M.R.O. 1—5,006—16-10-50.

(1) Number of pages 60

(2) Date of repair 22.7.1964

(3) Initials of the Referencer

MADRAS RECORD OFFICE

Government of Madras

Public works DEPARTMENT

G.O. No. / ~~B.P. No.~~	150 (J)	Press / ~~Mis.~~
Dated	10-2-1896	~~195~~ .

Not to be folded or roughly handled

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Irrigation.

READ—the following papers :—

From Lieutenant-Colonel A. W. SMART, R.E., Superintending Engineer on Special Duty, Cauvery Completion Estimates, to the Chief Engineer for Irrigation, dated Tanjore, 26th January 1896, No. 25.

I have the honour to forward a memorandum on investigations required in this district, which I was directed by His Excellency the Governor to submit for his information. I have the honour to request that you will place it before him and I hope that you will support the proposal I have made with regard to the formation of a Project circle.

ENCLOSURES.

MEMORANDUM.

The investigations to be made in connection with the irrigation of Tanjore may be taken under four heads—the Delta Proper, the Pattukkóttai project, the Bhavání project and the Udaiyárpálaiyam project.

DELTA PROPER.

Upper Anicut and Cauvery Dam.—The Upper anicut is a solid wall, with a narrow bridge placed across the Coleroon branch, whilst the Cauvery dam is an open work in steps and was built for the sole purpose of preventing the head from being scoured out by the large body of water forced into it by the action of the anicut. The crest of the anicut is 6 feet above the west step of the dam. As the Agunda Cauvery transports in high floods large quantities of sand and rolls it along the bottom in smaller floods, the result has been, and as was no doubt anticipated, that the Cauvery with its open head takes a far larger proportion of this heavy sand than the Coleroon with a bar across it. This was no doubt foreseen, but the Engineers of the time hoped that the sand would be carried to the sea and that raising of river beds, if real, would be met by a gradual simultaneous rise of the irrigated area. With reference to this question, see Proceedings of the Madras Government, No. 3683, 27th November 1867. The evils pointed out by Colonel Strachey in his memorandum printed with these Proceedings were and are real ones, but probably somewhat exaggerated; and though the land does rise with the rise in the river beds, the land cannot rise as fast as the river, because the silt deposited on the land is of a very fine quality and bulks to a much less extent than the heavy river sand. That the rivers in Tanjore are silting up, especially in the Cauvery and branches towards the east, has been a constant source of complaint, and a fact that has recently been brought to my notice seems to point to that conclusion. This is the fact that it is not considered safe to allow more than 7½ feet, read on the rear gauge, into the Cauvery at the Vennár head, whereas in former days, the Cauvery was supposed to be safe when there was 11 or 11½ feet measured at the Cauvery dam, which would be equivalent to about 8½ feet on the Cauvery regulator rear gauge. To whatever conclusion we may come with regard to this silt question, it is certain that if the Engineers of that day, when the anicut was built, had had the means at their disposal, they would have built an open vented head across the Coleroon with shutters to raise the supply for the Cauvery; in floods the shutters would have been raised and both rivers would have taken their due proportion of sand.

We have now the means at our disposal and I have no hesitation in saying that we should make use of them. I would propose the building of a new work in front of the anicut to consist of thirty openings of 70 feet to be fitted with Stoney's shutters and the lowest steps of the Cauvery dam should be raised by 2 feet. I would at the same time propose to raise the crest level of the anicut by 2 feet so as to increase the irrigation supply to the delta, when this can be done without detriment to the Lower Coleroon irrigation. Instead of a new work, it would of course be possible to fit Stoney's shutters to the 67 vents of the existing bridge, and to cut down anicut to floor level, but the bridge is only 8 feet wide, and in my opinion it is doubtful if it would be safe to cut down the anicut to the extent required. This, however, may be left for discussion hereafter. The cost of a new work complete, I estimate roughly at 15 lakhs; the fitting of the old work with Stoney's shutters would cost 10 lakhs. I append a statement showing the water going over the crests of the Upper and Lower anicuts, from the years 1875 to 1894; an examination of this shows that we may often increase the Cauvery supply, without in the least depriving the lands under the Coleroon of their fair share.

Major Montgomerie in his report, printed with G.O. No. 363 I., dated 9th June 1881, calculated the flood discharge in 1858, when there were extraordinary floods throughout the delta above the Upper anicut at 284,000 cubic feet per 1 inch. With the new work that I propose and the raising of the Cauvery dam by 2 feet (which will in no way diminish supply) I calculate that the Coleroon in a similar flood will take 184,000 cubic feet per 1 inch leaving 100,000 cubic feet for the Cauvery.

2. *Grand Anicut (Cauvery-Vennár regulators).*—With an open work instead of the present Upper anicut, the work required to be done by the Grand anicut will be considerably less than hitherto calculated. Taking a flood like that of 1858—

Cauvery discharge as above			100,000
Discharge 150 yards calingula into Coleroon			10,000
			90,000
Add—for local drainage, 868 square miles			50,000
			140,000
By Cauvery below regulators	30,000		
Vennár	10,000		
			40,000
To be discharged by Grand anicut			100,000

In November 1893 the Grand anicut discharged 63,874 cubic feet per 1 inch. Any extra waterway required may be obtained by removing the falling shutters and by cutting down the crest and fitting with 5 feet shutters to be worked by screw-gearing. Increased discharging capacity is required to allow of a reduction of the head above the regulators; the work itself is even now capable of discharging the 100,000 cubic feet. The discharge I have allowed from the local drainage basin is a maximum, and is hardly likely to be exceeded and, when the river is already full, the basin cannot discharge such a maximum. The water will tank back and discharge as the river falls.

The Cauvery is to discharge 80,000 cubic feet per 1 inch, represented by about 9 feet in the rear gauge; at present, it is not safe to allow water to rise above 7½ feet. In my opinion it is most essential that the flood capacity of this river should be restored to what it was before the regulators were built. With this increase it will be possible to re-open the Koviladi surplus 20 miles below the head; or, perhaps, a new work will be required there. The discharging capacity of the Grand anicut should be sufficient to take also the flood of 10,000 cubic feet per 1 inch of the Vennár. At times of heavy local rainfall around the town of Tanjore, and in the lower parts of the delta, it becomes necessary to exclude upper floods from the Vennár by closing the regulator. This regulator should only be shut unless absolutely necessary, as if closed for any length of time, the bed below is certain to rise and give us trouble in the future. The principle that each river should be made to discharge at its full flood capacity should be rigidly adhered to.

