Chapter III, E.

Village Communities and Tenures.

Village watchmen.

Fakírs 97: Bráhmins 96: Chúras 84: Patháns 78: Gújars 71: the number of Shaikhs, Fakírs, Churás and Patháns are thus greatly disproportionate to the Census numbers of these tribes among the general population of the district. The average pay per annum is in Ballabgarh Rs. 26-10-6, in Delhi Rs. 34-7-6 and in Sunipat Rs. 34-4-2. In some places they obtain also gifts at weddings, but this kind of perquisite is dropping out of fashion as not consistent with the social *status* engendered and fostered by the spirit of the times. In Delhi and Sunipat the *bách* is always levied by a uniform rate on families throughout the village, excepting the widow, the needy, and the *chúrá*. In Ballabgarh there is more variety: 195 villages follow the uniform rate; in four the proprietors pay more than the non-proprietors; in four it is the other way; in two it follows the revenue *bách*; in two more it is levied on the cultivated area; in four it is levied according to the means of the payer; while in six the *banyás* have to pay more than *zamíndárs*, and in one village five *sers* grain are taken per house. Three are provided for by Municipal Committees; eleven are too small to deserve the dignity of *chaukidárs*; and fifty-three have no *dhádás*.

Agricultural partnerships.

A system of agricultural partnership exists in the district under which several land-owners club together, cultivate their joint land with their joint resources in the way of cattle and men, and divide the produce and pay the revenue in proportion to the labour, animal or human, contributed by each, without reference to the areas owned respectively. The same principle is extended in part to landless labourers, who join in the cultivation on condition of receiving a share of the produce (excluding fodder) and paying the same share of the revenue. These men do much of the hardest work. The partners in both cases are called *sájis* or sharers, the one without land being distinguished as a *ji ka sáji* or sharer of his body. His ordinary share is from a fourth to fifth of the produce of one plough.

Kameras.

When a labourer takes fixed payment, he is called a *kamera*. He may be either an agricultural labourer pure and simple, paid by the day, month, or year, (see page 92 below) or he may receive a small share of the produce in addition to fixed wages. At Ganaur, a large village of Tagahs, the *kameras* receive one-fourth of the produce or one-third, according as the proprietor or his family assists or not in the cultivation. The proprietor supplies the seed, bullocks, and gives the *kamera* one *róti* daily, a pair of shoes and a few clothes, besides a share of the produce. The *kamera* pays one-quarter or one-third of the revenue. When wages are paid in cash the usual amount is Rs. 24 with one *roti* daily, shoes and clothes.

Village menials.

The village menials or *kamíns* are the following:—

Chamárs.	Náis.
Chúhras.	Dhobis.
Khátis.	Sakkas.
Lobárs.	Jhinwars or
Kumhárs.	Kahárs.

Chamárs make shoes, weave cloth, and work as agricultural labourers. Those who work in the fields receive one-twentieth share of the produce, and one or two *rótis* daily on the days they work. They

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Village Communities and Tenures.

Village menials.

have also a right to the skin and carcases of animals dying in the village. They give one-eighth share of the carcass to the Chúhras.

Chúhras collect manure, and sweep the houses of the villages. Each has from ten to twenty houses under his charge. They receive one *roti* daily from each house, and a few *seers* of grain at harvest time.

Khátis make ploughs and all farm implements required by the villagers. They receive 20 *seers* grain at each harvest per plough.

Lohárs make the iron work of ploughs, and also iron tools, such as *khurpás, gandásahs,* &c. Like the Khátis they receive half a maund of grain per plough each harvest.

Kumhárs make earthen jars, vessels, &c., for which they receive payment in grain. Their remuneration is not fixed.

Náis do barber's work and also act as agents at betrothals and marriages. For barber's work they receive one *roti*. They have no fixed remuneration, but they receive from Rs. 4 to Rs. 20 at marriages. The father of the bridegroom gives his *nái* Rs. 4, and from Rs. 8 to Rs. 20 to the Nái of the bride's father.

Dhobis do the village washing. They receive five *seers* of grain each harvest, also one *roti* when they wash clothes.

Sakkas, Jhínwars or *Kahárs* are water-carriers. They receive five *seers* of grain each harvest.

Agricultural labourers.

The subject of the employment of field labour other than that of the proprietors or tenants themselves, and the system of agricultural partnerships, are thus noticed in answers furnished by the District Officer, and inserted in the Famine Report of 1879 (page 711 *ff.*):—

"It is customary for the agriculturists to employ field labourers for (1) ploughing; (2) weeding; (3) guarding the ripening crops; (4) cutting them when ripe. They are generally paid in money, to a man two annas, a woman 1½ anna, a child of 12 to 15, one anna, excepting harvest time, when they are paid in grain of about the same value. Sometimes a man gets Rs. 2 a month, and his food for ploughing or guarding the crops. The persons usually so employed are of the Chamár, Koli, Agri, Dhának, Lodo, and Sweeper castes, who have most of them no other means of sustenance than field labour. Some of them make shoes, mend harness, weave cloth, and otherwise supply the wants of the village population, but they are almost wholly dependent on what they receive from the cultivators as wages for field labour. Very few inhabitants of the city of Delhi work in the field. The number of persons so employed may be put at about three per cent. on the total population, or five per cent. on the population outside the town of Delhi. Such field labourers are not so indebted as the poorer cultivating proprietors, for they cannot easily borrow money, and for the same reason their subsistence between harvests in average years is more precarious. They do not generally get advances from the village traders, nor do they live long on grain or money previously earned, though that does keep them going for some time after the harvest; they work at the preparations for the next harvest, or get an advance from the cultivator who regularly employs them."

The wages of labour prevailing at different periods are shown in Table No. XXVII, though the figures refer to the labour market of towns rather than to that of villages.

Petty village grantees.

The last two lines of Table No. XVI show the number of persons holding service grants from the village, and the area so held.

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Village Communities and Tenures.

But the figures refer only to land held free of revenue, which is by no means the only form which these grants assume. Sometimes the land is leased to the grantee at a favourable rent, or on condition of payment of revenue only; sometimes the owner cultivates and pays the revenue, making over the produce to the grantee; while occasionally the grant consists of the rights of property in the land, which, subject to the usual incidents, such as responsibility for revenue and the like, vest in the person performing certain specified services at such time and for so long as he performs them. These grants are most commonly made to village menials and watchmen on condition of, or in payment for, services rendered, to attendants at temples, mosques, shrines, or village rest-houses so long as they perform the duties of the post, and for maintenance of monasteries, holy men, teachers at religious schools, and the like.

Petty village grantees.

These grants are known by the names *dohli* and *bhondah*, which are sometimes confounded, but should not be so, as they are really different in a material point. The *dohli* is a grant of land for cultivation made in return for religious services, such as attendance at a shrine, or giving water at a well, provided it be done by a Bráhmin, *fakír*, or other holy person. A *bhondah*, on the other hand, is a grant of inferior degree, to persons of inferior degree, in return for ordinary menial services, and has no connection with religion: the *bhondadár* is generally a *chamár*, carpenter, *bheestie* or the like. If he does not do what is expected of him he is deprived of the *bhondáh* land. A *dohlidár*, on the other hand, is not under this control. If he himself goes away, giving up the land, then it may be given to some one else, but not otherwise; although the idea of surrendering altogether the proprietary title is never entertained. This kind of village grant is a kind of *muafi* held from *zamíndárs*. The *dohli* is generally smaller than the *bhondáh*, though neither is found over ten *bighas* in extent; the total extent of land held in *dohli** and *bhondáh* is given below:—

Tehsil.	Dohli.			Bhondah.		
	No. of villages	Holdings.	Bighas.	No. of villages.	Holdings.	Bighas.
Delhi	175	1,008	1,017	1	1	3
Ballabgarh ...	70	186	397	110	279	976
Sunipat	150	1,199	1,614	28	58	107
District	395	2,390	3,028	139	338	1,086

Wood preserves.

Another characteristic incident of land tenure in the district is the reservation of wood-producing land in the *shámilát deh* as an enclosure whence no fuel or wood is to be cut. This is generally connected with religion in the shape of a *fakír's* hut, or grave or a religious shrine; but sometimes no such religious element is observable, and in such cases the practice is probably due to the love of shady trees which not unnaturally is possessed strongly by the

* The derivation of the name *dohli* is said with some plausibility to be *dohali*—two turns or furrows of the plough made over thus to religious use. *Bhondah* is written in books sometimes *bhondá* with a long 'a' at the end, but the silent 'h' is the more correct.

Chapter III, B.

Village Communities and Tenures.

