguous villages. To these three Blocks, altogether 15 bulls were supplied in the year and number of service conducted was 1,271. In addition to natural stud centre there is one key village scheme functioning at Badasahi with seven sub-units in Badasahi Block. Besides the key village scheme, there are 17 artificial insemination centres which includes 6 pure artificial insemination sub-units.

71. Cattle shows and Fairs

Cattle shows are held every year in different parts of the district and prizes awarded to the best competitors. Regular cattle markets sit at Udala, Kuliana, Saraskana, Jashipur and Hatbadra.

72. Diseases

The principal animal and poultry diseases that break out in epidemic are haemorrhagic septecaemia, black quarter, rinderpest, foot and mouth disease and Ranikhet disease.

Haemorrhagic septecaemia and black quarter generally occur after the advent of rains and in the winter also, if there is an occasional shower. The source of infection of both these diseases is the natural grazing ground where organism responsible for these diseases remain in a dormant condition. After a shower they become virulent and attack the cattle while grazing.

The incidence of rinderpest is rare.

Foot and mouth disease breaks out in the winter and lasts up to March or April. The causes of infection are the movement of cattle by the cattle dealers who get infection from the affected areas and then spread it. Ranikhet disease is the principal poultry disease. It is of virulent type and when it breaks out, it practically destroys the whole mass of poultry. Fowl pox is also reported. It is not so serious like the Ranikhet disease. For the effective check of the cattle epidemic, preventive inoculation is carried out. Foot and mouth disease is given medicinal treatment for cure.

73. Veterinary Dispensaries

For the treatment of animal diseases, there are at present 24 Veterinary Dispensaries, located at the following places.

Baripada Subdivision

Sankhabhanga, Baisinga, Badasahi, Kuliana, Suliapada, Bangiriposi, Samakhunta, Saraskana, Baripada.

Kaptipada Subdivision

Khunta, Udala, Puruna Baripada, Kaptipada.

Bamanghaty Subdivision

Manda, Rairangpur, Bahalda, Tiring, Bijatala, Jamda.

Panchpir Subdivision

Jashipur, Karanjia, Thakurmunda, Sukruli, Baidyanath.

(C) FISHERIES

74. (*i*) Mayurbhanj being a hilly inland district tank fisheries are the only source of fish supply. The main rivers of the district are Burhabalanga, Subarnarekha and their tributaries. Besides these, the district is dependant on two big reservoirs, Haldia and Balidiha where pisciculture has been taken up. These reservoirs were primarily constructed for irrigation. There are 4,500 tanks both big and small, out of which 4,200 tanks comprising an area of nearly 7,200 acres have been transferred to the Grama Panchayats for pisciculture. Fish supply from private tanks is small. For sea fish the district depends upon the neighbouring Balasore district. Besides raw fish, dried fish is also imported in large quantities from Balasore, Puri and Ganjam districts. The rate of dried fish varies from Rs. 3 to Rs. 5 per Kilogram according to varieties available and the price of sea and fresh water fish varies from Rs. 3 to Rs. 4·50 Paise per Kilogram.

(*ii*) Varieties of fish available

The following common varieties of fresh water fish are available in the district : Rohee (Labeo rohita), Bhakoora (Catle Catla), Mirkal (Cirrhana mirjala), Kalabansee (Labeo Calbase), Phali (Motoptorus notoprerus), Chitala (Noto-terrus phalustriatus), Jallha (Chalca phulo and chela gora), Seulo (Ophice-phalustriatus), Magura(Clarais datrachas) and Korandi (Barbustigma).

Of the saline fish, only Hilsa (Illishsi) is available in rainy season from rivers Subarnarekha and Burhabalanga.

(iii) **Fishing Implements**

For purposes of catching fish, the fishermen generally adopt the traditional technique. Their fish catching implements are described below :

(*a*) CHARIGODIA

It is a square sized net being supported by two bamboo poles fixed crosswise. One man can operate it standing on the shore. This implement can only be used for fishing in tanks.

(*b*) GHAI JAL

This is a net used both in big and small tanks. On the bottom of the net there is a rope and the net is weighed down with lead sinkers provided with pockets. All types of fish are caught in this net.