3. *Main and branch regulators.*—The more important of these have been built; there are a certain number of minor branches which have still open heads. Surveys and plans for providing these with regulators are in progress. By a judicious use of the regulators we shall be able to send down to the eastern parts of the delta a larger share of the available supply.

4. *Minor distribution channel heads.*—The minor distribution is altogether in the hands of the people and the rights of Government as to control and prevention of waste, or ill-defined and adverse decisions of the High Court have emphasised the fact that, without further legislation, the executive can do little or nothing to ensure a fair distribution of the water-supply at command. What form this legislation should take is a matter for careful enquiry and the failure to pass the Conservancy Act proposed and brought forward a few years back shows that all the various questions raised require a careful re-study. We may learn much from the irrigation laws in

force in Italy and Spain and I have no doubt that in time we shall be able to prepare a suitable scheme for Tanjore. Whatever the form this may take, I am of opinion that the minor distribution should be left in the hands of the people and that this work should, under no circumstances, be undertaken by the Public Works. There are over 3,000 distributaries and even to take over those irrigating 1,000 acres and more would require an increase of establishment and would bring in its train various evils which will be obvious to those who have had anything to do with the irrigation in Tanjore. It is possible that a scheme may be devised which shall utilize the existing machinery of Taluk Boards, but it is probable, as suggested by Mr. Bliss, that an irrigation court would be required in the first instance to register rights and to bring the authority of Government to bear on the equitable division of the water-supply. If the Bhaváni project is carried through the extra supply proposed for Tanjore of 5,000 cubic feet per 1 inch during the months of August and September and half of October will be an enormous benefit to the irrigation. It will, however, be necessary to work out some method to ensure that this supply shall reach lands in the east where it is most required and that upper lands, already fully supplied, shall not draw on this extra supply. This will be a matter of some difficulty. As to how much of the 5,000 cubic feet per 1 inch will reach Tanjore, the experience in the Periyár will be of value, that is when we have ascertained how much of the supply leaving the Periyár lake reaches the Peranai anicut during the dry months of the year.

5. *Silt clearances.*—Of late years doubts have been thrown on the utility of clearing channels of silt at all, or at all events to the full formation depths. This is a matter requiring investigation. I would propose that four channels in the Tanjore district, two branching from anicuts and two from rivers not under the influence of backwater, should be completely cleared and that they should be regularly gauged for two seasons at least to ascertain the effect of the clearances. I would also suggest that similar observations should be made in South and North Arcot where the rivers have greater falls than in Tanjore.

6. *Delta drainages.*—It has been recognised for many years past that these drainages are in much need of improvement and especially within 20 miles of their outfalls into the sea. Without maps to show the areas drained by each we are not in a position to propose the works required or to estimate the cost with any accuracy. All the drainages are used as irrigation channels and there are many anicuts across them. It will be necessary to convert all of these into open works with shutters removable in floods. Direct returns from improvement of drainages cannot be expected, but I have, no doubt, that the indirect returns which cannot be previously measured will be great and the value of land is certain to rise. In any case it is almost obligatory on Government to place these drainages in order, not only on account of loss of revenue that is now suffered, but to prevent loss to the people and to improve the sanitary conditions of tracts now badly drained. With the flood waters from the west taken off first at the Grand anicut again from the Vennár by a flood channel to Pudukkóttai, which will be again alluded to, we shall have much less difficulty in dealing with the lower drainages than would otherwise be the case, and each small drainage may be almost exclusively kept with upper floods partially though not altogether excluded for the drainage of the actual area drained by it.

7. *Coleroon and Lower anicut.*—The Coleroon and anicut have to be adapted to take in a year like that of 1858 300,000 cubic feet per 1 inch or perhaps 80,000 to 100,000 more than they have been hitherto able to do with safety. The process of adaptation has been in progress for some years and the banks on the south side above the lower anicut have been, I believe, completed in accordance with Mr. Lobb's levels. I have elsewhere reported that I do not consider that the banks are strong enough for a flood of 300,000 and have given reasons for proposing that the flood discharge of the river and anicut should be limited to 25,000 cubic feet per 1 inch and that the rest should be allowed to spill over the country. In my opinion it is a matter of urgent necessity that the lower anicut should be now altered to take the increased flood as the banks completed above are a menace to its safety. With regard to the anicut I would propose that it should be cut down about one half and fitted with shutters to slide down as proposed by Colonel Brockman, and that twelve of the arches should be fitted with Stoney's shutters to the full depth to floor level. The crest at the same time should be raised throughout one foot to increase the supply of the Vadavaár which supplies the Veeranam tank. The question of silt is not of such great consequence as it is at the upper anicut, and, in my opinion, will be adequately dealt with by the alterations proposed above.

Last year a pair of experimental shutters were put up for trial. The Assistant Engineer informs me that to raise them with a head of water against them requires ten men for each. If the whole anicut were fitted with such shutters, 120 would be required; it may be imagined what would be the consequences in case of a sudden flood, the whole village would have to be called out to raise the shutters. There are also other objections against these shutters. They may be found useful if provided with rollers to reduce friction, counterweighted and with adequate lifting gear for small rivers but not for a river like the Coleroon. The flood banks of the river below the anicut have to be raised on both sides; an estimate for the north bank is now under preparation in the South Arcot division.

8. *Pudukkóttai project.*—Some years ago I submitted a proposal for a flood channel to be taken from the Vennár west of Tanjore to relieve the Vennár of flood waters. The channel

was, at the same time, to supply new (to be made) and old tanks in Mannárgudi and Pudukkóttai. I calculated that 40,000 acres could be so irrigated and an examination of statement will show that the available supply is more than ample for storage; there is no water available for direct supply. There were two bad years from 1877 to 1894, but even in these years there was ample during the north-east monsoon.

For the 40,000 acres we may take it that one-half the storage required, viz., 4,320 millions should be given in July and August and the other half in the north-east monsoon. A channel of 5,000 cubic feet per 1 inch capacity would give this amount in ten days. The channel should take this as a minimum with a maximum, if possible, of 8,000 to 10,000 cubic feet to give relief in Vennár floods. It may also be noticed that raising the full supply of the upper anicut will give as more water for the delta, a part of which may be taken for Pudukkóttai. The land in this taluk is mostly poligar or zemindary and there may be difficulties with regard to getting revenue for irrigation by Cauvery water. This is a matter that should be enquired into. In any case we require a flood channel and it would be almost a calamity if we were obliged to discharge Cauvery water uselessly into the sea by the new cut because of difficulties caused by the system of land tenure. The project should now be completely investigated.