Wood preserves.

zamíndár. In these *rakhyás*, as they are called (perhaps from *rakhná* to hold, or keep), the prohibition against cutting or using the wood is no mere form of words. As a rule indeed the people, with that faculty of docile obedience which is at once such a help and a trouble (when it degenerates, as so often is the case, into slavish adherence to custom) to the administrator, observe the social precept without asking more about it. But if a man transgresses by cutting the wood, he is fined at different sums, generally twice the value of the wood. If he does not pay, he is put out of caste, but, as a fact, the villagers say a fine is always paid without excuse. Money thus obtained is spent in charity. There are forty-six villages at least which thus preserve trees never to be cut. The common preservation of land for timber-growing (the timber being cut at regular intervals) may be noticed here, though it is more an incident of the management than of the tenure of land. In ninety villages this is done: the trees are generally *kíkar* or *ban* or *dhák*, and are cut at intervals of about five years. In some places the income thus derived is very considerable.

Rights in the village site.

The *ábádí*, or village site is generally held in common, but the ground of each proprietor's house practically belongs to him. As regards the important point of the rights of non-proprietors, which marks almost more than anything else the degree of development of the village into a town, the practice is diverse. In 20 villages it is said (perhaps doubtfully) that non-proprietors can sell their houses with the land on which they are built; in 589 villages they may sell the materials (*malba*) but not the site; and in 56 they can dispose of neither. In 13 cases it was found at attestation of the Administration Paper that the matter was in dispute: in eight villages no non-proprietors had houses. In one village, Bhaskaula in Ballabgarh, there is the curious compromise that those persons who, though not proprietors in the village itself, are proprietors in villages adjoining *viz.*, Muazzimábád and Mohabatpur, may take away the *malba* but other non-proprietors may not. The remaining 123 villages have no *ábádí*.* The 20 villages where non-proprietors are said to be entitled to sell the site of houses as well as the materials are thus distributed: Sunipat 14; Delhi 3; Ballabgarh 3. Some of the places are no doubt towns where one would expect to find the rule thus, *e.g.* Sunipat, Mahraulí, Faridábád and perhaps Bowána; but for little places like Kuraini, Sitaoli, Nawádah zor Najafgarh, and others, it is not easy to find an explanation.

Poverty or wealth of the proprietors.

Table No. XXXII gives statistics of sales and mortgages of land; Tables Nos. XXXIII and XXXIIIA show the operations of the Registration Department; and Table No. XXXIX the extent of civil litigation. But the statistics of transfers of land are exceedingly imperfect; the prices quoted are very generally fictitious; and any figures which we possess afford but little real indication of the economical position of the landholders of the district. The subject is discussed at some length at pages 332 *ff* of the Famine Report of

* In Delhi 50, Ballabgarh 53; Sunipat 20; and of these so far as is known never inhabited. Delhi 17, Ballabgarh 16, and Sunipat 3. About 16 it is not known if they have ever had *ábádí*.

Poverty or wealth of the proprietors.

1879, where actual figures are given for instances selected as typical. In forwarding these figures, the Settlement Officer wrote as follows :—

"I pass on to the last matter on which report is required. The causes of indebtedness are not generally obscure; in order of importance they may generally be put as follows :—

(1.) Expenses of marriages and funerals.
(2.) Vicissitudes of season, as regards crops.
(3.) Ill-luck with cattle, or personal illness.
(4.) Severity of Government revenue.

All these matters have often been dwelt on, and I am not likely to strike out any thing new. The question of sumptuary laws will probably be considered; perhaps too the idea of a rough assurance association to afford compensation in cases of death of cattle is not original. Both matters seem to me worthy of consideration But I think it better to pass on to the last point, indebtedness caused by the severity of Government revenue. I think this uncommon, but I believe it exists, and more than anywhere else in the canal villages. Some of these have been paying Rs. 3 on every cultivated acre for the last 30 years. Now this may be borne in fair years, though it is a great burden, and forces on a system of cultivation which cannot but injure the land. But in bad years, or when water is scarce, or not given at the right time, the canal village is worse off than any. The canal irrigation, at the style in which it has been going on here for many years past, would, I believe, ruin any land in time. It is of no use to say that the people are to blame for flooding their land so; their reply is cogent; we must do so to sustain the heavy Government demand; inelasticity too of the canal water rent is against them, so that as a matter of fact, canal irrigation, which should be the most certain protection of a high average, and of that average from wide variations, often introduces an element of speculation into the matter, which would at first sight seem astonishing. The inference to be drawn seems to be that Government has not properly discharged its duties as joint trustee of the land with the *zamíndárs*.* If they have not discretion sufficient to prevent a far distant but surely coming destruction of the powers of the soil by a moderate use of the immense power of irrigation from canals, that duty and that responsibility nevertheless remain with Government. The remedy is simple; allow only moderate irrigation, and assess accordingly; severity of revenue in other than canal villages is rare. The Government demand is inelastic, and we have failed to teach the people, as yet, to prevent the strain in bad years by forethought and thrift in good seasons. But the adjustment is generally accomplished, though in a clumsy and costly manner. The money-lender gives help in bad seasons, and is repaid in good; the greater cost is found in his exorbitant interest. If we push this further, we find that the "middleman" class is numerous; that it is favoured by superior intelligence and social custom. And this brings us to what perhaps is not the greatest cause of indebtedness, strictly speaking, but the greatest cause of *increase* of indebtedness, *viz.*, the power of the *bania* and money-lender over the *zamíndár*. The subject is a well worn one, and it seems unnecessary to do more than, having noted the distinction above, to record my assent to the general opinion. Twenty years ago the canal villages were in the height of prosperity, *pakka* houses were built, the common funds of the proprietors often raised a substantial traveller's house used as a village assembly room (the *chaupár* or *cha'pál*). The oxen, fed on sugar cane stalks, *gur*, and the abundant fod-

* The new revenue assessment has been framed with a view to improve matters in this respect.

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Village Communities and Tenures.

Poverty or wealth of the proprietors.

der of canal-irrigated fields, increased in size and strength; the people themselves adopted a more luxurious style of living and dress. But this prosperity has waned; the crops are not what they were; the soil is enfeebled and in many places destroyed, at least for the time. The people, however, do not easily come back to their primitive simplicity, and the consequence is that there is in the canal-irrigated district a far greater amount of indebtedness than there would have been, had the old circumstances of expenditure been unaltered. Still, where the canal has been used, and not abused, there is yet even a prosperity not equalled anywhere in the district. The holding of the canal proprietor is not generally larger than the ordinary size throughout the district, 12 to 13 acres; but he gets richer crops, especially sugarcane, off the ground. In a large canal village, it is not uncommon to find a mass of cultivation of this crop, sometimes 50, 75 or 100 acres standing together, with regularly-marked narrow-lanes, well fenced in, leading from one end to the other. Sugarcane is expensive alike for seed, planting, care while growing, and expressing when ripe. But it well repays the cost, and is in fact the great stand-by in those villages where it is grown. Sugarcane is grown chiefly in the Khádir *chak*, and in some villages in the Bángar, but nowhere does it come to such a size as in the canal villages.

"The other *chaks* have proprietors for the most part in moderate circumstances. The Kohi *chak* probably is the poorest, and there the people are sometimes very low in their standard of living. The houses are mere *chappars* of thatch; sometimes mud walls support the thatch; the food consists mainly of the inferior grains, and the dress often is only a piece of dirty coarse cotton cloth in the form of a *chádar*. The general average however is better than this. No. 1, it is true is in debt, but his style of living is something like comfort, and it is because he has a large family for his moderate holding that he becomes embarrassed. Had he fewer months to feed, he might be as well off as the shrewd Jat No. 4, who, in a holding of only seven acres, has managed to save money, and knows how to use it when saved. No. 9, though under a temporary cloud, may perhaps get right again; in an ordinary year he probably pays his way. His house is not much certainly; but it is better than the Kohi Gújar. If it were not for the cows of the latter, he would hardly manage to live.

"The general condition then of the proprietor may be described as moderately prosperous; there is little margin for him to fall back on in bad times, and his style of living is somewhat low; but in ordinary years, and with ordinary expenses, he generally pays his way. A marriage, a funeral, or bad luck with his cattle, may bring him into difficulties, but these too he may extricate himself from in many cases. There is reason to believe that legal fees are in a few instances the cause of embarrassment, if not of ruin. The tenants with occupancy rights, and still more the tenants-at-will, might perhaps be supposed as being inferior in station, to be inferior in circumstances also. This, however, is not always the case. The tenant with occupancy has sometimes (as in case No. 2) an auxiliary income from *parohitai*, priestly dues, which enables him not only to pay his way but save money. In the case in question this auxiliary income becomes most important. The number of such privileged persons is necessarily limited, but without such adventitious aid the tenant is often a man of substance. Whether he will remain so is a matter of doubt. Up to the present time he generally pays only the revenue-rate of the village on his land, i.e., he pays no rent; so that, provided his holding is of a fair size, he may be as well off as the proprietor of other land in the same village. There seems little doubt, however, that when the new assessments shall be announced, a general attempt will be made on the part of the proprietors to obtain rent, or an enhancement of rent, and this must lessen the profits of the tenant. The position of the tenant-at-

Chapter III, E.

Village Communities and Tenures.

