

Public Works (1899) Department.

G.O., No. 374 J

DATED 21st April 1899.

[Despatch Abstract.]

Revenue Report of Irrigation Works in the Punjab

Govt of India review of the — for 1897-98,
communicated to the Chief Engineer for Irriga-
tion for information

G.O.	No.	Department.	Date.	G.O.	No.	Department.	Date.

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The look of India.

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Communicated to

The Chief Eng for Inspection
for information. Date

Dated 28. 3. 99

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SUBJECT.

Review of the Revenue Report.

To the Chief Eng. for S
Lt. E. P. W. 2.

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12/4/88

22/4/97. Irrigation works in the Punjab for 1897-98.

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GOVERNMENT OF INDIA.
PUBLIC WORKS DEPARTMENT.

Simla, the 28th March 1899.

READ—

CAPITAL OUTLAY.

These figures do not include the capital outlay incurred on Contribution Works which amounted to Rs. 1,61,198 in 1897-98, of which Rs. 1,56,912 was on account of the share of the outlay on the Ghaggar Canals chargeable to the Bikanir State. The total capital invested by Native States in the canals amounted to Rs. 1,52,26,356 at the end of the year.

2. The total length of completed main and branch canals is now 4,518 miles, of which 309 miles are in Native States. The additions made during the year, amounting to 107 miles, consist of a new branch of the Chenab Canal and the new Ghaggar Canals.

The aggregate length of completed distributaries was increased by 384 miles during the year, the total length now amounting to 10,554 miles. The length of drainage channels amounts to 786 miles, the additions made during the year aggregating 17 miles.

3. The total area irrigated from all canals was 5,214,258 acres, exceeding the striking record of 1896-97 by 590,022 acres.

The following statement compares the average and maximum areas under irrigation in successive five year periods since 1867-68:—

Five years ending	Average area irrigated annually.	Maximum area irrigated annually.	QUINQUENNIAL INCREASE.	
			In average annual area.	In maximum annual area.
	Acres.	Acres.	Acres.	Acres.
1867-68 ...	873,279 (a)	1,006,453	...	...
1872-73 ...	1,183,872	1,251,664	310,593	245,211
1877-78 ...	1,136,951	1,318,026	—46,921	66,362
1882-83 ...	1,484,502	1,683,272	347,551	365,246
1887-88 ...	1,881,369	2,341,103	396,867	657,831
1892-93 ...	2,948,629	3,193,546	1,067,260	852,443
1897-98 ...	3,878,823	5,214,258	930,194	2,020,712

(a) This average is for the four years ending 1867-68, the total for 1863-64 not having been recorded.

The irrigating capacity of the canals has thus during the last five years been increased by over 2,000,000 acres, or by 66 per cent. The increase is slightly less marked when average areas actually irrigated during five year periods are considered, as owing to general rainfall the areas irrigated in the years 1893-94 and 1894-95 were abnormally low.

4. The Major Works irrigated 4,055,898 acres, the principal contributors being the Sirhind Canal with a total of 1,206,248, rather less than its area of last year; the Bari Doab with 849,074 acres exceeding its last year's record by 117,132 acres; the Chenab with a total of 810,000 showing an increase over last year's figures of 289,721 acres; and the Western Jumna with 706,307 acres. The Swat River Canal again did excellently, exceeding its area of last year by 15,470 acres.

The Minor Works irrigated 1,134,255 acres, an area larger than that irrigated in 1896-97 by 190,177 acres, the two largest contributors being the Lower Sutlej and Chenab and the Muzaffargarh Canals. The Ghaggar Canals commenced irrigating for the first time and supplied water to 19,436 acres. The conditions of the year are reported to have been favourable to the Inundation canals, and this accounts for the large area irrigated by them.

The table in paragraph 9 of the Local Government's Resolution shows that while there was an increase in the area of each of the six principal crops irrigated, it was most marked in the case of rice, maize and wheat, the area of the last named crop amounting to the large total of 1,723,140 acres, or almost exactly one-third of the total area irrigated.