(*c*) KHAINCHI AND PATTA

This is used in flowing water. It is made of bamboo sticks tied with strings. It can be fixed in flowing water in paddy fields and small water channels in rainy season. Fish enter through a small hole and are trapped.

(*d*) TANA JAL (DRAG NET)

This is a net which can be dragged at the bottom of the tank by men on either side. The length and breadth varies from place to place.

(*e*) MATHABHAURI JAL (CAST NET)

This can be used both in rivers and tanks and the size varies according to the choice of the fisherman. The process of operation is to throw the net from the shore inside the tank or the river and as soon as the net settles at the bottom, it is dragged out. Fish weighing up to 5 Kg. are caught by this net.

(*f*) KHADI JAL (STICK NET)

This is used both in rivers and tanks. Length of the net is 20′ and breadth 9′. Bamboo sticks are tied both at the bottom and on the surface of the net to keep it errect during the time of operation. It is generally dragged by 2 persons.

75. Improvement of Pisciculture

The district has yet to be fully surveyed for an assessment of fisheries potentiality. Demonstration fish farms and fish seed farms have been opened by the Fisheries Department in recent years to assist the Grama Panchayats. At present there are 8 fish seed farms and 2 demonstration farms. Since Grama Panchayats are increasingly taking to pisciculture in their respective tanks they have also established 10 fish seed centres. Demonstration farms are located at Kathpal and Amarda. Fish seed farms exist at Sirsa, Betnoti, Udala, Khadikapada, Rairangpur, Karanjia, Godupulsa and Badadalima. Grama Panchayat fish seed farms are located at Bhanjakia, Anlakuda, Basipitha, Pokhoria, Jashipur, Sukruli, Raruan and Baidyanath.

Nearly half the tanks dry up in summer and become unsuitable for fish cultivation. Pisciculture in Grama Panchayats is confined only to 400 to 500 of the tanks and the rest are leased out to the villagers. They get grants for the purpose. The average production of fish per annum is 600 to 700 mds. both of the Grama Panchayats and Fisheries Department. The condition of the tanks is not good. Most of them are rocky and have calcarious beds which make fishing difficult. The composition of the soil is also not suitable. The production of fish per acre is 20 to 25 Kilograms per annum. The income from an acre of water area is about Rs. 30.

Generally people purchase fish fries from the Fisheries Department. Some Community Development Blocks have their own nursery tanks, where they rear the spawn till it attains the size of a fingerling. It is then transferred to the stocking tanks in different Grama Panchayat areas. Before the establishment of fry distribution centres in the district the sources of supply were Balasore and Midnapore.

76. Fish feeding in Mahila Samiti under Expanded Nutrition Programme

Under Expanded Nutrition Programme, Mahila Samitis are supplied with fish caught from tanks transferred to Grama Panchayats for the consumption of expectant mothers and children. In 1961-62, 7 Mahila Samitis were selected for the programme and 29 tanks were selected. Out of these 29 tanks, pisciculture was taken up in 15 tanks and during that year 28,247 fingerlings were put. 3 maunds of fish were supplied to the Mahila Samitis for their feeding programme.

(D) FOREST

77. Importance of Forestry

Mayurbhanj being well wooded, the role of forests in its economy is important. Revenue comes from large scale exploitation for supplying sleepers to the Railway, timber to the mines and building materials for construction of houses. Small scale exploitation goes on in every village. People get their firewood, brush-wood, thatching grass and gather food. They also get logs and poles for ploughs, Dhenkis and for construction of houses. Tassar is entirely a forest produce. It gives employment both for growing the silk worm as well as in spinning and weaving of the silken textiles. It is a large scale cottage industry. Lac used to be grown extensively, but now has dwindled. Sabai grass which is a raw material in paper making was being cultivated quite extensively, but is now only used in rope-maknig as a cottage industry. Forests give employment to the people of Mayurbhanj in one way or another, much more than all other natural resources of Mayurbhanj.

78. Type of Forest

The area covered by different types of forests is 875 square miles. About 580 square miles are under Reserved Forests, 252 square miles under Protected Forests and 40 square miles under other forests.

