CHAPTER IV

AGRICULTURE AND IRRIGATION

Land Reclamation and Utilisation

Bhagalpur district has an area of 1,397,824 acres including unsurveyed area according to 1951 census out of which 217,022 acres were culturable waste lands. Out of a total population of 14,29,069, 1,158,703 or 81.1 per cent were engaged in agricultural occupations. In order to reclaim culturable waste lands, the Bihar Waste Land Reclamation, Cultivation and Improvement Act was passed in 1946. The Waste Land Reclamation Section is under the Revenue Department. There is a Waste Land Reclamation Officer for the district whose headquarters is located at Banka. He is under the administrative control of the District Magistrate, Bhagalpur.

Manual reclamation of waste lands is encouraged by the distribution of Land Improvement Loans. The District Development Office at Bhagalpur maintains the figures of areas reclaimed under Land Improvement Loans but there are no separate figures to show the actual amount of Land Improvement Loans given for the waste land reclamation purpose.* An enquiry shows that the rate is usually Rs. 100 as loan for reclamation of one acre of land.

The following figures of reclamation of waste land were supplied by the District Development Office:—

Year.	Area in acres reclaimed by Land Improvement Loan.
1951-52	5,320
1952-53	1,500
1953-54	310
1954-55	800
1955-56	70
1956-57	150
1957-58	•40
1958-59	310

The Act has provision for settlement of waste lands for reclamation purposes under Waste Land Reclamation Act. Loans are also given for the purchase of tractors for mechanised reclamation of larger consolidated areas. Encouragement is also given to persons to reclaim waste lands by tractors without taking loans in the shape of giving technical advice.

Under all these different heads the return from 1951-52 to 1959-60 is nil. The initial of 5,320 acres reclaimed in 1951-52, if correct, has had a remarkable decline in 1955-56 and in 1957-58

*S... l... figure are inc... on page 210.

only 70 and 40 acres were reported to be reclaimed respectively. Information regarding the yield of the reclaimed areas was not available in the District Development Office. It cannot be said, therefore, that the Waste Land Reclamation Section has been able to go much ahead in this district. The area reclaimed in 1960-61 is 52.16 acres against the target of 500 acres. The reason of low progress is due to the fact that the people of the area were not ready to deposit Rs. 10 per acre in cash as laid down in Government Circular no. 1084-W.L.R.(R), dated 26th March, 1960.

The statement below shows the classification of areas (in thousand acres) during 1953-54, 1954-55 and 1955-56* for the district of Bhagalpur—

Year.	Forest.	Not available for cultivation.	Other uncultivable land excluding current fallow.	Current fallow.	Net area sown.	Total area of the district.
1	2	3	4	5	6	7
1953-54 ..	101	148	40	215	879	1,384
1954-55 ..	101	172	69	115	928	1,384
1955-56 ..	160	133	24	154	890	1,384

Year.	Bhadai crops.	Aghani crops.	Rabi crops.	Fruits.	Potatoes.	Vegetables including root crops.	Total area sown.	Area sown more than once.
1	2	3	4	5	6	7	8	9
1953-54 ..	126	526	298	11	2	3	966	87
1954-55 ..	116	532	344	12	3	4	1,001	74
1955-56 ..	120	538	287	8	3	...	958	75

A scrutiny of the statement will show that there has been variation in the net areas sown which will be easily explained by the fact that this totally depends upon the season of the year and if it rains in right quantity and at the right time, the areas

under cultivation automatically increase. There has also been decrease in the areas of current fallow which shows that people are taking steps not to allow land to lie fallow. According to the Revenue Department, W.L.R. Section Circular no. 1673-W.L.R., dated 19th November 1955, rupees 100 are being given as subsidy to the cultivators of Banka Subdivision, Shahkund, Pirpainty and Cologong Police Stations to encourage the reclamation of waste lands in the lateritic tracts into paddy-fields. But the response is not encouraging.

There has been a decrease in the area under fruit trees in 1955-56. Most of the fruit orchards belonging to Zamindars were either sold or brought under cultivation just before the abolition of Zamindari was undertaken.

Irrigation

The main occupation of the people of Bhagalpur district is agriculture. But agriculture depends mainly on the availability of water at proper time and in proper quantities. Lack or excess of water tells on the crop prospects. The main source of water has been rainfall. Rainfall is not a dependable source of water and irrigation facilities are essential. In pre-zamindari abolition days the zamindars used to maintain *ahars* and *pynes* which served the purposes both of irrigation and drainage. Besides these channels there were and there are still wells for irrigational purposes.

The normal rainfall of the district is 45.98.*) The total rainfall of the district as taken from the Bihar Statistical Handbook, 1955, pp. 16-17 year by year is given below:—

1943-44	..	..	..	39.41''
1946-47	..	..	..	56.67''
1947-48	..	..	..	41.02''
1948-49	..	..	..	42.90''
1949-50	..	..	..	55.55''
1950-51	..	..	..	51.56''
1951-52	..	..	..	42.96''
1952-53	..	..	..	43-51''
1953-54	..	..	..	46.21''**
1954-55	..	..	..	44.80''
1955-56	..	..	..	43.99''

The following figures of annual rainfall have been obtained from the office of the District Statistical Officer, Bhagalpur:—

1957 ..	..	..	..	37.09''
1958 ..	..	..	..	44.40''
1959 ..	..	..	..	52.41''
1960 ..	..	..	..	50.73''

*Bihar Statistical Handbook, 1955.
**Revised by Dy. D.G.O. in 1944.

A rational distribution of rainfall in different seasons is necessary for proper cultivation and good harvest. Rainfall in the last week of May or first week of June is beneficial for *bhadai* crops, for it helps in sowing these crops. Rainfall during the last week of July and 1st week of August is essential for transplantation of paddy. Rainfall in the month of October determines the yield of paddy and also helps in preparation of land for *rabi* crops and keep the soil moist for growth of *rabi* though these crops require rain at intervals also for their proper growth and good yield. *Hathia* rains in October in moderation is very beneficial but an excess of *Hathia* rainfall, as in 1961, may cause a great damage.

The importance of timely rains has its echo in some well-known proverbs:—

(1) "*Sathi Pake Sath Din, Barsa Howe rat Din*", i.e., *Sathi* paddy ripens in sixty days if it rains all day and night.

(2) "*Veda vedita Nahowe Aan, Bina Tula Nahi Pothe Dhan*", i.e., the words of Vedas are infallible and paddy cannot ripen before *Lebra* or *Kartik* (October).

(3) "*Keya Rohin Barsa Kare Bache Jaith Nit Bhor, Ek Bond Kartika Pare Nase Tinoo Toon*", i.e., what can rainfall in *Rohin* do to save seedlings in *Jaith* when a drop of rainfall in *kartik* makes all crops fail ?

(4) "*Uttra Utter Dehaye, Hast Gaye Mukh Moor, Bhali Bechari Chitra Parja Legaye Bahoor*", i.e., when *Uttra* and *Hathia* fail in producing rainfall, *Chitra* comes to rescue the cultivators and saves the crops.

(5) "*Jo Purva Purvai Pavai, Sukhi Nadai Naw Chalawai*", i.e., if easterly wind blows in *Purva* it is likely that all the dry rivers will be navigable.

Situations arising out of lack of timely sufficient rains can be met only by irrigation. The physiography of the portion of the district north of the Ganga does not require much irrigation facilities. The moisture of the soil does not dry up soon.

A very accurate information regarding irrigational facilities in the past is not available. Francis Buchanan in his "An account of the District of Bhagalpur in 1810-11" merely mentions that irrigation was needed for agricultural purposes and that *Bundhs* and reservoirs were the main sources. He does not give much of details.

Captain Sherwill in his "Geographical and Statistical Report of the District of Bhagalpoor, 1869" mentions as follows:—

> "Irrigation, whenever, practicable, is recorded either from streams, or from tanks, or from wells, the level land before alluded to, as situated to the north of the southern hills and south to the Ganges, is universally irrigated, producing fine crops of rice, mustard, castor oil, murrooa, Kesari, sugarcane, gram, besides many of the smaller crops."

From Hunter's "A Statistical Account of Bengal, Volume XIV, district of Bhagalpur," it is gathered that due to slopy lands in south Bhagalpur it did not retain water and small streams dried up soon which made irrigation an absolute necessity. Irrigation was effected by small artificial channels leading off from a head of water collected by means of a dam, known as *dhar bundh* in one of the hill streams, and by wells. Sugarcane was irrigated in the cold weather from wells. The usual implement used for raising water was an earthen pot suspended from one end of a bamboo lever. The irrigation was done entirely by the landholders who appointed petty officers to distribute the water. The irrigation in the rice fields was generally done during the rainy season when long intervals of dry weather occurred and during the month of October(*Kartik*) when the rains usually ceased. At this time mountain torrents contained a quantity of water which was turned into the canals by temporary dams. In the rainy season, the rivers were sufficiently high to allow the water to enter the mouths of the canals without dams. Each cultivator made small dams across the canals in order to force the water upon his own fields and when these had received their allowance, the dams were broken and the water was permitted to run to the next cultivator's land.

A more detailed and up-to-date information on irrigational facilities in the district of Bhagalpur is available from the last "District Gazetteer of Bhagalpur" by J. Byrne, I.C.S. (1911).

Byrne had also stressed on the indispensable need of irrigation in South Bhagalpur. During his time irrigation was generally effected by leading off water from a natural stream or from a head of water collected in a *bundh* or tank. The channels were called *Danrhs* and their small branches were called *Singhas*. They were generally maintained by the landlords and the tenants were simply asked to supply labour for their repairs. The *Danrhs* and *Singhas* were mostly used for irrigating paddy fields during July to November. Wells were also used for irrigation purposes but generally they were used for special crops, such as, sugarcane

or tubers. *Rabi* fields were generally irrigated by *Danrhs*. But the landlords did not take any interest in them and the tenants occasionally dug holes (called *Bhaw*) and drew out water with buckets for irrigating agricultural fields.

From Settlement Department Byrne collected the information that the total length of the water channels was 892.65 miles and 646 villages with an area of 406.20 square miles were dependant on them for irrigation.

During the period from 1911 till the introduction of the First Five Year Plan in 1951 it was mainly the zamindars who made arrangements for irrigation. But some 230 minor irrigation schemes like *bundhs* (low mud walls thrown across a stream), *danrhs* (channels taken out from a rivulet or stream), tanks and protective embankments were taken in hand between the years 1947 to 1951. Realising the importance of irrigation for agriculture, the State Government drew up schemes for irrigation and started work on some of these schemes. Some of the schemes are described below:—

Major schemes

(1) *Gebua weir scheme.*—It is 110 feet long *pucca* weir on river Gebua in village Jamin P. S. Mufassil at a distance of about 6 miles from Bhagalpur. Two channels have been constructed from this weir, the one on the right bank being 5,100 feet long and the other on the left bank 4,400 feet long. They irrigate about 2,500 acres of land in the neighbouring villages. The work was begun in the year 1950 and completed in 1952 at a cost of Rs. 1,01,665.

(2) *Sonhaula-Tarar Irrigation Scheme.*—It is situated in village Ghoria, P. S. Sonhaula on the 9th mile of Ghoghar-Sonhaula road. It has a *pucca* weir 5 feet high and 110 feet long across the river Gahira. It has one canal 7 miles and 14.40 chains long and irrigates 5,000 acres of land. It was constructed at a cost of Rs. 6,08,316. It was begun in 1951 and completed in 1957.

(3) *Mahmuda Irrigation Scheme.*—It is situated in village Kajia, P. S. Jagdishpur on the 11th mile on Bhagalpur-Amarpur *Katcha* road. There is a weir 370 feet long on the river Andhari. A canal 2 miles long has been taken out of it which irrigates 47,000 acres of land. The scheme was started in 1954 and completed in 1956 at a cost of Rs. 3,81,625.

(4) *Chandan-Bilasi Irrigation Scheme.*—This scheme is situated near village Kabulichak, P. S. Amarpur. In this scheme river Bilasi is fed from river Chandan through a canal constructed for this

purpose. In order that waters of river Chandan might flow into the Bilasi river, a head regulator has been constructed on the river Chandan. The canal taken out in this scheme is an inundation canal. The canal is 6½ miles long and irrigates 17,000 acres of land. The work was taken in hand in 1954 and completed in 1957 at a cost of Rs. 13,72,317.

(5) *Chandan Reservoir Project.*—This scheme has under its command Kajia Danr Irrigation Scheme Phase I and Kajia Irrigation Scheme Phase II. Kajia Danr Irrigation Scheme Phase I is situated in village Madiha, P. S. Banka on the 6th mile of Banka-Deoghar road via village Mahasadih. It has an earth *bundh* 1,200 feet long and irrigates 400 acres of land. It was begun in 1954 and completed in 1956 at a cost of Rs. 51,110. Kajia Irrigation Scheme Phase II has got a weir 800 feet long situated in village Ikoria, P. S. Banka and has been constructed in 1957-58 at a cost of Rs. 16,35,023. The main Chandan Reservoir Project Phase I which is expected to irrigate 47,000 acres of land is situated in village Ikoria, P. S. Banka and will have a main canal 11 miles long with 40 miles long branch canal and 105 miles of distributaries. It will irrigate the area between village Ikoria, P. S. Banka and villages Ghogha and Persadih in P. S. Sonhaula. It will thus serve Banka, Rajaun, Dhoraiya, Sonhaula and Jagdishpur Police Stations. The scheme was started in the year 1958 and is still under execution. The scheme is expected to cost Rs. 41.96 lakhs.

(6) *Badua Reservoir Irrigation Project.*—The dam for this reservoir is located in village Bijikhorwa, P. S. Belhar in the district. The dam is across river Badua in village Bijikhorwa, P. S. Belhar, district Bhagalpur. It is 132 feet high and 1,600 feet long. The bottom width is 25 feet. When the project is completed the total length of the main canal will be 911 chains that is approximately 17½ miles. The branch canals will be 1,814 chains about 34.7 miles long and the distributaries will be 2,680 chains 51.3 miles long. The work when completed will cover Belhar and Shambhuganj Police-stations of Bhagalpur district and a portion of Monghyr district. When completed it is expected to irrigate 1.05 lakh acres of land and the cost will come to Rs. 4.26 crores. The work was begun in January, 1958 and is expected to be completed by 1963.

Medium Schemes

During the First Five Year Plan period, 28 medium irrigation schemes were taken up and completed at a cost of about 5½ lakhs of rupees benefiting 40,000 acres of land in the district. During the second Five Year Plan period, 18 schemes costing about 3½ lakhs of rupees were taken up and completed. These irrigate

about 14,390 acres of land in the district. During the Third Five Year Plan period 9 schemes are already under execution. These schemes are likely to cost 2,37,000 rupees and to irrigate 7,700 acres of land. A detailed list of medium irrigation schemes already executed and also under execution from 1950 to 1960 is appended herewith.