Poverty or wealth of the proprietors.

will is every unequal. He, too, at present often pays only the revenue-rate, but on the other hand he sometimes has to give a competition rent. The pressure of population is felt more directly here than in any other class. A family of strong men, or having active women, may do well; but whenever the non-producing part of the house becomes large, distress is sure to follow. The Máli of Ráthdhanah (instance No. 3) gets together in one way or another a pretty large income, but the large quantity of food requisite to keep his seventeen people going makes it a hard matter to keep out of debt. Probably by the time the boys come to working age they will find their earnings embarrassed with considerable debt. The limit, however, is not far off; when the money-lender ceases to give credit the house breaks up, and the men scatter to earn their living by hiring themselves out. The difference in *status* arising from advantages of irrigation is shown in instance No. 8, where a tenant-at-will on 17 acres contrives to pay a revenue of Rs. 62 odd, and Rs. 40 more water-rent. The revenue of course includes rent paid to the proprietor. With this heavy charge on him, he yet pays his way, and is on the whole in comfortable circumstances. This being so, it is no wonder that the proprietors expect to be well off, and are disappointed when they find their former prosperity gone."

CHAPTER IV.

PRODUCTION AND DISTRIBUTION.

SECTION A.—AGRICULTURE AND LIVE-STOCK.

Chapter IV, A.

Agriculture and Live-Stock.

General statistics of agriculture.

Table No. XIV gives general figures for cultivation and irrigation, and for Government waste land; while the rainfall is shown in Tables Nos. III and IIIA and B. Table No. XVII shows statistics of Government estates and Table No. XVIII of Forests. Table No. XX gives the areas under the principal staples, and Table No. XXI the average yield of each. Statistics of live-stock will be found in Table No. XXII. Further statistics are given under their various headings in the subsequent paragraphs of this Chapter. Land tenures, tenants, and rent, the system of agricultural partnerships and the employment of field labour have already been noticed in Chapter III. The following table gives the areas as ascertained at the recent Settlement. :—

Tahsil.	Total Area.	Mishal.		Culturable.			Cultivated.			
		Unculturable.	Unassessed.	Waste.	Lately abandoned.	Gardens.	Well watered	Naturally moist	Unirrigated.	Total of cultivation.
Ballabgarh	2,46,635	65,357	3,900	19,375	663	407	18,812	5,590	1,29,624	1,53,126
Delhi ...	2,76,405	41,480	7,095	51,563	3,200	1,196	17,527	20,257	1,35,1[illegible]	1,72,8[illegible]
Sunipat ...	2,90,452	34,043	924	65,131	2,001	954	43,900	1,453	1,41,[illegible]	1,87,390
Total of the district ...	8,15,6[illegible]	1,40,880	*11,909	1,36,069	4,873	2,557	75,389	27,300	4,10,728	5,19,417

* 3,932 cultivated—making total land actually cultivated 528,349.

The seasons. Rainfall.

The total annual fall of rain and the manner in which it is distributed throughout the year are shown in Tables III, IIIA, IIIB.

The *rabí* crop is called locally *sádhi*, the *kharíf*, *sáwaní*. Land bearing two crops is called *dofasli*, but this means two full crops, such as wheat after cotton, while for land which bears a lighter crop after a full one, such as *channá* after *jawár*, there is another name, *fánsil*. Land giving one crop a year is called *badhwár*.* Three crops in a year are very rare indeed in Delhi; they can be managed only by putting in a fast-growing crop like *chiná*, and the land requires rest after it. Two crops even are impossible without manuring. The comparative importance of the harvests varies in different parts, as a general rule, the Khádar mainly depends on its *rabí* crop, while the Bángar rain-lands naturally yield their revenue in the autumn harvest. And this point will indeed tell

* The word was originally, *Bhadwár*—meaning the land depending on the Bhádon rains for its cultivation.

pretty well the proportion of the crop. The villagers have themselves within certain limits decided how much revenue shall be paid on each crop, and this shows pretty plainly the relative importance of each. In Bángar well-lands the proportion is about half-and-half, and the cannal lands are pretty much the same.

Soils of the district how classified.

The soil of the district is mainly alluvial, and is classified as *dákar*, *rauslí*, and *bhúr*, which are described respectively as a clayey loam, a half sandy half clayey loam, and a sandy loam degenerating in its inferior state to mere sand. The *zamíndár* distinguishes the three kinds according to their degrees of consistency: the *dákar* clods are hard and stiff, not easily broken; the *rauslí*, while looking firm as a clod, should crumble in fine pieces when let fall from the hand to the earth; while *bhúr*, as a rule, does not lie in clods at all. The productive qualities of the soils may be estimated from their description. *Dákar* is strong and fertile if it is well worked and its particles well separated, but it is generally too stiff for the comparatively light ploughs of the native agriculture, while its great retentiveness of moisture requires a favourable succession of wet and dry weather. *Rauslí* is more easily worked, and is more porous; with less natural strength and forcing power, it is on the whole as good as *dákar* because it mixes better with manure, and allows the chemical action of the air freer scope. A light *rauslí*, likes a brackish (*mulmala*) water-well; the *zamíndárs* know this, though to a stranger they not unfrequently make the complaint, *pání bíl-kul khárá*, (our water is altogether salt), as proving the want of productiveness in the soil. This is referred to further on with reference to irrigation.

Distribution of soils.

The kind most commonly met with is *rauslí*. In fact, *dákar* is hardly found except in drainage lines, or old beds of pools and ponds; while *bhúr*, representing sand scarcely at all mixed with vegetable decayed matter is also rare: the proportion as found in the district cultivated area is, *rauslí* 79 per cent., *dákar* 13 per cent., *bhúr* 8 per cent. There is a considerable difference in the various assessment circles in respect of the distribution of soils. *Dákar* soil is found extensively in low-lying lands where the passage of drainage water, either free or impeded, may be suspected. It is also formed in canal lands by the accumulated deposit of alluvial matter, which is brought down by the canal, and the layer of decayed vegetation which generally works into the ground year by year. *Rauslí* is the normal soil of the Bángar, and *bhúr* represents the result of drainage washing away the lighter particles of soil or rock, so that it is not unnaturally found most largely in the Khádar near the river, or in the tracts immediately lying under the hills: the average of the assessment *chaks* as regards the distribution are given at the top of next page.

Agricultural implements and appliances.

Table No. XXII shows the number of cattle, carts, and ploughs in each *tahsíl* of the district as returned in 1878-79. The implements used by the *zamíndár* are as follows:—The plough (*hal*), of which the wooden share is *panyárá*; the yoke for his oxen (*júá*); *sántá* is the whip he urges them with when lazy or refractory; otherwise he does a great deal with the animal's own tail, which he twists and twirls in a manner which by its results would seem most significant.

Chapter IV, A.

Agriculture and Live-Stock.

Distribution of soils.

Chak.	Soil.	Ballabgarh.		Delhi.		Sunipat.		Total.	
		Area.	Percentage.	Area.	Percentage.	Area.	Percentage.	Area.	Percentage.
*Khádar-Bángar.	Dákar ...	1,235	3	1,152	12	9,575	13	11,982	10
	Rausli ..	32,035	82	6,864	69	56,705	80	95,084	79
	Bhúr ...	6,023	15	1,683	18	4,872	7	12,587	11
Bángar.	Dákar ...	1,240	3	13,259	18	29,120	35	43,648	17
	Rausli ...	49,842	86	58,723	79	82,705	71	1,91,270	76
	Bhúr ..	6,789	12	2,514	3	5,167	4	14,459	7
Dahri or Dábar.	Dákar ...	29,42	14	9,201	17	...	...	12,148	10
	Rausli ...	11,070	55	41,403	78	...	...	53,373	73
	Bhúr ...	5,526	28	2,640	5	...	...	8,166	11
Zerkohi	Dákar ...	173	1	796	4	...	...	974	8
	Rausli ...	10,212	56	17,038	92	...	...	27,250	75
	Bhúr ...	7,757	43	213	1	...	...	7,970	22
Khandrát	Dákar ...	...	...	14	...	...	...	14	...
	Rausli ...	6,234	100	4,[illegible]	93	...	...	10,[illegible]	97
	Bhúr ...	...	...	394	8	...	...	394	3
Kohi.	Dákar ...	18	...	60	..	...	...	78	...
	Rausli ..	14,493	90	13,713	100	...	...	27,[illegible]	94
	Bhúr ...	1,579	10	52	...	...	...	1,631	6
Total of District.	Dákar ...	5,813	4	24,511	14	38,695	21	68,819	13
	Rausli ...	1,24,796	79	1,40,834	81	1,39,410	74	4,05,040	79
	Bhúr ...	27,742	17	7,465	5	10,029	5	45,236	8
		1,58,151		1,72,810		1,88,134		5,19,095†	

Agricultural implements and appliances.

The reins he checks them with are *rás*. He has besides, his axe (*kuhárí*), and the spade-hoe (*kassí*), the common country hoe (*khurpá*), and the small hand scythe with jagged edges like a saw (*drátri*) with which he cuts most of his crops. The *gandásah* is a chopper for cutting up *jowár* stalks and sugarcane, and a smaller tool of the same kind is a *gandásí*. The *khodálá*, *khoduá*, or *rámprá* is a kind of spud with a thick handle used for making holes, where the line of action is the same as that of the hand, thrust downward. A smaller one is a *khodálí*; *kasólá* is a tool used for hoeing, smaller than a *kassí*, but working on the same principle.