79. Forest Revenue

The statement of revenue figures from 1962-63 to 1964-65 are given below :—

Year	Revenue from Baripada Division (in rupees)	Revenue from Karanjia Division (in rupees)	Total (in rupees)
1962-63 ..	22,70,851	33,99,760	56,70,611
1963-64 ..	23,64,908	23,05,133	46,70,041
1964-65 ..	30,96,450	33,61,872	64,58,322

80. The following industries thrive mainly on forest products—

(*i*) Tassar Cultivation

Tassar seed cocoon are collected and sold in weekly markets. The cultivators after obtaining their supplies of seed cocoons wait till the emergence of insects when they mate and lay eggs. These eggs are placed in leafy receptacles and tied to fresh shoots of Asan trees. The eggs hatch soon after and the larvae swarm the young succulent shoots. The larvae stage lasts for about three months from the middle of August, to the middle of November during which period the larvae eat an enourmous amount of Asan leaves necessitating their frequent removal from plant to plant. The larvae attain a size of 3″ to 3½″ when they mature and pass into pupa stage. They weave the tassar cocoon with secretion from their salivary glands. These cocoons are then collected by the cultivators and roasted to prevent emergence of the tassar silk moths which otherwise would spoil the tassar by cutting it through. Tassar is extensively cultivated in the plains, reserved and protected forests in Deuli, Bangiriposi and Bisai ranges. It is also cultivated, more or less in all other ranges. The cocoons from Bangiriposi yield comparatively more tassar than those from other places. The Forest Department used to give monopoly for its export or levied export royalty on outside purchasers in the weekly markets. Tassar used to fetch about 20,000 to 30,000 rupees annually. But since the abolition of monopoly system of exploitation, there has been a set-back in revenue from these sources.

(ii) **Lac industry**

This was a thriving industry and was yielding annually a considerable revenue to the State. In its peak period of prosperity between 1920 to 1930 the output was about 20 to 22 thousand maunds a year. Though in a state of decadence, lac is still cultivated on Kusum, Palas and Ber trees mainly in Karanjia and Rairangpur subdivisions. It is exported in the form it is collected.

(iii) **Sabai grass**

Sabai is found in the forests near Gudgudia and Nawana in Similipal hills. There used to be a big sabai plantation of about 5 sq. miles at Chaara, two and half miles from Podadiha. It thrived for a time and was abandoned towards 1925. The 2,000 acres of sabai plantation at Jamsol supplies most of the sabai grass for rope-making. Some finding the industry profitable have started growing sabai on their own lands. The sabai ropes are sold in the weekly markets and are also exported. The average revenue from this centre is in the neighbourhood of Rs. 50,000.

(iv) **Leaf plates**

It is made from Sal leaves by the forest dwellers for their own use and also for export. Leaf plates in bundles are sent to Balasore and Rupsa from where they are despatched by rail. Siali leaves are also collected for the same purpose. A kind of leafy cover made from siali leaves is manufactured and used by the forest folk for protection from rain.

(v) **Kendu leaves**

Collection of Kendu leaves and manufacture of Bidis is a recent development. Though Bidis are locally manufactured at Baripada and Rairangpur, local leaves are poor and the art of curing is not understood. The industry is supplied with leaves mostly from outside.

(vi) **Timber**

Carpentry is a cottage industry all over the district. The manufactured articles are mostly for agricultural and household use. There are a few cabinet making shops at Baripada which manufacture furniture of modern design. The timber used are mainly Piasal (*Ptorocarpus marsupium*), Gambhari (*Gmelina arborea*), Champa (*Magnolia champaca*) and Sisoo (*Dalbergia latifolia*). Lorry bodies are also locally built.

(vii) **Charcoal**

Charcoal used to be manufactured in the plains forests of Banahari and Muruda was largely being exported to Calcutta. This has since been stopped though small quantities are now illicitly manufactured for sale in Baripada and Rairangpur.

81. Forest products and their value

Among the major forest products, the following need mention.