MEDIUM IRRIGATION SCHEMES ALREADY EXECUTED

Serial no.	Name of scheme.	Nature of scheme.	Location.	Cost.	Area expected to be benefited.
1	2	3	4	5	6
				Rs.	Acres.
1	Construction of a sluice gate in a *bandh*.	Irrigational scheme—*Bandh*.	Vill. Madrauni, P. S. Gopalpur.	8,298	1,000
2	Construction of *Danr* ..	*Danr* ..	Kumri, P.S. Belhar	26,009	3,000
3	Repair of *Bandh* and construction of sluice gate.	*Bandh* ..	Bangama, P. S. Amarpur.	7,575	300
4	Construction of marginal embankment.	Embankment	Kaharpur, P. S. Bihpur.	7,907	400
5	Repair of *Bandh* and construction of sluice gate.	*Bandh* ..	Ghogha, P.S. Amarpur.	8,415	300
6	Repair of *Bandh* and construction of sluice gate.	*Bandh* ..	Chakmal, P. S. Amarpur.	7,752	550
7	Repair of *Bandh* and construction of sluice gate.	*Bandh* ..	Chakmal, P. S. Amarpur.	8,002	650
8	Construction of sluice gate.	Sluice gate ..	Rampurdarhi, P. S. Amarpur.	20,454	1,000
9	Repair of Burhwa *Bandh* and construction of sluice gate.	*Bandh* ..	Kodanda, P. S. Shahkund.	7,042	523
10	Construction of sluice gate.	Sluice gate	Ratanpur, P. S. Sultanganj.	10,302	1,500
11	Construction of sluice gate.	Sluice gate ..	Sarha, P. S. Shahkund.	16,320	1,100
12	Construction of sluice gate.	Sluice gate ..	Kapsona, P. S. Sahkund.	29,796	1,310
13	Construction of sluice gate in Buchha *Bandh*.	*Bandh* ..	Majhagain, P. S. Amarpur.	7,575	300

Serial no.	Name of scheme.	Nature of scheme.	Location.	Cost.	Area expected to be benefited.
1	2	3	4	6	6
				Rs.	Acres.
14	Repair of Chakmal *Bandh* and construction of sluice gate.	*Bandh* ..	Chakmal, P. S. Amarpur.	48,209	3,200
15	Construction of a new tank.	Tank ..	Katiama, P. S. Rajaun.	7,328	261
16	Construction of a submerged weir.	Weir ..	Majhagain, P. S. Rajaun.	16,099	850
17	Repair and strengthening of *Bandh*.	*Bandh* ..	Barauni, P. S. Rajaun.	15,546	5,000
18	Construction of submerged weir.	Weir ..	Barauni, P. S. Rajaun.	22,391	1,500
19	Construction of sluice gate in Barki *Bandh*.	*Bandh*	Gulmi, P. S. Amarpur.	9,968	308
20	Repair of *Danr* and construction of sluice gate.	*Danr* ..	Ajitnagar to Khaira, P. S. Rajaun.	19,786	5,000
21	Repair of Majhgai *Bandh*	*Bandh* ..	Bagha, P. S. Amarpur.	26,908	2,850
22	Construction of sluice gate in Barua stream.	Stream ..	Titahi, P. S. Amarpur	10,341	223
23	Construction of sluice gate.	Sluice gate ..	Belthu, P. S. Shahkund.	18,836	802
24	Construction of sulice gate.	Sluice gate	Pahlampur, P. S. Amarpur.	31,947	1,275
25	Repair of *bandh* and weir	*Bandh* ..	Lakha, P. S. Amarpur.	20,624	634
26	Construction of sluice gate in Jogthan *Bandh*.	*Bandh* ..	Tetahi, P. S. Amarpur.	36,380	1,580
27	Construction of sluice gate in Gahira river.	Rivergate ..	Jonki, P. S. Dhuraiya.	46,962	998
28	Construction of sluice gate and redeepening of *Danr* (Kumari to Sarkatia).	*Danr* ..	Kumari, P. S. Belhar.	56,399	4,450
29	Repair of *Bandh* and construction of weir.	*Bandh* ..	Birina, P. S. Bounsi.	12,373	200
30	Construction of sluice gate.	Sluice gate ..	Chalua, P. S. Dhuraiya.	6,316	220
31	Construction of sluice gate and repair of *Danr* with escape.	*Danr* ..	Kusmi, P. S. Dhuraiya.	85,637	1,921

Serial no.	Name of scheme.	Nature of scheme.	Location.	Cost.	Area expected to be benefited.
1	2	3	4	5	6
				Rs.	Acres.
32	Construction of sluice gate.	Sluice gate ..	Bhalua, P. S. Amarpur.	13,207	350
33	Construction of sluice gate across a *Danr*.	*Danr* ..	Chalua, P.S. Dhuraiya.	6,996	200
34	Construction of sluice gate across Kadma river.	River gate	Tarcha, P.S. Mufassil.	41,026	950
35	Construction of sluice gate in Jogia *Bandh*.	*Bandh* ..	Mukheria, P.S. Mufassil.	11,902	700
36	Construction of sluice gate and excavation of *Pyne*.	*Pyne* ..	Daulatpur, P.S. Shahkund.	42,883	1,207
37	Construction of sluice gate and repairing of *Bandh*.	*Bandh* ..	Baijnathpur, P.S. Dhuraiya.	40,928	2,000
38	Construction of sluice gate across Raj *Danr*.	*Danr* ..	Majghgain, P.S. Dhuraiya.	15,870	1,497
39	Repair of Bank and construction of Aqueduct and escape.	Aqueduct ..	Majhgain, P.S. Rajaun.	13,943	350
40	Construction of sluice gate across Gahira River (Mahua *Bandh*)	*Bandh* ..	Titihi, P.S. Amarpur.	34,689	466
41	Construction of west weir and repair of *Bandh*, etc.	*Bandh* ..	Dusadi, P.S. Banka.	42,289	2,000
42	Repair of Tetoria *Bandh* and construction of sluice gate.	*Bandh* ..	Madhiyagiri, P.S. Katoria.	11,945	400
43	Construction of sluice gate regulator.	Sluice gate	Pista, P.S. Mufassil.	28,681	1,000
44	Repair of Lakra *Bandh* with construction of escape weir.	*Bandh* ..	Lakra, P.S. Katoria.	14,176	200
45	Repair of an old *Bandh* and repair of existing sluice gate.	*Bandh* ..	Chichraun, P.S. Sultanganj.	10,393	374
46	Construction of a sluice gate regulator and repair of existing *Danr*.	*Danr* ..	Uparli Bhalua, P. S. Amarpur.	13,275	355

MEDIUM IRRIGATION SCHEMES UNDER EXECUTION

Serial no.	Name of Scheme.	Nature of Scheme.	Location.	Cost.	Area expected to be benefited.
1	2	3	4	5	6
				Rs.	Acres.
1	Construction of sluice gate in Raj *Danr*, etc.	*Danr* ..	Ramkoli, P. S. Dhuraiya.	33,706	1,500
2	Construction of an escape weir.	Weir ..	Amgachhi, P. S. Bounsi.	23,710	1,599
3	Construction of *bandh* and escape weir, etc.	*Bandh* ..	Lalmatia, P. S. Banka.	16,865	425
4	Improvement of *Katcha bandh* and construction of weir and two regulators.	*Bandh* ..	Gidhoura, P. S. Shambhuganj.	51,456	1,500
	Construction of sluice gates and culvert in Ramni Jamni river and repair of the adjourning *bandh*.	*Bandh* ..	Pasraha Tola Kiranpur, P. S. Sultanganj.	43,027	1,500
6	Repair of Dhawa *bandh* and construction of sluice gates, etc.	*Bandh* ..	Dhawa, P. S. Katoria.	15,904	278
7	Construction of sluice gate.	Sluice gate	Jhikulia, P. S. Belhar.	30,048	300
8	Construction of a sluice gate and repair of *bandh*.	*Bandh* ..	Bhuriya, P. S. Sonhaula.	12,432	..
9	Construction of sluice gate regulator across *Danr*.	*Danr* ..	Jogibagha, P. S. Sambhuganj.	10,277	290

Minor schemes

Minor irrigation schemes include *bunds*, *danrs*, tanks, small protective embankments, etc., as well as repairs to old minor irrigation works that had been carried out by the zamindars in the zamindari days. These minor irrigation works were since achivement of independence, carried out by three agencies, one under the Revenue Department which undertook 2,893 schemes at a total cost of Rs. 43,35,851, the second by the Agriculture Department which undertook 77 schemes at a total cost of Rs. 1,08,448 and by the Community Development Department figures for which are not

available. Now these works will be carried out by the unified Agency for Minor Irrigation. This agency was created in Government Order no. IDS-0169/59-Agri—30380, dated the 23rd December 1959/2nd January, 1960. An Additional Director of Agriculture (Engineering) has been appointed to be in charge of this agency. He will be responsible for all minor and medium schemes costing up to Rs. 1 lakh throughout the State irrespective of budget heads from which these schemes are financed. The schemes will include the following :—

(1) Medium *Ahars*, *Pynes*, *Bundhs*, etc., costing between Rs. 10,000 to Rs. 1 lakh.

(2) Minor *Ahars*, *Pynes*, *Bundhs*, etc., costing up to Rs. 10,000.

(3) Installation of private tube-wells.

(4) Open Borings with and without strainers.

(5) Surface percolation wells.

(6) *Rahat* pumps.

(7) Distribution and maintenance of irrigation pumping sets including mobile and other pumping sets under loaning scheme.

(8) Distribution of small irrigation pumps.

The following statement will show the construction of wells, tube-wells, open boring with strainer, open boring without strainer under the First and Second Five Year Plans.

	First Five Year Plan.	Second Five Year Plan.
Wells	639	2,202
Tube-wells	5	11
Open boring with strainer ..	11	90
Ditto without strainer ..	328	618

Fifty two *Rahat* pumps and 139 pumping sets were distributed in the First Five Year Plan and 33 *Rahat* pumps and 32 pumping sets were distributed in the Second Five Year Plan.

Protective Bundhs

In north Bhagalpur, North-Eastern Railway embankment serves the purpose of protecting the area north of it from the floods caused by the Ganga, but it acts against the natural drainage of any flood waters coming from the north.

The railway embankments on the Eastern Railway on the loop and the Bhagalpur-Mandar Hills lines also serve as flood protective embankments.

Besides these railway embankments Government took up construction of some embankments in the district. The more important are as follows :—

(1) *Marginal embankment schemes on both sides of the river Khalkhalia.*—It was constructed at a cost of Rs. 4,52,773. The embankment on the right bank of the river is 29,044 feet long and that of the left bank 27,200 feet long. These embankments protect an area of 4,600 acres of land. The work was begun in 1951 and completed in 1952.

(2) *Sultanganj Town Protection Scheme.*—This is intended to protect the Sultanganj town from the ravages of floods of the Ganga. The length of the embankment is 1,100 feet and has to be renewed practically every year. In 1957 the *bundhs* were constructed at a cost of Rs.19,337. The work undertaken in 1960 is still under construction and is expected to cost Rs. 54,747.

(3) *Gogri-Narainpur Embankment.*—It starts from the village Gogri in continuation of the old Gogri embankment and terminates in the North-Eastern Railway embankment just east of Narainpur Railway Station. Nearly 27 miles long embankment lies on the left bank of the Ganga and Burhi Gandak. It protects the area surrounded by the railway embankment on the north and the embankment itself on the other side.

It has been practically completed and benefits are occurring to 27,000 acres of land at present. An expenditure of Rs. 15.23 lakhs has been incurred over it during, 1951—56.

(4) *Marginal Embankment at Kaharpur, P. S. Bihpur.*—It protects an area of 400 acres. It was begun in 1950 and completed in 1951 at a cost of Rs. 7,907.

In addition to these, minor embankments have been constructed in Shahkund, Nathnagar, Naugachhia and Gopalpur police stations in the district.

AGRICULTURE INCLUDING HORTICULTURE

Soil and Crops

In this district soil may broadly be classified into different types—

Karaior or Karior.—The soil is blackish in colour and is difficult to plough when dry. This is best suited for winter rice. The soil is mostly found in Shahkund, Sonhaula and Sultanganj police stations in Sadar

subdivision and in Belhar police station in Banka subdivision.

Kewal.—The soil is also of blackish colour and is suitable for almost all crops except maize, *kurthi*, etc. The soil is called *char* when it goes under water during flood in the river Ganga. It is found mostly in Pirpainty, Colgong and Sultanganj police stations.

Gori-Mitti.—The soil is of reddish-yellow colour. It is most suitable for paddy plantation and ordinarily suitable for all kinds of crops if irrigated. This type of soil is mostly found near the hills in Pirpainty, Colgong, Katoria, Banka and Bounsi police stations.

Pasroti.—The soil is of whitish colour. It is mostly found in Bounsi police station and is suitable for *aghani* crops.

Loam.—Regarding this, J. Byrne has mentioned in the Bhagalpur District Gazetteer (1911) as follows:—

> "Loamy soils are known as *doras*. If low-lying, winter rice is grown on them generally; if high, various *bhadoi* and *rabi* crops do well on them. This class of soil is found around old village-sites where it receives cow-dung and all sorts of household refuse. It is then generally called *dih*, or *goora*, and it is sown with potatoes, vegetables, tobacco, chillies, etc. In low situations, loamy soils are called *tari*, and all crops except maize, *kurthi*, etc., will do well on them."

Sandy soil.—This is known as *balmut*. J. Byrne refers to it as follows:—

> "*Balmut* is a sandy loam that will grow anything. *Dhus* is the name given to sandy loam in the Gangetic diara. As it is submerged when the river is in flood, it is used for *rabi* crops only. These crops thrive in it exceedingly.
>
> "Soil that is almost pure sand is called simply *balu*. When a thin layer of silt (three to six inches thick) is deposited on the top of sand, it is called *patpar*."

Diara.—*Diara* is a sandy land formed due to the change in the course of a river. It is an extremely interesting process of soil formation. Somewhere the velocity of the water is checked sufficiently which allows the suspended matter to be deposited. The building up process continues till the sand bank appears at ordinary water

level. The water lying stagnant deposits clay and silt on the sand. Each succeeding flood deepens the layer of clay. This process gives formation to *diara* which rises above flood level. The *diara* land can produce excellent crops both autumn and spring but there is no certainty of the *bhadai* crops because of the flood water.

The following are the distribution of land according to their level in different parts of the district:—

High lands.—Katoria, Chandan, parts of Banka and parts of Bounsi blocks situated in Banka subdivision have high lands.

Level lands.—The rest part of South Bhagalpur and entire area of North Bhagalpur are mainly level lands.

Low lands.—Parts of Jagdishpur, Nathnagar and Sabour Blocks are low lands. These are liable to inundation.

Diara lands.—Parts of Pirpainty, Colgong, Sabour, Nathnagar, Gopalpur, Bihpur, Naugachhia and Sultanganj are *Diara* lands situated in Sadar subdivision.

Hills and hillocks.—Parts of Bounsi, Banka, Katoria and Chandan Blocks are hilly areas, situated in Banka subdivision. Parts of Pirpainty, Colgong and Shahkund Blocks are also hilly areas, situated in Sadar subdivision. The hills are small in height and usually within 1,000 feet.

