

*Bahraich.*

cause some loss : while prolonged damp and cloudy weather in January and February must be expected to produce rust on wheat and linseed. The loss from rust may be very serious, and its full extent may not be realized till the crops are harvested.

When the ground has been dry at sowing time, and sowings have been largely made with irrigation, an early fall of winter rain is of great importance. When there is little winter rain or when falls are delayed, the crops fall off in condition as they ripen, and tend to wither under the strong dry winds which in such seasons must be expected in the spring. It is noteworthy that gram as a rule suffers most in this case : a seed-bed prepared with irrigation is less suitable for it than for the cereals or peas.

6. Frosts occurring early in January cause little injury except to the *arhar*. Late frosts may be very injurious, but experience is wanting to show the most dangerous time.

Hailstorms do little harm until the cereals are beginning to ear; the danger from them increases as the season advances.

The rapeseed crop may be seriously injured by the aphid if the weather is damp and cloudy when the plants are in flower.

The poppy crop suffers severely from damp weather late in the season.

7. The area sown with *zaid* crops in ordinary seasons is very small : it increases when stocks of food are low, but is of importance in at most a few localities.

8. A series of abnormal seasons of one type may produce certain cumulative effects. After some seasons of deficient rainfall the water-level falls, and the efficiency of temporary wells decreases, while the cost and labour of irrigation are materially enhanced.

On the other hand a series of wet years may raise the water-level to a point where the productivity of the land



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declines. This may happen throughout the district, but its effects will probably be most noticeable in the Gogra tract. The trans-Rapti tract may be similarly affected, and in any case is likely to become more unhealthy.

9. Early attention should be given to any complaints that the injury caused by wild animals is extending, as the effect of extension is cumulative: and if land near the forests is found to be going out of cultivation endeavours should be made to arrange with the Forest department, or the owners, for a restoration of the balance.

10. Distress requiring some measures of relief must be expected to occur when the rains have ceased by the beginning of September: it should not be severe if July and August have been normal, in which case it will probably be almost confined to the trans-Rapti tract, but it may be severe and general after a season like 1907 when the rains did not last long enough for even the early crops to mature. The following measures were taken in 1907-8:—

Revenue suspended, kharif	...	...	4 lakhs.
"    "    rabi	...	...	2½ lakhs.
"    remitted, kharif	...	...	1½ lakhs.
"    "    rabi	...	...	2 lakhs.
Improvement loans	...	...	½ lakh.
Advances for rabi	...	...	2½ lakhs.
"    "    kharif	...	...	10 "

Maximum proportion of population relieved 24·8 per cent. in March.

11. Experience does not indicate any conditions in which the shortage of fodder may be so serious as to call for action by Government: the area under the large millets is so small that even their entire failure would not affect the district as a whole.

12. The improvement of the water-supply is a difficult question. In the trans-Rapti tract there may be scope for embankments to benefit the late rice (vide Provincial Note, section III): the Gogra and Rapti tracts may be left out of



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account, though it is possible that pumps on the latter river might be useful in places; the central upland must depend mainly on wells. This tract is a continuation of the upland tract in Gonda where cheap masonry wells are used in large and increasing numbers, and no explanation is known of the reason why there are so few in Bahraich. The divergence should be studied by the agricultural department before definite recommendations are made; but in the meantime facilities should be given to any one who wishes to make a well--both in the way of loans and by provision of a boring-staff to locate sites.

13. No demand for drainage works exists at the present time. The settlement officer was of opinion that much could be done to improve the drainage of parts of the Gogra and Rapti tracts, and this question should be studied in the light of the remarks contained in the settlement report when a qualified engineer can be obtained.

14. Cattle form a large proportion of the agricultural wealth of the district, and their protection from disease is a matter of great importance. The chief measures are insistence on prompt reporting of disease under the system prescribed in the Land Records Manual, and the maintenance of a veterinary staff sufficient to prevent outbreaks from spreading.

The maintenance of the pasturage provided by the private forests is a matter of importance.

15. The district is not well supplied with agricultural capital, and pending the development of alternative sources the *takavi*-system should be liberally worked. There is not at present a large demand for improvement loans, but they may be wanted for wells and for embankments. Agricultural loans may be wanted in the following circumstances :--

(a) *Early cessation of the rains.* The demand may be very large both for the rabi and for the following



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kharif: small sums may also be wanted about February in particular localities to enable sugar-cane and *zaid* crops to be grown.

- (b) *Floods in the lowlands.* Advances may be required to enable the rabi to be sown.
- (c) *Cattle disease.* Advances may be required to enable cultivators to replace their working-cattle in time for the next tillage-season. The needs of owners of cows should also be considered, in order to minimize the set-back to the breeding-industry.
- (d) *Curtailment of the poppy area.* It may be desirable to offer advances in villages where the crop has been largely grown to enable cultivators to substitute some other remunerative crop.

16. Some of the large estates may be able to co-operate effectively in the introduction of agricultural improvements requiring associated action, but should a co-operative organisation develop it will furnish a more useful agency. The varieties of the crops grown can probably in some cases be replaced, and new crops be introduced, but study is required before specific recommendations can be made. There is not much scope for machinery, except on a few of the larger holdings; but simple improved tillage-improvements would probably be useful, specially in the lowlands.



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## DISTRICT NOTE.

### SULTANPUR.

#### Topography.

THE district may be divided into three tracts, the lines of division running roughly parallel to the Gumti which flows from north-east to south-west. Along the river the prevailing soil is loam while further north and south is rice country with *jhils* and *usar* plains.

*Northern clay.*—This tract occupies the north and east of Aldeman, and extends to a narrow strip of land on the north of Baraunsa and Isauli. It depends very largely on late rice so that an early cessation of the rains causes an almost entire loss of the principal crop. The drainage of this tract is sufficient in ordinary years, but when the rainfall has been excessive there is much flooding, which injures both the kharif and the rabi. The Majhui river, which flows along the northern boundary, floods its banks in such seasons.

*Gumti tract.*—This tract includes practically the whole of Jagdispur, the greater portion of Isauli, Musafirkhana, Miranpur, Baraunsa and Chanda, and the south-west of Aldeman. There is some *tarai* land on the river especially from the centre of Jagdispur to Isauli town and again in the north of Miranpur. This land is very productive in ordinary years, but when a heavy flood occurs on the Gumti it gets waterlogged, *reh* appears, and cultivation is rendered impossible till a dry year enables it to recover. The banks of the river are a good deal broken by ravines and the land is at first very sandy; further inland it is a level, fertile loam till it passes into the clay tract. The drainage of this tract is good, and the only part likely to suffer from wet is the *tarai* already mentioned.





## Sultanpur.

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**Southern clay.**—This tract includes the whole of Gaura, Jamun and Amethi, nearly the whole of Asal, and the west of Musafirkhana and Miranpur. It is heavy soil, full of *jhils* with large *usar* plains: late rice is an important crop. In wet years the whole tract is liable to injury from floods which affect the kharif directly and may leave the land in bad condition for the following rabi: but the people are not anxious for drains, fearing their effect in dry seasons.

### Water-supply.

Much irrigation is done from *jhils* in all parts of the district, the proportion being highest in Aldemau: wells are however the most important source. Masonry spring wells can be made almost everywhere except along the Gumti where foundation-clay is not met with, and a few villages in other parganas which have been recorded in the well-survey: masonry wells are popular with cultivators, but a certain amount of hostility on the part of landholders was recorded especially in pargana Baraunsa.

The district officials who carried out the well-survey considered that there was scope for more wells in nearly 400 villages, mainly in pargana Asal and in the river tract. Temporary wells can be made in most parts of the district: the villages where they will be required in a drought are recorded in the well-survey. Ordinarily they are cheap and do not last beyond a single season, but in some localities they remain efficient for many years.