Sal (*Shorea robusta*) is by far the most important of the timber species available in the district. Other marketable species available are Piasal (*Pterocarpus marsupium*), Gambhari (*Gmelina arborea*), Champa (*Michelia champaca*), Panjam (*Ougenia dalbergioides*), Dhaura (*Anogeissua latifolia*), Asan (*Terminalia tomentosa*), Simul (*Bombex malabaricum*), and other soft woods. Sal is marketed in the form of railway sleepers and special railway sizes. Requirements used to be about half a million cubic ft. upto the termination of timber lease of Messrs. Borooah Timber Co. Ltd. in 1946. Piasal of about 10,000 cft. used to be annually supplied in squares to gun carriage factories at Jabalpur and Coshipur. Champa was supplied to the railways for coach building. Large quantities of Asan in various sizes used to be supplied during the war years from 1940 to 1946 and Daura in the form of cart axles and various sawn sizes were exported to West Bengal districts. Almost all timber used to be exported sawn and converted as the royalty on this was higher, and the railways absorbed about 80 per cent of the total output of timber. It was also more convenient to export in sawn form as the logs were usually more than 5′ in girth.

A comprehensive list of timber species available has been given in Chapter I. The other important products are firewood, bamboos, Kendu leaves, sabai grass, tassar, arrowroot, honey, resin, mohua flower, broom stick, tamarind and eucalyptus. Tassar production is an important enterprise. It is being managed by the co-operative sector. Sabai rope making is a cottage industry, bringing about a lakh of rupees annually.

Forest products and their value (in rupees)

Year	Timber	Firewood	Minor-Forest produce
1962-63 ..	4,910,024	245,071	159,713
1963-64 ..	3,863,530	248,635	160,671
1964-65 ..	5,621,800	269,618	266,647

82. Market and marketable forest products

With regard to the marketability of forest products the district is well served by railway and road communication.

The railways had been the biggest of all customers for timber in the form of sleepers and special sizes. They continue to absorb a large

dart of timber. Next to the Railways are the Tata Iron and Steel Company. The important markets for most of the timber produced are Calcutta, Jamshedpur, Asansol, Jharia, Raniganj and almost all the town of Bengal, Bihar and Mahdhya Pradesh that are situated either on the main railway lines or near them. Timber in various sizes and firewood are exported from Talbandh, Bangiriposi, Rajaluka, Ghakkuari, Baripada, Jamsol, Krushnachandrapur, Betnoti, Rupsa, Amarda and Balasore on the southern side. In the north they are mainly exported from Badampahar, Rairangpur and Gorumahisani stations. At no time there was an internal market for big timber. The demand for small timber and firewood has increased of late. It is very considerable in Baripada and Bamanghaty subdivisions. That which once must have been flourshing sal forests have been reduced to bushes These bushes also have been disappearing because of excessive grazing and digging of roots.

At one time, the chief marketable product was railway sleepers, and round logs. The pressure has now shifted in favour of special sizes, squares and scantlings, and firewood poles of 2½′ girth are in demand in the local markets and by the tenants and villagers. Among minor forest produce, sabai grass, tassar cocoons, lac, tanning barks, myrabolan, mohua flowers and fruits, honey, wax, resins, arrowroots, herbs, hide and ivory are also locally used.

83. Measures for Scientific Exploitation and Development

(*i*) History of exploitation

Before 1885, timber leases had been granted to businessmen and traders from outside on very nominal rates. The revenue realised from these leases was limited but the damage done to the forests was considerable. A glimpse of the state of affairs then existing can be had from the Annual Administration Report for 1885-86. It appears that from this date till 1904, the forest of Similipal and some other forests were worked out departmentaly. Round logs were floated down the Burhabalanga and also transported in carts to Balasore on the newly constructed road. The quantity so exploited was small. With the opening of rail communication, the market for Mayurbhanj timber expanded. From 1904 onwards, a number of timber merchants from Calcutta took timber leases

As early as 1907, the reserved forests in Mayurbhanj were under the management and control of the Forest Department, whereas the protected forests were under the charge of the Revenue Department. The former category of forests were more or less of a permanent character, whereas the protected forests were subject to clearance for cultivation and were maintained primarily to meet the wants of the ryots and residents of the ex-State. As forest areas were being given under Amalnama

leases by the Revenue authorities and leases for reclamation of reserved forests were being given under the special sanction of the Ruling Chief the total acreage under reserved and protected forests decreased. In 1907 the total forests of Mayurbhanj stood as follows :—