Crops.—Regarding crops and cultivation J. Byrne, I.C.S. has mentioned in the last Bhagalpur District Gazetteer (1911) as follows:—"The total area of the district may be classified as follows from the point of view of agriculture. The actual figures are those furnished by the Settlement Department:—

	Acres.*
Total area	2,654,620
Uncultivable area	261,016
Cultivable waste other than fallow	396,327
Current fallow	63,561
Net cropped area	1,684,107

"Following the usual division into *rabi* (spring), *bhadoi* (autumn), and *aghani* (winter) harvests, the following areas are cultivated for each of these harvests:—

	Acres.
Rabi crops	731,560
Bhadoi crops	458,477
Aghani crops	1,070,265
Total area under crops	2,260,302

*This includes 249,609 acres which were only surveyed topographically, for which no detailed records were prepared and no statistics compiled. About half this area would be entirely uncultivable and the other half "cultivable waste".

The municipal areas, 6,400 acres, are also included in this total. No agricultural statistics were compiled except for the purely rural areas of the municipalities.

"As usual, a large proportion of the lands can bear two harvests. In the year for which figures are quoted, not less than 576,195 acres bore two crops. Deducting this from the total just shown we arrive at the net cropped area of 1,684,107 acres.

"The following table gives all the principal crops grown in the district, with the assumed normal area under each crop, and the actual area sown with each crop during the settlement operations.

Class.	Name.	Assumed normal acreage.*.	Actual acreage.
Cereals and pulses ..	1. Rice	1,615,200	997,760
	2. Wheat	203,200	110,518
	3. Barley	68,900	62,739
	4. Millet (*Cholum* or *Joar*)	22,000	10,373
	5. Marua	123,100	142,683
	6. Maize	242,600	114,375
	7. Gram	73,700	99,203
	8. Pulses, etc. ..	203,100	435,145
Oil seeds	9. Linseed	14,100	94,622
	10. Til	2,900	4,256
	11. Mustard	38,200	85,524
	12. Others	17,200	17,372
Condiments and spices ..	13. Various	1,000	2,672
Sugarcane	14. Sugar	63,700	10,768
Fibres	15. Cotton	14,000	503
	16. Jute	22,400	816
Dyes	17. Indigo	13,000	5,408
Narcotics	18. Opium	600	463
	19. Tobacco	8,000	2,302
Orchards and gardens ..	20. Various	22,700	39,795
Miscellaneous	21. Food crops	69,600	21,515
	22. Non-food crops ..	87,600	1,590

"In spite of some marked variations from the normal it is obvious that the rice crop is far and away the most important crop in the district. Under the heading "Oil seeds" there is a marked tendency to an increase and probably the accepted figures for normal acreage will need to be revised soon in respect of these

*Normal areas are taken from the "Agricultural Statistics".

crops just as a permanent diminution is indicated under the headings Indigo (17) and Sugarcane (14)."

Saharsa which is now a separate district was formed out of the areas comprising about one half of the old Bhagalpur district in Byrne's time. The present total area of the district according to 1951 census was 1,397,824 acres (Geographical area including unsurveyed areas). The following statement will show the classification of areas from 1952-53 to 1955-56.*

* *Bihar Statistical Handbook*, 1955 published by the Directorate of Economics and Statistics, Government of Bihar.

(In Thousands of acres.)

Year.	Forest.	Not available for cultivation.	Other uncultivated land excluding current fallow.	Current fallow.	Net area sown.	Total area of the district.	*Bhadai.*	*Aghani.*	*Rabi.*	Fruits.	Potatoes.	Vegetable including root crops.	Total area sown.	Area sown more than once.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1952-53 ..	90	1,99	45	2,15	8,35	13,84	1,23	4,71	4,03	12	3	3	10,14	1,79
1953-54 ..	1,01	1,48	40	2,15	8,79	13,84	1,26	5,26	2,98	11	2	3	9,66	87
1954-55 ..	1,01	1,72	69	1,15	9,28	13,84	1,16	5,32	3,44	12	3	4	10,01	74
1955-56 ..	1,60	1,33	24	1,54	8,90	13,84	.1,20	5,38	2,87	8	3	..	9,58	75

According to 1951 Census the picture of cultivation in Bhagalpur district will be shown in the following charts:—

(*a*) *Classification of land in acres.*

Total area (Geographical area including unsurveyed).	Net area sown.	Area sown more than once.	Current fallows.	Area under orchard.	Cultivable waste.	Not available for cultivation.
1	2	3	4	5	6	7
1,307,824	744,967	263,067	111,195	8,910	217,022	315,730

(*b*) *Progress of cultivation during three decades.**

Average net area sown in acres.				Average area sown more than once in acres.				Area under principal crops.*			
1951.	1941.	1931.	1921.	1951.	1941.	1931.	1921.	Rice	Wheat.	Maize.	Gram.
1	2	3	4	5	6	7	8	9	10	11	12
744,967	648,812	712,962	762,366	263,067	185,550	154,414	251,061	374,725	47,011	129,527	75,313

The above statistics compared with the statistics of Sadar and Banka subdivisions in Byrne's time now constituting Bhagalpur district indicate little change in the cultivable areas.

Paddy.—Paddy is the important crop of Bhagalpur. Transplantation method is generally used but broadcasting is also practised.

Aghani.—Aghani or winter rice is generally cultivated on level low lands, although some species are grown on comparatively high soils. The following yearwise figures supplied by the office of the Deputy Director

* District Census Handbook, Bhagalpur, 1956 (P. 118—119).

of Agriculture, Bhagalpur will show the acreage and outturn of winter rice in the district from 1949-50 to 1960-61 :—

Year.	Area in acres.	Outturn in tons.
1949-50	476,720	173,957
1950-51	584,361	134,993
1951-52	416,222	130,572
1952-53	420,619	86,621
1953-54	492,065	147,874
1954-55	485,213	85,640
1955-56	509,251	144,563
1956-57	361,231	111,853
1957-58	302,518	42,324
1958-59	434,813	199,351
1959-60	398,031	152,041
1960-61	392,508	189,791

The early months of spring are the most suitable time for preparing land not bearing a second crop, by repeated ploughing.

In May, after a good shower the field for cultivation is ploughed about four times and seed is thickly scattered over it. Another field is prepared for transplantation when the seedlings make their appearance. The rain usually sets in by that time and the land is made to retain water in it. It is repeatedly ploughed and the whole field is reduced to thick mud. The young seedlings are then taken out of the nursery and transplanted in rows at about a distance of 8 to 9 inches.

Aghani or winter paddy is sometimes sown broadcast but this method is less productive. If there is sufficient rain in early April and May, transplantation is convenient, but if as often happens, there is no rain until the usual rain begins in the middle of June, it is broadcast and transplantation is done at the places where the sources of irrigation are available. The distribution and the quantity of rainfall determine the fate of the harvest.

Bhadai or autumn rice is generally sown on high land. The field is ploughed 10 to 12 times after the first showers of spring and seed is broadcast either in April or May.

Its yield per acre is less than the transplanted *aghani* or winter rice, but its cultivation is easier and involves less labour. The following yearwise figures supplied by the office of the Deputy Director of Agriculture, Bhagalpur show the acreage and outturn of *bhadai* or autumn rice in the district.

Year.	Area in acres.	Outturn in tons.
1949-50	22,303	5,743
1950-51	3,160	3,844
1951-52	3,226	4,463
1952-53	2,078	301
1953-54	1,538	280
1954-55	1,416	232
1955-56	2,673	575
1956-57	1,692	276
1957-58	1,149	165
1958-59	3,275	369
1959-60	2,311	401
1960-61	2,074	379

Harvest.—Paddy is reaped by cutting off the ears (*sish*), with about a foot and a half of the stem of a plant attached. Then it is tied up in bundles (*bojha*) and carried to the threshing floor. The threshing floor is usually prepared by merely cutting off the surface turf. A bamboo is drived into the ground in the middle of the cleared area. Around the bamboos sheaves or the bundles are placed and a number of cattle are brought in. They are tied neck to the bamboo. They are driven round and round. They tread on the grain separating it from the stalk and ear. The stalk left after threshing out the grain is carefully stored for feeding cattle. The process of separating the grain is called *dauni*. The grain is then collected in a heap on the threshing ground and winnowed which is called *osouni*.

Storage.—Store houses for grain are made by laying bamboo *Chatai* on blocks of wood or bricks and raising cylindrical bamboo enclosure above it covering the whole thing by thatch roofing. Such structures are called *berhis*. These are rather primitive but cheap and quite useful.

Wheat.—Wheat is the most important *rabi* crop. It is mostly cultivated in the areas lying north of the river Ganga and in Sultanganj, Nathnagar, Sabour, Colgong, and Pirpainty areas. It requires a clayey soil of medium elevation. The sowing starts from middle of October and it continues upto the end of December. The harvesting starts from the month of March and continues upto April. The area in acres under cultivation and outturn in tons yearwise are given below. The figures below are supplied by the office of the Deputy Director of Agriculture, Bhagalpur.

Year.	Area in acres.	Outturn in tons.
1949-50	37,640	8,546
1950-51	32,895	9,412
1951-52	25,638	14,952
1952-53	36,516	7,606
1953-54	37,924	8,066
1954-55	48,291	9,171
1955-56	42,495	12,566
1956-57	73,774	3,442
1957-58	11,813	5,078
1958-59	54,200	16,565
1959-60	49,653	7,422

Gram.—Gram is an important *rabi* crop. The area under cultivation of gram and its outturn yearwise are given below. The figures below are supplied by the office of the Deputy Director of Agriculture, Bhagalpur.

Year.	Area in acres.	Outturn in tons.
1949-50	125,192	14,023
1950-51	81,800	7,371
1951-52	69,661	3,941
1952-53	138,240	15,742
1953-54	101,404	16,874
1954-55	12,262	14,462
1955-56	101,832	21,659
1956-57	75,529	12,569
1957-58	45,744	7,360
1958-59	125,131	21,282
1959-60	100,330	11,728

It is mostly cultivated in the areas lying north of the river Ganga, and in Sultanganj, Nathnagar, Colgong and Pirpainty areas.

Maize.—Maize forms an important cereal and an item of food amongst the poor masses. The following yearwise figures supplied by the office of the Deputy Director of Agriculture, Bhagalpur will show the acreage under cultivation of maize and its outtrun:—

Year.	Area in acres.	Outturn in tons.
1949-50	195,475	53,638
1950-51	143,458	17,865
1951-52	139,723	20,965
1952-53	105,983	36,791
1953-54	105,493	15,394
1954-55	97,538	13,626
1955-56	94,579	16,825
1956-57	75,804	17,251
1957-58	146,367	28,551
1958-59	114,265	20,752
1959-60	129,779	79,929
1960-61	166,859	78,612

The most important maize growing areas are in North Bhagalpur particularly Naugachhia area. Naugachhia is the important trade centre of maize not only in Bhagalpur district but in the State of Bihar. A large quantity of maize is exported from here through boats and rails.

Other-food crops.—Among other food crops, barley, *khesari* and *arhar* are important. Both *khesari* and *arhar* are pulses and barley is generally consumed in form of bread and flour (*sattu*).

Non-food crops.—Sugarcane is the most important non-food crop. The following yearwise figures supplied by the office of the Deputy Director of Agriculture, Bhagalpur will show the acreage and outturn of sugarcane in the district:—

Year.	Area in acres.	Outturn in tons.
1949-50	14,405	1,466
1950-51	16,113	2,878
1951-52	11,070	1,830
1952-53	9,578	6,519
1953-54	10,302	1,514
1954-55	3,919	183
1955-56	10,946	979
1956-57	9,491	59,079
1957-58	6,607	29,377
1958-59	9,077	128,107
1959-60	13,005	149,623

It is a cash crop. It keeps the fields engaged for the whole year. Its cultivation is mostly restricted to Colgong, Pirpainty and Amarpur areas. Sugarcane is generally crushed locally here for producing *gur* and *khandsari*. Sugarcane has replaced Indigo which used to be grown extensively a few decades back.

Fruits and vegetables.—Besides foodcrops and non-food crops different kinds of fruits and vegetables are grown in this district. Fruits are grown in gardens where other kinds of crops are generally not grown. Vegetables are grown in the lands generally near the homestead of a cultivator. Vegetables are also grown in large quantities in the umlands near the towns because they get ready market. Sometimes other crops are also grown in the fields where vegetables are grown.

The important vegetables commonly grown in this district are potato, brinjal, lady's finger, tomato, cauli-flower, *palwal*, bottle-gourd, ridge gourd, cabbage, beans, spinach, beet and carrot, etc., Potato is the most important vegetable grown in the district.

Due to large cultivation of potatoes a cold storage plant was opened at Sabour in the private sector to store potatoes. The capacity of the cold storage is 15,000 mds.

Sweet potato is grown in both *kharif* and *rabi* seasons. During *kharif* this is planted in June or July and the vines from them are also utilised in the plantation during *rabi* season after harvest of *bhadai* crops in September and October. This is harvested in October or November and in March or April. Sweet potatoes are in great demand and being cheaper is largely consumed by the poorer classes.

Water-melon and musk-melon are generally grown extensively in the *diara* land, in summer. Bhagalpur melons are very large in size and sweet and command a big market outside Bhagalpur. A large quantity is exported to Calcutta, Patna, Asansol, etc. They are mostly grown in North Bhagalpur and in villages Baijani, Phulwaria, Puraini, Jagdishpur and in some parts of Colgong and Sabour. They are generally sown in February or March and harvested in May or June. The *diaras* of the district grow good water-melons besides various kinds of vegetables.

Fruits.—Important fruits grown in this district include mangoes, guavas, *lichis*, *kagazilemus* (citrus), bananas, papayas, black-berries, *phalsas*, custard apples, jack-fruits, etc.

There are different varieties of mangoes. The important varieties of mangoes are *Malda*, *Zardalu*, Alfanso, *Bombai*, *Fazli* and *Himsagar*. The main mango growing areas are Bhagalpur, Sultanganj, Nathnagar, Sabour, Colgong, Pirpainty, Bihpur and Naugachhia. Possession of mango orchards was considered a mark of prestige at one time. Large number of mango groves have been recently cut down.

Guavas and *lichis* are generally grown in North Bhagalpur and in some parts of Sabour area. Papayas, black-berries and jack-fruits are grown in mango belts. Other fruits like custard apples, lemons, *baels* are scattered all over the district. The area under fruit trees in the district is given below :—

Name of the fruits.	Area in acres.
1. Mango	4,900
2. *Lichi*	2,000
3. Citrus	1,000
4. Guava	1,000
5. Banana	1,000
6. Orange	24
7. Pineapple	300
8. Custard apples	100

It will be seen that the area is very small. There are also some local fruits which are grown throughout the district. Some of them are, *Mahua, Khajur, Imli, Bair, Jamun, Tapari, Amla, Kamranga, Aura, Gab, Sapato, Khiruni.*

Arboriculture.—Different kinds of trees are found in the district. Some of them, namely, mango, *jamun, pipal, banian, kachanar, amaltash, ashok, sirish, sakhua, kathal, shisho,* Indian cork, etc., *Kachanar, shisho, sakhua,* etc., are generally found in North Bhagalpur and other trees are scattered all over the district. But it is unfortunate that in spite of the availability of good shady trees arboriculture by the sides of the main roads has been rather neglected. A well-planned long stretch of avenue for miles of shady and flowering trees is hardly to be seen anywhere in the district. The road from Bhagalpur to Bounsi has trees in certain stretches only. The same is the case with the road from Bhagalpur to Sultanganj. Some of the roads in Bhagalpur town have got old trees, viz., *amaltash* and *krishnachura.* They could be alternately planted by the sides of the roads. In Bhagalpur town there are some good old trees in Sandy's compound, Khanjarpur, Tilkamanjhi and Barari. In front of the Courts at Bhagalpur there are trees of *amaltash* and *krishnachura* which present a good sight of yellow and red flowers in summer. Trees of different species are also found in Champanagar area.