### Cattle-supply.

The stock of cows is relatively very low and the quality inferior: there are no extensive grazing grounds, and no herds of any size; the cows are kept for milk, and the calves are insufficiently nourished. Working cattle are imported from north Oudh and also from Bundelkhand.

The district is liable to all the common forms of cattle disease, and there have in the past been very heavy losses from rinderpest. The practice of preventive inoculation is now welcomed by the people.



*Sultanpur.***Annals.**

The first reports received show that from 1892 to 1894 the district had a succession of poor crops, the result mainly of excessive rainfall. In 1894 there was a great flood on the Gumti which completely destroyed the fertility of the *tarai*, and in the same year much of the late rice was destroyed by excessive floods in the lowest parts of the clay tracts. In 1896 the rains ceased in August; most of the kharif suffered severely and the late rice was almost a complete failure. There was some distress but a considerable area was sown with rabi which gave good yield, and further relief was obtained from the hot-weather *sawin* which was sown on a large scale. The harvests of the following year were good and the distress disappeared rapidly; the dry season cured the *tarai* which came under cultivation again, and also indirectly benefited the whole district which had been more or less soaked by the run of wet years. From 1897 to 1900 no serious calamity visited the district; cultivation recovered, and the people were, generally speaking prosperous. In 1901 prolonged damp weather caused serious rust on wheat and barley, while the rains were at first so scanty as to injure early rice. The year 1902 was prosperous.

The seasonal yields since 1903 are given in the following table :—

Year.	Rabi.				Kharif.				
	All crops.	Wheat.	Barley.	Gram.	All crops.	Rice.	Small mil-lets.	Pulses.	Sugar cane.
1903 ...	89	100	100	81	76	84	85	44	81
1904 ...	81	87	87	69	94	84	100	87	87
1905 ...	35	31	31	50	79	75	100	75	100
1906 ...	83	87	87	87	72	65	95	75	100
1907 ...	71	50	87	75	20	13	35	13	55
1908 ...	75	87	87	50	59	31	85	75	52
1909 ...	65	62	75	44	89	84	100	94	59
1910 ...	96	94	100	94	83	87	100	62	94
1911 ...	82	75	87	87	...	...	...	...	...



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In 1903 the rains were late and at first scanty; heavy falls in October injured all the later crops, but enabled a very large rabi to be sown for 1904: this crop did well with the exception of gram which was seriously injured by caterpillars. The rains of 1904 were favourable though not quite sufficient for the rice crop, and they lasted sufficiently long to ensure another very large rabi area in 1905. The crops promised well till the exceptional frosts of February which caused very great injury especially to cereals. The following rains were good at first but deficient late in the season; and the rabi area of 1906 was reduced owing partly to drought and partly to the want of sound seed, which was not available locally owing to the frost of the previous year.

The rains of 1906 were favourable to the early crops but deficient in August and September, and the following rabi suffered from rain and cloudy weather in February and March, wheat in particular being affected by rust. The rains of 1907 were late and scanty, and ceased prematurely: all crops suffered very severely, and sugarcane was affected by the cane-hopper as well as by drought. The rabi area of 1908 was reduced by more than one-fourth and the crops—especially gram—suffered from want of moisture in the early stages of growth. There was some distress during these seasons, but it was never severe and it diminished rapidly when the rabi was harvested. Some works were open from January to April, while gratuitous relief continued till July.

The following monsoon was light throughout and especially in September so that the rice crop was very poor. Sugarcane was again seriously damaged by cane-hoppers. The rabi area of 1909 was again much contracted, and there was much difficulty in irrigating as the *jhils* were dry. The rains were however favourable though a final fall in October would have improved the late rice; the injury caused by cane-hoppers was very marked in this year. The rabi area of 1910 was extended though still below the normal, and the season was favourable.



*Sultanpur.*

throughout. The rains were too light for rice in July and August: heavy falls at the end of September injured the late crops other than rice: but the yields were on the whole satisfactory, and the cane-hopper was rarely seen. A very large rabi area was sown for 1911; the crops were somewhat affected by prolonged damp in March, wheat suffering most.

**Progress.**

A slight increase in cultivation occurred between the close of the settlement in 1897 and 1902: the area has been practically constant during the last decade and there appears to be no room for further expansion. The proportion of land devoted to remunerative crops is low and shows no increase. Wheat has increased slightly but sugarcane has fallen and indigo is now little grown. The poppy area had increased slightly, but is now falling. Among food crops maize has extended considerably of late years, the area having more than doubled since 1907.

The number of masonry wells increased by 22 per cent. between 1905 and 1911, in which year there was one such well to 26 acres of normal cultivation; construction was naturally most rapid during the famine, but has been well maintained since.

Population increased very slightly between 1891 and 1901, while there has been a substantial fall during the last decade: in 1911 it stood at 1,048,000 as against 1,076,000 in 1891.

Agricultural wages have not moved appreciably in the last five years; in 1911 the prevailing cash rate was two annas, while the grain rates were equivalent to cash rates, lying between  $1\frac{1}{2}$  and 2 annas.

Advances for land improvement were taken on a small scale between 1897 and 1906, the amount ranging from Rs. 250 to Rs. 2,000 in ordinary years. During the famine large sums were advanced, and half a lakh was taken in



*Sultanpur.*

1908-9; the demand has since decreased. Loans for temporary purposes are taken on a moderate scale in ordinary seasons, but the demand appears to have increased substantially since the famine.

Agricultural co-operation appears to be well established in the district. In 1911 there were 48 rural credit societies with over 1,200 members, financed by three central banks, and expansion is going on rapidly. In the same year there were eighteen small societies, established with the special object of providing sound seed for their members.

Communications have greatly improved. In 1891 the district was practically without railways, though the loop line of the Oudh and Rohilkhand Railway just touched it on the extreme east: the main line now serves the south-west, and the Fyzabad branch passes through the centre. The number of stations is still below the standard of the province, there being only 1 to 245 square miles. Metalled roads have been increased by close on 100 miles during the same period, but further extensions are still required.

Rents have risen fairly rapidly since the conclusion of the settlement. Between 1898 and 1900 the recorded rents gave a rate of about Rs. 5.9 per acre, while for 1909-1911 the rate is Rs. 6.6, and it appears to be rising steadily.

Industries are exceptionally unimportant in the district; hand weaving has never been widely extended, but has suffered from competition: there is little sugar refining, while a small amount of seasonal employment has been lost by the closing of indigo factories. No factory of the modern type exists in the district.

Income from external sources, mainly service outside the district, forms a most important resource, and has increased rapidly. Between 1898 and 1902 the sums distributed by money-order were about 14 lakhs annually, but from 1905 to 1907 over 19 lakhs were received; in 1907-8, the famine year,





### *Sultānpur.*

the sum rose to 22 lakhs, and in the last two years it has exceeded 24 lakhs, or four-fifths of the recorded rental of the district.

#### **Dangers and possible remedies or improvements.**

1. The area sown with kharif crops depends mainly on the weather during the first month of the season counting from the first heavy fall of rain. An early beginning is an advantage, but the most important point is that there should be bright weather with just sufficient rain to enable tillage and sowing to proceed without interruption. If the first month is wet, sowings of dry crops will be delayed but early rice will extend.

The area under late rice, which is important in both the clay tracts, depends mainly on the weather of the second month: frequent falls of rain and little sunshine are desirable, and a long break may reduce the area considerably.

The area planted with sugarcane is influenced by the weather in February and March, at which time rain facilitates tillage: but it is determined mainly by economic causes. One of these is the yields and prices obtained from the crop in recent seasons; the other is the financial position of the cultivators, which depends mainly on the success or failure of the preceding harvests.