5. The estimated value of the crops irrigated is just under 15 crores of rupees, the value per acre being nearly Rs. 27. The average rate levied for the use of the water, including owner's rate and indirect revenue, was Rs. 3, or one-ninth of the value of the crop. The lower estimated value of the crops, compared with the figures of 1896-97, is due to the fall in prices from those which prevailed during the famine.

The areas given above include the irrigation in Native States, the area of which was 345,431 acres in 1897-98 as compared with 394,291 acres in the previous year.

WORKING EXPENSES.

6. The statement in paragraph 6 of the Local Government's Resolution, which gives the working expenses for the last five years, shows that though for Major Works (Imperial) the working expenses have steadily increased from Rs. 24,45,060 in 1893-94 to Rs. 31,86,227 in 1897-98, the rate per acre has as steadily declined in the same period from Rs. 1'39 per acre to Rs. 0'87 per acre, while the percentage on gross revenue, which was Rs. 45'69 in 1893-94, was only Rs. 26'14 in 1897-98. These results are very satisfactory. The increase in the maintenance charges of the Minor Works is said to be due chiefly to the inclusion of the Ghaggar Canals for the first time and to heavy but necessary expenditure on the Muzaffargarh Canals. The rate per acre irrigated was Re. 1 and the percentage on gross revenue Rs. 62'42.

FINANCIAL RESULTS.

7. The financial results of the Punjab Canals in operation during the year may be summarised as follows:—

	Capital outlay to end of year.	Net revenue.	Return on Capital outlay.
	Rs.	Rs.	Per cent.
IMPERIAL WORKS—			
Major Works ...	8,70,19,865	90,02,192	10'35
Minor Works ...	21,29,213	5,12,438	24'07
WORKS IN NATIVE STATES—			
Contribution Works ...	1,52,26,356	10,33,492	6'78

The gross revenue yielded by the Major Works amounted to the large sum of Rs. 1,21,88,419, exceeding by Rs. 12,43,971 the gross receipts collected in the previous year, which were more than 38 lakhs in excess of any previous record.

The net revenue was over 90 lakhs as compared with 78½ lakhs last year, which was nearly double the net revenue of 1895-96.

8. In the Review on the Revenue Report of 1896-97 the Government of India dwelt on the extremely satisfactory returns of that year. But they have been again surpassed by the returns of 1897-98, the Major Works having paid a return of 10'35 per cent. as compared with 9'34 per cent. in the previous year, and the Minor Works a return of 24'07 per cent. as compared with 14'57 per cent.

The Swat River Canal, the only Protective work in the Province, paid a return of 7'38 per cent. on Capital outlay with a net revenue of Rs. 1,53,732.

The Productive works collectively paid 10½ per cent. on their capital with a net revenue of 87 lakhs of rupees. The largest contributors to this unprecedented success were the Sirhind which with a net revenue of Rs. 26,15,798 paid a dividend of 10'83 per cent.; the Bari Doab which paid a return of 13'66 per cent. with a net revenue of nearly 24½ lakhs; the Western Jumna with a net revenue of 16½ lakhs equivalent to 10'34 per cent. on its capital, and the Chenab which yielded a net revenue of Rs. 16,65,628, or 7'34 per cent. on its Capital outlay.

9. The returns on the Native States Branches of the Sirhind Canal exceeded 4 per cent. on the capital outlay for the first time in 1896-97. It is satisfactory to note a further improvement in the financial results attained on these branches during the year under review, the returns for the last four years being as below :—

State.	1894-95.	1895-96.	1896-97.	1897-98.
	Per cent.	Per cent.	Per cent.	Per cent.
Patiala ...	1.38	1.56	6.05	6.52
Nabha ...	0.10	0.68	4.66	5.34
Jind ...	1.26	0.09	4.92	5.75

The Patiala share in these branches is nearly five-sixths, the other two States holding each about one-twelfth.

The high returns of 1897-98 were realized in spite of a charge of Rs. 84,316 for seigniorage which was recovered from these States for the first time during the year, under the terms of the Canal Agreement.

The Patiala section of the Sirsa Branch, Western Jumna Canal, yielded a return of 13.72 per cent. as compared with 15.91 per cent. in the previous year.