9. *Bhaváni project.*—A trench is now being excavated across the valley to ascertain the nature of the foundations and is in charge of the Superintending Engineer, IV Circle. The supply proposed to be given to Tanjore in August and September, viz., 5,000 cubic feet per 1 inch will be a very great boon, and if this quantity reaches the land, where most required, will, in my opinion, amply repay the people for the enhanced assessment that they have to pay under the new settlement. With this extra supply we may safely anticipate a large increase in the second crop irrigation. In 1893-94 the area under second crop was 107,570 or $\frac{1}{8}$th of the area under the first crop which was 888,485 acres according to statement printed with G.O. No. 246 I., dated 12th March 1895, the rate per acre, second crop, is Rs. 3·23; an increase of 100,000 acres under second crop would therefore give as a revenue of Rs. 3,23,000, or nearly 5 per cent. on a capital of 65 lakhs. As this project is of much importance to this delta, I would propose that the investigations should be placed under me now.

10. *Udaiyárpálaiyam project.*—Many years ago, the restoration of a large tank in this taluk was proposed with a supply-channel from the upper anicut. Very little is known as to the possibilities of the scheme and whether such a tank ever existed. A preliminary investigation is advisable. It is possible that the investigation may lead us to consider the desirability of building another or intermediate anicut across the Coleroon somewhere at the Ponnéri head. There is much water going to waste over the lower anicut which could be made available for storage, but our information with regard to the taluk is very meagre. The slope of the country is towards the river and the area commanded may not be sufficient to justify any large expenditure. The subject, however, wants further enquiry.

11. *Investigations how to be carried out.*—It will be conceded from what has gone before that the various investigations required will demand time; I should say at least three years. We are dealing with the largest system of irrigation in the world and what we require to do and know cannot be done hurriedly or without ample discussion. I would propose that a circle be formed which may be called the project circle, if so approved, to take up the investigations now in hand and when these are completed, there is plenty of other somewhat similar work to be done in the Presidency. The circle should consist of a Superintending Engineer, two Executives and two Assistant Engineers with other subordinate establishment. If I may be allowed to make the suggestions I would propose that Mr. Ashpitel be deputed under me to complete the Bhaváni project which is intimately connected with the Tanjore irrigation and that Mr. Moss, who will be shortly relieved from the Public Works Workshops, Madras, should be placed in charge of the Pudukkóttai project.

12. *Financial.*—For the delta I calculate roughly that we shall require an expenditure of of forty lakhs, upper works fifteen lakhs, lower anicut ten lakhs; Pudukkóttai channel, as flood channel only five lakhs, ten lakhs for minor regulators and drainages. The Bhaváni project will probably cost fifty lakhs; the Pudukkóttai for irrigation 30 lakhs. With regard to the forty lakhs required for the delta proper, I would suggest that it should be obtained from revenue and not from capital. The sum amounts to about three years of the increased assessment under the new settlement of the district. The lower and upper anicuts should be dealt with at an early date; the former, in my opinion, should no longer be left in its present state. If the works are carried out under capital, we shall have to wait long years before anything is done and sanction will not be given to isolated sections which can be easily worked out independently one of the other. On the other hand if the Government of India (if this is necessary) is asked to allow expenditure of three years of the increased assessment, say at the rate of six lakhs a year, we shall be able to actually do something at an early date.

13. A sketch-map of the Cauvery delta to illustrate this memorandum with two water statements are attached.

(Signed) A. W. SMART, Lieut.-Col., R.E.,
Superintending Engineer on Special Duty.

26th January 1896.

Statement of actual quantities of water that entered the Cauvery through Cauvery dam in the months of July and August 1877 to 1894.

Years.	Millions of cubic feet in July.	Millions of cubic feet in August.	Quantity required for Cauvery irrigation. Millions of cubic feet for the month.	Excess available.	Remarks.
1877	30,997	48,565	48,211	354	Cauvery—irrigated area = 800,000 acres. Discharge required at 3 cubic yards per hour per acre = 18,000 cubic feet per second, or 48,211 millions cubic feet for the month; of which, however, not more than two-thirds required in July, as all the area will not then be under cultivation.
1878	29,281	63,612	48,211	15,401	
1879	79,539	74,278	48,211	31,328	
1880	81,783	60,562	48,211	33,572	
1881	46,062	51,300	48,211	3,039	
1882	198,521	97,908	48,211	150,310	
1883	101,205	69,241	48,211	52,994	
1884	22,132	56,816	48,211	8,605	
1885	67,038	68,230	48,211	18,827	
1886	68,852	59,711	48,211	20,671	For Pattukkóttai (40,000 acres) half supply to be given in July and August, the other half in north-east monsoon.
1887	61,970	22,724	48,211	13,759	
1888	83,247	61,418	48,211	35,036	
1889	63,317	63,816	48,211	15,106	
1890	48,134	52,569	48,211	4,358	Total required 4,320 millions cubic feet.
1891	75,852	64,454	48,211	27,641	
1892	104,843	69,638	48,211	56,632	*Note.*—Figures given by Major Montgomerie in 1881—
1893	37,522	46,820	48,211	..	Area now irrigated, 888,485 acres first crop.
1894	50,166	52,054	48,211	3,843	

Statement of water going over the crest at Upper and Lower anicuts, 1875 to 1894.

(Note.—Ordinary figures relate to Upper anicut and italic ones to Lower anicut.)

| Months. | North or south branch. | 1875. 1' | 2' | 3' | 4' | 5' | 6' | 7' | 8' | 9' | 1876. 1' | 2' | 3' | 4' | 5' | 6' | 7' | 8' | 9' | 1877. 1' | 2' | 3' | 4' | 5' | 6' | 7' | 8' | 9' | 1878. 1' | 2' | 3' | 4' | 5' | 6' | 7' | 8' | 9' | 1879. 1' | 2' | 3' | 4' | 5' | 6' | 7' | 8' | 9' | 1880. 1' | 2' | 3' | 4' | 5' | 6' | 7' | 8' | 9' | 1881. 1' | 2' | 3' | 4' | 5' | 6' | 7' | 8' | 9' | 1882. 1' | 2' | 3' | 4' | 5' | 6' | 7' | 8' | 9' | 1883. 1' | 2' | 3' | 4' | 5' | 6' | 7' | 8' | 9' | 1884. 1' | 2' | 3' | 4' | 5' | 6' | 7' | 8' | 9' |
|---|---|---

Note by the Chief Engineer for Irrigation on Memorandum by Lieutenant-Colonel A. W. Smart, R.E., on the investigations in connection with the irrigation of the Tanjore district.