2. The yield of the early dry crops, which are rapidly increasing in importance, depends mainly on the weather during the first two months of the season: alternations of rain and bright weather are desirable, and the yield may be much reduced by excessive rain in the second month. The early rice requires more rain, and is not likely to give a full yield when the dry crops do best.

The late dry crops require the prolongation of the rains almost to the end of September: they may be seriously injured by heavy falls in the end of September or the beginning of October, while they will give very little grain if September is altogether dry.



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The late rice requires more rain in September than is suitable for the dry crops, and at least one fall in October is desirable for its complete success.

Sugarcane is apt to suffer seriously at two periods. The first is the end of the hot weather: the crop benefits from an early commencement of the rains and suffers from delay. The second is the end of the rains: a premature cessation is most injurious, and rain in October is beneficial. The crop can stand a considerable excess of rain but prolonged breaks are likely to cause injury.

In the past the cropping of the district was badly balanced, with excessive dependence on rain in September; the balance is being redressed by the increasing popularity of maize, but a further extension of this crop is desirable.

3. Apart from variations in the rainfall, the chief danger to the kharif is flooding in the lowlands, but this occurs to a dangerous extent only in very exceptional seasons.

The sugarcane may be injured very seriously by cane-hoppers (vide Provincial Note, section VI); and probably both cane and *juar* are liable to injury from boring insects.

4. The rabi area depends mainly on the rainfall of September and October. Rain in the latter month secures a large extension of a second crop on rice land; when the rains cease early the rabi area must fall, but the fall can be mitigated by the timely grant of advances.

5. The irrigation facilities are so great that when the seed-bed has been sufficiently moist the rabi yield depends relatively little on the occurrence of winter rains: these are however beneficial up to the latter part of January provided the falls are moderate in amount and of short duration. Later rain will usually cause some injury, while prolonged periods of damp and cloudy weather in January and February must be expected to produce rust on wheat and linseed, and possibly on barley also; in this case the full extent of the loss may not be realised until the crops are harvested.



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When however the ground has been dry at sowing time, and sowings have been largely made with irrigation, an early fall of winter rain is of great importance. When there is little winter rain or when falls are delayed, the crops fall off in condition as they ripen, and tend to wither under the strong dry winds which in such seasons must be expected in the spring. It is noteworthy that gram as a rule suffers most in this case : a seed-bed prepared with irrigation is less suitable for it than for the cereals or peas.

6. Frosts occurring in the early part of January will do little harm except to the *arhar* : late frosts however may cause very serious injury, especially to the cereals and peas : probably the most dangerous time is just at the end of January or in the first days of February, when the frosts of 1905 took place.

Hailstorms cause little injury until the cereals are beginning to ear ; the danger increases from them as the season advances.

The rapeseed crop suffers much injury from the aphid if damp and cloudy weather occurs when the plants are in flower.

Gram has in the past suffered from caterpillars, but the conditions under which this danger arises are not actually known.

Poppy suffers from blight if the latter portion of the season is damp.

7. The *zaid* area is of some importance in ordinary seasons and expands rapidly when stocks of food have been reduced, the hot-weather millet known in Oudh as *sawan* being the chief staple. The cost of seed of this crop rises very high when the demand is great, and advances would probably be welcomed about February in seasons when the kharif yield has been bad or the rabi is unpromising.

8. A series of abnormal seasons of one type may produce certain cumulative effects. After some seasons of deficient



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rainfall the water-level falls, and the efficiency of temporary wells decreases, while the cost and labour of irrigation are materially enhanced. It is possible that the lowering of the water-level may proceed so far as to render the masonry wells useless in some tracts; and any reports that the wells are failing should receive special attention.

On the other hand a series of wet years may raise the water-level to a point where the productivity of the land declines. This may happen throughout the district, its effects will be most noticeable in the small lowland areas along the Gumti which may go out of cultivation, but the gradual impoverishment of the uplands is perhaps a more serious danger.

9. Distress requiring measures of relief must be expected to occur if the rains cease at the beginning of September; its extent will depend largely on the position of cultivators as determined by the yield of previous harvests. The following measures were taken in 1907-8, when the distress was relatively slight:—

Revenue suspended, kharif	...	...	Rs. 86,000
"      rabi	...	...	" 10,000
Revenue remitted, kharif	...	...	3½ lakhs.
"      rabi	...	...	Nil.
Improvement loans	...	...	1½ "
Loans for rabi	...	...	3 "
"      " kharif	...	...	2 "

Maximum proportion of the population relieved 3 per cent. in February.

10. A serious shortage of fodder may occur in seasons when the rains have ceased so early that the large millets wither altogether or are seriously stunted in growth: in this case the only remedy that can be suggested is the importation of grass from the forests and its distribution on the *takavi*-system. The demand will depend very largely on the winter rains; if there are none, it may become very great, but even light





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falls bring up enough grass to keep large numbers of cattle going.

A fodder famine does not necessarily occur when the millets yield no grain, as the plants may have grown to a sufficient size to yield fodder; but in such seasons *juar* occasionally becomes poisonous and the loss of cattle due to this cause may be considerable. The poison is formed under the abnormal conditions of growth, and its presence cannot be recognised beforehand except by analytical methods: the only action possible is to provide advances to enable cultivators to replace cattle that have died from this cause.

11. There is still room for a large number of masonry wells, and loans for their construction should be readily given, while endeavour should be made to influence any landholders who still throw obstacles in the way of construction.

There may also be scope for action in regard to embankments in rice tracts (vide Provincial Note, section III).

12. There is no demand for drainage works at the present time, but the clay tracts which suffer from flooding should receive careful attention in any examination that may be made of the Ganges-Gogra doab.

13. In order to mitigate losses from cattle disease, attention should be given to securing prompt reports of outbreaks, under the rules laid down in the Land Records Manual; and the local veterinary staff should be sufficiently strong to localise outbreaks when they occur.

14. The district is not well supplied with agricultural capital and the extension of the co-operative movement is most desirable. For the present however there is a wide scope for the *takavi*-system. Improvement loans may be wanted mainly for wells and embankments. Agricultural loans are likely to be wanted in the following conditions:—

(a) *Early cessation of the rains.*—Advances may be required on a large scale to sow the rabi, and their early distribution is a matter of the utmost



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importance. Smaller sums may be required towards February for sugarcane and *zaid* crops; and a further large demand may be expected in June for the kharif. Advances may also be required to buy fodder.

(b) *Floods.*—In the exceptional years when floods cause much damage, loans may be required for sowing the rabi.

(c) *Cattle disease.*—It is desirable to make loans available to replace working cattle before the next tillage season begins.

(d) *Curtailement of the poppy area.* Advances may be desirable in the villages where it has been largely grown to enable cultivators to substitute some other remunerative crop.

15. Conditions on the large estates are not as a rule favourable at present for the introduction of agricultural improvements requiring associated action, and the development of the co-operative organisation is probably the most hopeful line of action. The district does not offer much scope for improvements requiring large capital outlay, though there may be a demand for pumping installations on the larger *jhils*. There is probably room for a great improvement in seed stocks and for introducing new staples; and a demand may be expected to arise gradually for the cheapest forms of improved tillage implements.





## DISTRICT NOTE.

### PARTABGARH.

#### Topography.

THE topography of this district is generally similar to that of Rae Bareilly. On the south-west, where the Ganges touches parganas Manikpur and Bihar, there is a stretch of *kachhar* or *tarai* land : most of this is sandy and unproductive, but there are fertile areas in places. Above this is a strip of fertile loam, occupying the centre of Manikpur and the greater part of Bihar. Then follows a tract of stiffer soil, full of *jhils* and imperfectly drained, covering the north-east of Manikpur and Bihar, the whole of Dhingwas, the greater part of Rampur and the south of Partabgarh and Patti. Further north again is the Sai tract, lighter loam shading off into *bhur* ; this covers the north of Rampur, nearly the whole of Ateha, most of Partabgarh and the south centre of Patti. Finally the greater part of pargana Patti, north of the Sai is again stiff soil, full of *jhils* and badly drained.

