

G.O., No. 512

DATED 16-6-96

[Despatch Abstract.]

Administration Report of Irrigation Works
in the Madras Presidency for 1894-95: The
Govt of India review of the —, cou^{ld}
to the officers concerned for information.

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

FURTHER PAPERS.

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

No. 512 I., 16TH JUNE 1896.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Irrigation.

READ—the following paper:—

Order from the Government of India, Public Works Department (Civil Works—
Irrigation), dated Simla, the 19th May 1896, No. 96 I.

Read—

Administration Report of Irrigation Works in the Madras Presidency for 1894-95.

Observations.—There are ten major works in the Madras Presidency, of which nine are classed as productive, and one, the Rushikulya project, as protective. All of the productive works are in operation with the exception of the Periyár project, which is still under construction, and the construction estimates of seven of them have been closed.

The number of minor works, for which Capital and Revenue Accounts are kept, was raised during the year from twenty-four to twenty-six by the inclusion of the Ganjám minor rivers system and the Nandyar channel in the Trichinopoly district. Of these minor works twenty-two are irrigation systems, and four are tidal canals intended for navigation only. They are all in operation with the exception of the Munnyeru, Dondapad, Sagilêru, and Nandyar channel projects and the Ganjám-Gopalpur tidal canal, and the construction estimates of all have been closed with the exception of the following six projects: the Buckingham canal, the Cumbum tank, and the Pálár, Poiney, Cheyáru and Lower Coleroon anicut systems.

2. The capital outlay incurred on the major and minor works during and up to the end of 1894-95 was as follows:—

—	Number of works	During the year 1894-95.							Total direct and indirect to end of 1894-95.
		Works.	Estab-lish-ment.	Tools and plant.	Suspense account.	Total direct charges.	Indirect charges.	Total direct and indirect charges.	
1	2	3	4	5	6	7	8	9	10
<i>Major Works.</i>									
		RS.	RS.	RS.	RS.	RS.	RS.	RS.	RS.
Protective Irrigation Works (Account head 35) ..	1	2,45,747	52,613	11,366	..	3,09,726	26,702	3,36,428	40,10,884
Irrigation Works not charged against Revenue (Account head 49)	9	10,67,083	2,39,215	1,11,723	— 807	14,17,214	49,659	14,66,873	6,30,22,149
<i>Minor Works and Navigation.</i>									
Works for which Capital and Revenue Accounts are kept (Account head 43) ..	*23	3,24,597	72,866	11,659	..	4,09,122	12,824	4,21,946	1,60,38,589
Total ..	33	16,37,427	3,64,694	1,34,748	— 807	21,36,062	82,185	22,25,247	8,30,71,622

* Exclusive of the Ganjám minor rivers system, the Nandyar channel and the Védaranniyam canal, for which complete Capital accounts to end of 1894-95 have not yet been prepared.

3. Under Major Works, the capital outlay was incurred chiefly on the Kistna, Periyár and Rushikulya projects. The capital outlay on the Kistna delta system was Rs. 4,29,197, including indirect charges, and was incurred on various improvements to head-works, canals and distributaries.

The capital outlay on the Periyár project amounted to Rs. 9,82,563, including indirect charges. The work in the head-works sub-division was again impeded by an outbreak of cholera at the beginning of the year, but good progress was made nevertheless with the dam. Its average height was raised from 68 feet to 115 feet, the addition representing 1,552,656 cubic feet of material.

The boring of the water-shed tunnel was completed and the masonry work at the mouth of the tunnel put in hand. In the Madura division 36 miles of canals and 70 $\frac{3}{4}$ miles of distributaries were completed up to the end of the year.

The capital outlay on the Rushikulya project was Rs. 3,36,428, including indirect charges. The Russellkonda reservoir dam and head sluice were completed, and water was let down the whole length of the Rushikulya canal in August 1894.

Under Minor Works the principal capital outlay incurred was on the Sagilérú project and on the Buckingham canal.

On the Sagilérú project the capital outlay was Rs. 84,085, including indirect charges. Good progress was made with the anicut, head and scouring sluices and supply channel, and materials were collected for a few masonry works.

On the Buckingham canal the capital outlay was Rs. 1,67,452, including indirect charges. Seven locks were completed and some improvements and diversions were in progress.

4. Of major works, the length of completed main canal was 2,054 miles and of distributaries 5,652. The aggregate length of navigable channels of both major and minor works was 1,294 miles.

5. The following statement shows the revenue receipts and working expenses of each work in operation for which Capital and Revenue Accounts are kept:—