Lieutenant-Colonel Smart in his memorandum has brought forward the salient points which require immediate attention, as well as others which may be temporarily deferred, and states that, in his opinion, a term of three years will be required for a full and satisfactory solution of all the questions involved.

The works that are clearly of an urgent nature, are the alterations in design connected with the Upper and Lower Coleroon anicuts and the Grand anicut. The undersigned had already recognized the necessity for dealing with the first two works in the manner indicated, and with this view, experimental shutters for taking the place of the masonry dams in each of these works were fixed (in the case of the Lower anicut) and entered for execution (in the case of the Upper anicut) during the coming official year. The expenditure proposed as regards the Upper anicut is very large indeed, although, as Lieutenant-Colonel Smart puts it, it is but comparatively small when the enhanced revenue derived from the resettlement in Tanjore is taken into consideration. I am not myself, however, in favour of such sweeping measures as are laid down in Lieutenant-Colonel Smart's proposals. The height of the dam at the Upper anicut is 5 feet, and if the level of water be raised as suggested by 2 feet and the dam removed, a shutter 7 feet in height would be required. I do not however consider that the whole of the dam need be removed, especially if the Cauvery dam be raised 2 feet also as is proposed. In such case, if 2 feet in height of the existing Upper anicut dam be retained, all that would be required would be a shutter in two lengths of 17 feet, each worked by screws lifting them clear of the M.F.L. The cost of these alterations to the existing works, North and South branch, would not exceed $1\frac{1}{2}$ lakhs of rupees, or one-tenth of that suggested by Lieutenant-Colonel Smart, with the attainment of at least five-sixths of the efficiency of his proposals.

The Lower anicut may be treated as indicated in his memorandum, as here the utility of having a free water-way in floods is more clearly demonstrated, and Stoney's shutters, although very expensive in themselves, may be adopted for the centre vents of the work.

The lowering of the crest of the Grand anicut may also be undertaken on the lines indicated.

Lieutenant-Colonel Smart is adverse to the taking over by the Public Works Department of the minor distribution in the Cauvery delta, and in the present state of things I, in the main, agree with him. Much, however, may be done towards mitigating the inefficient condition into which the irrigation channels are brought by the ingress of silt at the beginning of the irrigation season, by fitting the head sluices of the more important of them with shutters, such as have been fixed at the head sluices of the Gódávari and Kistna systems, and the interested ryots can be instructed how to work them for various levels of water in the main rivers.

The investigation of silt clearances in channels is an important matter and Lieutenant-Colonel Smart's proposals may be carried out, as well as the improvement of the many drainage channels which serve for purposes of irrigation as well throughout this delta.

The Pattukkóttai taluk project is worth investigation, although the effect of the channel in reducing the level of maximum floods in the Vennár will not, I consider, be very appreciable. But it is advisable, in any case, to conserve as much as possible by storage in reservoirs for purposes of irrigation so much of the flood waters as may not be required for flushing and scouring out the beds of the Vennár and its branches down to their junction with the sea.

The Bhaváni reservoir project is in the condition indicated in Lieutenant-Colonel Smart's memorandum, but investigations have also been in progress for some months for the irrigation of the Coimbatore district therefrom.

The Ponnéri tank in the Udaiyárpáliyam taluk of the Trichinopoly district is probably the project Lieutenant-Colonel Smart alludes to in paragraph 10 of his memorandum. This subject has been dealt with in G.O. No. 1046 W., dated 4th May 1895.

After dealing with the points that demand investigation, Lieutenant-Colonel Smart goes on in paragraph 11 of his memorandum to make proposals as to how this may be more efficiently carried out, and that is by the constitution of a special Project circle, consisting of a Superintending Engineer, two Executive Engineers, two Assistant Engineers and a suitable staff of subordinates and temporary establishment. I do not support this proposal. Lieutenant-Colonel Smart should, I consider, confine his attention to the Tanjore delta, pure and simple, until all that is required has been decided upon in that locality; as for the Bhavâni reservoir, the investigation of the project for its construction can well be left to the local executive. The subject of the location of the reservoir has been well threashed out and definite proposals accepted. The irrigation from the reservoir in no way affects the Tanjore delta.

As regards the investigation of projects in other districts, experience has shown that, unless funds are made available soon after this has been done, a large amount of the work has to be re-done, estimates revised and works re-designed, when, after a lapse of time, funds are granted for the prosecution of the work.

MADRAS, 31st Jan. 1896. (Signed) R. R. E. DRAKE-BROCKMAN, Col., R.E., Chief Engineer for Irrigation.

No. 31 I.

Submitted to Government.

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

ORDER—No. 150 I., dated 10th February 1896.

Lieutenant-Colonel Smart's proposals as modified by the Chief Engineer for Irrigation are accepted, and the necessary investigations should be pressed forward as speedily as possible, precedence being given to those whose execution can be undertaken soon. As plans and estimates are prepared for each section of irrigation under the Cauvery and Vennár for the more equitable distribution of water under the main branches of those rivers, they should be forwarded for sanction and allotment of funds, so that some work can be undertaken in this direction during the next working season in the Cauvery delta.

2. Separate orders will be passed regarding the investigation of the Bhavâni reservoir. The Chief Engineer for Irrigation will direct Colonel Smart as to the order in which works should be investigated.

(True Extract.)

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

To the Chief Engineer for Irrigation.
" Superintending Engineer, IV Circle.
" " " V "
" " " VI "
" " " on special duty, Cauvery Completion Estimates.
" Revenue Department.
" Examiner, Public Works Accounts.

Exd. T. K. Narayana Aiyangar.
Spare Copies

IRRIGATION.

Govt. of {1896} Madras.

PUBLIC WORKS.

Dated February, 10th.

Recd. *Encl.*

G.O. No. 150 I., 10th Feb. 1896.

FEBRUARY.

Investigations in connection with irrigation of the Tanjore delta

Accepting Lieutenant-Colonel Smart's proposals in regard to —, as modified by the Chief Engineer for Irrigation, and directing that, as plans and estimates are prepared for each section of irrigation under the Cauvery and Vennár, they should be forwarded for sanction and allotment of funds.

1541 - 10-2-96

No. 25

Office of Superintending Engr
Cauvery Completion Estimates
Tanjore dated 26th January
recd 26th

1 Pce

From.

A. W. Smart. Lt Col RE.
Superintending Engineer
on Special duty

To.

The Chief Engineer
for Irrigation and
Secretary to Government
Madras.

Sir,

I have the honor to forward a memorandum on investigations regarding in this District, which I was directed by His Excellency the Governor to submit for his information. I have the honour to request that you will place it before him and I hope that you will support the proposal I have made with regard to the formation of a Project Circle.

