Public Works (1897) Department.

G.O., No. 309 I

DATED 22 March 1897

[Despatch Abstract.]

Krishnagiri Project. Stating that Consideration of the — will not be finally abandoned but will be taken up again when the Tank Restoration Scheme investigation of the Ponniar Minor basin is completed.

Indexed 24/3/97

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.

Government {1897} of Madras.

PUBLIC WORKS.

Recd. } 1897. *Enclosures*

Regd. } *Spare copies*

G.O., No. 309 I., 22nd March 1897.

MARCH.

Krishnagiri Project

Stating that consideration of the — will not be finally abandoned, but will be taken up again when the Tank Restoration Scheme investigation of the Penniar minor basin is completed.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Irrigation.

READ—the following papers :—

From H. H. O'CONNELL, Esq., Executive Engineer, Salem Division, to the Superintending Engineer, IV Circle, dated 28th July 1896, No. 273 S.E.

In continuation of my No. 232 S.E., dated 2nd July 1896, asking for a surveyor to continue the investigation of the Krishnagiri project, I have the honour to state that I have since gone further into the matter and consider that the project is hopeless and would recommend that it be dropped.

2. I enclose abstract of discharges over the Nedungal anicut for the last five years, from which it will be seen that nothing like the amount of water calculated on by Major Romilly is available. He calculated that 15,428 millions of cubic feet were available, but the discharges over the anicut, which is 10 miles *below* the site of proposed dam, show that nothing like this amount is available. I find that of the stations at which rainfall registers were kept on which he based his calculations, only two are in the catchment basin, viz., Hosúr and Krishnagiri. He has included the Shevaroy Hills in his catchment basin, but they lie a long way below the site of proposed dam. I think, therefore, that his average rainfall on which he based his calculations is all wrong.

3. I am quite sure there is not enough water to warrant the execution of this project, and an inspection of the country round showed that, if the dam were built, it would be very costly to distribute the water from it.

4. I therefore request that this reference may be omitted in future from the unanswered reference list.

ENCLOSURE.

ABSTRACT of the calculation of discharges of water passed over the anicut and through sand sluices at Nedungal for the last five official years in millions of cubic feet.

Month.	1891–92.		1892–93.		1893–94.		1894–95.		1895–96.	
	Discharge over the anicut.	Discharge through sand sluice.	Discharge over the anicut.	Discharge through sand sluice.	Discharge over the anicut.	Discharge through sand sluice.	Discharge over the anicut.	Discharge through sand sluice.	Discharge over the anicut.	Discharge through sand sluice.
April	..	..	..	..	37·93	..	..	..	..	..
May	..	..	216·03	..	252·33	..	126·91	..	..	..
June	246·73	..	420·78	..	686·02	..	327·51	..	90·89	..
July	..	..	267·58	..	816·42	..	11·81	44·67	..	..
August	..	..	1,998·20	..	..	..	1,150·92	..	..	..
September	..	..	..	..	610·07	..	11·81	..	..	..
October	235·92	..	580·68	..	4,613·74	..	164·01	433·85	525·57	326·62
November	..	..	61·27	..	2,554·43	..	..	..	5,718·22	419·01
December	..	..	..	..	..	..	..	..	1,977·23	164·14
January	..	..	..	..	..	..	..	..	..	..
February	..	..	11·81	..	..	..	..	..	..	..
March	..	..	..	..	..	..	..	..	..	..
Total ..	482·65	..	3,556·35	..	9,570·94	..	1,792·97	478·52	8,311·91	909·77
Grand Total ..	482·65		3,556·35		9,570·94		2,271·49		9,221·68	

No. 150/I.

Copy forwarded to the Chief Engineer for Irrigation with the information that the undersigned concurs with Mr. O'Connell and with a request that this reference may now be excluded from the unanswered reference list.

(Signed) J. HANNAN,
3rd August 1896. Supg. Engineer, IV Circle.

Proceedings of the Board of Revenue (Revenue Settlement, Land Records and Agriculture), Mis. No. 5881, dated 21st November 1896.

Read—again Board's Proceedings, Mis. No. 4557, dated 17th September 1896.

ABSTRACT.—Forwarding to the Collector of Salem for report Government Order, Revenue Department, Mis. No. 3481, dated 28th August 1896, regarding the abandonment of the Krishnagiri reservoir project, Salem district.

Read—also the following letter from the Collector of Salem, dated 8th October 1896, No. 5466 :—

I have the honour to return the enclosures received with Board's Proceedings (Revenue Settlement), Mis. No. 4557, dated 17th September last, and to report as follows.

2. The resolution refers to the proposed Krishnagiri reservoir project. This appears to have been originally recommended upon the ground that there was an available surplus in the Penniar river of about 15,500,000,000 cubic feet, whereas the present Executive Engineer calculates that the maximum available surplus at a spot 10 miles below the proposed anicut during the last five years is about 9,500,000,000 cubic feet. It is pointed out to me that these years may not be a good guide in the matter owing to bad seasons prevailing. The district average rainfall is about 31·5 inches, which is almost the same as that for the taluks of Hosúr and Krishnagiri, which is 32·12. The actuals for the two recording stations in the basin of the Penniar above the site of the proposed dam, omitting 1890 (which was a little below the average) as the Executive Engineer gives no figures for that year, are—

—	Hosúr.	Krishnagiri.	Discharge in millions of cubic feet.	Official year.
Average—				
1870 to 1889	32·86	31·39	..	..
1891	22·56	23·55	482·65	1891–92
1892	27·47	36·02	3,556·35	1892–93
1893	30·43	38·30	9,570·94	1893–94
1894	31·57	33·39	2,271·49	1894–95
1895	32·51	31·88	9,221·68	1895–96

The figures for 1894 do not seem easily reconcilable with those for 1893 and 1895, but I notice that it is stated in 1884 by the Chief Engineer that it is very difficult to gauge the discharge at Nedungal. As surmised by the Board, the last five years have been below the average at Hosúr, but, strange to say, four of these have been above the average at Krishnagiri. This, however, can have had little effect upon the surplus, as the portion of the river basin in Krishnagiri taluk is, I roughly calculate from a map, perhaps about one-eighth of the part in Hosúr taluk, to say nothing of the catchment area in Mysore. Admitting this, the figures supplied do seem to prove that a surplus of 15,500 millions of cubic feet is not available. If that be so, the question arises whether the surplus that is available may not be put to use. I regret I can give no opinion upon this subject.