10. The interest charges on the borrowed capital out of which the Productive works have been constructed amounted to Rs. 31,37,215 for the year under review, and the net revenue being Rs. 87,07,276, these works have contributed the substantial sum of Rs. 55,70,061 to the general revenues of the country. The accumulated surplus revenue at the close of the year amounted to no less than 373 lakhs of rupees.

GENERAL REMARKS.

11. The Government of India in reviewing the Revenue Report for 1896-97 referred to the extraordinarily rapid development of irrigation on the unfinished Chenab Canal, which was first opened as a perennial canal in 1892-93 when 157,197 acres were irrigated from the new channels. During the last five years the area under command has been extended by the construction of new branches and distributaries, and land has been brought under irrigation as soon as water could be conveyed to it. The following figures shew the rate of development, which is more marked than ever during the year under review :—

Year.	Capital outlay to end of year.	Area irrigated during the year.	Net Revenue during the year.	Return on Capital outlay.
	Rs.	Acres.	Rs.	Per cent.
1892-93 ...	1,08,18,500	157,197	—61,272	—0.57
1893-94 ...	1,31,70,513	270,405	53,283	0.40
1894-95 ...	1,49,25,489	269,357	1,42,676	0.96
1895-96 ...	1,76,21,724	369,935	7,74,486	4.40
1896-97 ...	2,04,31,137	520,279	13,79,442	6.75
1897-98 ...	2,26,93,743	810,000	16,65,628	7.34

The accumulated interest charges exceeded the total net revenue at the end of 1897-98 by Rs. 7,47,556 only, and this small balance will undoubtedly be cleared during 1898-99 or before the construction estimate is closed.

12. This rapid development of irrigation has occurred in a tract the greater part of which was absolutely unpopulated in 1892. It is unnecessary to consider in this review the highly successful operations by which colonies of settlers have been established in these crown wastes *pari passu* with the construction of the Canal, but the growth of irrigation would have been remarkable even if it had occurred in a thickly populated district. It is mainly attributable to the fact that the alignment and construction of the entire system of water-courses within each village has been undertaken by the Canal Officers, the cost of construction being ultimately recovered from the occupiers. The water-courses are laid out with great care so as to gain the most effective command, and water is thus brought into every man's field as soon as it is available. This system had previously been adopted, though on a smaller scale and with less thoroughness, on the Sidhnai and Lower Sohag Canals and also on the Sirsa Branch of the Western Jumna Canal. It has been justified in every case by the rapid development of irrigation on each distributary system as completed, apart from the greater economy of water that may be due to a properly aligned system of water-courses. It has sometimes been objected to large irrigation works that many years must elapse after completion before they can become directly remunerative, but the results attained on all the more recently constructed works in the Punjab indicate, as observed in the Resolution by the Local Government, that the very heavy arrears of interest charges, which in the past used to accumulate before the canals began to pay, are no longer a necessity.

13. The great increase in the area irrigated by Major Works during the last two years is not however entirely due to the new irrigation on the Chenab Canal and on the Sirsa Branch of the Western Jumna Canal. The construction estimates for the remaining Major Works were formally closed between 1890 and 1893, but considerable additional capital expenditure has been since incurred on all of them under the rules for open capital accounts. This expenditure has been mainly incurred in extending and improving the distributary system, in increasing the capacity of the main canals and branches, so as to enable them to carry greater supplies during the monsoon, and generally in improving the control and distribution of the supply, and securing a great economy of water. The following table indicates the amount of this expenditure and the results that may be fairly attributed to it :—

Canal.	Date of closing construction estimate.	Maximum area irrigated in a year up to end of second year after closing construction estimate.	Maximum area irrigated in 1896-97 or 1897-98.	Capital outlay incurred after closing of construction estimate.
		Acres.	Acres.	Rs.
Swat River ...	31st March 1893	110,819	138,557	3,84,616
Western Jumna, excluding Sirsa Branch.	31st March 1890	507,974	564,552	21,77,224
Bari Doab ...	31st March 1890	592,785	849,074	16,82,426
Sirhind Imperial ...	31st March 1891	685,610	943,789	8,72,544
Do. Contributions...		224,446	394,291	1,41,304
Lower Sohag and Para	31st March 1891	70,129	102,014	24,693
Sidhnai ...	31st March 1892	151,427	185,709	1,99,862
GRAND TOTAL ...		2,343,190	3,177,986	54,82,669

All these canals had been virtually completed many years before the construction estimates were formally closed. The areas entered in the third column are the maxima recorded to the end of the second year after closing the construction estimate, as it may be assumed that any increase of area directly due to expenditure against the open capital account would not appear until after this year.