*Tarai tract.*—The chief feature of the *tarai* is an area of stiff soil near Benti which has been reclaimed by extensive engineering works. Elsewhere the crops are liable to injury in wet years. The uncultivated area is of some value for grazing.

*Ganges loam tract.*—The Ganges loam tract is a rich fertile soil except where broken by ravines. Irrigation is adequate as there are many masonry wells, and good temporary wells can be made almost everywhere. The drainage is also good.

*Jhil tract.*—The soil is usually stiff, with clay in the depressions, and much rice is grown : but light sandy soil is



*Partabgarh.*

often found above the *jhils*. In ordinary seasons the *jhils* furnish an ample supply of water for the rabi; but when the rains have ceased early the supply falls short, and as the sub-soil is sandy in many places temporary wells cannot be made to the extent that is required. In wet years the drainage is altogether inadequate and the tract suffers from waterlogging: the injury is greatest in the villages lying close to the *jhils*. A main drain has been constructed to benefit the southern part of Patti, but other projects are not contemplated.

*Sai tract.*—The Sai tract is mainly light fertile loam, with sand in places along the river and its tributary streams; but the country is a good deal broken up by extensive systems of ravines. The level portions of the tract are admirably protected by wells of both kinds, and temporary wells can be dug almost everywhere. In the broken country along the river temporary wells cannot be made, and some villages suffer in consequence in dry years. The tract is thoroughly drained, and injury in wet years is confined to the small tracts of lowlying land along the Sai.

*Patti clay tract.*—The Patti clay tract is largely irrigated from *jhils* in ordinary years, but temporary wells can be made in most places on the level ground when the supply in the *jhils* runs short. The drainage is very defective, and in wet seasons most of the tract suffers from floods and water-logging. On the extreme east where the Gumti touches the pargana there are a few villages with lighter soil resembling the Sai tract.

**Water-supply.**

The chief sources of irrigation have been noticed above. Masonry wells are possible practically throughout the district except along the Sai, Gumti and Ganges where foundation-clay is not commonly met with. These wells are exceedingly popular with cultivators and very little hostility on the part of landholders exists. In some villages however construction has





### *Partabgarh.*

been impeded by quarrels among pattidars. In the opinion of the district authorities who examined the well-survey there was still need for many more masonry wells in all parganas except Rampur and Dhingwas. The villages where temporary wells cannot be made have been recorded in the well-survey: there is room for large numbers of these in a dry season.

#### **Cattle-supply.**

The stock of cows in the district is very small: there are no large grazing areas, and the cows are not concentrated in herds, but are kept by individuals for the sake of their milk. The supply of bulls is sufficient for the cows. The quality of cows and young stock is inferior. The better working cattle are imported from north Oudh, while large numbers of inferior animals come from the Bundelkhand breeding grounds.

The district is liable to all the ordinary forms of cattle disease: rinderpest appears usually to be imported from Bundelkhand *via* the lower doab. The people were at first strongly opposed to the idea of preventive inoculation, but their attitude has altered and the practice will probably be accepted in time.

#### **Annals.**

There are few records of serious calamities before the series of annual reports began. There was distress in 1878 following on the drought of the previous year, but the demand for relief was not large and recovery was rapid. The district suffered from the wet seasons ending in 1894, especially the last when excessive rain flooded the lowlying parts and damaged both the standing kharif and the following rabi. In 1895 the rain was scanty and the kharif suffered while the rabi area of 1896 was short and was affected by the absence of water in the *jhils*. The rains of 1896 ceased in August, the rice crop was almost a total failure, and other crops also suffered severely. The kharif yield as a whole was less than 40 per cent. of the normal, while the rabi area of 1897 was much reduced. For relief purposes the district was classed as "scarcity":



*Parlatgarh.*

relief works attracted some labourers in the spring but were not required after the rabi, which yielded well, was harvested. The years from 1898 onwards were prosperous until 1901 when there was widespread rust on wheat. The rains of 1901 were late and there were breaks which injured the rice, and in the following year rice and sugarcane were affected by want of rain in August.

The seasonal yields since 1903 are given in the following table :—

Year.	Rabi.				Kharif.				
	All crops.	Wheat.	Barley.	Gram.	All crops.	Rice.	Juar.	Small millets.	Sugarcane.
1903 ...	88	88	88	75	76	90	70	75	81
1904 ...	85	81	87	80	87	84	95	100	75
1905 ...	36	34	34	50	85	85	80	95	87
1906 ...	100	94	100	100	81	81	75	100	100
1907 ...	81	81	87	85	43	22	45	65	75
1908 ...	78	81	83	55	75	56	80	95	56
1909 ...	81	81	81	75	90	94	67	94	79
1910 ...	100	98	100	100	77	94	44	90	97
1911 ...	84	75	79	100	...	...	...	...	...

The rains of 1903 began very late but were heavy and lasted into October when the late dry crops were injured. A very large rabi area was sown for 1904. The following rains were deficient at times for rice, but again enabled a large rabi to be sown for 1905. The exceptional frosts of February were disastrous in this district. A large *zaid* area was sown, and the following kharif was much the largest on record: the rains were favourable until September when they were deficient, and the rabi area of 1906 was much reduced. It yielded exceptionally well, but local damage from hail was severe. The rains that followed were sufficient except for rice and





### *Partabgarh.*

secured a normal rabi area for 1907 : the yield was reduced by prolonged damp weather in February and March.

The rains of 1907 began fairly well but ceased at the end of August ; most of the rice was lost and all other crops suffered. The rabi area of 1908 was naturally contracted, but was larger than could have been expected, and the crops yielded fairly well with the exception of gram. No direct measures of relief were required during these seasons, but revenue was suspended and considerable sums given in advances. In 1908 the rains were light, and a long break in September almost ruined the late rice. The rabi area of 1909 was low owing partly to the drought and partly to the prevalence of fever, while there was little water in the *jhils*.

The rains of 1909 began early and were favourable, but sugarcane was injured by the cane-hopper and *juar* by the hopper and by borers. A normal rabi area was sown for 1910 and yielded exceptionally well. The following monsoon was light at first but very heavy in September, when *juar* and *bajra* suffered serious injury. The late rain gave a large rabi area for 1911 : the pulses were good but the cereals suffered from excessive rain in March.

### **Progress.**

There was a slight apparent extension of cultivation after the completion of the settlement, but the last decade shows no further progress, and there is practically no room for further expansion. The proportion of the land devoted to remunerative crops has been steady with perhaps a slight tendency to fall. Wheat has not expanded : sugarcane has varied greatly from year to year but has not extended on the whole : indigo has disappeared, and poppy has been reduced. San hemp has extended substantially, and an export trade in the fibre has developed since the railway was opened, and on a small scale potatoes and garden crops have increased in importance. Among food grains maize has been very little grown, but the



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area has doubled in the last four years and the crop is apparently becoming popular—an important point as the district is at present too dependent on September rain.

Construction of masonry wells has proceeded actively, and the number available increased by 2,730 between 1905 and 1911: in the latter year there was one such well to 24 acres of normal cultivation as against 27 acres in the former.

The population of the district has remained almost unchanged during the last two decades; in 1911 it stood at 900,000 as against 911,000 in 1891. The ratio of population to normal cultivation is the highest of any rural district in Oudh.

Agricultural wages do not appear to have risen in the last five years: the rates recorded in 1911 lay between  $1\frac{1}{2}$  and two annas.