Sowing.

Sowing for the *rabí* begins in Asauj, the latter part of September, and continues till Mangsir has half gone, the beginning of December; the order of sowing is gram, barley, wheat. *Channá* is always sown with a rough drill (*orhná*) fastened on to the plough. This is merely a thick piece of bamboo, the upper end of which has been split into many slips, and opened out so as to form a kind of trumpet shape. It is strengthened with an iron ring put inside (*andí*) and bound with leather outside; the top part of the *orhná* is called *dórhí*. It is big enough at the mouth to let a man's full hand

* In Sunipat this is wholly Khádar: in the other two *tahsils* the villages mostly contain both Bángar and Khádar soil.

† The revised calculations of these measurements give a slight increase on this of 322 acres, viz., 159,417.

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in. The sower walks along with his *chádar* full of seed, and takes out a handful with his right hand, and gives it to his left hand to drop down the *orhná*, the left hand remaining on the *dórhí*, and guiding the plough.* Barley is sown with a drill or broadcast (Ballabgarh *pabhér*—Delhi *pabhér* and *bakhér*—in Sunipat *bakhér* and *hindáo*). Wheat is sown with a drill, and also broadcast, and in the northern part of the district in the furrow (*khud*) without the drill. Sowings for the *kharif* (except for sugarcane, of which the special treatment is described further on), begin in Chait with cotton and *jowár* for fodder. Then come *bájrá*, the *jowár* intended to give a full crop, *makái*, *urid*, *moth*, *múng*, *jowár*, &c., &c. *Makái* and *moth* can be sown up to 15th Sáwan. Both modes of sowing are used; broadcast is however, preferred when the ground is well moistened as after good rains. When the land is dry the drill is more used.

Sowing.

The ordinary number of ploughings is for the *kharif* crops five and for the *rabi*, nine. The first ploughing is called *pár*, the second *dosár*, the third *tesar*, the fourth *chausar*, and the fifth *panchbáhini*; after this there is no special name till the ninth, when it is *naubáhini*; and this is enough. But sometimes for sugarcane more is done. The depth of ploughing is only six fingers breadth, and is often only three; this is of course merely scratching the ground. Seed is put in about three fingers breadth deep. Good ploughing is a *pukká bighá* per day; work goes on from early dawn to evening, with two hours rest in the middle of the day. But this of course is work in the Indian style, and allows for some half-dozen pulls at the *hukkáh*; four times before mid-day and twice afterwards. Some rest is necessary of course for the bullocks, and to make sure that their necks will not be galled by the yoke (*júá*). Well-work generally is very trying for the animals; the husbandman says it is as bad for them as gambling is for a man. The *sohágá* is used after ploughing, for levelling the ground, and breaking the clods (*dalle*, *dhím*). It is also called *mahs*. A little *sohágá*, according to the usual way of making diminutives, is *sohágí*, or *mahjí*.

Ploughing.

Propitious times (*mahúrat*) are sought for ploughing, and certain days must be somewhat humoured. Thus on Monday and Saturday a prudent man will not plough with his face to the east. On Monday and Saturday the demon of the four quarters (*Disá-Súl*) remains in the east; his location is not so fixed during the rest of the week as to give rise to any other proverb; but a *zamíndár* will not of his own accord go northward on Tuesday and Wednesday or westward on Friday and Sunday, and the south must be avoided on Thursday (*Brihaspat.*) These limitations are strictly observed.† Wednesday is good for sowing and Tuesday for cutting the crop.

Lucky days.

* Most of the guidance is done with the voice. *Barrh* turns the animal to the righ; to turn it to the left, it is necessary to say *ah* (the *h* very soft), and as the turn it always made from right to left, this is the cry at the end of each furrow. To stop them turning the man makes a noise with his lips (*puchkár*).

† Of course a *hákim's* order, such as a summons to court, must be obeyed, whether on a lucky or unlucky day. But the *zamíndár* will explain his want of success in a suit by saying—"I went to the devil (*Disá-Súl*) so I was bound to be unlucky."

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Harvesting.

Crops are harvested by the *zamíndárs* themselves, but they generally require the aid of hired labourers, so that in almost every village some of this class will be found. They are for the most part *Chamárs*, but sometimes *Chúhrás*. *Málís* generally cultivate on their own account, but at times work as labourers. Brahmins often go shares (*sájhí* or *sánjhí*) with the proprietor, furnishing one yoke of oxen to one of the owners. A Játt does this too when he is poor. The rates of pay for the *kharíf* season are 2 annas per diem and a *roti* of ¼ seer weight, but the bread given in is sometimes enough for a full meal. The owner calls on the men he wants for next day the evening before, and looks them up too in the early morning. Then they all go a-field together and begin work. When six *gharís* of the day have passed the *básí* meal is brought by the owner's boy or girl for all the men. After this work goes on again till noon, when the main morning meal comes on. The labourers provide this for themselves unless it be a dear season for labour, when the proprietor will have to find it. The work is again resumed, after a pull at the *hukkáh*, and goes on in a quiet way till sundown or after that, and then they all go home together. No one forces the labourers to stay, for no one is extremely anxious to go; they even take an interest in getting the crop cut and gathered in quickly. The general understanding is that the cutting goes on till sundown, and the collection of the sheaves after that. Pay is given that evening or the day before. If payment is not made, the man is known and marked, and they laugh at him the next season.

In *rábí* the labourer mostly takes grain; he won't take cash. The rate is 4 seers, or more, reckoned by sheaves (*púlís*) which give something less than a seer each. In order to see that he is not cheated by very big sheaves being taken, the owner puts his own people to arrange the stock (*kúndrá*); the big sheaves are put down at the bottom, and so are safe. A man cuts about ¼ *pakká bighá* in the day. The hired labourer eats three times a day, and there is not much inferiority in his diet to that of the land proprietor. He has not the rank of the *zamíndár*, but otherwise is happy.

Hoeing and weeding.

Hoeing and weeding (*nalái*) are considered good for all crops, but some need this more than others. Sugarcane is never satisfied in this way; cotton likes also much to be clean; while wheat will do with one good hoeing: also *jowár*, and *bájrá*. Pepper wants a great deal, and tobacco the same.

Carting grain to the threshing floor.

The grain when cut is carted to the threshing-floor (*pair*; Punjabí, *kalwára*); a collection of these is called a *khúlá*. The owner will generally see to his crop himself by sleeping there at night till it is threshed out, which he loses no time in doing. "With your threshing-floor and your enemy, deal quickly."

Modes of storing grain.

Grain is either stored in *kothás* or rooms of the house, or in *kothís* in one of them, or in a large canvass bag *théká* which stands upright by the weight of the grain in it, and holds 50 or even 100 maunds. All kinds of grain are housed in this way. The animals attacking grain when thus stored (besides rats and mice of course if there are

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ny) are (1) *sursali*, (2) *khaprá*, (3) *dhorá*. Of these the *dhorá* is a winged insect with a little round body; if the *khaprá* is put into a granary where he is, he dies, not being able to abide the savour of the other! The *khaprá* is a kind of weevil that confines his depredations to the top of the store, not going more than a span deep. The *sursali* is a kind of red ant; he is as bad as the *dhorá*.

Manure.

Manure is generally the dung of cows, buffaloes, or bullocks fastened up in the house. No *zamíndár* hesitates to handle it; it would be most unreasonable, for dung and mud serve him instead of wall-papering. The ashes of cow-dung, pats, *upla*, and of any wood burnt—but not those of the *khoi* (canestraw refuse),—all come into use. The great enemy that prevents the supply of manure being much larger than it is, is the custom of burning such pats for fuel. All but the best families use their women in making them up. When made, they are placed inside a square enclosure called a *bitaura*. The pats are dried, put inside, and it is then built up solid, and then closed for future use. When the pats are needed, a hole is made in the side and they are taken out as wanted.

Fallows and rotation of crops.

There is no custom of fallows in the district. The soil indeed has very little rest now-a-days, whether from the greed of the *zamíndár* or from the acceleration which appears going on generally in the slow-paced oriental life. Land left unsown after one crop is reaped, during the succeeding season is called *tápar*; next year if it is still left so, it becomes *banjar*. *Báhan* is really the name for land after it is ploughed (*báhná*); when sown, it takes the name of its crop. Rotation of crops is partially practised, for the *zamíndár* has his predilections and prejudices which may be taken as embodying the results of traditional experience about the succession of crops. Thus after wheat will come *jowár*, or cotton, or *moth* with advantage; after sugarcane, cotton, or *jowar* or *urd*; after cotton *makkaí* is very good. The best rotation is given as follows: sugarcane, then cotton, then tobacco, then pepper, or *makkaí*.

Irrigation in Delhi.