I have the honour to be
Sir,
Your most obedt Servant

A. W. Smart Lt Col RE
Superintending Engr
on Special duty

Enclos 4
1. Memorandum in 29 pages.
1. Sketch map of the Cauvery Delta showing the important branches &c &c
1. Statement of actual quantities of water that entered the Cauvery through the Cauvery Dam in the months of July & August 1877 to 1894.
1. Statement of water going over the Crests of Upper & Lower anicuts from 1875 to 1894

Statement of Water going over the Crest at Upper and Lower Anicuts: 1875 to 1894.

(Note:— Black figures relate to Upper Anicut and Red ones to Lower Anicut.) —

#10

Months	Work for the month	1875	1876	1877	1878	1879	1880	1881	1882	1883	1884
Days water ran.		1 2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8
January	N					1			3 2 6 4 4	1 0 7 4 6	
"	S								7 10		
February	N								7 7 8		
"	S								7 7 8 1		
March	N										
"	S										
April	N								1 8 1		
"	S								2 2 6 4 4		
May	N					1			6 6		
"	S					2 1			1 3 4 2		
June	N	1	1 5		4	2 3			3 2 3 7		
"	S	2	1 1 6		5	5 3 1			1 2 6 3 5 5	4 8 3 1	3
July	N	5 2 4	1 1 1		5	16 6	14 3	8	1 3 4 1 3 3	10 8 8	
"	S	3 4 6 3 4	5 2 1		10 2	16 11 4	19 10 1	11 6	1 1 4 5 5 4 4 8	8 3 11 4 1	3 2
August	N	1	7		6 4 1	15 2	2 3	3 2 1	10 6 5	5 4	
"	S	9 1	8 11		12 5 4 1	17 14	14 7	10 2 3	14 7 7 3	14 11 3	7 3 5 1
September	N	2	2 4		12 3	11	1		6	7 6 3	2 2 3
"	S		20 1 1		18 10	16 5	6		20 1	4 10 2 3	7 2 1 2
October	N	3					6		10 4	7 3 2 2	5 1
"	S	8	11 11 9		14 7 2		5 8	1	13 7	12 4 7 2	13 3
November	N	2	5 1 1 4 1 1		1		5 4 2 1 1	2	4 3 1	2 7 4	3
"	S	1	7 5 1 6 1		2		5 4 3 1 1	2	12	5 5 7	7 2
December	N		2				1 3 1			2	2 1
"	S		5 1 1				7 4 4			5	2 2
							9 1				

Months	Work for the month	1885	1886	1887	1888	1889	1890	1891	1892	1893	1894
		1 2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8
January	N										
"	S										
February	N										
"	S										
March	N										
"	S										
April	N										
"	S										
May	N		3							6 1	3
"	S		4 1							7 2	
June	N		4 2	7 1	5					8 3	5
"	S	3	4 2 2	11 2	7				4 6 3 2 2	7	3 1 3
July	N	8	6 10	17 2 2	13 2 3	5 5	2 6	2 5 3		5	
"	S	7	2	7 3 2 2		3 3	1 2			10	5 2 1 2
		12 6	3 6 9	13 6 2 4	15 8 2 2	11 4 4	2 2 5	8 1 6 2	4 3 4 5 2		
August	N	1 1 6								3	4
"	S	6 2 7	15 8	4		18 8	5 4	10 6 1	22 8	7 4	16 1
		5 3 1 6			5	27 1				6	
September	N	5 8	11 1	5		17 7		1	3	7 1	
"	S	2	15 4	7	4	14 12 2		1	11 1	9 1	
		4 9	1	2 1 1 1 1	5	5 6 6	3 1	7 1	8	10 3 1	3
October	N	18 1	2	14 1 1 1 1 1	5		5 3 1	22 1 1	8	10 6 4 1	
"	S	17 7	3	11 1 1 2 1	3	11 4 10 1	2 1	9 1	1	16 4 3	6 1
		19 5	6	15 7	3	9	4 2 1	14 3	2	8 5 4 1	
November	N	1	6	5 2	3	5 4 3	5 5 4	2	8 6	11 3 2	2
"	S	3	7 2	13 5 11	7	7	5 6 1	11		10 8 7 1	
December	N		22	5	5					11	
"	S	1		2 4							

Auchmuty 12.6.82

Superintending Engineer

The investigations to be made in connection with the irrigation of Tanjore may be taken under four heads the Delta proper the Pattucottai Project, the Bhawani Project and the Vadiarpalaiam Project.

Delta Proper

1 Upper Anicut and Cauvery Dam. The upper anicut is a solid wall with a narrow bridge, placed across the Coleroon branch, whilst the Cauvery dam, is an open work in steps and was built for the sole purpose of preventing the head from being scoured out by the large body of water forced into it by the action of the anicut. The crest of the anicut is 6 ft above the lowest step of the dam — As the Cauvery transports in high floods large quantities of sand and rolls it along the bottom in smaller floods the result has been And as we may no doubt anticipated that

the

the Cauvery with its open head takes a far larger proportion of this heavy Sand than the Coleroon with a bar across it. This was no doubt foreseen but the Engineers of the time hoped that the Sand would be carried to the Sea and that Raising of river beds, if real, would be met by a gradual Simultaneous rise of the irrigated area. With reference to this question see Proceedings of the Madras Government, 27 November 1867 No 3683. The evils pointed out by Colonel Strachey in his memo printed with these Proceedings were and are real ones; but probably somewhat exaggerated. and though the Land does rise with the rise in the river bed the Land cannot rise as fast as the river,

because

because the silt deposited on the Land is of a very fine quality and bulks to a much less extent than the heavy river Sand. That the rivers in Tanjore are silting up, especially in the Cauvery and branches towards the east has been a Constant source of complaint and a fact that has recently been brought to my notice seems to point to that conclusion. This is the fact that it is not considered safe to allow more than 7½ ft, read on the Rear guage, into the Cauvery at the Vennar head where as in former days the Cauvery was supposed to be safe when there was 11 or 11½ ft Measured at the Cauvery Dam, which would be equivalent to about 8½ ft on the Cauvery regulator rear guage. To whatever

Conclusion

Conclusion we may come to with regard to this 5th question it is certain that if the Engineers of that day, when the anicut was built, had had the means at their disposal they would have built an open vented head across the Coleroon with shutters to raise the supply for the Cauvery; in floods the shutters would have been raised and both rivers would have taken their due proportion of Sand.

