C.F. 75.

Date taken out.	For what purpose.			Initials of clerk taking the paper or of attender.	Date returned.	Initials of attender.
	Department.	C. No.	Year.			

Public Works (1898) Department.

~~Urgent~~ Show Print

G.O., No. 559 / 560

DATED 22nd ~~June~~ July 98

120/1

[Despatch Abstract.]

Sangam Anicut System. The revised completion report of the —— with note thereon by the Chief Engineer for Irrigation, approved & a copy of the Pros: ordered to be forwarded to the Govt of India.

Sangam Anicut System =

forwarding copy of Pros: approving the revised completion report of the —— submitted with remarks by the Chief Engineer for Irrigation.

Indexed.

BACK PAPERS.

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

FURTHER PAPERS.

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

IRRIGATION.

ACCOUNT.

Government {1898} of Madras.

PUBLIC WORKS.

Regd. } 1898. *Enclosures*

Regd. *Spare copies*

G.O., Nos. 559, 560 I., 22nd July 1898.

JULY.

Sangam Anicut System

Forwarding copy of Proceedings approving the revised completion report of the — submitted, with remarks, by the Chief Engineer for Irrigation.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Irrigation.
Account.

READ—again the following papers :—

G.O., No. 1027 I., dated 26th November 1895.

Read—the following paper :—

From the Under Secretary to the Government of India, Public Works Department (Civil Works—Irrigation), dated Simla, 5th November 1895, No. 270 I.

Order—No. 1027 I., dated 26th November 1895.

Communicated to the officers concerned with reference to G.O., No. 698 I., dated 29th August 1895.

2. The Chief Engineer for Irrigation will submit, as soon as possible, a revised completion report for the Sangam anicut system with the information required by the Government of India to decide the incidence of the further capital outlay thereon.

	Rs.
Gogulapalli branch channel, minor sluice, 2 miles 1,050 feet, right bank	270
Gogulapalli regulator and sluice, 2 miles 1,320 feet ..	530
Total, I. Works ..	800
II. Establishment ..	184
Total ..	984

Sanction to expire on 31st March 1896.

3. The sanction accorded by the Government of India in paragraph 4 of the foregoing letter is registered as No. 148 I. of 1895–96.

4. The estimates sanctioned for the works marginally noted will be treated as having been sanctioned under "Open Capital Account" of the Sangam anicut system.

(True Extract.)

(Signed) R. R. E. DRAKE-BROCKMAN, Colonel, R.E.,
Joint Secy. to Govt., P.W.D.,
Irrigation Branch.

From Colonel R. R. E. DRAKE-BROCKMAN, R.E., Chief Engineer for Irrigation, to the Secretary to the Board of Revenue (Revenue Settlement, Land Records and Agriculture), dated 18th November 1895, No. 594 M.

In the forecast statement of irrigation and growth of revenue under the Sangam anicut system submitted with the Proceedings of the Board of Revenue (Revenue Settlement, Land Records and Agriculture), No. 618,* dated 2nd November 1888, it was expected that the ultimate increase will be reached in 1896–97. The actuals for 1894–95 compare with the Board's estimate above referred to as shown below :—

* Printed in Proceedings of Madras Government, No. 44 I., dated 5th February 1889.

—	First crop.	Second crop.	Irrigation revenue.
	ACS.	ACS.	RS.
Board's estimate	94,000	16,026	2,84,173
Actuals for 1894–95	72,583	4,095	1,85,490
Balance of ultimate increase still to be reached ..	21,417	11,931	98,683

The accounts for the past year have not yet been closed by the Examiner, Public Works Accounts, but the percentage of net revenue derived from the system in 1893–94 was only 2·79 on the sum at charge, viz., Rs. 44,02,748, which shows that the system has not yet fulfilled the conditions of a productive public work. The construction estimate was closed on 31st March 1894.

2. As the Government of India desires to be furnished with information as to whether the ultimate revenue will cover the interest charges on the sum at charge in order to decide the incidence of further capital outlay on the system, I have the honour to request that you will be so good as to inform me at as early a date as practicable what probability there is of the revenue anticipated in 1888 being fully realized.

READ—also the following papers :—

Proceedings of the Board of Revenue (Revenue Settlement, Land Records and Agriculture), Mis. No. 878, dated 19th February 1896.

Read—the following letter from the Collector of Nellore, dated 15th February 1896, Ref. No. 872/Ver. :—

With reference to Board's Proceedings, Mis. No. 689, dated 7th February 1896, I have the honour to state that a reply to the Board's original reference is pending information from the Tahsildars of Nellore and Kavali and the Executive Engineer.

2. The Board's estimate of 94,000 acres mentioned in Proceedings, No. 618, dated 2nd November 1888, as the first-crop area irrigable under the Sangam project, has all along been the estimate calculated by both the Public Works and Revenue officers. The Board is aware that, during the past few years, the freshes in the Pennér have not been as timely and as abundant as they ought to be. It is possible that the maximum cultivation was not reached on this account, but in the absence of correct figures showing the quantity of water available in a series of years, it cannot be asserted that dearth of water was the only cause. In any case, there were extensive lands unoccupied in the villages of Yellayappollem, Gandavaram, Nagamambapuram, Rebala, &c., at the time of framing the forecast statement referred to in the Board's Proceedings. It was then considered that these lands would be taken up on wet assessment. A large portion has accordingly been granted on wet rates, but only dry assessment is being levied, as no means of irrigation was provided. I am making detailed enquiries as to the causes which contributed to short cultivation, without which no satisfactory reply can be made to the Board's reference. The information will be collected with the least possible delay and the reply submitted as soon as possible.

Resolution—Mis. No. 878, dated 19th February 1896.

Communicated to the Chief Engineer for Irrigation, with reference to his letter dated 18th November 1895, No. 594 M.

2. The further report promised by the Collector is awaited.

(True Copy and Extract.)

(Signed) I. SARABHALINGAM NAIDU,
for Secretary.

Proceedings of the Board of Revenue (Revenue Settlement, Land Records and Agriculture), Mis. No. 4450, dated 12th September 1896.

Read—the following letter from the Collector of Nellore, dated 3rd September 1896, Ref. No. 240 G.B./Ver. :—

With reference to Board's Proceedings, Mis. No. 3944, dated 11th August 1896, I have the honour to state that the forecast reported in 1888 was not, I find, based on villagewar particulars of areas available, &c., but was made out with reference to gross calculations based on conjecture. I have now thoroughly worked out villagewar particulars for the 94,000 acres estimated as irrigable when the original forecast was made for each village commanded by the Sangam project and am sending a statement of all unirrigated lands to the Executive Engineer in view to ascertaining from him definitely what portion thereof can be irrigated and when means of irrigation will be provided for such portions. I shall submit a final reply to the Board as soon as I hear from the Executive Engineer.

Resolution—Mis. No. 4450, dated 12th September 1896.

Communicated to the Chief Engineer for Irrigation.

2. The final reply promised by the Collector is awaited.

(True Copy and Extract.)

(Signed) I. SARABHALINGAM NAIDU,
for Secretary.

Proceedings of the Board of Revenue (Revenue Settlement, Land Records and Agriculture), No. 406, dated 7th December 1896.

Read—again the following papers :—

Proceedings of the Board of Revenue (Revenue Settlement, Land Records and Agriculture), Mis. No. 6595, dated 3rd December 1895.

ABSTRACT.—Forwarding to the Collector of Nellore, for early report, letter from the Chief Engineer for Irrigation requesting to be informed what probability there is of the revenue under Sangam anicut anticipated in 1888 being fully realized.

Proceedings of the Board of Revenue (Revenue Settlement, Land Records and Agriculture), Mis. No. 4450, dated 12th September 1896.

ABSTRACT.—Communicating, with remark, to the Chief Engineer for Irrigation letter from the Collector of Nellore stating that the forecast of cultivation under the Sangam anicut reported in 1888 was not based on villagewar particulars of areas available, &c.

Read—also the following paper :—

From E. SCOTT, Esq., Acting Collector of Nellore, to the Secretary to the Commissioner of Revenue Settlement and Director of the Department of Land Records and Agriculture, dated 16th October 1896, No. 3795 Ver.

In continuation of this office letter No. 240 G.B./Ver., dated 3rd September 1896, I have the honour to submit a final reply to Board's Proceedings, Mis. No. 6595, dated 3rd December 1895.

2. The above Proceedings gives cover to a letter from the Chief Engineer, in which, while bringing to notice the backward financial results of the Sangam irrigation project as exhibited by the actuals of 1894–95 when compared with the forecast prepared in 1888, he requests to be informed what probability there is of that forecast being realized.

3. The figures of the forecast of irrigation of 1888 were not based on any villagewar particulars of areas available for irrigation. It was assumed (1) that a certain percentage of all unoccupied lands would be newly brought under wet cultivation ; (2) that a certain percentage of the occupied dry lands would be cultivated with wet crops; and (3) that a certain further percentage of occupied wet lands would be cultivated with a second wet crop—*vide* this office letter, No. 793 Ver., dated 4th April 1888. The forecast was not therefore likely to be even approximately correct, and it has therefore been necessary to disregard that forecast and frame a fresh one *de novo*.

4. It was originally estimated that 94,000 acres (first crop) would be irrigated under the project. The estimate was based upon the villagewar statement of irrigable areas prepared by the Collector in 1868 and shown as an enclosure to the papers disposed of in G.O., No. 1818, dated 28th July 1870. quoted in G.O., No. 818, dated 18th March 1871, and upon the estimated available supply of water for irrigation, but no attempt was then made to ascertain, even approximately, the probable cultivation under the project in each village. The Collector merely stated that 134,682 acres could be cultivated if water was supplied to them, while the Engineer estimated that the supply of water would be sufficient to irrigate 94,000 acres, and this figure was therefore adopted. As a matter of fact several villages entered in this statement have not been brought under the project.

There are, however, some subsequent statements from which it has been possible to ascertain what irrigation was expected in the several villages under the project. These are : (*a*) the appendices A, B and C printed in G.O., No. 2015, dated 13th August 1873; and (*b*) the statements furnished by the District Engineer, Mr. O'Shaughnessy, with his letter No. 1994, dated 12th November 1878, printed in G.O., No. 270 I., dated 2nd May 1879. Mr. O'Shaughnessy's estimate, it must be noted, was 98,000 acres, or 4,000 acres in excess of the original estimate.

5. Enclosure A shows the villagewar areas originally estimated according to the appendices in G.O., No. 2015 of 13th August 1873, compared with the areas actually irrigated in fasli 1305, with particulars as to further areas available for cultivation. Mr. O'Shaughnessy's figures of 1878 are noted in red ink.

In enclosure B the differences in the areas have been briefly explained in the case of each village. It will be seen from these enclosures that the area irrigated at present falls short by 25,504 acres of the estimate of 1873 and by 29,857 acres of Mr. O'Shaughnessy's estimate.

Enclosures C and D give villagewar particulars for these differences, column 10 of each giving the areas available for further irrigation in each village.

6. The aggregate area available for extension of irrigation is 11,673 acres. Adding this to the present irrigated area under first crop, viz., 74,000 acres, the total first crop irrigated area will not exceed 85,673 acres, or more than 8,000 acres less than the original estimate of 94,000 acres.

7. As already reported in this office Ref. No. 240 G.B./Ver., dated 3rd September last, I furnished the Executive Engineer with a villagewar statement of areas already irrigated and those available for extension of irrigation with a request that he would state what portions of the latter could be brought under irrigation and when. With these figures I hoped to be able to give the Board as accurate an idea of the future prospects of the project as possible. The Executive Engineer, however, in his reply (copy enclosed), expresses his inability to furnish at present detailed particulars, but he estimates the probable additional cultivation at 15,000 acres as shown below :—

	ACS.
Allur	4,000
Utukur	4,000
Rebala	3,000
Chellayapalem	2,000
Various tank-beds	2,000
Total ...	15,000

This gives a difference of 3,323 acres with reference to the areas shown in column 10 of enclosures C and D. But, except in the case of Allur, the Engineer's figures cannot be accepted as at all accurate. In Rebala village, for instance, the maximum area available, including all occupied dry lands and porambokes, is only 2,193 acres, while the Engineer's estimate of increased irrigation is 3,000 acres. The probable increases in wet cultivation in this village and Utukur have been dealt with in enclosure B. As regards the 2,000 acres of tank-bed lands referred to by the Executive Engineer, it is not understood where these lands are. As already explained in enclosures B and C, only 636 acres of tank-bed land remain to be sold. The extent of 2,000 acres given under the shrotriem village of Chellayapalem can only be a mistake. The total ayacut of the village is only 792 acres, of which 385·11 are already irrigated and 68 are poramboke. I therefore consider the figure 11,673 acres given in paragraph 6 *supra* may be adopted. The fieldwar investigation, which the Executive Engineer states he is having carried out, should furnish a much more accurate estimate, but it is not likely to be completed for some time to come. The maximum area, then, that will be irrigated under first crop will be 85,673 acres including (*a*) dry lands irrigated and (*b*) wet inam lands (acres 10,295) * for which water is allowed free.

* Including shrotriem jari.

8. In respect of second-crop irrigation, the estimate of 1888 appears to have been far too high. It was then assumed that one-fifth of the entire wet occupation *plus* one-eighth of the total extent of inam lands under the project could be brought under second crop. On this assumption it was calculated that, in fasli 1306, acres 16,026 would be cultivated under second crop. However, the actual fasaljasti cultivation in fasli 1305, out of a total wet occupation of 63,073 acres in Government villages and 2,879 in shrotriems, was only 3,759 acres. The following table gives fasliwar particulars from fasli 1294 under this head:—

Fasli.	Area under second-crop.	Fasli.	Area under second-crop.
	ACS.		ACS.
1294	265	1300	3,054
1295	554	1301 (Famine year) ...	236
1296	606	1302	3,552
1297	2,148	1303	2,968
1298	2,723	1304	2,457
1299	3,507	1305	3,759

It will be seen from the above that the highest figure obtained was in fasli 1305. The only explanation possible, I think, for this small second-crop irrigation is that the available supply of water is not in average years sufficient for the irrigation of a much larger extent. The second-crop cultivation depends mainly upon the supply of water early in the year, *i.e.*, from June to August, and the statement (F) attached, which gives the number of days on which water passed over the Nellore anicut in every month from the year 1884 to 1895, will show how since 1886 the extent under second crop has varied with the supply in the Pennéru river during these three months. The Executive Engineer attributes the short cultivation partly to the existing regulation under which the water level in the Kanigiri reservoir is kept down to 15 feet (the maximum possible being about 21 feet) before the bursting of the north-east monsoon—a restriction, which, he says, will shortly be removed; but I doubt if this has much effect on second-crop cultivation. The fact that in November 1892 the water level in the reservoir was 19·60 would seem to show, it does not, as in that year the second-crop cultivation was less than in fasli 1305. Looking at these facts I am inclined to limit the estimate for second-crop cultivation to 4,500 acres on the average.

9. In enclosure E the revenue from the project has been worked out with reference to the areas of cultivation as estimated in the preceding paragraphs. The ultimate revenue that can be realized on the estimated extents of 85,673 acres first crop and 4,500 acres second crop is Rs. 2,28,134 after making allowance for all deductions. This gives 5·17 per cent. on the sum at charge, viz., Rs. 44,02,748.