Advances for land improvement (mainly wells) have been a regular feature in this district, the annual amounts given ranging until 1907 between Rs. 2,000 and Rs. 4,000. In the famine year however, advances were very largely taken, and over half a lakh has been given during the last two years. Advances for temporary purposes have also in the past been regularly taken on a small scale: but the demand has apparently increased considerably since the famine.

A beginning has been made in the introduction of agricultural co-operation. In 1911 there were 14 rural credit societies with over 1,000 members. Reorganisation is in progress, and a large expansion of the movement is anticipated.

There has been very marked improvement in the means of communication. Twenty years ago the district was quite unserved by railways, Allahabad being then the nearest station to Partabgarh. The opening of the Oudh and Rohilkhand main line, of the branches to Allahabad and Fyzabad, and more recently the Allahabad-Rae Bareilly line, has provided





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ample communications for the district, and in 1911 there was one station to 111 square miles. In the same period the mileage of metalled roads has risen from 45 to 120, and further improvements are contemplated.

The rise in rents since settlement has been steady : in 1895 the recorded rents gave a rate of Rs. 6.2, which had risen to Rs. 7.0 in 1910 and 1911.

There are no important industries in the district. Some sugar is refined in tahsil Patti, but this industry has suffered from competition, as has the unimportant handloom industry ; and the closing of indigo factories has involved the loss of seasonal employment. There is no factory in the modern sense of the word.

The district derives an income of growing importance from external sources, the people of all classes being habituated to the idea of seeking employment in other parts of India. At the end of the last century about ten lakhs of rupees were distributed annually by money-order : while in the last two years the figures have exceeded 17 lakhs, or considerably more than the revenue of the district.

#### **Dangers and possible remedies or improvements.**

1. The area sown with kharif crops depends mainly on the weather during the first month of the season counting from the first heavy fall of rain. An early beginning is an advantage, but the most important point is that there should be bright weather with just sufficient rain to enable tillage and sowings to proceed without interruption. If the first month is wet, sowings of dry crops will be reduced, but rice will extend, and there will probably be larger sowings of *bajra*, which can be sown until nearly the end of August.

The area under late rice depends on the weather during the second month : frequent falls of rain with little sunshine are required, and a long break will reduce the area substantially.

The area planted with sugarcane is influenced by the weather in February and March, at which time rain facilitates





tillage : but it is determined mainly by economic causes. One of these is the yields and prices obtained from the crop in recent seasons ; the other is the financial position of the cultivators, which depends mainly on the success or failure of the preceding harvests.

2. The yield of the early dry crops depends mainly on the weather during the first two months of the season : alternations of rain and bright weather are desirable, and the yield may be much reduced by excessive rain in the second month. The early rice requires more rain, and is not likely to give a full yield when the dry crops do best.

The late dry crops require the prolongation of the rains almost to the end of September : they may be seriously injured by heavy falls in the end of September or the beginning of October, while they will give very little grain if September is altogether dry.

The late rice requires more rain in September than is suitable for the dry crops, and at least one fall in October is desirable for its complete success.

Sugarcane is apt to suffer seriously at two periods. The first is the end of the hot weather : the crop benefits from an early commencement of the rains and suffers from delay. The second is the end of the rains : a premature cessation is most injurious, and rain in October is beneficial. The crop can stand a considerable excess of rain, but prolonged breaks are likely to cause injury.

The cropping is not altogether well-balanced ; the district depends too much on the late crops, and an extension of early crops, and especially maize, is desirable. Judging from recent figures this extension is in progress.

3. The kharif crops are also exposed to the following dangers :—

(a) Floods in the *tarai* and the clay tracts in exceptionally wet seasons,





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(b) The cane-hopper) vide Provincial Note, section VI).

(c) Boring insects in sugarcane and *juar* (vide Provincial Note, section VI).

4. The rabi area depends mainly on the rainfall during September and early October. A heavy fall of rain in October results in an area much above the normal : while if the rains cease by the beginning of September there will be a serious reduction in area, which can however be mitigated by the early grant of advances.

5. Irrigation facilities are so great that the occurrence of winter rains is not essential in seasons when the seed-bed has been sufficiently moist. Falls up to nearly the end of January are however beneficial provided they are moderate in amount and of short duration : later falls will probably cause some injury, while prolonged periods of damp and cloudy weather in January and February must be expected to produce rust on wheat and linseed, and possibly also on barley. The loss from rust may be very serious, and its extent may not be fully realised till the crops are harvested.

When the ground has been dry at sowing time, and sowings have been largely made with irrigation, an early fall of winter rain is of great importance. When there is little winter rain or when falls are delayed, the crops fall off in condition as they ripen, and tend to wither under the strong dry winds which in such seasons must be expected in the spring. It is noteworthy that gram as a rule suffers most in this case : a seed-bed prepared with irrigation is less suitable for it than for the cereals or peas.

6. Frost occurring early in January does little harm except to the *arhar*. Late frosts may cause very serious loss : probably the period of greatest danger is the last few days of January and the first few days of February.

Hailstorms early in the season do little harm, but the danger increases as the season advances.





The rapeseed crop is liable to severe injury from the aphids if damp and cloudy weather occurs while the plants are in flower.

The gram crop is occasionally injured severely by caterpillars: the conditions under which this occurs are not yet accurately known.

The poppy suffers severely when damp and cloudy weather occur late in the season.

Where potatoes are grown, a watch should be kept for the potato moth (vide Provincial Note, section VI), which may cause very serious losses.

7. A substantial area is sown in ordinary seasons with *zaid* crops, principally the hot weather millet known in Oudh as *sawan*; and the area increases largely when stocks of food are low. The cost of seed of *sawan* rises very high when a large demand sets in and it may be desirable to offer advances for its purchase when the kharif yield has been bad or the rabi is unpromising.

8. A series of abnormal seasons of one type may produce certain cumulative effects. After some seasons of deficient rainfall the water-level falls, and the efficiency of temporary wells decreases, while the cost and labour of irrigation are materially enhanced. It is possible that the lowering of the water-level may proceed so far as to render the masonry wells useless in some tracts, but this is not known to have occurred.

On the other hand a series of wet years may raise the water-level to a point where the productivity of the land declines. This may happen throughout the district, but its effects will probably be most noticeable in the clay tracts and in the small lowlying areas on the Sai.

Another process with cumulative results is the extension of the ravine systems along the Sai and its tributaries (vide Provincial Note, section V).



*Paratagarh.*

9. Distress requiring some measures of relief must be expected to occur when the rains have ceased at the beginning of September. In 1907-8 no direct relief was found necessary, but the following measures were taken :—

Revenue suspended, kharif	...	...	2 lakhs.
" " rabi	...	...	Rs. 27,000
Revenue remitted : kharif	...	...	" 33,000
" " rabi	...	...	Nil
Improvement loans	...	...	1 lakh.
Advances for rabi	...	...	1½ lakhs.
" " kharif	...	...	1½ "

10. A serious shortage of fodder may occur in seasons when the rains have ceased so early that the large millets wither altogether or are seriously stunted in growth: in this case the only remedy that can be suggested is the importation of grass from the forests and its distribution on the *takavi*-system. The demand will depend very largely on the winter rains: if there are none, it may become very great, but even light falls bring up enough grass to keep large numbers of cattle going.

A fodder famine does not necessarily occur when the millets yield no grain, as the plants may have grown to a sufficient size to yield fodder; but in such seasons *juar* occasionally becomes poisonous and the loss of cattle due to this cause may be considerable. The poison is formed under the abnormal conditions of growth, and its presence cannot be recognised beforehand except by analytical methods: the only action possible is to provide advances to enable cultivators to replace cattle that have died from this cause.

11. The most important action for the improvement of the water-supply is the provision of facilities for the construction of masonry wells, which are still required in considerable numbers. The chief need is the continuance of the present policy of giving loans, but a boring staff should also be maintained for some time to come, to locate sites in the doubtful





villages and also to pierce the foundation-clay where it is too thick for the tools ordinarily available.