Serial number.	System.	Gross revenue receipts, 1894-95.				Working expenses.			Net actual revenue.	Deduct receipts less maintenance charges on account of old irrigation.	Net revenue attributable to outlay of Government capital.	Percentage of return.
		Capital outlay.	Irrigation revenue.	Miscellaneous receipts.	Total.	Direct.	Indirect.	Total.				
1	2	3	4	5	6	7	8	9	10	11	12	13
MAJOR WORKS.												
1	Godavari ..	1,29,16,644	25,04,022	1,24,831	26,28,853	6,13,457	35,044	6,48,501	19,80,352	1,15,500	18,64,852	14.55
2	Kistna ..	1,16,26,104	20,36,154	53,729	20,89,883	6,18,715	23,500	6,42,215	16,47,668	86,100	14,61,568	12.74
3	Pennér ..	18,86,304	2,83,118	397	2,83,515	54,665	3,182	57,847	2,26,728	87,000	1,38,728	7.35
4	Sangam ..	37,84,748	3,24,490	536	3,25,026	68,432	3,777	72,209	2,62,817	1,14,000	1,38,817	3.67
5	Kurnool ..	2,16,95,111	1,04,550	8,506	1,13,056	1,06,306	3,374	1,09,680	3,376	3,376	3,376	0.02
6	Barur ..	4,19,713	11,842	26	11,868	4,661	201	4,862	7,005	1,850	5,155	1.23
7	Cauvery ..	17,84,268	(a) 45,38,420	3,569	46,41,989	4,12,688	39,666	4,52,354	40,89,635	32,85,722	8,03,913	45.06
8	Srivaikuntam ..	14,61,028	1,77,383	1,566	1,78,949	34,380	1,989	36,319	1,42,630	66,500	76,130	5.21
9	Rushikulya ..	40,10,984	47,160	1,023	48,183	16,290	376	16,666	32,517	20,850	11,667	0.29
Total, Major Works, 1894-95 ..												
MINOR WORKS.												
I.—Irrigation.												
1	Gumbam tank ..	55,375	42,677	..	42,677	3,763	82	3,845	38,832	25,973	8,857	15.99
2	Thadapalli channel ..	93,552	1,06,469	80	1,06,549	3,384	55	3,439	1,03,160	76,369	26,791	28.64
3	Arkenkota do. ..	1,02,964	28,465	..	28,465	1,654	30	1,684	26,781	19,498	7,283	7.07
4	Kalingaroyen do. ..	60,278	1,06,514	..	1,06,514	2,574	25	2,599	1,03,915	84,786	19,129	31.73
5	Pélar anicut ..	20,35,378	2,68,734	1,077	2,69,811	66,967	3,017	69,984	1,99,827	1,21,100	78,727	3.87
6	Poincy do. ..	2,31,828	90,133	689	90,822	29,460	738	30,198	60,624	46,539	14,085	6.07
7	Cheyara do. ..	3,85,049	81,715	129	81,844	20,889	499	21,388	60,456	44,849	16,107	4.18
8	Chembambakam tank ..	7,44,038	39,030	50	39,080	6,502	136	6,638	32,442	9,100	23,342	3.14
9	Madras water-supply ..	17,54,045	21,988	13,462	35,450	9,915	398	10,313	25,137	6,200	18,937	1.08
10	Valuru anicut ..	63,805	9,259	4	9,263	1,199	26	1,225	8,038	5,282	2,756	4.32
11	Trunkoyilur anicut ..	2,64,451	97,070	494	97,564	15,766	368	16,134	81,430	58,551	22,879	8.99
12	Mehamatur do. ..	71,047	12,378	20	12,398	3,695	76	3,771	8,727	2,084	6,643	9.35
13	Vridhdachalam do. ..	49,737	25,364	55	25,419	5,055	111	5,166	20,253	8,463	11,790	23.70
14	Shattatope do. ..	1,36,047	1,21,440	315	1,21,755	13,786	226	14,012	1,07,743	20,027	87,716	64.47
15	Pelandorai do. ..	4,53,931	32,033	273	32,306	10,264	234	10,498	21,798	2,850	18,948	4.17
16	Lower Coleroon do. ..	5,73,826	4,39,722	1,619	4,41,341	42,455	709	43,164	3,98,177	1,45,302	2,52,875	44.07
17	Marudur do. ..	41,135	1,85,866	192	1,86,058	16,517	341	16,858	1,59,230	1,14,264	44,966	133.62
Total, I.—Irrigation ..												
II.—Navigation.												
1	Chilka lake ..	31,027	..	..	31,027	609	16	625	..	..	625	..
2	Buckingham canal ..	84,79,914	..	1,09,427	1,09,427	97,883	3,653	1,01,536	7,891	..	7,891	0.09
3	Védaranniyam canal ..	..	..	1,136	1,136	3,722	110	3,832	2,696	..	2,696	..
4	Ganjam-Gopalpur canal ..	1,55,493	..	..	1,55,493	15	..	15	..	..	15	..
Total, II.—Navigation ..												
Total, Minor Works, 1894-95 ..												
Total for 1893-94 ..												
Total for 1894-95 ..												

(a) Exclusive of the revenue of the year derived from the system in the Trichinopoly district and inclusive of Rs. 6,60,297, the revenue of the previous year brought into the accounts in 1894-95.

6. Comparing the results of the year's working with the figures of 1893-94, the gross revenue derived from major works shows a satisfactory increase of Rupees 14,28,463. There was also an increase of Rs. 34,318 in the working expenses, so that the increase in the net revenue amounted to Rs. 13,94,145, of which Rupees 12,38,272 was due to old irrigation and the balance Rs. 1,55,873 is attributable to outlay of Government capital. The net revenue from major works is equivalent to a return of 7.61 per cent. on the capital outlay as compared with 7.45 per cent. in the previous year.

7. The net revenue derived from Minor Irrigation Works was Rs. 6,71,831, representing a return of 9.45 per cent. on the capital outlay as against 11.57 per cent. in 1893-94.

Of the four Minor Navigation Works, the Buckingham canal alone paid its working expenses, the gross revenue exceeding them by Rs. 7,891. The net deficit on the other three works was Rs. 3,336, or Rs. 546 more than in 1893-94.

8. The total irrigation revenue from major works during 1894-95 amounted to Rs. 1,02,73,852, inclusive of Rs. 6,50,297 brought into the accounts of the year on account of the irrigation revenue of the previous year of the Cauvery delta system. But as the revenue information for the Trichinopoly portion of the Cauvery delta system was not received in time, the amount credited in the accounts of the Public Works Department for 1894-95 was only Rs. 1,00,27,139. Of this, Rs. 95,43,645 represented the share of land revenue on account of water supplied from the canals, and the balance Rs. 4,83,494 was the irrigation share of enhanced land revenue.