We have now the means at our disposal and I have no hesitation in saying that we should make use of them. I would propose the building of a new work in front of the anicut to consist of thirty openings of 70 ft to be fitted with Stoney's shutters and

the

the lowest step of the Cauvery dam should be raised by 2 ft. I would at the same time propose to raise the crest level of the anicut by 2 ft so as to increase the irrigation supply to the Delta, when this can be done without detriment to the Lower Coleroon Irrigation. Instead of a new work it would of course be possible to fit Stoney's shutters to the 67 vents of the existing bridge, and to cut down anicut to floor level, but the bridge is only 8 ft wide and in my opinion it is doubtful if it would be safe to cut down the anicut to the extent required. This however may be left for discussion hereafter. The cost of a new work complete I estimate roughly at 15 Lakhs; the fitting of the old work with Stoney's shutters would

cost

Cost 10 Lakhs. I append a statement shewing the water going over the crests of the Upper and Lower Anicuts from the years 1875 to 1894; an examination of this shews that we may often increase the Cauvery supply without in the least depriving the lands under the Coleroon of their fair share.

Major Montgomerie in his report printed vol G. O. No 363 I dated 9th June 1881 Calculated the flood discharge in 1858 when there were extraordinary floods throughout the Delta, above the Upper anicut at 284,000 cft per 1". With the new work that I propose & the raising of the Cauvery dam by 2ft (which will in no way diminish supply) I calculate that

the Coleroon in a similar flood will take 184,000 cft per 1" leaving 100,000 cft for the Cauvery.

2. Grand Anicut (Cauvery Vennar Regulators)

With an open work instead of the present Upper anicut the work required to be done by the Grand Anicut will be considerably less than hitherto calculated. Taking a flood like that of 1858.

Cauvery discharge as above	100,000
Discharge 150 yards Calingulah into Coleroon	10,000
	90,000
Add for local drainage 868 Sq miles	50,000
	140,000
By Cauvery below regulators — 30,000	
Vennar 10,000	40,000
To be discharged by Grand anicut	100,000

In November 1893 the Grand Anicut discharged 638,74 cft per 1". Any extra

extra waterway required may be obtained by removing the falling shutters and by cutting down the crest and fitting with 5 ft shutters to be worked by screw-gearing. Increased discharging capacity is required to allow of a reduction of the head above the regulator; the work itself is even now capable of discharging the 100,000 cft. The discharge I have allowed from the local drainage basin is a maximum, and is hardly likely to be exceeded and when the river is already full the basin cannot discharge such a maximum. The water will tank back and discharge as the river falls.

The Canvery is to discharge 30000 cft per 1" represented by about 9 ft in the river gauge; at present it

is not safe to allow water to rise above 7½ ft. In my opinion it is most essential that the flood Capacity of this river should be restored to what it was before the regulators were built. With this increase it will be possible to reopen the Koviladi Surplus 20 miles below the head; or perhaps a new work will be required there. The discharging capacity of the Grand Anicut should be sufficient to take also the flood of 10,000 cft per 1" of the Veimar. At times of heavy local rainfall around the town of Tanjore and in the lower parts of the Delta it becomes necessary to exclude upper floods from the Veimar by closing the regulator. This regulator should only be shut unless

absolutely

absolutely necessary. as if closed for any length of time the bed below is certain to rise and give no trouble in the future.

The principle that each river should be made to discharge at its full flood capacity should be rigidly adhered to.

3. Main and Branch Regulators.

The more important of these have been built; there are certain number of minor branches which have still open heads. Surveys and plans for providing these with regulators are in progress. By a judicious use of the regulators we shall be able to send down to the eastern parts of the Delta a larger share of the available supply.

4. Minor Distribution Channels heads. The minor distribution is altogether in the hands of the people and the rights of Government as to control and prevention of waste are ill defined and adverse decisions of the High Court have emphasised the fact that without further legislation the executive can do little or nothing to ensure a fair distribution of the water supply at Command. What form this legislation should take is a matter for careful enquiry and the failure to pass the Conservancy Act proposed and brought forward a few years back shews that all the various questions raised require careful study. We may learn much from the irrigation laws in force in Italy and Spain and I have no doubt that in time we shall be able

to prepare a suitable
Scheme for Tanjore. Whatever
the form this may take
I am of opinion that minor
distribution should be left
in the hands of the people
and that this work should
under no circumstances
be undertaken by the
Public Works. There are
over 3000 distributaries and
even to take over those —
irrigating 1000 acres and
more would require an
increase of establishment
and would bring in its
train various evils which
will be obvious to those
who have had anything
to do with the irrigation
in Tanjore. It is possible
that a Scheme may be
devised which shall
utilise the existing
machinery of Taluq Boards,
but it is probable as
suggested by Mr Bliss
that

that an Irrigation Court
would be required in
the first instance to
register rights and to
bring the authority of
Government to bear on
the equitable division of the
water supply. If the
Bhavani project is carried
through the extra supply
proposed for Tanjore of
5000 cft per 1" during the
months of August and
September and half of
October will be an enormous
benefit to the irrigation.
It will however be necessary
to work out some method
to ensure that this supply
shall reach lands in the
east where it is most
required and that
upper lands already
fully supplied shall not
draw on this extra supply.
This will be a matter of
some difficulty. As to
how much of the 5000 cft
per 1" will reach Tanjore

the

the experience in the Periyar will be of value, that is when we have ascertained how much of the Supply leaving the Periyar Lake reaches the Peranai anicut during the dry months of the year.

5 Silt clearances. Of late years doubts have been thrown on the utility of clearing channels of silt at all, or at all events to the full formation depths. This is a matter requiring investigation. I would propose that four channels in the Tanjore District, two branching from anicuts and two from rivers not under the influence of backwater, should be completely cleared and that they should be regularly gauged for two seasons at least to ascertain the effect of the clearances.

clearances. I would also suggest that similar observations should be made in South and North Arcot where the rivers have greater falls than in Tanjore.

6 Delta drainages. It has been recognised for many years past that these drainages are in much need of improvement and especially within 20 miles of their outfalls into the Sea. Without maps to shew the areas drained by each we are not in a position to propose the works required or to estimate the cost with any accuracy. All the drainages are used as irrigation channels and there be many anicuts across them. It will be necessary to convert all of these into open works with shutters removable in floods. Direct returns from improvement of drainages cannot be expected, but I have no doubt

doubt that the indirect returns, which cannot be previously measured will be great and the value of land is certain to rise. In any case it is almost obligatory on Government to place these drainages in order, not only on account of loss of revenue that is now suffered, but to prevent loss to the people and to improve the sanitary conditions of tracts now badly drained. With the flood waters from the west taken off first at the Grand Anicut again from the Vennar, by a flood channel to Puttoo cottah, which will be again alluded to, we shall have much less difficulty in dealing with the lower drainages than would otherwise be the case, and each small drainage may be

be almost exclusively kept with upper floods partially though not altogether excluded, for the drainage of the actual area drained by it.

