Cultivated soils.

CHAPTER II.—ECONOMIC.

Section A.—Agriculture including Irrigation.

Four classes of natural soils are recognized in the district :—

Chiknot.—Hard clay.

Narmot.—Fairly hard loam.

Magda.—Light and somewhat sandy loam.

Bhûr.—Sandy soil.

The hard *chiknot*, known elsewhere as *dâkar* or ***rohi***, is for the most part found in the drainage channels and is of importance only in the Dahar circle of Nuh, the Dahar and Chiknot circles of Firozpur and the Sahibi circle of Gurgáon. It requires a good deal of moisture and is therefore a very precarious soil in this district with its uncertain rainfall. In years of good rainfall it gives a magnificent yield, but in dry years it cannot be sown, or if sown yields little or nothing.

Narmot requires less rain than *chiknot* and as, like *chiknot*, it is capable of growing all the valuable crops, is on the whole the best soil in the district. It is the prevalent soil of the whole Palwal *tahsil* and of the east of the Nuh and Firozpur *tahsils*, which are canal irrigated.

Magda is lighter than *narmot* and is the best soil in seasons of short rainfall, but it is incapable of growing such valuable crops as *narmot*. It is the prevalent soil of parts of the Rewári *tahsil* of the Táoru circle of Núh and of the Gurgáon and Sohna circles of Gurgáon.

The *bhûr* is sometimes flat and sometimes billowy, but in any case it is capable of growing only very inferior crops.

It is impossible to give accurate figures of the areas in each *tahsil* or assessment circle of the above four classes of soil, as in the case of the irrigated and flooded soils (columns 8, 9, 12 and 15 of table 18), the natural class of soil was not recorded at the recent settlement. This record was only made for the unirrigated area (column 14), as where the land receives irrigation or flooding the nature of the soil is of minor importance. The following table

shews for each *tahsil* and assessment circle the proportions of each class of unirrigated soil to the total unirrigated area :—

Cultivated soils.

TAHSIL.	Assessment Circle.	PERCENTAGE ON TOTAL UNIRRIGATED AREA OF			
		Chiknot.	Narnot.	Magda.	Bhúr.
REWARI.	Cháhát Khári	5		39	56
	Cháhát Mitha	8		32	60
	Pahár	...		11	89
	Sáhibi	7		34	59
	Total	5		31	64
PALWAL.	Bángar	2	66	18	14
	Khádar	...	85	5	10
	Total	2	67	17	14
NUH.	Táoru	...	...	75	25
	Dahar	3	67	16	14
	Bángar	2	69	18	11
	Total	2	52	31	15
FIROZPUR.	Bángar	8	69	15	8
	Budher	4	9	19	68
	Dahar	15	44	24	17
	Chiknot	63	31	3	3
	Total	13	44	18	25
GURGAON.	Sáhibi	36		39	25
	Gurgáon	8		77	15
	Bhúr	2		37	61
	Sohna	10		49	41
	Bahora	7		54	39
	Total	7		52	41
	Total of the district	35		31	34

System of cultivation.

The system of cultivation of unirrigated land is determined by (*a*) the quality of the soil, and (*b*) the rainfall. The former determines the class of crop to be sown. If the soil is *chiknot*, *jowár* at the *kharif* and wheat or gram at the *rabi* (sown either

CHAP. II, A. Agriculture.

System of cultivation.

alone or as a mixture called locally *gochni*) are the crops usually sown, while the area put under *rabi* crops is as large as, if not larger, than that put under *kharif* crops. If the soil is *narmot*, it is sown at the *kharif* with cotton, *jowár* or *bájra* (with pulses intermixed) and at the *rabi* with *bejhar* (barley and gram mixed) or gram alone. Generally about two-thirds of the land is sown with *kharif* crops and about one-third reserved for *rabi* crops. *Magda* yields little but *bájra* and pulses at the *kharif*, and gram at the *rabi*, while *bhúr* is usually unfit for anything except *bájra*, *moth* and *guár*.

The rainfall determines the proportions of the various crops grown. If the preceding seasons have been unfavourable, a large proportion of good crops (*bájra*, barley and gram) and fodder crops (*jowár*, *charri* and *guár*) will be sown. If the monsoon sets in early, the area under cotton will be large.

The normal proportions of matured crops at the *kharif* and *rabi* respectively are 62 and 38.

Agricultural operations.

The following account of the chief agricultural operations for each month of the year was drawn up by Mr. Channing :—

Asárh, June-July.—In this month the farmer hopes for plenty of rain in heavy showers with intervals of sunshine and westerly wind. As soon as the rain falls the land is ploughed over, and the sowing of the *kharif* commences. If there is too much rain and cloudy weather without breaks of sunshine, the crops do not come up properly.

Sáwan, July-August.—Rain and sunshine are still both required: if there is too much rain the crops are liable to rot, or be mildewed; if there is too much sunshine with westerly wind, they dry up. The sowing of the later *kharif* crops, such as *jowár* is completed early in the month; and those formerly sown are weeded. Locusts occasionally attack the crops. Ploughing for the *rabi* commences.

Bhádon, August-September.—Occasional heavy rain with intervals of sunshine is still required much as in *Sáwan*. The ploughing for the *rabi* and the weeding of the *kharif* continue: and the crops have to be guarded from the depredations of birds. There is some danger of injury to the crops from young locusts. Indian-corn and *barti* are cut.

Kuár, September-October.—A few occasional showers do good, but too much rain will blacken the *bájra*, and cause the cotton pods to drop off. Sunshine and a drying wind are required to ripen the *kharif* crops, but if a hot westerly wind blows, it dries them up. *Bájra* is cut in the latter half of the month, and cotton begins to bear. The *jowár* has to be watched. Ploughings for the *rabi* continue, and the land is gone over with a *mez* (a flat heavy piece of wood), and the surface levell-

ed so as to retain the moisture. Towards the end of the month the first sowings of gram and barley begin.

Agricultural operations.

Kátak, October-November.—Unless the previous rains have failed, no rain is required in this month. The harvesting of *bájra* and the autumn pulses is finished, the picking of cotton continues, and part of the *jowár* is cut. The *rabi* crops have to be sown, and those which are to be irrigated are watered from the wells. There is but little leisure for the farmer during this month.

Mangsir, November-December.—Cotton pickings continue: the rest of the *jowár* and the *pála* (*Zizyphus nummularia*) and *pula* (*Munj grass*) are cut. The *rabi* sowings are completed, and the *kharif* crops are threshed out and stored. Sunshine, but not with too strong a heat, is needed; rain is not required. The wells are hard at work irrigating the *rabi* crops.

Poh, December-January.—Towards the end of the month the winter rains are hoped for, but they should not continue too long together without breaks of sunshine and drying wind, or the crops will mildew. Until the rain falls the wells continue to be worked; afterwards ploughings for the *kharif* commence. A southerly wind is considered a good sign of rain in the winter months. If the frosts are severe they damage the cotton, *arhar* and gram.

Mágh, January-February.—In the beginning of the month rain, as in the end of Poh, does good: if required, the wells are worked. Ploughings for the *kharif* continue; melons are sown and tobacco is planted out; the cotton is cut down. A month of comparative leisure to the farmer.

Phágan, February-March.—Gentle westerly winds with sunshine and no rain are required; hail-storms are feared. Sugarcane is planted out; ploughings for the *kharif* continue, and the *rabi* crops have to be watched and watered.

Chait, March-April.—Drying westerly winds, not so violent as to scorch up or beat down the crops, are required with sunshine. Rain does harm; the danger of hail-storms continues. During the first half of the month wheat is still watered. The crops have to be watched, and during the latter half of the month, barley, *sarson* and gram are cut. Early cotton is sown on irrigated lands.

Baisákh, April-May.—The harvesting of the *rabi* crops is now completed; and the harvested crops are trodden out and winnowed. Hot westerly winds are desired: rain does harm. Tobacco, early cotton and spring *jowár*, where this has been sown for fodder, are watered.

Jeth, May-June.—Until about the end of the month the same kind of weather is required as in Baisákh. The *rabi* crops

CHAP. II, A. Agriculture.

Agricultural operations.

are now stored; tobacco is cut; early cotton and *jowár* are watered; and if rain falls, the land is ploughed for the *kharif*, and *bájra* is sown. The *zamindárs* have little to do in this month, and employ their leisure in putting their houses in order against the advent of the rains.

In Baisákh the earth is said to be asleep and should be left to repose in quiet; Wednesday is a good day for sowing and Friday for harvesting; and on Tuesday the earth should not be dug, nor should a plough be first started on that day.

Agricultural implements.

The following are the principal agricultural implements in use in the district:—

Plough.—There are two kinds: '*hal kharáb*' which has a perpendicular handle, and '*hal lotan*' which has a slanting handle.

Seed drill (*orná*).—This is attached to the plough when sowing takes place.

Clod-crusher (*mez*).—A flat piece of wood drawn by bullocks. The driver stands on it.

Mattock.—Short (*pháori*); long (*pháorá*).

Hoe.—Short (*kassi*); long (*kasoli*).

Rake (*datáli*).

Axe (*kulhári*).

Spud (khurpa).—Used for weeding and for cutting grass.

Sickle (*daránti*).

Pitchfork (*jeli*).

Bánkri.—Chopper used for cutting *pálá*, cotton stalks etc.

Manjhá.—A flat piece of wood with string attachment for making the compartments of irrigated land.

All the above implements are made of *kikar* wood, which is the most durable in the district.

Rotation of crops, manure and double cropping.

The following description of the use of manure and the system of rotation of crops, as practised in the district, was furnished for the Famine Report of 1879 (page 247.)

"Percentage of cultivated area which is manured:—

	Constantly manured.	Occasionally manured.	Not manured.	Total.	REMARKS.
Irrigated land ...	19	25	56	100	Percentage of *dofasli* on cultivated, 3 per cent.
Unirrigated land ...	2	2	96	100	
Total ...	5	6	89	100	

"The average weight of manure given to the acre per annum on land constantly manured is 200 maunds. The average weight of manure given to the acre per annum on land occasionally manured is 300 maunds every second year. Little attention is paid to any regular course of cropping. The unmanured land is generally cultivated only for one harvest, and the rest it gets during the other harvest is thought sufficient. *Jowár* is not sown in the same land two years in succession. Cotton is not sown after *bájra*. In all other cases, in deciding what crop to sow, regard is paid to the kind of soil and amount of rainfall, without any consideration as to what the previous crop was. The second crop most commonly taken is gram, or more rarely barley and gram after *bájra*: occasionally, if the rains have been very heavy and the prospects of the *rabi* are good, the *jowár* is cut before it is ripe, so as to make room for the second crop."

Rotation of crops, manure and double cropping.

The system of cultivation has remained practically unchanged during the last 30 years and there is nothing to add to the above account. Even the percentages of manured and unmanured land must be taken as they stand, as no record of the area manured was made at the recent settlement.

The population dependent on agriculture is 449,794 or 61·3 per cent. of the total population.

Population engaged in and dependent on agriculture.

Out of this number only 32 per cent. are returned as actual workers, the remaining 68 per cent. being returned as dependents. In this district the women of all tribes except the Rájpúts, Khánzádas, Sheikhs, Sayads, Biloches and Patháns assist in the field work. The Ahír and Ját women are largely responsible for the prosperity of these tribes, while the Meos owe more than any other tribe to the energy of their women, who do most of the field work except the ploughing and clod-crushing. Many of those returned as dependents therefore are actual workers. Gurgáon is essentially a district of peasant proprietors and, as table 17 shews, out of the total population dependent on agriculture 93 per cent. are owners or their dependents and only 7 per cent. tenants. The tenants consist of ex-proprietors, who have lost their land owing to poverty or misbehaviour, and of menials.

As 51 per cent. of the total cultivated area is cultivated by tenants (table 38) it is clear that the owners do not themselves cultivate all the land they own, and that many owners cultivate land also as tenants.

Agricultural labourers.

As Gurgáon is a poor district inhabited by numerous peasant proprietors owning small holdings, hired labour is not usually employed for general agricultural operations except by those tribes whose women do not assist them in the field. This confines the practice to the Muhammadan tribes (excluding Meos) and to the Rájpúts.

CHAP. II, A. Agriculture.

In the cultivation of certain crops, however, all tribes are compelled to employ hired labourers. Much of the weeding and picking of cotton and of the hoeing and pressing of cane is done by hired labour. Cotton-pickers are generally paid in kind, receiving one-tenth of the pickings, while other labour is paid for in cash at the rate current.

Crops.

Staple food grains.

Bájra.

Table 19 gives the areas under the chief crops of the district. *Bájra* is the chief staple food grain. *Bájra* flour is more nourishing than wheat and is the chief article of the agricultural population's diet from October to May.

It is the great *kharif* crop of all the more sandy parts of the district, and in some circles such as the Táoru circle of Núh and several of the Gurgáon and Rewári circles, is by far the most important article of produce. During the 22 years from 1885-86 to 1906-07 the matured area of *bájra* averaged 188,372 acres or 22 per cent. of the total matured area. Table 19 shews that this percentage has been largely exceeded since 1900-01, but the abnormal character of the seasons during this period has stimulated the cultivation of *bájra*. Its yield at the recent settlement was estimated at from 3 to 6 maunds per acre in different circles, the total yield on the area of five selected years (265,227 acres) amounting to 1,194,914 maunds or an average of 4½ maunds per acre against 5½ assumed by Mr. Channing at the previous settlement. As soon as the rains fall it is sown, both broadcast and drilled, about a *ser* and a half to the acre. The better soil is ploughed two or three times to prepare it, but the very inferior lands are often not ploughed until actual sowing takes place. The crop requires one or two weedings. It is only irrigated in droughts. Its harvesting commences about the end of September, and it is generally off the ground in time for a second crop of gram or barley and gram to be sown if the season is favourable.

Barley.

After *bájra* barley comes next in importance among the food grains. On irrigated land it is generally grown alone, but on unirrigated land it is usually mixed with gram, and is then called *bejhar*. At last settlement a record was kept of the areas under barley sown alone and under *bejhar*, but from 1883-84 onwards *bejhar* was shown in the crop abstracts as so much barley and so much gram. The areas therefore of barley and gram given in table 19 include *bejhar*.

Barley is the predominant crop of the well lands throughout the district, except along the Jamna; but where the soil is light and sandy, as in the Gurgáon and Rewári *tahsils* and in Táoru, there its predominance becomes an almost exclusive possession. The estimates of the yield of *chábi* barley per acre varied in the different circles from 11 to 19 maunds.