9. The statement below shows the irrigation receipts and the areas irrigated under first and second crops :—

System.	Revenue derived from irrigated lands.		Area charged as irrigated.		Rate per acre.	
	1894-95.	1893-94.	1894-95.	1893-94.	1894-95.	1893-94.
1	2	3	4	5	6	7
Major Works.	RS.	RS.	ACRES.	ACRES.	RS.	RS.
Gódavari	25,04,022	24,17,675	759,513	721,740	3.3	3.3
Kistna	20,36,154	20,29,290	519,976	512,578	3.9	4.0
Pennéru	2,83,118	2,80,141	70,569	70,346	4.0	4.0
Sangam	3,24,490	3,13,561	76,678	74,960	4.2	4.2
Kurnool	1,04,550	1,18,621	33,540	31,424	3.1	3.8
Barur	11,842	11,045	4,480	4,324	2.6	2.6
Cauvery	45,38,420	32,35,301	989,891	996,055	4.6	3.2
Srivaikuntam	1,77,383	1,82,055	38,573	40,570	4.6	4.5
Rushikulya	47,160	17,571	27,389	8,195	1.7	2.1
Total Irrigation Works not charged against Revenue..	1,00,27,139	86,05,260	2,520,599	2,460,192	3.9	3.5
Minor Works.						
I.—Irrigation.						
Total ..	17,08,877	17,39,681	463,064	471,676	3.7	3.7
Grand Total ..	1,17,36,016	1,03,44,941	2,983,663	2,931,868	3.9	3.5

The area under Major Works charged as irrigated exceeded the area of the previous year by 60,407 acres, and there was a corresponding increase of Rs. 3,67,993 in the revenue assessments.

10. The following table gives details of the average water-rate per acre for first and second crops under Major Works, excluding areas irrigated free of charge :—

	First crop.						Second crop.
	Government lands.		Zemindari lands.		Inam lands.		
	Wet crop.	Dry crop.	Wet crop.	Dry crop.	Wet crop.	Dry crop.	
	RS.	RS.	RS.	RS.	RS.	RS.	RS.
Gódavari delta	4.01	2.11	4.06	2.45	4.01	2.56	2.53
Kistna	4.08	3.28	3.88	2.68	4.08	3.35	2.88
Pennéru anicut	4.52	3.16	..	..	4.07	3.25	2.57
Sangam	4.59	3.74	..	..	3.87	3.27	2.91
Kurnool-Cuddapah canal	4.10	1.87	..	..	3.90	2.33	2.92
Barur tank	3.76	3.80	4.00	..	4.00	3.67	1.26
Cauvery delta	4.39	3.00	..	..	3.96	3.11	3.71
Srivaikuntam anicut	6.25	3.42	3.98	3.06	4.00	3.50	3.23
Rushikulya project	1.94	2.27	2.11	..	2.07	1.98	1.11

11. The area irrigated under first crop on the major works was 2,235,404 acres and under second crop 227,957 acres, making a total of 2,463,361 acres. These figures are less than those shown in column 4 of the table in paragraph 9, as the latter includes the extent of "waste charged."

Of the total area of 2,463,361 acres, 2,390,653 acres were irrigated by flow and 72,708 acres by lift, or about 97.05 per cent. and 2.95 per cent. respectively.

12. The following statement shows the details of the working expenses including the old maintenance charges for each of the major systems and for the minor systems in the aggregate :—

Systems.	1894-95.					1893-94.
	New works and repairs.	Establishment.	Tools and plant.	Indirect charges.	Total.	Total.
Major Works.	RS.	RS.	RS.	RS.	RS.	RS.
Gódavari	2,41,922	3,25,953	45,582	35,044	6,48,501	6,24,380
Kistna	2,17,534	2,63,948	37,233	23,500	5,42,215	5,93,819
Pennéru	24,787	29,818	..	3,182	57,787	57,443
Sangam	33,129	35,121	182	3,777	72,209	77,223
Kurnool	75,902	29,326	1,078	3,374	1,09,680	1,42,842
Barur	2,831	1,830	..	201	4,862	4,912
Cauvery	85,918	3,26,662	108	39,666	4,52,354	3,55,830
Srivaikuntam	15,221	19,109	..	1,989	36,319	37,907
Rushikulya	11,239	4,003	48	376	15,666	10,919
Total, Major Works ..	7,08,483	10,35,770	84,231	1,11,109	19,39,593	19,05,275
Per acre irrigated ..	..	..	..	..	0.79	0.77
Minor Works and Navigation ..	2,39,785	1,11,791	4,348	10,850	3,66,774	2,97,930
Grand Total ..	9,48,268	11,47,561	88,579	1,21,959	23,06,367	22,03,205

The cost of maintaining the major works during the year was 19.00 per cent. of the gross revenue and 23.4 per cent. of the net revenue derived from them, against 21.6 per cent. and 27.6 per cent., respectively, in the previous year.

13. The charge for establishment in column 3 of the statement in the last paragraph is made up as follows :—

	Major works.	Minor works and navigation.	Total.
Revenue management	RS. 5,89,307	RS. 12,986	RS. 6,02,293
Direction and execution. .. .	2,90,123	44,919	3,35,042
Collection charges	..	..	..
Total ..	8,79,430	57,905	9,37,335
Maintenance of works	1,56,340	53,886	2,10,226
Grand Total ..	10,35,770	1,11,791	11,47,561

The cost of revenue management on the major works was 8.6 per cent. of the gross revenue realized from them.

14. The estimated value of the crops irrigated by the major works and the minor works in operation and for which Capital and Revenue Accounts are kept was 669 lakhs of rupees. Eighty-nine per cent. of the total area irrigated by these works was under rice-crop.