10. The only question that remains to be considered is the number of years it will take to reach the ultimate revenue. Any answer I could give would be a mere guess, as arrangements have to be made for the supply of irrigation to the greater portion of the additional area to be irrigated. When such arrangements will be completed, it is not possible for me to say, and as noted in paragraph 7, I have been unable to obtain the information from the Executive Engineer. I therefore leave the question unanswered.

Resolution—No. 406, dated 7th December 1896.

Forwarded to the Chief Engineer for Irrigation, with reference to his letter No. 594 M., dated 18th November 1895, and in continuation of Board's Proceedings, dated 12th September 1896, Mis. No. 4450.

2. The Collector reports that the figures of the forecast sanctioned in G.O., No. 44 I., dated 5th February 1889, were not based on any villagewar particulars of areas available for irrigation, but that it was assumed that a certain percentage of all unoccupied lands would be newly brought under wet cultivation, that a certain percentage of the occupied dry lands would be cultivated with wet crops and that a certain further percentage of occupied wet lands would be cultivated with a second crop. He thinks that the total first-crop area that will ultimately be brought under cultivation will not exceed 85,673 acres, including 11,673 acres available for extension of irrigation, against 94,000 acres originally estimated by the Public Works Department. The Executive Engineer, who was consulted by the Collector as to the actual extent of the future irrigation, has expressed his inability to furnish at present detailed figures, but estimates the additional extent that will be brought under wet cultivation roughly at 15,000 acres. This estimate, the Collector thinks, cannot be accepted as accurate. The former officer, however, reports that he has deputed two overseers on special duty on this investigation and hopes to be able, by the end of the current year, to have ready the revised completion report called for by the Chief Engineer. The Board begs to state that until the Public Works Department is able to say for what additional extent irrigation will be available under the project, it will not be possible to frame an accurate estimate of the area that will be brought under irrigation or of the total revenue realizable under the project.

3. As regards second crop also, the Collector considers that the area of 16,026 acres estimated in G.O., No. 44-I., dated 5th February 1889, is excessive, and that, taking into account the highest extent that was hitherto irrigated, viz., 3,759 acres, in fasli 1305 and the available supply of water in average years, the area cannot be estimated at more than 4,500 acres. The ultimate revenue that will be reached he would accordingly fix at Rs. 2,28,134. As regards the number of years in which the ultimate increase of revenue would be reached, he is unable to give a definite answer, as it will depend upon the arrangements to be made for the supply of irrigation to the additional area to be brought under the project. This is a matter which rests entirely with the Public Works Department.

4. Pending the orders of Government on the revised completion report called for by the Chief Engineer, the Collector will be requested to prepare, as in the current year, his future budget estimates of revenue due to irrigation under the project, with reference to the actuals of previous years.

(True Copies and Extract.)

(Signed) R. V. SRINIVASIAR,
Secretary.

Proceedings of the Board of Revenue (Revenue Settlement, Land Records and Agriculture), No. 115, dated 10th March 1898.

Read—the following letter from E. SCOTT, Esq., Acting Collector of Nellore, to the Secretary to the Board of Revenue (Revenue Settlement, Land Records and Agriculture), dated 12th October 1897, No. 3368-Ver. :—

With reference to the Board's References noted in the margin, I have the honour to state that the Executive Engineer, Nellore Division, has, with his letter, No. 283-M., dated 21st July 1897, returned the statement sent to him last September referred to in paragraph 7 of this office letter, No. 3795-Ver., dated 16th October 1896, printed in Board's Proceedings, No. 406, dated 7th December 1896, after entering therein the additional areas he considers can be irrigated under the Sangam project. He estimates an additional area of 11,686 acres as likely to be brought under irrigation against 11,673 acres estimated by this office. The estimate may be adopted as accurate as possible, after excluding an extent of 1,558 acres of poramboke and unoccupied land which I consider will have to remain poramboke and is unlikely to become occupied.

Mis. No. 574, dated 27th January 1897, and Mis. No. 2229, dated 25th March 1897.

2. As regards the period within which this additional area can be brought under irrigation, the Executive Engineer states that he cannot give a definite forecast as it depends upon the allotment of funds, but he estimates an increase of 2,000 acres per annum which gives roughly five years as the period within which the ultimate revenue would be attained. I have taken the period of five years as commencing from fasli 1308 in view to the existing financial pressure.

3. Having regard to the above remarks, I have worked out a revised financial statement (enclosure E of my former letter) which I enclose. The Executive Engineer has said nothing as to the period within which the additional second-crop area can be brought under irrigation and I have accordingly apportioned the area under this head over the six faslis allowed for the completion of the project. The ultimate revenue that can be realised by the end of fasli 1312, thus estimated amounts to Rs. 2,22,647 which gives 5·05 per cent. on the sum at charge at present, viz., Rupees 44,02,748.

Reference on the above, dated 23rd November 1897.

In the revised financial statement for the irrigation under the Sangam project submitted by the Collector with his letter read above, the marginally-noted items of "indirect receipts" have been omitted. The receipts under the second and third items during the last five years were as shown below :—

1. Increment of land assessment due to irrigation.
2. Land assessment of waste land brought under irrigation.
3. Land revenue of miscellaneous items.

Fasli—	Land assessment of waste brought under irrigation.	Land revenue of miscellaneous items.
	Rs.	Rs.
1306	15,602	391
1305	15,418	874
1304	14,968	957
1303	12,374	1,218
1302	11,172	1,339

The Collector is requested to submit a revised statement including estimates of the probable revenue under the three items.

2. The "tirvajasti" (water-rate) on 6,101 acres of Government and Inam lands including shrotriems is entered as Rs. 27,511, but at the rate mentioned in the statement (viz. Rs. 4 per acre), the amount comes only to Rs. 24,404. The Collector is requested to explain the discrepancy.

(Signed) R. V. SRINIVASIAR,
Secretary.

Read—the following letter from E. SCOTT, Esq., Acting Collector of Nellore, to the Secretary to the Board of Revenue (Revenue Settlement, Land Records and Agriculture), dated 10th February 1898, No. 404-Ver. :—

I have the honour to reply to Board's Reference on G. R. No. 8545 of 1897, dated 23rd November 1897.

2. *Paragraph* 1.—A revised statement E, including the indirect receipts, is submitted.

3. *Paragraph* 2.—The sum of Rs. 27,511 represents the actuals of fasli 1305 and includes the penal water-rate charged as well as that charged on unauthorised cultivation, &c. Hence the rate calculated on 6,101 acres at Rs. 4 per acre does not equal the actuals.

Resolution—No. 115, dated 10th March 1898.

The letters read above, which contain a revised forecast of the financial results of irrigation under the Sangam project, will be forwarded to the Chief Engineer for Irrigation, with reference to the correspondence ending with Board's Proceedings, No. 6368, dated 13th August 1897.

2. In his first letter read above, the Collector states that the Executive Engineer estimates an additional area of 11,686 acres as likely to be brought under irrigation against 11,673 acres estimated by the Collector in paragraph 6 of his letter printed in Board's Proceedings, No. 406, dated 7th December 1896, and that the Executive Engineer's estimate may be adopted after excluding an extent of 1,558 acres on account of poramboke and other lands which are likely to remain unoccupied.

3. As regards the number of years in which the ultimate increase of revenue would be realised, the Collector states that the Executive Engineer is unable to give a definite answer, as it depends upon the allotment of funds, but that he estimates roughly five years as the period during which the ultimate area of 10,128 acres will be brought under irrigation at the rate of 2,000 acres per annum. In regard to the second-crop area, the Executive Engineer having, it is reported, said nothing about the period within which the additional area can be brought under irrigation, the Collector has apportioned the area over the six faslis within which, it is estimated, that the ultimate return under the project can be reached.

4. The revised forecast prepared by the Collector is shown in the following statement :—

Year.	Revenue receipts and charges.								
	Irrigated area at the end of the year.		Revenue due to work.			Collection charges in the Revenue Department.	Net earnings due to work.		
	First crop.	Second crop.	Direct receipts.	Enhanced land revenue or indirect receipts.	Total.		Including enhanced land revenue.	Excluding enhanced land revenue.	
	Acs.	Acs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	
1303 (1893-94) ..	70,378	3,393	1,52,689	17,655	1,70,344	8,517	1,61,827	1,45,055	Actuals.
1304 (1894-95) ..	72,583	4,095	1,63,603	21,887	1,85,490	9,275	1,76,215	1,55,423	
1305 (1895-96) ..	73,557	3,790	1,68,687	22,899	1,91,586	9,579	1,82,007	1,60,253	
1306 (1896-97) ..	72,676	* 7,110	1,72,805	16,448	1,89,253	9,463	1,79,790	1,64,165	
1307 (1897-98) ..	74,002	3,882	1,85,286	23,015	2,08,301	10,415	1,97,886	1,76,022	Estimates.
1308 (1898-99) ..	76,002	4,005	1,93,593	26,215	2,19,808	10,990	2,08,818	1,83,913	
1309 (1899-1900) ..	78,002	4,128	2,01,900	29,315	2,31,215	11,561	2,19,654	1,91,805	
1310 (1900-1901) ..	80,002	4,251	2,10,207	32,415	2,42,622	12,131	2,30,491	1,99,697	
1311 (1901-1902) ..	82,002	4,374	2,18,514	35,515	2,54,029	12,701	2,41,328	2,07,588	
1312 (1902-1903) ..	84,130	4,500	2,27,341	38,615	2,65,956	13,298	2,52,658	2,15,974	

* The increase compared with the actuals of the previous years and the estimates of the succeeding years was due to the raising of second crop in consequence of copious rainfall in November in tracts in which the first crop had withered owing to the deficient south-west monsoon.

The Board was requested to state at, as early a date as practicable, what probability there was of the revenue anticipated in 1888 being fully realized.

4. After a detailed enquiry by the Collector of Nellore, the Board of Revenue in its Proceedings, No. 406, dated 7th December 1896, reported that the figures of the forecast embodied in Proceedings of Madras Government, No. 44 I., dated 5th February 1889, were not based on any villagewar particulars of areas available for irrigation, but that it was assumed that a certain percentage of all unoccupied lands would be newly brought under wet cultivation, that a certain percentage of the occupied dry lands would be cultivated with wet crops, and that a certain further percentage of occupied wet lands would be cultivated with a second crop. In its Proceedings, No. 115, dated 10th March 1898, the Board submitted a revised forecast statement prepared by the Collector.

5. The revised forecast of revenue may be accepted. It compares with the original estimate as follows:—

—	Ultimate area of irrigation.		Irrigation revenue.
	First crop.	Second crop.	
	ACS.	ACS.	RS.
Original forecast	94,000	16,026	2,84,173
Revised do.	84,130	4,500	2,65,956
Decrease ..	9,870	11,526	18,217

In 1902–1903, *i.e.*, nine years from the date of closure of the construction estimate of the project, viz., 31st March 1894, it is expected that the ultimate area and revenue will be attained.

6. The completion report has been revised as required by the Government of India and is appended to this note. The anticipated results of the system up to end of 1902–1903 based on the Board's revised forecast are shown below:—

	RS.	RS.
Capital outlay up to end of 1893–94, the date of closure of the construction estimate—		
Direct		30,66,962
Indirect		6,85,032
Total (1) ...		37,51,994
Revenue account—		
Gross revenue to end of 1902–1903—*vide* statement D appended to the completion report		28,96,548
Working expenses to end of 1902–1903—*vide* statement D appended to the completion report		8,27,201
Net revenue ...		20,69,347
Deduct—		
Interest charges—		
Actual charges to end of 1893–94	11,50,433	
Charges (estimated) for nine years from 1894–95 to 1902–1903 at 4 per cent. on Rs. 30,66,962, the direct capital outlay to end of 1893–94 ...	11,04,106	
		22,54,539
Balance of interest (2) ...		1,85,192
Sum-at-charge (1) + (2) ...		39,37,186
Net revenue during 1902–1903—*vide* statement D ...		2,19,556
Percentage of net revenue in 1902–1903 on the sum-at-charge ...		5·58

In deducing the above results all charges incurred on the system since 31st March 1894 and which have been debited to the open capital account have been left out of account—*vide* Code II, chapter V, paragraph 35, Rule IV.

7. The above figures indicate that the Sangam anicut system is expected to fulfil the conditions of a productive public work nine years after the date of closure of the construction estimate, which period is within the limit of ten years prescribed in Code II, chapter V, paragraph 3 (*a*), to admit of a work being classed as such. It is therefore considered that all further capital outlay on the system should be charged to Imperial 49. and that there can be no objection to the suggested amalgamation of the accounts of the Sangam and Penner (Nellore) anicuts referred to in paragraph 1 of the Government of India letter No. 79 I., dated 18th April 1896, printed in Proceedings of Madras Government, No. 458 I., dated 28th May 1896.

(Signed) W. HUGHES,
Chief Engineer for Irrigation.

11th June 1898.

ENCLOSURES.

REPORT ON THE CLOSURE OF THE CONSTRUCTION ESTIMATE OF THE SANGAM ANICUT SYSTEM.

The history of the Sangam anicut system may be briefly narrated thus.

2. Prior to the construction of the anicut about 40,000 acres of land were fitfully irrigated by two large channels which took off from the right bank of the Pennéru river, a little distance below the junction of the Pennéru with its last affluent, the Biraperu.

3. Irrigation was carried on directly from these channels (Duvur and Gandavaram) and indirectly from shallow tanks. The arrangements, however, were unsatisfactory. Drains were used as irrigating ditches, cross bunds being erected at various points, and irrigation was constantly being interrupted by these dams being washed away in the monsoon entailing severe and often unavailing labour on the part of ryots concerned. Owing also to the uncertain freshes in the south-west monsoon cultivation was precarious and speculative, as the work of weeks in preparing fields for crop might be thrown away if the freshes failed or even were deficient. On the other hand, if operations were delayed until the character of the season could be fairly gauged, the crops ran the risk of withering for want of rains later on. The consequence was that large quantities of water were allowed to run waste to the sea.

4. This condition of affairs early attracted the attention of the Collectors of the district and the Civil Engineers of the division, and in 1865 Mr. Richard Smith was appointed to draw up estimates for the Sangam or Northern Pennéru delta.

5. The village of Sangam is situated close to the northern bank of the Pennéru and about 20 miles to the west of Nellore. About a quarter of a mile above the village, the Biraperu, the last affluent of the Pennéru on the left bank, enters the main stream, and the scour caused by this affluent combined with the action resulting from a rock projecting a quarter of a mile down on which a pagoda is built, causes a permanent set which results in a constant depth being maintained at this point. This unchanging condition of the river-bed led to the off-take of the two old native channels (Duvur and Gandavaram) being situated here.

6. These old channels had been provided with head sluices and improved since the British occupation of the district. Their efficiency, however, varied from year to year being taken nominally at 40,000 acres. The success of the lower anicut at Nellore led to the preparation of the estimates by Mr. Richard Smith in 1865. These estimates amounted to 38 lakhs. The project was prepared under the direction of the Chief Engineer for Irrigation, Colonel Anderson, R.E. It provided for the construction of a head sluice on the northern bank immediately below the Biraperu, the erection of a river wall thence to the Gandavaram channel—an arrangement analogous to the Korumboo which trained the rivers to the Duvur and Gandavaram channels.