Agricultural Implements

The indigenous agricultural implements are widely used for agricultural operations. Francis Buchanan who had visited the district in 1810-1811 has left an account on the agricultural implements. The agricultural implements used during Francis Buchanan's time do not differ much from the present implements prevalent in the district. The reaping hooks *Hangsuya, Kachiya Jhapan,* the weeding iron (*Khurpi*), the hatchet (*Kulhari*), or the bill (*Dao*), the hoe (*Kodar*), wooden ploughs with iron share (*hal*), hoe (*Kodali*), etc., of Buchanan's time are still in use.

Certain improved implements have also been introduced. Some of the big cultivators have taken to the partial use of tractors in their fields. The number of tractors registered in this district since 1955 is 35. Mechanised cultivation is only possible in consolidated large plots of land belonging to individual owners. There are not many such plots. It is also difficult to get the improved varieties of implements or parts of tractors.

There are several improved implements which are coming into use. Bihar Junior and Bihar Senior are some of the improved ploughs yielding better results. These are used if soil

inversion is necessary or undesirable plants are grown in the field or for ploughing every bit of land for deep ploughing.

Cultivators.—These implements are used for interculturing in the standing crops. There are several types of cultivators but Bihar cultivators are commonly used in this district.

Japanese paddy weeder.—This is becoming popular for paddy cultivation and is used for weeding and hoeing of the paddy field.

Chaff-cutter.—This implement is used for cutting the dry or wet fodder to feed the cattle. This mechanical device saves a lot of human labour and a large turnover is possible.

Maize sheller.—This implement is used for threshing the maize crops. They are available only with the big cultivators of maize growing tract, but it is becoming popular with the common cultivators also.

In addition to the above implements, some of the improved implements such as scraper, wet land puddler, hand hoe and hand duster are also in use.

The approximate price of the implements used in the district is as follows :—

1. Mould Board Plough	..	Rs. 20 to Rs. 25 per plough.
2. *Deshi* Plough ..	..	Rs. 10 to Rs. 12 per plough.
3. Bihar Cultivator	..	Rs. 30 to Rs. 40.
4. Bihar Ridger ..	..	Rs. 25 to Rs. 40.
5. Japanese Paddy Weeder	..	Rs. 15.
6. Chaff Cutter ..	..	Rs. 150 to Rs. 200.
7. Maize Sheller ..	..	Rs. 10.
8. *Phawara* ..	..	Rs. 5 to Rs. 7.
9. *Kudali* ..	..	Rs. 5.
10. *Khurpi* ..	..	Rs. 2 to Rs. 3.

The above implements are available at the district town with the dealers and in subdivision and blocks with the Subdivisional Agricultural Officer and Block Development Officers on subsidised rates.

Tractor and pumping sets are utilised for ploughing and irrigation.

The Agriculture Department has a tractor loaning scheme in which a tractor is given to cultivators for ploughing their fields on loan. Pumping sets are very useful to small cultivators also.

Seeds

The quality of seeds also counts considerably in stepping up yield. In respect of some of the crops, it has been estimated that better varieties of seed can enhance the output even to the extent of 20 to 25 per cent.

The cultivators generally reserve a certain portion of their field produce for use as seed. But the seed often deteriorates in quality if no particular care is taken. Several improved varieties of seeds have been obtained either by selection on hybridisation by the Department of Agriculture, Bihar, at its research stations in the State or imported from other research stations in other parts of India. Several imported seeds have been given trial under local conditions and have been recommended to replace local seeds.

To check the deterioration in the quality, Seed Multiplication Scheme has been taken up for multiplying better type of seeds to introduce them to the farmers. The aim of the Government has been to open a Seed Multiplication Farm at each Block Headquarters. There are 18 Seed Multiplication Farms out of the 21 Blocks.

Previously, the recommended seeds of improved varieties were supplied to the cultivators from the Sabour Regional Farm and Banka Research Farm in small quantities and that too were not sufficient to meet the demand of each and every cultivator. So the seeds are now being distributed through the Seed Multiplication Farms to the cultivators.

Seed Multiplication Farms receive pedigree seeds from Sabour or Banka Farms. These seeds are multiplied at the Seed Multiplication Farms and the multiplied seeds are supplied to the big cultivators and they multiply the seeds in their fields under the supervision and guidance of the Village Level Workers who are trained personnel in the agricultural field.

The farmers and the Block Development Officers have an agreement that the seeds produced will be exchanged with the general cultivators for multiplication purpose. They get Re. 1 as premium for each maund of seeds exchanged or sold with general cultivators.

Manures

Cow-dung, the droppings of sheep and goats and farm refuse are common manures. Cow-dung is very popular and it is unfortunate that cow-dung should be used as fuel. The cultivators are no longer allergic to use chemical and organic fertilizers. They are also becoming compost-minded.

In the rural areas the cultivators prepare their own compost. Cow-dung, farm refuse, etc., are collected in a pit and are allowed to decompose to form compost. The pits are opened after one year and the farm-yard manure thus prepared is taken to the field.

The outskirts of the urban areas are now being used by municipal bodies and notified area committees to prepare town compost out of the sweepings and nightsoil. The apathy of the cultivators to use this type of manure is now being liquidated. Oil-cakes are used widely in the district.

The cultivators of this district are getting used to the chemical manures and in this district there are six Co-operative Agricole Depots and many Co-operatives Societies and Multi purpose Co-operative Societies which are selling fertilizers to the cultivators. The figures of sale of manures from Bhagalpur Agricole Depot from 1954-55 to 1960-61 is given below.

Sale position of chemical fertilizer from 1954-55 to 1960-61 (in tons) of Bhagalpur Co-operative Credit Agricole Depot is given below :—

Year.	Ammonium Sulphate.	Urea.	Ammonium Sulphate Nitrate.	Calcium Ammonium Nitrate.	Single Super-phosphate.	Bone-meal.	Fertilizer mixture.
1	2	3	4	5	6	7	8
1954-55 ..	210	..	..	..	60	4	..
1955-56 ..	175	..	..	..	55	..	..
1956-57 ..	231	..	..	..	41	3	..
1957-58 ..	234	1	..	..	63	2	..
1958-59 ..	444	6	..	..	70	2	..
1959-60 ..	448	20	7	5	88	..	10
1960-61 ..	546	15	11	6	73	..	14

The above figures show that there has been a marked increase in the sale of chemical manures.

The sale position of chemical fertilizers of all Agricole Depots of the district is given below for 1960-61 (in tons) except Bhagalpur Agricole Depot which has been mentioned above.

Name of Depot.	Ammonium Sulphate.	Urea.	Ammonium Sulphate Nitrate.	Calcium Ammonium Nitrate.	Single Super-phosphate.	Bone-meal.	Fertilizer mixture.
1	2	3	4	5	6	7	8
1. Colgong ..	218	5	2	1	20	..	3
2. Pirpainty	175	8	..	..	14	..	2
3. Naugachhia	12	..	..	..	12	..	..
4. Banka ..	290	14	5	5	41	6	..
5. Rajoun ..	246	13	..	1	38	26	3

Ammonium Sulphate is used in all the crops but for leguminous crops the quantity used is practically nil. The following chart will show the application of ammonium sulphate in different crops :—

Crops.	Quantity per acre. Md. sr. ch.	Time of application.
Paddy ..	1 22 8	½ dose at the time of padding and ½ dose after one month.
Maize	1 22 8	½ dose at sowing and ½ dose after one month.
Wheat ..	1 10 0	Full dose at the time of sowing.
Potato ..	4 27 8	½ dose at the time of sowing and ½ dose in subsequent two earthings.
Sugarcane ..	4 27 8	½ dose at planting and ½ dose at earthing time.
Barley ..	1 10 0	Full dose at the time of sowing.
Gram and other leguminous crops.	0 12 8	Full dose at the time of sowing.

For all the crops chemical fertilizers are suitable.

On analysis of the soils of the different parts of the district it has been found that they are deficient in nitrogen and phosphate contents. Ammonium Sulphate is a good nitrogen fertilizer.

Besides these, green manuring is also an important process to increase the fertility of the soil. Green manuring is the practice of applying large quantities of green materials such as the leaves and twigs of various plants, trees and shrubs or crops which are specially cultivated for the purpose. This process benefits the soil with addition of nitrogen. It also results in addition of organic matter. The important green manures used in the district are

leguminous crops, such as, *Sanai*, *Dhaincha*, *Moong* and *Kalai*. In parts of hilly tracts, such as, Katoria, Banka, Amarpur and Bounsi police stations, plants, twigs and leaves also are used as green manure. To popularise green manure, the State Government sanctioned 20 per cent reduction on selling price of *Dhaincha* and *Sanai* seeds. The selling rate of *Sanai* seeds is Rs. 20 per maund and of *Dhaincha* seeds is Rs. 15 per maund.

Another method of increasing the fertility of the land is by leaving the land fallow. The field when fallow may be left quite undisturbed or left in a ploughed condition.

The formation of nitrates is less in the soil of a field with a crop growing on it than on an uncropped land. Fallow land helps in securing the formation of nitrates.

Rotation of Crops

The cultivators are fully conscious of the beneficial effects of rotation of crops. Crops are generally sown in rotation but there are certain tracts specially in *diara* areas where rotation cannot be strictly followed. Crop rotations maintain and improve the fertility of the soil, increase the quality and the yield of the crop, and will also help in the conservation of soil. Crop rotation also controls the incidence of disease and weeds. The following rotation of crops is usually followed :—

Kharif.	Rabi.
(1) Early Paddy ..	.. Wheat or Barley.
(2) Green manure ..	.. Wheat.
(3) Maize	.. Barley or wheat.
(4) Maize and *Arhar* ..	.. *Arhar*.
(5) Maize	.. Potato.
(6) Paddy	.. Broadcast gram or *Khesari*.
(7) Paddy	.. Gram or wheat.
(8) Maize and green manure	.. Gram.
(9) Maize	.. Sugarcane.

Cultivators generally sow mixed crops as the seeds of the cultivators are diversified and most of them hold small holdings. The crops usually grown together are—(i) Maize, *arhar* and turmeric; (*ii*) Maize, *urid* and *moong*; (*iii*) Wheat and gram; (*iv*) Barley and gram and (*v*) Wheat and mustard.

The cultivators do not usually allow a margin of rest to the land in between two crops. A small gap between *rabi* and *Kharif* crops should be given.

Agricultural Diseases and Pests

The common pests of paddy are the Rice *Gundi Bug* and Rice case worm. The first generally attacks the early paddy at the flowering time and sucks the juice at the fruiting stage. The latter is common to both the *Bhadai* and *Aghani* paddy and damages the growing plant at all the stages of its growth. Both of them are very harmful and if not checked reduce the yield by about 50 per cent.

Borers are also commonly found doing damage to the maize and sugarcane crops. They bore holes into the stems of plants and cause considerable stunting of growth and driage. Spraying with insecticides such as strong crude emulsion oil at the early stages of attack is useful.

Crickets and hoppers are common in *rabi*. They damage the crops by cutting the plants at their bases and eating away their leaves. Clean cultivation and irrigation are good preventives. Irrigating the fields with crude emulsion oil or flooding them with water mixed with kerosene oil is extremely beneficial.

Mango hoppers are serious pest in the mango orchards of the district. The juice of the young shoot and flower buds or the entire inflorescene is sucked up. A characteristic fungus grows and the whole crop is lost. Spraying with resin soap, kerosene or crude oil emulsion and weak mixture of sulphate and lime help in combating these hoppers.

Amongst the plant diseases, *Dakhinaha* disease of paddy is a serious problem with the cultivators. The tops of the leaves start drying and the driage continues to move downward till the plant itself dries out. The disease appears in slight different forms in the district from place to place and from year to year. The use of *khari* salt or ammonium sulphate is useful.

The traditional method to prevent pests and diseases is the simple use of liquid cow-dung and ash.

Agriculture Department

The district organisation of Agriculture Department has the District Agricultural Officer at the head of the Section. The District Agricultural Officer works under the Deputy Director of Agriculture who has also his headquarters at Bhagalpur. The Director

of Agriculture is the administrative head of the Agriculture Department at the State level, whose headquarters is at Patna.

Under the District Agricultural Officer, there are Subdivisional Agricultural Officers at each Subdivision. The District Agricultural Officer is assisted by the Subdivisional Agricultural Officers and by a team of subject matter Specialists in agronomy, botany, chemistry, plant protection, well-boring, fishery, etc. Their job is to co-ordinate the result of research from the laboratories to the farmers in the field. Broadly, the District Agriculture Officer has to co-ordinate three fold functions—research, education, agricultural extension and development.

Agricultural research

The head of the research work is the Regional Director whose headquarters is at Sabour. Under the control of the Regional Director, all researches are carried on. There is a Director of Agricultural Research at Patna who is in overall charge of research for the State.

With a view to help the Regional Director in reviewing the progress of research and co-ordinating the programme for the region, a council consisting of the research specialists has been set up. The council meets frequently in different research sections and discusses the research work in progress.

The important research centres are of Agronomy, Botany, Agriculture, Chemistry and Soil Science, Horticulture and Plant Pathology.

Agronomy

This section conducts trials on improved varieties regarding their suitability to different tracts. The programme also includes studies on the possibility of double cropping on paddy, control of weeds, green manuring of paddy and wheat, inter-culturing, etc.

The following agronomical practices have been done in the Sabour Agriculture College Farm :—

(1) (*a*) *Kalai* as a fodder crop grown mixed with maize without allowing it to interfere with the inter-culturing and earthing up of maize crop.

(*b*) *Kalai* as a green manure crop has been found to benefit the succeeding wheat crop without loss of the main *Kharif* crops (maize).

(2) Taking two additional crops one of *Kalai* and the other of early mustard between green manuring and sugarcane planting.

(3) Hill method of maize planting (especially in the matter of weed eradication).

Kalai is popular in villages also. Hill method is not practised and is not popular even in the farm.

Botany

This section is engaged in research and evolves various varieties of improved crops and distributes them to cultivators through block agencies.

Agricultural Chemistry and Science

There has been an expansion of the scope of the agricultural chemistry and soil science section. Prior to this expansion the research work was limited to the studies of the effects of fertilizers on crop and analysis of different soils. The work is now done on the following lines:—

(*a*) *Soil Survey.*—Soil maps and recommendation for land use are made on the results of carried out soil surveys.