15. The following table gives the details regarding navigation on the four principal canals :—

	Length of navigable canals	Receipts.	Expenditure.	Value of goods.	Ton mileage.	Passengers.
	MILES.	RS.	RS.	RS.		
Godavari delta canals ..	493	1,03,892	81,261	2,30,52,554	11,967,929	256,612
Kistna delta canals ..	307	37,222	64,921	1,19,76,805	12,583,540	117,337
Kurnool-Cuddapah canal ..	190	1,457	10,102	2,39,050	151,365	32
Buckingham canal ..	262	1,07,784	62,885	1,78,53,374	25,975,977	93,825
Total for 1894-95 ..	1,252	2,50,355	2,19,169	5,31,20,783	50,678,811	467,806
Total for 1893-94 ..	1,242	2,41,542	2,27,655	5,40,74,418	45,552,974	486,368

16. The following table gives details regarding works for which neither Capital nor Revenue Accounts are kept :—

Class.	Area, first and second crops.	Irrigation revenue.	Rate per acre.	Outlay, direct and indirect, and collection charges.	Rate per acre.
	ACS.	RS.	RS.	RS.	RS.
I. Works under Public Works Department for which a continuous record of expenditure is kept individually ..	230,949	8,02,518	..	..	..
II. Other works under Public Works Department ..	1,328,053	37,52,115	..	..	..
III. Works under the Revenue Department ..	1,675,631	38,84,222	..	..	..
Total, 1894-95 ..	3,234,633	84,38,855	2.61	(a) 17,59,321	0.54
Total, 1893-94 ..	3,573,871	90,69,303	2.54	17,46,915	0.49

(a) Inclusive of Rs. 3,96,461, the outlay incurred by Civil officers and not included in the accounts of the Examiner of Public Works Accounts.

The total area irrigated was made up of 2,467,109 acres of first crop and 767,524 acres of second crop, and the irrigation revenue was Rs. 6,30,448 less than in the previous year. The decrease occurred chiefly under works in the Cuddapah, Anantapur, Chingleput, North Arcot, Madura and Tinnevely districts owing to deficient rainfall.

17. The following statement shows the outlay on Agricultural works, i.e., river conservancy and embankments :—

Original works ..	..	..	..	..	..	RS. 83,869
Repairs ..	..	..	..	..	..	2,13,265
Establishment ..	..	..	..	..	..	2,97,134
Tools and plant ..	..	..	..	..	..	64,423
	..	..	..	..	..	4,032
Total ..	..	..	..	..	..	3,65,589

The receipts realized from the plantations along the river embankments amounted to Rs. 26,979 against Rs. 43,777 in the previous year.

18. Six investigating parties were at work on the Tank Restoration Scheme, the expenditure on which during and up to the end of the year was as follows :—

	Expenditure during 1894-95.					Expenditure to end of 1894-95.
	Works.	Repairs.	Establishment.	Tools and plant.	Total.	
	RS.	RS.	RS.	RS.	RS.	RS.
Execution ..	2,41,375	1,19,652	82,355	5,392	4,48,774	41,24,193
Investigation ..	216	..	55,341	579	56,136	12,25,470
Total ..	2,41,591	1,19,652	1,37,696	5,971	5,04,910	53,49,663

Up to the end of the year, 31,377 square miles had been completely investigated and estimates for 4,315 works to the amount of Rs. 45,66,193 had been sanctioned.

19. The following figures relate to the discharge of some of the principal canals which are not supplied mostly from storage works, and the areas irrigated from them :—

	Area actually irrigated, first crop.	Maximum discharge as designed.	Maximum discharge during the year.	Average discharge at head.	Acres irrigated per cubic foot per second of average discharge.
	ACRES.	CUBIC FT. PER SECOND.	CUBIC FT. PER SECOND.	CUBIC FT. PER SECOND.	FIRST CROP.
Godavari ..	654,126	(a) 8,516	13,176	7,006	93.36
Kistna ..	514,812	8,126	9,184	4,508	114.20
Pennéru ..	64,608	2,306	1,004	371	173.87
Sangam ..	70,517	4,800	5,361	670	105.25
Kurnool ..	25,832	1,468	935	563	45.88
Cauvery ..	855,258	Not known.	28,460	11,252	76.01

(a) Previous to the construction of the extra vents built in 1887-88 to the Dowlaishweram head sluice.

20. During the year the investigation of the Mellavagu, Atmakúru and Manchikalla projects in the Kistna Northern division were put in hand.

21. The report was received by the Government of India on the 4th February 1896, and is accompanied, in addition to the usual appendices, by a descriptive note of the Kistna delta system illustrated by photo. prints.

Order.—Ordered, that copies of this review and of the report be forwarded to the Revenue and Agricultural Department for information.

Ordered also, that copies of this review be forwarded to the Government of Madras

and to the Local Governments and Administrations in the Public Works Department noted in the margin, for information.

Ordered further, that this review be published in the *Gazette of India*, and that copies of the review be forwarded to Her Majesty's Secretary of State for India.

(Signed) JOHN W. OTTLEY, Col., R.E.,
Deputy Secy. to the Govt. of India.

To the Secretary to the Government of Madras,
Public Works Department.

ORDER—No. 512 I., dated 16th June 1896.

Communicated to the officers concerned for information.

(True Extract.)

Under Secy. to Govt., P.W.D.,
Irrigation Branch.

To the Chief Engineer for Irrigation.
„ the Chief Engineer, Tank Restoration Scheme.
„ all Superintending Engineers.
„ the Consulting Engineer for Railways.
„ the Examiner, Public Works Accounts.
„ the Public Department.
„ the Revenue Department.

Exd. C. M. Brisson.

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IRRIGATION.

Govt. of {1896} Madras.

PUBLIC WORKS.

Dated June, 16th.

Recd.

Encl.

G.O. No. 512 I., 16th June 1896.

JUNE

Administration Report of Irrigation Works in the Madras Presidency for 1894-95

The Government of India review of the —, communicated to the officers concerned for information.

No 512 I, dt 16 June 1896.

PROCEEDINGS OF THE MADRAS GOVERNMENT.

UNDER date the

Read the following

From Govt of India No 96 I. & 19 May 196.

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to the officers concerned
for information.