There may also be scope for improvement in the matter of embankments in rice country (vide Provincial Note, section III).

12. There is at present no demand for drainage works: but both the *jhil* tract and the Patti clay are badly drained, and they should be watched in wet seasons, while they should receive special attention in any investigation of the drainage of the Ganges-Gogra doab.

13. In order to minimise losses from cattle disease it is important to pay continuous attention to the enforcement of the rules for reporting outbreaks contained in the Land Records Manual, and also to maintain a veterinary staff sufficient to localise outbreaks when they occur. Efforts should also be made to influence public opinion in favour of the practice of preventive inoculation.

14. Cultivators on a few of the large estates are supplied with capital by the landholders, and there is a hopeful prospect of the development of the co-operative organisation, but at the present time the supply of agricultural capital is insufficient, and the *takavi*-system should be liberally worked. Improvement loans are wanted mainly for masonry wells, and to a less extent for embankments in rice tracts. Agricultural loans may be wanted on the following occasions:—

(a) *Early cessation of the rains.*—Advances may be wanted on a large scale first for sowing the rabi and again for the following kharif: while smaller sums may be required about February for sugarcane and *zaid* crops, and during the cold weather to buy fodder.

(b) *Floods.*—In exceptional years advances may be needed to enable the rabi to be sown.





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(c) *Cattle disease.*—It is important that cultivators should be in a position to replace working-cattle before the next tillage season begins.

(d) *Curtailment of the poppy area.*—Advances may be needed in villages where the crop has been largely grown to enable the cultivators to substitute some other remunerative crop.

15. It is possible that agricultural improvements requiring associated action might be introduced through the management of one or two of the larger estates, but should the co-operative organisation develop, as is expected, it will offer a more satisfactory agency. There is probably considerable scope for improving seed stocks, notably of wheat and sugarcane for accelerating the extension of maize; and for introducing any new crops that may be found suitable to the soil and climate provided they require the labour of the family rather than extensive capital outlay. The scope for expensive agricultural machinery is probably small at present, though a demand may arise for power-pumps for the *jhils*, but the cheapest forms of improved tillage-implements will probably come gradually into favour.





## DISTRICT NOTE.

### BARA BANKI.

#### Topography.

THE district may be divided into three tracts which may be named after the rivers which affect them—the Gogra Chauka *khadir*, the Kaliani tract, and the Gumti tract; but the transition between the second and third is gradual.

*The Gogra Chauka khadir.*—The *khadir* is wide on the north-west but narrows towards the east. It includes the whole of Bhitauli, practically the whole of Mohammadpur and Bado Sarai, about half of Ramnagar, part of Daryabad, and a small portion of Rudauli. Bhitauli lies between the Gogra and the Chauka and resembles the *ganjar* tract in Sitapur; it is swept by great floods and all cultivation is very precarious: it is permanently settled with the Maharaja of Kapurthala. The rest of the *khadir* is of a much superior type; the land is fertile and is well cultivated from the homesteads lying on the high bank. It is at its best in a dry year and is not exposed to much danger from drought. Wet years on the other hand affect it very seriously: floods damage or destroy the kharif, and the soil gets waterlogged and gives very poor rabi crops. Landward this tract is bounded by sandy slopes of little value for cultivation but bearing fine groves of mangoes.

*The Kaliani tract.*—This tract lies south and west of the *khadir*: it includes, on the north of the Kaliani, Fatehpur, the west of Ramnagar, the south of Daryabad, Basrohi and nearly all Rudauli; on the south it includes the north of parganas Kursi, Dewa, Nawabganj, Partabganj and Surajpur. There is light loam and some *bhur* along the edge of the *khadir* and on both sides of the Kaliani, but the greater part of the





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tract is rich loam or clay. The distinguishing feature is the number of *jhils* spread all over the tract except close to the rivers.

Drainage is usually adequate as the *jhils*, though numerous, are not individually large and cause comparatively little damage: but the north of Kursi and Dewa and about half of Rudauli are liable to suffer seriously from waterlogging in wet years. Elsewhere the damage is local.

*The Gumti tract.*—This tract includes Haidargarh and Subeha on the south of the Gumti; and on the north, Mawai Maholara, south Surajpur, Siddhaur, Satrikh, and the south of parganas Partabganj, Dewa and Kursi. On the north the distinction between this and the Kaliani tract is not well-defined, but going southwards the soil becomes lighter, and the *jhils* become fewer and disappear altogether as the river is approached. The uplands are thoroughly drained with the exception of a few scattered villages, and the only real danger of flooding is where the valley of the Gumti opens out. The lowland along it is very fertile, but after heavy floods it is apt to get completely waterlogged and to go out of cultivation until the next dry season restores it.

There is a line of clay villages on the extreme south of Haidargarh and Subeha, a continuation of the northern clay tract of Rae Bareilly; their drainage appears to be defective.

#### **Water-supply.**

The Kaliani tract in ordinary years draws most of its water from the *jhils*: when the rains cease early, a very large proportion of the tract can be protected by temporary wells, provided timely advances are given. The villages where such wells cannot be made are recorded in the well-survey: the principal defective areas are the north of Kursi, the land just above the *khadir* and parts of the north of Dewa. Masonry wells are rare in this tract, though their number has increased rapidly in recent years. Foundation-clay is by no means





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universal, but local information on the subject is incomplete: it appears to be absent along the edge of the *khadir*, and to be met with more frequently further south, but not in the vicinity of the Kaliani.

In the Gumti tract *jhils* are still an important resource, but a larger area is irrigated from wells. Temporary wells can usually be made: the villages where they are impossible are recorded in the well-survey. North of the Gumti masonry wells are still rare, and are not increasing rapidly, but south of the river the number is very large: thus in 1911 there was one such well to 63 acres of normal cultivation in Siddhaur, and to 19 acres in Haidargarh. Foundation-clay is ordinarily found except in the neighbourhood of the Gumti and its tributary streams. There appears to be some hostility to well-sinking on the part of landholders in this tract particularly in pargana Siddhaur, where the local officers who examined the well-survey considered that many more masonry wells are wanted. A similar need was found in Mawai Maholara, but not in other parganas.

### *Cattle-supply.*

The stock of cows in the district is proportionately not large, and it is not concentrated near any large grazing area. But there are a good many villages, mainly in the Bara Banki and Ramsanehighat tahsils, where a considerable number of cows are owned by Ahirs, and it is remarkable that these owners seem to pay more attention to the calves and less to the milk than is usually the case in south Oudh; they may in fact almost be called small breeders. The cows are not a pure breed but approximate to the Kheri type: the supply of bulls for breeding is adequate.

The markets of the district serve to some extent as distributing centres: working cattle are brought in large numbers from Bahraich, Kheri and Sitapur, and sold to dealers from Fyzabad, Sultanpur and Azamgarh, who also occasionally buy



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locally raised stock. On balance the district is not self-supporting, but the two tahsils named are probably more nearly so than any part of south Oudh.

The district is liable to all the ordinary forms of cattle disease: rinderpest however has not been severe since 1900. The people were at first hostile to the practice of inoculation, but it is now welcomed.

**Annals.**

There are few records of agricultural vicissitudes before 1895 when the series of annual reports was begun. It is known vaguely that the drought of 1837 had serious results; and in 1878 there was some distress requiring relief, at first in the north of the district but later in tahsil Haidargarh.