3. In view of the remarks of the Chief Engineer for Irrigation that there would be a possible failure "on the grounds of want of agricultural population and capital, as has been found to be the case under the Barur project," it may be thought that

nothing should be done even if some use could be found for available water. But I beg to point out that having recently spent some days at Barur, I am by no means sure that that project has a hopeless future before it. I have not the figures before me.—expecting a detailed report—but since the Barur project has been completed, I think 3,000 acres of dry lands have been taken up and are now cultivated as dry. When definite orders are passed as to the grouping of the irrigation sources, main supply channel, tanks and channels from the tank, as to which I made detailed enquiries, I would not be surprised if most, if not all, of the above 3,000 acres which are commanded by the scheme, be not converted into wet. From this year forward the supply of water will be on a much more sound basis. Hitherto all the sluices were of one size—2 feet square, no matter what the extent of cultivation was under them, leading to much waste. Now their size is regulated by the amount of cultivation they have to irrigate. In short the Barur project has attracted both population and cultivation. There is a steady increase in the population of the district, and this is accompanied by a slackening of the ties that originally kept surplus population from moving where labour was more in demand. The number of labourers that go to and from various coffee estates, the fortunes that can be made by a little steady work at the Kolar gold fields have strongly tended in this direction. In Krishnagiri especially, there are cases of Pariahs even who have acquired much land out of their savings at the gold fields. Krishnagiri taluk in 1891 had not nearly recovered the loss of its population caused by the famine of 1876–77; and where there is more scope for expansion, the quicker the expansion will be. Krishnagiri lost 29 per cent. of its population between 1871 and 1881, increased by 26 per cent. between 1881 and 1891, and even this was $10\frac{1}{2}$ per cent. below its population in 1871.

4. Whether the reservation of forests will permanently increase the rainfall in the catchment basin of the Penniar river is another question that might be considered before it be finally decided to abandon for ever a project which, if successful, would be of great benefit indirectly and directly to the district and so to the Presidency.

Resolution—Mis. No. 5881, dated 21st November 1896.

The Collector's letter read above will be submitted to Government with reference to its order No. 3481, dated 28th August 1896.

2. In its order No. 696 I., dated 30th July 1884, the Government considered "that the investigations made by Captain Romilly, R.E., sufficiently proved that an extensive reservoir might be formed at Krishnagiri at a cost which would be remunerative," and accordingly authorized "the preparation of detailed plans and estimates," remarking at the same time that "there can be no doubt that the work would prove of immense benefit to a part of the country which has suffered greatly in times of scarcity." The project was based on the assumption that there would be a total quantity of 15,428 millions of cubic feet of water available from the Penniar for storage in the proposed reservoir, and that this quantity would suffice to irrigate, in years of ordinary rainfall, an area of 500,000 acres, in addition to the extent already irrigated, and in a famine year, probably, for half that extent.

3. The papers received with the Government order under reply show that Major Romilly over-estimated the quantity of water available in the river, and that this was due to his having taken into account the rainfall at some stations which are outside the catchment basin. It is further stated that the discharges of the river, as recorded at the Nedungal anicut, which is 10 miles below the site of the proposed reservoir, during the last five years, give the total quantity available there at only 9,500 millions of cubic feet and that the nature of the country round is such that if a dam were built it would be very costly to distribute the water from it.

4. The condemnation of the project is thus mainly based on the calculation of the discharges of the river during the past five years, but unfortunately those years were more or less exceptionally unfavourable to cultivation and cannot be taken as a safe guide in the matter. The average rainfall at Hosúr and Krishnagiri, which are the only rain-recording stations in the catchment basin of the reservoir, is 32·86 and 31·39 inches, respectively. The fall at Hosúr was more or less below the average

* This should be 50,000.

during each of the five years 1891 to 1895. At Krishnagiri, however, the fall was more or less above the average in four of the five years; but the portion of the river basin in the Krishnagiri taluk is estimated by the Collector to be only about one-eighth of that in Hosúr. A part of the catchment basin also lies in the Mysore territory. Even if the total available quantity is not likely to be 15,500 millions of cubic feet, it may be large enough to justify the project being carried out. This question, however, cannot be answered without fresh investigation and estimates, especially as the Executive Engineer is of opinion that even if a dam were constructed, the distribution of water would be very costly.

5. With regard to the Chief Engineer's opinion formed on the experience of the Barur project that this project may fail for want of agricultural population and capital, the Collector points out that the case of the Barur project is not so hopeless as the Chief Engineer seems to think. The Collector has reason to believe that the Barur project has attracted both population and cultivation (capital) and thinks that in this respect the Krishnagiri project is likely to be attended with a larger measure of success. This project was the offspring of Mr. H. S. Thomas, one of the very ablest Revenue officers in the service. The Board knows from personal experience that the tract in question is one which largely requires additional irrigational facilities and is confident that population will follow irrigation. The value of such a work is by no means to be solely judged by the percentage which it pays on cost of construction. The Periyár project would hardly stand such a test.

The Board concurs in the Collector's view that the project should not be finally condemned without some further investigations.

(True Copy and Extract.)

(Signed) R. V. SRINIVASIAR,
Secretary.

G.O., Mis. No. 23, Revenue, dated 4th January 1897.

Read—again G.O., Mis. No. 3481, dated 28th August 1896.

ABSTRACT.—Referring to the Board of Revenue for report as to whether it concurs with the proposal to abandon the Krishnagiri reservoir project (endorsement of the Public Works Department, dated 19th August 1896).

Read—also Proceedings of the Board of Revenue (Revenue Settlement, Land Records and Agriculture), dated 21st November 1896, Mis. No. 5881.

Order—Mis. No. 23, Revenue, dated 4th January 1897.

Transferred to the Public Works Department with an expression of concurrence in the Board's remarks.

(True Extract.)

(Signed) LIONEL DAVIDSON,
Under Secretary to Government.

No. 45 I.

Note by the Chief Engineer for Irrigation.

Captain F. J. Romilly, R.E., worked out data for the Krishnagiri project in the Salem district, which was for the formation of a reservoir by a masonry dam across the Penniar in 1884, and in G.O., No. 696 I., dated 30th July 1884, detailed plans and estimates were called for.

2. The general idea was for a reservoir to irrigate 50,000 acres to cost about 40 lakhs. It was then estimated that 15,428 millions cubic feet of water would be available for storage.

3. The Executive Engineer, Salem division, reported on the project in July last and was supported by the Superintending Engineer in considering that the investigations should be dropped as the water in the river was insufficient.

4. In Proceedings of Madras Government, Revenue Department, Mis. No. 23, dated 4th January 1897, the Collector gives his reasons for desiring further investigation, and in this is supported by the Revenue Board and Government in the Revenue Department.

5. It is considered that the project need not, under the circumstances, be finally abandoned, but nothing effective can be done in investigating it until the Tank Restoration Scheme investigation of the whole Penniar minor basin is completed.

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

24th February 1897.

ORDER—No. 309 I., dated 22nd March 1897.

Consideration of the Krishnagiri project will not be finally abandoned, but will be taken up again when the Tank Restoration Scheme investigation of the Penniar minor basin is completed.

(True Extract.)

Under Secretary to Government,
Irrigation Branch.

To the Superintending Engineer, IV Circle.
" Chief Engineer for Irrigation.
" Chief Engineer for Irrigation, T.R.S.
" Examiner, Public Works Accounts.
" Revenue Department.