7. The existing Gandavaram channel was to be enlarged for a short distance and a short new cut made to the Kanigiri tank, the capacity of which was to be increased enormously. From the tank several large feeder channels were to be taken off to fill important minor tanks. The total acreage was to be 83,620 acres.

8. The then Acting Chief Engineer for Irrigation (now Lieutenant-General John Mullins, R.E.) made sweeping alterations. He reduced the capacity of the main canal and tank, dispensed with the river wall, substituted an anicut besides dispensing with some expensive distributaries. The ayacut was increased to 94,000 acres. The reduction in the capacity of the tank and the channels was made because Mr. Richard Smith had taken the discharge on the worst of a series of years as the basis of calculation of the water available, while the Chief Engineer considered that the average discharge for a series of years should be taken, this also allowed of a greater area being irrigated. The estimated cost of the revised project amounted to 27 lakhs. It was submitted in 1870 to the Chief Engineer for Irrigation who altered it to Rs. 35,69,049 including indirect charges (G.O., No. 352 I. of 2nd June 1881).

9. One important alteration was made, viz., the set of under-sluices provided at the south end of the anicut was omitted and an increased number of vents was allowed for the northern set of under-sluices.

The reason for the omission was, that it was considered that a channel and head sluice from the south end of the anicut would not prove remunerative. A lapse of 25 years and a consideration of the amount of water running to waste to the sea over the Nellore anicut have made it clear that this doubt was unfounded and an estimate has been submitted for such a head sluice and channel for the supply of the Nellore tank. The under-sluices, however, will not be built, as observation has shown that the deep water channel at the southern end (right bank) is permanent notwithstanding the position of the scouring sluices at the opposite bank.

10. The total of the estimates submitted to Government by the Chief Engineer for Irrigation was Rs. 25,83,800; on this outlay the returns were calculated at 9·56 per cent.

11. The estimates were sanctioned in G.O., No. 1818, dated 28th July 1870, provisionally pending settlement of certain points by the Revenue Department.

The gross revenue which was estimated by the Public Works Department at Rs. 3,07,956 was reduced successively by the Revenue Department to Rs. 2,59,250 and Rs. 2,38,000. This last figure was accepted, and the Government of Madras after deducting Rs. 34,200 on account of maintenance charges, estimated the net return at Rs. 2,03,800, *i.e.*, 7·88 per cent. on the proposed outlay.

12. The Inspector-General of Irrigation in his note, dated 2nd May 1872, doubled the number of vents in the under-sluice, reduced the width of the apron of the anicut and the height of the headworks, and increased the fall of the main canal.

The discussion on engineering points then ceased, and for the next five or six years the Secretary of State and the Governments of India and Madras discussed various points in connection with the scheme, such as indirect charges, the prior rights of the Madras Irrigation Company, &c., &c.

13. The Secretary of State desired information on the following points:—

(i) Whether preliminary expenses had been included in the estimate.
(ii) If interest during construction had been entered.
(iii) Probable period of completion of works and of development of irrigation.
(iv) Whether credit should be taken for sales of beds of the tanks until experience has proved that they are not wanted.
(v) Why inam holders should receive irrigation free of charge.
(vi) Infringement of rights of the Madras Irrigation Canal Company.
(vii) What the circumstances connected with the application for unoccupied land were.

14. The Accountant-General, Public Works Accounts, increased the estimate of Rs. 25,83,000 to Rs. 32,38,729 by adding preliminary expenses and increasing cost of establishment. The Chief Engineer for Irrigation objecting, Government in their Order, No. 2492, dated 3rd September 1874, reduced the latter figure to Rs. 29,82,830, the net return being estimated at 6·30 per cent., and the Government of India was informed accordingly.

15. Further correspondence ensued and the estimate was fixed at Rs. 35,75,000, the return being taken as 5·25. This was further increased by the Government of India in their No. 405 I., dated 12th November 1875, the return being reduced to 4·28 per cent.

16. A serious remonstrance from the Deputy Examiner, Public Works Accounts, led to the estimate being reduced to Rs. 34,80,130. More correspondence ensued, and in G.O., No. 606 I., dated 14th October 1879, it was decided that the Government of India should be informed that the total cost of the project would be Rs. 34,62,176 and the net return 5·42 per cent., the cost of a river embankment being omitted.

17. The Government of India finally sanctioned the scheme as follows:—

	Rs.
Works	23,64,935
Establishment	5,78,451
Tools and plant	82,670
Total ...	30,26,056
Deduct—Receipts on capital account, sale-proceeds of old tank-beds	1,29,619
Net direct charge ...	28,96,437
Indirect charges.	
Leave and pensions	1,44,612
Capitalized land revenue	5,28,000
Total ...	6,72,612
Grand Total ...	35,69,049

18. The letter communicating the sanction to the project was received a year after the preparation of the estimate and after 12 years of correspondence. The estimates as originally drawn up amounted to Rs. 25,83,000, and the estimated return stood at 7·88 per cent. as revised; the figures stood at Rs. 35,69,049 and 5·25 per cent.

The result was due to a compromise of conflicting opinions as to what constituted indirect charges.

19. Though the delay led to a loss of revenue for 10 years (among which were the great famine years of 1877–79), an advantage was gained, viz., of securing a very fairly accurate estimate, though the calculations were necessarily based on data that were vague.

The principal features of the project were—

(i) The construction of a weir 4,290 feet long.
(ii) A head sluice of 40 vents of 4½ feet span each to supply the main canal.
(iii) The excavation of a main canal 6 miles long and 157 feet bottom width to fill the Kanigiri reservoir and to supply the original ayacut of the Duvur tank.
(iv) Improvements to the existing Duvur branch channel which was to be supplied from the main canal.
(v) The raising of the bank of the Kanigiri reservoir to increase its capacity.
(vi) The excavation of the following channels from the Kanigiri reservoir.

Eastern channel.
Feeder for central and southern channels.
Southern channel and central channel.

(vii) The excavation of a channel from the Duvur tank.

20. The capacities of the tanks were to be as follows:—

	Cubic feet.
Kanigiri	6,419,001,600
Duvur	1,042,986,100
Total ...	7,461,987,700

The head sluice was designed to discharge 4,800 cubic feet a second, of which 4,576·5 cubic feet a second was carried to the Kanigiri tank by the main canal, while 223·5 cubic feet a second was allowed to enter the Duvur branch channel (improved).

21. The discharge of the distributaries was to be as follows:—

	Cubic feet a second.
Eastern channel	934·5
Feeder for central and southern channels	420·0
Central channel	157·5
Southern do.	262·5
Duvur branch channel	223·5
	Acs.
The present area of irrigation was taken at	44,053
Increase	49,947
Total ...	94,000

Of this, 87,944 were Government and 6,056 were inam.

The area to be irrigated by each channel was as follows :—

	ACS.
Eastern channel	62,300
Central do.	10,500
Southern do.	17,500
Duvur channel and tank	3,700
Total ...	94,000

22. The total first crop area that will be brought under irrigation is now estimated by the Board of Revenue as 84,130 acres against 94,000 acres originally anticipated.

23. The works have been carried out more or less as they were designed, but the estimate has been revised three times. The first revision (see G.O., No. 393 I. of 1st July 1887, Rs. 38,25,000). This was due to the provision for baling being increased from Rs. 18,000 to Rs. 50,000, a separate establishment for settling compensation being found necessary, and a change being made in the alignment of the first 6 miles of the Eastern channel.

24. The second revised estimate (G.O., No. 195 I. of 25th March 1890) provided for a redistribution of the sub-heads, the amount remaining unaltered. Finally, in No. 781 I. of 16th September 1892, provision was made in a revised estimate for draining the Alláru swamp lands. The estimate finally stands at Rs. 38,91,552.

25. The accompanying extract from the administration report of 1893-94 gives the main facts as regards irrigation. It will be seen that the year 1893-94 was the first in which there was a surplus after paying the maintenance and interest charges, but omitting the past interest charges. The project is therefore assured as a success.

26. The project came into working in 1886-87 and there has been a steady increase of cultivation, except in 1891-92, when there was a falling off owing to the scarcity which amounted nearly to famine in the district. The value of the anicut and reservoir was clearly shown in these years. Under the former conditions no land would have been irrigated, and the deduction of Rs. 1,14,000 made for old irrigation year by year would have been lost to Government; and in the two years previous large remissions would have had to be granted—what the indirect gain to the ryots was cannot be estimated. The price of rice in 1891-92 was double the normal price, and though the irrigation sank by nearly 50 per cent., the prices gained made up for the diminished area reaped; the harvest and other crop operations also served as a famine relief work of the very best kind, and but for the two Pennéru deltas costly relief operations such as were put in hand in the northern taluks would have been rendered necessary in the central and southern portions of the delta.

27. One consideration which seriously affects the value of the reservoir was not sufficiently weighed when the estimates were drawn up or the works carried out, and that was, the effect on the reservoir bund of a north-east offing of over 6 miles.

To prevent accidents in cyclone months it has been found necessary to limit the depth to be maintained in the reservoir in the monsoon (north-east) months at the risk of running short later on.

By providing means of surplussing quickly at a low level, it is hoped that this danger will be sufficiently guarded against and an estimate has been sanctioned by the Government of India for the purpose.

28. One great want in the delta is want of roads. This has been brought to the notice of the President of Local District Board, and it will be the duty of the Executive Engineer to urge on all occasions the claim of the delta to a fair treatment. The great increase in the revenue of the Board is, to a considerable extent, due to the project. Experience has shown that the provision for drainage was not sufficient. In the case of the Alláru swamp a flood embankment to prevent the flood tide invading the swamp lands is necessary. As regards the Maldevi drain, which at present is the escape channel of the reservoir, the improvements found necessary will be carried out from Provincial funds, agricultural.

(Signed) W. HUGHES,
Chief Engineer for Irrigation.

APPENDIX A.

EXTRACT from the Administration Report of 1893-94 regarding the irrigation and direct returns of the Sangam Anicut System.

The irrigated area and revenue compare as follow with those of the previous year :—

		Area occupied.	Area charged as irrigated.	Irrigation revenue.
		ACS.	ACS.	RS.
First crop ..	1893-94	73,514	71,567	2,85,971
	1892-93	71,128	70,106	2,78,084
Second crop ..	1893-94	3,499	3,393	9,920
	1892-93	4,912	4,881	14,801

The share of enhanced land revenue due to the works amounted to Rs. 17,670 as shown below :—

	RS.
Land assessment on waste lands brought under cultivation	12,388
Do. on miscellaneous items	1,219
Four per cent. on sale-proceeds of tank-bed lands	4,063
Total ...	17,670

The gross revenue and working expenses per acre amounted to Rs. 4·20 and Rs. 1·03, respectively, against Rs. 4·13 and Rs. 1·07 in the previous year.

The following statement shows the financial results :—

Expenditure.	During 1893-94.	To end of 1893-94.	Receipts.	During 1893-94.	To end of 1893-94.
	RS.	RS.		RS.	RS.
Direct charges	64,772	5,02,226	Direct receipts in Public Works Department	680	6,793
Indirect charges	3,723	27,418	Irrigation revenue	2,95,891	20,62,727
Collection charges in the Civil Department	8,728	44,481	Share of enhanced land revenue ..	17,670	73,048
Interest on capital outlay, direct charges	1,21,641	11,50,433			
Total ..	1,98,864	17,24,588	Total receipts ..	3,14,241	21,42,568
Deduct portion of maintenance charges due to "old irrigation."	25,000	1,77,428	*Deduct* portion of revenue assumed to be due to "old irrigation" ..	1,39,000	12,46,162
Total working expenses on improvements ..	1,73,864	15,47,160			
Surplus revenue ..	1,377	—6,50,754			
Total ..	1,75,241	8,96,406	Net Total ..	1,75,241	8,96,406

The actual return after paying interest charges was Rs. 1,377 against a deficit of Rs. 4,289 in the previous year.

(Signed) W. HUGHES,
Chief Engineer for Irrigation.

APPENDIX B.

STATEMENT of outlay incurred on the Sangam anicut system to end of 1893–94 compared by main and sub-heads with estimates sanctioned by the Secretary of State in G.O., No. 352 I., dated 2nd June 1881, and with those as finally modified in G.O., No. 102 I., dated 4th February 1893.

Main and sub-heads.	Estimates sanctioned by the Secretary of State.	Estimates as finally modified.	Outlay to end of 1893–94.	Difference of columns 2 and 4.	Difference of columns 3 and 4.
1	2	3	4	5	6
	Rs.	Rs.	Rs.	Rs.	Rs.
I. Head works—					
A. Preliminary expenses	51,130	51,130	51,130	..	..
B. Land	800	18,562	18,513	— 17,713	49
C. Works	5,03,911	5,91,255	5,91,255	— 87,344	..
K. Buildings	25,185	21,026	21,026	4,159	..
O. Miscellaneous	40,635	32,502	32,502	8,133	..
P. Maintenance	..	4,105	4,105	— 4,105	..
Total	6,21,661	7,18,580	7,18,531	— 96,870	49
(2) Main canals and branches—					
B. Land	1,23,918	2,56,811	2,55,118	— 1,31,200	1,693
D. Regulators	1,05,654	94,287	94,287	11,367	..
E. Falls and weirs	44,000	24,019	24,011	19,989	— 1
G. Bridges	20,400	28,221	28,221	— 7,821	..
L. Earthwork	2,69,905	2,10,003	2,10,004	59,901	— 1
N. Tanks and reservoirs	2,32,015	2,99,082	2,99,182	— 67,167	— 100
O. Miscellaneous	7,082	13,761	13,760	— 6,678	1
P. Maintenance	..	22,058	22,058	— 22,058	..
M. Plantation	4,000	..	..	4,000	..
Total	8,06,974	9,48,233	9,46,641	— 1,39,667	1,692
(3) Distributaries—					
B. Land	19,105	51,905	28,407	— 9,302	23,498
C Works	4,58,240	2,97,011	3,08,274	1,49,966	— 11,263
L. Earthwork	3,93,855	3,77,802	3,73,712	20,143	4,090
N. Tanks and reservoirs	11,450	5,358	5,377	6,073	— 19
O. Miscellaneous	..	14,676	13,503	— 13,503	1,173
P. Maintenance	..	9,468	9,469	— 9,469	— 1
Total	8,82,650	7,56,220	7,38,742	1,43,908	17,478
(4) Drainage and protective works—					
B. Land	325	8,644	3,139	— 2,814	5,505
C. Works	28,850	828	829	28,021	— 1
L. Earthwork	24,475	76,397	53,694	— 29,219	22,703
O. Miscellaneous	..	2,000	884	— 884	1,116
Total	53,650	87,869	58,546	— 4,896	29,323
Provision for unforeseen works	..	3,182	..	..	3,182
Total Works	23,64,935	25,14,084	24,62,460	— 97,525	51,624
II. Establishment	5,78,451	4,96,362	4,87,770	90,681	8,592
III. Tools and plant	82,670	1,19,334	1,16,610	— 33,940	2,774
III-A. Loss by exchange	..	170	170	— 170	..
Grand Total	30,26,056	31,30,000	30,67,010	— 40,954	62,990
V. Less receipts on capital account	1,29,619	..	48	— 1,29,571	— 48
Net Total	28,96,437	31,30,000	30,66,962	— 1,70,525	63,038

(Signed) W. HUGHES,
Chief Engineer for Irrigation.