On flooded lands barley is not generally grown unless the soil is sandy. Its yield was estimated at from 7 to 12 maunds per

acre. The extent to which the unirrigated lands are sown in any given year with barley or barley and gram varies greatly according to the character of the rains; when these have been good, large areas are thus sown in *tahsils* Palwal, Firozpur and Núh, and to a smaller extent in Gurgáon and Rewári: as a general rule, it may be said that in a favourable season barley and gram can be produced everywhere, except on the very poor and sandy soils: but it is pre-eminently the spring crop of the Bángar circles of Núh, Palwal and Firozpur, and the south of the Firozpur valley the outturn depends mainly on the winter rains.

Barley.

The estimated yield of unirrigated barley on loam varied from 7 to 9½ maunds, and on sandy soil from 4½ to 7 maunds.

During the 22 years referred to above the average area of matured barley was 118,476 acres[1] or about 13 per cent. of the total matured area. The land is ploughed before, during and after the rains, and gets generally about six ploughings.

The normal time for sowings is about the end of October. The seed is sown with a drill, the usual quantity being 50 *sers* per acre. On well lands the crop gets two or three waterings if the winter rains are normal. It is hardly ever weeded.

Harvesting takes place at the end of March.

Jowár.

In *chiknot* soil *jowár* takes the place of *bájra* as the chief *kharif* cereal. It is very difficult to draw an accurate distinction between *jowár* and *chari*. The former is sown for a full crop of grain while the latter is sown entirely for fodder. The areas of *jowár* and *chari* proper are both small, and nearly all over the district the form which the crop takes is something half way between *jowár* and *chari*. It is sown moderately thick to ensure a good yield of *chari*, and at the same time it is allowed to stand until the beads of grain are ripe. At the second regular settlement *jowár* was returned as representing 15½ per cent. of the total sown area, but Mr. Channing admitted that the returns had failed to distinguish between *jowár* and *chari* and that the area under the latter had been under-estimated. The average matured area under *jowár* during the 22 years from 1885-86 amounted to 86,979 acres or 10 per cent. of the total cropped area. The estimates of its yield at the recent settlement varied from 3 on sandy soil to 8 maunds on irrigated land and averaged about the same as *bájra*. The amount of seed sown varies. For *jowár* proper the amount is about 8 sers (for the medium crop about 15 sers and for *chari* proper anything up to 40 sers) per acre. Sowings take place as soon as *bájra* and cotton sowings are completed, *v.e.*, generally towards the end of July and beginning of August. The crop is rarely weeded, and is not irrigated except in droughts, or unless grown on well or canal lands purely for fodder. On the shores of the *jhils chari*

(1) This includes a few acres of *bejhar*.

CHAP. II, A. Agriculture.

is sown in Phágan (February-March) and reaped in Asárh (June-July). The stalks of *jowár* and *chari* are invaluable as fodder, and it is for this reason that the crop is so extensively cultivated and not on account of the grain, which is not nearly such a nourishing food as *bájra*.

Gram.

Of the *rabi* food grains gram is nearly as important as barley, and these two form the chief food of the agricultural population during the hot season. The preceding remarks about *bejhar* apply to the recorded area of gram also. The 22 years' average matured area of this crop is 98,427 acres or 11 per cent. of the total matured area. The estimates of its outturn per acre varied from 8 to 12 maunds on irrigated land, from 8 to 10 maunds on flooded land, from 5 to 9 maunds on loam and from 4 to 6 maunds on sandy soil. Gram can be produced in most soils except in loose *bhur*, and is the crop which grows best in very hard clay such as is found in low-lying lands liable to long continued flooding. It is sown first of the *rabi* crops, sowings beginning as soon as the *bájra* has been cut. It is sown with a drill about 25 *sers* to the acre and after only one or two ploughings. It is rarely irrigated except when grown mixed with barley or wheat, and it is not weeded. It is cut about the middle of April, and then after the pods have been separated from the plant by tossing with a fork, is trodden out in the usual manner. It is liable to suffer from frost, and is said also to be damaged by lightning when in flower.

Wheat.

Gurgáon is not distinctively a wheat-growing district, and the average matured area under wheat for the 22 years from 1885-86 only amounted to 42,675 acres or 5 per cent. of the total matured area, but wheat is also sown mixed with gram (*gochni*) or barley (*gojra*) and the average area under *gojra* and *gochni* during the above period was 43,812 acres. The total percentage therefore under wheat and mixtures of wheat was 10. At the second regular settlement the percentage was 8 and the increase is due to the Agra Canal. Wheat is rarely sown alone except as an irrigated crop. On canal-irrigated lands it is the chief *rabi* crop, and on the well-irrigated lands of a few circles (*e.g.*, the two Palwal circles, the Dahar circle of Firozpur and the Sáhibi circle of Gurgáon) the area under wheat exceeds, or at any rate equals that under barley, but in all other circles wheat only represents about $\frac{1}{4}$ or $\frac{1}{5}$ of the total well-irrigated *rabi* crop. The estimated yield of well-irrigated wheat varied from 9 to 14 maunds, and of canal-irrigated wheat from 11 to 12 maunds per acre. On lands flooded by streams and from embankments wheat mixed with gram (*gochni*) is the characteristic crop, and the estimated yield of wheat on these soils varied from 8 to 11 maunds. As an unirrigated crop wheat is grown in the form of *gochni* on heavy low-lying soils like that of the Firozpur Chiknot circle. The estimated yield of such wheat varied from 5 to $7\frac{1}{2}$ maunds on loam and from $3\frac{1}{2}$

to 6 maunds on sandy soil. The total yield of wheat sown alone on the area of five selected years (37,563 acres) amounted to 398,587 maunds or about 10½ maunds per acre, and the total yield of *gojra* and *gochni* similarly averaged about 8¾ maunds on an area of 29,314 acres. In years of at all deficient rainfall the production of wheat will be especially liable to contrast except on lands protected by irrigation; and even on irrigated lands the tendency in such circumstances would be to supplant wheat by barley as the latter requires fewer waterings. For wheat the land requires two or three more ploughings than barley. The only kind grown is the hard red wheat. Sowings begin at the time of the Diwáli and continue until the middle of December. The same amount of seed is sown as for barley, and it is sown with a drill. Irrigated wheat gets 4 or 5 waterings, if the winter rains are normal.

Wheat.

The only other food staples of the district are the autumn pulses, which are almost invariably grown intermixed with the cereals and cotton. *Másh* or *urd* requires a good soil and is chiefly grown in Palwal, Núh and Firozpur, being commonly sown with *jowár*. *Mung* is sown with *bájra* and grows on any except the worst soils. *Moth* grows on all soils and is the pulse preferred for sowing with cotton as it spreads and does not climb. *Chaula* or *lobia* is the chief *kharif* crop on very inferior soils where it takes the place of *bájra*. The average matured area under these four pulses amounts to 98,191 acres or 11 per cent. of the total cultivated area. Their yield is somewhat difficult to estimate as they are very rarely sown alone, but it may be taken to be a little less than *bájra*.

Másh, mung, moth, chaula.

Peas and *masúr* are sown to a small extent in the khádar and low-lying *dahri* lands, and the former is now rather a popular crop on canal-irrigated lands where it follows irrigated cotton. *Arhar* is rarely seen in the north and west of the district, but is generally to be found sown in lines through the cotton fields of Palwal, Firozpur and the part of Núh which lies east of the hills. Two varieties are sown. The common variety does not ripen until the commencement of the hot weather; it is very liable to be killed by frost and it is rather rare for it to survive the winter, but it is said to aid in protecting the cotton from the cold. Its leaves are used for fodder, and its stem and branches for fuel, while the pulse is little esteemed, so that its perishing in the winter is of the less consequence. The other variety ripens in the autumn, but it is not often sown.

Other food crops.

This crop is cultivated chiefly in the canal-irrigated tract, and also in a small area round the banks of the Najafgarh *jhíl* and above the Medawas emkankment. The total area matured during the five selected years (which are more representative than the 22 years owing to the steady increase in the cultivation of cane) was 6,639 acres or 1 per cent. of the total matured area. Except in a few villages cane cultivation is very inferior to that

Sugarcane.

CHAP. II, A. Agriculture. Sugarcane.

of most Punjab districts, and nothing like the high yields of the Punjab are obtained here. The estimated yield of irrigated cane varied from 20 to 23 maunds and of unirrigated cane from 11 to 22 maunds.

Canal-irrigated cane can only be sown in villages where irrigation is by flow and the supply of water abundant: it is sometimes sown in fallow land—if possible in land which has previously borne a nitrogenous crop, such as gram or *guár*,—but long fallows are the exception rather than the rule, and it is more generally sown after irrigated cotton. Some owners take two cane crops in succession, but this is unusual and probably not good agriculture. About ten ploughings are given: if the crop is sown in fallow land the soil is well manured, whereas if it is sown after manured cotton the unused manure in the soil is sufficient: the cultivators of this district appear to consider that manuring spoils the quality of the sugar, and hence they prefer to sow cane after cotton rather than in fallow land. The seed-canes are buried in December to protect them from frost; in February they are dug up and the joints which are to serve as seed are cut off: a preliminary watering is then given, followed by ploughing and the seed is placed in the ground: the field is then gone over with the "*mez*"; four or five hoeings and two or three waterings are given before the rains break, while in July or August the crop is hoed over with the long hoe: after the end of the rains two more waterings are generally required: the crop ripens about the middle of December.

The cost of cultivating an acre of cane is as follows:—

	Rs.	a.	p.
Manure	4	0	0
Seed	9	0	0
Hoeing	7	0	0
Watching	4	0	0
Cutting and stripping	3	0	0
Hire of press	5	0	0
Oil for press	1	4	0
Pay and food of Jhoka and Taria who prepare the *gur*	7	12	0
Total	41	0	0

A little rice is grown in the *jhils* and a little Indian-corn is grown near the village sites chiefly in the canal-irrigated parts of the three southern *tahsils*. Among "other cereals" are *barti* and *kangni*.

Non-food crops. *Guár*.

Guár is one of the autumn pulses and is sown exclusively as a fodder crop. Like *chaula* it grows on the most inferior soils, but is also regularly sown with the other pulses on the better soils and it is more often sown alone than any of them. The average area under *guár* and *chari* combined during the 22 years

from 1885-86 amounted to 78,991 acres or 9 per cent. of the total matured area. The grain is boiled and given to bullocks throughout the year. CHAP. II, A. Agriculture.

Oilseeds.

Sarson and *tárámíra* at the *rabi* and *til* at the *kharif* are the only oilseeds grown. *Til* is sometimes sown alone, but more often in lines in *bájra* and cotton fields, and the total area of the crops in this district is very small. It is a delicate crop and a moderate yield of 3½ maunds per acre has been estimated. Of the *rabi* oilseeds *sarson* is by far the most important, *tárámíra* being only sown on inferior lands. As noted by Mr. Channing *sarson* used only to be sown in lines through the wheat and barley crops, and much of it is still so sown, but of recent years it has been sown alone over an increasingly large area. A light and sandy but moist soil suits it and large areas in the Rewári and Firozpur *tahsils* are now cultivated with *sarson*. The area under *rabi* oilseeds is now three times what it was at the second settlement, the matured area of the five selected years being 23,612 acres or 3 per cent. of the total matured area. *Sarson* is a paying but very delicate crop, suffering severely from frost or excessive rain. A certain amount is cut green for fodder. A yield of 8 maunds on irrigated and 4½ maunds on unirrigated land was assumed at the recent settlement for both *sarson* and *tárámíra*.

Fibres.

Two kinds of hemp are grown. The smaller hemp locally called '*san*' is grown alone in small strips, while the larger hemp (*pat san*) is grown as a hedge round cotton fields.

Cotton.

Cotton is one of the most important staples in the district. The average matured area under this crop during the 22 years from 1885-86 amounted to 64,250 acres or 7 per cent. of the total matured area. Of this nearly the whole is grown in the Palwal, Núh and Firozpur *tahsils*: very little is grown in Rewári or in Gurgáon except towards Sohna and Sailáni on the borders of Núh. The cotton of the Firozpur valley is esteemed the best. On irrigated soil the yield is about 6 maunds per acre, on the best unirrigated soil it is 5 maunds and on inferior unirrigated soil from 3 to 4 maunds.

The yield of cleaned cotton is ordinarily reckoned one-third of that of the uncleaned. Cotton is sown in the end of *Chait*, March-April, or in *Baisákh*, April-May, on irrigated lands; and on rain lands in *Asárh*, June-July, as soon as the first rain falls. The land is generally plouged three or four times, commencing in *Mágh*, January-February; the seed is sown broadcast, having been first rolled in cowdung, so as to separate the individual seed; about eight seers go to the acre. Weeding is needed three or four times; ten labourers will weed half a *bigha* in a day. The early-sown cotton begins to bear in *Bhádaun*, August-September, and the later-sown in *Kátak*, October-November; the plants continue to bear until they are killed off

CHAP. II, A. Agriculture.

Cotton.

by frost; and the great advantage gained by sowing early cotton is that it generally brings out all its pods before the frost comes. If there is too much rain, or too much hot westerly wind, the pods are not formed. The Agra Canal has caused a great extension of the cultivation of early cotton in Palwal and the adjoining parts of Núh and Firozpur. On the other hand, years in which the rains begin late will ordinarily be marked by a great falling off in the area under *bárani* cotton; and when the rains are late or the frosts early, the outturn will be affected. Only one kind of cotton is grown in the district; it is the ordinary native kind. The plants are rarely allowed to stand for a second year.

Indigo.

Indigo was extensively grown on canal-irrigated land up to 1900-01, but the subsequent fall in price has caused its cultivation to be almost totally discontinued.

Spices etc.

Chillies, onions, tobacco, coriander seed, cumin, aniseed and safflower are grown in small quantities on well lands, and coriander seed is also grown unirrigated in lowlying clay soils like that of the Chiknot Circle of Firozpur. In some of the villages near Rewári "*isafgol*," flicus fleawort, is sown unirrigated on the well lands to a considerable extent. *Singhára* (waternuts) are commonly grown in the village ponds.

Increase or decrease of cultivation.

The district was already fully cultivated at last settlement, and there has been very little increase of cultivation since. Except in the Palwal *tahsil*, where large groves are preserved as sacred by the Játs, there is very little room for an increase of cultivation. In the Mewát there is hardly an acre worth cultivating which is not already under the plough. The figures for the second and third settlements are :—

	Uncultivated.		Cultivated.
	Unculturable.	Culturable.	
Second Regular Settlement	13	7½	79½
Third „ „	13	7	80

Changes of cropping.