1. Reserved Forests	..	1,152	Sq. miles
2. Protected Forests	..	675·50	Sq. miles
3. Cultivated area	..	1,944·50	Sq. miles
4. Waste lands	..	471	Sq. miles

The area covered under forests was about 43 per cent of the entire area of the State. Forest settlement and survey along with demarcation for working circles were being undertaken in accordance with the directions laid down in the Mayurbhanj Forest Manual. In November 1906, a survey staff was employed to demarcate the boundary line from Tamalbandh to Similipal Garh via Rout Rai to form another working circle to be allocated to Messrs. B. Borooah and Co. Fire conservancy measures had been introduced in the Banhari reserved forests. Any case of breach of the Forest Law was being suitably dealt with. The timber in the Similipal reserved forests was being given on lease to forest contractors. The total quantity of timber exported by such contractors in 1906-1907 was about 177,263 cubic feet. The total number of contractors including Messrs. B. Borooah and Co. was 13. The best among minor forest produce was lac reared on Kusum trees which yielded two crops in a year. Next in importance was tassar cocoons reared on Asan trees yielding one crop a year. Annual revenue on these items were Rs. 5,776 and Rs. 9,223 respectively.

From the beginning, the exploitation of the forests of Mayurbhanj has been done through contractors under various kinds of lease having a minimum period of five years to a maximum of thirty years. The lease of the Similipal forest to Messrs. B. Borooah and Co. was for 30 years. The leases were granted after private negotiations. The system of exploitation continued until the date of merger in 1949. Since then efforts have been made to introduce the system of granting short term leases on open auctions as in other forest divisions of Orissa.

On 12th September 1906 the Forest Officer of the Mayurbhanj State entered into an agreement with Mr. Bholanath Borooah, timber trader of Calcutta. It granted to the contractor the right to fell in the specified manner trees and stems growing in the northern portion of the Similipal reserved forests, to convert the same into sleepers, beams, square and round logs and to remove them on payment of royalty.

The minimum annual royalty was fixed at Rs. 10,000 besides the royalty on removal which was fixed at Rs. 10,000 for a term of 10 years. This gave the contractor a monopoly as the leases granted to other

contractors were not renewed after this contract. The contract with Mr. Borooah was initially for a term of 10 years only. The Political Agent communicated his approval to the proposed lease in December 1905.

On 7th February 1916, Messrs. Borooah entered into another agreement for 30 years. The terms were broadly the same as that of the previous 10 years lease and all the forests of Similipal came under the scope of operation of the agreement.

In 1919, Mr. B. Borooah's lease of Badam and Ukan Reserved Forests were transferred into a limited liability Company consisting of British and Indian nationals.

The history of the working of the forests under this long lease is the past history of the Mayurbhanj forests, as nearly three-fourth of the past activities in matters of exploitation, organisation and building of roads and rest houses in the whole of the ex-State was confined to the Similipal Forests. On the basis of area also Similipal constitutes about 5/8th of the total forest area of the ex-State and what now remains of the extensive forests of Mayurbhanj are the resumed forests of Similipal. Others have considerably deteriorated yielding very little or nothing to the State revenue.

The Mayurbhanj State Light Railway was initially built upto Baripada in 1904. Proposals for its further extension to Bangiriposi and thence to Talbandh were afloat on account of the impetus it provided to the exploitation of the plains forests and the vast amount of timber traffic it carried. In their search for a co-partner to finance and undertake the construction of the railway, correspondence was started with Bholanath Borooah and Co. in August 1907. Mr. Borooah offered that he should be given a 30 years monopoly lease for the extraction of timber from the whole of the Similipal reserved forests on the terms and conditions of the existing 10 years lease. Besides this, he wanted a guarantee for a minimum of 5 to 7 lakh cft. of sawn timber annually under the proposed lease so as to make the running of the railway profitable. He further wanted 30 years monopoly for collection of export of myrobalan and for other forest produce of the ex-State and prospecting license for 3 years convertible to 30 years mining lease for minerals of every description except those already given to the Tatas. The Ruler, in reply, wrote "in the event of your guaranteeing me goods traffic which will yield a net profit of 3½ per cent per annum on the capital expenditure on the railway, I shall have no objection to granting you lease of the entire Similipal forests (subject to the