APPENDIX C.

SCHEDULE of works required to be carried out to complete the Sangam Anicut System.

Name of work.	Amount of estimate.	Expenditure to end of 1893–94.	Amount required to complete the project.	Date of completion.
WORKS WHICH ARE NECESSARY FOR THE FULL DEVELOPMENT OF THE PROJECT, BUT WHICH ARE NOT IN THEMSELVES DIRECTLY REMUNERATIVE.	Rs.	Rs.	Rs.	
Sanctioned in 1893–94.				
Ulavapalla bridge, 2 miles 1,320 feet	2,580	626	1,954	31st March 1896.
Allâru main drain and affluents, excavation	53,630	30,724	22,906	31st ,, ,,
Do. demarcation stones	870	275	595	31st ,, ,,
Do. land compensation	5,600	..	5,600	31st ,, 1897.
Duvur branch channel extension, land compensation	156	63	455	31st ,, 1896.
Total	..	..	31,510	
WORKS WHICH ARE DIRECTLY REMUNERATIVE IN THEMSELVES.				
Sanctioned in 1893–94.				
Eastern channel, minor channel, from Kariavadima tank, excavation	280	244	36	Completed 31st March 1895.
Iskapalli branch channel, minor channel, 5,000 feet, right bank, excavation	340	2	338	31st March 1896.
Iskapalli branch channel, minor channel, one sluice at head	350	122	228	Completed 31st March 1895.
Iskapalli branch channel, minor channel, one regulator at end	74	..	74	Do. do.
Iskapalli branch channel, minor channel, demarcation stones	50	..	50	31st March 1896.
Southern channel, minor channel, 5 miles 660 feet, right bank, head sluice	200	..	200	Completed 31st March 1895.
Southern channel, minor channel, excavation	474	..	474	Do. do.
Southern channel, minor channel, demarcation stones	34	..	34	Do. do.
Central channel, minor channel, 4 miles 990 feet, right bank, excavation	250	169	81	31st March 1896.
Land compensation (approximation)	2,47,572	2,41,195	6,377	31st ,, 1897.
Total	..	..	7,892	
Grand Total	..	..	39,402	
Establishment on above *less* land charges	..	..	6,203	
Total	..	..	45,605	

(Signed) W. HUGHES,
Chief Engineer for Irrigation.

APPENDIX D.

STATEMENT showing the estimated and actual Financial results of the Sangam anicut system.

—	Area irrigated.				Revenue.								Working expenses inclusive of collection charges and exclusive of old maintenance charges.		Net Revenue.	
	First crop.		Second crop.		Direct.		Indirect.				Total.					
							Irrigation revenue exclusive of old irrigation.		Share of enhanced land revenue.						Estimate.	Actual.
	Estimate.	Actual.	Estimate.	Actual.	Estimate.	Actual.	Estimate.	Actual.	Estimate.	Actual.	Estimate.	Actual.	Estimate.	Actual.		
	ACS.	ACS.	ACS.	ACS.	RS.	RS.	RS.	RS.	RS.	RS.	RS.	RS.	RS.	RS.	RS.	RS.
To end of 1887–88 ..	..	..	..	..	..	864	..	1,74,790	..	9,095	..	1,84,749	..	86,465	..	98,284
In 1888–89 ..	56,900	52,789	3,526	3,149	..	1,417	96,964	86,841	3,315	3,061	1,00,279	91,319	44,569	47,891	55,710	43,428
In 1889–90 ..	62,000	60,638	4,796	4,288	600	914	1,14,677	1,19,391	4,965	6,930	1,20,242	1,27,235	53,465	56,697	66,777	70,538
In 1890–91 ..	67,800	64,741	6,246	3,483	600	1,271	1,35,640	1,26,744	7,365	9,535	1,43,605	1,37,550	54,150	61,354	89,455	76,196
In 1891–92 ..	73,500	38,975	7,996	234	700	742	1,59,882	— 1,977	10,965	10,548	1,71,547	9,313	55,542	37,038	1,16,005	— 27,725
In 1892–93 ..	78,500	70,106	9,746	4,881	800	905	1,84,257	1,53,885	14,565	16,209	1,99,622	1,70,999	56,941	55,059	1,42,681	1,15,940
In 1893–94 ..	71,567	71,567	3,393	3,393	900	680	1,56,891	1,56,891	17,670	17,670	1,75,461	1,75,241	55,517	52,223	1,23,238	1,23,018
In 1894–95 ..	72,583	72,583	4,095	4,095	1,000	536	1,63,603	1,63,603	21,887	21,887	1,86,490	1,86,026	43,475	47,209	1,39,281	1,38,817
In 1895–96 ..	73,557	73,557	3,790	3,790	1,035	551	1,68,687	1,68,687	22,899	22,899	1,92,621	1,92,137	43,799	59,896	1,32,725	1,32,241
In 1896–97 ..	72,676	72,676	7,110	7,110	1,035	588	1,72,805	1,72,805	16,448	(b) 23,055	1,90,288	1,96,448	43,663	52,363	1,37,925	1,44,085
	..	..	..	..	..	8,468	..	13,21,660	..	1,40,889	..	14,71,017	..	5,56,195	..	9,14,822
Estimate, 1897–98 ..	74,002	..	3,882	..	(a) 600	..	1,85,286	..	23,015	..	2,08,901	..	(c) 36,930	..	1,71,971	..
1898–99 ..	76,002	..	4,005	..	600	..	1,93,593	..	26,215	..	2,20,408	..	(d) 46,076	..	1,74,332	..
1899–1900 ..	78,002	..	4,128	..	600	..	2,01,900	..	29,315	..	2,31,815	..	47,000	..	1,84,815	..
1900–1901 ..	80,002	..	4,251	..	600	..	2,10,207	..	32,415	..	2,43,222	..	47,000	..	1,96,222	..
1901–1902 ..	82,002	..	4,374	..	600	..	2,18,514	..	35,515	..	2,54,629	..	47,000	..	2,07,629	..
1902–1903 ..	84,130	..	4,500	..	600	..	2,27,341	..	38,615	..	2,66,556	..	47,000	..	2,19,556	..
	..	..	..	..	3,600	..	12,36,841	..	1,85,090	..	14,25,531	..	2,71,006	..	11,54,525	..
	..	..	..	..	12,068		25,58,501		3,25,979		28,96,548		8,27,201		20,69,347	

(a) The budget estimate for 1897–98.
(b) Includes Rs. 6,607 shown in the Administrative Accounts of the Examiner of Public Works Accounts for 1896–97 but not included in the Proceedings of the Board of Revenue, No. 115, dated 10th March 1898.
(c) The revised estimate for 1897–98.
(d) The budget estimate for 1898–99.

(Signed) W. HUGHES,
Chief Engineer for Irrigation.

ORDER—No. 559 I., dated 22nd July 1898.

The Government concurs in the opinion expressed by the Chief Engineer for Irrigation in the concluding paragraph of the foregoing note. The completion report of the Sangam anicut system as revised is approved.

2. Ordered that a copy of these Proceedings be forwarded to the Government of India with reference to its letter No. 270 I., dated 5th November 1895.

[Here enter No. 560 I., dated 22nd July 1898.]

(True Extract.)

(Signed) J. C. LARMINIE,
Ag. Joint Secy. to Government,
Irrigation Branch.

To the Chief Engineer for Irrigation.
" Superintending Engineer, II Circle.
" Examiner, Public Works Accounts.
" Revenue Department.

ENDORSEMENT—No. 560 I., dated 22nd July 1898.

Forwarded.

(By order.)

(Signed) J. C. LARMINIE,
Ag. Joint Secy. to Government,
Irrigation Branch.

Exd. C. Parthasarthy.

HS
Hon'ble Sir H Thorn. K.C
Hon'ble Mr Arundel.

Read the following:—

Print
P.M.G. No. 1027 I, dt 26 Nov/96.
To Bd. of Rev, No. 594 M. dt 18. 11. 96
From do . 878 Mis dt 19. 2. 96
From do . 4450 Mis dt 12. 9. 96
From do . 406 dt 7. 12. 96
From do . 115 dt 10. 3. 98
From do . 545 dt 4. 5. 98
Office note to C No. 161 dt 20 ~~May~~ June /98 No 177 I dt 11. 6 98
Do from C - 1918 B/A dt 7 Note by the Chief Engr for Irrigation

+ Flag I

Completion Report of the Sangam Anicut. Nellore Dt.—

In G.O. No. 698 I, dt 29 Augt/95, the completion report on the closing of the construction estimate of the Sangam Anicut Project was submitted to the Govt of India.

2. The Govt of India in its letter, No. 2703, dt 5 Nov/95, embodied in P.M.G. No. 1027 I, dt 26 Nov/95, pointed out that though the final results have not been affected the method adopted

Issue.
WH
20. 6. 98

Flag # M

Note for press
Print soon & send proof for approval
ACG
21/6/98

in deducing the financial results of the project was erroneous & requested that the errors pointed out may be rectified & the statements appended to the report revised accordingly. As the project up to the end of 1893-94 had not fulfilled the conditions of a productive public work, as defined in the code viz that there must be good reason to believe that the revenue derived from it will repay the annual interest on the capital invested within ten years of its completion. the Govt of India also desired to be favoured with information as to whether the ultimate revenue will cover the interest on the sum-at-charge to admit of a decision being arrived at as to whether the further capital outlay on the project should be debited to the grant

22 P

under Imperial 49. Capital Expenditure not charged to Revenue or to that under Provincial 43 Minor works & navign.

3. With reference to the concluding portion of the enquiry from the Govt of India it was pointed out to the Board of Revenue in this office letter, No. 594† M, d/ 18 Nov/95, that in the forecast statement of irrigation & growth of revenue under the project submitted with the Bd's Procs: printed in P. W. G. 44 I d/ 5 Feb 1891, it was expected that the ultimate increase will be reached in 1896-97, but that the actuals for 1894-95 indicated that the balance of ultimate

† Flag B

Flag R

increase still to be
reached according to
the Dy Ks estimate was
as shown below —

1st crop acres 2,1487
2d crop - 11,931
Irrigation Rev. Rs. 95,683.

The Dy Ks was requested
to state at as early
a date as practicable
what probability there
was of the revenue
anticipated in 1898
being fully realized.

4. After a detailed
enquiry by the Collector
of Nellore, the Dy Ks of
Rds. in its Proc: No
406, dy 7 Dec 1/96, re-
ported that the figures
of the forecast em-
bodied in Flag No.
44 I. dy 5 Feb/97, were
not based on any
village-wise particulars
of areas available

for irrigation, but
that it was assumed
that a certain perc
of all unoccupied la
would be newly bro
under wet cultivation
that a certain percen
of the occupied dry lan
would be cultivated
with wet crops & that
a certain further per
centage of occupied wet
lands would be culti-
vated with a second
crop. In its Proc: No
115 dy 10 March/98
the Dy Ks submitted a
revised forecast
statement prepared
by the Collector.

5. The revised fore
cast of revenue may
be accepted. It com-
pares with the
original estimate as
follows: —

	Ultimate area of irrigation 1st crop acres	2nd crop acres	Irrigation revenue Rs
Original forecast..	94,000	16026	284,173
Revised do	84,130	4,500	265,956
Decrease	9,870	11526	18,217

In 1902-3 i.e. nine years from the date of closure of the construction estimate of the project viz 31st March 94, it is reported that the ultimate area & revenue will be attained.

6. The completion report has been revised as required by the Govt of India & is appended to this note. The anticipated results of the system upto end of 1902-3 based on the 1899 revised forecast are shown below:—

Capital outlay upto end of 1893-94, the date of closure of the construction estimate —

	Rs
Direct	30,66,962
Indirect	6,85,032
Total (1)	37,51,994

Revenue Account—

Gross revenue to end of 1902-3. vide statement D appended to the completion report	28,96,548
Working Expenses do	8,27,201
Net Revenue	20,69,347

Deduct

Interest charges—

	Rs	
Actual charges to end of 1893-94	11,50,433	
Charges (estimated) for nine years from 1894-95 to 1902-3 at 4 p.c on Rs 30,66,962, the direct capital outlay to end of 1893-94	11,04,106	2,54,539
Balance of interest (2)		185,192
Sum. al. charges (1)+(2)		39,37,186
Net revenue during 1902-3 vide Statement D		219,556
Percentage of net revenue in 1902-3 on the sum. al. charges		5.58

In deduc... the above res... charges in... the system sinc... & which have been... the open Capital Acc... left out of account... Chap V, para 34, re... ults all ...red on 31 March 94 ...debited ...have been ...vide Code II, ...le IV

7. The above figures indicate that the Sangam Amini system is expected to fulfil the conditions of a productive public work nine years after the date of closure of the construction estimate which period is within the limit of ten years prescribed in Code II. chapter V. para 3(a) to admit of a work being classed as such. It is therefore considered that all further capital outlay on the system should be charged to Imperial Rg. & that there can be no objection to the suggested amalgamation of the accounts of the Langam & Pinner (Nellore) Anicuts referred to in para 1 of the Govt of India letter No. 79 I, dg 18 April/96, printed in Pub Rg No. 458 I, dg 28 May/96.

No 559 I dg 22.7.98.

Order thereon

The Govt concurs in the opinion expressed by the Chief Engr for Irrigation in the concluding para of the foregoing note. The completion report of the Sangam Amini System as revised is approved.

2. Ordered that a copy of these Proc: be forwarded to the Govt of India with reference to its letter No. 270 I dg 5 Nov/95.

Endorsement

No. 560 I dg 22-7-98 forwarded.

EXAMINED
P. W. ACCOUNTS.
27 MAY. 1898
No.....

No 5944 dt 4/6/1895

To the Secretary to the
Board of Rev. Rev.
Sett! Land Records &
Agriculture.

Sir, In the forecast
statement of irrigation
& growth of revenue
under the Sangam
Anicut System submitted
with the Proc: of the
Board of Rev., Rev.
Sett! Land Records
& Agriculture, No 618,
dy 23 Nov 88, it was
expected that the
ultimate increase
will be reached in
1896-97. The actuals
for 1894-95 compare
with the Board's
estimate above referred to as shown
below:

	1st crop acs.	2d crop acs.	Irrigation Revenue Rs.
Board's Estimate -	94,000	16026	284,173
Actuals for 1894-95 -	72,583	4095	185,490
Balance of ultimate increase still to be reached	21417	11,931	98,683

† printed in P.W.Q. No 443 5/2/89. P.W.D.

Rec'd 87

I.W.C.22
52 51/88

CHIEF ENGINEER
FOR IRRIGATION
14 SEP. 96
No. 547/2

1896

(Sett. 20—2,000—18-11-95.)

Board of Revenue

(Revenue Settlement, Land Records and Agriculture).

MADRAS

To

The Chief Engineer for Irrigation

No. of Enclosures.