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To
The Chief Eng. for S.
all S. & P. Engrs.
Cons. Eng. for S.
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Public Works
Dep.
10/6/96

Administration Report of Irrigation Works in the Madras Presidency for 1894-95
The Government of India review of the —, communicated to the officers concerned for information.

Govt of India review
of the Administration
Report of the P. W. D.,
Imperial Branch,
for 1894-95.

Issue
Papers
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96

GOVERNMENT OF INDIA.
PUBLIC WORKS DEPARTMENT.
CIVIL WORKS.
Irrigation.

READ—

Administration Report of Irrigation Works in the Madras Presidency for 1894-95.

OBSERVATIONS.—There are ten Major Works in the Madras Presidency, of which nine are classed as Productive, and one, the Rushikulya project, as Protective. All of the productive works are in operation with the exception of the Periyár project, which is still under construction, and the construction estimates of seven of them have been closed.

The number of Minor Works for which Capital and Revenue Accounts are kept was raised during the year from 24 to 26 by the inclusion of the Ganjam minor rivers system and the Nandyar channel in the Trichinopoly district. Of these Minor Works twenty-two are irrigation systems, and four are tidal canals intended for navigation only. They are all in operation with the exception of the Munnyeru, Dondapad, Sagileru, and Nandyar channel projects and the Ganjam-Gopalpur tidal canal, and the construction estimates of all have been closed with the exception of the following six projects: the Buckingham Canal, the Cumbum tank, and the Palar, Poiney, Cheyáru, and Lower Coleroon anicut systems.

2. The Capital Outlay incurred on the Major and Minor Works during and up to the end of 1894-95 was as follows :—

		DURING THE YEAR 1894-95,								Total direct and indirect 10 end of 1894-95.
	Number of Works.	Works.	Estab- lishment.	Tools and Plant.	Susp-nse Account.	Total direct charges.	Indirect charges.	Total direct and indirect charges.		
I	2	3	4	5	6	7	8	9	10	
		Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	
Major Works.										
Protective Irrigation Works (Account head 35).	1	2,45,747	52,613	11,366	...	3,09,726	26,702	3,36,428	40,10,884	
Irrigation Works not charged against Revenue (Account head 49).	9	10,67,083	2,39,215	1,11,723	—807	14,17,214	49,659	14,66,873	6,30,22,149	
Minor Works and Navigation.										
Works for which Capital and Revenue Accounts are kept (Account head 43).	23*	3,24,597	72,866	11,659	...	4,09,122	12,824	4,21,946	1,60,38,589	
TOTAL ...	33	16,37,427	3,64,694	1,34,748	—807	21,36,062	89,185	22,25,247	8,30,71,622	

* Exclusive of the Ganjam minor rivers system, the Nandyar channel and the Védaranniyam Canal, for which complete Capital Accounts to end of 1894-95 have not yet been prepared.

3. Under Major Works, the Capital Outlay was incurred chiefly on the Kistna, Periyar, and Rushikulya projects. The Capital Outlay on the Kistna delta system was Rs. 4,29,197, including indirect charges, and was incurred on various improvements to head-works, canals and distributaries.

The Capital Outlay on the Periyar project amounted to Rs. 9,82,563, including indirect charges. The work in the head-works subdivision was again impeded by an outbreak of cholera at the beginning of the year, but good progress was made nevertheless with the dam. Its average height was raised from 68 feet to 115 feet, the addition representing 1,552,656 cubic feet of material.

The boring of the water-shed tunnel was completed and the masonry work at the mouth of the tunnel put in hand. In the Madura Division 36 miles of canals and $70\frac{3}{4}$ miles of distributaries were completed up to the end of the year.

The Capital Outlay on the Rashikulya project was Rs. 3,36,428, including indirect charges. The Russellkonda reservoir dam and head sluice were

completed, and water was let down the whole length of the Rushikulya Canal in August 1894.

Under Minor Works the principal Capital Outlay incurred was on the Sagileru project and on the Buckingham Canal.

On the Sagileru project the Capital Outlay was Rs. 84,085, including indirect charges. Good progress was made with the anicut, head and scouring sluices and supply channel, and materials were collected for a few masonry works.

On the Buckingham Canal the Capital Outlay was Rs. 1,67,452, including indirect charges. Seven locks were completed and some improvements and diversions were in progress.

4. Of Major Works the length of completed main canal was 2,054 miles and of distributaries 5,652. The aggregate length of navigable channels of both Major and Minor Works was 1,294 miles.

5. The following statement shows the revenue receipts and working expenses of each work in operation for which Capital and Revenue Accounts are kept :—