limitation of the existing leases and termination) for timber operation or a period of thirty years under similar terms and conditions as those attached to the one, you already hold, subject to such alterations as the British Government may propose. As regards to the additional clause you propose to add to the effect that the State will find for you sufficient trees to permit you being able to cut at least 5 to 7 lakh cft. of timber annually for 30 years, I have to say that I cannot accept the clause. I would alter the additional clause to the effect that in the event of your not being able to secure 5 lakh cft. of timber in any year during 30 years from timber of 6 cft. in girth, the State shall grant you permission to cut timber of any girth not below 5′ in girth for that year to make up the deficit". Excepting for the monopoly of mohua flowers and export of lac, all other concessions including the prospecting license were agreed to. To this, the company wrote "We beg to submit that it is only in anticipation of getting such a guarantee from your Highness, that we accepted the undertaking (Construction of railways and 3½ per cent annual profit on capital cost). We have therefore the honour to accept the alternative you have been pleased to propose subject to a condition to the effect that if in any year, we cannot turn 5 lakh cft. of timber even by cutting trees upto 5′ in girth, our guarantee to your Highness to the extent of such deficit would stand cancelled". Although the company by so writing wriggled out of the original undertaking regarding the construction of railways the Chief in his letter, dated the 2nd November 1907 accepted the modified proposal for the 30 years timber monopoly lease of Similipal forests. The proposed lease could not immediately be executed as other timber leases were current in Similipal. The Maharaja died in 1912. The lease was finally executed during the Court of Wards management on the 7th February 1916, after further modifications guaranteeing sufficient sal trees 6′ and over girth to ensure a certain minimum annual return of sawn timber. This lease with further modification in 1936, granting a lower exploitable girth limit (4½ ft. girth) and permitting 8 lakh cft. annually remained in force with all advantage to the lessee and disadvantage to the lessor till February 1946.

Some minor forest produce like horns, hides and lac, etc. were being leased out annually whereas for other items like tassar, fibres, etc. export royalty used to be levied from the businessmen and traders in weekly markets.

For other items like timber, firewood, etc. permits were being issued by subordinate staff from pass offices. This system remained in force until merger after which it was abolished.

Messrs. Borooah and Co. employed a large number of sawyers from outside and put up 6 saw mills in Similipal area. These saw mills converted the timber within a radius of 2 and 4 miles and frequenlty had to be on the move for new sites. The sawyers were brought from Singhbhum. They were mainly Santals already trained in the timber industry in the famous Saranda Forest Division of Bihar. They came in large number and their progeny may still be found inhabiting the Similipal forests.

The problem of extraction was an important matter. A wet slide was constructed and used to transport sleepers from Baraghati towards Talbandh. Steam engines and tractors were plying on specially constructed roads to handle and transport timber and sleepers. A large number of bullock carts was also being used.

(ii) Present method of Exploitation and Development

The reserved forests of the ex-State of Mayurbhanj had no working plan of any kind till February 1946. There were only sketchy schemes for some reserved forests which failed to ensure continuity of policy and management. A working plan for Similipal and Noto Reserved forests was introduced from 1946-47 at the expiry of the lease period to M/S. Borooah Timber and Co. The working plan was not very useful and was replaced by another working plan in 1953-54 which covered the entire Mayurbhanj district. This working plan continues to operate with amendment wherever necessary. The main objects of management are to conserve and improve the forest by scientific management, so that the forests will ultimately produce the maximum possible sustained yield. It should also cater to the growing needs of the population of the district in respect of their requirement of forest produce. The timber should be grown to as big a size as is possible in suitable localities with a view to export outside after having met the demands of the local population. The aim was also to regulate the flow of water in various streams and to prevent soil erosion by maintaining forest cover. The need to rehabilitate the forests deteriorated by mal-treatment in the past was keenly felt.