The area of 507,974 acres on the old Western Jumna Canal was recorded in the great famine year 1877-78, but except in years of excessive drought the area on this canal seldom exceeded 400,000 acres before the construction estimate was closed. The area irrigated by the old canal in 1897-98 amounted to 564,552 acres, but in addition to this 199,744 acres were irrigated from the Sirsa Branch, making the total area 764,296 acres. This great increase in area is due to the combined effect of the capital outlay incurred on the Sirsa Branch to end of 1897-98 (Rs. 41,68,560) and of the Rs. 21,77,224 expended on the open capital account of the old canal.

The figures for the other canals require no explanation. The increase in area may be regarded in every case as mainly attributable to the increased capital expenditure, and is specially remarkable in the case of the Bari Doab Canal.

The total expenditure against the open capital account of these completed canals has thus amounted to the large sum of Rs. 54,82,669, but this has been accompanied by an increase in the irrigating capacity of the canals of over 800,000 acres. There is therefore every reason to suppose that this liberal expenditure has been highly remunerative.

14. Great as has been the development of irrigation on these older canals during recent years it is doubtful whether it has yet reached its maximum, and whether further improvement may not be expected in the irrigating duty which will result in a further extension of the area irrigated. The question of this duty is, as remarked in the Local Government's Resolution, intimately connected with that of the correct measurement and record of canal and distributary discharges, and the Government of India note with much satisfaction the steps which have been taken by the Chief Engineer, as explained in paragraph 259 of his report, to train the native revenue establishment in the systematic measurement of the supplies for the distribution of which they are responsible, and in the habit of comparing these for different periods with the areas to which the water is applied. The more effectively the subordinate agency are trained in these duties the more reliable will be the records of duty attained, and the easier will be the detection of all preventible loss or waste of water. The figures in the statement in paragraph 10 of the Local Government's Resolution indicate that the efforts already made in this direction have been attended with success, the duties obtained during the year under review on every canal system having been higher than the averages of the previous five years, the improvement being most marked in the Swat, Sirhind and Bari Doab Canals.

15. The results recorded in the Punjab Revenue Report for 1897-98 are unparalleled in the history of irrigation in that Province and the Government of India desire to express their gratification at the success which has been attained on nearly every canal, and to cordially acknowledge the efficiency of the canal administration and the excellent services rendered by the staff of Irrigation Engineers, to whose exertions and skill these results are largely attributable.

The report was received by the Government of India on the 27th January 1899. It has as usual been admirably compiled and is full of interest from beginning to end.

ORDER.—Ordered, that copies of this Review and of the Report and the Resolution by the Punjab Government be forwarded to the Revenue and Agricultural Department for information.

Ordered, also, that copies of the Review be forwarded to the Government of the Punjab for information and guidance and that copies of the Review and of the Report and Resolution by the Punjab Government be forwarded to the Local Governments and Administrations in the Public Works Department, noted on the margin, for information.

The Governments of Madras, Bombay, Bengal, North Western Provinces and Oudh and Burma.
The Chief Commissioners of the Central Provinces and Coorg.
The Residents at Hyderabad and Mysore.
The Agents to the Governor General in Central India, Rajputana and Baluchistan.

Ordered, further, that the Review be published in the *Gazette of India*, and that copies of the Review and of the Report and Resolution by the Punjab Government be forwarded to Her Majesty's Secretary of State for India.

J. Ki. Nam.

Joint Secy. to the Govt. of India.

The Secretary to the Government—
of Madras. P.W.D.
with 6 copies of Review
& 1 copy of Report
will follow

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