Serial number.	System.	Capital outlay.	GROSS REVENUE RECEIPTS, 1894-95.			WORKING EXPENSES.			Net actual revenue.	Deduct receipts less maintenance charges on account of old irrigation.	Net revenue attributable to outlay of Government capital.	Percentage of return.
			Irrigation revenue.	Miscellaneous receipts.	Total.	Direct.	Indirect.	Total.				
1	2	3	4	5	6	7	8	9	10	11	12	
MAJOR WORKS.												
1	Godavari	1,28,16,644	25,04,022	1,24,831	26,28,853	6,13,457	35,044	6,48,501	19,80,352	1,15,500	18,64,852	14'55
2	Kistna	1,16,25,104	20,36,154	53,729	20,89,883	5,18,715	23,500	5,42,215	15,47,668	66,100	14,81,568	12'74
3	Penner	18,86,204	2,83,118	397	2,83,515	54,605	3,182	57,787	2,25,728	87,000	1,38,728	7'35
4	Sangam	37,84,748	3,24,490	536	3,25,026	1,68,432	3,777	72,209	2,52,817	1,14,000	1,38,817	3'67
5	Karnul	2,16,95,111	1,04,550	8,506	1,13,056	1,06,306	3,374	1,09,680	3,376	...	3,376	0'02
6	Barur	4,19,713	11,842	26	11,868	4,661	201	4,862	7,006	1,850	5,156	1'23
7	Cauvery	17,84,238	(a) 45,38,420	3,599	45,41,989	4,12,688	39,666	4,52,354	40,89,635	32,85,722	8,03,913	45'06
8	Srivaikuntham	14,61,028	1,77,383	1,566	1,78,949	34,330	1,989	36,319	1,42,630	66,500	76,130	5'21
9	Rushikulya	40,10,884	47,160	1,023	48,183	15,490	376	15,866	32,517	20,850	11,667	0'29
Total Major Works, 1894-95		5,94,83,794	1,00,27,139	1,94,183	1,02,21,322	18,28,484	1,11,109	19,39,593	82,81,729	37,57,522	45,24,207	7'61
Total for 1893-94		5,66,63,056	86,05,260	1,87,599	87,92,859	18,00,984	1,04,291	19,05,275	68,87,584	25,10,250	43,68,334	7'45
MINOR WORKS.												
I.—Irrigation.												
1	Cumbum tank	55,375	42,677	...	42,677	3,763	82	3,845	38,832	29,975	8,857	15'00
2	Thadapalli channel	93,552	1,06,469	80	1,06,549	3,334	55	3,389	1,03,160	76,369	26,791	28'64
3	Arkenkota do.	1,02,964	28,465	...	28,465	1,654	30	1,684	26,781	19,498	7,283	7'07
4	Kalingaroyen do.	60,278	1,06,514	...	1,06,514	2,574	25	2,599	1,03,915	84,786	19,129	31'73
5	Palar anicut	20,35,378	2,68,734	1,077	2,69,811	66,967	3,017	69,984	1,69,827	1,21,100	48,727	3'87
6	Poincy do.	2,31,828	90,133	689	90,822	29,460	738	30,198	60,624	46,539	14,085	6'07
7	Cheyaru do.	3,85,049	81,715	127	81,842	20,889	499	21,388	60,456	44,349	16,107	4'18
8	Chembrambakam tank... ..	7,44,038	39,030	50	39,080	6,502	136	6,638	32,442	9,100	23,342	3'14
9	Madras water-supply	17,54,045	21,938	13,462	35,450	9,915	398	10,313	25,137	6,200	18,937	1'08
10	Valluru anicut	69,805	9,259	4	9,263	1,199	26	1,225	8,038	5,282	2,756	4'32
11	Tirukkoyilur do.	2,54,451	97,070	494	97,564	15,766	368	16,134	81,430	58,551	22,879	8'90
12	Mehamattur do.	71,047	12,378	20	12,398	3,995	76	3,071	8,727	2,084	6,643	9'35
13	Vridhdachalam do.	49,737	25,364	55	25,419	5,935	111	5,166	20,253	8,463	11,790	23'70
14	Shatiatope do.	1,36,047	1,21,440	315	1,21,755	13,786	226	14,012	1,07,743	20,027	87,716	64'47
15	Pelandorai do.	4,53,931	32,023	273	32,296	10,264	234	10,498	21,798	2,850	18,948	4'17
16	Lower Coleroon do.	5,73,826	4,39,722	1,619	4,41,341	42,455	799	43,254	3,98,177	1,45,302	2,52,875	44'07
17	Maradur do.	41,135	1,85,896	192	1,86,088	16,517	341	16,858	1,69,230	1,14,264	54,966	133'62
Total I.—Irrigation		71,06,486	17,08,877	18,459	17,27,336	2,53,695	7,071	2,60,766	14,66,570	7,94,739	6,71,831	9'45
II.—Navigation.												
1	Chilka Lake	31,027	...	...	...	609	16	625	— 625	...	— 625	...
2	Buckingham Canal	84,79,914	...	1,99,427	1,09,427	97,883	3,653	1,01,536	7,891	...	7,891	0'09
3	Vedaraniyam do.	...	...	1,136	1,136	3,722	110	3,832	— 2,696	...	— 2,696	...
4	Ganjam-Gopalpur Canal	1,35,493	...	...	...	15	...	15	...	...	— 15	...
Total II.—Navigation		86,66,434	...	1,10,563	1,10,563	1,02,229	3,779	1,06,008	4,556	...	4,555	0'05
Total Minor Works, 1894-95		1,57,72,020	17,08,877	1,20,022	18,37,899	3,55,924	10,850	3,66,774	14,71,125	7,94,739	6,76,386	4'29
TOTAL FOR 1893-94		1,54,98,379	17,39,681	1,27,874	18,67,555	2,89,912	8,018	2,97,930	15,69,625	7,78,988	7,90,637	5'10

(a) Exclusive of the revenue of the year derived from the system in the Trichinopoly district and inclusive of Rs. 6,50,297, the revenue of the previous year brought into the accounts in 1894-95.

6. Comparing the results of the year's working with the figures of 1893-94, the gross revenue derived from Major Works shows a satisfactory increase of Rs. 14,28,463. There was also an increase of Rs. 34,318 in the working expenses, so that the increase in the net revenue amounted to Rs. 13,94,145; of which Rs. 12,38,272 was due to old irrigation and the balance Rs. 1,55,873 is attributable to outlay of Government capital. The net revenue from Major Works is equivalent to a return of 7'61 per cent. on the Capital Outlay as compared with 7'45 per cent. in the previous year.

7. The net revenue derived from Minor *Irrigation* Works was Rs. 6,71,831, representing a return of 9'45 per cent. on the Capital Outlay as against 11'57 per cent. in 1893-94.

Of the four Minor *Navigation* Works, the Buckingham Canal alone paid its working expenses, the gross revenue exceeding them by Rs. 7,891. The net deficit on the other three works was Rs. 3,336, or Rs. 546 more than in 1893-94.