(*b*) *Soil microbiological studies.*—It has been established by research that yields of *Kalai*, *Moong* and *Soyabean* are increased by bacterial inoculation of their seeds. It has also been established here that Algae when incorporated in paddy fields increase the soil fertility.

(*c*) *Trace elements studies.*—Research has shown that the application of manganese for gram cultivation at Sabour has increased the crop yield.

(*d*) *Increase production by fertilizer application.*—It has been established by researches that the application of fertilizer increases the productive capacity of the soil. Manurial schedule for different crops has been worked out. The problem is to pass it on to the cultivators and to make it popular. It has been proved that efficacy of green manure crops can be increased by applying phosphate while sowing or burying them.

Entomology

An expansion has been made in the Entomology Section. Prior to this expansion limited research work on the bionomics and ecology of important pests of economic crops in Bihar was done.

The work is in progress on the following lines:—

(*a*) Evaluation of synthetic and systematic insecticides for control of pests.

(*b*) Possibilities of biological control of crop pests.

(*c*) Biology and life history of crop pests.

Hortriculture

There is a Horticulture Section under the Agriculture Department. The main activity of the section is conducting researches on horticultural crops in the State of Bihar which is located at Sabour in the district. This section was established in 1934. The work of this section was formerly included in the Botanical Section and was limited to the propagation by grafts of well known fruit varieties, *e.g.*, *Langra*, *Bombai*, *Fazli*, *Zardalu* and *Gulabkhas* varieties of mango. New mango varieties, such as, *Abehayat*, summer *Bahesht*, *Surkh Burma* and *Sundar Prasad* are being introduced.

Research is going on to work out prevention of preharvest drop in mango and *Lichi*, deficiency symptoms in mango, *Lichi*, guava and papaya, and to increase sweetness in orange fruits by application of chemical fertilizers.

The section at Sabour is under the control of the State Horticulturist who controls and guides research at Sabour and at the different sub-stations distributed throughout the State. From the horticultural garden a very large number of graft fruit plants are sold annually to the public.

Within this section there is one fruit and vegetable sub-section at Sabour. Researches are being carried out on (*i*) Fungal disease, (*ii*) Physiological disease and (*iii*) Virus disease and to find out suitable antidotes.

Some of the practical results achieved in the Horticultural Section may be indicated. The causes and remedy of the irregular bearing in mango have been found out. Mango has been induced to flower every year by cultural operations only. This is possible if mango trees are manured every year with the scheduled doses of different nutrients and in the 'On' year, the dose of nitrogen is doubled to induce vegetation just after harvest. These late shoots mature and flower during the next spring. Good strains of mango have been evolved by crossing suitable types. It has been established that "Black tip" disease of mango is caused by coal fumes emitted from brick kilns.

It has also been found possible to change the flowering season in Nagpur oranges from spring to rains thus yielding fruits in April-May in place of November-December.

The researches have also established some of the effective control measures for some pests and diseases like mango hopper, litchi mite, leaf cancer in citrus, etc. Processes for improving fruit preserve have also been found.

The Horticultural Section has also been able to grow successfully a number of spices and medicine plants like Anise, Cardamom, Rawolfia serpentina, etc.

Agriculture College

The Agricultural College at Sabour was started in 1910. The course of studies which originally extended over three years for the Diploma of Licentiate in Agriculture, was subsequently reduced to 2 years' certificate course. It imparted training in Agriculture including Livestock and Rural Economy, Physics, Chemistry Botany, Entomology, Veterinary Science, Agricultural Engineering and Land Records. This course is now abolished and has been substituted by a degree course in the Agriculture College.

The College is located at Sabour about 5 miles east of Bhagalpur. It is affiliated to Bhagalpur University. In the present set up the College imparts education up to B. Sc. (Agriculture) and M.Sc. (Agriculture). The subjects taught are Agronomy, Agricultural Botany, Agricultural Chemistry, Horticulture, Entomology, Plant Pathology (Mycology and Bacteriology and Plant Pathology), Agricultural Engineering, Agricultural Economics and Rural Extension, Animal Husbandry, Farm Management, Statistics and Farm Accounts.

The minimum qualification for admission in B. Sc. Course (Agriculture) is a pass in I.Sc. with Physics, Chemistry and Biology or Mathematics or an equivalent qualification. From 1961, students who have passed Higher Secondary Examination or Pre-University Examination with Science or Agriculture group are also admitted to the Course.

The minimum qualification for admission in M.Sc. Course (Agriculture) is a degree in B.Sc. (Agriculture). The following five subjects are taught in the M. Sc. (Agriculture) class: (1) Agronomy, (2) Horticulure, (3) Entomology, (4) Plant Pathology and (5) Agricultural Extension.

Model farms.—There is one Central Farm at Sabour, one Research Farm at Banka and 18 Seed Multiplication Farms in different *Anchals* of the district.

The Central Farm with an area of 600 acres at Sabour is used for experiments and demonstrations by the Agricultural College, Sabour. The farm grows almost all the important crops including fodder. Besides providing facilities for training to the students in the field of practical agriculture, it multiplies seeds of improved and recommended varieties.

A Research Unit has recently been added to Sabour Agricultural College and a number of schemes under the Indian Council of Agricultural Research have been taken up. The sections under Botany, Chemistry, Horticulture, Entomology and Soil Survey are all busy in investigation work. The Botany section now consists of sub-sections for oil-seeds, maize and millet, rice, pulses, each incharge of a Specialist Officer. There is also a scheme of Indian Central Cotton Committee for introduction of long staple cotton in Bihar. Under the Chemistry section there is a Soil Survey Officer, a Soil Microbiologist and a Geologist and maps for soil survey and mineral occurrences are being compiled after due investigation. Under the Horticultural section a Zonal Fruit Research Station of Indian Council of Agricultural Research has been started under a Zonal Horticulturist with jurisdiction in West Bengal, Bihar and Orissa.

New varieties of cotton, linseed, safflower (*Kusum*), ground nut, sweet potato have been introduced. New agronomical practices and improved strains of barley, wheat and rice have been evolved. The Botanical Garden contains a representative plant of different families, quite a few of which are also medicinal plants. The Botanical Garden is mainly used for teaching botany to the students. There is also a Dairy as a teaching unit. The Dairy has herd of Tharparkar cow and bull and Murrah buffalo. Preparation of butter, cheese and cream and artificial insemination techniques are taught to the students. There is a Poultry Unit as well with White Leg Horns and Rodes Island Red, Minorcas, etc. There is a Fruit Preservation Unit for teaching the preparation of jam, jelly and preservation of fruits.

Animal Husbandry and Fisheries

As this district has to depend mainly on animals for its agriculture, a cultivator of even moderate means has to maintain at least one bullock. Cultivators in better circumstances maintain one or more pairs of bullocks, a few buffaloes and sometimes a few cows also. The poorer section keeps goats, sheep and poultry. The number of cattle generally adds to the social status of the farmer. The cattle wealth of Bhagalpur district is good because of the number and the quality of the animals.

Regarding cattle, Captain Sherwill in his "Geographical and Statistical Report of the District of Bhagalpur (1869)" mentions as follows : "The principal draught cattle in the District are buffaloes, and the common grey bullock; horses, mules and asses are almost unknown; cows, pigs, poultry and pigeons are common". His remarks do not hold good these days for he-buffalloes have ceased to be draught animals and have been replaced by bullocks; horses and asses are common while pigs are kept only by certain sections of *Harijans*, e.g., Musahars, Dosadhs, Doms, etc.

The following table indicates the livestock population from 1920 onwards :—

Year.	Cattle.	Buffaloes.	Sheep.	Goats.	Pigs.
1	2	3	4	5	6
1920	1,142,395	204,638	25,351	125,383	N.A.
1925	1,143,267	213,071	25,535	372,363	N.A.
1930	1,166,538	242,201	27,204	282,329	N.A.
1940	1,080,606	221,506	25,709	277,435	16,189
1945	916,175	209,644	17,124	179,344	11,749
1951*	1,331,600	245,107	30,395	344,090	18,381
1956	5,77,722	1,25,226	19,688	2,83,852	10,885
1961	6,19,790	1,18,816	23,905	3,72,627	N.A.

The figures of 1940 and 1945, showing a decrease under each of the heads, are easily explained by the heavy drain of livestock due to the exigencies of the Second World War. But a marked increase is noticed in the animal wealth of the district when the figures of 1951 are compared with that of the 1945.

The decrease in the number of all the heads quoted above in 1956 and 1961 as compared with the 1951 is due to the fact that the two subdivisions of the old district of Bhagalpur were transferred to the newly created sub-district of Saharsa which was later raised to the status of full-fledged district in the year 1954.

The figures of 1961 as compared with 1956 show an increase in all the heads excepting buffaloes. This shows that there is a great tendency towards increase in the cattle wealth of the district. It is unfortunate that the goat population is increasing. The figure of goat population in 1961 as compared with 1956 shows that there is an increase of about one lac in five years. Goats are the worst enemies of crops. The population of pigs in 1951 has increased by 7,000 as compared with 1945. The figures of pig in 1961 are not available. The State Government have decided to encourage people for keeping more pigs during the Third Five Year Plan. The population of other animals has increased in 1961 as compared with 1956 which indicates that the people are getting more and more interested in animals.

*Figures upto 1951 cover both Bhagalpur and Saharsa districts (District Census Handbook, 1956). Later figures are for Bhagalpur district excluding Saharsa.

A detailed classification of bulls for Bhagalpur only according to 1951 census is given below:—

Bulls over three years

	Cattle.				Buffaloes.			
	Breeding bulls.	Working bulls.	Other bulls.	Total.	Breeding bulls.	Working bulls.	Other bulls.	Total.
1	2	3	4	5	6	7	8	9
Rural ..	913	202,813	13,666	217,392	1,135	16,848	3,453	21,436
Urban ..	35	1,493	119	1,647	21	8	4	33
Total ..	948	204,306	13,785	219,039	1,156	16,856	3,457	21,469

The above figures disclose that the number of breeding bulls, both in cattle and buffaloes are less than that of working bulls. It also discloses that the livestock wealth is more found in the rural area than in urban area.

A detailed description of cows over three years according to 1951 census is given below (for Bhagalpur only).

Cattle

	In-milk.	Dry.	Not calved.	For work.	Others.	Total.
1	2	3	4	5	6	7
Rural ..	71,177	77,231	27,850	16,732	5,941	198,931
Urban ..	2,100	1,531	337	464	127	4,559
Total ..	73,277	78,762	28,187	17,196	6,068	203,490

Buffaloes

	In-milk.	Dry.	Not calved.	For work.	Others.	Total.
1	2	3	4	5	6	7
Rural ..	14,569	17,477	7,493	5,467	2,665	47,671
Urban ..	143	192	23	90	59	507
Total ..	14,712	17,669	7,516	5,557	2,724	48,178

The population of dry cattle and buffaloes is more than the population of cattle and buffaloes in-milk.

Fodder crops

As the straw of cereals is generally used as food for cattle, people do not feel the necessity of growing crops to be used as fodder only. There is no reliable record to assess the area under fodder crops, but, for improving the quality of animal wealth, the Government is keen to increase and develop fodder products. Altogether 1,136 demonstration plots covering 136 acres of land were laid in both the seasons *i.e.*, in *Kharif* and *rabi* during 1958-59. Three hundred ninety-six maunds of improved fodder cuttings of Napier and Para and 19½ mds. of Goar, Darseem and Lucerene seeds were distributed among the people of the district during 1958-59. During 1959-60, 1,168 demonstration plots covering 181 acres of land were laid in both the seasons. Eight hundred and sixty maunds of improved fodder cuttings of Napier and Para and 25 maunds of seeds were distributed among the people of the district during 1959-60. This shows that there is a marked increase in the demonstration plots as well as in area covered by the fodder crops and in seed distribution among the people.

Dairy farming

Mostly *gowalas*, who are professional cowherds, keep herds of cows and buffaloes and trade in cow and buffaloe milk. There are five privately managed *goshalas* in the district. At these *goshalas* cows and buffaloes are maintained but the standard of maintenance is poor. *Gosadans* are meant for housing decrepit and semi-useless cattle. There is no *gosadan* in the district. The two important *goshalas* are 'Shri Goshala' at Bhagalpur and 'Shri Gopal Goshala' at Naugachhia. Both are maintained by public subscriptions and donations.

In order to organise the sale of pure milk and improve the quantity of milk the Government have encouraged the existing *goshalas* on modern lines. The Government have distributed Hariana bulls and cows to the *goshalas* at Naugachhia and Bhagalpur.

Shri Goshala of Bhagalpur has its three branches at villages Tikuri, Mohanpur and Shahkund. Mohanpur and Shahkund *goshalas* have no cows fit for giving milk. The total quantity of milk produced by 'Shri Goshala' and its branch at Tikuri comes to about 8 mds. daily (1961). The milk is supplied at Bhagalpur. Besides these, there is a 'Co-operative Milk Union' at Bhagalpur which manages to supply milk to the inhabitants of the area. It does not keep cattle but purchases milk from the milkmen

residing in different parts of the area and the purity of milk is tested and then the milk is supplied to the people.

But these agencies cannot be said to fulfil the total demand of the area. The *goshalas* and the milkmen maintain mostly average cows and the yield of an average cow is about 3 pounds per day that is why they cannot meet the full demand. The average yield of a Hariana cow is about 10 pounds per day. If Hariana cows will be popularised in the *goshalas* and amongst the milkmen, they may get sufficient quantity of milk and thereby they can easily meet the demand of milk.

The price of milk per seer is 63 nP. in Bhagalpur. The quantity of milk supplied by the above agencies varies from season to season.

Bhagalpur is famous for its milk-products like *ghee*, curd, sweets, etc. The northern portion of Bhagalpur is noted for exporting *ghee* and butter.

Sheep breeding

The sheep population of the district according to 1956 Livestock Census was 19,688 and, according to 1961 Livestock Census, is 23,905. There has been a marked increase in the population of sheep which is apparent from the figures. The areas where sheep population is concentrated in the district are Belhar, Katoria, Banka, Baounsi, Sabour and Colgong Police-stations.

There is no specified pasture ground in the district. Only idle and fallow lands are used as pasture grounds for the sheep population. Hilly tracts also provide some grazing for the Livestock.

The shepherds of the district rear wool out of sheep and supply it to the Central Jail, Bhagalpur. The district has a ready-made market for blankets as a large number of them are manufactured at the Central Jail, Bhagalpur, alone. Besides, shepherds also prepare blankets from wool. It is a very good cottage industry for the shepherds. Blankets are prepared at every place where the population of sheep is thick. The Government is also intending to help the shepherds by providing them training in the field of blanket weaving.

Poultry farming

Poultry is kept by a good number of people, but there is practically very little of proper housing and feeding except in a very few cases where improved types of birds are maintained

Normally the birds are let loose to feed themselves and they are not given healthy balanced diet. Mostly Muslims and the poorer sections of the Hindu keep poultry as a side-income.

There are two Government poultry farms in the district (1) Poultry Extension, Bounsi and (2) Regional Poultry Farm Barari (Bhagalpur) and there are three hatching poultry centres, namely, Sabour, Katoria and Banka run by Government. There is one private poultry farm also in the district at Mandar named Mandar Poultry Home.