Exd. T. K. Narayana Aiyangar

Public Works (1896) Department.

Receipt
~~CURRENT~~ No. 2754

Order 311

From The Supdg Engineer, 4 Circle

No. 150 I

Dated 31 August 1896

Received

Enclosures

Spare copies

SUBJECT.

Krishnagiri Reservoir Project
Reports that — is a hopeless
one and recommends that it be
dropped -

BACK PAPERS.

No.	Date.

FURTHER PAPERS.

No.	Date.

Abstract of the calculation of discharges of water passed over the anicut and thro: Sand sluices at Kadungal for the last five official years in Millions of cft.

Month	1891-92		1892-93		1893-94		1894-95		1895-96	
	Discharge over the Anicut	Discharge thro Sand Sluices	Discharge over the Anicut	Discharge thro Sand Sluices	Discharge over the Anicut	Discharge thro Sand Sluices	Discharge over the Anicut	Discharge thro Sand Sluices	Discharge over the Anicut	Discharge thro Sand Sluices
April	"	"	"	"	37.93	"	"	"	"	"
May	"	"	216.03	"	252.33	"	126.91	"	90.89	"
June	246.73	"	420.78	"	686.02	"	327.51	"	"	"
July	"	"	267.58	"	816.42	"	11.81	44.67	"	"
August	"	"	1998.20	"	"	"	1150.92	"	"	"
September	"	"	"	"	610.07	"	11.81	"	525.57	326.62
October	235.92	"	580.68	"	4613.74	"	164.01	433.85	5718.22	419.01
November	"	"	61.27	"	2554.43	"	"	"	1977.23	164.14
December	"	"	"	"	"	"	"	"	"	"
January	"	"	"	"	"	"	"	"	"	"
February	"	"	"	"	"	"	"	"	"	"
March	"	"	11.81	"	"	"	"	"	"	"
Total	482.65	"	3556.35	"	9570.94	"	1792.97	478.52	8311.91	909.77
Grand Total	482.65		3556.35		9570.94		2271.49		9221.68	

Executive Engineers Office
Salem Div
28 July 96

10

2

Asst. O' Connell
Ey: Engineer

CRm
27/7

SUPG. ENGINEER'S OFFICE P.W.D.
No. 31381
30 JUL 96
FOURTH CIRCLE.

CHIEF ENGINEER
FOR IRRIGATION.
5-AUG.96
No. 2782

1896
REVENUE DEPARTMENT
Serial No. 1
Date 1012

fc 6020/96

fc 7781/96

178

No. 273 SE.

Executive Engineer's office,
Salem Division,
28th July 1896.

From,

A. H. O'Connell Esq,
Executive Engineer,
Salem Division,

To,

The Superintending Engineer,
Fourth Circle
Coimbatore.

Sir,

In continuation of my No. 232 SE., dated 2nd July 1896 asking for a Surveyor to continue the investigation of the Krishnagiri Project, I have the honor to state that I have since gone further into the matter and consider that the Project is hopeless and would recommend that it be dropped.

2. I enclose abstract of discharges over the Kedungal Anicut for the last five years, from which it will be seen that nothing like the amount of water calculated on by Major Romilly is available. He calculated that 15,428 millions of cubic feet were available, but the discharges over the Anicut which is 10 miles below the site of proposed dam show that nothing like this amount is available. I find that of the stations

stations at which rainfall registers were kept on which he based his calculations only 2 are in the catchment basin Viz. Hosur and Krishnagiri. He has included the Shevaroy Hills in his Catchment basin but they lie a long way below the site of proposed dam. I think therefore that his average rainfall on which he based his calculations is all wrong.

3. I am quite sure there is not enough water to warrant the execution of this project and an inspection of the country round showed that if the dam were built, it would be very costly to distribute the water from it.

4. I therefore request that this reference may be omitted in future from the Unanswered Reference List.

I have &c.,
(Sd) Hugh O'Connell,
Executive Engineer.

No. 150 dated 3rd August 1896.

Copy. Forwarded to the Chief Engineer for Irrigation with the information that the undersigned concurs with Mr. O'Connell and with a request that this reference may now be excluded from the Unanswered Reference List.

2 Enclosure
1 Statement.

J. Hammond
Supg. Engineer 4 Circle

CHIEF ENGINEER
FOR IRRIGATION.
5 AUG 96
No. 2782

From

The Supdg. Engineer
Hr. Circle

Dated 3d August 1896
Despd. 4th August 1896
Recd.

No. 150/9
Enclo: one

Krishnagiri Reservoir Project. Reports that it is a hopeless one and recommends that it be dropped.

9 1603/96

1896
REVENUE D. Misc.
No. 2
From 6012
7815/96

(13—1,000—21-1-93.)

REVENUE BOARD OFFICE
MADRAS.

Proceedings of the Board of Revenue

(Revenue Settlement, Land Records and Agriculture).

Dated 21st November 1896.

No. 5881 Mis

READ again Board's Proceedings dated 17th September 1896 No 4557 Mis. forwarding to the Collector of Salem for report Government order Revenue Department, dated 28th August 1896 No 3481 Mis. regarding the abandonment of the Krishnagiri Reservoir Project, Salem District.

Read also the following letter from the Collector of Salem, dated 8th October 1896 No. 5466:—

I have the honor to return the enclosures received with Board's Proceedings No 4557 Mis Revenue Settlement, dated 17th September

September last and to report as follows:-

2. The resolution refers to the proposed Krishnagiri reservoir project. This appears to have been originally recommended upon the ground that there was an available surplus in the Penniar river of about 15,500,000,000 cubic feet, whereas the present Executive Engineer calculates that the maximum available surplus at a spot 10 miles below the proposed anicut during the last five years is about 95,00,000,000 cubic feet. It is pointed out to me that these years may not be a good guide in the matter owing to bad seasons prevailing. The District average rainfall is about 31·5 inches which is almost the same as that for the taluks of Hosur and Krishnagiri, which is 32·12. The actuals for the two recording stations in the basin of the Penniar above the site of the proposed dam, omitting 1890 (which was a little below the average) as the Executive Engineer gives no figures for that year, are-

	Hosur	Krishnagiri	Discharge in millions of cubic feet	official year
average 1870 to 1889	32.86	31.39	"	"
1891	22.56	23.55	482.65	1891-92
1892	27.47	36.02	3556.35	1892-93
1893	30.43.	38.30	9570.94	1893-94
1894.	31.57	33.39	2271.49	1894-95
1895.	32.51	31.88	9221.68	1895-96.

The figures for 1894 do not seem easily reconcilable with those for 1893 and 1895, but I notice that it is stated in 1884 by the Chief Engineer that it is very difficult to gauge the discharge at Nedumgal. As surmised by the Board the last five years have been below the average at Hosur but strange to say four of these have been above the average at Krishnagiri.