7 Coleroon and Lowr Anicut.

The Coleroon and Anicut have to be adapted to take in a year like that of 1858 300,000 cft per 1" or perhaps 80000 to 100,000 more than they have been hitherto able to do with safety. The process of adaptation has been in progress for some years and the banks on the south side above the Lower Anicut have been, I believe, completed in accordance with Mr Cobb's levels. I have elsewhere reported that I do not consider that the banks are strong enough for a flood of 300,000 and have given reasons for proposing that the flood discharge

discharge of the river and anicut should be limited to 25,000 Cft per 1" and that the rest should be allowed to spill over the Country. In my opinion it is a matter of urgent necessity that the Lower Anicut should be now altered to take the increased flood, as the banks Completed above are a menace to its safety. With regard to the Anicut I would propose that it should be cut down about one half, and fitted with shutters to slide down, as proposed by Col Brockman, and that twelve of the arches should be fitted with Stoney's shutters to the full depth to floor level. The crest at the same time should be raised throughout one foot to increase the supply of the Vadavaur,

25000 ?

which supplies the Veranam tank. The question of silt is not of much great Consequence, it is at the Upper anicut, and in my opinion will be adequately dealt with by the alteration proposed above.

Last year a pair of experimental shutters were put up for trial. The Assistant Engineer informs me that to raise them with a head of water against them requires 10 men for each. If the whole anicut were fitted with such shutters 120 would be required; it may be imagined what would be the consequences in case of a sudden flood, the whole village would have to be called out to raise the shutters. There are also other objections against these shutters. They may be found useful

if provided with rollers to reduce friction, counter weighted and with adequate lifting gear for small rivers but not for a river like the Coleroon. The flood banks of the river below the anicut have to be raised on both sides; an estimate for the north bank is now under preparation in the South Arcot division

Puttoocottah Project

8 Some years ago I submitted a proposal for a flood channel to be taken from the Vennar west of Tanjore to relieve the Vennar of flood waters. The channel was at the same time to supply new (to be made) and old tanks in Mannargudi and Puttoocottah. I calculated that 40,000 acres could be so irrigated and an examination

of statement will show that the available supply is more than ample for storage; there is no water available for direct supply. There were two bad years from 1877 to 1894, but even in these years there was ample during the N.E. monsoon.

For the 40000 acres we may take it that one half the storage required viz. 4320 millions should be given in July and August and the other half in the north East monsoon. A channel of 5000 cft per ps capacity would give this amount in ten days. The channel should take this as a minimum with a maximum, if possible, of 8000 to 10000 cft to give relief in Vennar floods. It may also be noticed that raising the

the full supply of the Upper anicut will give us more water for the Delta, a part of which may be taken for Pattoocottah. The land in this Taluq is mostly Poligar or Zemindary and there may be difficulties with regard to getting revenue for irigation by Cauvery water. This is a matter that should be enquired into. In any case we require a flood channel and it would be almost a calamity if we were obliged to discharge Cauvery water uselessly into the Sea by the new cut because of difficulties caused by the system of land tenure. The Project should now be completely investigated

9. Bhavani Project. A trench is now being excavated across the valley to ascertain the nature of the foundation and is in charge of the Superintending Engineer IV circle. The supply proposed to be given to Jamps in August and September viz 5000 cft per 1" will be a very great boon and if this quantity reaches the land where most required, will in my opinion amply repay the people for the enhanced assessment that they have to pay under the new settlement. With this extra supply we may safely anticipate a large increase in the 2nd crops irigation. In 1893-94 the area under 2nd crops was 107570, or 1/8th of the area under the first crops, which was 888485 acres,

according

according to statement printed with G.O. No. 2463 dated 12th March 1895 the rate per acre 2nd crop is 3·23 ft; an increase of 100000 acres under 2nd crops would therefore give us a revenue of Rs 3,23000 or nearly 5 per cent on a Capital of 65 Lakhs.

As this Project is of much importance to this Delta, I would propose that the investigations should be placed under me now.

10. Wodiarpalian Project.

Many years ago the restoration of a large tank in this taluq was proposed with a supply Channel from the Upper Anicut. Very little is known as to the possibilities of the Scheme and whether such a tank ever existed. A preliminary investigation

is advisable. It is possible that the investigation may lead us to consider the desirability of building another or intermediate Anicut across the Coleroon somewhere at the Donnery head. There is much water going to waste over the Lower Anicut which could be made available for storage, but our information with regard to the taluq is very meagre. The slope of the country is towards the river and the area commanded may not be sufficient to justify any large expenditure. The subject however wants further enquiry.

11 Investigations — How to be carried out.

It will be conceded from what has gone before that the various investigations required

required will demand
time; I should say
at least three years.
We are dealing with the
largest system of irrigation
in the world and what
we require to do and
know cannot be done
hurriedly or without
ample discussion.
I would propose that a
Circle be formed which
may be called the Project
Circle, if so approved,
to take up the investigations
now in hand and when
these are completed there
is plenty of other some-
what similar work
to be done in the —
Presidency. The Circle
should consist of a
Superintending Engineer,
two Executives and
2 Assistant Engineers
with other subordinate
establishment.

If I may
be allowed to make the
suggestion I would propose
that Mr Ashpitel be deputed
under me to complete the
Bhavani Project, which
is intimately connected
with the Tanjore Irigation
and that Mr Moss who
will be shortly relieved
from the P. W. Workshops
Madras should be
placed in charge of the
Puttocottah Project.

12. Financial. For the
Delta I calculate roughly
that we shall require
an expenditure of
forty lakhs, Upper
works 15 lakhs, Lower
Anicut ten lakhs, Puttoo-
cottah Channel, as flood
channel only 5 lakhs,
10 lakhs for minor regulation
and drainages. The
Bhavani project will
probably

probably cost 50 lakhs;
the Vattaracottah for irrigation
30 lakhs. With regard
to the forty lakhs required
for the Delta proper I
would suggest that it
should be obtained from
Revenue and not from
Capital. The sum
amounts to about three
years of the increased
assessment under the
new settlement of the
district. The Lower and
Upper Anicuts should
be dealt with at an
early date; the former
in my opinion should
no longer be left in its
present state. If the
works are carried out
under Capital we shall
have to wait long years
before anything is done
and Sanction will not
be given to isolated
sections, which can
be

be easily worked out
independently one of the
other. On the other hand
if the Government of
India (if this is necessary)
is asked to allow expendi-
ture of three years of the
increased assessment,
say at the rate of 6 lakhs
a year, we shall be
able to actually do some-
thing at an early date.