Proceedings, dated 12 — 9 — 1896
No. 4450 Mis

Subject.

Communicating with remark to the Chief Engineer for Irrigation letter from the Collector of Nellore, stating that the forecast of cultivation under the Sangam Anikut reported in 1888 was not based on villagewar particulars of areas available &c.

Later case
Proc No. 1162 d/27.1.97
R 318 d/16-2-97
R 1238 d/16-2-97
R 2462 d/30-4-97
R 2404 d/7-5-97
R 3942 d/31-7-97
R 3794 d/13-8-97
Indexed R 4988 d/20-9-97
25/9/96

J.W.E. 19 / 5251/28.

(Sett. 22—2,000—16-10-95.)

REVENUE BOARD OFFICE MADRAS

4P

Proceedings of the Board of Revenue

(Revenue Settlement, Land Records and Agriculture).

Dated 19th February 1896

No. 878 Mis:

READ the following letter from the Collector of Nellore, dated 15th February 1896, Ref: No. 872/ur :—

With reference to Board's Proceedings No. 689 Mis: dated 7th February 1896, I have the honor to state that a reply to the Board's original reference is pending information from the Tahsildars of Nellore and Kavali and the Executive Engineer.

2. The Board's Estimate of 24,000 acres

acres mentioned in Proceedings
No. 618 dated 2nd November 1888
as the 1st crop area irrigable
under the Sangam Project has
all along been the estimate
Calculated by both the Public Works
and Revenue officers. The
Board is aware that during
the past few years, the
freshes in the Pennar have
not been as timely and
as abundant as they ought
to be. It is possible that
the maximum Cultivation
has not reached on this
account, but in the ab-
sence of correct figures
showing the quantity of
water available in a
Series of years, it cannot
be asserted that depth of
water was the only cause.
In any case, there were ex-
tensive lands unoccupied
in the villages of Yellayapalem,
Gundavaram, Nagamambapuram,
Rakala etc at the time of
framing the forecast State-
ment referred to in the
Board's Proceedings. It was
then Considered that these
lands would be taken up
on wet assessment. A
large portion has accord-
ingly been granted on wet
rates, but only dry assess-
ment is being levied, as no
means of irrigation pre-

To

No.

Pro

was provided. I am making detailed enquiries as to the Causes which Contributed to short Cultivation, without which no Satisfactory reply Can be made to the Board's reference. The information will be Collected with the least possible delay and the reply Submitted as Soon as possible.

Resolution

Communicated to the Chief Engineer for Irrigation, with reference to his letter, dated 18th November 1895, No. 594 Dr.

2. The further report promised by the Collector is awaited.

(True Copy and Extract)

J. Sambasiva Rao Dr
for Secretary

To

The Chief Engineer for Irrigation

" Collector of Nellore.

CHIEF ENGINEER FOR IRRIGATION 21 FEB. 96 [illegible]

1896.

(Sett. 20—2,000-27-11-95.)

Board of Revenue

(Revenue Settlement, Land Records and Agriculture),

MADRAS.

To

The Chief Engineer for Irrigation

Former Case
I 594 M d/ 18-11-95
I 50 M d/ 4. 2. 96
R 491. M – 11. 8. 96

Entered 20/10/96

1372 21-2-96

Record

No. of Enclosures. B R 24.2.96

Proceedings, dated 19 – 2 – 1896
No. 878 Mis.

Subject.

Communicating to the Chief Engineer for Irrigation letter from the Collector of Nellore submitting an intermediate reply to Board's reference regarding the realization of the revenue anticipated from the Sangam [illegible] System.

P.W. 221 / 5257/58

Later Cases
B R No. 6741 d/ 16-7-96
I 328. M d/ 31-7-96
R 491. M d/ 11-8-96
R 5 M d/ 7-12-96
R 64 M d/ 27-1-97
R 31 d/ 16-2-97
R 123 d/ 16-2-97
R [illegible] d/ 30-4-97
R 240 M d/ 17-5-97
R 39 [illegible] d/ [illegible]-7-97
R 379 [illegible] d/ 13-[illegible]
R 198 d/ 10-9-97

(Sett.—21—2,000—16-5-96.)

REVENUE BOARD OFFICE MADRAS

Proceedings of the Board of Revenue

(Revenue Settlement, Land Records and Agriculture),

6 1/2

Dated 11th August 1896.

No. 3944 Mis.

READ letter from the Chief Engineer for Irrigation dated 31st July 1896 No. 328 M.

Resolution

Forwarded to the Collector of Nellore who is requested to take prompt measures to have the further report promised in his letter No. 872 dated 15th February 1896 submitted to the Board without further delay.

(True Extract)

J. Saravabhava [illegible]
for Secretary

To

The Collector of Nellore.

Copy to the Chief Engineer for Irrigation.

1896.

Board of Revenue

(Revenue Settlement, Land Records and Agriculture),

MADRAS.

CHIEF ENGINEER FOR IRRIGATION. 3 AUG. 96 No. R 69/M

To

The Chief Engineer for Irrigation

Former Case
P.W.C. No. 6741 d 16-9-96
I 328 M d 31-7-96

P.W.C. No 6741/96
R 108 M - 19-2-96
R 88 M - 7-2-96

BR 12-8-96 Forward Record

No. of Enclosures. 10/10

Proceedings, dated 11 — 8 — 1896
No. 3944 mis:

Subject.

Forwarding to the Collector of Nellore letter from the Chief Engineer for Irrigation and requesting him to move the report promised ~~submitted~~ regarding the revenue anticipated from the Sangam project submitted without further delay.

P.W.C. 20 / 5251/48

Later Cases
R 188 Op. d 29-9-96
I 305 Op. d 10-9-96
R 547 M - 12.9.96
R 5 M d 7-12-96
R 64 M d 27-1-97
P.W.C 1162 d 27.1.97
R 31 d 16-2-97
R 1239 d 16-2-97
R 284 M d 30-4-97
R 240 M d 17-5-97
R 394 M d 31-7-97
R 379 M d 18-8-97
R 1987 d 10-9-97

(Sett. 22—2,000—28-4-96.)

REVENUE BOARD OFFICE. MADRAS.

7 P

Proceedings of the Board of Revenue

(Revenue Settlement, Land Records and Agriculture),

Dated 12th September 1896.
No. 4450 Mis

READ the following letter from the Collector of Nellore, dated 3rd September 1896, Reference No. 240 G.B / Ver:—

With reference to Board's Proceedings No. 3944 Mis, dated 11th August 1896, I have the honor to state that the forecast reported in 1888 was not, I find, based on villagewar particulars of areas available to but was made out with reference to gross calculations based on conjecture. I have now thoroughly worked out villagewar particulars

as irrigable when the original forecast was made for each Village commanded by the Sangam Project and am sending a statement of all unirrigated lands to the Executive Engineer in view to ascertaining from him definitely what portion thereof can be irrigated and when means of irrigation will be provided for such portions. I shall submit a final reply to the Board as soon as I hear from the Executive Engineer.

Resolution

Communicated to the Chief Engineer for Irrigation.

2. The final reply promised by the Collector is awaited.

(True Copy & Extract)
I. Sarabhaluganam ?
for Secretary

The Chief Engineer for Irrigation
Collector of Nellore

Public Works (189) Department.

~~CURRENT~~ No. R 5 M

Order

From The Board of Revenue
Rev Sett. L. R. & Agri

No. 406

Dated 7-12-96
Received 4-1-97.
Enclosures ~~2~~ (7)
Spare copies

SUBJECT.

Sangam irrigation Project
– Forwarding to the Chief Engineer for Irrigation report from the Collector of Nellore on the financial results of the –

8-1-97

BACK PAPERS.

No.	Date.
R 491 m	11-8-96
R 547 m.	14-9-96.
R 108 m	24-2-96
R 83 m	8-2-96
950 m.	4-2-96
R 753 m.	3-12-95
9594 m	18-11-95

FURTHER PAPERS.

No.	Date.
R 64 & 92	29-1-97
R 31	16-2-97
R 123 & 916	16-2-97
R 28 & 30	4-2-97
R 140 & 17	17-5-97
R 39 & 2	31-7-97
R 379 & 13	13-8-97
R 198	10-9-97
R 109 & 16	16-3-98
R 190 & 4	4-5-98
R 47	7-6-98

CHIEF ENGINEER FOR IRRIGATION. 2 JAN 96

1896. No. 5 M.

Board of Revenue

(Revenue Settlement, Land Records and Agriculture),

MADRAS.

Printed December 1896.

Proceedings, 7th Dec. 1896, *No.* 406.

Sangam Irrigation Project.—Forwarding to the Chief Engineer for Irrigation report from the Collector of Nellore on the financial results of the —.

I.W.S. 11 / 525 / 98

PROCEEDINGS OF THE BOARD OF REVENUE

(REVENUE SETTLEMENT, LAND RECORDS AND AGRICULTURE).

READ—again Proceedings of the Board of Revenue (Revenue Settlement, Land Records and Agriculture), dated 3rd December 1895, Mis. No. 6595.

ABSTRACT.—Forwarding to the Collector of Nellore, for early report, letter from the Chief Engineer for Irrigation requesting to be informed what probability there is of the revenue under Sangam anicut anticipated in 1888 being fully realised.

READ—again Proceedings of the Board of Revenue (Revenue Settlement, Land Records and Agriculture), dated 12th September 1896, Mis. No. 4450.

ABSTRACT.—Communicating, with remark, to the Chief Engineer for Irrigation letter from the Collector of Nellore stating that the forecast of cultivation under the Sangam anicut reported in 1888 was not based on villagewar particulars of areas available, &c.

READ—also the following letter from E. SCOTT, Esq., Acting Collector of Nellore, to the Secretary to the Commissioner of Revenue Settlement and Director of the Department of Land Records and Agriculture, dated 16th October 1896, No. 3795-Ver.:—

In continuation of this office letter No. 240 G.B.-Ver., dated 3rd September 1896, I have the honour to submit a final reply to Board's Proceedings, Mis. No. 6595, dated 3rd December 1895.

2. The above Proceedings gives cover to a letter from the Chief Engineer in which, while bringing to notice the backward financial results of the Sangam irrigation project as exhibited by the actuals of 1894–95 when compared with the forecast prepared in 1888, he requests to be informed what probability there is of that forecast being realized.

3. The figures of the forecast of irrigation of 1888 were not based on any villagewar particulars of areas available for irrigation. It was assumed (1) that a certain percentage of all unoccupied lands would be newly brought under wet cultivation; (2) that a certain percentage of the occupied dry lands would be cultivated with wet crops; and (3) that a certain further percentage of occupied wet lands would be cultivated with a second wet crop—*vide* this office letter No. 793-Ver., dated 4th April 1888. The forecast was not therefore likely to be even approximately correct, and it has therefore been necessary to disregard that forecast and frame a fresh one *de novo*.

4. It was originally estimated that 94,000 acres (first crop) would be irrigated under the project. The estimate was based upon the villagewar statement of irrigable areas prepared by the Collector in 1868 and shown as an enclosure to the papers disposed of in G.O., No. 1818, dated 28th July 1870, quoted in G.O., No. 818, dated 18th March 1871, and upon the estimated available supply of water for irrigation, but no attempt was then made to ascertain, even approximately, the probable cultivation under the project in each village. The Collector merely stated that 134,682 acres could be cultivated if water was supplied to them, while the Engineer estimated that the supply of water would be sufficient to irrigate 94,000 acres, and this figure was therefore adopted. As a matter of fact several villages entered in this statement have not been brought under the project.

There are, however, some subsequent statements from which it has been possible to ascertain what irrigation was expected in the several villages under the project. These are: (*a*) the appendices A, B and C printed in G.O., No. 2015, dated 13th August 1873; and (*b*) the statements furnished by the District Engineer, Mr. O'Shaughnessy, with his letter No. 1994, dated 12th November 1878, printed in G.O., No. 270 I., dated 2nd May 1879. Mr. O'Shaughnessy's estimate, it must be noted, was 98,000 acres, or 4,000 acres in excess of the original estimate.

5. Enclosure A shows the villagewar areas originally estimated according to the appendices in G.O., No. 2015 of 13th August 1873, compared with the areas actually irrigated in fasli 1305, with particulars as to further areas available for cultivation. Mr. O'Shaughnessy's figures of 1878 are noted in red ink.

In enclosure B the differences in the areas have been briefly explained in the case of each village. It will be seen from these enclosures that the area irrigated at present falls short by 25,504 acres of the estimate of 1873 and by 29,857 acres of Mr. O'Shaughnessy's estimate.

Enclosures C and D give villagewar particulars for these differences, column 10 of each giving the areas available for further irrigation in each village.

6. The aggregate area available for extension of irrigation is 11,673 acres. Adding this to the present irrigated area under first crop, viz., 74,000 acres, the total first crop irrigated area will not exceed 85,673 acres, or more than 8,000 acres less than the original estimate of 94,000 acres.

7. As already reported in this office Ref. No. 240 G.B.-Ver., dated 3rd September last, I furnished the Executive Engineer with a villagewar statement of areas already irrigated and those available for extension of irrigation with a request that he would state what portions of the latter could be brought under irrigation and when. With these figures I hoped to be able to give the Board as accurate an idea of the future prospects of the project as possible. The Executive Engineer, however, in his reply (copy enclosed), expresses his inability to furnish at present detailed particulars, but he estimates the probable additional cultivation at 15,000 acres as shown below:—

	ACS.
Allur	4,000
Utukur	4,000
Rebala	3,000
Chellayapalem	2,000
Various tank-beds	2,000
Total ...	15,000

This gives a difference of 3,323 acres with reference to the areas shown in column 10 of enclosures C and D. But, except in the case of Allur, the Engineer's figures cannot be accepted as at all accurate. In Rebala village, for instance, the maximum area available, including all occupied dry lands and porambokes, is only 2,193 acres, while the Engineer's estimate of increased irrigation is 3,000 acres. The probable increases in wet cultivation in this village and Utukur have been dealt with in enclosure B. As regards the 2,000 acres of tank-bed lands referred to by the Executive Engineer it is not understood where these lands are. As already explained in enclosures B and C, only 636 acres of tank-bed land remain to be sold. The extent of 2,000 acres given under the shrotriem village of Chellayapalem can only be a mistake. The total ayacut of the village is only 792 acres, of which 385·11 are already irrigated and 68 are poramboke. I therefore consider the figure 11,673 acres given in paragraph 6 *supra* may be adopted. The fieldwar investigation, which the Executive Engineer states he is having carried out, should furnish a much more accurate estimate, but it is not likely to be completed for some time to come. The maximum area then that will be irrigated under first crop will be 85,673 acres including (*a*) dry lands irrigated and (*b*) wet inam lands (acres 10,295) * for which water is allowed free.

* Including shrotriem jari.