8. The total irrigation revenue from Major Works during 1894-95 amounted to Rs. 1,02,73,852, inclusive of Rs. 6,50,297 brought into the accounts of the year on account of the irrigation revenue of the previous year of the Cauvery Delta system. But as the revenue information for the Trichinopoly portion of the Cauvery Delta system was not received in time, the amount credited in the accounts of the Public Works Department for 1894-95 was only Rs. 1,00,27,139. Of this, Rs. 95,43,645 represented the share of land revenue on account of water supplied from the canals, and the balance Rs. 4,83,494 was the irrigation share of enhanced land revenue.

9. The statement below shows the irrigation receipts and the areas irrigated under first and second crops :—

System.	REVENUE DERIVED FROM IRRIGATED LANDS.		AREA CHARGED AS IRRIGATED.		RATE PER ACRE.	
	1894-95.	1893-94.	1894-95.	1893-94.	1894-95.	1893-94.
1	2	3	4	5	6	7
Major Works.						
Godavari ...	25,04,022	24,17,675	759,513	721,740	3'3	3'3
Kistna ...	20,36,154	20,29,290	519,976	512,578	3'9	4'0
Penner ...	2,83,118	2,80,141	70,559	70,346	4'0	4'0
Sangam ...	3,24,490	3,13,561	76,678	74,960	4'2	4'2
Karnul ...	1,04,550	1,18,621	33,540	31,424	3'1	3'8
Barur ...	11,842	11,045	4,480	4,324	2'6	2'5
Cauvery ...	45,38,420	32,35,301	989,891	990,055	4'6	3'2
Srivaikuntham...	1,77,383	1,82,055	38,573	40,570	4'6	4'5
Rushikulya ...	47,160	17,571	27,389	8,195	1'7	1'2
Total Irrigation Works not charged against Revenue	1,00,27,139	86,05,260	2,520,599	2,460,192	3'9	3'5
Minor Works.						
I.—Irrigation.						
Total ...	17,08,877	17,39,681	463,064	471,676	3'7	3'7
GRAND TOTAL						
	1,17,36,016	1,03,44,941	2,983,663	2,931,868	3'9	3'5

The area under Major Works charged as irrigated exceeded the area of the previous year by 60,407 acres, and there was a corresponding increase of Rs. 3,67,998 in the revenue assessments.

10. The following table gives details of the average water-rate per acre for first and second crops under Major Works, excluding areas irrigated free of charge:—

charge:—

	FIRST CROP.						Second crop.
	GOVERNMENT LANDS.		ZEMINDARI LANDS.		INAM LANDS.		
	Wet crop.	Dry crop.	Wet crop.	Dry crop.	Wet crop.	Dry crop.	
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
Godavari delta ...	4'01	2'11	4'06	2'45	4'01	2'56	2'53
Kistna ...	4'08	3'28	3'88	2'68	4'08	3'35	2'88
Penner anicut ...	4'52	3'16	...	...	4'07	3'25	2'57
Sangam ...	4'59	3'74	...	...	3'87	3'27	2'91
Karnul-Cuddapah Canal ...	4'10	1'87	...	...	3'90	2'33	2'92
Barur tank ...	3'76	3'80	4'00	...	4'00	3'67	1'26
Cauvery delta ...	4'69	3'00	...	...	3'96	3'11	3'71
Srivaikuntham anicut ...	6'25	3'42	3'93	3'06	4'00	3'50	3'23
Rushikulya project ...	1'94	2'27	2'11	...	2'07	1'98	1'11

11. The area irrigated under first crop on the Major Works was 2,235,404 acres and under second crop 227,957 acres, making a total of 2,463,361 acres. These figures are less than those shown in column 4 of the table in paragraph 9, as the latter includes the extent of "waste charged."

Of the total area of 2,463,361 acres, 2,390,653 acres were irrigated by flow and 72,708 acres by lift, or about 97'05 per cent. and 2'95 per cent., respectively.

12. The following statement shows the details of the working expenses, including the old maintenance charges for each of the Major Systems and for the Minor Systems in the aggregate:—

Systems.	1894-95.					1893-94.
	New works and repairs.	Establishment.	Tools and plant.	Indirect charges.	Total.	Total.
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
<i>Major Works.</i>						
Godavari ...	2,41,922	3,25,953	45,582	35,044	6,48,501	6,24,380
Kistna ...	2,17,534	2,63,948	37,233	23,500	5,42,215	5,93,819
Penner ...	24,787	29,818	...	3,182	57,787	57,443
Sangam ...	33,129	35,121	182	3,777	72,209	77,223
Karnul ...	75,902	29,326	1,078	3,374	1,09,680	1,42,842
Barur ...	2,831	1,830	...	201	4,862	4,912
Cauvery ...	85,918	3,26,662	108	39,666	4,52,354	3,55,830
Srivaikuntham ...	15,221	19,109	...	1,989	36,319	37,907
Rushikulya ...	11,239	4,003	48	376	15,666	10,919
Total Major Works	7,08,483	10,35,770	84,231	1,11,109	19,39,593	19,05,275
Per acre irrigated	...	...	...	...	0'79	0'77
Minor Works and Navigation	2,39,785	1,11,791	4,348	10,850	3,66,774	2,97,930
GRAND TOTAL	9,48,268	11,47,561	88,579	1,21,959	23,06,367	22,03,205

The cost of maintaining the Major Works during the year was 19'00 per cent. of the gross revenue and 23'4 per cent. of the net revenue derived from them, against 21'6 per cent. and 27'6 per cent., respectively, in the previous year.