Poultry farming has come to take the form of an important industry. The Government extends loans to the persons working in this field. The following figures will show the extent of development in this field :—

	Fowls	Ducks.
1945	1,23,992	6,510
1951	1,70,246	8,067
1956	1,57,757	2,985

From the figures it transpire that there has been some development in the field of poultry. The decline in the figures of 1956 is only due to the fact that the two subdivisions of old district of Bhagalpur were transferred to the newly created sub-district of Saharsa, which was later raised to the status of a full-fledged district in the year 1954. For the development of poultry, hatching centres at Sabour, Katoria and Banka have been opened.*

The aims of the hatching centres is to improve the breed of the birds. Better type birds are hatched and distributed for breeding purposes. The work done so far from these centres is extremely poor in consideration of the consuming public. During the years 1957-58 to 1959-60, 1,624 birds have been distributed for breeding purposes. The Community Development Blocks are expected to encourage poultry rearing but not much appears to have been achieved so far.

It is unfortunate that poultry farming at small scale on improved lines has not been adopted by the common middle class family who could spare about 400 square feet of ground space which is sufficient for a few birds. It may be noted here that the late Mr. S. K. Roy, a retired Superintending Engineer had started a modest poultry farm at Bounsi in his own house and was quite successful in producing very good birds long before the State Government had taken any steps to encourage poultry. He is an example that could usefully be followed by the middle class people for improving their diet and also to supplement the income.

Generally it may be said that the price of meat in Bhagalpur ranges from Rs. 3 to 4 (1961) which is 50 per cent more than the ruling price in Patna. The price of milk product has also gone up very considerably.

* Fowls and ducks in 1951 for Bhagalpur excluding Saharsa were 114,869 and 5,843 respectively.

Fisheries

The large number of rivers, streams, low lying fields which accumulate water in the rainy season, ponds and marshes indicate a rich fish potentiality for this district. Certain portions of the bed of Ganga near Bhagalpur are particularly noted for a large variety of spawn. A large number of tanks are kept reserved for rearing fish. There are four such tanks in Bhagalpur town. The recent rehabilitation of displaced families from East Pakistan belonging to fishermen class near about Rajmahal has given a great incentive to fish culture. These displaced Bengali fishermen are experts in catching fish with their large net (*mahajal*) from which fish could hardly escape. The presence of ice factory and a large fish consuming public indicate an assured consumption of large quantities of fish within the district. Only two decades back a variety of fish both large and small used to be available in the markets of the district and the surplus used to go out of the district by rail or boat. Somehow the position has been reversed now and due to higher price of fish in Asansol, Chittaranjan, Burdwan and Calcutta the bulk of the best fish caught daily is sent out while the balance is sold in Bhagalpur and in other markets at a price ranging near about Rs. 3 per seer. The State Government has rightly taken up a scheme for development of fisheries. One Inspector of fisheries has been appointed under the administrative control of the District Agricultural Officer. The Fishery Inspector is expected to look after the development and exploitation of suitable water reservoirs in the district. He is also required to look after the welfare of the fishermen and to do a necessary amount of propaganda and demonstrations. The achievement so far has been imperceptible and the condition of the fisheries and the fishermen continue to be almost the same as it was two or three decades back. No active fishermen co-operatives have been functioning and the middlemen continue to exploit the poor fishermen. There has been no serious attempt to tap the paddy fields which can grow a large quantity of particular species of fish. No attempt has been made to introduce new varieties of fish and on the other hand many of the species are declining.

The main occupation of the men belonging to the castes Mallahs, Keuts, Banpars or Tiors is to catch fish and do other allied work for marketing fish. There are regular fishing villages in this district mostly located by the river side. Fishermen usually live in a distinct *tola* or *tolas* of the village or town. This is the case at Colgong and Naugachhia. According to the District Census Handbook, 1956, the total number of persons who were found to be economically active in fishery was only 598 with 476 males and 122 females. Bhagalpur district is noted for its fish wealth although the fishermen occupy a distinctly lower position in fish trade and their role is to catch fish only. The

bulk of their catch is sold to a few traders who belong to other castes, such as, Gwalas, Kurmis and Muslims. These are big traders who directly import and export fish. Quite a large quantity of fish is received in Bhagalpur market every day from the other side of the Ganga mostly from Khagaria and Katihar Subdivisions. Occasionally particular kinds of fish like lobsters, *hilsa*, *bhetki*, etc., packed in ice are imported from Calcutta. Fresh water fish like *Rohu* and *Katla* are sent out from Bhagalpur to Calcutta.

In Bhagalpur town fish are brought from different centres and they are sent to the wholesale fish market at Sujaganj. From this market the fishes are sent to retailers on auction basis.

The chief fish markets and trade centres in the district are at Bhagalpur, Colgong, Naugachhia, Pirpainti, Amarpur and Sultanganj. The following are some of the species of fish that are commonly available:—*Rohu* (*Labeo rohita*), *Katla* (*Catla buchani*), *Boari* (*Wallago attu*), *Tengara* (*Macrones tengra*), *Hilsa* (*Clupea ilisha*), *Bachwa* (*Eutropichthys vacha*), *Jhinga*, Carp, Featherbacks, Livefish and Prawn, etc. A kind of very tasty mullets known locally as *Arwari* is a particular variety available in Bhagalpur. This type of fish usually swims against the current and at the surface of the water in the rivers. A variety of small fish called *pothia* is also common here.

In this district two types of crafts, *viz.*, (1) dug-out canoes and (2) plank built boats are used for catching fish. Dug-out canoes which ply in the rivers are stable and cheap. Plank built boats of various types are used in the strong current of large rivers like Ganga and Kosi. The small canoes are commonly used for catching *hilsa*, prawn, etc.

Implements used for catching fish are many. They can be classified as under:—

1. Drag nets of small and big size.
2. Drift and gilling nets.
3. Cast nets.
4. Scoop nets.
5. Pouch nets.
6. Long lines.
7. Fish spears.

The fishes are caught at different catching centres such as, Naugachhia, Colgong, Bounsi, Pirpainti and Sultanganj. As regards fish for sale it may be mentioned that there are four seasons in a year, i. e., from January to March, April to June, July to August and September to December. The average daily consumption

of fish in Bhagalpur town only according to season is given below:—

January to March—	about 50 mds.
April to June—	,, 30 mds.
July to August—	,, 45 mds.
September to December—	,, 60 mds.

On enquiry it was found that in Naugachhia and Colgong towns about 20,000 mds. of fish are exported yearly to other parts of the State and to Calcutta and Siliguri. But there is still scope for development. With the implementation of several new irrigation development schemes, which have a direct or indirect bearing on fisheries, pisciculture is bound to gain more importance in this region. The Ice Factories in Bhagalpur sell daily about 2,000 mds. of ice for the fish trade.

These days there is some apathy among the younger generation of *Mallahs* to take to fish trade. On getting some education they like other educated youngmen, hanker after soft collared jobs and detest the profession of catching fish. This might lead to some decline in fish trade. The other obstacle that stands in the way of the development of fishing industry is the lack of capital amongst the fishermen.

Measures to improve quality of breeds of animals.—Efforts are being made by the Government to improve the quality of breeds. Bulls of improved varieties are purchased and distributed in the different parts of the district. During 1960-61, 62 approved bulls were distributed in the district for improving the breed of cattle.

Artificial Insemination Centres in the district, are located at Banka, Bihpur, Sultanganj, Sonhaula, Pirpainty, Naugachhia and Bhagalpur. In 1960-61, 1,122 animals were artificially inseminated at Banka, 1,798 at Bihpur, 1,503 at Sultanganj, 957 at Sonhaula, 515 at Pirpainty, 272 at Naugachhia and 1,154 at Bhagalpur. In consideration of the cattle population the number is small.

These Artificial Insemination Centres have got different sub-centres and the number of animals referred to above indicates the total number of animals inseminated in the centre including its sub-centres.

There is neither a Research Centre nor a Model Farm nor any other centre for segregation of old animals in the district.

A cattle fair is an important step towards creating a lively interest amongst the people in animals. But unfortunately there is no cattle fair in the district. Only cattle markets are held in different places of the district. The important cattle markets in the district are Shambhuganj (Jagdishpur *Anchal*), Sonhaula (Sonhaula P.-S.), Sahibganj (Belhar P.-S.), Bharko (Amarpur P.-S.) and Puraini (Jagdishpur *Anchal*).

One cattle show is organised every year in every block. During 1960-61, cattle shows were organised in all the blocks except Gopalpur Block. A district cattle show is also organised every year in the district.

Animal Diseases and Veterinary Hospitals

The diseases, from which animals generally suffer from in the district, are rinderpest, haemorrhagic septicaemia, anthrax, black-quarter, foot and mouth diseases. The Animal Husbandry Department deals both with the treatment and prevention of cattle diseases. All out-breaks are attended to promptly with Sera and Vaccine, as the case needs. The affected animals are medically treated wherever possible. Mass inoculation is done against those diseases for which specific vaccines are available.

The comparative figures of vaccination against these diseases in 1958 and 1959 are given below:—

	Rinderpest.	Haemorrhagic Septicaemia.	Anthrax.	Black quarter.
1	2	3	4	5
1958	1,09,597	22,958	1,101	16,517
1959	98,120	7,918	2,021	6,729

In the district of Bhagalpur, there is one Veterinary Hospital at Bhagalpur and class I dispensaries are at the following places:—

(1) Banka, (2) Katoria, (3) Dumraon, (4) Rajoun, (5) Bounsi, (6) Shahkund, (7) Bihpur, (8) Naugachhia, (9) Gopalpur, (10) Colgong, (11) Pirpainty, (12) Belhar, (13) Sabour, (14) Dhuraiya, (15) Jagdishpur, (16) Sultanganj, (17) Nathnagar, (18) Sonhaula, (19) Shambhuganj, (20) Barahat and (21) Chandan.

Statement of cases treated at the Veterinary Hospital, Bhagalpur is given below:—

Year.	Cases treated.	Number of deaths.	Remarks.
1	2	3	4
1956-57	3,110	10	Deaths were due to the outbreak of Haemorrhagic Septicaemia.
1957-58	2,898	57	
1958-59	3,297	8	
1959-60	3,506	12	

During the markets in the district where the animals are sold in large number, efforts are made to vaccinate the cattle as a measure to check the spread of diseases among them.

Forestry

Regarding forests, J. Byrne, I. C. S. has in the last "Bhagalpur District Gazetteer" published in 1911 mentioned as follows:—

> "There is no tract of woodland in Bhgalpur District which deserves the name of a forest, but there is much low jungle interspersed with trees of large size in the south of *parganas* Bhagalpur and Danra Sakhwara, and in *parganas* Nisankpur Kurha and Harawat, north of the Ganges. Along the southern hills there are two distinct tracts, one stretching from near the Umarpur Police Station to the Belhar outpost of Katuriya, including *tappa* Chandan. The second begins near Chandan, and runs by Jaipur along the whole Santhal Parganas boundary to Lakshmipur. The former covers an area of above forty square miles and the latter about thirty."

In this connection it will be interesting to note that the first department for forestry in Bihar was located at Bhagalpur. At that time the districts of Bhagalpur, Purnea and Santhal Parganas had plenty of forests. But at the moment, the forests of Bhagalpur district are not very important. All the forests of the district had so far been privately owned. But with the implementation of the Bihar Land Reforms Act, 1950, the State Government have become the proprietor of these forests.

The forests of the district have been divided into two ranges, viz., Banka and Katoriya. Each of the ranges is placed under a range officer. They are under the administrative control of Divisional Forest Officer, Deoghar with his headquarters at Deoghar.

Banka range consists of 133.39 square miles demarcated area. There are four beats, namely, Banka, Bhitta, Lakshmipur and Belhar and 25 sub-beats under this range. No afforestation work is being done in this range.

Katoriya range consists of 81.33 square miles demarcated area. There are three beats, namely, Katoriya, Suia ar d Chandar and 20 sub-beats under this range. Afforestation work is going on in this range.

State Assistance to Agriculturists

The Agriculturists Loans Act, 1884 and the Land Improvement Loans Act, 1883 enable Government to give loans for relief of distress, purchase of seed or cattle or any other purpose connected with agricultural objects.

Under the Land Improvement Loans Act, the Collector is competent to sanction loans up to Rs. 2,000. Loans exceeding Rs. 2,000 but up to Rs. 5,000 require the sanction of Government. In respect of the Agriculturists' Loans Act, the Subdivisional Officer can grant loans up to Rs. 250 and loans above it but up to Rs. 700 are granted by the Collector. The loans above Rs. 700 require the sanction of the Commissioner.

On receipt of an application for loans under any of the two Acts, the Collector or Subdivisional Officer first ensures that the application is genuine and grant of loan appears *prima facie* to be desirable. For this purpose, the Collector or Subdivisional Officer makes an enquiry or causes an enquiry to be made by an officer not below the rank of *Kanungo*, or by a reliable non-official agent, for the purpose of ascertaining several particulars such as the area of the land, status of the applicant, that is, whether proprietor, tenure-holder, etc., nature and value of immovable property offered as security, the pre-existing encumbrances on the property, names, status and means of sureties, suitable date for the repayment of the first instalment with reference to the circumstances under which the loans are applied for, proposed instalments and period of repayment, and the date on which the loan should be received by the applicant. In the case of a loan under the Land Improvement Loans Act, the estimated utility and the value of the work proposed to be undertaken, probable cost of the work, and the probable date on which the work will begin to yield profit are also required to be reported by the official

conducting the enquiry. Particular care is also taken to ascertain what encumbrances there are on the land to be improved ; and, in cases in which doubts arise, a notice is issued by the Collector or Subdivisional Officer, calling upon any person objecting to the loan, to appear before him at a time or place to be fixed in the notice and to submit his objections. Such notices are published by being fixed in a prominent place in the village in which the land to be improved is situated. After considering such evidences as the objecting parties may produce, the Collector or Subdivisional Officer may admit the objection or overrule them.

After completion of the enquiry and disposal of the objections, if any, the Subdivisional Officer sends the application to the Collector with his opinion as to whether the loan is to be sanctioned or not. In considering the application for a loan, the Collector is to decide (1) whether the need for the loan is established, (2) whether the security offered is sufficient, (3) the amount that should be advanced, (4) the number of instalments and (5) the period that is to be allowed before repayment commences. The rules require the Collector to satisfy himself that the advance made to the cultivator is sufficient to cover so much of the total outlay required for the construction of the work as the borrower is unable to provide out of his own resources.

In the case of loans given under the Land Improvement Loans Act, where the amount of the loan does not exceed three-fourths of the value of the applicants' transferable interest in the land after carrying out the improvement, no collateral security is required. Where this condition is not satisfied, further security consisting of transferable interests in other lands belonging to the applicant or to other persons willing to become his sureties is demanded. Lands which are not transferable without the landlord's consent are not ordinarily to be accepted as security. Where a body of five or more co-villagers bind themselves jointly and severally for the repayment of the loan, their personal security will generally be sufficient, provided the loan does not exceed five times the annual rent of the land held by members of the group.