The following table shows the matured areas of the principal crops according to the returns of the five years selected for assessment, and of the 22 years from 1885-86 to 1906-07, and a comparison in percentages of the cropping of the present and last settlements. This comparison does not give exact results because the area of the former settlement included all land sown within three harvests of the date of measurement, while the present area is of matured crops only. Still the result is sufficiently accurate to make the comparison useful. Of the areas in

Changes of cropping.

columns 2 and 3 the normal area is of course that of column 3, as the recent dry seasons have disturbed the normal proportions of the various crops. In the case of only two crops—cane and oilseeds—is the five years' area more representative than the 22 years' area. The cultivation of these two crops is steadily increasing, and of them the area in column 2 should be taken as the normal area rather than that in column 3.

1	2	3	4	5	6
Crop.	Average matured area of the				
	Five selected years.	Twenty-two years.	Area in column 2 in percentages.	Area in column 3 in percentages.	Settlement area in percentages.
	Acres.	Acres.			
Jowár	75,421	86,979	9	10	15
Bájra	265,227	188,372	30	22	28
Pulses (excluding guár)	77,491	98,191	9	11	13
Cane	6,639	4,106	1	1	...
Cotton	62,692	64,250	7	7	8
Guár-chari	89,084	78,991	10	9	2
Others	15,319	18,950	2	2	...
Total Kharif ...	591,873	539,839	68	62	66
Wheat	37,560	42,675	4	5	6
Barley and bejhar	112,924	118,476	13	13½	17
Gram	72,467	98,427	8	11	7
Gojra and gochni	29,314	43,812	3	5	2
Oilseeds	23,612	19,222	3	2	1
Others	9,413	13,630	1	1½	1
Total Rabi ...	285,290	336,242	32	38	34
Total Year ...	877,163	876,081	100	100	100

Changes of cropping.

columns 2 and 3 the normal area is of course that of column 3, as the recent dry seasons have disturbed the normal proportions of the various crops. In the case of only two crops—cane and oilseeds—is the five years' area more representative than the 22 years' area. The cultivation of these two crops is steadily increasing, and of them the area in column 2 should be taken as the normal area rather than that in column 3.

1	2	3	4	5	6
Crop.	Average matured area of the				
	Five selected years.	Twenty-two years.	Area in column 2 in percentages.	Area in column 3 in percentages.	Settlement area in percentages.
	Acres.	Acres.			
Jowár	75,421	86,979	9	10	15
Bájra	265,227	188,372	30	22	28
Pulses (excluding guár)	77,491	98,191	9	11	13
Cane	6,639	4,106	1	1	...
Cotton	62,692	64,250	7	7	8
Guár-chari	89,084	78,991	10	9	2
Others	15,319	18,950	2	2	...
Total Kharif ...	591,873	539,839	68	62	66
Wheat	37,560	42,675	4	5	6
Barley and bejhar	112,924	118,476	13	13½	17
Gram	72,467	98,427	8	11	7
Gojra and gochni	29,314	43,812	3	5	2
Oilseeds	23,612	19,222	3	2	1
Others	9,413	13,630	1	1½	1
Total Rabi ...	285,290	336,242	32	38	34
Total Year ...	877,163	876,081	100	100	100

CHAP. II, A. Agriculture.

Changes of cropping.

There has been very little change of cropping since settlement. Column 6 compared with column 5 indicates that at the *kharif* there has been a large decrease of the area under *jowár* and *bájra* and a large increase of the area under *guár-chari*, but the changes are due to a more accurate crop classification and not to any material change in the areas sown. Similarly at the *rabi* barley seems to have decreased and gram to have increased, but this again is due to *bejhar* having been recorded since 1885-86 separately as barley and gram. The total area under barley, *bejhar* and gram in columns 5 and 6 is much the same. Probably the only real changes that have taken place are, an increase of the area under cane and mixtures of wheat due to the extension of canal irrigation, and of the area under *sarson*.

Selection of seed, etc.

An attempt was made between 1904 and 1908 to improve the cultivation of cotton by collecting and distributing seed, but the experiment was never a success and was abandoned in 1908.

New varieties and appliances.

New varieties or appliances have been introduced in the district.

Working of Land Improvements and Agriculturists' Loans Act.

Table XX shows the amount advanced under the Land Improvements and Agriculturists' Loans Acts.

The working of these two Acts has been very beneficial to this district with its poor and resourceless peasantry and its peculiar liability to vicissitudes of season.

Land Improvements Act.

Grants under this Act have been confined entirely to wells, and most of the loans have been made to the thrifty Ahírs and Játs of the Rewári and Gurgáon *tahsils*, where well irrigation is most profitable. In Palwal canal irrigation has supplanted well irrigation and so loans have been few, while the Meos of Núh and Fírozpur are too lazy and thriftless to attempt to increase their protected area by well sinking. As table 20 shews loans have been freely distributed during the recent years of scarcity.

There have been very few instances of loans being misapplied, instalments have been regularly collected, and works in progress are properly inspected by Revenue officers. The only defect in the working of the Act in this district has been the failure to employ it for the encouragement of *band* construction. A large number of small *bands*, which Government for want of a supervising staff cannot manage and therefore will not construct, could profitably be constructed by the villagers with the aid of loans under the Act.

Agriculturists' Loans Act.

Most of the same remarks apply to the working of this Act as to the Land Improvements Act. In years of scarcity it has proved invaluable, and the liberal loans granted in 1899-1900, 1900-01, 1901-02, 1905-06 and 1907-08 did much to put heart into the peasantry and mitigate the effects of famine and scarcity. At the same time loans were made under prudent restrictions in

Agriculturists Loans Act.

these years. Money was only advanced for seed at the *rabi* for sowing irrigated or flooded lands on which the seed was certain to germinate, and advances were not made for bullocks unless there was a reasonable probability of the owner being able to maintain them. Large advances were made in 1905-06 and 1907-08 for the purchase of fodder which poured into the district from the Punjab under the stimulus of reduced railway rates. The best proof that the administration of the Act during the last few years has been judicious is the following statement of outstandings at the end of 1908-09:—

Tahsil.	*Total outstanding.*
	Rs.
Rewári	18,711
Palwal	17,541
Núh	18,305
Firozpur	4,861
Gurgáon	23,448
	77,866

Prospects of Co-operative Credit Societies.

The following note on the prospects of Co-operative Credit Societies in this district was kindly furnished by the Registrar.

Ten societies were started at the beginning of 1907, principally through the agency of the Revenue Extra Assistant Commissioner of the time, in the following villages:—

1. Firozpur-Jhirka.
2. Nagína.
3. Sánthawári.
4. Dháruhera.
5. Sidhráoli.
6. Pinangwan.
7. Marora.
8. Tánkri.
9. Rathiwas.
10. Khanpur Ghati.

These villages are inhabited by various tribes, the Meos predominating. Unfortunately at this early stage the most successful form of Co-operative Credit Society for the Punjab had not yet been evolved and, as elsewhere, societies were founded by a single individual, the members belonging to a number of villages without any basis of unity. There has thus been none of that common action or enthusiasm among the members which are necessary in order to make a society successful. These societies have also been under the disadvantage of being far remote from the Registrar's head-quarters and have consequently enjoyed little or no supervision. The result has been that one society has been cancelled, three are winding up their business and none of the remaining six shows a prospect of successful development. If started on proper lines and properly supervised there is no reason why Co-operative Credit Societies should not flourish in Gurgáon as elsewhere and it may be hoped that in the future progress will be made.

CHAP. II, A. Agriculture.

The Dháruhera society is working well under the supervision of Ráo Chaju Rám, and a new society is about to be started at Játusana.

Indebtedness of the cultivator.

The economic condition of the peasantry of the district is discussed at some length at pages 332ff of the Famine Report of 1879, where actual figures are given for instances selected as typical. In forwarding these figures, the District Officer wrote as follows :—

"In a district such as this containing such a variety of soil and caste and even climate, it is necessary to divide the agricultural community into classes, and describe their circumstances in some detail ; no general description of their ordinary economic condition would apply to the whole community with any approximation to exactness.

"The circumstances which determine the condition of an agriculturist come in order of importance as follows :—

"(1) *Caste.*—As a general rule, whatever be the nature of the soil he cultivates or the incidence of the revenue he pays, the caste of the agriculturist, which determines his habits and custom and natural disposition will determine his economic condition. At the head of the prevalent castes in this district I would place the Ahírs, as the most industrious, thrifty, and prudent. Though much of the land occupied by them is of aninferior description, and the incidence of the revenue in Rewári *tahsil*, where most of the villages are owned by them, has for thirty years been very high as compared with the rest of the district; they have, by unremitting toil, compelled the soil to yield them a wonderful amount of produce, and have by prudent thrift kept themselves and their lands free from debt. Next to them come the Játs, who own many villages in the east and north-east of the district. Their land is very fertile, and in the Palwal *tahsil*, where they form the chief portion of the land-owning class, the incidence of the revenue has been hitherto extremely light. In industry and thrift they are inferior to the Ahírs, though superior to other castes : while on the whole very well-to-do, they have not been careful to keep themselves free from debt and their land from mortgage. After them come the Rájpúts owning land chiefly in the centre of the district, and the Brahmans scattered here and there, but neither caste forming a very important element in the agricultural population. Last of all on the list come the comparatively lazy and superlatively unthrifty Meos, who own some 350 villages in the two southernmost *tahsils* of the district (Núh and Fírozpur). Without the excuse of a barren soil or an excessive revenue, they live so closely up to their income, are so negligent in developing the resources of their land, and indulge so in unwarranted expenditure, that the failure of one harvest plunges them irretrievably into debt. Last year's scarcity found many of them still burdened with debt contracted in the famines of 1860-61 and 1868-69, and has left them with 17 per cent. of their land heavily mortgaged, and much floating debt hanging over them besides.

"(2) *The number of the family.*—Other things being equal, the lucky man who has few children has less difficulty in making ends meet. When the children are young, they make more mouths to feed, without any corresponding increase in the number of hands to work ; and even when they become old enough to help in the fields, the cost of their food is greater than would be the hire of labourers to give the same amount of work at the most pressing times. Each child too must be married, and

Indebtedness of the cultivator.

marriages are the great extravagance of the agriculturist's family : even where one contracting party exacts a sum of money from the other, the expenses of the ceremony are sure to exceed the income. The greater the number of births, the greater will be the number of deaths in the family ; and each funeral too is an expensive affair—the brotherhood and the poor must be luxuriously and extravagantly feasted. There was a time not many years ago when the agriculturist who had a number of sons and daughters to help him to break up new land was likely to better his condition ; but now throughout the greater part of the district the population has overtaken the land, and hired labour is cheap. Happy is the man whose quiver is not too full. As might be expected, the unthrifty Meos are famous for the number of their children.

" (3) *Sub-division of the land.*—This is closely connected with the last head. Where the family is a large one, the family holding is, on the death of the head, sometimes worked in common by the sons, but very frequently divided between them in equal shares. The practice of separating off distinctly the different shares of the land is encouraged by our revenue and law system, and is rapidly becoming more common ; and as the increase of a holding by the death of a brother or uncle without heirs is much less common than its sub-division among the sons of the deceased proprietor, this practice leads to the rapid increase of small holdings, the produce of which is barely sufficient to supply the necessaries of life to the agriculturist and his family ; and while the heads of families in the village community are gradually becoming more distinct in their individual rights and responsibilities, they have not yet learned to co-operate in the modern sense of the word. There is thus little to fall back on when a season of misfortune comes. The extent of sub-division is generally much influenced by the tenure of the village. Where the village is held in *bhaiachára* tenure, as is usual among the Játs and Meos, the land is much sub-divided ; and where the tenure is *pattidári*, as it often is among the Ahírs, the owners of a share in the village often hold and cultivate it in common, and can thus meet misfortune better than if they had to fight it single-handed.

" (4) *Facility of irrigation.*—The introduction of the Agra Canal into the eastern part of the district has vastly improved the condition of the agriculturist in that tract by increasing the productiveness of their land in much greater proportion than it increases the cost of production ; but most of all by protecting them against seasons of drought—the great source of indebtedness and poverty. Although irrigation from the canal commenced only some four years ago, its good effects are already seen, and it is to be hoped that the standard of comfort of the Ját agriculturist benefiting therefrom will be decidedly raised before the population overtakes the increase of produce ; provided, however, that their prosperity does not make them lazy, and that the proximity of the canal does not permanently enervate them, as seems to have been the case with the Ját land-holders on the Western Jamna Canal. There seems some danger of the latter calamity, for this year in particular fever has literally devastated the tract through which the canal passes ; some villages have in a few months lost one-sixth of their population, and scarcely a man is to be found who has not been greatly reduced in strength by repeated attacks. But if this prove to have been an exceptional year, as there is some reason to hope, the great diminution of the population may even prove a blessing to the survivors. The facility of well-irrigation is also an important factor, as on this depends the protection of the land from drought, but it must be taken advantage of. The Ahírs work their deep wells night and day ; the Meos often do not take the trouble to sink them when water is near.

CHAP. II, A. Agriculture.

Indebtedness of the cultivator.

"(5) *Nature of soil.*—This factor, which at first sight seems most important, really comes low down in the list. The sandy soil of Rewári produces enough to keep the thrifty Ahírs in comfort, while the comparatively rich soil of the Fírozpur valley is heavily mortgaged to meet the extravagances of the thriftless Meos.

"(6) *Incidence of the revenue.*—This too is of less importance than would at first sight seem probable. The Ahír land-owners of *tahsil* Rewári hitherto notoriously heavily assessed, are much less indebted than the lightly assessed Meos of Fírozpur, and less even than the much more lightly assessed Játs of Palwal, thrifty though the latter are said to be.

"(7) *Status of agriculturist.*—There is much less difference between the condition of the owner of land, tenant with right of occupancy, and tenant-at-will throughout the greater part of the district, than would be expected. The vast majority of tenants with rights of occupancy, and a very large number of tenants-at-will, have hitherto held their land on condition of paying simply the revenue and cesses due thereon, and they have generally shared on equal terms with the owners in the common rights of the village. However, since the operations of the present settlement began, and more especially since the new assessments were announced last year, the tendency to distinguish more sharply between these classes of agriculturists has been rapidly growing. Tenants-at-will are called on to pay higher rents, or are ejected from land they have held for years on these favourable terms. Suits are instituted to have defined more exactly the rights of occupancy tenants and to enhance their rents. Property in land is becoming more valuable every day, and the rights of owners having been more clearly defined in the new settlement records, money-lenders are willing to advance larger sums than before on the security of land. Thus it is generally remarked that tenants-at-will have greater difficulty in borrowing than owners, or even than tenants with occupancy rights. All these tendencies may be expected to develope with remarkable rapidity in the few years following the close of the present settlement operations.