13. The charge for establishment in column 3 of the statement in the last paragraph is made up as follows:—

	Major works.	Minor works and navigation.	Total.
	Rs.	Rs.	Rs.
Revenue management ...	5,89,307	12,986	6,02,293
Collection charges ...	2,90,123	44,919	3,35,042
Total ...	8,79,430	57,905	9,37,335
Maintenance of works ...	1,56,340	53,886	2,10,226
GRAND TOTAL ...	10,35,770	1,11,791	11,47,561

The cost of revenue management on the Major Works was 8'6 per cent. of the gross revenue realized from them.

14. The estimated value of the crops irrigated by the Major Works and the Minor Works in operation and for which Capital and Revenue Accounts are kept was 669 lakhs of rupees. Eighty-nine per cent. of the total area irrigated by these works was under rice crop.

15. The following table gives the details regarding navigation on the four principal canals:—

	Length of navigable canals.	Receipts.	Expenditure.	Value of goods.	Ton-mileage.	Passengers.
	Miles.	Rs.	Rs.	Rs.		
Godavari delta canals ...	493	1,03,892	81,261	2,30,52,554	11,967,929	256,612
Kistna delta canals ...	307	37,222	64,921	1,19,75,805	12,583,540	117,337
Karnul-Cuddapah canal ...	190	1,457	10,102	2,39,050	151,365	32
Buckingham canal ...	262	1,07,784	62,885	1,78,53,374	25,975,977	93,825
Total for 1894-95 ...	1,252	2,59,355	2,19,169	5,31,20,783	50,678,811	467,806
Total for 1893-94 ...	1,242	2,41,542	2,27,655	5,40,74,418	45,552,974	486,368

16. The following table gives details regarding works for which neither Capital nor Revenue Accounts are kept:—

Class.	Area, first and second crops.	Irrigation revenue.	Rate per acre	Outlay, direct and indirect, and collection charges.	Rate per acre.
	Acres.	Rs.	Rs.	Rs.	Rs.
I. Works under Public Works Department for which a continuous record of expenditure is kept individually...	230,949	8,02,518	...	...	...
II. Other works under Public Works Department ...	1,328,053	37,52,115	...	...	...
III. Works under the Revenue Department ...	1,675,631	38,84,222	...	...	...
Total, 1894-95 ...	3,234,633	84,38,855	2'61	(a) 17,59,321	0'54
Total, 1893-94 ...	3,573,871	90,69,303	2'54	17,46,915	0'49

(a) Inclusive of Rs. 3,96,461, the outlay incurred by Civil officers and not included in the accounts of the Examiner of Public Works Accounts.

The total area irrigated was made up of 2,467,109 acres of first crop and 767,524 acres of second crop, and the irrigation revenue was Rs. 6,30,448 less than in the previous year. The decrease occurred chiefly under works in the Cuddapah, Anantapur, Chingleput, North Arcot, Madura and Tinnevely districts owing to deficient rainfall.

17. The following statement shows the outlay on Agricultural Works, i.e., river conservancy and embankments:—

			Rs.	Rs.
Original Works	...	...	83,869	
Repairs	...	...	2,13,265	
				2,97,134
Establishment	...	...	...	64,423
Tools and plant	...	...	...	4,032
Total	...	...		3,65,589

The receipts realized from the plantations along the river embankments amounted to Rs. 26,979 against Rs. 43,777 in the previous year.

18. Six investigating parties were at work on the Tank Restoration scheme, the expenditure on which during and up to the end of the year was as follows:—

	EXPENDITURE DURING 1894-95.					Expenditure to end of 1894-95.
	Works.	Repairs.	Establishment.	Tools and plant.	Total.	
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
Execution ...	2,41,375	1,19,652	82,355	5,392	4,48,774	41,24,193
Investigation ...	216	...	55,341	579	56,136	12,25,470
Total ...	2,41,591	1,19,652	1,37,696	5,971	5,04,910	53,49,663

Up to the end of the year 31,377 square miles had been completely investigated and estimates for 4,315 works to the amount of Rs. 45,66,193 had been sanctioned.

19. The following figures relate to the discharge of some of the principal canals which are not supplied mostly from storage works, and the areas irrigated from them:—

	Area actually irrigated, first crop.	Maximum discharge as designed.	Maximum discharge during the year.	Average discharge at head.	Acres irrigated per cubic foot per second of average discharge.
	ACRES.	CUBIC FT. PER SECOND.	CUBIC FT. PER SECOND.	CUBIC FT. PER SECOND.	FIRST CROP.
Godavari ...	654,126	(a) 8,516	13,176	7,006	93'36
Kistna ...	514,812	8,126	9,184	4,508	114'20
Penner ...	64,508	2,306	1,004	371	173'87
Sangam ...	70,517	4,800	5,361	670	105'25
Karnul ...	25,832	1,468	935	563	45'88
Cauvery ...	855,258	Not known.	28,460	11,252	76'01

(a) Previous to the construction of the extra vents built in 1887-88 to the Dowlaishwaram head sluice.

20. During the year the investigation of the Mellavagu, Atmakur and Manchikalla projects in the Kistna Northern Division were put in hand.

21. The report was received by the Government of India on the 4th February 1896, and is accompanied, in addition to the usual appendices, by a descriptive note of the Kistna Delta system illustrated by photo. prints.

ORDER.—Ordered, that copies of this review and of the report be forwarded to the Revenue and Agricultural Department for information.

Ordered also, that copies of this review be forwarded to the Government of Madras and to the Local Governments and Administrations in the Public Works Department noted in the margin, for information.

The Governments of Bombay, Bengal, the North-Western Provinces and Oudh, and the Punjab.
The Chief Commissioners of the Central Provinces and Burma.
The Agents to the Governor General in Rajputana and Baluchistan.

Ordered further, that this review be published in the *Gazette of India*, and that copies of the review be forwarded to Her Majesty's Secretary of State for India.

W. N. Oulton

Colonel, R.E.,

Deputy Secretary to the Government of India.

To The Secy to the Govt of Madras.
P.W. Dept.

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Dec. 28. 96

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