The following information is gathered from the annual reports. The wet seasons from 1892 to 1894 were disastrous to the *khadir*, the inhabitants of which were much impoverished. The north of Kursi and parts of Rudauli also suffered from floods, while the productive power of the soil over most of the district appears to have been temporarily affected by the rise in the water-level. In 1894 the great flood on the Gumti threw the lowlands out of cultivation, and here as elsewhere along the river the injury appeared at the time to be permanent. The flood extended up the Kaliani and the villages on its banks were also much injured. In 1896 the rains ceased prematurely, and the rice crop, the principal kharif supply of food, was almost an entire failure: the failure was more severe in the south and west than in the east. Distress existed through the cold weather, being most severe in Kursi and in Haidargarh; but a large rabi was sown for 1897 everywhere except in Kursi and all crops except gram doing well; the distress had almost disappeared by May. It was noticed that the dry season brought great benefit to most of the waterlogged *khadir* and to the lowland along the Gumti. Enquiries were made during the year as to possibility of draining the wet parts of Rudauli and one project was carried out.



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From 1897 to 1902 the district was on the whole very prosperous. In 1901 the wheat suffered severely from rust, but other crops were good. In 1902 the Chauka shifted its course and caused a good deal of local injury in Muhammadpur, but the inhabitants of that part of the country rapidly accommodate themselves to such incidents which cannot be prevented.

The seasonal yields since 1903 are given in the following table :—

Year.	Rabi.				Kharif.				
	All crops.	Wheat.	Gram.	Poppy	All crops.	Rice.	Sugarcane.	Small mil-lets.	Pulses.
1903 ...	100	100	81	100	65	75	100	62	44
1904 ...	86	94	75	100	100	100	100	100	94
1905 ...	56	56	50	94	100	100	105	100	78
1906 ...	100	100	100	100	101	100	125	94	113
1907 ...	Not available.	56	81	100	18	10	60	19	19
1908 ...	50	62	13	50	69	44	75	94	44
1909 ...	77	87	44	62	119	122	94	125	110
1910 ...	119	125	100	125	115	125	87	119	100
1911 ...	94	87	100	75	...	...	...	...	...

The rains of 1902 lasted well and enabled a large rabi to be sown for 1903: winter rains were light and unirrigated crops suffered slightly but other crops did exceedingly well. The monsoon was late and abnormal falls in October caused serious injury to all the late crops. An exceptionally large rabi area followed: wheat suffered slightly from rust, and gram was widely attacked by caterpillars. The rains of 1904 were satisfactory throughout and secured another large rabi area for 1905: but the crops suffered severe loss by the unusual frosts of February. As a consequence, the *zaid* area was three times the normal and the largest kharif area on record was sown. Both crops succeeded, though there were floods



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in the *khadir* in August. The rabi area of 1906 was slightly below the normal but the yield was good, and the following monsoon was also favourable despite exceptionally severe floods in the *khadir*. The rabi crops of 1907 suffered from excessive rain, wheat in particular being affected by rust.

The monsoon of this year began very late, and was practically confined to August. Most of the rice was lost and the yield was much the worst on record, while the rabi of 1908 was deficient in area by two-fifths and suffered from want of moisture and from dry winds in March. Distress was severe during these seasons: regular works were opened in February and relief continued until August. The relief given reached a maximum in March, but after falling at the rabi harvest increased again until a higher maximum was reached in the beginning of July: the numbers relieved exceeded five per cent. of the population. The north of the district was most affected, owing to the difficulty of sinking temporary wells.

The rains of 1908 were late but at first favourable, and the early crops were good: September was however too dry for the later crops, and the rabi area of 1909 was very small. Winter rains were inadequate and the crops suffered for want of moisture. The rains of this year were satisfactory and the crops were magnificent, but floods were severe in the *khadir*. The rabi of 1910 was sown on a substantially increased area: the winter rains were timely and not prolonged, and excellent crops were secured. The following rains were equally favourable, and their prologation enabled a normal rabi to be sown for 1911. Damp weather in February and March brought rust on wheat and injured poppy somewhat severely but the harvest was still satisfactory.

**Progress.**

The cultivated area increased substantially between the settlement of 1892—1896 and 1902, but the settlement areas were low, and the established increase over 1891-92 is very slight;





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apparently the limit of expansion has been reached. The proportion of land devoted to remunerative crops is high for south Oudh and shows a distinct tendency to increase. The sugarcane area has been better maintained than in the neighbouring districts, and wheat has extended progressively. Poppy is locally a very important crop, occupying 24,000 acres in 1911, and a large reduction in this area would be greatly felt by particular villages.

The number of masonry wells increased by 28 per cent. between 1905 and 1911: construction was active during the famine, but the impetus seems to have worn out as the increase in 1911 was only 72. The exceptional position of the district is shown by the fact that in 1911 there was only one masonry well to 60 acres of normal cultivation as against 39 acres in Lucknow on the west and 20 acres in Fyzabad on the east.

The population of the district increased substantially between 1891 and 1901, but there has been a heavy fall in the last decade: in 1911 it stood at 1,084,000 as against 1,131,000 in 1891.

Agricultural wages do not appear to have risen in the last five years: the rates recorded in 1911 lay between  $1\frac{1}{2}$  and 2 annas.

Advances for land improvement were taken in this district on a moderate scale (about Rs. 6,000 annually), between 1892 and 1899: from 1899 to 1906 the distribution was trifling, but in the famine year loans were taken on a very large scale. Since then demand has been more active, and in the last three years advances have averaged over Rs. 18,000. Loans for temporary purposes are freely taken in unfavourable seasons. There has been no development of agricultural co-operation in this district; a large agricultural bank was started but it was dissolved in consequence of its failure to adopt co-operative principles.



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The construction of the metre-gauge line from Gonda to Cawnpore, and especially the opening of the Elgin bridge over the Gogra, have greatly facilitated traffic with north Oudh, while the new branch line from Burhwal to Sitapur should be of material benefit to the north-west of the district. The length of metalled roads has been increased by nearly 100 miles since 1891, and in present conditions no large extensions are required.

The rise in rents has been rapid during recent years. The recorded rents in 1896, the first year after the settlement, gave a rate of Rs. 6.9 per acre, and the rate has risen to Rs. 8.3 in 1911: this figure is approached only by Lucknow of the Oudh districts.

Handloom weaving is still widely carried on in the district, but the industry has suffered heavily from competition, and sugar-refining has declined owing to the same cause. The wood-working industry at Bahramghat is of some little importance: the only other modern form of industry is the factory for manufacturing sugarcane mills at the same place. This factory does not usually sell its mills but hires them out by the season over an area extending from Azamgarh to Kheri.

The district draws a smaller income from external sources than Fyzabad or Rae Bareilly, but the receipts are important, and are extending steadily. At the end of the last century about six lakhs of rupees were distributed annually in money-orders: the amount had risen to over eight lakhs before the famine, and in the financial year 1908-9 rose further to 11½ lakhs. In each of the last two years it has been 10½ lakhs, a fact which indicates that the new sources of income developed during the famine have been largely maintained.

**Dangers and possible remedies or improvements.**

1. The area sown with kharif crops depends mainly on the weather during the first month of the season counting





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from the first heavy fall of rain. An early beginning is an advantage, but the most important point is that there should be bright weather with just sufficient rain to enable tillage and sowing to proceed without interruption. If the first month is wet, sowings of dry crops will be delayed and the area will fall, though the loss may be to some extent made good by larger sowings of rice and also of *bijra* and the late pulses, which can be sown until nearly the end of August.

The small area under late rice depends chiefly on the weather during the second month: frequent falls of rain are required at this time, and a prolonged break will reduce the area.

The area planted with sugarcane is influenced by the weather in February and March, at which time rain facilitates tillage: but it is determined mainly by economic causes. One of these is the yields and prices obtained from the crop in recent seasons; the other is the financial position of the cultivators, which depends mainly on the success or failure of the preceding harvest.

2. The yield of the early dry crops, which cover over one-third of the kharif area, depends mainly on the weather during the first two months of the season: alternations of rain and bright weather are desirable, and the yield may be much reduced by excessive rain in the second month. The early rice, which covers about the same area, requires more rain, and is not likely to give a full yield when the dry crops do best.