"The general condition of the agricultural population, then, may be said to be painfully dependent on the seasons; all their income comes from the land. Where a land-owner, besides the actual produce of his own separate holding, can count among his income the proceeds of hiring his cart between the busy times, or those of the sale of his *ghi*, he finds that in a year of drought even these are apt to fail him, for the difficulty of feeding his oxen and his buffaloes swallows up all the income they bring, and where a cultivator ekes out the produce of his field by his dues as a village menial or family priest, he finds the villagers, in seasons of scarcity, unable to pay him the full fee. The Játs of Palwal are now greatly protected against drought, but are in some danger of increasing their expenditure too fast, and losing some of their old industry and thrift; but they may be generally described as well off, especially the land-owners. They can easily stand a year of scarcity, and will probably soon recover themselves, though even they are, like all agriculturists, apt to neglect payment of the principal, and even of the interest, of a debt once contracted; and often carelessly allow the sum noted against them in the village money-lender's books to grow and grow until they can have little hope of paying it off, the wily banker knowing it to be his interest not to press for ready payment, but to encourage his debtor deeper into the toils, until he has become completely at his mercy. When this is so with men having such advantages as the Játs of Palwal, what must it be with the Meos? Their condition is rapidly becoming hopeless. They live so literally from hand to mouth, carelessly contracting debt for marriages, funerals, and petty

luxuries even in average years, that when a year of drought comes they are thrown on the mony-lender, who can make with them what terms he likes. It is pleasant to turn from this state of things to that of the Ahírs in Rewári. With all their disadvantages, their industry reduces the evils of a year of drought to a minimum, and their thrift supplies them with a means of tiding it over and reduces their expenditure for the time. The causes of debt are—(1), general extravagance, which leads to debt even in ordinary years; (2), marriages and funerals, the expenditure on which is enormously disproportionate to the income; (3), drought, which finds the agriculturist without any surplus saved, and kills his cattle, and compels him to borrow to pay the revenue and support his family; (4), neglect to pay the interest on debts already contracted, which rapidly multiply themselves.

Indebtedness of the cultivator.

The above remarks are no less true now than they were 30 years ago.

Recently in the year of assessment an attempt was made to ascertain for each *tahsil* the amount of unsecured debt due from the landowners. The estimate was only a rough one, but probably indicates fairly accurately the amount of unsecured debt due at the time it was made. The figures are as follows:—

Floating debt.

Tahsil.	Amount of unsecured debt.	Multiple of new land revenue.	Prevailing tribes.
	Rs.		
Rewári	12,33,869	4½	Ahír.
Palwal	7,10,657	2	Ját.
Nuh	9,09,007	3½	Meo.
Fírozpur	5,91,687	2½	Meo.
Gurgáon	13,80,670	6	Ahír, Ját, Rájpút.
Total	48,25,890	3½	

At first sight these figures appear to contradict the remarks quoted above about the relative indebtedness of the various tribes of the district, but when both secured and unsecured debts are considered together, this will be found not to be the case.

The fortunate state of the Palwal Játs is of course due to the protective influence of the Agra Canal. The figures for the Meo *tahsils* of Nuh and Fírozpur are surprisingly low, but this is probably due to the fact that the thriftless Meo cannot get much credit.

When we turn to the figures of secured debt, sales and mortgages—the position of the tribes is reversed. Detailed figures for various periods are given in Table 21 and the position as it

Sales and mortgages.

CHAP. II, A. Agriculture.

stood when the assessment statistics of the recent settlement were compiled is as follows :—

Sales and mortgages.

Tahsil.	Sales since previous settlement.		Existing mortgages.	
	Area.	Price per acre.	Area	Price per acre.
		Rs.		Rs.
Rewári	10	23	10	23
Palwal	6	41	19	54
Nuh	4	36	29	46
Firozpur	4	48	34	46
Gurgáon...	14	27	12	34
Total	8	31	20	44

Sales.

The figures in columns 2 and 4 show the percentages of the cultivated area transferred. Sales are not serious. The relatively large percentage of sales in Rewári and Gurgáon seems due to the inferiority of the soil and the high pitch of the assessment which combine to deter mortgagees from taking up the land. It also indicates real necessity as opposed to mere extravagance which leads to mortgage and not to sale.

History of mortgage.

The history of the origin and early growth of the mortgage is given in the following remarks by Mr. (now Sir James) Wilson :—

"During the progress of settlement operations two statements of land mortgaged were drawn up. The first statement shows the amount of land mortgaged at the end of June 1877, when the last instalment of the past settlement had been realized, and the new assessments had been announced, but had not yet come into effect; when a series of average years had brought the district to what may be considered its normal condition after the famine of 1868-69, and the coming drought of 1877 had as yet had no effect. The second statement shows the amount of land mortgaged during the following eighteen months, beginning with July 1877, and ending with December 1878. At the end of June 1877, over six per cent. of the cultivated area of the district had been mortgaged in 20,000 separate transactions, to agriculturists and non-agriculturists in the proportion of 3 to 2, for a sum equal to 1¼ year's revenue of the district,—the average amount of debt per acre mortgaged being Rs. 24, equivalent to 18 years' purchase of the revenue assessed. During the eighteen months which followed, while the redemptions from mortgage were insignificant, 4·41 per cent. more of the cultivated area was mortgaged for six *lakhs* or half-a-year's revenue, giving a rate of Rs. 14 per acre mortgaged, or 10½ years' revenue of the land mortgaged. Thus at the end of 1878, nearly 10½ per cent. of the cultivated area of the district was under mortgage, the burden being 21½ *lakhs* or 1⅝ year's revenue of the district. During the same period of eighteen months ending December 1878, 1·14 per cent. of the cultivated area of the district was sold at Rs. 14 per acre, or 11 years' revenue of the land sold. The average

History of mortgage.

area mortgaged in one transaction was seven acres, more than double the former average, and the proportion of mortgages to agriculturists and non-agriculturists, respectively, was 2 to 5, instead of the former proportion of 3 to 2.

"The cause of this enormous increase in the transfers of land, by which 5½ per cent. of the total cultivated area of the district changed hands in the course of a year and a half, is not far to seek. The almost entire failure of the rains of 1877 left the district destitute of the *kharif* harvest and unable, from want of cattle and seed and seasonable moisture, to cultivate the ordinary extent of *rabi*. Many of the people living from hand to mouth, especially the improvident Meos, were driven at once to the money-lender even before the first instalment of the new assessment became due: and as a thorough investigation into the rights of proprietors of land was just being completed, and the assessment for the next thirty years had been announced, it was possible to estimate with some certainty the value of land, and the money-lenders seem to have seized the opportunity to throw on the land by way of mortgage not only the value of the cash and grain they then advanced, but all outstanding debts, or to have cleared them all off by purchasing the land outright; so that the sum representing the new burden of the land does not represent new debt, but includes much debt that formerly appeared only in the books of the money-lenders.

"The proportions of land mortgaged vary greatly in the different *tahsils*. Firozpur, almost wholly inhabited by proverbially thriftless Meos, gives the highest figures. Up to June 1877, nearly 13 per cent. of the cultivated area of the *tahsil* had been mortgaged for 2½ years' revenue; in the following 18 months 6 per cent. more was mortgaged for 1¼ year's revenue, and 2 per cent. was sold during the same time. At the end of 1878, 19 per cent. of the cultivated area was burdened with 3¾ years' revenue of the *tahsil*. Nuh, also chiefly inhabited by Meos, follows close behind. Up to June 1877, 11 per cent. of the cultivated area of the *tahsil* had been mortgaged for 2¼ years' revenue; and during the next year and a half 5 per cent. more was mortgaged, and 1 per cent. was sold, leaving 16 per cent. burdened with 3 years' revenue of the *tahsil*. In the Ját *tahsil* of Palwal, which up to (1877 was lightly assessed, and which suffered less from the drought of) 1877-78 than the other *tahsils*, 5 per cent. had been mortgaged up to June 1877 for 1¼ year's revenue of the *tahsil*; and during the following year and a half 2 per cent. more was mortgaged for a fifth of a year's revenue only, and very little land was sold. So that here at the end of 1878 only 7 per cent. of the cultivated area is burdened with 1⅝ year's revenue. In the *tahsil* of Rewári, inhabited chiefly by industrious economical Ahírs, which has always been highly assessed, and which, like Nuh and Firozpur, suffered greatly from the drought of 1877-78, only 1½ per cent. of the cultivated area had been mortgaged up to June 1877, for only one-ninth of a year's revenue of the *tahsil*; but during the eighteen months that followed 6 per cent. of the cultivated area was mortgaged for a fourth of a year's revenue of the *tahsil*, and 1½ per cent. was sold, leaving 7½ per cent. of the cultivated area burdened with only a third of a year's revenue of the *tahsil*. In the Gurgáon *tahsil*, up to June 1877, 2 per cent. of the cultivated area had been mortgaged for a fourth of a year's revenue; and during the following 18 months 1½ per cent. more was mortgaged for a sixth of a year's revenue, and 1 per cent. was sold, leaving 3½ per cent. of the cultivated area burdened with half a year's revenue of the *tahsil*."

Table 21 shows that mortgage went on steadily increasing during the decades ending 1889-90 and 1899-1900 in spite of the fact that these periods continued nearly as many good years as

CHAP. II, A. Agriculture.

History of mortgage.

bad. After 1902-03 in spite of the bad seasons mortgage decreased, owing as previously stated, to the effect of the Land Alienation Act. From this it follows that much of the mortgage was unnecessary and due to extravagance, and this remark applies especially to the Játs of Palwal and to the Meos of Nuh and Firozpur. Making all allowance however for extravagance the large percentage of "existing mortgage" in Nuh and Firozpur is a serious feature of the economic condition of these two overpopulated *tahsils*. The evil is worst in the two Dahar Circles and in the Chiknot Circle which are those which have suffered most from the long series of unfavourable season. In these circles the percentages are as follows :—

Tahsil.	Assessment circle.	Percentage.
Nuh	Dahar	38
Firozpur	Dahar	44
Firozpur	Chiknot	47

Total indebtedness.

Statement VI of the Assessment Reports gives the consideration money paid for the sales and mortgages shown in the preceding abstract. Adding the figures of unsecured debt already given, the total ascertained indebtedness of owners and occupancy tenants to creditors other than Government is as follows :—

1	2	3	4	5	6	7
Tahsil.	Consideration money of land.			Unsecured debt.	Grand total.	Multiple of new land revenue.
	Sold.	Mortgaged.	Total.			
	Rs.	Rs.	Rs.	Rs.	Rs.	
Rewári	5,60,479	5,73,401	11,33,880	12,33,869	23,67,749	8½
Palwal	5,37,034	20,44,532	25,81,566	7,10,657	32,92,223	9
Nuh	2,95,586	28,47,193	31,42,779	9,09,007	40,51,786	15
Firozpur	3,43,562	25,81,462	29,25,024	5,91,687	35,16,711	14
Gurgáon	7,26,677	7,25,768	14,52,445	13,80,670	28,33,115	13
Total ...	24,63,338	87,72,356	1,12,35,694	48,25,890	1,60,61,584	12

It cannot of course be claimed that the recorded consideration money of sales and mortgages accurately represents the value of the land transferred, but the figures are sufficiently accurate to give a rough idea of the total indebtedness of landowners and occupancy tenants to creditors other than Government. The result in column 6 justifies the remarks made under the head of unsecured debt. The thrifty Ahírs of Rewári are least burdened with debt, though their assessment is the heaviest and their land the worst in the district, and next to them come the prosperous Játs of Palwal. In the other three *tahsils* the burden of debt is very heavy.

The following table shows that most of the transfers referred to in the preceding paragraphs are to members of an agricultural tribe. Transfers to outsiders are not serious except in the Dahar Circle of Nuh, Sahibi Circle of Gurgáon and Khádar Circle of Palwal, all of which are depressed tracts. There are no separate figures to support the statement, but most of the transfers to members of an agricultural tribe are to co-sharers :—

1	2	3	4	5	6	7
	SALES.		MORTGAGES.		TOTAL TRANSFERS.	
Tahsil.	To members of an agricultural tribe.	To others.	To members of an agricultural tribe.	To others.	To members of an agricultural tribe.	To others.
Rewári	58	42	54	46	56	44
Palwal	75	25	65	35	68	32
Nuh	47	53	64	36	62	38
Firozpur	40	60	65	35	62	38
Gurgáon	58	42	57	43	55	45
Total	56	44	62	38	61	39

The above figures are abstracted from Statement VI of the Assessment Reports.

The rates of interest charged on ordinary unsecured loans to agriculturists are 12, 24 and 37½ per cent. per annum. Only borrowers of good status can secure loans at the lowest rate; the prevailing rate is 24 per cent., while the highest rate is paid by the poorer among the Meos of Nuh and Firozpur. The rate, when

CHAP. II, A. Agriculture.

Total indebtedness.

the loan is secured by pawned jewelry, is from 6 to 20 per cent., and when secured by landed property, is from 12 to 24 per cent., special terms are fixed for loans for short periods, such as loans for seeds, purchase of bullocks, or for payment of land revenue. Money-lenders generally refuse to accept interest for a shorter period than six months, and compound interest is usually charged after six months on debts.

Agricultural stock.

Table 22 gives details of agricultural stock. The following remarks in this subject form part of the preliminary report submitted in connection with the Provincial Monograph on Cattle Breeding (1910-11).

Bullocks and cows.

"Gurgaon is at the same time a home breeding and an exporting tract. There are no tracts in which breeding is carried on exclusively for sale by professional breeders. At the same time all the agricultural classes breed sufficient cattle for their own requirements and for export in moderate quantities.

"The local breed of cattle is *desi*, but it is a fine breed and Gurgaon is noted on page 3 of 'Breeds of Indian Cattle, Punjab,' as being one of the six districts producing the best breed of cattle in the Punjab. The district adjoins the Hariána tract and the breed, though smaller, resembles the Hariána breed. There is probably not much difference between the breed of this district and of the Rohtak section of Hariána which is described on pages 39—47 of Major Pease's book.

Breeding.