This

This, however, can have had little effect upon the surplus as the portion of the river's basin in Krishnagiri Taluk is, I roughly calculate from a map, perhaps about $\frac{1}{8}$ to of the part in Hosur Taluk, to say nothing of the catchment area in Mysore. Admitting this the figures supplied do seem to prove that a surplus of 15,500 millions of cubic feet is not available. If that be so, then question arises whether the surplus that is available may not be put to use. I regret I can give no opinion upon this subject.

3. In view of the remarks of the Chief Engineer for Irrigation that there would be a possible failure" on the grounds of want of agricultural population and capital, as has been found to be the case under

the

18

the Barur project", it may be thought that nothing should be done even if some use could be found for available water. But I beg to point out that having recently spent some days at Barur, I am by no means sure that that project has a hopeless future before it. I have not the figures before me - Expecting a detailed report - but since the Barur project has been completed, I think 3000 acres of dry lands have been taken up and are now cultivated as dry. When definite orders are passed as to the grouping of the irrigation sources, main supply channel, tanks and channels from the tank, as to which I made detailed enquiries, I would not be surprised if most, if not all, of the above 3000 acres which are commanded by

by the scheme, be not converted into wet. From this year forward the supply of water will be on a much more sound basis. Hitherto all the sluices were of one size – 2 feet square, no matter what the extent of cultivation was under them, leading to much waste. Now their size is regulated by the amount of cultivation they have to irrigate. In short the Barur project has attracted both population and cultivation. There is a steady increase in the population of the district and this is accompanied by a slackening of the ties that originally kept surplus population from moving where labour was more in demand. The number of labourers that go to and from various coffee estates, the fortunes that can be made by a little steady work at the Kolar gold fields have strongly tended in this direction. In Krishnagiri especially

especially there are cases of Pariahs even who have acquired much land out of their savings at the gold fields. Krishnagiri Taluk in 1891 had not nearly recovered the lost of its population caused by the famine of 1876-77; and where there is more scope for expansion there is more the quicker the expansion will be. Krishnagiri lost 29 per cent of its population between 1871 and 1881 increased by 26 per cent between 1881 and 1891 and even this was 10 1/2 per cent below its population in 1871.

4. Whether the reservation of forests will permanently increase the rainfall in the catchment basin of the Pennair river is another question that might be considered before it be finally decided to abandon for ever a project which, if successful, would be of great benefit indirectly and directly to the District and so to the Presidency.

Resolution.

The Collector's letter read above will be

be submitted to Government with
reference to its order No 3481 dated
28th August 1896.
2. In its order No 6969 P. W. R. dated
30th July 1884 the Government
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cost which would be remunerative"
and accordingly authorized "the
preparation of detailed plans
and estimates" - remarking at the
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that the work would prove of immense
benefit to a part of the country
which has suffered greatly in times
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on the assumption that there would
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of cubic feet of water available
from the Penniar for storage in
the proposed reservoir and that this
quantity would suffice to irrigate,
in years of ordinary rainfall,
an area of 500,000 acres in addition
to the extent already irrigated and
in a famine year, probably for
half

especially

half that extent.
3. The papers received with the Govern-
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Major Romilly overestimated the
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the river and that this was due
to his having taken into account
the rainfall at some stations
which are outside the catchment
basin. It is further stated that
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recorded at the Nedugalankat
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only 9500 millions of cubic
feet and that the nature of the
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a dam were built it would be
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from it.
4. The condemnation of the project
is thus mainly based on the cal-
culation of the discharge
the river during the

years, but unfortunately those years were more or less exceptionally unfavourable to cultivation and can not be taken as a safe guide in the matter. The average rainfall at Hosur and Krishnagiri which are the only the rain-recording stations in the catchment basin of the reservoirs is 32.86 and 31.39 inches respectively. The fall at Hosur was more or less below the average during each of the five years 1891 to 1895. At Krishnagiri, however, the fall was more or less above the average in four of the five years; but the portion of the river basin in the Krishnagiri Taluk is estimated by the Collector to be only about $\frac{1}{8}$th of that in Hosur. A part of the catchment basin also lies in the Mysore Territory. Even if the total available quantity is not likely to be 15,500 millions of cubic feet, it may be large enough to justify the project being carried out. This question, however, cannot

cannot be answered without fresh investigation & estimates especially as the Executive Engineer is of opinion that even if a dam were constructed the distribution of water would be very costly.

5. With regard to the Chief Engineer's opinion formed on the experience of the Barur project, that this project may fail for want of agricultural population and capital, the Collector points out that the case of the Barur project is not so hopeless as the Chief Engineer seems to think. The Collector has reason to believe that the Barur project has attracts both population and cultivation (capital) and thinks that in this respect the Krishnagiri project is likely to be attended with a larger measure of success. This project was the offspring of Mr H.S. Thomas, one of the very ablest Revenue officers in the Service. The

Board

Board knows from personal experience that the tract in question is one which largely requires additional irrigational facilities and is confident that population will follow irrigation. The value of such a work is by no means to be solely judged by the percentage which it pays on cost of construction. The Periyar project would hardly stand such a test.

The Board concurs in the Collector's view that the project should not be finally condemned without some further investigations.

(True copy + Extract)

R. V. Srinivasaiyar
Secretary.

To
The Secretary to Government,
Revenue Department.

Copy to the Collector of Salem.

Rec. E.I. 357/97

Public Works (1897) Department.

CURRENT No. 357

12

From The Revenue Department

Order

No. 23 Mis.

Dated 4th Janr 1897

Received 11.1.97

Registered 11.1.97

Enclosures 2

Spare copies

SUBJECT.

Transferring to the Public Works Dept with an expression of concurrence in the Board's remarks regarding the abandonment of the Krishnagiri reservoir Project Salem Dt.

BACK PAPERS.

No.	Date.
R 275 L	3 8 96
Draft order thereon with MO's remarks	15 8 96
6069	18/8/96 30 7 84

FURTHER PAPERS.

No.	Date.
12	

F 16 3,000—14-7-94.

118 5P 1/4 1

REVENUE DEPARTMENT.

PROCEEDINGS OF THE MADRAS GOVERNMENT.

Read again G.O.No.3481 Misc, dated 28th August 1896, referring to the Board of Revenue for report as to whether it concurs with the proposal to abandon the Krishnagiri Reservoir project, Endorsement of the Public Works Department, dated 19th August 1896.

Read also Proceedings of the Board of Revenue (Revenue Settlement, Land Records and Agriculture) dated 21st November 1896, No.5881 Misc.

Order thereon, No.23 Misc, dated 4th January 1897.

Transferred to the Public Works Department with an expression of concurrence in the Board's remarks.

(True Extract)

Lionel Davidson 7.1.97
Under Secretary to Government.

To the Public Works Department with original notes.

To the Board of Revenue (Revenue Settlement, &c)

Her Excellency the Governor.

Nr. 309 I a/22.3.97

PUBLIC WORKS DEPARTMENT,
IRRIGATION BRANCH.

PROCEEDINGS OF THE MADRAS GOVERNMENT.