The late dry crops require the prolongation of the rains almost to the end of September: they may be seriously injured by heavy falls in the end of September or the beginning of October, while they will give very little grain if September is altogether dry.

The small area under late rice requires more rain in September than is suitable for the dry crops, and at least one fall in October is desirable for its complete success.





Sugarcane is apt to suffer seriously at two periods. The first is the end of the hot weather: the crop benefits from an early commencement of the rains and suffers from delay. The second is the end of the rains: a premature cessation is most injurious, and rain in October is beneficial. The crop can stand a considerable excess of rain, but prolonged breaks are likely to cause injury.

The balance of cropping is fairly satisfactory, though from the nature of the soil the area under rice is so large that there must always be anxiety until this crop has matured.

3. Apart from variations in the rainfall, the only danger to kharif crops recorded is from floods, which affect the *khadir* and the lowlying areas on the Gumti: an exceptionally heavy flood on the Gumti may cause flooding along the Kalliani.

It is noteworthy that injury from the cane-hopper has not been reported in this district, and it is unlikely to occur in those localities where the people adhere to the practice of digging the field as soon as the cane is cut.

Injury caused by other insects has not been reported but should be watched for.

4. The rabi area depends on the rainfall during September and early October: late falls secure a considerable extension by enabling the rice-fields to be sown with a second crop, while an early cessation of the rains tends to produce a decrease considerably greater than occurs in the adjoining districts south of the Gogra. An examination of the statistics of border parganas indicates that the district fares worse in such seasons than its immediate neighbours, and the only explanation apparent in the figures is the scarcity of masonry wells which limits the possibility of *paleo* irrigation.

5. When the seed-bed has been sufficiently moist, the yield of the rabi does not depend largely on winter rains: these are however beneficial up to nearly the end of January, provided the falls are moderate and of short duration. Rain





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later in the season will ordinarily do harm, while prolonged periods of damp and cloudy weather in January and February must be expected to produce rust on wheat and linseed: the injury caused may be very serious, and its extent may not be fully realised until the crops are harvested.

When the ground has been dry at sowing time, and sowings have been largely made with irrigation, an early fall of winter rain is of great importance. When there is little winter rain or when falls are delayed, the crops fall off in condition as they ripen, and tend to wither under the strong dry winds which in such seasons must be expected in the spring. It is noteworthy that gram as a rule suffers most in this case: a seed-bed prepared with irrigation is less suitable for it than for the cereals or peas.

6. Frost occurring early in January does little harm except to the *arhar*: late frost may however cause very serious injury, and probably the end of January or the first week in February is the most dangerous period.

Hailstorms are of little importance until the cereals begin to ear: the danger from them increases as the season advances.

The rapeseed crop may be seriously injured by the aphid if damp and cloudy weather occurs while the plants are in flower.

The gram crop has occasionally suffered severely from caterpillars, but the conditions in which this becomes important are not accurately known.

Poppy may be seriously injured by damp and cloudy weather in March.

7. The *zaid* crops are of some importance in ordinary seasons, and when stocks of food are low the area increases largely owing to extended sowings of the hot-weather millet known in Oudh as *sawan*. The price of seed of this crop rises very high when the demand is large, and advances for



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its purchase will probably be welcomed when the kharif yield has been bad or rabi prospects are unpromising.

8. A series of abnormal seasons of one type may produce certain cumulative effects. After some seasons of deficient rainfall the water-level falls, and the efficiency of temporary wells decreases, while the cost and labour of irrigation are materially enhanced. It is possible that the lowering of the water-level may proceed so far as to render the masonry wells useless in some tracts; but this has not yet been reported.

On the other hand a series of wet years may raise the water-level to a point where the productivity of the land declines. This may happen throughout the district, but its effects will be most noticeable in the Gumti lowlands, the *khadir*, and portions of Kursi, Dewa and Rudauli.

9. Distress requiring some measures of relief must be expected to occur when the winter rains have ceased by the beginning of September. The north of the district, especially pargana Kursi, has as a rule suffered most in seasons of scarcity but parts of tahsil Haidargarh have also been severely affected. In 1907-8, when distress was acute in the north, the following measures were taken :—

Revenue suspended, kharif ...	... 4½ lakhs.
"    "    rabi ...	... 4½ "
Improvement loans ...	... 3½ "
Advances for rabi ...	... 6½ "
"    "    kharif ...	... 2 "
"    to agricultural bank	... ½ lakh.

Maximum proportion of population relieved 5·2 per cent. in June.

10. A serious shortage of fodder may occur in seasons when the rains have ceased so early that the later crops wither altogether or are seriously stunted in growth: in this case the only remedy that can be suggested is the importation of grass from the forests and its distribution on the *takavi*-system. The demand will depend very largely on the winter rains: if there are none, it may become very great, but even



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light falls bring up enough grass to keep large numbers of cattle going.

A fodder famine does not necessarily occur when the large millets yield no grain, as the plants may have grown to a sufficient size to yield fodder; but in such seasons *juar* occasionally becomes poisonous and the loss of cattle due to this cause may be considerable. The poison is formed under the abnormal conditions of growth, and its presence cannot be recognised beforehand except by analytical methods: the only action possible is to provide advances to enable cultivators to replace cattle that have died from this cause.

11. The question of improving the water-supply is most important: the district north of the Gumti falls far behind the rest of south Oudh in the equipment of masonry wells, and the need for these is actually felt in dry seasons: but on the other hand the facilities for *jhil* irrigation in ordinary seasons have in the past deterred the people from undertaking construction. Many more wells are undoubtedly needed for protection, and all possible facilities should be given for their construction: loans should be readily granted, a boring staff should be maintained to locate sites, and endeavours should be made to influence those landholders who are at present hostile to construction.

There may also be some scope for embankments in the rice tracts (vide Provincial Note, section III).

12. There is at present no demand for drainage works, but the question may become important in Kursi, Dewa and Rudauli if a series of wet seasons should recur. These *par-ganas*, and also the *khadir* and the Gumti lowlands, will in any case require watching in such seasons, and any decline in cultivation should be taken as indicating that a temporary adjustment of the revenue may be required.

13. To minimise losses from cattle disease, it is important that sustained attention should be given to the system of



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reporting outbreaks prescribed in the Land Records Manual, and that the local veterinary staff should be sufficient to localise outbreaks when they occur.

14. While the cultivators on a few of the large estates are financed by their landholders, the supply of capital is quite insufficient in the district generally, and there is an extensive scope for the working of the *takavi*-system. Improvement loans may be wanted for masonry wells and for embankments in rice tracts: agricultural loans may be required in the following circumstances:—

- (a) *Early cessation of the rains.*—Advances will be required on a very large scale for the rabi, and probably also for the following kharif, while a smaller demand may arise about February for sugarcane and *zaid* crops. Advances to buy fodder may also be required.
- (b) *Floods.*—Advances may be required to sow rabi in the tracts indicated above as liable to floods.
- (c) *Cattle disease.*—It is important that cultivators should be able to replace working-stock before the beginning of the next tillage-season.
- (d) *Curtailement of the poppy area.*—In this case it may be desirable to offer advances in villages where the crop has been largely grown to enable cultivators to substitute some other remunerative crop.

15. There is at present no general organisation which could introduce agricultural improvements requiring associated action, but possibly something could be done on a few of the larger estates. The seed stocks of the district require examination before recommendations can be made for their improvement. The Kurmi cultivators are exceptionally skilful and would probably welcome any new crop not requiring a





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large capital. The scope for expensive machinery is not great, but a demand may arise for power-pumps on the *jhils*; the cheaper forms of improved tillage implements will probably become popular by degrees.

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