Breeding is from local bulls supplemented by bulls purchased from the Hissar Cattle Farm by the District Board. At the present time there are 23 Hissar bulls in the district distributed as follows:—

Tahsil.	
Rewári	1
Palwal	7
Nuh	4
Firozpur	7
Gurgaon	4

"The distribution is made in accordance with the requirements of the people. The bulls are selected by the Superintendent of the farm in consultation with a veterinary assistant and zaildár who are sent from this district to take over the cattle. On arrival at their destination they are made over to the zaildár and lambardárs of the village where they are to be located, and these persons are made responsible for their safe custody and proper maintenance. This arrangement works well, but is of course very unpopular with the zaildárs and lambardárs on whom a rather unfair burden of responsibility is laid. The bulls accompany the village herds to the grazing grounds, and are allowed by the zamindárs to graze freely on their crops. In times of scarcity when there are no crops, the bulls are supplied with fodder by the zamindárs. Hissar bulls are fairly popular in the district, but there is a well founded objection to them from the agriculturists of some tracts that their produce is too large to be suitable for agriculture. Their stock is much prized for employment in *raths* and *majholis*, but not for agriculture. This objection would seem to apply in a special degree to those parts of the district where the soil is light and sandy, *viz.*, Rewári, Táoru and the west of the Gurgaon *Tahsil*. Hence the

number of Hissar bulls located in the three *tahsils* in question is less than in Palwal, Firozpur and the rest of Nuh where the soil is heavy and a larger type of bullock is not so strongly objected to. The greater part of the breeding, however, is from local bulls let loose as an act of charity. Many of them are very fine animals, but others are inferior and unsuitable. There is no evidence of the breed having deteriorated. As far as can be ascertained, its quality has been well sustained, and as stated above the local bull is on the whole preferred to that of Hissar. The defects of the present system are pointed out by Major Pease in page 46 of his book, and there is no doubt that much might be done to improve local breeding. Rearing depôts for bull calves might be established locally, as was suggested by the Veterinary Department in 1902. In this way good bulls of the local breed, reared under local conditions, would be available. Some measures also for preventing breeding from immature and unsuitable bulls might be undertaken.,,

Breeding.

Grazing and feeding.

The district is very fully cultivated and except in villages adjoining the hills, in the Jamna Khádar, in the Ját villages in the east of the district where large groves are preserved as sacred, and in the Sáhibi circle of Gurgáon the amount of waste land available for grazing is nominal. The grazing on such waste as there is, is supplemented by the grazing on cultivated lands lying fallow, but on the whole grazing is inadequate. In consequence the cattle have to be largely stall fed, and considerable areas of crops are grown exclusively for fodder. *Chari, guár* and *kásni* are exclusively fodder crops, while of other crops, most of the peas, carrots, and turnips, about one quarter of the *sarson* and autumn pulses and small quantities of barley and gram are given to the cattle. To these must be added the stalks of *jawár* and *bájra,* the straw of the autumn pulses and *rabi* cereals, cotton seed, oil cake and *pálá.*

In good years all the above sources supply the zamindárs with an abundance of good fodder, but if the rains fail, a dearth of fodder and terrible loss of cattle result. When fodder is scarce, the cattle are fed on branches of trees, roots of *pula*, etc. In this district there is no possibility of increasing the area of waste available for grazing, but the afforestation of the large hill area is quite feasible, though it would no doubt be a difficult operation. If this were done facilities for grazing would be vastly improved, and a much larger number of cattle could be maintained.

Owing to the pressure of population on the soil there is no possibility of increasing the area under fodder crops, but much might be done in the way of

(*a*) importing fodder by railway in times of scarcity;

(*b*) taking measures for the better preservation of the existing supply in good years.

Importation was successfully tried in the severe fodder famine of 1905-06, though measures were taken much too late to save a

CHAP. II, A. Agriculture

Grazing and feeding.

large proportion of the cattle lost. This defect, however, could easily be remedied in future by having timely enquiry made. Of course the success of the measure depends on the extent of the famine. It would only be possible to resort to it in the case of a partial famine. In the case of widespread and universal famine there would be no fodder available or if any were available the price would be prohibitive. Importation of fodder must be accompanied by grants of *taccávi* to purchase it, care being taken that *taccávi* is only given for the preservation of valuable animals.

As regards (*b*) there are great possibilities, though as the subject has never been fully enquired into, it is difficult to say which of the various measures which suggest themselves, are practicable. In favourable years an abundance of good grass springs up all over the district, which is wasted as the zamindárs have neither the time nor the means to cut it. Similarly there is in such years a large surplus of *chari* and *bájra* stalks, which instead of being scientifically preserved are in many cases sold.

It should be possible for Government either to buy up and preserve locally the surplus fodder of good years or to offer such inducements to the zamindárs as would lead them to store it themselves. If this were systematically done, there would in time of scarcity be an ample supply of fodder for such cattle as are really worth preserving. Surplus stock is disposed of at the numerous fairs held in and near the district.

Disposal of stock.

A weekly fair is held at Nuh at which chiefly old and useless animals are sold to butchers. A large fair is held at Rewári in the spring and autumn. The following statements relating to the autumn fair of 1909 shew the tracts from which the animals were brought for sale, the tracts to which the animals sold were exported and the average price realised for each class of animal. The figures are interesting as shewing (*a*) the extent to which Gurgáon is an exporting district, (*b*) the extent to which the districts of the Punjab and United Provinces depend on the districts in and adjoining Hariána for the supply of bullocks, and (*c*) the rise of prices in recent years.

Prices.

The price of a bullock now ranges from Rs. 50 to Rs. 120, and of a cow from Rs. 20 to Rs. 60. Prices have in fact exactly doubled during the last 25 years. For instance the old gazetteer of the district shews the price of a bullock as ranging from Rs. 35 to Rs. 60. The third statement indicates that the rise dates from the famine of 1899-1900. In 1898 the average price per bullock was only Rs. 39, but in 1900 after the serious shortage caused by the famine of 1899-1900 the average price jumped up to Rs. 51, and after a further series of bad years has now reached Rs. 60.

The tracts from which animals were brought for sale to the Rewári autumn fair of 1909.

Name of tract from which brought.	Detail of animals.							Total.
	Bullocks.	Calves.	Cows.	Buffaloes.	Buffalo-calves.	Horses.	Camels.	
Gurgáon District	28,836	207	75	85	25	4	1	29,233
Hissar "	3,904	180	40	27	10	2	...	4,163
Jaipur State	4,178	100	35	13	4	...	...	4,330
Patiála State	2,028	175	27	42	7	1	1	2,281
Rohtak District	2,958	136	21	25	4	...	..	3,144
Nábha State	1,397	120	13	5	2	...	...	1,537
Jínd State	3,330	109	4	7	5	1	...	3,456
Dujána State	1,989	200	64	75	10	...	...	2,338
Nimrána State	3,316	175	80	25	2	...	...	3,598
Alwar State	8,872	244	92	15	9	...	...	9,232
Lohárn State	1,311	117	75	50	2	1	1	1,557
Pataudi State	90	40	...	...	...	...	...	130
Total ...	62,209	1,803	526	369	80	9	3	64,999

Purchasign tracts at the Rewári autumn fair of 1909.

	Name of tract.	Detail of animals purchased.							Total.
		Bullocks.	Calves.	Cows.	Buffaloes.	Buffalo-calves.	Horses.	Camels.	
Punjab Districts.	Gurgáon	305	159	75	45	46	1	1	632
	Ferozepore	504	103	25	10	...	1	...	643
	Hissar	75	20	16	12	...	...	...	123
	Rohtak	75	12	6	...	2	..	...	95
	Delhi	104	...	...	...	...	...	...	104
	Ludhiána	409	...	...	16	..	...	...	425
	Lyallpur	130	...	...	...	...	...	...	130
United Provinces Districts.	Aligarh	225	317	...	...	...	...	...	542
	Bulandshahr	344	205	...	...	...	...	...	549
	Saháranpur	402	149	...	...	...	...	...	551
	Muzaffarnagar	400	240	...	...	...	...	...	640
	Meerut	342	233	...	...	...	...	...	575
	Etah	202	100	...	...	...	...	..	302
Native States.	Patiála	249	95	...	...	...	...	1	345
	Jínd	211	27	3	2	...	...	...	243
	Total ...	3,977	1,660	125	85	48	2	2	5,899

CHAP. II, A. Agriculture. Prices.

The following statement shews the number of animals sold and the prices realised at the Rewári autumn fairs from 1898 to 1909. Under the total sale price the average price per animal sold is given in brackets. In 1906 and 1908 there were no fairs owing to cholera.

Kind of animals.	1898.		1899.		1900.		1901.		1902.	
	No. sold.	Price.	No. sold.	Price.	No. sold.	Price.	No. sold.	Price.	No. sold.	Price.
		Rs.		Rs.		Rs.		Rs.		Rs.
Bullocks ...	1,231	49,231 (39)	4,266	89,214 (21)	4,002	2,02,441 (51)	4,113	2,34,839 (57)	2,548	1,15,934 (46)
Calves ..	171	1,340 (8)	633	5,447 (9)	1,209	8,468 (7)	586	17,098 (29)	155	4,650 (30)
Cows ...	61	370 (6)	708	3,227 (4)	200	3,129 (15)	46	1,150 (25)	59	885 (15)
Buffaloes ...	6	79 (12)	667	4,686 (7)	80	3,037 (38)	21	1,785 (85)	3	180 (60)
S. Calves ...	17	45 (3)	56	212 (4)	...	...	...	...	...	...
He-goats ...	2	4 (2)	6	9 (2)	...	...	...	...	...	...
She-goats ...	...	...	1	1	9	30 (3)	...	...	...	...
Horses ...	...	...	...	...	...	...	15	1,200 (80)	...	...
Mares ...	...	...	...	...	...	...	...	...	3	243 (81)
Ponies ...	6	56 (9)	44	295 (7)	4	230 (5)	...	...	...	..
Camels ..	1	50	2	85 (42)	2	126 (63)	25	180 (7)	...	...

Kind of animals.	1903.		1904.		1905.		1907.		1909.	
	No. sold.	Price.	No. sold.	Price.	No. sold.	Price.	No. sold.	Price.	No. sold.	Price.
		Rs.		Rs.		Rs.		Rs.		Rs.
Bullocks	2,815	1,24,972 (43)	2,860	1,51,019 (53)	3,743	1,54,809 (41)	2,856	1,87,520 (66)	3,977	2,40,196 (60)
Calves ...	234	16,190 (69)	738	18,077 (24)	1,182	33,155 (29)	113	4,288 (38)	1,660	57,674 (35)
Cows ...	28	695 (25)	58	1,122 (19)	94	1,580 (17)	22	1,774 (80)	125	1,885 (15)
Buffaloes	26	450 (17)	61	1,083 (18)	73	1,811 (26)	28	2,538 (91)	85	4,290 (50)
S. Calves	...	...	31	273 (9)	77	640 (8)	22	370 (17)	48	489 (10)
He-goats	...	...	...	...	11	28 (2)	...	...	...	...
She-goats	...	...	...	...	...	...	...	...	...	...
Horses ...	...	...	18	264 (15)	14	187 (13)	14	458 (33)	2	60 (30)
Mares ...	7	94 (13)	1	72 (72)	...	...	...	...	...	...
Ponies ...	...	...	...	...	...	...	...	...	...	...
Camels ...	1	64 (64)	...	...	4	215 (54)	37	3,076 (83)	2	240 (120)

Prices.

Gurgáon is a district of extremely precarious harvests, and the character of the seasons naturally has a marked effect on cattle-breeding. To take the case of the most important class of cattle, plough bullocks. The number of plough bullocks returned at the 2nd regular settlement (1872-76) was 112,321 (paragraph 5 of Mr. Wilson's Revision Report) as against 110,000 actually required to keep up a good standard of cultivation. The drought of 1877-78 was dreadfully fatal to the cattle, and when the next reliable census was taken in 1882-83, the number had fallen to 81,000. After a series of good years the numbers rose to 145,113 in 1893-94 and 146,964 in 1898-99, but at the next quinquennial census in 1903-04 after the famine of 1899-1900 the numbers were 115,198 and in 1908-09 they had fallen still further to 113,279. This number is just sufficient for the cultivation of the district. The case of cows is much worse, as the numbers in 1908-09 were little more than half what they were in 1893-94. Fortunately the decrease in young stock is very much less than in bullocks or cows. This seems to indicate that the animals sacrificed in the recent bad seasons were mostly old and useless and that breeding was kept up satisfactorily. The comparatively large number of young stock explains how the district was able to send 28,836 bullocks for sale to Rewári in the autumn of 1909.

Buffaloes.

As regards buffaloes Gurgáon is a home breeding district and there is very little export or import.

Like cows they are kept for dairy purposes. The breed is local and the bulls are set free by well-to-do zamindárs, the same remarks applying as in the case of local Brahmini bulls. Milch buffaloes are generally kept by well-to-do zamindárs or shopkeepers and in areas where the cropping is secure, as in the canal tract, or where there is plenty of grazing as in the Palwal Khádar and Gurgáon Sáhibi. In consequence the dry seasons seem to have had little effect on their numbers as in 1908-09 there were 65,442 against 67,425 in 1903-04. As in the case of bullocks and cows, their price has doubled, being now from Rs. 40 to Rs. 100 against an average price of Rs. 34 in 1883. Male buffaloes are only used for agricultural purposes in the Palwal Khádar, and to a small extent in the Firozpur *tahsil*. Elsewhere they are found only in villages, where the landowners employ *bhisties* to draw their water. In such villages the *bhisties* keep male buffaloes to carry their water skins. During the recent years of scarcity male buffaloes have been extensively sold for the value of their hides, and in 1908-09 the number (including bulls kept for breeding) only amounted to 1,921 as compared with 2,527 at the previous cattle census of 1904-05.

Dairying.

The manufacture of *ghi*, which is regularly made by the zamindárs, is the only form of dairying carried on in the district. The quantity manufactured is of course largest in the tracts where there are most buffaloes. The zamindárs either take the *ghi* to

CHAP. II.A. Agriculture.

Dairying.

the *bania* for sale or the *bania* makes a round of the villages and collects it. Sometimes the zamindárs sell direct to wholesale dealers in Delhi, but generally they sell to a middleman who makes a profit of about 6 pies per rupee on the transaction. Buffaloes and cows when in milk get cotton seed or oil-cake in addition to from 8 to 10 sers of *chari* per day. The amount of cotton seed or oil-cake is fixed in proportion to the expected yield of *ghi*. The average yield of milk by a cow is 5 sers and by a buffalo 8 sers. The price of dairy produce has like the price of stock doubled during recent years. Thus the price of milk has risen from 20 to 10 sers per rupee and of *ghi* from 2 to 1 ser per rupee.

Goats.

Goats are kept all over the district, but they are most numerous in villages adjoining the hills. Their numbers fell from 234,147 in 1903-04 to 152,764 in 1908-09. The decrease is due to disease and to traders not having brought their goats to the district to graze owing to the dry seasons and consequent absence of a demand for meat. Goats are easy to keep as they feed on any bush or shrub, and traders bring large quantities to graze on the hills, paying the zamindárs as grazing fee half the increase. Goats' flesh is consumed largely by meat eating communities, and a profit is also made on their skins and milk.