UNDER date the

READ the following

Endorsement of the Supey. Engineer, South Circle } (Hd. Nr. 150-I. dated 3 Aug. 1896)

Proc. Board of Revenue, Revenue Settt., Land Records & Agriculture } (Hd. Nr. 5881. Misc. dated 21. Nov. 1896)

G.O. Revenue Department, Nr. 23. Misc. dated 4 January 1897.

Note by the Chief Engineer for Irrigation. (Hd. Nr. 45 I. dated 24 Febr. 1897).

Captain F.J. Romilly R.E. worked out data for the Krishnagiri project in the Salem district, which was for the formation of a reservoir by a masonry dam across the Pennar in 1884; and in G.O. Nr. 696-I. dated 30th July 1884, detailed plans and estimates were called for.

2. The general idea was for a reservoir to irrigate 50,000 acres to cost about forty lakhs. It was then estimated that 15,428 million cubic feet of water would be available for storage.

3. The Executive Engineer, Salem division, reported on the project in July last and was supported by the Superintending Engineer in

PUBLIC WORKS SECRETARIAT,
IRRIGATION BRANCH,
CHEPAK, MADRAS.

March 1st 1897.

Dear Sir,

With reference to your note of the 27th it is not likely that a party can be made available for completing the Pennair basin until the party now working in Cumool has finished its work

E. I. Form No. 1—500—14-5-95

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PUBLIC WORKS DEPARTMENT,
IRRIGATION BRANCH.

PROCEEDINGS OF THE MADRAS GOVERNMENT.

UNDER date the

READ the following

Endorsement from the Supg: Engineer, IV circle (H.E.NO: 150. I. dated 3rd August 1896).
Note by the Chief Engineer for Irrigation..../H.E.NO: .I. dated 12th- DO -)

In G.O.NO: 696. I. dated 30th July 1884 orders were passed for the preparation of detailed plans and estimates for the construction of a reservoir at Krishnagiri in the Salem district.

2. The preliminiary investigation of the project was made by Captain Romilly R.E, Executive Engineer. The project was to cost nearly 40 lakhs to irrigate 50000 acres and to return 5 per cent. Captain Romilly calculated that a quantity of 15428 millions cubic feet of water would be available for storage and in his note accompanying the above mentioned order the Chief Engineer for Irrigation gives the quantity of water that it was then roughly calculated ran to waste over the Tirukoilur anicut in 1872-74. The probable success of the scheme was based on these figures.

3. The discharges of water over the Nedungal anicut (the one next below proposed site for reservoir,) for the last five years now reported by the Executive Engineer, Salem, show that these figures were too sanguine & the Superintending Engineer, Fourth Circle supports the Executive Engineer in his opi- that the project should be abandoned.

I think the Rev. Depart.t should have an opportunity of commenting upon these papers before the order for rejecting this project is passed.

2.94
18.8.96

4. The undersigned agrees with the Supg: Engineer and considers that even were the project carried out under more favourable conditions of catchment drainage there would be every probability of its failing to be a success, on the grounds of want of agricultural population and capital, as has been found to be the case under the Barur project.

Order thereon:-

Under the circumstances brought to notice in the foregoing note by the Chief Engineer for Irrigation further consideration of the Krisnnagiri reservoir project will be dropped.

To

The Superintending Engineer, Fourth circle.

" Chief Engineer for Irrigation.

" Examiner, Public Works Accounts.

" Revenue Department.

E. I. Form No 1—1,000—27-11-95.

30TH JULY 1884, No. 696 I., PUBLIC WORKS.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Irrigation.

READ—the following papers :—

From Colonel J. BEATTY, R.E., Superintending Engineer, IV Circle, to the Chief Engineer for Irrigation, dated Coimbatore, 21st February 1884, No. 20 E.I.

I have the honor to forward, herewith, for your consideration, the preliminary report of the Executive Engineer, B. Project division, on the Krishnagiri project, and to request your instructions whether the estimates for it should be worked out as proposed by Captain Romilly, or if you have any modifications you would wish made.

Preliminary report with index.
Statements with index.
1 Folio containing plans with index.
Estimate, amounting to Rs. 12,000, with a specification.

ENCLOSURE.

PRELIMINARY REPORT ON KRISHNAGIRI PROJECT.

INDEX.

Para. 1.—Previous references.
" 2.—Nature of the project.
" 3.—Information available up to date.
" 4.—Conclusions deduced from plan of reservoir site.
" 5.—Disposal of surplus.
" 6.—Probable arrangements.
" 7.—Amount of water.
" 8.—Capacity of reservoir.
" 9.—Surplus to be provided for.
" 10.—Effect on existing irrigation.
" 11.—Area to be commanded.
" 12.—Probable returns.
" 13.—Several idea of the scheme when worked out.
" 14.—Probable cost of works.
" 15.— Do. do. under all heads.
" 16.—Net returns or total outlay.
" 17.—Summary.
" 18.—Alternative scheme.
" 19.—Probable cost and return.

KRISHNAGIRI PROJECT.

PRELIMINARY REPORT.

Previous references.—Up to date the following references are recorded with regard to this project:—

Number.	Date.	Nature.
883 F.R.	9th April 1878 ...	Government Order. Observations by the Irrigation Chief Engineer.
883 F.R.	7th July 1882 ...	Preliminary report by Captain F. J. Romilly, R.E., Executive Engineer.
IV/30 S.L.	2nd Sept. „ ...	Memorandum from Irrigation Chief Engineer regarding the supply of river, &c.
1187	30th Mar 1883 ...	Letter from Salem Collector about ayacut and revenue under the Pennér.

2. *Nature of the project.*—The project may briefly be described as a scheme to extend irrigation in the Krishnagiri taluk of the Salem district by means of a large reservoir to be supplied from the Pennér, the dam to impound the water to be constructed across the river about 5 miles south-west of the town of Krishnagiri. The index map that accompanies this report gives full information regarding the position of the reservoir and probable area that will be affected by it.

3. *Information available up to date.*—An examination of the site for the proposed dam was made in May and June 1882. The report will be found among the papers attached (see appendix K.) and it may be accepted that a good rock foundation is obtainable at a reasonable depth. The necessary levels and sections have been taken, from which the plan of the proposed reservoir has been prepared showing the contours at 10 feet interval up to 100 feet above the level of the river bed at the site for the dam. The following data are now available:—

(*a*) Areas and contents of the reservoir at every 20 feet interval.
(*b*) Gauge readings and corresponding discharges in the Pennér at the site of the proposed dam for the years 1882-83 and at Nedingal, 10 miles lower down, for 1882.
(*c*) Rainfall statistics for ten years of eight stations in the catchment basin of the Pennér.
(*d*) Statements of the existing cultivation under the river below Krishnagiri.
(*e*) Compensation statements of land submerged by the reservoir at different levels.