8. In respect of second-crop irrigation, the estimate of 1888 appears to have been far too high. It was then assumed that one-fifth of the entire wet occupation *plus* one-eighth of the total extent of inam lands under the project could be brought under second crop. On this assumption it was calculated that in fasli 1306 acres 16,026 would be cultivated under second crop. However the actual fasaljasti cultivation in fasli 1305, out of a total wet occupation of 63,073 acres in Government villages and 2,879 in shrotriems, was only 3,759 acres. The following table gives fasliwar particulars from fasli 1294 under this head:—

Fasli.	Area under second-crop.	
	ACS.	
1294	265	
1295	554	
1296	606	
1297	2,148	
1298	2,723	
1299	3,507	
1300	3,054	
1301	236	(Famine year.)
1302	3,552	
1303	2,968	
1304	2,457	
1305	3,759	

It will be seen from the above that the highest figure obtained was in fasli 1305. The only explanation possible, I think, for this small second-crop irrigation is that the available supply of water is not in average years sufficient for the irrigation of a much larger extent. The second-crop cultivation depends mainly upon the supply of water early in the year, *i.e*, from June to August, and the statement (F) attached, which gives the number of days on which water passed over the Nellore anicut in every month from the year 1884 to 1895, will show how since 1886 the extent under second crop has varied with the supply in the Pennéru river during these three months. The Executive Engineer attributes the short cultivation partly to the existing regulation under which the water level in the Kanigiri reservoir is kept down to 15 feet (the maximum possible being about 21 feet) before the bursting of the north-east monsoon—a restriction, which, he says, will shortly be removed; but I doubt if this has much effect on second-crop cultivation. The fact that in November 1892 the water level in the reservoir was 19·60 would seem to show, it does not, as in that year the second-crop cultivation was less than in fasli 1305. Looking at these facts I am inclined to limit the estimate for second-crop cultivation to 4,500 acres on the average.

9. In enclosure E the revenue from the project has been worked out with reference to the areas of cultivation as estimated in the preceding paragraphs. The ultimate revenue that can be realized on the estimated extents of 85,673 acres first crop and 4,500 acres second crop is Rs. 2,28,134 after making allowance for all deductions. This gives 5·17 per cent. on the sum at charge, viz., Rs. 44,02,748.

10. The only question that remains to be considered is the number of years it will take to reach the ultimate revenue. Any answer I could give would be a mere guess, as arrangements have to be made for the supply of irrigation to the greater portion of the additional area to be irrigated. When such arrangements will be completed, it is not possible for me to say, and as noted in paragraph 7, I have been unable to obtain the information from the Executive Engineer. I therefore leave the question unanswered.

RESOLUTION—dated 7th December 1896, No. 406.

Forwarded to the Chief Engineer for Irrigation, with reference to his letter No. 594 M., dated 18th November 1895, and in continuation of Board's Proceedings, dated 12th September 1896, Mis. No. 4450.

2. The Collector reports that the figures of the forecast sanctioned in G.O., No. 44 I., dated 5th February 1889, were not based on any villagewar particulars of areas available for irrigation, but that it was assumed that a certain percentage of all unoccupied lands would be newly brought under wet cultivation, that a certain percentage of the occupied dry lands would be cultivated with wet crops and that a certain further percentage of occupied wet lands would be cultivated with a second crop. He thinks that the total first-crop area that will ultimately be brought under cultivation will not exceed 85,673 acres, including 11,673 acres available for extension of irrigation, against 94,000 acres originally estimated by the Public Works Department. The Executive Engineer, who was consulted by the Collector as to the actual extent of the future irrigation, has expressed his inability to furnish at present detailed figures, but estimates the additional extent that will be brought under wet cultivation roughly at 15,000 acres. This estimate, the Collector thinks, cannot be accepted as accurate. The former officer, however, reports that he has deputed two overseers on special duty on this investigation and hopes to be able, by the end of the current year, to have ready the revised completion report called for by the Chief Engineer. The Board begs to state that until the Public Works Department is able to say for what additional extent irrigation will be available under the project, it will not be possible to frame an accurate estimate of the area that will be brought under irrigation or of the total revenue realizable under the project.

3. As regards second crop also, the Collector considers that the area of 16,026 acres estimated in G.O., No. 44-I., dated 5th February 1889, is excessive, and that, taking into account the highest extent that was hitherto irrigated, viz., 3,759 acres, in fasli 1305 and the available supply of water in average years, the area cannot be estimated at more than 4,500 acres. The ultimate revenue that will be reached he would accordingly fix at Rs. 2,28,134. As regards the number of years in which the ultimate increase of revenue would be reached, he is unable to give a definite answer, as it will depend upon the arrangements to be made for the supply of irrigation to the additional area to be brought under the project. This is a matter which rests entirely with the Public Works Department.

4. Pending the orders of Government on the revised completion report called for by the Chief Engineer, the Collector will be requested to prepare, as in the current year, his future budget estimates of revenue due to irrigation under the project, with reference to the actuals of previous years.

(True Copies and Extract.)

R. V. Srinivasiar
Secretary.

To the Chief Engineer for Irrigation, with enclosures to be returned.
" Collector of Nellore.

Exd. A. F. Eccleston.

	Land assessment of waste brought under irrigation.	Land revenue of miscellaneous items.
	RS.	RS.
Fasli—		
1306	15,602	391
1305	15,418	874
1304	14,968	957
1303	12,374	1,218
1302	11,172	1,339

The Collector is requested to submit a revised statement including estimates of the probable revenue under the three items.

2. The "tirvajasti" (water-rate) on 6,101 acres of Government and Inam lands including shrotriems is entered as Rs. 27,511, but at the rate mentioned in the statement (viz., Rs. 4 per acre), the amount comes only to Rs. 24,404. The Collector is requested to explain the discrepancy.

(Signed) R. V. SRINIVASIAR,
Secretary.

To the Collector of Nellore.

READ—the following letter from E. SCOTT, Esq., Acting Collector of Nellore, to the Secretary to the Board of Revenue (Revenue Settlement, Land Records and Agriculture), dated 10th February 1898, No. 404-Ver.:—

I have the honour to reply to Board's Reference on G. R. No. 8545 of 1897, dated 23rd November 1897.

2. *Paragraph* 1.—A revised statement E, including the indirect receipts, is submitted.

3. *Paragraph* 2.—The sum of Rs. 27,511 represents the actuals of fasli 1305 and includes the penal water-rate charged as well as that charged on unauthorised cultivation, &c. Hence the rate calculated on 6,101 acres at Rs. 4 per acre does not equal the actuals.

RESOLUTION—No. 115, dated 10th March 1898.

The letters read above, which contain a revised forecast of the financial results of irrigation under the Sangam project, will be forwarded to the Chief Engineer for Irrigation, with reference to the correspondence ending with Board's Proceedings, No. 6368, dated 13th August 1897.

2. In his first letter read above, the Collector states that the Executive Engineer estimates an additional area of 11,686 acres as likely to be brought under irrigation against 11,673 acres estimated by the Collector in paragraph 6 of his letter printed in Board's Proceedings, No 406, dated 7th December 1896, and that the Executive Engineer's estimate may be adopted after excluding an extent of 1,558 acres on account of poramboke and other lands which are likely to remain unoccupied.

3. As regards the number of years in which the ultimate increase of revenue would be realised, the Collector states that the Executive Engineer is unable to give a definite answer, as it depends upon the allotment of funds, but that he estimates roughly five years as the period during which the ultimate area of 10,128 acres will be brought under irrigation at the rate of 2,000 acres per annum. In regard to the second crop area, the Executive Engineer having, it is reported, said nothing about the period within which the additional area can be brought under irrigation, the Collector has apportioned the area over the six faslis within which, it is estimated, that the ultimate return under the project can be reached.

4. The revised forecast prepared by the Collector is shown in the following statement :—

Year.	Revenue receipts and charges.								
	Irrigated area at the end of the year.		Revenue due to work.			Collection charges in the Revenue Department.	Net earnings due to work.		
	First crop.	Second crop.	Direct receipts.	Enhanced land revenue or indirect receipts.	Total.		Including enhanced land revenue.	Excluding enhanced land revenue.	
	Acs.	Acs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	
1303 (1893–94) ..	70,378	3,393	1,52,689	17,655	1,70,344	8,517	1,61,827	1,45,055	Actuals.
1304 (1894–95) ..	72,583	4,095	1,63,603	21,887	1,85,490	9,275	1,76,215	1,55,423	
1305 (1895–96) ..	73,557	3,790	1,68,687	22,899	1,91,586	9,579	1,82,007	1,60,253	
1306 (1896–97) ..	72,676	* 7,110	1,72,805	16,448	1,89,253	9,463	1,79,790	1,64,165	
1307 (1897–98) ..	74,002	3,882	1,85,286	23,015	2,08,301	10,415	1,97,886	1,76,022	Estimates.
1308 (1898–99) ..	76,002	4,005	1,93,593	26,215	2,19,808	10,990	2,08,818	1,83,913	
1309 (1899–1900) ..	78,002	4,128	2,01,900	29,315	2,31,215	11,561	2,19,654	1,91,805	
1310 (1900–1901) ..	80,002	4,251	2,10,207	32,415	2,42,622	12,131	2,30,491	1,99,697	
1311 (1901–1902) ..	82,002	4,374	2,18,514	35,515	2,54,029	12,701	2,41,328	2,07,588	
1312 (1902–1903) ..	84,130	4,500	2,27,341	38,615	2,65,956	13,298	2,52,658	2,15,974	

* The increase compared with the actuals of the previous years and the estimates of the succeeding years was due to the raising of second crop in consequence of copious rainfall in November in tracts in which the first crop had withered owing to the deficient south-west monsoon.

5. It will be observed from the above that the total first crop area that will be brought under irrigation will be only 84,130 acres against 94,000 acres originally estimated by the Public Works Department in the forecast sanctioned in G.O., No. 44-I., dated 5th February 1889, and that the ultimate revenue that will be realised, including indirect receipt but excluding collection charges, is estimated at Rs. 2,52,658 against Rs. 2,69,965 originally estimated. This gives a return of 5·7 per cent. on the capital account of the project, which stood at Rs. 44,02,748 at the end of 1893–94.

6. The following errors in calculation have been noticed in the estimate submitted with the Collector's second letter read above :—

(1) The collection charges on the estimate of Rs. 2,08,301 for fasli 1307 (1897–98) is entered as Rs. 10,850; but at the rate, viz., 5 per cent. mentioned in the statement, the amount comes to Rs. 10,415.

(2) The additional second crop area for the last fasli, fasli 1312 (1902–1903) is given as 127 acres; while it comes to only 126 acres, after deducting from 741 acres as per estimate in the Collector's letter disposed of in Board's Proceedings, No. 406, dated 7th December 1896, 615 acres, the total extent likely to be brought under irrigation during the preceding five faslis, at the estimate rate of 123 acres per fasli. The necessary corrections have been carried out in the abstract statement given in paragraph 4 above.

(True Copies and Extract.)

R. V. Srinivasan
Secretary.

To the Chief Engineer for Irrigation, with enclosures in original to be returned.
Copy to the Collector of Nellore.

Exd. Md. Pahilvan.

P.W.S 6 / 5251/98

10 P

PROCEEDINGS OF THE BOARD OF REVENUE

(REVENUE SETTLEMENT, LAND RECORDS AND AGRICULTURE).

READ—the following letter from E. SCOTT, Esq., Acting Collector of Nellore, to the Secretary to the Board of Revenue (Revenue Settlement, Land Records and Agriculture), dated 12th October 1897, No. 3368-Ver. :—

Mis. No. 574, dated 27th January 1897, and Mis. No. 2229, dated 25th March 1897.

With reference to the Board's References noted in the margin, I have the honour to state that the Executive Engineer, Nellore Division, has, with his letter, No. 283-M., dated 21st July 1897, returned the statement sent to him last September, referred to in paragraph 7 of this office letter, No. 3795-Ver., dated 16th October 1896, printed in Board's Proceedings, No. 406, dated 7th December 1896, after entering therein the additional areas he considers can be irrigated under the Sangam project. He estimates an additional area of 11,686 acres as likely to be brought under irrigation against 11,673 acres estimated by this office. The estimate may be adopted as accurate as possible, after excluding an extent of 1,558 acres of poramboke and unoccupied land which I consider will have to remain poramboke and is unlikely to become occupied.

11686-58 / 10128

2. As regards the period within which this additional area can be brought under irrigation, the Executive Engineer states that he cannot give a definite forecast as it depends upon the allotment of funds, but he estimates an increase of 2,000 acres per annum which gives roughly five years as the period within which the ultimate revenue would be attained. I have taken the period of five years as commencing from fasli 1308 in view to the existing financial pressure.

3. Having regard to the above remarks, I have worked out a revised financial statement (enclosure E of my former letter) which I enclose. The Executive Engineer has said nothing as to the period within which the additional second-crop area can be brought under irrigation and I have accordingly apportioned the area under this head over the six faslis allowed for the completion of the project. The ultimate revenue that can be realised by the end of fasli 1312, thus estimated amounts to Rs. 2,22,647 which gives 5·05 per cent. on the sum at charge at present, viz., Rupees 44,02,748.

— —

Reference on the above, dated 23rd November 1897.

In the revised financial statement for the irrigation under the Sangam project submitted by the Collector with his letter read above, the marginally-noted items of "indirect receipts" have been omitted. The receipts under the second and third items during the last five years were as shown below :—

1. Increment of land assessment due to Irrigation.
2. Land assessment of waste land brought under Irrigation.
3. Land revenue of miscellaneous items.

1898.

Board of Revenue

(Revenue Settlement, Land Records and Agriculture),

MADRAS.

CHIEF ENGINEER FOR IRRIGATION. 28 MAR 1898. No. 104-Rc

Recd. } 1898. *Enclosures* 104

Regd. *Spare copies*

Printed March th.

Proceedings, No. 115, 10th March 1898.

MARCH.

Sangam Project.—Forwarding to the Chief Engineer for Irrigation the report from the Collector of Nellore submitting an accurate estimate of the area that will be brought under irrigation and of the total revenue realisable under the —.

Later case
R 190 dt 4-5-98
R 1177 dt 6-98

GOVT. 1898. P. W. DEPT.

13

Memorandum of Correctness

Revenue receipts and charges

Year	Irrigated Area at the end of the year		Revenue due to work		Collection charges in the Revenue Department	Net earnings due to work
	First Crop	Second Crop	Direct (and Revenue) receipts	Indirect (and Revenue) receipts	Total	
			For			
1303 (1893-94)	70378	3393	152689	17655	170344	85117	16,827	145,055
			Read			
1303 (1893-94)	71567	3393	158891	17670	174561	87728	16,583	149,046

G. V. Srinivasa Rao
Sentry

CHIEF ENGINEER FOR IRRIGATION.
8-MAY.1898
No.

P.W.C 4
525/98

E. I. Form No. 22—2,000—8-8-96.

GOVT. OF MADRAS. } 1898. { P. W. DEPT.

CHIEF ENGINEER FOR IRRIGATION.

REVENUE BOARD OFFICE. MADRAS.

Proceedings of the Board of Revenue

(Revenue Settlement, Land Records and Agriculture),

Dated 6th May 1898.

No. 5452 Revenue

~~READ~~ Resolution

The Chief Engineer for Irrigation and the Collector of Vellore are requested to take the Corrections indicated in the accompanying memorandum carried out in the Statement at para 4 of Board's Proceedings, dated 10th March 1898, No 116.

(True Extract)

R. C. Sundaram
Secretary

To

The Chief Engineer for Irrigation with

(Sett. 11—2,000—30-3-98.