Delhi stands high in the list of Punjab districts as regards the proportion of protected, *i.e.*, irrigable area. The statistics given for the purposes of the Famine Commission,* place the percentage of such area as compared with the total cultivated land at 37, of which 15 may be taken as protected by wells, 4 by *bands* and irrigation from *jhíls*, and 18 by canals. Some particular notice will now be taken of each of these.

Number of wells.

Some facts about wells in each *chak* are given at the top of the next page.

Kinds of wells.

There were in 1872-75, the years of Settlement measurements, in the whole district 8,841 working wells, *viz.*, 4,797 in Sunípat, 2,256 in Delhi, 1,788 in Ballabgarh. This information, however, is not so precise as it looks, for wells, so called, are of four kinds, of very unequal degrees of efficiency in irrigation. There is first the ordinary masonry well,† made of brick, or stone, and mortar, and

* See Volume I of Report, page 178.

† *Pakká kúa, golá, rékhtá.*

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Number of wells.

Tahsil.	Assessment Circle.	Cultivated area in acres.	Wells.			Acres irrigated from wells.		
			Masonry.	Without masonry.	Total.	Masonry.	Without masonry.	Total.
Ballabgarh.	Khádar Bángar	39,358	246	75	321	2,015	404	2,419
	Bángar ...	57,870	613	217	830	6,359	1,505	7,864
	Dabri—Sailábá	20,437	159	7	166	658	11	669
	Zerkohí ...	18,147	160	3	163	874	3	877
	Khandrát ...	6,254	228	0	228	1,871	0	1,871
	Kohí ...	16,090	80	0	80	334	0	334
	Total ...	1,58,151	1,486	302	1,788	12,111	1,923	14,034
Delhi.	Khádar Bángar	9,188	103	156	259	881	1,653	2,534
	Bángar ...	74,525	512	182	694	3,927	2,380	6,307
	Dábar ...	53,249	745	32	777	5,259	205	5,464
	Zerkohí ...	18,047	207	1	208	1,775	13	1,788
	Kohí ...	12,826	70	0	70	722	0	722
	Khandrát ...	4,976	246	2	248	2,012	15	2,027
	Total ...	1,72,810	1,883	373	2,256	14,576	4,266	18,842
Sunipat.	Bángar ...	1,16,982	897	180	1,076	6,197	1,573	7,770
	Khádar ..	71,152	2,557	1,124	3,721	28,447	8,345	36,792
	Total ...	1,88,134	3,454	1,313	4,797	34,644	9,918	44,562
	Grand Total...	5,19,095*	6,853	1,988	8,841	61,331	16,107	77,438*

constructed to last, and often actually lasting hundreds of years.† Next in point of solidity of construction is the dry masonry well. This is found chiefly in the circles near the hills where the vicinity of the rock renders the use of rough, half-hewn, stone very cheap; but there are not very many places where this kind of construction answers. Then there is the wooden well,‡ a well of which the sides are built of curved block pieces of wood, like the segments of a cart-wheel, in length varying from nine inches to two feet. These wells in favourable soil, and not too deep-sunk, last for many years, sometimes a full generation. They are found in many circles, but specially in certain villages of the Khádar. Lower than these in the scale of efficiency and durability is the Jár-ká-kúa,§ a mere hole dug in the earth, with its sides fenced round with brushwood of various kinds,‖ and thus forming a rude support to the crumbling soil. These wells are of course very cheap, and in most places last only one, two, or three

Kinds of wells.

* These are the figures of the settlement assessment reports. The corrected area is 5,19,417, or 322 acres more. The corrected well watered area is 75,382.

† It depends very much on the sub-soil whether a well will last—the old wells, (which are made with a mortar, hardly ever also equalled now-a-days) often fail, and fall into large block pieces, because of some treacherous giving way of a sandy, which is always liable to become a hollow, sub-soil.

‡ *Gandwále ká cháh.*

§ Also called *Banwáld.*

‖ The most common kinds of wood used for this purpose, are *jhárí*, *dhák*, and *bánsá*.

years, though in a firm, hard soil, they may last a little longer. The depth to which they are sunk is of course small, the deepest not exceeding twenty feet.

Jhalár; dhénkli.

Besides these wells is the *jhalár* and the *dhénkli*; the former is found on the side of river streams and *jhíls*, and is merely a variety of the Persian wheel with larger *tindás* (water pots); the latter is a simple but ingenious apparatus by which the water to be raised comes up in a vessel suspended from the long arm of a lever of the balance kind, and its weight is overcome by the weight of a block of hard earth or mud piled on the other end of the lever. The pole constituting the beam of the lever works up and down on a rude wooden fulcrum placed in a fork of the support, which is also of wood. When the water raised is to be emptied into the distributory channel, the weight of the short end holds the vessel at the level of the surface. The manual labour necessary is employed to sink the vessel in the well; a curiously inverted process, but which answers its purpose. The weight is so graduated as to only just exceed that of the water vessel when full.

Two modes of raising water, *charsá* and *harat*.

As to the means of raising the water there are two kinds of wells; the rope-and-bucket, or *charsá*, and the Persian wheel or *harat*. The first is the only kind used in the southern part of the district, and up northward to Ráthdhanah, *i.e.*, nearly as far as Sunipat. Then comes a small zone in which both *charsá* and *harat* are found, and then beyond this comes the part where only the *harat* is used. Both kinds of wells are so commonly known that it is unnecessary to describe them.* There is the question, however, of comparative efficiency as regards irrigation, on which a few notes may be made. It is not merely the depth of the spring level that practically decides the question for the agriculturist which he shall use. It is far more, if not entirely, a matter of custom and traditional habit. There are villages in the Khádar, where the water is so near that a Persian wheel would seem the simplest mode of raising water, where yet from long hereditary use the people employ only the *charsá*. And again in some villages north of Sunipat the water is not so very near as from this cause alone to make the *harat* specially eligible. A fact which is more likely to afford a partial explanation in some cases is the difference in the division of labour. In the *harat* the arduous labour falls alone on the oxen. In the *charsá*, while the animals have to work hard, there is also a good deal of active though intermittent labour for the men. The toil of the oxen in the *harat* is unremitting, while in the *charsá*, though the temporary strain is greater, there are intervals of rest while the animals are coming up from the hollow (*gon*), where they are released from the *láo*. The man driving the Persian wheel ordinarily sits on the beam behind the oxen as they go round. The influence of the active muscular strain in the *charsá* work is seen in the well developed sinewy frames of the Játs and Ahírs who work at this from morning till night. Mr. Maconachie writes:

"Personal observation obtained figures, which may be relied on as trustworthy and carefully accurate. The depth of water of course is a very

* The double rope of the *harat* is called *mál*; the wooden transverse pieces in which the *tindás* are fastened are called *rédi*; the ends of these perforate the two parts of the *mál*. The *bár* is the wheel on which it lies.

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important element in determining the supply; another, less so perhaps but still important, is the abundance of the spring supply; as a water-level which falls rapidly is much the same as if it were originally lower. The number of men again at work* makes a difference necessarily, and also the size of the *charsá*.† A big one though it moves a trifle more slowly on the whole yields more. The general result, so far as it goes, shows the supply yielded by a fair *charsá* to be greater than that of a Persian wheel.

How much water is required to water a given area.

"It is difficult to estimate the quantity of water required to water a given area, but at different rates of depth some comparative idea may be obtained as follows, taking 340 maunds as perhaps the fairest average. This gives 340 × 82 = 27,977lbs, nearly. A cubic foot of water weighs 1,000 oz. avoirdupois = 62½ lbs, so that there would be 447½ cubic feet nearly poured out in one hour. At an estimate of 1 inch depth this would give very nearly an acre in a day of eight working hours. The actual extent irrigated is less than this considerably, and the depth I should say greater."

Area protected by a *láo* on the average.

The estimate of the extent of land which can be considered thoroughly protected by a one *láo* well necessarily differs inversely according to the depth and rapidity of exhausting the supply. The *zamíndárs* themselves perhaps think the latter point more important than the actual depth from the surface. Nothing delights a good husbandman more than a strong equable spring of water which he can work at for hours without reducing it more than a foot or so; *pakká pání* then he calls it; *kacheha pání* on the other hand he complains of greatly, where the water level sinks sometimes as much as six or seven feet in a few hours. In a good many villages the wells cannot be worked continuously all day; rest has to be given to them to get the supply replenished by percolation; ten acres on the average is perhaps a low estimate of protection; the *zamíndárs* will allow this; about eleven will give probably more really accurate results.

Cleaning out wells.

The cleaning out of wells depends much on their position, as, of course, one protected by a masonry coping (*man*) standing a foot or two above the surface of the ground prevents sand and earth from falling in. The Persian wheel, which generally has nothing of the kind, requires much more attention in this respect than the *charsá*. The latter, if kept fairly full of water, needs cleaning only once in five years, and often not then. The task, when necessary, is performed by the owner or his tenants.

Sinking a wells.