In the case of loans given under the Agriculturists' Loans Act, the loan may be given against the guarantee of a third party possessing transferable interest in immovable property.

The loans under the Land Improvement Loans Act are generally repayable in instalments within a period not exceeding 20 years, while the loans under the Agriculturists' Loans Act are repayable within one or two years. The dates for repayment of loans under both the Acts are fixed by the Collector with due regard to the dates of harvest of principal crops, and under the Land Improvement Loans Act the time when the profit begins to accrue. The

ordinary rate of interest on both the types of loans is 6¼ per cent per annum. From the procedure indicated it would be appreciated that a loan under either of the two Acts will not be quickly available. The procedure is rather involved and will necessitate the presence of the applicant in the court offices several times. Allegations of corruption in the court offices are commonly made. But at the same time a certain amount of enquiry is absolutely necessary to avoid the influx of spurious applications. The incidence of the realisation of loans under the Acts has been poor and the State Government is finding it a problem to get an automatic realisation. This fact alone shows that in spite of the enquiries there is a certain amount of leakage and the loans may not have been always properly utilised.

Under the above stated heads the agriculturists of the district have been provided State assistance in the shape of loans by Government. A list of loans advanced to the agriculturists from 1948-49 to 1960-61 under agriculturists' loans, in which *taccavi* loans are also included is given below:—

AGRICULTURISTS' LOANS

Year	Allotment received (in rupees)	Loans advanced (in rupees)
1948-49	10,10,000.00	1,06,000.00
1949-50	2,40,000.00	23,000.00
1950-51	10,00,000.00	7,35,000.00
1951-52	27,50,000.00	22,00,000.00
1952-53	15,00,000.00	14,23,325.00
1953-54	2,48,945.00	2,48,935.00
1954-55	14,00,000.00	13,50,000.00
1955-56	20,00,000.00	19,50,000.00
1956-57	3,85,000.00	3,85,000.00
1957-58	17,25,000.00	17,25,000.00
1958-59	22,00,000.00	21,83,155.00
1959-60	2,00,000.00	14,065.00
1960-61	1,00,000.00	16,050.00

The above figures have been given by the Relief Section, Collectorate, Bhagalpur. A scrutiny of them will show that in the years 1951-52, 1955-56, 1957-58 and 1958-59 both the allotment

and the loans advanced were high. This is because in those years either there was flood, drought or total failure of crops in the district. From the figures discussed above it also appears that the material condition of the agriculturists was not good, so they had to take loans from Government.

Besides, Land Improvement Loans were also advanced to the agriculturists for improving the methods of utilising the fields so that they may yield more production. The following are the figures which show the amount of loans advanced to the agriculturists from the year 1951-52 to 1960-61:—

Year	Allotment received	Loans advanced
	Rs.	Rs.
1951-52	6,05,000	5,32,000
1952-53	2,00,000	1,80,852
1953-54	50,000	39,198
1954-55	50,000	31,200
1955-56	1,00,000	99,592
1956-57	51,000	7,770
1957-58	60,000	15,000
1958-59	1,00,000	35,893
1959-60	30,000	15,310
1960-61	15,000	1,410

The above figures show that the amounts allotted and advanced from 1956-57 to 1960-61 have been less as compared to 1951-52 to 1955-56. The above amounts indicated against the allotments of 'Land Improvement Loans' also include the amounts given for the reclamation of waste lands.

Floods, Famines and Scarcity

On reference to Hunter's Statistical Account of the district of Bhagalpur (1877), it will be seen that Hunter has mentioned about famines and scarcity in 1770, 1775, 1779, and 1783. There was a very severe drought in 1779 in Bhagalpur which was then subordinate to the Supervisor of Rajmahal. There is no mention of famines or scarcity between 1783 and 1866. There is no reason to think that this period was free from any scarcity and all that could be

said is that Hunter could get no records for scarcity or famine. Hunter describes the famine of 1866 in great details. There was again a famine in 1874 due to failure of crops caused by irregular rains. Parts of Bhagalpur district were affected differently in 1874. Some of the portions affected have now gone over to Saharsa district.

J. Byrne in his District Gazetteer of Bhagalpur (1911) has based his description on famine and scarcity up to 1874 on Hunter's Statistical Account. He has continued the subject and has referred to famine and scarcity in the years 1889, 1892, 1896, 1897, 1902 and 1908-09.

Some of the references may be quoted. Hunter mentions that Mr. Harwood, the Supervisor reported that "the Zamindars are ruined, the lands not having yielded half produce for the last twelve months."* The drought continued up to the year 1775. The last District Gazetteer (1911) mentions "In September 1775, the Collector reported to the Governor-General and Council that, 'as the drought still continues, the approaching harvest affords a very bad prospect throughout my districts, but particularly in those *Parganas* where the chief cultivation is the early grain. The late crops were good ; but grain has for some time past sold at an advanced price, from the unfavourable appearance of the next harvest. The settlement has been made good, but I very much apprehend great deficiencies in the revenue in the ensuing year. The growth in the most plentiful year not being sufficient for the consumption of the inhabitants, the price grain bears in the markets of my district depends in a great degree on the adjacent provinces from which supplies are drawn."

Regarding the drought of 1779 the last District Gazetteer (1911) mentions:—

> " 'As there is no appearance of a change in the weather', writes the Collector 'it is with much concern I am under the necessity of representing to the Honourable Board, that the severe drought which we have experienced in this part of the country for some time past, has alarmed the landholders in general to so great a degree, that they absolutely refuse to make themselves responsible for the current year's revenue, without a considerable remission ; or upon such terms as must in the end prove very disadvantageous to Government. The country is certainly in a most alarming situation. The lands which ought to have been cultivated six weeks or two months ago, are still lying waste for want of rain, as a result

* *District Gazetteer of Bhagalpur* (1911) by J. Byrne, p.93.

of which little or nothing is to be expected from the *bhadoi* harvest ; and the *aghani* or principal rice harvest, which should be sown by this time, will suffer materially if we have not a change of weather very shortly. To add to the distress which the inhabitants must necessarily experience from the extreme heat, the tanks and wells in the interior parts of the country are entirely dried up ; scarce a village in the district has escaped being burnt to the ground ; the cattle are dying for want of grass ; and grain in general, notwithstanding every method is taken to supply the markets as usual, is every day apparently more difficult to be procured, and of course rising in price. The country being in this situation, I have in vain used my endeavours with the Zamindars to prevail on them to renew their leases for the present year's revenue, agreeably to your orders. They absolutely refuse, except on terms which will reduce the revenue about one-eight, or from Rs. 1,71,771 to Rs. 1,50,300.' "

Famine of 1866

The famine of 1866 was not so severe in Bhagalpur as in other districts. There was general distress due to high prices of food. The difficulties were enhanced by the failure of the *marua* crop in the northern *parganas*. Severe distress was felt in October, 1865. The commonest kind of rice had risen to the rate of 11 seers for the rupee.

Relief depots were supplied with grain imported from other districts on the north side of the river Ganga. The highest average number of persons relieved gratuitously throughout the district during the months of August and September when the distress was the greatest, did not exceed 1,108 persons ; and the largest average number employed on labour, supplied as a means of relief during any month, was about 700.

Regarding the high prices in the south of Ganga, J. Byrne mentions in the last District Gazetteer (1911) as follows:—

"On the south of the Ganges, high prices were chiefly due to large exportation to the Patna Division. The Deputy Collector of Banka wrote:—'I think the high price of rice, and of pulses too, is owing mainly to the *mahajans* buying up the grain for export to the western provinces. I believe the general outcry at present is not of bad crops, but of the scarcity of grain caused by export. If grain continues at its present price up to the harvest time, the lower classes in this subdivision will not suffer extreme want. I cannot say what the

consequences of a bad harvest and exportation combined will be next year, but I think famine in such a contingency is not improbable'."

Famine of 1874

Regarding the famine of 1874 the last District Gazetteer refers to the Minute of Sir Richard Temple, dated 19th February 1874, which mentions that the Collector did not apprehend any serious distress but scattered outbreaks of distress owing to the high range of prices.

Famine of 1896-97

Last District Gazetteer (1911) mentions regarding the above famine as follows:—

"The scarcity in 1896-97 was due mainly to the general rise in prices consequent on the widespread failure of crops in Upper India which caused prices to advance rapidly. The free supply of foodgrains was exported, and in consequence the local supplies fell short. Between October 1896 and September 1897 the total exports of foodgrains from the district exceeded the imports by nearly 83,000 tons. The same is true of the scarcity in 1892 but to a less degree. The experience of those two years makes it difficult for local officers to calmly acquiesce in a policy of unrestricted export, in consequence of which hundreds of thousands suffer privations that a few bunnias may grow wealthy. It is the poorest of the poor that suffer the pinch of scarcity first and that recover from it last. At times the greed of the local grain dealers brings its own punishment. Thus in 1903 around Banka, in consequence of the failure of the rains, the local bunnias put up the prices. The result was an indiscriminate and unrestricted outbreak of grain looting that lasted for three days about."

Mr. James Robinson, District Engineer, Bhagalpur had mentioned in his written statement before the Famine Commission, 1898 as follows:—"In North Bhagalpur relief works opened in the middle of January, 1897, and closed on the 10th July of the same year. In South Bhagalpur the first of the three testworks opened in April, and they were all finally closed in the third week of June. The total expenditure from Provincial and Local funds upon relief operations amounted to Rs. 1,64,480, out of which Rs. 26,609 represents the cost of rations, doles and allowances to persons gratuitously relieved. The maximum daily attendance of workers was 24,565 men, women and children and that in the week ending

8th May, over fifteen works : the establishment at this period being one supervisor, one non-official "charge superintendent" and fifteen "officers in charge". The contents of this paper relate to relief works, and do not deal with other measures of relief which did not come within the range of the writer's duties."

Scarcity in 1908-09

The rainfall was very poor in 1908-09. Scarcity was apprehended. The last District Gazetteer (1911) mentions regarding it as follows:—

> "The first warning of impending danger was submitted as early as August, 1908 when it was obvious that there was a widespread failure of rains. After August, the only big fall of rain was registered at Banka, 10.97 inches having fallen in September and 89 in October. But this was by no means a general fall as the northern portion of this subdivision suffered as much from short rainfall as the Sadar subdivision. South of the Ganges there were literally hundreds of square miles left absolutely fallow, without a crop of any sort being planted out. But the crops of previous years had been good and the cultivators were well prepared to stand a strain. The landless labourers cleared out in thousands to look for employment elsewhere."

It further mentions that "Agricultural loans were freely distributed to enable the cultivators to sow *rabi* crops, but unfortunately the failure of the hoped-for rains in December and January nullified to a large extent the beneficial results that were expected.

"The local officers were able to induce zamindars and other wealthy persons to avail themselves of the abundant supply of labour for the excavation or re-excavation of tanks and wells ; and for the construction of bunds and irrigational channels."

Later Scarcities

Facts about the later famines and scarcities are available in the Land Revenue Administration Reports of the district. After the scarcity in 1908-09 general scarcity condition prevailed in 1916-17 and 1917-18 due to the heavy floods of August in the district. The floods affected different crops and temporary distress was caused. In 1919-20 famine had to be declared in the district south of the Ganga. The people were given Land Improvement Loans and Agriculturists' Loans. They were given money for purchasing seed and some arrangements for the employment of labourers were also made. In 1923-24, in Bhagalpur Division the rainfall was late, deficient and ceased early in most parts of the district,

and there was a total failure of *Hathia* rains. In consequence of the lateness of the monsoon a magnificent *Makai* crop had been grown over the Ganga but floods of August destroyed it wholly. Distress was felt in the district. The people were able to tide over the year partly with the help of Agriculturists' Loans.

In the years 1924-25, 1926-27, 1927-28, 1928-29, 1934-35, 1937-38, 1938-39 and 1939-40, the district was visited by floods either of the Kosi or the Ganga. Due to the floods there was distress amongst the people of the district. The people were given money as gratuitous relief in the shape of seeds, house building grants, etc., to alleviate distress in the affected areas. In January 1934, Earthquake had caused a heavy damage in the district and there was a great distress in certain areas. The Earthquake had no adverse effect on agriculture in this district. Several buildings including the buildings of the residence of the Executive Engineer and the Office of the Excise Superintendent of Bhagalpur were damaged.

On account of failure of crops in 1940-41 the general condition of the people in Banka and parts of the Sadar subdivision in Bhagalpur caused anxiety. The failure was due to untimely rain.

From 1941 onwards there was a phenomenal rise in the prices of the foodgrains, short supply of essential commodities and the purchasing power of money started falling. The spiral rise of the price of foodgrains benefited the actual growers to some extent but to the service holders, professionals and others there was a period of stress and strain which has continued since. The first rise in the prices and short supply were due to the after effect of the Second World War but the price level has not been allowed to fall by other circumstances. From this period onwards the incidence of savings in the common man started falling and not much reserve has been left to withstand scarcity.

Scarcity of 1948-49

Amarpur, Belhar and Katoria Police-Stations and also parts of Shahkund and Sonhaula Police Stations in the Banka and Sadar subdivisions of the district were affected by drought during the year 1948. Transplantation of paddy was very badly hampered due to the failure of timely rains. This had resulted in total loss of paddy crop in the affected areas. Unfortunately, due to excessive rain, *rabi* crops also suffered in its early state in the areas. The failure of the paddy in these areas has resulted in the cultivators eating up even their seed stock kept for the next paddy sowing season. Circle no. 6 of the Amarpur Police Station was the worst affected.

Relief Measures

Relief measures were taken. Loans under the different Acts for the purchase of seeds and *Taccavi* loans were made available. Arrangements for the opening of Fair Price Shops, etc., were made.

Scarcity of 1951-52

Scarcity conditions were badly felt due to the failure of timely rains. The material condition of the people recorded a great setback.

Middle class families and all those with fixed income were hard hit. Relief works were also arranged on a liberal scale. With a view to provide work to the poorer sections of the people and unskilled labourers a large number of minor irrigation schemes were taken up. *Taccavi* loans and Land Improvement Loans were given liberally.

Scarcity of 1957-58

There was scarcity due to loss of *Aghani* paddy to the extent of 57 per cent during the year due to failure of *Hathia* rains and continued drought and also loss of *Rabi* crops to the extent of about 80 per cent for want of adequate moisture. Sonhaula, Shahkund and Pirpainty Anchals of Banka subdivision were worst affected pockets.