1898.

Board of Revenue

(Revenue Settlement, Land Records and Agriculture),

MADRAS.

CHIEF ENGINEER FOR IRRIGATION. 6-MAY. 1898 No. 190 M.

To

The Chief Engineer for Irrigation

No. of Enclosures.

Proceedings, dated 6th May **1898,**

No. 565 Routine

Subject.

Requesting the Collector of Nellore and the Chief Engineer for Irrigation to carry out certain corrections as indicated in the accompanying memorandum in the statements at para 4 of Board's Proceedings dated 10th March 1898, No 115

P.W.E.S. 251/98

E. I. Form No. 22—2,000—8-8-96.

GOVT. OF MADRAS. 1898. P. W. DEPT.

CHIEF ENGINEER FOR IRRIGATION.

Madras, 20th May 1898.

OFFICE NOTE No. 161.

14 P

EXAMINER P. W. ... No.

Circulation Register.

To	From	Despatch Date.	Receipt Date.
C	E.I.		

... 8-JUN 1898 171

KEEP-WITH.

No. , dated 189 .

Draft note and revised Co-pletion report of the Sangam Anicut System.

For favour of remarks and early return.

It is a question whether the expenditure incurred and sanctioned but not yet undertaken Open Capital account should be taken account of in the financial ...

W. Hughes
E.I.

16/5/98

Lake Case R 117 7 6 98

8/6/98

ef

reeking

uoum

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P.W.E.A.
5251/98

/98

Public W[orks] (1898) Department.

CURRENT No. 117

Urgent

From E. A. Dennys Esquire
Ex. P.W. Accounts,
Madras & Coorg

Order

No. 1918 B/A

Dated 7th June 1898.
Received 8 — Do —
Registered
Enclosures)
Spare copies

SUBJECT.

Sangam Anicut — Returns verified revised Completion Report for —

DEI
I have made an addition to para 6 of the note with reference to para 2 of E's office note - The disposal may now go forward if approved

[illegible] 8/6/98.

E.I.

Ms

[illegible] 10/6/98.

[illegible] 8/6/98

BACK PAPERS.

No.	Date.
9161 Ed 20.5 98	

FURTHER PAPERS.

No.	Date.

E. No .27.
1,000—6-9-97.

KEEP-WITH

CURRENT No.

GOVT. OF MADRAS. } 1898 { P. W. DEPT.

EXAMINER, P. W. ACCOUNTS.

189 .

Madras, 7th June 1898.

15 P

OFFICE NOTE No. 1918 B/A

To

E.I.

Your O.N.No.161 dated 20th May 1898

The figures shewing the financial results in the draft note, and in the revised Completion Report, as also those representing actuals up to 1896-1897 in the appendix D have been checked and found correct.

2. As the present revised Completion report is with reference to the construction estimate of the Sangam anicut project, which was closed on 31st March 1894, I think you have, in deducing the financial results of the project, rightly left out of account all charges incurred on it since 31st March 1894 and which have been debited to open Capital account - vide code volume II chapter V para 35 ~ rule IV-but it seems necessary that ~ India should be clearly apprised of ~ the fact.

W 7.6.98

C.

Public Works (1898) Department.

CURRENT No. 190 Rr.

EXAMINED
P. W. ACCOUNTS.
27 MAY. 1898
No.

From The Board of Revenue Settlement

Order

No. 545 routine

Dated 4th May 1898

Received 6 — /98 —

Registered

Enclosures /

Spare copies

SUBJECT.

Statements at page 4 of B. P. 115 Press 10.2.98 regarding Sangam Project — requesting the Collr. of Nellore & E.I. to carry out certain corrections as indicated in the F.E.I. accompanying Memorandum

RCW 6/5/98

CHIEF ENGINEER
FOR IRRIGATION
8-JUN. 1898
No. 117

P.W.E.I. 5251/98

BACK PAPERS.

No.	Date.
R104 M dy	12/3/98

FURTHER PAPERS.

No.	Date.
I/61	20-5-98
R117	7-5-98

EXAMINED
P. W. ACCOUNTS
27 MAY. 1898
No.....

~~29th August 1895, No. 698 I., Public Works.~~

~~GOVERNMENT OF MADRAS.~~

~~PUBLIC WORKS DEPARTMENT.~~

16 S. P

Irrigation.
Account.

Read—the following paper:—

From the Executive Engineer, Nellore Division, to the Superintending Engineer, II Circle, dated 6th May 1895, No. 72 S.E.

With reference to your No. 400 N.L. of 10th September 1894, I have the honour to forward herewith a report on the completion of the Sangam Project Works drawn up by Mr. Marjoribanks before he went on leave.

No. 142 N.L.

Submitted to the Chief Engineer for Irrigation with reference to his No. II/67 N.L., dated 17th September 1894.

The undersigned has little to add to the excellent report drawn up by Mr. Marjoribanks, to whose ability and energy the satisfactory state of the works comprising the project, except the Kanigiri reservoir, is largely due.

It is hoped that the proposals lately brought forward will, when carried out, place this important reservoir above suspicion; it certainly is not so at present.

Proposals for improving the Maldevi drain are nearly ready for submission.

The new scheme for an additional supply to the Nellore tank might, with advantage, be included in the Sangam anicut system.

(Signed) W. M. ELLIS, Captain, R.E.,
for Superintending Engr., II Circle.

18th May 1895.

~~Enclosure.~~

Report ~~called for in G.O. No. 724 P., Public Works, dated 3rd October 1894, in connection with the closing~~ on the closure of the construction estimate of the Sangam anicut system.

The history of the Sangam anicut system may be briefly narrated thus.

2. Prior to the construction of the anicut about 40,000 acres of land were fitfully irrigated by two large channels which took off from the right bank of the Pennéru river, a little distance below the junction of the Pennéru with its last affluent, the Biraperu.

3. Irrigation was carried on directly from these channels (Duvur and Gandavaram) and indirectly from shallow tanks. The arrangements, however, were unsatisfactory. Drains were used as irrigating ditches, cross bunds being erected at various points, and irrigation was constantly being interrupted by these dams being washed away in the monsoon entailing severe and often unavailing labour on the part of ryots concerned. Owing also to the uncertain freshes in the south-west monsoon cultivation was precarious and speculative, as the work of weeks in preparing fields for crop might be thrown away if the freshes failed or even were deficient. On the other hand if operations were delayed until the character of the season could be fairly gauged, the crops ran the risk of withering for want of rains later on. The consequence was that large quantities of water were allowed to run waste to the sea.

4. This condition of affairs early attracted the attention of the Collectors of the district and the Civil Engineers of the division, and in 1865 Mr. Richard Smith was appointed to draw up estimates for the Sangam or Northern Pennéru delta.

5. The village of Sangam is situated close to the northern bank of the Pennéru and about 20 miles to the west of Nellore. About a quarter of a mile above the village, the Birapéru, the last affluent of the Pennéru on the left bank, enters the main stream, and the scour caused by this affluent combined with the action resulting from a rock projecting a quarter of a mile down on which a pagoda is built, causes a permanent set which results in a constant depth being maintained at this point. This unchanging condition of the river-bed led to the off-take of the two old native channels (Duvur and Gandavaram) being situated here.

6. These old channels had been provided with head sluices and improved since the British occupation of the district. Their efficiency, however, varied from year to year being taken nominally at 40,000 acres. The success of the lower anicut at Nellore led to the preparation of the estimates by Mr. Richard Smith in 1865. These estimates amounted to 38 lakhs. The project was prepared under the direction of the Chief Engineer for Irrigation, Colonel Anderson, R.E. It provided for the construction of a head sluice on the northern bank immediately below the Biraperu, the erection of a river wall thence to the Gandavaram channel—an arrangement analogous to the Korumboo which trained the rivers to the Duvur and Gandavaram channels.

7. The existing Gandavaram channel was to be enlarged for a short distance and a short new cut made to the Kanigiri tank, the capacity of which was to be increased enormously. From the tank several large feeder channels were to be taken off to fill important minor tanks. The total acreage was to be 83,620 acres.

8. The then Acting Chief Engineer for Irrigation (now Lieutenant-General John Mullins, R.E.) made sweeping alterations. He reduced the capacity of the main canal and tank, dispensed with the river wall, substituted an anicut besides dispensing with some expensive distributaries. The ayacut was increased to 94,000 acres. The reduction in the capacity of the tank and the channels was made because Mr. Richard Smith had taken the discharge on the worst of a series of years as the basis of calculation of the water available, while the Chief Engineer considered that the average discharge for a series of years should be taken, this also allowed of a greater area being irrigated. The estimated cost of the revised project amounted to 27 lakhs. It was submitted in 1870 to the Chief Engineer for Irrigation who altered it to Rs. 35,69,049 including indirect charges (G.O. No. 352 I. of 2nd June 1881).

9. One important alteration was made, viz., the set of under-sluices provided at the south end of the anicut was omitted and an increased number of vents was allowed for the northern set of under-sluices.

The reason for the omission was, that it was considered that a channel and head sluice from the south end of the anicut would not prove remunerative. A lapse of 25 years and a consideration of the amount of water running to waste to the sea over the Nellore anicut have made it clear that this doubt was unfounded and an estimate has been submitted for such a head sluice and channel for the supply of the Nellore tank. The under-sluices, however, will not be built, as observation has shown that the deep water channel at the southern end (right bank) is permanent, notwithstanding the position of the scouring sluices at the opposite bank.

10. The total of the estimates submitted to Government by the Chief Engineer for Irrigation was Rs. 25,83,800; on this outlay the returns were calculated at 9·56 per cent.

11. The estimates were sanctioned in G.O. No. 1818, dated 28th July 1870, provisionally pending settlement of certain points by the Revenue Department.

The gross revenue which was estimated by the Public Works Department at Rs. 3,07,956 was reduced successively by the Revenue Department to Rs. 2,59,250 and Rs. 2,38,000. This last figure was accepted, and the Government of Madras after deducting Rs. 34,200 on account of maintenance charges, estimated the net return at Rs. 2,03,800, *i.e.*, 7·88 per cent. on the proposed outlay.

12. The Inspector-General of Irrigation in his note, dated 2nd May 1872, doubled the number of vents in the under-sluice, reduced the width of the apron of the anicut and the height of the headworks, and increased the fall of the main canal.

The discussion on engineering points then ceased, and for the next five or six years the Secretary of State and the Governments of India and Madras discussed various points in connection with the scheme, such as indirect charges, the prior rights of the Madras Irrigation Company, &c., &c.

13. The Secretary of State desired information on the following points:—

(i) Whether preliminary expenses had been included in the estimate.
(ii) If interest during construction had been entered.
(iii) Probable period of completion of works and of development of irrigation.
(iv) Whether credit should be taken for sales of beds of the tanks until experience has proved that they are not wanted.
(v) Why inam holders should receive irrigation free of charge.
(vi) Infringement of rights of the Madras Irrigation Canal Company.
(vii) What the circumstances connected with the application for unoccupied land were.

14. The Accountant-General, Public Works Accounts, increased the estimate of Rs. 25,83,000 to Rs. 32,38,729 by adding preliminary expenses and increasing cost of establishment. The Chief Engineer for Irrigation objecting, Government in their Order, No. 2492, dated 3rd September 1874, reduced the latter figure to Rs. 29,82,830, the net return being estimated at 6·30 per cent., and the Government of India was informed accordingly.

15. Further correspondence ensued and the estimate was fixed at Rs. 35,75,000, the return being taken as 5·25. This was further increased by the Government of India in their No. 405 I., dated 12th November 1875, the return being reduced to 4·28 per cent.

16. A serious remonstrance from the Deputy Examiner, Public Works Accounts, led to the estimate being reduced to Rs. 34,80,130. More correspondence ensued, and in G.O. No. 606 I., dated 14th October 1879, it was decided that the Government of India should be informed that the total cost of the project would be Rs. 34,62,176 and the net return 5·42 per cent., the cost of a river embankment being omitted.

17. The Government of India finally sanctioned the scheme as follows:—

	Rs.
Works	23,64,935
Establishment	5,78,451
Tools and plant	82,670
Total ...	30,26,056
Deduct—Receipts on capital account, sale-proceeds of old tank-beds	1,29,619
Net direct charge ...	28,96,437
Indirect charges.	
Leave and pensions	1,44,612
Capitalized land revenue	5,28,000
Total ...	6,72,612
Grand Total ...	35,69,049

18. The letter communicating the sanction to the project was received a year after the preparation of the estimate and after 12 years of correspondence. The estimates as originally drawn up amounted to Rs. 25,83,000, and the estimated return stood at 7·88 per cent. as revised; the figures stood at Rs. 35,69,049 and 5·25 per cent.

The result was due to a compromise of conflicting opinions as to what constituted indirect charges.

19. Though the delay led to a loss of revenue for 10 years (among which were the great famine years of 1877–79), an advantage was gained, viz., of securing a very fairly accurate estimate, though the calculations were necessarily based on data that were vague.

The principal features of the project were—

(i) The construction of a weir 4,290 feet long.
(ii) A head sluice of 40 vents of 4½ feet span each to supply the main canal.
(iii) The excavation of a main canal 6 miles long and 157 feet bottom width to fill the Kanigiri reservoir and to supply the original ayacut of the Duvur tank.
(iv) Improvements to the existing Duvur branch channel which was to be supplied from the main canal.
(v) The raising of the bank of the Kanigiri reservoir to increase its capacity.
(vi) The excavation of the following channels from the Kanigiri reservoir.

Eastern channel.
Feeder for central and southern channels.
Southern channel and central channel.

(vii) The excavation of a channel from the Duvur tank.

20. The capacities of the tanks were to be as follows:—

	Cubic feet.
Kanigiri	6,419,001,600
Duvur	1,042,986,100
Total ...	7,461,987,700

The head sluice was designed to discharge 4,800 cubic feet a second, of which 4,576·5 cubic feet a second was carried to the Kanigiri tank by the main canal, while 223·5 cubic feet a second was allowed to enter the Duvur branch channel (improved).

21. The discharge of the distributaries was to be as follows:—

	Cubic feet a second.
Eastern channel	934·5
Feeder for central and southern channels	420·0
Central channel	157·5
Southern do.	262·5
Duvur branch channel	223·5

	Acs.
The present area of irrigation was taken at	44,053
Increase	49,947
Total ...	94,000

Of this, 87,944 were Government and 6,056 were inam.

The area to be irrigated by each channel was as follows:—

	Acs.
Eastern channel	62,300
Central do.	10,500
Southern do.	17,500
Duvur channel and tank	3,700
Total ...	94,000

22. The irrigation under the last has increased to over 5,000 acres, and the estimated ayacut of the other channels will probably turn out to be more or less accurate. As subsequent enquiries have shown that the duty of a cubic foot is greater than has hitherto been accepted, it is possible that the ayacut of the project will in time considerably exceed 100,000 acres.

23. The works have been caried out more or less as they were designed, but the estimate has been revised three times. The first revision (see G.O. No. 393 I. of 1st July 1887, Rs. 38,25,000). This was due to the provision for baling being increased from Rs. 18,000 to Rs. 50,000, a separate establishment for settling compensation being found necessary, and a change being made in the alignment of the first 6 miles of the Eastern channel.