4. *Conclusions deduced from examination of plan of reservoir site.*—An examination of the contoured plan shows that a dam of moderate length thrown across the Pennér a little north of Chinnamootoor will create a reservoir of considerable extent. It is also evident that there are no facilities for the disposal of surplus on the western side, and that on the east the only site suitable for an escape is the saddle between the Tolapully and Kotapully hills crossed by the road to Dowlatabad. This saddle is about 130 feet above the river bed, and a weir of suitable capacity could be constructed here without difficulty.

5. *Objections to disposal of surplus by a natural saddle.*—The disposal of the surplus in this manner is open to two objections. One has already been stated by Major Pennycuick in his report quoted among the references, viz., that the surplus so disposed of would have to be conveyed back to the Pennér round the Kotapully hill along about 3 miles of valley where expensive works would be necessary to confine the large body of water within bounds and heavy compensation would have to be paid for tanks and cultivation in the valley that would have to be taken up. The other objection is that the adoption of this level for an escape would arbitrarily fix the height of the dam, capacity of the reservoir and compensation to be paid for land submerged, while with greater latitude in the choice of an escape level a reservoir of more moderate capacity, but which would yield more favorable returns, might be secured.

6. *Probable arrangement that must be adopted.*—If a reservoir is constructed here, it is considered that the dam must be of masonry and the surplus passed over the dam direct, in which case the most favorable level at which to discharge the surplus can be selected with reference to other considerations. Moreover, by adopting this arrangement, if desired a smaller reservoir might in the first case be constructed to be increased by raising the dam at some future period.

7. *Amount of water available.*—It being assumed that the possibility of constructing a reservoir is accepted, the next point to consider is the amount of water that may be counted on for storage.

Statements of rainfall at eight stations in the catchment basin of the river are given in the tables showing the rainfall for 1877-78 with totals for nine years from 1870—1878. In the tables giving approximate discharges in the river for 1882-83 the rainfall for each month of these

two years is also given for the two stations of Hosúr and Krishnagiri, which lie within the basin above Chinnamootoor. These latter tables also give the proportions of rainfall received on the catchment to that drained off. The average annual rainfall may be taken at 35·75 inches, or, say, 35 inches; about 4·45 inches per month from May to December. In the report on the Baroor project the free catchment of the Pennér from the Mysore frontier down to the proposed Nedingal anicut, 10 miles below the site for the dam proposed to be built at Chinnamootoor, is estimated at 1,080 square miles. This makes an allowance for the portion of the area occupied by tanks. The area of the catchment lying between the sites at Chinnamootoor and Nedingal is 132 square miles, so that 948 or, say, 950 square miles may be taken as the area of the drainage basin from which the supply for the Krishnagiri reservoir will be drawn.

With a catchment of 950 square miles, 35 inches of rain over the area would give a total quantity of 1,93,000 million cubic feet or 7,148 million cubic yards. Assuming one-fifth of this quantity as the probable yield (the geological features of the area are a gravelly or rocky surface and steep gradients, and according to Rankine the proportion should be greater) then 15,428 million cubic feet or 500 million cubic yards may be counted on as available for storage during the year.

A reference to tables B. and C. shows that this quantity may very safely be expected, and if forthcoming will suffice for the irrigation of rather more than 50,000 acres at 8,000 cubic yards per acre per season. The amount gauged in 1882 at Chinnamootoor would, on this estimate, have sufficed for 80,000 acres, and that in the following year for about twice as many.

8. *Suitable capacity for reservoir.*—In professional circular No. 39, the Chief Engineer for Irrigation lays down as the most suitable capacity for a reservoir that which will "absorb the quantity of water flowing from the catchment in years of average rainfall." With so large a catchment as in the present case from which to draw the supply a dam of unusual height would be necessary to secure the necessary capacity to store even half the quantity shown by the calculations to have passed down the river in 1882. The capacity of the reservoir must therefore be fixed with reference to some definite area to be irrigated for which there is no doubt as to a sufficient supply being forthcoming.

In the previous paragraph a supply for 50,000 acres has been shown to be assured from a consideration of the river discharges, and a reference to table A shows that storage for this amount would be provided by a dam with F.T.L. at from 100 feet to 120 feet.

9. *Probable amount of surplus to be provided for.*—The highest readings recorded on the gauges at Chinnamootoor in 1882-83 were 8 feet, and the corresponding discharge is 29,609 cubic feet per second. Using a coefficient of 200 in the formula $C = M^{\frac{3}{2}}$, the maximum discharge from 950 square miles would be 34,224 cubic feet per second. It is considered that surplus works capable of discharging 40,000 cubic feet per second would provide amply for all contingencies, more especially when the action of the reservoir as a flood moderator is considered.

10. *Effect on existing irrigation.*—Below the site of the proposed dam near Chinnamootoor the irrigation at present dependant on the Pennér is as follows:—

	ACRES.
In Salem district	1,435
„ South Arcot	50,612
Total ...	52,047

To this must be added some 8,000 acres of new irrigation that will be supplied when the Baroor project now sanctioned is completed. This will make a total of 60,000 acres dependant upon the Pennér and allowing a margin for supply to tanks, and possible extension of irrigation in the lower reaches of the river at a future time, we may assume 1,00,000 acres as the area drawing its supply from the river below the Krishnagiri dam.

The total drainage basin of the Pennér between the site of the proposed Krishnagiri reservoir and the Tirukoilúr anicut, in South Arcot, 80 miles lower down the river, is 3,150 square miles. The rainfall averages 35 inches yearly, and assuming one-tenth of this as the yield, the supply from this area would amount to 947·8 million cubic yards, sufficient for 110,000 acres. In other words, if the whole of the drainage from the area above the Chinnamootoor dam were utilised for the Krishnagiri project, the yield from the remainder catchment would more than suffice for the irrigation at present dependant upon the river below and on a moderate estimate would meet further demands to an extent of about 25 per cent.

A consideration of the river discharges at Nedingal and the Tirukoilúr anicut supports the assumption that a still larger proportion may be expected to run off the drainage basin. At the former station the difference between the amount gauged at Chinnamootoor and Nedingal in 1882 was 10,837 million cubic feet, sufficient for 50,000 acres, and was received off a catchment of 130 square miles. This catchment is confined by steep hills and provided with numerous drainage streams with rapid fall by means of which the surface drainage would be quickly carried down to the river. At the Tirukoilúr anicut the average *surplus* that passed over it in three years was 58,000 million cubic feet, sufficient for the irrigation of 2,60,000 acres, and this too after most of the existing irrigation had been supplied.

As already stated the construction of a reservoir near Krishnagiri to absorb the drainage from the entire catchment above Chinnamootoor would be too large an undertaking to be practicable and a large surplus will therefore be forthcoming after a sufficient quantity has been stored for the supply to the new area proposed to be irrigated. The construction of a reservoir of the capacity proposed may therefore safely be undertaken without fear of injury to existing cultivation below it. It would, however, be necessary to provide for the passage through the dam at all times of a certain discharge to allow of a supply reaching the lower irrigation while the reservoir was filling. The lands to be irrigated by the Baroor scheme would be those earliest affected, and a supply of 20 million cubic yards per month, or about 300 cubic feet per second, would be ample for their requirements during the cultivating season. For all contingencies it is thought that provision should be made for a discharge from the reservoir of 10,000 cubic feet per second, whenever desired, and these arrangements might be included among the surplus works.