The sale price of a goat has risen since 1884 from Rs. 2 to 3 to Rs. 4 to 8 now, the price of the skin has risen from 8 to 10 annas to Re. 1 to 1-8-0 and the price of the milk from 1½ to 2 pice per ser to 3 to 4 pice.

Sheep.

Most of the same remarks apply as in the case of goats except that sheep are kept for their wool instead of their meat and that in consequence there has not been the same falling off in numbers as in the case of goats. In fact though there was a small decrease between 1903 and 1908, the figures of the latter year are nearly 30 per cent. above those of 1893. The wool is cut twice a year and realizes about Re. 1 per sheep. The price of a sheep has risen from Re. 1 to 2 in 1884 to Rs. 2 to 4 now, and the value of the skin from 4 to 8 annas.

Horse and mule-breeding.

Table 23 gives details of horse and mule-breeding. Owing to the poverty of the peasants and to the lack of grazing Gurgáon is not a horse-breeding district. The District Board stallions are distributed as follows :—

Horse stallions.	Breed.	Where located.
Mandárin	Arab	Palwal.
Martinet	Do.	Do.
Matar	Do.	Gurgaon.
Manager	Do.	Do.
Donkey stallions.		
Kero	Country	Gurgaon.
Pira	Do.	Nuh.

No branding has been done since 1902-03.

The following note on the chief diseases among the horned cattle of the Gurgáon District and the operations of the Civil Veterinary Department in connection therewith has kindly been supplied by the Superintendent, Civil Veterinary Department, South Punjab:—

Cattle disease.

"Contagious disease is much more prevalent in the Gurgáon district than is usually realized. Until recently, there were no satisfactory means of obtaining the Mortality Statistics. Before October 1907 this was done by a very small Veterinary Staff but since then the information has been provided by the *Patwáris*. It is much more complete and goes to show that the annual loss of stock from contagious disease is very considerable indeed. For example, in the year 1909, 15,315 animals were attacked by Rinderpest alone and of these 3,018 died.

Rinderpest is perhaps the most wide-spread disease in the district and it accounts for the greatest number of deaths amongst cattle. It is well known to the people who describe it under various names in different localities. In Gurgáon tahsil it is called *Dhanda, Mata, Phonkla, Bang* or *Sitla*; in Rewári *Bang, Kat* or *Bedha*; and in Nuh *Phonka*. It is very highly contagious and often very fatal. It will spread over a large area in a very short time carrying off hundreds of animals. It is probably generally spread from village to village by the various herds coming in contact while grazing but it is often introduced by a new purchase from an infected area. The disease is characterised by a vesicular eruption in the mouth associated with high fever followed by a bloody diarrhœa. If it ends fatally death generally takes place in about 8 to 10 days but a great number of cases recover to be immune from further attack. It cannot be said to be confined to any particular locality in the district, but is always cropping up here and there at various times in the year.

Other epidemic diseases common in the district are foot and mouth, Hæmorrhagic Septicæmia and Black Quarter.

Foot and mouth is perhaps more common than Rinderpest, but it is not responsible for so much loss. It is well known in the district as *munh khur* or *chapla* or *chupka*. This disease is not very fatal but it causes considerable damage from the fact that both milk and plough cattle are rendered useless during an attack which may last for several weeks. It is easily recognized by the peculiar smacking of the lips and a copious flow of saliva produced by an ulcerative condition of the mouth. There is also severe lameness caused by a similar ulceration round the top of the hoof which may result in the claws being shed. It is most common in the early half of the summer when the crops are cut and the cattle are grazing together, but it may occur at any time of the year and in any locality. Hæmorrhagic Septicæmia is fairly common in the district and although not so widespread as the diseases previously described it claims a large number of victims. It is known to the people as *Galghotua* or *Gala-phulna* from a characteristic swelling of the throat. This swelling and the fact that it runs a very rapidly fatal course distinguishes it from other diseases. It may be mistaken for Anthrax or Black Quarter however. It most commonly occurs after rains and is generally confined to low-lying localities that are liable to be flooded. It may not attack many animals in a village but of those that are attacked very few recover. It rarely lasts more than two days and very often an animal will die within a few hours of the first symptoms being shown. Black Quarter is not very common but it is

CHAP. II, A. Agriculture.

occasionally reported and is known to the people in most parts of the district. It is generally called *Phar Sujan*. This disease like Hæmorrhagic Septicæmia runs a rapid course with usually a fatal termination but seldom is an extensive outbreak met with.

Cattle disease.

Other diseases that are known in the district are Anthrax, Sheep-pox, etc., but these do not seem to be very common.

It cannot be said that the people do very much in the way of treatment of epidemic diseases. When an outbreak becomes more severe than usual and the losses are considerable in a village resort is had to religious ceremony. A *jogi* is called in who provides a charm in the form of an earthen lid of a *gharra* on which is written a petition to one or other of the deities. This is suspended over the entrance of the village by means of a *munj* rope and all the cattle are driven under it. On the day of this ceremony all work is suspended and the people eat *Khichri* and *Dalia*. The *jogi* then repeats the songs of *Hir* and *Ranjha* in the village Serai and this is continued for several days by which time the disease will have run its course and the people are convinced of the good results. Apart from this, however, there are methods of treatment which are of more or less practical value. Individual cases of Rinderpest are treated by feeding with *ghi* and milk when the owner can afford it, and in foot and mouth, *gur* is given as well as bread made from *moth* which is supposed to have soothing effect on the mucous membrane of the mouth besides being very sustaining. In this disease also the lameness is treated by making the cattles stand in hot sand, or if in winter they are made to stand in water. Again, cases of Hæmorrhagic Septicæmia are treated by applying the actual cautery to the swelling of the throat and although success is frequently claimed for this form of treatment it is not of so much value as the treatment in the other diseases. The futility of treating Black Quarter is generally realized and no attempt is made.

Operations of the Civil Veterinary Department.

Within recent years considerable progress has been made in the treatment of all diseases on modern scientific lines by the Civil Veterinary Department. In 1901 there were two qualified Veterinary Assistants in the district. Now there are 5 and in 1911 another will be added to complete the sanctioned establishment. One man, the Itinerating Veterinary Assistant, spends most of his time on tour amongst the villages treating both contagious and non-contagious diseases. Each of the others is in charge of a Veterinary Hospital at the headquarters of each tahsil. These Hospitals have been provided in every tahsil now except Firozpur Jhirka where one will be built very soon. They are built more or less on the standard plan recommended by the Civil Veterinary Department and are very well equipped with medicines and instruments. The rapid development of the work at these Institutions shows that there is no lack of appreciation of modern treatment for their animals on the part of the *zamindárs*. Although the men in charge of the Hospitals are stationary the demand for their services to attend outbreaks of contagious disease in their respective tahsil necessitates their spending a considerable time on tour. This is the most important branch of the work and although it is conducted under very great difficulties fair progress has been made. In coping with these epidemic diseases the adoption of preventive measures is a most important factor but certain customs such as the disposal of infectious carcases by *Chamars* and the general indifference to sanitary principles render it very difficult to have any measures satisfactorily carried out. There is rarely any attempt made to have infectious carcases buried or otherwise destroyed. They are generally dragged to the outskirts of the village leaving a track of infection behind and are skinned in a field and

left to be consumed or dragged about by dogs or carrion birds, etc. Still, in many cases, people will isolate infectious cases with more or less care and that there is progress in their enlightenment and their appreciation of what can be done is very strongly shown by the great advance made in preventive inoculation against Rinderpest. In 1905-06, 210 animals were inoculated; in 1906-07, 28; in 1907-08, 2,711 (Hæmorrhagic Septicæmia); in 1908-09, 293; and in 1909-10, 5,408. From these figures it will be seen that preventive inoculation is fairly well established in the district. Inoculation is conducted by the Veterinary Assistants most of whom have had special training in the work and it is checked by the Veterinary Inspector and the Superintendent, Civil Veterinary Department. The results have invariably given satisfaction to owners. The existence of the Civil Veterinary Department is now well known in the district and it has had a considerable educational influence not only through the Hospitals where several thousand animals are treated annually for ordinary ailments but also through the Itinerating Veterinary Assistant and the touring of the other Veterinary Assistants who besides treating cases advise the villagers on the general managements of their stock and as to the nature and prevention of disease.

Operations of the Civil Veterinary Department.

Patwáris and *Lambardárs* have been responsible for reporting the occurrence of disease to the Veterinary Assistants since 1907 and since that time they have become more alive to their duty in dealing with it and it is gratifying to note that several *Lambardárs* in the district have done good service in assisting Veterinary Assistants in inoculation work and in carrying out any preventive measures possible. Much still remains to be done by the local officials in this respect however. It is still difficult to get the villagers to act on a Veterinary Assistant's instructions unless he be a man of considerable personal influence, and although a great deal is being done in the way of medical treatment and preventive inoculation to minimize the loss to the district from disease, it is obvious that more depends on the *zamindárs* taking action themselves in adopting preventive measures and ordinary sanitary precautions."

Irrigation in this district is of three kinds :— Irrigation.

(*a*) by wells, (*b*) by the Agra canal and (*c*) by embankments.

Well irrigation is of considerable importance all over the district, but chiefly in the Gurgáon and Rewári tahsils and the adjacent plateau of Táoru where the inferiority of soil does not permit of the production of the best rabi crops without irrigation. In the whole of this tract excluding the south-east of the Gurgáon circle well irrigation is regularly undertaken. This is due partly to its being much more profitable than the cultivation of unirrigated crops and partly to the predominance in this area of Ahirs, who devote themselves assiduously to well cultivation. In the whole area referred to well irrigation may be classed as productive, while in the rest of the district except the Palwal Khádar it may be classed as protective, and is not regularly undertaken in years of good rainfall. This is because owing either to the excellence of the soil or to the inferiority of the irrigation the value of an unirrigated crop in a good year is not very much less than that of an irrigated crop. A contributory cause is the preponderance in the area in question of Játs and Meos. The former are not

Wells.

CHAP. II, A. Agriculture.

such industrious or skilful well cultivators as the Ahirs and seem to prefer the cultivation of unirrigated crops, while the lazy Meos have recourse to their wells as little as possible.

Classes of wells.

Wells are of three kinds, (*a*) masonry (*golá*), (*b*) semi-masonry, *i.e.*, of masonry in one stratum only; (*c*) earthen, and earthen wells are again subdivided, according as they are worked by bullocks or by manual labour, into *jheras* and *dhenklis*.

Masonry wells are generally constructed of stones quarried from the local hills, bricks being only used in a few tracts situated at a distance from the hills. Ordinarily the masonry is plastered with cement, but in a few tracts adjoining hills the masonry is handpacked only. Such wells are called *Karand*. The cost of a masonry well varies with the depth to water and the character of the soil strata which have to be pierced. The average cost of a cylinder large enough to accommodate two buckets is Rs. 20 per cubit, and the total cost can be roughly calculated by applying this rate to the length of cylinder required. The actual cost varies from Rs. 300 to Rs. 1,200 in the various assessment circles and averages about Rs. 700. *Karand* wells cost from Rs. 300 to Rs. 500. A masonry well may last any time from 100 to 300 years if the water level does not sink seriously. If for any reason the water level sinks, the cylinder is liable to crack and become crooked, and in that case the life of the well will be much shorter. In this district semi-masonry wells are generally found where the lower stratum is hard. In the soft upper stratum a masonry lining is constructed, and the lower stratum is left unlined. The cost of these wells varies from Rs. 100 to Rs. 200 and they last nearly as long as masonry wells. They are found chiefly in the villages of the Rewári Pahár circle adjoining the hills.

Earthen wells, if to be worked by bullocks, can only be successfully constructed where the soil is firm. Their cost varies with the depth of water from Rs. 20 to Rs. 100 and averages about Rs. 50. They are common only in the Cháhát Khári and Táoru circles, where they last some years. Before the opening of the Agra canal they were common also in the Bángar plain in the east of the district, but the effect of the canal on the subsoil has made their construction in this area impossible. Elsewhere earthen wells only last a year or two, and are only constructed as a temporary measure in droughts.

Dhenklis worked by hand can be sunk wherever the subsoil water is very near. Mális use them regularly for the production of valuable garden crops, but other cultivators only use them in dry years, when a great expansion of irrigation takes place in low-lying areas like the Firozpur Dahar.

Supply of waetr.

The depth to and of water and its quality are factors of great importance in well irrigation, and vary greatly in different parts of the district. In the Palwal Khádar, in the north of the

Firozpur Dahar and in many canal-irrigated villages water is found as near as 10 feet, while in some villages adjoining the hills the depth exceeds 100 feet.

Supply of water.

Almost more important than the depth to water is the supply and consequently though the wells in the west of the district are deepest, their irrigation is the best because they contain the best supply of water. As noted by Mr. Channing,

> "the water supply in the wells situated in that part of the district which lies east of a line drawn along the range of hills on the Alwar border, and thence prolonged northwards, is, as a rule, comparatively scanty, while west of that line it is abundant; the cause of this is probably connected with the fact shown by the course of the Sáhibi, that this western part of the district is lower than the Rájputána country to the south."

Quality of water.

A marked peculiarity of the Gurgáon district is the saltness or brackishness of the water supply in many parts; in some tracts, such as the Chiknot circle of Firozpur, the water is invariably salt, in others it is everywhere sweet, and in others again it is impossible to tell beforehand whether a well will be sweet or salt; and sometimes there are two strata of water, one salt and the other sweet, so that the well when first worked is sweet, and after being worked some little time, yields salt water. It may be said that the wells are especially liable to be salt (1), when the depth to water is considerable and the soil of a clayey character (as a rule, in sandy villages the water is sweet); (2), in tracts which are low-lying and receive and retain the drainage of higher lands. The wells are classed in the Settlement papers as sweet, brackish, or salt; the effect of the character of the water on the produce depends partly on the nature of the soil; where this is sandy, a certain amount of saltness in the water is a positive benefit, and where the water is very salt, very fine crops can be grown if the seed is once sprouted by rain water; on the other hand, on a clay soil saltness in the water is very prejudicial. Besides the above three descriptions of water, there is a kind of water found in some wells in Rewári, known as *matwála*, or hard, the crops on which are generally good; and there are also a few wells in which the water is sweet *kallar*; on sweet *kallar* wells and on very salt wells on clayey soils, it is often necessary to let the land, which has been watered one year, lie fallow or be cultivated with rain crops the next year, in order to prevent its becoming unculturable.