24. The second revised estimate (G.O. No. 195 I. of 25th March 1890) provided for a redistribution of the sub-heads, the amount remaining unaltered. Finally, in No. 781 I. of 16th September 1892, provision was made in a revised estimate for draining the Allúru swamp lands. The estimate finally stands at Rs. 38,91,552.

25. The accompanying extract from the administration report of 1893–94 gives the main facts as regards irrigation. It will be seen that the year 1893–94 was the first in which there was a surplus after paying the maintenance and interest charges, but omitting the past interest charges. The project is therefore assured as a success. There are still over 20,000 acres to be brought under cultivation, and the works still to be carried out will cost less than Rs. 1,00,000.

26. The project came into working in 1886–87 and there has been a steady increase of cultivation, except in 1891–92, when there was a falling off owing to the scarcity which amounted nearly to famine in the district. The value of the anicut and reservoir was clearly shown in these years. Under the former conditions no land would have been irrigated, and the deduction of Rs. 1,14,000 made for old irrigation year by year would have been lost to Government; and in the two years previous large remissions would have had to be granted—what the indirect gain to the ryots was cannot be estimated. The price of rice in 1891–92 was double the normal price, and though the irrigation sank by nearly 50 per cent., the prices gained made up for the diminished area reaped; the harvest and other crop operations also served as a famine relief work of the very best kind, and but for the two Pennéru deltas costly relief operations such as were put in hand in the northern taluks would have been rendered necessary in the central and southern portions of the delta.

27. One consideration which seriously affects the value of the reservoir was not sufficiently weighed when the estimates were drawn up or the works carried out, and that was, the effect on the reservoir bund of a north-east offing of over 6 miles.

To prevent accidents in cyclone months it has been found necessary to limit the depth to be maintained in the reservoir in the monsoon (north-east) months at the risk of running short later on.

By providing means of surplussing quickly at a low level, it is hoped that this danger will be sufficiently guarded against and an estimate has been submitted for the purpose.

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28. One great want in the delta is want of roads. This has been brought to the notice of the President of Local District Board, and it will be the duty of the Executive Engineer to urge on all occasions the claim of the delta to a fair treatment. The great increase in the revenue of the Board is, to a considerable extent, due to the project. Experience has shown that the provision for drainage was not sufficient. In the case of the Allúru swamp a flood embankment to prevent the flood tide invading the swamp lands is necessary. As regards the Maldevi drain, which at present is the escape channel of the reservoir, the improvements found necessary will be carried out from Provincial funds, agricutural.

29. The question whether the cost of the scheme for supplying the Nellore tank by a head sluice and channel from the southern end of the Sangam delta should be charged to the delta project is one that will have to be settled. The scheme is remunerative and is estimated to cost Rs. 2,60,000.

4th May 1895.

(Signed) R. A. SRINIVASA AIYANGAR,
Executive Engineer, Nellore Division.

Appendix A

Extract from the administration report of 1893–94 regarding the irrigation and direct returns of the Sangam anicut system.

The irrigated area and revenue compare as follow with those of the previous year:—

—		Area occupied.	Area charged as irrigated.	Irrigation revenue.
		Acs.	Acs.	Rs.
First crop	1893–94	73,514	70,378	2,81,768
	1892–93	71,128	70,106	2,78,084
Second crop	1893–94	3,499	3,393	9,921
	1892–93	4,912	4,881	14,801

The share of enhanced land revenue due to the works amounted to Rs. 17,670 as shown below:—

	Rs.
Land assessment on waste lands brought under cultivation	12,388
Do. on miscellaneous items	1,219
Four per cent. on sale-proceeds of tank-bed lands	4,063
Total ...	17,670

The gross revenue and working expenses per acre amounted to Rs. 4·20 and Rs. 1·03, respectively, against Rs. 4·13 and Rs. 1·07 in the previous year.

The following statement shows the financial results:—

Expenditure.	During 1893–94.	To end of 1893–94.	Receipts.	During 1893–94.	To end of 1893–94.
	Rs.	Rs.		Rs.	Rs.
Direct charges	64,772	5,02,226	Direct receipts in Public Works Department	680	6,793
Indirect charges	3,723	27,448	Irrigation revenue	2,95,891	20,62,727
Collection charges in the Civil Department	8,728	44,481	Share of enhanced land revenue ..	17,670	73,048
Interest on capital outlay, direct charges	1,21,641	11,50,433	Total receipts ..	3,14,241	21,42,568
Total	1,98,864	17,24,588	Deduct portion of revenue assumed to be due to "old irrigation," less old maintenance charges ..	1,39,000	12,46,162
Deduct portion of maintenance charges due to "old irrigation"	25,000	1,77,428	Net Total ..	1,75,241	8,96,406
Total working expenses on Improvements.	1,73,864	15,47,160			
Surplus revenue.	1,377	-6,50,754			
Total.	1,75,241	8,96,406			

rges was Rs. 1,377 against a deficit of Rs. 4,289

R. A. SRINIVASA AIYANGAR,
Executive Engineer.

Appendix B.

STATEMENT of outlay incurred on the Sangam anicut system to end of 1893–94 compared by main and sub-heads with estimates sanctioned by the Secretary of State in G.O. No. 352 I., dated 2nd June 1881, and with those as finally modified in G.O. No. 102 I., dated 4th February 1893.

Main and sub-heads.	Estimates sanctioned by the Secretary of State.	Estimates as finally modified.	Outlay to end of 1893–94.	Difference of columns 2 and 4.	Difference of columns 3 and 4.
1	2	3	4	5	6
	Rs.	Rs.	Rs.	Rs.	Rs.
I. Head works—					
A. Preliminary expenses	51,130	51,130	51,130	..	..
B. Land	800	18,562	18,513	— 17,713	49
C. Works	5,03,911	5,91,255	5,91,255	— 87,344	..
K. Buildings	25,185	21,026	21,026	4,159	..
O. Miscellaneous	40,635	32,502	32,502	8,133	..
P. Maintenance	..	4,105	4,105	— 4,105	..
Total	6,21,661	7,18,580	7,18,531	— 96,870	49
(2) Main canals and branches—					
B. Land	1,23,918	2,56,811	2,55,118	— 1,31,200	1,693
D. Regulators	1,05,654	94,287	94,287	11,367	..
E. Falls and weirs	44,000	24,010	24,011	19,989	— 1
G. Bridges	20,400	28,221	28,221	— 7,821	..
L. Earthwork	2,69,905	2,10,003	2,10,004	59,901	— 1
N. Tanks and reservoirs	2,32,015	2,99,082	2,99,182	— 67,167	— 100
O. Miscellaneous	7,082	13,761	13,760	— 6,678	1
P. Maintenance	..	22,058	22,058	— 22,058	..
M. Plantation	4,000	..	..	4,000	..
Total	8,06,974	9,48,233	9,46,641	— 1,39,667	1,592
(3) Distributaries—					
B. Land	19,105	51,905	28,407	— 9,302	23,498
C. Works	4,58,240	2,97,011	3,08,274	1,49,966	— 11,263
L. Earthwork	3,93,855	3,77,802	3,73,712	20,143	4,090
N. Tank and reservoirs	11,450	5,358	5,377	6,073	— 19
O. Miscellaneous	..	14,676	13,503	— 13,503	1,173
P. Maintenance	..	2,468	9,469	— 9,469	— 1
Total	8,82,650	7,56,220	7,38,742	1,43,908	17,478
(4) Drainage and protective works—					
B. Land	325	8,644	3,139	— 2,814	5,505
C. Works	28,850	828	829	28,021	— 1
L. Earthwork	24,475	76,397	53,694	— 29,219	22,703
O. Miscellaneous	..	2,000	884	— 884	1,116
Total	53,650	87,869	58,546	— 4,896	29,323
Provision for unforeseen works	..	3,182	..	..	3,182
Total Works	23,64,935	25,14,084	24,62,460	— 97,525	51,624
II. Establishment	5,78,451	4,96,362	4,87,770	90,681	8,592
III. Tools and plant	82,670	1,19,384	1,16,610	— 33,940	2,774
III.A. Loss by exchange	..	170	170	— 170	..
Grand Total	30,26,056	31,30,000	30,67,010	— 40,954	62,990
V. Less receipts on capital account	1,29,619	..	48	— 1,29,571	— 48
Net Total	28,96,437	31,30,000	30,66,962	— 1,70,525	63,038

Appendix C.

SCHEDULE of works required to be carried out to complete the Sangam anicut system.

Name of work.	Amount of estimate.	Expenditure to end of 1893–94.	Amount required to complete the project.	Date of completion.
WORKS WHICH ARE NECESSARY FOR THE FULL DEVELOPMENT OF THE PROJECT, BUT WHICH ARE NOT IN THEMSELVES DIRECTLY REMUNERATIVE.	Rs.	Rs.	Rs.	
Sanctioned in 1893–94.				
Ulavapalla bridge, 2 miles 1,320 feet	2,580	626	1,954	31st March 1896.
Allúru main drain and affluents, excavation	53,630	30,724	22,906	31st ,, ,,
Do. demarcation stones	870	275	595	31st ,, ,,
Do. land compensation	5,600	..	5,600	31st ,, 1897.
Duvur branch channel extension, land compensation	156	63	455	31st ,, 1896.
Total	..	..	31,510	

Schedule of works required to be carried out to complete the Sangam anicut system—*cont.*

Name of work.	Amount of estimate.	Expenditure to end of 1893–94.	Amount required to complete the project.	Date of completion.
WORKS WHICH ARE DIRECTLY REMUNERATIVE IN THEMSELVES.	Rs.	Rs.	Rs.	
Sanctioned in 1893–94.				
Eastern channel, minor channel, from Karlavadima tank, excavation	280	244	36	Completed 31st March 1895.
Iskapalli branch channel, minor channel, 5,000 feet, right bank, excavation	340	2	338	31st March 1896.
Iskapalli branch channel, minor channel, one sluice at head	350	122	228	Completed 31st March 1895.
Iskapalli branch channel, minor channel, one regulator at end	74	..	74	Do. do.
Iskapalli branch channel, minor channel, demarcation stones	50	..	50	31st March 1896.
Southern channel, minor channel, 5 miles 660 feet, right bank, head sluice	200	..	200	Completed 31st March 1895.
Southern channel, minor channel, excavation	474	..	474	Do. do.
Southern channel, minor channel, demarcation stones	34	..	34	Do. do.
Central channel, minor channel, 4 miles 990 feet, right bank, excavation	250	169	81	31st March 1896.
Land compensation (approximation)	2,47,572	2,41,195	6,377	31st ,, 1897.
~~*Sanctioned in* 1894–95.~~				
~~Gogulapalli branch channel, minor sluice, 2 miles 1,056 feet, right bank~~	~~270~~	..	~~270~~	~~31st March 1896.~~
~~Gogulapalli regulator and sluice, 2 miles 1,320 feet~~	~~530~~	..	~~530~~	~~31st ,, ,,~~
Total	..	..	~~8,699~~	7892
Grand total	..	..	~~46,280~~	39402
Establishment 15%	..	..	~~6,931~~	6203
above land charges. Total	..	..	~~48,589~~	45605

The Executive Engineer, Nellore Division, states that the balance payable under land compensation cannot be exactly stated, and that the Collector has been addressed on the subject.

(Signed) R. R. E. DRAKE-BROCKMAN, Colonel, R.E.,
Chief Engineer for Irrigation.

Appendix D.

Statement showing the estimated and actual financial results of the Sangam Anicut system.

	Area irrigated: First crop, Estimate	First crop, Actual	Second crop, Estimate	Second crop, Actual	Revenue, Direct: Estimate	Direct: Actual	Indirect, Irrigation revenue exclusive of old irrigation: Estimate	Irrigation revenue: Actual	Indirect, Share of enhanced land revenue: Estimate	Share: Actual	Total: Estimate	Total: Actual	Working expenses inclusive of collection charges and exclusive of old maintenance charges: Estimate	Working expenses: Actual	Net Revenue: Estimate	Net Revenue: Actual
	acres	acres	acres	acres	Rs	Rs	Rs	Rs	Rs	Rs	Rs	Rs	Rs	Rs	Rs	Rs
To end of 1887-88	.	.	.	.	.	864	.	1,74,790	.	9095	.	1,84,749	.	86,465	.	98,284
In 1888-89	56,900	52,789	3,526	3,149	.	1,417	96,964	86,841	3,315	3,061	1,00,279	91,319	44,569	47,891	55,710	43,428
1889-90	62,000	60,638	4,796	4,288	600	914	1,14,677	1,19,391	4,965	6,930	1,20,242	1,27,235	53,465	56,697	66,777	70,538
1890-91	67,800	64,741	6,246	3,483	600	1,271	1,35,640	1,26,744	7,365	9,535	1,43,605	1,37,550	54,150	61,354	89,455	76,196
1891-92	73,500	38,975	7,996	234	700	742	1,59,882	-1,977	10,965	10,548	1,71,547	9,313	55,542	37,038	1,16,005	-27,725
1892-93	78,500	70,106	9,746	4,881	800	905	1,84,257	1,53,885	14,565	16,209	1,99,622	1,70,999	56,941	55,059	1,42,681	1,15,940
1893-94	71,567	71,567	3,393	3,393	900	680	1,56,891	1,56,891	17,670	17,670	1,75,461	1,75,241	55,517	52,223	1,23,238	1,23,018
1894-95	72,583	72,583	4,095	4,095	1000	536	1,63,603	1,63,603	21,887	21,887	1,86,490	1,86,026	43,475	47,209	1,39,281	1,38,817
1895-96	73,557	73,557	3,790	3,790	1,035	551	1,68,687	1,68,687	22,899	22,899 (b)	1,92,621	1,92,137	43,799	59,896	1,32,725	1,32,241
1896-97	72,676	72,676	7,110	7,110	1,035	588	1,72,805	1,72,805	16,448	23,055	1,90,288	1,96,448	43,663	52,363	1,37,925	1,44,085
						8,468		13,21,660		1,40,889		14,71,017		556,195		9,14,822
Estimate 1897-98	74,002		3882		(a) 600		1,85,286		23,015		2,08,901		(c) 36,930		1,71,971	
1898-99	76,002		4,005		600		1,93,593		26,215		2,20,408		(d) 46,076		1,74,332	
1899-1900	78,002		4,128		600		2,01,900		29,315		2,31,815		47,000		1,84,815	
1900-01	80,002		4,251		600		2,10,207		32,415		2,43,222		47,000		1,96,222	
1901-02	82,002		4,374		600		2,18,514		35,515		2,54,629		47,000		2,07,629	
1902-03	84,130		4,500		600		2,27,341		38,615		2,66,556		47000		2,19,556	
					3,600		12,36,841		1,85,090		14,25,531		2,71,006		11,54,525	
					12,068		25,58,501		3,25,979		28,96,548		8,27,201		20,69,347	

(a) The budget estimate for 1897-98.
(b) Includes Rs 6607 shown in the Administration Accounts of the Examiner of P.W. Accounts for 1896-97 but not included in the proceedings of the Board of Rev: No. 115 d/ 10th March 98.
(c) The revised estimate for 1897-98.
(d) The [illegible] 1898-99.

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