The expense of sinking a well of course varies very greatly according to the kind of soil in which it is made and the depth at which water is met with. In Sunipat there are three degrees noted; one of the Bángar soil (*oarh*), the second is the higher Khádar, the third the land immediately bordering on the river. In digging wells in the Bángar, the soil turned out is very generally stiff loam, with here and there a stratum of *kankar*. Occasionally a small depth of sand intervenes, to be succeeded lower down by the loam as above. In the Khádar this soil is not found, or found only in thin strata; the subsoil is mainly sand. Of course this alters the conditions of excavation. A common plan of sinking a well is as follows: The

* Only one man at a time can work at the bucket, but at the pegs of the *láo* there are sometimes two, sometimes one only.

† The size of the *charsá* is reckoned by the number of *mathis* or hand-breadths it measures when held suspended vertically.

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earth is excavated down to the spring level; then the *nim-chak* is made, a round frame either of *kikar*, *lasora* or *dhak*; the wood is about 1½ foot broad, and a span thick (*i.e.*, high). The pieces are fitted closely together like those of a wheel, and are fastened with nails. On this is built up the masonry cylinder (*golá* or *kothi*). This generally extends beneath the surface from 14 to 17 *háths* and above it some 12 or 13 *háths*. On the top of this cylinder a rough frame-work is placed consisting of four large beams, two one way and two another (*dháran*.) On these is heaped up a mixture of mud and earth as a make-weight, and the earth dug out from below is also put on it. The weight thus accumulated sinks the well down to the surface or further. It is then built up again. The old way used to be to sink the cylinder down to the real spring level; but now the usual way is to sink it as said before, down some 14 or 15 cubits, and then bore down in the centre of the cylinder with a *ballí* made of two or three beams fitted together and headed with a sharp point. Across this *ballí* is fitted a cross beam (*dandlá*) to both ends of which is fastened a well-rope. This is passed over a pulley (*chák* or *bháwan*), as at the well, and then the *ballí* is alternately raised and let down, sinking down at each time lower and lower till the real spring is arrived at. This is at 52 *háths* beneath the surface, and this point, the natural spring level (*sár*), is called accordingly *báwani*. In the Khádar water is found at 14 *háths*, and the cylinder goes some seven or eight *háths* below this point. The *nim-chak* is made by the village carpenter; the masonry work requires a mason who is found only in the towns or larger villages. In the Khádar the excavation is made by the Játs themselves. In every village are several fellows who can dive (*gote már*), and they go down into the water with the *khássa*, which brings up each time enough earth to give hard work to some twenty men to raise it up on to the *dháran* or platform. The divers are of every tribe and caste. In the Bángar the plan used to be the same, but since the canal irrigation has rendered the sub-soil percolation more copious, few men not making a regular trade of it can stand the enormous flow of water that comes in below a certain depth, so that the diver who can work in a Bángar *golá* generally becomes known; he has also the dignity of a special name* *Sihá*. They are generally of the Jhinwar caste. They get about 12 annas or Re 1 per foot of excavation, with a *pagrí* at the finish. For beginning the work of course a lucky day is necessary. The *parohit* or some other person possessing the necessary learning is called in, and generally getting something for his pains, either a rupee, or some meal and *ghí*,† points out the propitious season. It is incumbent on the husbandman at all events to make a beginning on that day; if he cannot conveniently spend much time he must at least dig not less than five hoe-fuls with his *kasi*. The undertaking thus auspiciously begun may then be intermitted, if need be, for a month. There is a practice still obtaining in some parts of placing five vessels full of water on the spot chosen for the well. After standing for a whole night, if they are found full in the morning, the place is reckoned lucky. If not

* *Jhámi*—the tool is called *jhám*.

† When food is thus given it is called *nidhá*.

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full, expectation of good water is unreasonable. Some of the intelligent *zamíndárs*, however, doubt whether this is thoroughly reliable. A more reasonable custom is that of distributing alms, large or small, on the completion of the undertaking. When asked what would happen if this is not done, the *zamíndárs* reply—"who would omit such a good precaution? The work of danger is finished, and thanks are reasonable." The speculative character of the risks in sinking a well is shown by the proverb: "To dig a pond requires but money. But Ráma's aid (is necessary) for a well."

Quality of water.

Distinctions are drawn here, as elsewhere, as to the quality of the water, which may be sweet (*mítha*), brackish (*malmalá*), or salt (*namkín* or *khárá*.) The salt water is of course not good for irrigation; but the brackish wells often produce the finest crops, nor is this good effect confined alone to inferior soils. On superior soil also it is considered best of all to have the first watering (*kor* or *korwá*,) made by brackish water, and then water with sweet. Where there are two wells within a practicable distance of each other, the water of both will be interchanged in this way: the brackish water irrigating the lands of both for the *kor*, and then the sweet water coming over all in its turn. The reason given for this is that the land requires some degree of saltness; it is alleged that there will be a perceptible difference in the yield of two fields side by side, one of which has the *malmalá kor* and the other the sweet. The appreciation of salt as a manure is shown from the fact that it is common to scrape the ground round the *ábádí* and carry it on the fields, one cart-load being a dose for two *kachá bighas*. Distinction is even made in the quality of land from its trees; the best *banjar* is shown by the growth of *dhák*; then *bánsá* (*Tephrosia purpurea*), and lastly *kair*. The *bánsá* itself is known as a salt plant, and consequently the land near the plant for a short time is productive, but afterwards becomes what it naturally would be.

Irrigation from *bands*.

Irrigation from *bands* is a characteristic feature in all parts of the district lying under or near the hills. The principle is that of concentrating the rainfall so as permanently to moisten a given cultivated area, allowing surplus water to run or drain off; and applications of this principle were successfully made on a large scale by the former rulers of the country. In no respect perhaps does the civilization of the Mughal Empire show better than in this of artificial irrigation. In a report of 1848, written by Mr. E. Battie, in charge of the Najafgarh *jhíl* works, there is an interesting account of two of the largest of the hill circle *bands*, Chhatarpur and Khirkí. But there are numerous others, which only a good local knowledge gives an acquaintance with, for most of them are in a semi-ruinous condition, and not a few are in out-of-the-way corners, among ravines or on the slope of not very accessible hills. Some are evidently too far gone for repair, some are not worth it,* but others almost certainly are. It gives a sense of dreary desolation to ride through these gaping holes in what

* There is a printed correspondence on this subject with Government letter, No. 2,937 I, dated 10th July 1877.

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are still magnificent lines of works which might be so beneficial and remunerative.

List of *bands*.

On the next page is given a list of all but very petty *bands*, showing the locality and the area affected by them, with some other facts. One or two of the large earth work *bands*, and notably that of Tilpat, have been very much injured by the construction of the Agra canal, the line of which comes down athwart the catch basin of the *band* in one part. It may be noted that there are places here and there where probably new *bands* might be constructed with success. There are two or three places at the foot of the hills on their Ballabgarh side, where it is almost impossible to think that water might not be thus advantageously stored.*

Minor *bands*.

There are besides the hill *bands* in the north-west of Ballabgarh, the south-west of Delhi, and the east centre of Ballabgarh, several minor *bands* made to catch the drainage near Dhauj and Pálí, but these apparently are very happy-go-lucky concerns, and are not at present of any considerable importance. There is also, or rather was, a *band* in the boundary of Pugthallah in the north-west of Sunipat *tahsíl*, which the men of that village either erected or, as some say, strengthened in the stormy days of the mutiny. The canal officers, on the ground that a natural drainage of the country was obstructed, have now obtained the demolition of the *band*. This *band* did good to the lands of Pugthallah by keeping the water *off* the land, allowing moisture to come only by percolation.

Najafgarh *jhíl*.

The Nagafgarh *jhíl* and its drainage works are described in the Settlement Report. The system of cultivation pursued by the villagers bordering the *jhíl* is suited to the circumstances under which they are placed. Experience has taught them the level which the waters usually attain; and with reference to this, is the disposition of their crops. That is, from the higher grounds they obtain the common *báráni* crops; their cotton is sown out of reach of anything but extraordinary floods; their sugarcane fringes the whole *jhíl*, and is kept accurately a little above, but close to, the ordinary level of the *jhíl* water, so as to facilitate the irrigation of the plant without actually subjecting it to injury from submersion; the low grounds in the immediate vicinity of the *jhíl* are sown with gram and wheat, and also as the water retires in consequence of being expended in irrigation, by partial drainage, by evaporation, &c., the rich soil laid dry is ploughed up, and produces a fine crop of wheat.

Canal-irrigation.

The canal-irrigation is perhaps the most important of all; important both for good, and for ill. Irrigation from the Agra canal is, and perhaps always will be, insignificant, owing to the high level of the land in this district through which it runs. But the water of the Western Jamná Canal has for many years been a factor of enormous power in determining the condition of the *zamíndár* in a large and densely populated portion of the district.

* Mr. Maconachie writes in 1884: "Since this was written a change has taken place, the limits of which it is at present difficult to estimate. Many of the old *bands* have since the beginning of 1883 been put into thorough repair; other *bands* have been made, and there are other schemes coming on for early execution. About half a lac of rupees have been or are being spent, and there will be an increase of produce on the least protected parts of the district of about that amount. And we have not done yet half what can be done."