All the forests were brought under systematic working. If it was not possible to effect improvement in any area the forests already depleted in the past were to be rehabilitated artificially and given sufficient protection to recoup. The need of population being mainly for firewood, small timbers for house building, for agriculture and grazing forests in proximity of populated areas are to be managed under the coppice system with rotation ranging from 40 to 60 years to produce the materials required by the people. The rotation should be lower still where demand for firewood is greater. Besides helping the natural regeneration, standards

are to be left to produce timber. The rest of the forest, capable of growig big timber, should be placed under appropirate silvicultural system to meet the growing demand for big timber. The methods of treatment for various kinds and parts of the forests as prescribed by the working plan are as follows :

1. Selection system .. This was adopted for hilly and remote areas.

2. Uniform system .. This was prescribed for fairly accessible areas situated in the plains for gently undulating grounds. They include major part of the better quality plains sal forests in the south-west corner of the district.

3. Coppice with standard system to be adopted for all the plains sal forests and for most of the hill forests situated inside the populated parts or close to such parts. A comparatively low rotation would be made for such parts where the demand is acute. The rotation is extended to 60 years where the present demand is not much.

4. No working is prescribed for the areas completely denuded of forest growth or where it is not capable of growing due to excessive grazing and for reasons of mal-treatment. These areas are to be effectively protected, so that they may improve in course of time to be worked systematically. The following working circles have been constituted :

1. Selection Working Circle
2. Improvement Working Circle
3. Coppice Working Circle
4. Bamboo Working Circle
5. Protection Working Circle.

The Selection Working Circle includes all the major valuable high forests allotted to 'Selection-*cum*-Improvement Working Circle' of the previous plan. It also includes major part of the Satkosia and a part of Badampahar block. All the forest blocks situated and allotted to the Selection Working Circle under this plan cannot have the same measure of treatment due to disparity in quality and condition in crops and also due to treatment they were subjected in the past. The forest in Similipal hills, being encumbered with quite fair percentage of effective stems due to unsystematic and heavy fellings in the past without having any kind of cultural operation, afterwards needed more of tending and improvement than exploitation. Cleanings are essential after the main-fellings.

The Improvement Working Circle includes all the good quality plains forests of Baripada, Tatnapur and Thakurmunda and areas quite apart from the forests earmarked for the supply of the tenants' requirement. The condition of the crop is rather abnormal as they are fairly even-aged and consists mostly of big-sized poles and a small percentage of middle-aged trees which are hardly exploitable, but fairly well congested. It was necessary to look after this crop so that the trees may put on the maximum increment possible and the crop would ultimately be exploitable when it would yield big-sized timber.

The 'Coppice Working Circle' includes all the areas previously worked under 'Coppice System' with a 20 years rotation. It also includes major parts of Badampahar and other hill forests in Rairangpur division. These forests were previously excluded from any systematic exploitation, though near enough to centres of popular demand. This is working with the view to meet the growing demand of the locality specially of Rairangpur areas.

'The Bamboo Working Circle' includes a few small bamboo plantations in Badampahar and ex-Rairangpur division. The method adopted was a selection system.

The 'Protection Working Circle' includes area where no fellings are prescribed. These are in the north-west of Karanjia division and in parts of ex-Rairangpur division. The aim is to close them to grazing and any felling by the people. This closure coupled with artificial regeneration is hoped to bring definite improvement.

APPENDIX I

Area and average yield of crops (1964-65)

	Area under different crops (in acres)	Average yield per acre (in maunds)
1. Winter Rice ..	731,000	11·72
2. Autumn Rice ..	49,000	8·86
3. Summer Rice ..	133	8·39
4. Jowar ..	366	2·23
5. Bajra ..	96	3·97
6. Maize ..	4,832	8·08
7. Ragi ..	215	2·53
8. Wheat ..	1,400	4·76
9. Millet (Small) ..	1,109	2·50
10. Gram (Rabi) ..	6,820	7·82
11. Arhar ..	1,435	10·43
12. Other pulses (Rabi) ..	27,785	5·21
13. Other pulses (Khariff) ..	1,403	5·20
14. Sugar-cane ..	1,040	26·76
15. Potato ..	553	75
16. Chillies (Dry) ..	2,248	10
17. Ginger (Dry) ..	36	10
18. Groundnut ..	4,108	7·64
19. Seasamum ..	7,855	3·61
20. Mustard ..	4,579	5·42
21. Linseed ..	5,037	3·55
22. Castor ..	284	2·10
23. Jute ..	1,700	10·47 (yield in lbs.)
24. Mesta ..	3,421	720
25. Tobacco ..	500	8