In the worst cases the land can only be irrigated once in three or four years.

System of cultivation.

In the tracts previously noted where irrigation is regularly undertaken for profit, as much of the well land as the character of the soil, and the supply and quality of the water will permit of being irrigated is sown with a rabi crop of wheat and barley, barley largely predominating in nearly all circles. A little tobacco,

CHAP. II,A. Agriculture.

System of cultivation.

cotton, vegetables and fodder are also sown if the water is sweet or only slightly brackish. Kharif irrigation is only undertaken where the lift is easy and the soil is good enough for cotton, or in droughts to protect millets sown as an unirrigated crop on the well lands.

In the tracts where irrigation is protective the wells are not used in years of good rainfall or if used, are used only to irrigate wheat, while in droughts the whole irrigable area is sown with an irrigated rabi crop.

The method of irrigation except in the case of *dhenklis* is universally by bucket and rope. The Persian wheel is unknown. The number of bullocks per bucket is generally four, but is sometimes six or eight.

Area irrigable and irrigated.

Land irrigated from a well is called *châhi*, and definition of *châhi* sanctioned at the recent settlement was :—

"All land regularly irrigated from a well whether the well is constructed with masonry or not and whether it is worked by bullocks or by lift (*dhenkli*).

Land will be regarded as regularly irrigated if it has received water in two different years in the period 1898-99 to 1902-03, provided the means of irrigation are still in existence."

This definition shews that *châhi* represents the area irrigable and not the average area actually irrigated in a series of years. At the same time the area irrigable (*châhi*) is not necessarily the area irrigable in any given year. This is only the case where irrigation is protective and resorted to only in dry seasons.

Agriculture.

In tracts where irrigation is regular and varies little in area according to the seasons, the area of average irrigation represents the area irrigable, in any one year.

The total *châhi* area of 1908-09 according to the district Note Book was 129,090 acres or 13 per cent. of the total cultivated area.

Leading statistics of well irrigation.

The following table summarises the leading statistics bearing on the well irrigation of each assessment circle in the district. For fuller details reference must be made to Statement III of the tahsil assessment report :—

TAHSIL.	REWARI.				PALWAL.		NUH.			FIROZPUR.					GURGAON.						TOTAL.
ASSESSMENT CIRCLE.	Cháhát Khári.	Cháhát Mitha.	Pahár.	Sáhibi.	Bángar.	Khádar.	Tauru.	Dahar.	Bángar.	Bángar.	Bhunder.	Dahar Mitha.	Dahar Khári.	Chiknot.	Sáhibi.	Gurgáon.	Bhud.	Hill.	Sohna.	Bahora.	
1. Percentage of cháhi (irrigable) area to total cultivation.	27	16	14	33	9	13	13	4	5	9	13	16	8	1	34	11	15	6	8	14½	13
2. Percentage of average irrigation of the 5 selected years.	18	14	9	26	5	7	8	2	2½	4	7	8	5	1	25	8	12	4	4	11	9
3. Average cháhi area per bucket in acres.	11	9	9	13	7	6	6	4	4	6	5½	6	5	5	13½	6	9	6	5	8	8
4. Average irrigated area per bucket in acres.	7½	8	6	10	4	3½	4	2	2	3	3	3	3	3	10	5	7	4	2½	6	5
5. Percentage of sweet wells.	21	94	65	73	64	99	98	61	48	53	56	72	37	62	47	84	82	94	67	97	63
6. Depth to water of masonry wells in feet.	57	57	78	26	20	10	35	18	29	30	29	21	13	18	20	25	33	46	21	21	30
7. Depth of water of masonry wells in feet.	15	18	19	17	26	13	22	15	26	29	18	18	11	15	13	15	15	15	18	22	18
8. Increase or decrease of irrigation per cent	+5	+10	−1½	+20	−3	−33	+25	+71	+43	+69	+17	+68	+53	+925	−9	+15	+24	+29	−23	+19	+13

CHAP. II, A. Agriculture.

The Agra Canal.

Canal irrigation is all from the Agra Canal which is under the control of the United Provinces. It was introduced in 1875 and is confined to the Bángar plain in the east. The total mileage in 1908-09 was as follows :—

	Miles.	Furlongs.
Main Canal	23	0
Main Distributaries	91	4
Minor ,, ...	141	4
Escapes	13	4
Drains	35	5
Mill channels	0	1
Total	305	2

Definition of *nahri*.

Land irrigated from the canal is recorded in the revenue papers as *nahri*. The sanctioned definition of *nahri* at the recent settlement was :—

"All land regularly irrigated from the Agra Canal. Land will be regarded as regularly irrigated if it has received canal water in any two years from 1898-99 to 1902-03 or is irrigated at the time of measurement."

As in the case of *chāhi* the recorded *nahri* area represents the area commanded and not the average area actually irrigated in a series of years. Table 24 which gives details of the areas irrigated and matured from 1900-01 onwards shews that the irrigated area varies greatly from year to year. The *kharif* area is fairly steady as the irrigated crops are almost entirely cotton and cane, both of which have to be watered before the rains break, but the *rabi* area fluctuates violently. In dry years every available acre is irrigated, while in wet years hardly any water is taken at all. For instance in *rabi* 1905 only 4,299 acres were irrigated, while in the next *rabi* the area was 61,590 acres. From the point of view of agriculture and sanitation this is a very desirable state of affairs and should be encouraged. The percentages which the areas commanded and actually irrigated bear to the total cultivation in the three canal assessment circles are as follows :—

1	2	3	4
	Palwal Bángar.	Nuh Bángar.	Firozpur Bángar.
Percentage of *nahri* (commanded) area to total cultivation.	35	25	17
Percentage of average irrigation of 5 selected years to total cultivation.	25	20	13

As the whole commanded area can be and is irrigated in a dry year, the immense protective benefit conferred by the canal is clearly demonstrated.

Chief canal crops.

The following table shews in percentages the matured area of the chief canal crops :—

Crop.	Percentage.	REMARKS.
Cotton	38½	The area on which the percentages are calculated is the average of the five years 1900-01 to 1904-05. Taking good years with bad this series gives approximately average results.
Cane	10	
Millets and pulses	3	
Others	4½	
Total Kharif	56	
Wheat	14	
Barley	11	
Gram	8	
Gojra and gochni	7	
Oilseeds	2	
Others	2	
Total Rabi	44	
Grand Total	100	

As the above table shews cotton is by far the most important crop. It is sown in April-May after a preliminary watering, which is the only watering given if the rains are timely and sufficient. The number of waterings required by the other principal crops has been mentioned in the paragraph dealing with the principal crops of the district.

System of distribution of water.

The main distributaries run each alternate week, unless water is scarce when they run only once in three weeks, according to a sanctioned roster. Minor distributaries run with major distributaries as a rule. Water is distributed to fields through outlets, and where necessary the order in which the fields irrigated from outlets may take water (*osrabandi*) is prescribed.

Assessment of canal irrigation.

At the second regular settlement, though canal irrigation had been introduced before the new assessment was sanctioned no canal land revenue was imposed. An owner's and occupier's rate levied by the Canal Department was the only charge made for the advantage conferred by the canal until the third regular settlement. At this settlement a very low fixed canal-advantage land revenue was imposed on the area actually irrigated and it was ordered that it should be similarly imposed (under certain restrictions) on land newly irrigated after the introduction of the new assessment. This canal land revenue, whether imposed at or after settlement, is liable to be remitted if the land ceases to be irrigated. At the same time, as a preliminary to the introduction of the new demand, the former owners' and occupiers'

CHAP. II.A. Agriculture.

rates were merged into a combined occupier's rate, and the resulting crop rates were modified so as to make them suitable to the local unit of measure. The existing schedule of rates is as follows, but the rate on cotton is liable to be enhanced if the Punjab Government thinks fit :—

Class.	Nature of crop.	Rates.				Per
		Flow per		*Lift per*		
		Acre.	Pakka bigha.	Acre.	Pakka bigha.	
		Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.	
I	Sugarcane	8 0 0	5 0 0	4 0 0	2 8 0	Year.
II	Rice	5 0 0	3 2 0	5 0 0	3 2 0	Crop.
III	Tobacco, poppy, vegetables, orchards, gardens and water nuts, and all *rabi* crops except gram, linseed and peas.	5 0 0	3 2 0	2 8 0	1 9 0	Orchards and gardens per half year, the rest per crop.
IV	Gram, linseed, peas and all *kharif* crops other than those specified in classes I, II and III.	3 0 0	1 14 0	1 8 0	0 15 0	Crop.

The principle on which the rates are fixed appears to be not the value of the crop produced but the number of waterings require to produce it. The result is satisfactory from the agricultural and sanitary point of view, as the schedule encourages the irrigation of *kharif* and nitrogenous crops which, excepting cane, are as a rule only watered once, and discourages the cultivation of cane, rice and *rabi* cereals which require a number of waterings and the excessive cultivation of which tends to cause water-logging.

Benefits and drawbacks of canal irrigation.

Canal irrigation is extremely popular, and has almost entirely displaced well irrigation in the commanded zone. The reasons for this are obvious.

(*a*) In this district well irrigation affords no protection at the *kharif*, which is the important harvest because the water level is too deep for irrigation on a large scale during the hot season. A village therefore with a sufficient area of canal irrigation has both harvests secured, while a village with wells and no canal irrigation is protected only at the *rabi* harvest.

(*b*) The cost of production in the case of well irrigation has increased enormously of recent years owing to the increased cost of well gear and bullocks, while

Benefits and drawbacks of canal irrigation.

the expense is greatest in years of scarcity, which in the canal-irrigated circles where wells are purely protective are the only years in which well irrigation is undertaken.

(c) Canal irrigation of course involves much less labour to the cultivator than lifting water from a well.

Against the enormous benefits which the Agra Canal has undoubtedly conferred must be set certain disadvantages. The natural drainage of the tract has been seriously interfered with by the construction of the main canal and its net work of subsidiary branches and channels, and in years of heavy rainfall large areas are submerged for a long period as happened in 1908-09. Again there is the evil of excessive irrigation. Mr. Maconachie when Deputy Commissioner repeatedly urged on Government the necessity of restricting canal irrigation as far as possible, and presumably as the result of his representation rules 6 and 7 were included in notification No. 0857 I., dated 4th August 1899, which contains the rules applicable to the portion of the Agra Canal situated in the Punjab. Unfortunately these rules appear to have been overlooked. No attempt has been made by the district or canal officials to restrict irrigation, which in many villages is over-abundant and has supplanted well irrigation. The results are water-logging, the spread of *reh* to a serious extent and the attendant evils of malaria and enervation.

In accordance with paragraph 9 of the Government orders on the Palwal assessment report the special attention of the United Provinces Government has been drawn to this state of affairs, and no doubt a vigorous effort will be made to remedy it. The Canal Department has recently attempted to effect an improvement by constructing drains, but this in itself is not enough, and more should be done to restrict over-abundant irrigation. A maximum of irrigation, say one-third of the cultivated area of any village, might be fixed, less being allowed in low-lying villages. *Rabi* irrigation might be prohibited in villages with a sufficiency of wells, and no water at all should be given to the *chāhi* lands of any well which is capable of being worked. The rise of the water level should be carefully watched, and new irrigation should not be extended to unsuitable localities.

Embankments.

The various streams which flood the district and the flow of the natural drainage have been described in Chapter I.

In former times under native rule, much irrigation was carried on by throwing dams across the hill streams, and thus causing the water to flood an expanse of country. Under British rule these works were placed in the charge of the Irrigation Department, under whose management many of them were allowed to fall into disrepair on account of the small direct revenue derived from them. In 1819, however, they were taken

CHAP. II, A. Agriculture.

Embankments.

over by the District Fund Committee (later called the District Board) and the system has since been greatly extended, and as much attention has been paid to the prevention of swamping as to the development of irrigation. A great impetus was given to the construction of embankments by Mr. Maconachie, and the drainage system of the district stands now much as he left it in 1890.

The following statement gives brief details of the works at present owned and managed by the District Board. The entry in column 4 is explained by the account given in Chapter I of the various sections into which the drainage of district falls:—

Serial No.	Tahsil.	Band.	Place in District Drainage Scheme.	Brief History and Description.
1	Gu áon ...	Gualpahári ...	North Gurgáon Drainage Scheme. Lessens the flooding into the Najafgarh Jhil.	An old work reconstructed in 1883 at a cost of Rs. 994. The first of the series of five bands which drain the Bádshahpur Nala and so help to drain the Najafgarh Jhil. The others of the series are Nos. 2—5. The band belongs to, and is maintained by, Delhi, though it is managed by Gurgáon.
2	Do. ...	Ghata ...	Ditto ...	Auxiliary to Gualpahári. Constructed in 1883-84 by Delhi at a cost (including repairs necessary in the first two years) of Rs. 9,480. Subsequently transferred to Gurgáon. Raised as a famine work in 1899-1900 at a cost of Rs. 76,383, of which Rs. 62,033 were debited to capital expenditure. Intercepts the discharge from No. 1, and the drainage of the intermediate catchment area.
3	Do. ...	Medawás ...	Ditto ...	Auxiliary to Gualpahári and Ghata. Constructed by Mr. Maconachie in 1885—87 at a cost of Rs. 5,873. Intercepts the discharge from Nos. 1 and 2 and the drainage of the intermediate catchment area. The water so held up is discharged at the time of *rabi* sowings by means of sluices and channels.

Serial No.	Tahsil.	Band.	Place in District Drainage Scheme.	Brief History and Description.
4	Gurgáon ...	Fazilpur ...	North Gurgáon Drainage Scheme. Lessens the flooding into the Najafgarh Jhil.	A small band across the Bádshahpur Nala below Medawás intercepting the surplus water which has to be allowed to escape from that band in wet years. Constructed in 1890. Separate cost of construction not known.
5	Do. ...	Jhársa ...	Ditto ...	Originally an isolated band built about 1860 as a famine work. Connected later with the Medawás band. Estimated cost of this band, as it now stands together with No. 4, Rs. 36,800. Intercepts the drainage of the hills to the north-east and receives and distributes the water discharged from the Medawás band in October.
6	Do. ...	Ghamroj ...	South Gurgáon Drainage Scheme. Lessens the flooding into the Nuh Tahsil.	Newly built in 1899-1900 as a famine work at a cost of Rs. 13,738, of which Rs. 4,772 were debited to capital expenditure. Raised, lengthened, repaired and provided with channels for irrigation below the band in 1907—09 as a test work at a cost of Rs. 31,770, of which Rs. 12,955 were debited to capital expenditure. Impounds water from a large catchment area in the hills south of Bhundsi which would otherwise flow off into the Nuh Tahsil.
7	Do. ...	Raisina Muhamadpur.	Ditto ...	An old band constructed originally at an approximate cost of Rs. 23,204. Repaired by Mr. Maconachie in 1885—87 at a cost of Rs. 2,227. Raised and improved in 1899-1900 as a famine work at a cost of Rs. 51,542, of which Rs. 30,988 were debited to capital expenditure. Intercepts the drainage of the hills north of Sohna, which would otherwise flow off into the Nuh Tahsil.