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List of *bands*.

No.	Name.	Tahsil.	Remarks as to area irrigated, condition, &c.
1	Ambarhai ...	Delhi ...	Estimated to irrigate 315 acres, but this *band* has been broken and is not worth repair, in fact it probably did more harm than good.
2	Arangpur ...	Ballabgarh ...	About 130 acres are moistened by this *band*, which is a natural basin, and thus is easily kept in fair working order.
3	Bijwasan ...	Delhi ...	About 300 acres were moistened by this *band*, but it is broken now, and should not be repaired, as it does more harm than good.
4	Chhatarpur ...	Ballabgarh ...	A fine *band*, moistening some 500 acres; broken and wants repairing. If it is not repaired, deterioration of the neighbouring lands is certain.
5	Gwálpahári ...	Gurgáon ...	Another fine *band*; the lands of six villages would benefit from its repair, and will be damaged by its continued broken condition.
6	Haus Khás ...	Ballabgarh ...	About 40 acres here form a *haus*, or bath-tank, in fair preservation, and there is no chance of damage.
7	Khirki ...	Ballabgarh ...	This *band* is broken, and might well be repaired; it would prevent the formation of ravines and fissures over a large extent of ground.
8	Mahpálpur ...	Delhi ...	A very fine masonry *band*, but broken and neglected; would moisten 200 acres if well looked after, and preserve other land too.
9	Mánakpur Basantnagar. ...	Delhi ...	A first-rate position for a *band*, but broken now in the middle; still moistens about 100 acres. Ravines are forming near the break—a masonry *band*.
10	Naráina ...	Delhi ...	A *kachá band* made in 1861, and broken in 1875. No need to repair it; it is not in a good place.
11	Pálam ...	Delhi ...	A large work, broken, and not fit to be repaired. If *bands* are made on this side of the hills, they should be made higher up, i. e., more to the east than this line.
12	Rajokhri ...	Delhi ...	A very strong masonry *band* of ancient make, long since partially broken; now it would be difficult to repair, as deep ravines have formed.
13	Sultánpur ...	Ballabgarh ...	A *pakka band* repaired by the *zamindárs*; somewhat broken but not much, and will be now doubtless repaired. Moistens some 40 acres.
14	Tilpat ...	Ballabgarh ...	A large *kachá band*, made in 1861; broken by the line of the Agra Canal. It still moistens some land, but not much.
15	Tughlakábád ...	Ballabgarh ...	Two *bands*, one an old one, the other made in 1861; broken, but might well be repaired, perhaps by the *zamindárs*; about 110 acres moistened by them.
16	Yábyánagar ...	Ballabgarh ...	A *kachá band* made in 1861, and still in good repair. Some *dhiánat* is taken here.

Irrigation by *tor* and *dál*.

Of the two modes of irrigation, that of flow (*tor*) is far more common than by *dál* or lift. Irrigation by lift is more advantageous in this, that it implies a higher level of land to be irrigated, and a greater labour in irrigating it, so that as a rule a *tor* village is likely to be more water-logged than a *dál* one. The average acreage under *dál* irrigation for seven years in the *kharif* was 1,617 acres as compared with 38,690 *tor*, and in the *rabí* 4,545 as compared

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Abiáná (Water-rates.)

with 33,978 *tor*, The rates charged as *ábiáná* on the canal vary according to the class of crop, as below*:—

		I.		II.					III.				IV.	V.
		Sugarcane.	Gardens.	Rice.	Tobacco.	Opium.	Vegetables.	Water-melons. (Singhárás)	Indigo.	Cotton.	All rabi crops.	Tarik.	All kharif crops, not specified above.	A single watering before sowing or to fallow lands.
Per acre.	By over flow.	Rs. 5 0 0 per crop. per annum.		Rs. 3 0 0 per crop.					Rs. 2 4 0 per crop.				Rs. 1 10 8 per crop.	Rs. 1 0 0
	By lift.	Rs. 3 5 4 per crop. per annum.		Rs. 2 0 0 per crop.					Rs. 1 8 0 per crop.				Rs. 1 0 0 per crop.	Rs. 0 10 0

The tabular statement on the next page shows the irrigation from the canal for the seven years ending 1877-78. Canal irrigated area.

Under the new arrangement owner's rate is to be taken at one-half of the *ábiáná*: and this is to be taken per crop, so that *dofasli* land will pay owner's rate twice. Owner's rate how fixed.

Crop.	1880-81	1881-82.
Kangni ...	268	247
China ...	298	218
Mattar ...	1,607	1,137
Másh (Urd) ...	4,000	3,416
Mung ...	4,425	5,947
Masur ..	542	306
Arhar ..	13,654	1,188
Coriander ...	862	549
Ginger ...	...	2
Chillies ...	5,145	5,712
Other drugs and spices. ...	857	629
Linseed ...	2	29
Mustard ...	3,783	8,738
Til ...	626	463
Téra Mira ...	5,904	5,363
Hemp ..	461	488
Kusumbh ...	279	191
Other crops ..	2,663	14,645

Principal staples.

Table No. XX shows the areas under the principal agricultural staples. The remaining acres under crop in 1880-81 and 1881-82 were distributed in the manner shown in the margin.

Crops and areas under each.

The principal crops of the district, with the areas under each, as ascertained during the recent Settlement measurements, are given at the top of page 113.

The largest acreages, it will be seen, are as follows :—

KHARIF.		Acres.	RABI.		Acres.
Jowár	...	1,01,589	Wheat	...	1,09,222
Bájra	...	90,320	Barley	...	44,141
Sugarcane	...	30,762	Gram	...	43,265
Cotton	...	28,835	Barley and Gram	...	33,473
			Wheat and Gram	...	24,527

Some crops, such as sugarcane and rice, are hardly ever grown except on irrigated and manured soil, while others are for the most part grown on land dependent on rain for its moisture. Among these last are *bájrá*, *jowár* and *channá*.

The tabulated statement on page 114 gives the leading facts respecting the cultivation of the chief crops; while a more detailed account of the cultivation of melons and sugarcane, both of which present in a way special features, will be found at page 113. Tabular statement of agricultural operations for various crops.

* Sanctioned in No. $\frac{641}{1}$ of 10th September 1873, from Government of India, Public Works Department, to Joint Secretary to Government, Punjab, and published in Gazette, No. 4,068,I of 29th September 1873.

Year.	Kharif.							Rabi.							Total.	
	Villages.	Area irrigated in acres.			Amount of Water-rate.			Villages.	Area irrigated in acres			Amount of Water Rate.			Area irrigated.	Amount of water rate.
		Tor.	Dál.	Total.	Tor.	Dál.	Total.		Tor.	Dál.	Total.	Tor.	Dál.	Total.		
1871-72 ...	206	43,691	1,535	45,226	1,54,895	2,810	1,57,695	203	57,733	6,554	64,287	1,30,989	8,130	1,39,112	1,09,513	2,96,807
1872-73 ..	202	43,899	2,074	45,973	1,67,680	3,906	1,71,586	198	29,584	6,726	36,310	67,455	7,756	75,211	82,293	2,46,797
1873-74 ...	194	38,952	1,841	40,693	1,54,207	3,754	1,57,961	175	13,370	6,952	20,322	31,559	7,453	39,012	61,015	1,96,973
1874-75 ...	155	28,329	1,393	29,722	1,07,234	3,427	1,10,661	198	39,676	3,006	42,682	80,009	4,543	84,557	72,404	1,95,212
1875-76 ...	168	34,180	1,360	35,540	1,23,637	3,288	1,26,925	179	21,407	1,396	22,803	43,115	2,130	44,245	58,343	1,71,170
1876-77 ...	191	38,327	1,164	39,491	1,39,469	3,060	1,42,529	179	28,381	3,318	31,699	58,047	5,008	63,055	71,190	2,05,584
1877-78 ...	197	43,551	1,954	45,505	1,55,026	3,871	1,58,897	197	47,185	3,862	51,047	1,02,865	6,014	1,08,879	96,552	2,67,776
Total ...	1,385	2,70,929	11,221	2,82,150	10,02,188	24,116	10,26,264	1,317	2,37,848	31,313	2,69,658	5,13,032	41,033	5,54,065	5,51,809	15,90,319
Average ...	191	38,690	1,617	40,307	1,43,163	3,445	1,46,608	188	33,978	4,545	38,523	73,290	5,862	79,152	78,830	2,25,760

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Crops and areas under each.

Statement of area in acres under each crop at the time of Settlement measurements.