Officers were posted at different *Anchals* for giving priority to matters relating to the organisation of relief in their respective *Anchals*. Relief measures had to be undertaken all over the district. These included opening of 546 Fair Price Shops throughout the district, distribution of *Taccavi* and Land Improvement Loans to the agriculturists, execution of hard and light manual labour schemes and gratuitous relief. Realisation of Government dues through certificate procedure was stayed. The following amounts were spent during the year 1957-58 on different items of relief :—

	Rs.
(1) Hard Manual Labour Schemes	12,14,649
(2) Light Manual Labour Schemes	6,000
(3) Agriculturists' Loan	17,24,950
(4) Land Improvement Loan	59,399
(5) Natural Calamity Loan	51,990

Scarcity of 1958-59

The year was preceded by total failure of two main crops of the district, namely, *Rabi* and *Aghani*, causing distress among the people. In order to relieve their distress, relief measures including distribution of gratuitous relief were taken in the district. Relief to the landless labourers was provided through hard manual labour schemes. Relief to the middle class specially to unattached female widows, orphans, etc., was provided through light manual labour schemes. On different items of relief the following amounts were spent during the year 1958-59 :—

	Rs.
(1) Hard Manual Labour Schemes	24,35,000
(2) Light Manual Labour Schemes	2,42,200
(3) Gratuitous Relief including relief for Fire and Flood.	1,40,000

Scarcity of 1959-60

The years of 1956-57, 1957-58 and 1958-59 were bad years of drought for the district. In 1959-60 both the maize and paddy crops were damaged because of floods in the rivers. The paddy crop was affected due to excessive rain and cyclonic weather in the latter part of the rainy season which caused breaches in protective embankments specially in river Burna and Chandan. These breaches devastated large tracts of paddy fields and rendered them sandy. Due to excessive rains the yield was affected. North Bhagalpur and some of the pockets in the south, namely, Sonhaula, Pirpainty, Amarpur and portions of Belhar and Sultanganj remained affected due to either flood, lack of rain or excessive rain necessitating distribution of gratuitous relief and provision for medical and public health facilities. Expenditure for finalising hard manual labour schemes of previous years was also incurred during the year 1959-60. The following amounts were spent to clear arrear dues and provide relief :—

	Rs.
(1) Hard Manual Labour Schemes	1,33,982
(2) Light Manual Labour Schemes	4,716
(3) Gratuitous Relief including relief for Fire and Flood.	1,06,177
(4) Medical and Public Health	10,000

Floods

The characteristics of the principal rivers of North Bhagalpur have been fully described by Shri P. C. Ghosh in his "Treatise on North Bihar Flood Problems" (1948). Although now the bulk of North Bhagalpur goes to form Saharsa district, the observations are pertinent.

The river system of Bhagalpur district even after the carving out of the Saharsa district consists of a reach of the Ganga about 60 miles in length with numerous Himalayan effluents on the north bank; and on the south a few hill streams which during the greater part of the year are sandy water courses, but in the rainy season swell up and assume considerable size, unnavigable, however, from their rapidity and the uncertainty of their floods.

The Ganga first touches Bhagalpur district at Tulsipur, and for about 10 miles forms the boundary between parganas Jahangira in Bhagalpur and Pharkiya in Monghyr; it then regularly enters the district opposite the township of Sultanganj, where a great mass of granite rises out of its bed. Thence the vast river flows with two great bends, the first northward round the town of Bhagalpur and the second southward to Colgong, where it meets a low range of hills by which its course is again diverted in an almost northerly direction for eight miles until it reaches Patharghatta. At that point it receives the united water of the Kosi and all the northern rivers of the district.

Bhagalpur town is situated on the right bank of the river. It is the headquarters of the district and is the seat of the Commissioner of the Bhagalpur Division. It is connected with the northern portion of the district by a ferry of the North-Eastern Railway.

The river Ganga occasionally recedes from the town of Bhagalpur. About 25 years back the river was flowing just by the side of an inhabited portion of the town and the *ghats*, Buranath, Adampur, Khanjarpur and Mayaganj were touching the river and in the flood season the river frequently entered into portions of the town through creeks. The steamer service of B. I. S. N. Company and another steamer service belonging to Bhaggu Singh used to halt at Adampur *ghat*. But the main channel of the river Ganga has now gone away from the town about a mile or two at different places. Barari *ghat*, however, continues to be just by the riverside. The recession of the river at Barari is much less. The very old generation of Bhagalpur fondly remembers that the Ganga deserts the edge of the town but usually comes back again in 25 or 30 years.

There are two categories of rivers in the district. Rivers which have their sources in the snows of the Himalayas like the Ganga and the Kosi are in the first category. The Ganga flows from west to east and the Kosi flows into the Ganga from the north. They begin rising in the summer months long before the rainy season due to the melting of snows. They are perennial rivers. The Ganga has got a long course before it enters this district. Otherwise sluggish she gains in velocity during the rainy season only. As the course of the Kosi is comparatively very short, the river is

rapid and very destructive. If there is a heavy rainfall even higher up in the basin of these rivers a flood is bound to occur in them which may take an alarming turn if the rainfall is usually heavy.

In the second category of rivers are those that have their sources in the hills in the Santhal Parganas to the south of the district. These rivers are generally dry during the summer and winter months and are full occasionally in the rainy season when there is heavy rainfall. The rivers Chandan, Cheer, Badua, Gabua, Sukhania, Gahira, Bhaira, Kataria, Orhari, Bilasi and Khalkhalia belong to this category. They ultimately fall into the Ganga. During the rainy season they carry a large quantity of water mixed with sand and their currents are very rapid eroding their banks. If the rainfall is very heavy, destructive floods are caused. Of these rivers Chandan and Cheer are the most notorious for their floods.

It is rather peculiar that although floods in this district have become quite common occurrences, we do not find much reference to floods in the old literature. Buchanan Hamilton who had visited Bhagalpur district in 1810-11 has not mentioned anything particular about the floods although he has given a rather elaborate description of the rivers. All that he mentions about floods and embankment is as follows :—

> "There are no embankments for excluding floods of any considerable size, and the number of small ones even is altogether inconsiderable. In fact I heard of only one of the banks of the Gumanmardan, which is about 60 cubits long and 2 or 3 cubits high, and of a few on the creeks near Kahalgang that were still less considerable. In this district no banks have been erected to procure an equal distribution of the water, nor is the country in general adapted for this improvement. In the south-east part of the district, it is sometimes necessary in the beginning of the fair weather to make drains, in order to take the water from low parts, so as to admit of the plough for sowing the winter crops; and this practice might be extended with the utmost advantage to the part on the north side of the Ganges, where with a little pains I have no doubt most of the swamps might be rendered fit for crops of this nature." *

P. W. Murphy, I. C. S., in his "Final Report on the Survey and Settlement Operations in the Bhagalpur District 1902—10" mentions :—

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*From *An Account of the District of Bhagalpur in* 1810—11, by Francis Buchanan, p. 450 (Patna : 1939).

"The rivers in the south of the district all take their rise in the Sonthal Pargana hills. The slope of the country being steeper than in the north, the character of these streams is different from that of the rivers which flow into the Kosi. They carry little water at ordinary times, but are subject to sudden and dangerous floods when heavy rainfall occurs in the area from which they are fed. The chief of these is the Chandan which is important on account of the part it plays in the irrigation system of the district. The Chir, which flows along the east of the district, has been the cause of several floods, the last and most destructive of which took place in 1899 and was accompanied by considerable loss of life. These floods by depositing sand have caused the soil of the area affected to deteriorate in quality, and rendered it less fertile than that of any other portion of the south of the district with the exception of the *tanr* lands in Banka and Katauria."*

Regarding floods in Bhagalpur, the last District Gazetteer (1911) mentions as follows :—

"About 1860, the great main road from Bhagalpur through Deoghar to Suri was constructed across these low lands. The work had scarcely been completed, when a great flood came down the Chandan, swept through the petty embankments of the zamindars, breached the new road in several places and broke down some bridges. Attention was strongly called to the condition of the river, which was made the subject of a report in May 1864, by the Superintending Engineer, Northern Circle."

From this report the following particulars are derived :—

"The Chandan is a river which has its source in the hills about Deoghar in the Sonthal Pargana, and, for the first half of its course, is fed by numerous tributaries, also rising in the hills. At about thirty miles from its embouchure into the Ganges, it begins to throw off branches to the eastward, and, twenty miles nearer its termination, also to the westward. It thus gradually loses nearly the whole body of water it brings down, the main channel at its junction with the Ganges being reduced to insignificant dimensions. At its greatest width, the Chandan is about 1,500 feet from bank to bank.

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* *Final Report on the Survey and Settlement Operations in the Bhagalpur District* 1902—1910 by P. W. Murphy, I. C. S., pp. 4-5 (Calcutta : 1912).

> From the long continued practice of embanking, its bed is actually higher than the land on either side. Being a hill stream, it is liable to sudden and violent inundations; but, except when in flood, the channel is a dry bed of gritty sand, bounded on either side by artificial embankments pierced throughout with innumerable cuts for irrigation purposes."

The last Gazetteer also mentions :—

> "In 1899 (September) the eastern part of South Bhagalpur including the country about Colgong suffered very severely from a heavy flood. Owing to the bursting of a cyclonic storm the river Chandan breached its embankment and flooded all the country in the neighbourhood of Ghogha, washing away the railway bridge near that place. At least 1,800 lives were lost and 25,000 houses were destroyed. Numbers of cattle perished, and loans were freely given to enable the ryots to purchase new cattle."

Natural calamities in Bhagalpur district are mostly due to drought and in a less degree to floods. The problem of floods has been complicated by a number of private embankments put in for parochial interest. Such embankments are more common in North Bhagalpur. Chandan embankment, however, has been the responsibility of the Revenue Department since a very long time.

Although severe floods are not very common, floods of moderate degree have been a common source of damage. The Land Revenue Administration Reports will indicate that there have been floods of varying intensity in the years 1916-17, 1917-18, 1923-24, 1924-25, 1925-26, 1927-28, 1928-29, 1929-30, 1934-35, 1937-38, 1938-39 and 1939-40.

Most of these floods are due to Kosi and Ganga rivers.

In recent years the flood in 1948 of the river Ganga and the flood in 1961 because of Ganga and continuous rainfall for days during *Hathia* season which brought in floods in practically all the rivers require particular mention.

Flood of 1948-49

The Ganga showed a steady rise from the 9th September, 1948, at about 10 p.m. and it continued rising with an extraordinary speed till the 17th September, 1948. The flood, however, began to subside from the 17th September and the district was completely out of danger by the 20th September, 1948.

An area of approximately 600 square miles was covered by the flood. Ten thanas were badly affected. A considerable number of mud houses had collapsed or were partially damaged. There was, however, no loss of human life or cattle in the district. Standing crops, comprising of *Bhadai* paddy and *Rabi* crops to the extent of 25 per cent were badly damaged in the villages affected by the flood. No epidemic broke out in any area due to timely precautionary measures of sanitation and medical aid by the Public Health Department as well as by the District Board.

Relief Measures

On the 13th September, 1948 when the Ganga started suddenly rising, rescue and evacuation work as well as relief started in full swing. Four officers were deputed for the work and thirteen non-officials co-operated with the Government. Three evacuation centres were opened and about one hundred boats and two steamers were employed for rescue and evacuation work. More than three thousand persons and one thousand heads of cattle were rescued from the flood encircled villages and taken to the evacuation centres. The people thus evacuated were fed at Government cost and arrangement for fodder had also been made for feeding the rescued cattle. Free seed, cash relief and house building loan were advanced to the flood stricken people. Nine centres were opened for distribution of cash and other kinds of relief. Nine officers and other non-officials were engaged in these operations.

Government had sanctioned Rs. 1,02,000 and Rs. 15,000 for free distribution of seeds and for giving house building relief, respectively, out of which Rs. 90,809 was actually spent.

Flood of 1961

There was a very heavy flood in October 1961 along with excessive *Hathia* rains. A flood due to the *Hathia* rains is rather unprecedented. There were torrential rains and local storms. The Ganga and Chandan rivers showed a steady rise from 2nd October, 1961 and continued rising till the 1st week of October, 1961. The floods in the northern parts of the district was caused by river Ganga and the southern parts by river Chandan.

About 569 villages covering a population of about 2,38,665 and extending over an area of more than one thousand square miles were affected. The *anchals* affected were Pirpainti, Colgong, Sabour, Jagdishpur, Nathnagar, Sultanganj, Shahkund, Bihpur, Naugachhia in Sadar subdivision and Amarpur, Rajaun, Banka and Shambhuganj in Banka subdivision. About 11,105 houses were damaged. The areas Jagdishpur, Nathnagar, Sultanganj, Shahkund and Bihpur Blocks were worst affected. Villages Belthu, Harpur,

Sarha, Kapsouna, Basiatola, Goriasi, Sikaritola and Dariapur in Shahkund, Srirampur and other villages in Sultanganj, Ranoochak, Makandpur, Kishanpur, Fatehpur, Bhowalpur, Puranisarai, Bhatoria, Chit Makanpur, Chouwania, Golahu Kathaili in Nathnagar Anchal, Puraini, Jagdishpur, Baluachak, Tessor, Tardiha, Makna in Jagdishpur Anchal, village Amarpur in Colgong Anchal and village Sarath in Sabour Block were very badly affected. Katoria, Bounsi, Chandan and Dhoraiya *anchals* of Banka subdivision were unaffected by the floods.

As reported, in Sultanganj, Shahkund, Nathnagar and Bihpur *anchals* standing paddy crops were partially affected. *Arhar* and *Kalai* crops over an area of 8,624 acres were also damaged. The lowlying countryside was a sheet of water for a number of days. A vast area of land, from Puraini to south of Jagdishpur on Bhagalpur-Dumka road was an example. More than two dozen of villages lying in that belt were partially under water.

Communications were disrupted by a number of breaches, large and small. The protective *Bundh* running parallel to the Dumka road, from Chandan bridge near village Puraini to Jagdishpur was breached at several places. Bhagalpur-Mandar Hill Railway branch line was breached and railway communication was affected. The following roads had some breaches:—

(1) Akbarnagar-Shahkund Road, (2) Bhagalpur-Dumka Road, (3) Bhagalpur-Monghyr Road, (4) Dhakamore-Banka Road, (5) Amarpur-Shahkund Road, (6) Sultanganj-Darapur-Belhar Road, (7) Banka-Amarpur Road and (8) Surya-Sahebganj Road.

Relief operations on a liberal scale were immediately launched by the State Government. Several non-official bodies from beyond the State came to help in the relief operations. Boats were placed for rescue and evacuation work in the affected areas. For speedy relief operation the entire flooded area of the district was divided into 20 zones and each zone was placed incharge of a gazetted officer.

Gratuitous relief in the shape of grains, rugs and cloth was distributed. Kerosene oil, *gur* and salt were made available in the affected areas. The villagers were given *taccavi* loans. Milk centres were opened to supply milk. Tarpaulines and tents were sent to be used mainly as temporary sheds for the affected villages. Besides these relief measures taken by Government certain non-official agencies, namely, Sahu Jain Industrial House, the Aryasthan *Seva Samiti*, the Marwari Relief Society and Kashi Vishwanath *Seva Samiti* had also worked for providing relief to the flood sufferers of the district at several places. Money was raised by

several agencies within and beyond the State. The Governor's Relief fund collected the largest amount among all the Relief funds and granted cash grants to Bhagalpur district as well.

Seventy-nine more Fair Price Shops had been opened to cope with the heavy demand. Two hundred and fifty Fair Price Shops had been functioning since before in the district.

Twenty-four health centres and sub-centres and twenty-four veterinary centres were immediately opened for preventive and curative works. The wells of the district were disinfected twice and a large number of persons were inoculated or vaccinated. In some of the affected villages there was an outbreak of cholera and twenty-one human lives were lost. There were about 300 cattle lost.