CHAP. II,A. Agriculture

Embankments.

Serial No.	Tahsil.	Band.	Place in District Drainage Scheme.	Brief History and Description.
8	Gurgáon ...	Sohna	South Gurgáon Drainage Scheme. Lessens the flooding into the Nuh Tahsil.	Built in 1882-83 by Mr. Maconachie on the site of an older work at a cost of Rs. 4,814. Canal added in 1883-84 at a cost of Rs. 4,744. Intercepts the water of the hills north-west of Sohna which would otherwise flow down into the Nuh Tahsil. The Canal has never been used.
9	Nuh	Dhuláwat ...	North Gurgáon Drainage Scheme. Lessens flooding into the Indori which flows *viâ* the Sáhibi into the Najafgarh Jhil.	Constructed by Mr. Maconachie in 1884-85 to 1885-86 at a cost of Rs. 6,015. This and the next four bands intercept the drainage of the Táoru plateau which used to flow into the Najafgarh Jhil *viâ* the Indori and Sáhibi.
10	Do.	Raheri ...	Ditto ...	See above. Constructed in 1899 at a cost of Rs. 631.
11	Do.	Táoru ...	Ditto ...	See above. Purchased from a zamindár in 1892-93 and repaired at a total cost of Rs. 3,805.
12	Do.	Táoru-Jatáoli Road.	Ditto ...	See above. This is really a road connecting Táoru with the Jatáoli Station of the Rájpútána-Málwa Railway, but it acts also as a band. Constructed in 1891 and following years at a cost of Rs. 17,211, of which Rs. 8,514 is debited to the band, and the remainder to the road.
13	Do.	Sabras	Ditto	See above. Constructed in 1899 at a cost of Rs. 1,673. Subsequently raised 3 feet and a spur added at a cost of Rs. 1,023 in 1903-04.
14	Do.	Khalilpur ...	South Gurgáon Drainage Scheme. Protects Khalilpur Jhil.	This and the next 3 works form the Kaisari Scheme which was completed by Mr. Maconachie at a cost of Rs. 17,447 between the years 1886-87 and 1888-89. The drainage of the Bhundsi Valley and Ballabgarh, which formerly filled up the Khalilpur Jhil, be-
15	Do.	Kutabgarh ...	South Gurgáon Drainage Scheme. Protects Chandaini Jhil	
16	Do.	Kaisari and Duraichi Band.	South Gurgáon Drainage Scheme. Subsidiary to No. 15.	

Serial No.	Tahsil.	Band.	Place in District Drainage Scheme.	Brief History and Description.
17 and 18	Núh	Chandaini Band and new cut.	South protects Chandaini Jhil from local drainage.	fore passing on to the Chandaini and Kotla Jhils is kept out of the first Jhil by the Khalilpur band, off which it cushions on to the Kutabgarh band, where it is held up and prevented from reaching Chandaini and Kotla. To prevent water-logging a drain was cut to the east to lead off surplus water on to the Doraichi band. To the west a large sluice lets off water if necessary towards Chandaini. Chandaini is further protected from local drainage by a low band running along the north and east sides of the Jhil with a drain outside the eastern arm of the band to carry the water off into the Chandaini Canal.
19	Do.	Chandaini Canal	South Gurgáon Drainage Scheme. Intended to drain Chandaini Jhil and protect the Kotla Jhil.	This is a very old work which was designed to drain the Chandaini Jhil by carrying off the water into the Ujina-Sangel basin. Estimated cost Rs. 20,000. Repaired by Mr. Maconachie in 1886-87 and 1887-88. The Canal only works in very wet years; also acts as a band to keep drainage from the north-east from flowing into the Kotla Jhil.
20 and 21	Do.	Miswási Drain and Malai watercourse.	South Gurgáon Drainage Scheme. Intended to drain the Ujina-Sangel basin of the collected drainage of North Núh and of the Firozpur Valley.	The Miswási drain is a very old work. The Malai water-course was constructed by Mr. Maconachie between 1888—92 at a cost of Rs. 955. The former is designed to carry off the waters of the Ujina-Sangel basin, down the Lohinga Valley towards Bhartpur, while the latter is intended to allow them to spread off to the east. As a matter of fact the Miswási drain only carries off a small part of the overflow, and the Malai water-course does not work at present.

CHAP. II.A. Agriculture

Embankments.

Serial No.	Tahsil.	Band.	Place in District Drainage Scheme.	Brief History and Description.
22	Núh and Firozpur.	Kotla	South Gurgáon Drainage Scheme. Protects the Kotla Jhil against flooding from the south.	This is one of the oldest and most important bands in the district. It diverts the drainage of the Firozpur Valley which would otherwise find its way into the Kotla Jhil into the Ujina-Sangel basin. Here it joins the Chandaini Canal (No. 19) and by the junction the floods are prevented from flowing round the end of the band into the Jhil. The band is 12 miles long and was originally constructed by Sir Henry Durand in 1838. Estimated cost of Rs. 68,700.
23	Núh	Akhaira ...	South Gurgáon Drainage Scheme. Inside and subsidiary to the Kotla band.	Constructed in 1888-90 by Mr. Maconachie at a cost of Rs. 451. A small band on the edge of the Kotla Jhil which holds up local drainage from lands inside the Kotla band (No. 22).
24	Do.	Palri	Ditto ...	Constructed in 1883 by Mr. Maconachie at a cost of Rs. 232. Rest as above.
25	Do.	Palla	Ditto ...	Constructed in 1890 by Mr. Maconachie at a cost of Rs. 368. Rest as above.
26	Firozpur ...	Mau	Ditto ...	Constructed in 1890 by Mr. Maconachie at a cost of Rs. 300. Rest as above.
27 and 28	Do.	Sakhráwa and Shahchoka.	South Gurgáon Drainage Scheme. Regulate the overflow from the Ujina-Sangel basin.	Constructed in 1887-88 by Mr. Maconachie at a cost of Rs. 1,099 and Rs. 1,429 respectively. These two works are raised roads which serve both as roads and bands. Sakhráwa holds up the water which overflows from the Ujina-Sangel basin *via* the Miswási Drain (No. 21). Surplus water is discharged by a sluice on to the Shahchoka band which deals with it in a similar manner, and passes the surplus on towards Lohinga.

Serial No.	Tahsil.	Band.	Place in District Drainage Scheme.	Brief History and Description.
29	Firozpur ...	Dangocha ...	South Gurgáon Drainage Scheme. Helps to drain Lohinga Valley.	Constructed by Mr. Maconachie in 1889-90 at a cost of Rs. 1,680. Intercepts drainage which would otherwise flow into the hollows round Lohinga. Has been breached for some years, but is now being repaired.
30	Do.	Ghâta, Shamsabad.	An isolated band which has no connection with the North or South Drainage Scheme.	Constructed by Mr. Maconachie in 1889-90 at a cost of Rs. 1,523. Intended to dam a very destructive tributary of the Landoha which deposits much sand. Has been breached for some years.
31	Do.	Rawa	Ditto ...	Constructed by Mr. Maconachie in 1889-90 at a cost of Rs. 6,936. Dams a torrent which carries much destructive sand down into the Firozpur Valley.
32	Rewari	Khol	Ditto ...	Constructed by Mr. Maconachie in 1886-87 at a cost of Rs. 1,885. Remodelled as a famine work in 1899 at a cost of Rs. 14,445, of which Rs. 5,598 were debited to capital expenditure. Intercepts the drainage of the hills west of Khol, which used to deposit sand on lands below the band.

The total capital expenditure on these embankments amounts to about $3\frac{3}{4}$ lakhs, of which $2\frac{1}{4}$ lakhs have been contributed from Provincial revenues and the balance from District Board Funds.

All the thirty-two embankments are included in schedule I, of the Punjab Minor Canals Act (III of 1905), and the land irrigated from them (classed in the records as *ábi*) pays water rates. The total area classed as *ábi* in 1908-09 was 7,521 acres.

CHAP. II,A. Agriculture

Schedule of water rates.

The following water rates have been imposed under Section 29 of the Minor Canals Act with effect from *kharif*, 1909:—

Class of crop.	Detail of crop.	RATE PER ACRE MATURED.		REMARKS.
		Voluntary irrigation from controlled channels.	All other irrigation.	
		Rs. a. p.	Rs. a. p.	
I	Cane, orchards and fruit and vegetable gardens.	4 0 0	3 0 0	Half these rates will be charged on irrigation by lift.
II	Cotton, *til*, hemp, pepper, rice, indigo, and all *rabi* crops except orchards, fruit and vegetable gardens, carrots, turnips, fodder, extra *rabi* vegetables and melons.	2 8 0	1 8 0	
III	All crops not included in classes I and II.	1 0 0	0 8 0	

The average income at these rates from the *bands* in their present condition is estimated at about Rs. 5,300 to, which may be added also Rs. 700 for miscellaneous income, making a total direct income of Rs. 6,000. To the direct income may be added an equal amount on account of increase of fixed land revenue at the recent settlement due to improvements effected by the *bands*.

The estimate of indirect income is probably much below the true figure, but this is unavoidable as it is impossible to discriminate in many cases between development due to the *bands* and to general causes. The maintenance charges are estimated at about Rs. 9,830 per annum: so the estimated direct and indirect income covers the cost of maintenance and yields a return on the capital of about ·6 per cent. This is a very small return, but it must be borne in mind that, (*a*) the *band* system is at present in a very imperfect state of development, and that, when the necessary improvements have been made, the direct return in the shape of water rates will be much larger; (*b*) the theoretical estimate of enhancement of land revenue due to the action of the *bands* is probably much less than the actual enhancement, and (*c*) the *bands* are intended to be protective rather than productive, and the benefits which they have conferred on the health and agriculture of the district by draining low-lying areas, checking erosion and sand deposits and raising the spring level are immense. The utility of the *bands* and the small returns in the shape of direct income derived from them has formed the subject of voluminous correspondence during the last 13 years, and the question of abandoning some or all of them

has been raised. The whole subject was carefully considered at the recent settlement, and a strong recommendation in favour of their maintenance was submitted by the Financial Commissioner. Final orders have not yet been passed, but it may be assumed that they will be maintained. Further information about the *band* system as it stood at the end of 1908-09 will be found in Appendix X of the Settlement Report.

Schedule of water rates.

As explained at the beginning of this paragraph the *lands* have since 1879 been under the management of the District Board, but this arrangement has not worked well, as in dry seasons when the income from *bands* falls away almost to nothing, the resources of the Board are unequal to the expense of maintaining them in an efficient condition. For this reason it has been decided to provincialize them, and from April 1st, 1910, they will be placed under the direct control of the Deputy Commissioner, who will manage them with the assistance of the District Engineer. It was proposed to constitute an excluded local fund to facilitate their working, but this proposal was negatived by the Government of India, and the income and expenditure will be governed by the ordinary rules, but under the orders of the Local Government a *pro formâ* account of income and expenditure will be maintained in detail. To supplement the income from water rates, the Local Government has sanctioned a grant of Rs. 6,000 for three years from April 1st, 1910, and an initial non-recurring grant of Rs. 5,000. The amount of the former grant will be subject to revision after three years. The fixed expenditure will amount to Rs. 6,530 on account of the staff, to which may be added an estimated expenditure of Rs. 3,300 on maintenance and contingencies—total Rs. 9,830. The excess of income over the above expenditure will be available for improving and developing the embankment systems.

Future management.

Recurring.

In addition to the *bands* managed by the District Board, there are a number under village management. These fall into two classes, (*a*) *bands* for controlling the Landoha floods, (*b*) *bands* constructed from Provincial or District Board revenues, but abandoned as unremunerative and made over to the villages in which they are situated. The latter class of *bands* are all entered in schedule I of the Minor Canals Act, which gives the Deputy Commissioner power to supervise and control their management if necessary. Of the former only three Kanmaida, Madapur and Nagli are of importance. The remainder are small concerns constructed by individual villages to make the best use of the Landoha floods. They sometimes give rise to disputes, which are now capable of being dealt with under Sections 49-51 of the Minor Canals Act. The Kanmaida, Madapur and Nagli *bands* are larger embankments designed to regulate the distribution of the Landoha and are entered in schedule II of the Minor Canals Act. Madapur and Nagli are of especial importance

Other embankments.

CHAP. II, B. Rents, Wages and Prices.

Other embankments.

as they divide the floods into two equal branches, and if they are not kept up, the villages on the eastern branch do not get their fair share of the flooding. These bands were repaired at last settlement at the cost of the villages concerned, but their working was not supervised, and all of them have been breached since 1896, with the result that the villages in the eastern branch have suffered severely. It was found on enquiry at the recent settlement that the people were most anxious that they should be repaired, and this repair is now being undertaken, each village concerned contributing to the cost in proportion to its flooded area.

Section B.—Rents, Wages and Prices.

Rents.

Table 38 gives details of the areas under the various classes of tenants in 1901-02 and 1906-07. The area in 1908-09, when final attestation had been completed in all tahsils is shewn in percentages as follows :—

1	2	3	4	5	6	7
Tahsil.	Cultivated by owners.	Held rent free.	CULTIVATED BY OCCUPANCY TENANTS PAYING		CULTIVATED BY NON-OCCUPANCY TENANTS PAYING	
			Cash rents.	Kind rents.	Cash rents.	Kind rents.
Rewári	46	2	6	2	29	15
Palwal	47	2	9	...	35	7
Núh	57	2	9	...	22	10
Firozpur	57	2	9	...	23	9
Gurgáon	46	2	10	...	37	5
Total District ...	50	2	9	...	30	9

Corresponding figures for 1878-79 are given in table 16 of the old Gazetteer, but their accuracy is so doubtful that it is of no use to include them. The following figures taken from the village statements of the second regular settlement shew in percentages the area cultivated by owners, occupancy tenants and other tenants :—

1	2	3	4
Tahsil	AREA IN PERCENTAGES CULTIVATED BY		
	Owners.	Occupancy tenants.	Other tenants.
Rewári	64	10	26
Palwal	73	13	14
Núh	69	13	18
Firozpur	68	8	24
Gurgáon	59	11	30
Total	66	11	23