		Delhi.	Ballabgarh.	Sunipat.	Total.	REMARKS.
KHARÍF	Cotton	4,[illegible]	11,52[illegible]	12,[illegible]	28,[illegible]	
	Vegetables	457	253	391	1,101	
	Chillies	347	59	1,173	1,578	
	Sugarcane	15,714	129	14,939	30,782	
	Rice	3,962	1	7,856	11,819	
	Joár	30,616	24,985	43,988	1,01,589	
	Indian-corn	1,018	1,450	6,572	9,040	
	Bájra ...	[illegible]	[illegible]	[illegible]	[illegible]	
	Til	6	8	7	20	
	Mash	655	61	717	1,313	
	Bamp	38	69	48	155	
	Charí	603	923	...	1,526	
	Guár	3,557	2,144	9,579	15,180	
	Lobia	60	1	3	64	
	Italian Millet ...	5	...	73	78	The difference between the total here given and the entered as cultivated viz., 5,10,417, is due to the *dofasli* land which here appears twice.
	Moth	1,474	2,009	3,732	7,215	
	Múng	593	97	103	793	
	Chená, &c	126	1	139	266	
RABÍ.	Wheat	30,505	21,312	57,102	1,08,923	
	Wheat and Gram ...	8,257	2,193	14,077	24,527	
	Wheat and Barley ...	5,301	4,538	690	10,529	
	Barley	16,156	25,824	2,163	44,141	
	Barley and Gram	9,472	21,839	2,163	33,474	
	Gram	23,818	2,365	16,483	43,265	
	Melons	1,419	54	61	1,534	
	Ajwáin, Saunf, &c. ...	350	59	83	492	
	Tobacco	560	434	292	1,286	
	Onion	30	24	37	91	
	Safflower	71	143	75	289	
	Sarson	118	54	247	419	
	Tarámírá	560	643	1,553	2,756	
	Masúr	3	79	18	100	
	Arhar	238	52	...	290	
	Peas	789	439	201	1,427	
	TOTAL.	2,06,698	1,81,224	2,06,814	5,74,734	

to 121. The estimates of produce given in the following tables are not too high for good soil, but are too high for the *general* average of the whole district.

Cultivation of sugarcane.*

Sugarcane is the most important and profitable crop of the *kharíf* harvest in the Delhi and Sunipat Bángar tracts. The average acreage under cane in the district for the last ten years is given as 4,347. The land taken is the best in the village, that is to say, some of the best is taken every year; it is a sign of weakness of resources when cane follows cane on the same ground.† Nor without manuring is the cultivation profitable. Cotton is a first-rate crop to follow cane,‡ and then after the cotton cane can be planted a second time if manure is available, otherwise wheat will grow well without it. It is not usual to try for a *rabí* crop when cane is to be planted in the spring; if this is done the latter will suffer by being planted late (*pachétr*). Ratooning (leaving the roots to produce a second crop in the succeeding year, called *muridaik*) is uncommon now, though in old times it was often practised. The change may be put down to the decreased fertility of the soil, or, as the *zamíndárs* themselves say, to the increase in resources as shown in the greater power to buy seed, and the greater number of hands avail-

* See Mr. Batt's account of sugarcane cultivation in Sháhjehánpur (Revenue Reporter N. W. P.) 1874, Vol. III, No. 1.

† According to the rhyme: "To plant cotton after cotton *and sugarcane after sugarcane*, to attend to other people's advice, these three things ruin a house."

‡ So the rhyme:—"If cotton follows cane, no bare place will remain."

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Tabular Statement of agricultural operations for various crops.

Crops.	Harvest	When sown	Sown after watering (*Paleva*) or without.	Quantity of seed per *pukka bigha*	Number of ploughings.	Number of hoeings or cleanings.	Is manure used or not.	Irrigated or unirrigated land.	Month of harvest.	Produce per *pukka bigha*	Preceded and succeeded by what crops.	Remarks as to weather, rain and soil required.
Jowár...	Kharif.	Asádh ..	Without watering.	6 sers ...	2 to 6	1	Manure not used.	Unirrigated.	Kátik ..	2 to 8 mds.	Preceded by wheat, and succeeded by gram.	Good rain is wanted for *jowár* and *bájra* in the early rainy season July and first part of August.
Bájra ...		Asádh ...	Without watering.	2½ sers ...	2	1	Manure not used.	Unirrigated.	Kátik ...	3 to 8 mds.	Preceded by wheat, and succeeded by wheat or barley.	Of the two *bájra* is generally sown on the poorer soil. The character of *bárání* land may be distinguished in no small degree by noticing this.
Rice ...		Asádh ...	Without watering.	7 sers ...	6	2	See Wheat.	Irrigated ...	Asauj and Kátik.	3 to 25 mds.	Wheat and gram—(*gochani.*)	Is grown in only the more swampy villages of Sunipat Canal Tract.
Hemp ...		Asádh ...	Without watering.	3 sers ...	2	No cleanings.	Manure not used.	Unirrigated.	Kátik ...	3 mds. ...	Preceded by *jowár* and *makki* and succeeded by wheat, barley or gram.	Not important in this district; it generally is sown as a border to sugarcane.
Indian corn.		Asádh ...	Without watering.	6 sers ...	2	3	Manure used on *chahi* land.	Unirrigated (3 waterings given in time of drought).	Asauj and Kátik.	10 to 12 mds.	Preceded by barley, or wheat, and succeeded by gram.	
Chillies		Asádh ...	*Paleva*	¼ ser ...	5	4	Manure used 240 mds. to a *bigha*.	Irrigated (15 to 20 waterings.)	Kátik ...	6 to 15 mds.	Cotton ...	Grows best in the hot, strong soil of the Delhi Khaudrat; it wants much manuring, and very copious irrigation.
Indigo...		Chait and Baisákh	*Paleva*	¼ to 1 ser ...	2	Cleanings not required.	Manure not used.	Irrigated ...	Poh ...	7 to 15 mds.	No crops specified	Very rarely grown.
Máh ...		Asádh ...	Without watering.	6 sers ...	2	1	Manure not used.	Unirrigated.	Kátik ...	3 to 6 mds ...	Preceded by wheat, barley and gram (*bájhar*) or barley—and succeeded by wheat on land left fallow after the crop is cut.	*Máh*, *moth*, and *mung* are all light crops, and do well with comparatively moderate moisture.

Mung ...	KHARIF	Asádh ...	Without watering	6 sers ...	2	1	Manure not used.	Unirrigated.	Kátik ...	3 to 5 mds.	Wheat or *bájra*, or barley—that mixed after allowing the land to lie fallow for some time; after mixed wheat or *bájra*.	See above.
Moth ...		Asádh ..	Without watering	6 sers ...	6	1	Manure not used.	Unirrigated.	Kátik ...	3 to 5 mds.	Preceded by *bájra*, and succeeded by *mung*; after mixed *bájra* or barley.	See above.
Cotton		Chait to Asádh.	Do., *Palewá* if sown in Chait.	7 sers ...	3 to 5	4	Manure used on *chahi* land only.	Irrigated (3 or 2 waterings.)	Asauj to Mangsir.	*Chahi* 3 or 4 mds. *Bárani* 1½ to 2 mds.	Preceded by wheat, and succeeded by cotton—generally 6 month's rest allowed.	Extensively grown, but seldom of fine growth, or very good quality; the rain for it should be early—and the season not too cold at the time when the picking begins.
Sugarcane		Phágun and Chait.	*Palewá*..	14 pills each *pill*=166 *gundás* (bits of cane.)	5 to 10	6 to 9 or 10	Manure used.	Irrigated (5 to 8 waterings with rain; 16 or 20) (but without.) [See also Appendix IV.]	Maughsir to Chait.	10 to 40 mds. (*Gur*.)	Cotton.	
Wheat...	RABI	Kátik .	*Palewá*, if the soil is *dofasli*; otherwise, without it	21 to 30 sers.	6 to 9	*Chahi*—2, *Bárani*—1,	Manure used on *chahi* land not on *bárani*.	If irrigated, 6 waterings are given.	Baisákh	*Chahi*—10 to 13 mds. *Bárani*—5 to 8 mds.	*Bájra* or *jowár*. If preceded by *bájra*, wheat will grow barter and yield a good out-turn.	Wheat is not grown generally except in good soil, and there are various distinctions drawn in some parts as to quality of seed.
Barley...		Kátik ..	See above	15 to 21 sers.	6 to 9	*Chahi*—1, *Bárani* none,	Manure used on *chahi* sometimes on *bárani* also.	As above ...	Chait ...	*Chahi*—11 to 16 mds. *Bárani*—6 to 9 mds.	*Bájra* or *jowár* (see above).	Barley stands to wheat as *bájra* does to *jowár*—a zamindar will rarely grow barley if he thinks the ground will grow wheat well.
Gram ...		Asauj ...	Without watering	12 to 15 sers.	3	No cleanings.	Manure not used.	Unirrigated.	Chait ...	5 to 8 mds.	Preceded by *jowár* and succeeded by the same.	A light crop, wants early rain, and the winter rain (*mahawat*,) and a gentle equal wind. A dry blast withers the plant.
Tobacco		Magh ...	After watering	2 sers.	6	3	Manure used as for wheat.	Irrigated (20 waterings.)	Jeth ...	15 to 20 mds.	Preceded by cotton and succeeded by *jowár*.	Like pepper in preferring the dry, hot soil of the *khandrás* and copious waterings.

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Agriculture and Live-Stock.

Tabular Statement of agricultural operations for various crops.