11. *Area that can be commanded.*—From Chinnamootoor down to Nedingal the valley of the Pennér is steep and shut in by hills on either side and with a sill level at 40 feet above the river bed at the site of the dam distributaries with a fall of about 1½ or 2 feet per mile would have the positions approximately shown by the yellow lines on the index map. Below Nedingal the hills are left behind, and the country opens out on either side, so that after passing the Tattakul Droog on the east and the hills near Periyár on the west the distributaries could command a practically unlimited area of land at present but scantily cultivated with dry crops, and containing many small tanks where water could be stored and utilised. The area enclosed on the map by the two approximate distributaries as far as Nedingal is about 12,000 acres.

12. *Probable returns.*—The information afforded upon this point by the Revenue Department is very scanty and attention is invited to the second paragraph of the Sub-Collector's letter attached. The index map and rough idea of the scheme was forwarded to him in January 1883 and more than ten months after the reply states that the necessary information to enable a rough idea of the returns to be worked out is not forthcoming through the carelessness of the tahsildar of Krishnagiri. All that can be said is that probably the newly irrigated land will pay Rs. 5 per acre.

13.—*Probable shape the scheme will take if worked out.*—If worked out in detail, the scheme will probably consist of the following items :—

I. A masonry dam with its crest level at 100 feet above the river bed.
II. Two or more water towers or sluices in the masonry or tunnelled round the flanks in the hills capable of supplying 50,000 acres.
III. Surplus works forming part of the dam.
IV. Two distributaries with masonry detail.
V. Diversion of the Royacottah and Krishnagiri road.

14. *Probable cost of the project.*—

I. *The masonry dam.*—The cost for this has been estimated and at the crest level proposed would amount to Rs. 15,75,640.

II. *Main sluices.*—The two sluices in the Vaniar project which took the form of masonry culverts in the dam with shafts on the reservoir side cost Rs. 8,400 each. In the present estimate Rs. 60,000 is set down as the probable cost of the arrangements for drawing water from the lake.

III. *Surplus arrangements.*—It is assumed that the surplus will be passed over the masonry direct. In this case the weirs will form part of the dam, but expensive arrangements will be necessary to drop the water down to the river below the dam, and Rs. 3,00,000 is set down as the probable cost.

IV. *Distributaries.*—These are estimated at Rs. 15 per acre. The cost of the Vaniar channels came to Rs. 12-6-0 per acre commanded, and it is not anticipated that the actual cost in the present instance will be greater. The country through which the distributaries will run is very similar to that in the Vaniar valley, and by a judicious selection of the line of channel, the weirs of many existing tanks may be utilised to carry off the upland drainage. Below Nedingal too the channels can probably be run along dividing ridges, and the numerous drops necessary in the Vaniar distributaries will be required to a smaller extent in those from the Krishnagiri reservoir.

V. *Diversion of the Royacottah and Krishnagiri road.*—About 3 miles of this road will be submerged by the new reservoir. Communication can be restored either by a branch running north from the point marked A. on the index map to B., or the Hosur-Krishnagiri road, or by one from the same point southwards to Panakamuttalu B., whence a road runs to Kavaripatam and thence to Krishnagiri. Either of these diversions would be about 6 miles in length, and the one to the north would give a shorter distance into Krishnagiri than that on the south. The new road would not be expensive; little or no embankment would be necessary; the soil is good, and stone for metalling plentiful and close at hand, and no large streams would have to be crossed except the Pennér if the north branch were chosen, and for this the same arrangements could be adopted as those that exist at the present

crossing, viz., the river bed in the dry seasons and a ferry during high freshes. It is considered that Rs. 5,000 per mile will be ample for either of the proposed diversions. Altogether the cost of works may be put down as follows :—

	Rs.
Masonry dam	15,75,640
Main sluices	60,000
Surplus	3,00,000
Distribution (15 per acre)	7,50,000
New road (6 miles at Rs. 5,000 per mile)	30,000
Sundries	2,84,360
Grand Total ...	30 lakhs.

15. *Expenditure under all heads.*—Besides the actual cost of the projected works, there will be expenditure for compensation for land submerged, for establishment, and tools and plant. The compensation due at different levels has been worked out by the Revenue Department, and is given in statement. At the level proposed, viz., F.T.L. at the 120 feet contour, the amount of compensation will be Rs. 2,18,653. Altogether including compensation, establishment, tools and plant, &c., the project on the proposed scale will cost 39,73,399, say, 39¾ lakhs approximately, and it is believed that these figures by which this total is arrived at allow liberally for all contingencies.

16. *Net returns.*—With 50,000 acres of new cultivation at Rs. 5 per acre, as stated in paragraph 11, the returns after making the necessary deduction for collection and maintenance charges will amount to Rs. 2,07,000, or a little over 5 per cent. on the gross outlay of 39¾ lakhs. In statements I to IV, which accompany this report, the financial forecasts of the scheme are given approximately. It is presumed that the scheme can be completed in five years, that at the end of the second year the works will be sufficiently advanced to allow of 10,000 acres being brought under cultivation in the third year, and that in the sixth year the full amount of new cultivation will be realised. Also that the payments for compensation will be spread over the last three years of the work. Supposing these assumptions to be correct, ten years after the completion of the project there will be a net return of Rs. 90,856 after paying off the simple interest on the capital outlay at 4½ per cent. In the estimate of returns no account is taken for a second crop over the whole or part of the new irrigation. In years when the supply in the river is good, the reservoir will certainly be filled more than once, and a second crop over a considerable portion of the area may reasonably be expected.

17. *Summary.*—A reservoir with distributaries can be constructed on the Pennér near Krishnagiri for 39¾ lakhs to supply 50,000 acres. The supply of water in the river is ample for the demand.

Existing irrigation out of the project area will not be effected by the scheme.

The net returns will be over 4½ per cent.

18. *Alternative scheme.*—If the proposal to discharge the surplus over the dam direct is regarded with disfavor, the only alternative is to use the saddle between the Talapully and Kottapully hills. In this case the F.T.L. must be at the 130 feet contour, and the crest level of the dam about the 140 feet contour, the surplus being conveyed back to the river along the valley between the Kottapully hills and the Krishnagiri-Kaveripatam road, which contains several tanks. There would be no difficulty whatever in this arrangement but owing to the amount of valuable cultivation that would thereby be destroyed, and the heavy works necessary to confine the flood waters within proper limits, the cost would certainly equal that for discharging it over the dam direct and not improbably exceed it. The advantage would be the greater security gained for the foundation of the reservoir dam, which, unless very efficiently protected, might be undermined from the action of the falling water, the result being a serious catastrophe.

19. *Probable cost and return.*—If the surplus is discharged in the way last proposed, storage for about 66,000 acres would be obtained and the total cost of the scheme would amount to 60,85,330, say 61 lakhs, and the net return at the end of ten years after paying 4 per cent. interest on the capital outlay would amount to Rs. 24,252. Details are given in appendices.

Coimbatore,
11th February 1884.

(Signed) F. J. ROMILLY, Captain, R.E.,
Executive Engineer, B. Project Division.

No. 132 I.

Note by the Chief Engineer for Irrigation.

With the Superintending Engineer's letter, No. 125, dated 10th July 1882, a report on the Krishnagiri reservoir was submitted showing the result of the borings

at the site of the proposed dam, from which it appeared there was little doubt that a good rock foundation would be found throughout; but, to make sure on this point, the Superintending Engineer suggested that walls should be built in the bed of the river, so that the rock could be thoroughly examined before the Government committed themselves to the project.

2. In returning the papers to the Superintending Engineer it was requested that in the first place investigations should be made to ascertain the water available, the capacity of proposed reservoir, and the extent of land commanded.

3. The report now submitted gives the information required, and with it an estimate, amounting to Rs. 12,000, is submitted for building the walls proposed by the Superintending Engineer in the river bed with a view to examining thoroughly the surface of the rock.

4. As regards the water-supply, we have observations at the proposed site of the dam from May 1882 till December 1883; at Nedingal, where the anicut to supply the Baroor channel is to be built, for 1883; the record of the Tirukoilúr anicut from 1872—1876; and the rainfall at eight stations in the river basin between the Mysore frontier and the Tirukoilúr anicut between 1870 and 1878, and at two stations in the catchment basin of the proposed reservoir for 1882 and 1883. The average rainfall for nine years from 1870 to 1878, which include the famine years, over the whole river basin amounts to 35·75 inches, that for 1882 near the reservoir 37·25 inches, and for 1883, 31·95 inches; and the calculations of the river discharge at the proposed site of dam show that in 1882 ·2 of this fall over the whole catchment basin drained off, and in 1883 ·5 of the fall; the large amount draining off in the latter year is supposed to be due to surplus from the Mysore tanks falling into the river. The record of discharge at Nedingal for the year 1882 does not agree with the discharge at site of proposed dam, being very much larger, but the river at this point is very difficult to gauge. The discharges over the Tirukoilúr anicut, which are roughly calculated as the water below the anicut does not appear to have been gauged, show that the average quantity of water that flowed to waste in the years 1872—1874 was 58,889 millions of cubic feet, which, if it could be stored for irrigation, would supply 270,000 acres; it is to be noticed, however, that in 1875 only 4,066 millions of cubic feet and in 1876 only 8,403 millions passed the anicut, which would suffice for 20,000 and 40,000 acres, respectively. The conclusion arrived at is that in a year of ordinary rainfall there is a more than ample supply for 50,000 acres in addition to the extent already irrigated, and in a famine year probably for half that extent. Of course the old irrigation must be supplied before any new irrigation can be undertaken, and sluices in the dam would have to be provided to pass on the water to which the old cultivation is entitled, and precise rules laid down for their working.

5. The reservoir has been contoured, and appendix E gives the contents at 80, 100, 120, 130 feet with the acreage that can be supplied, allowing 8,000 cubic yards to be stored for each acre. The approximate cost of the dam and compensation for land submerged is also given. From this it appears that a height of about 120 feet, probably something less, would be the most economical and provide sufficient water for 50,000 acres. Here the question of the escape comes in; on the south side of the river it has been ascertained that there is no break in the hills through which surplus could be discharged, and on the north side there is a saddle at about 130 feet above river bed. This saddle might possibly be cut down so as to suit the level determined on for the reservoir, but the surplus would then pass down about 3 miles of a valley leading to the river and would necessitate taking up three existing tanks and about 500 acres of irrigated land, besides embanking; considering that the bed of the river below the site of the dam is rock, it is considered that the best arrangement would be to discharge the surplus over the dam itself. It would seem that this could best be done on the north of the river. If a maximum of 5 feet were allowed to pass over, about 1,000 feet in length would be required, and in the bed of the river a wall would be required to form a water cushion. If the dam is made of concrete or of rubble masonry the surplus could be passed over it during construction, the dam itself and the cushion wall being raised simultaneously.

6. The area commanded by the reservoir is stated to be practically unlimited, and though there is at present no definite information regarding the cultivation, it seems to be the opinion of the Revenue authorities that the extent of land for which water is available will be cultivated and may be expected to return Rs. 5 an acre.

7. The rough estimate and forecast statements afford some guide as to the probable result of the undertaking. At a cost of 40 lakhs a reservoir can be formed which will irrigate 50,000 acres and return 5 per cent. on direct charges. It is considered that sufficient grounds have been shown for working out in detail the designs for a project which has long been considered by Public Works and Revenue officers a most desirable undertaking, but considering that funds for the work may not be available for some time, and that the examination of the bed of the river shows almost conclusively that sound rock will be met with at a reasonable depth for foundations of the dam, it is thought that the estimate should be framed without further examination, allowing liberally for the coffer dam that will be necessary and for cutting down to solid rock, when the work is commenced. When once sanction has been obtained to its commencement and work-people and materials are being collected it will cost much less to carry out the work now estimated for than at present, and if there should be delay in obtaining sanction for the work, the expenditure may be in great part wasted.

(Signed) J. O. HASTED, Colonel, R.E.,
Chief Engineer for Irrigation.

OOTACAMUND,
15th July 1884.

To the Joint Secretary to Government,
Public Works Department, Irrigation Branch.

ORDER—dated 30th July 1884, No. 696 I., Public Works.

The Government consider that the investigations made by Captain Romilly, R.E., sufficiently prove that an extensive reservoir may be formed at Krishnagiri at a cost which will be remunerative, and authorise the preparation of detailed plans and estimates as suggested by the Chief Engineer for Irrigation.

2. There can be no doubt that the work would prove of immense benefit to a part of the country which has suffered greatly in times of scarcity.

(True Extract.)

(Signed) J. O. HASTED, Colonel, R.E.,
Joint Secy. to Govt., P.W.D.,
Irrigation Branch.

one

To the Superintending Engineer, IV Circle, with twenty enclosures
" Chief Engineer for Irrigation.
" Examiner, Public Works Accounts.
" Revenue Department.

Exd. E. Fernandez.
Spare Copies

R806W

CHIEF ENGINEER
13 AUG
1884
IRRIGATION

IRRIGATION

Govt. of {1884} Madras.

PUBLIC WORKS.

Dated July, 30th.

Read. *Encl.*

G.O., 30th July 1884, No. 696 I.

JULY.

Krishnagiri Reservoir Project

Authorising preparation of detailed plans and estimates for the —, Salem district.

15