13. A sketch map of the
Cauvery delta to illustrate
this memorandum with
two water statements
are attached.

Lt Col RE
Superintending Engineer
26/1/96 On Special duty

CHIEF ENGINEER FOR IRRIGATION.
27 JAN 96
No. 13 Sp

Dw. E. 3
1 1 1 1 96

Statement of actual quantities of water that entered the Cauvery through Cauvery Dam in the Months of July and August 1877 to 1894.

Years	Millions of Cft in July	Millions of Cft in August	Quantity required for Cauvery irrigation Millions of Cft for the month.	Excess available	Remarks
1877	30,997	48565	48211	354	X Cauvery irrigated area = 800,000 acres. Discharge required at 3 Cy.ds. per hour per acre = 18000 Cft. per second or 48211 Millions Cft for the months; of which however not more than 2/3 required in July as all the area will not then be under cultivation. For Puttoocottah 40,000 acres ½ supply to be given in July & August the other half in North East Monsoon. Total required 4,320 millions Cft.
1878	29281	63612	48211	15401	
1879	79539	74278	48211	31328	
1880	81,783	60,852	48211	33572	
1881	46062	51300	48211	3039	
1882	198521	97908	48211	150310	
1883	101,205	69241	48211	52,994	
1884	22,132	56876	48211	8605	
1885	67038	68230	48211	18827	
1886	68852	59711	48211	20671	
1887	61970	22,724	48211	13759	
1868	83247	61418	48211	35036	
1889	63317	63,816	48211	15,106	
1890	48,134	52569	48211	4,358	
1891	75852	64,454	48211	27,641	
1892	104843	69,638	48211	56,632	
1893	37532	46820	48211	"	
1894	50,153	52,054	48,211	3,843	

in 1861.

X Note. Figures given by major Montgomerie Area was irrigated 888485 acres first Crop.

A. Cunard Lt Col RE
Superintending Engineer
on Special duty
26. 1. 96

CHIEF ENGINEER
FOR IRRIGATION.
27 JAN 96
No. 13 6a

Statement of actual
quantities of water that
entered the Cawery Main
Cawery Dam in the months
of July and August
1877 & 1894

CHIEF ENGINEER
FOR IRRIGATION.
27 JAN 96
No. 138

From.

A. W. Smart. Lt Col RE
Superintending Engineer
on Special duty

To. The Chief Engineer
for Irrigation
&
Secretary to Govt
P.W.D.
Madras.

No. 25
Dated 26th
Despd 26th
Received
January/96

Enc 64.

Ok S.2
11/2/96

Subject

Investigations in Connection
with the irrigation of Tanjore
District.

Forwarding a Memorandum on the — for the information of His Excellency the Governor, as directed

SKETCH MAP OF THE CAUVERY DELTA

SHOWING POSITIONS OF

THE PRINCIPAL IRRIGATION WORKS

SCALE OF MILES

0 5 10 20 30 MILES

79°

11°

TRICHINOPOLY DISTRICT

SOUTH ARCOT DIST

TANJORE DISTRICT

S. I. R. FROM ERODE

KATTALAI

LALAPET

KULITALAI

PETTAIVAYTALAI

CAUVERY DAM

ELAMA NUR

FORT

TRICHINOPOLY

JUNCTION

S. I. R. FROM MADURA

TIRUVARAMBUR

BUDALUR

VALLAM

GANDHARVAKOTTAI

AGANDA CAUVERY

CAUVERY R.

COLEROON R.

PERUVALI CHANNEL

IYENVAIKAL

IYAR

UPPER ANICUT

150 YDS. CALINGULAH

SRIRANGAM

GRAND ANICUT

CAUVERY & VENNAR REGULATORS

TIRIVIAR

KACHCHAMANGALAM

MELATTUR

VADAVAR

TANJORE

SALIYAMANGALAM

PUTTUR

VENNAR

SELLUR

SHULLANAUR DRAIN

KODAMURTI RIVER

MUDIKUNDANAR

VETTAR

PETHARASANAR

SULASUDAMANIAR

VELLAPPAR

PUTHAR

NANNILAM

KATTAR

SUKKANAR

ODEMBOGYAR

TIRUVALUR

KODUVAYAR

PANDAVAYAR

VELLAYAR

VENNAR

VEDAYAR

ERAYANGUDI

TIRUNATTIYATTANGUDI

VADUVUR TANK

VADUVUR AGRIC FARM

MUNICIPAL CANAL

MANNARGUDI

GUNNANAR

PAMANIYAR

CORAYAR

IYENAR

MULLIYAR

ADIVIRARAMA NAR

PONNUCONDANAR

SALUVANAR

PUTHUPANDYAR

PALAMPANDYAR

TUKANANGURIVIAR

TIRUTTURAIPPUNDI

TILLAIVILAGAM

PATTUKKOTTAI

MUTTUPET

SALT SWAMP

SALT PANS

KODIYAKKARAI

POINT CALIMERE

BAY OF BENGAL

DEVIKOTA

VIRANAM TANK

ANAIKKARAN CHUTTRUM

PUDU MANNIAR

PORAVAIKAL

SHIYALI

UPPANAR DRAIN

VAIDISVARANKOYIL

TIRUNAGAR DRAIN

ANATANDAVAPURAM

AIYAVAYANAR DRAIN

CAVERIPATNAM

MAYAVARAM

MANJA VAIKAL

MAHIMALAI YAR

AMBANAR

PERUMBUR

PANDARA ODAI

KADALALAI

MANGANALLUR

NANDALAR

NATTAR VAIKAL

VANJIYAR

PERALAM

NULAR

ARASILAR R.

FRENCH TERRITORY

KARIKAL

TRANQUEBAR

NAGORE

NEGAPATAM

VADUGACHERI

VELANGANNI

PONNIRAI

PIRINJIMULAI

PAPANAR

CHAKLIAN VOIKAL

HARICHENDRANADI

CHANDRA NADI

PULLAVANAR

THATHAN CHUTTRUM

OUMBALACHERI

ADAPPAR

PAMANI

KALLIMODU

TOPPUTURAI

IDUMBAVANAM

VEDARANNIYAM

KILATANGIAR

PALAVANAR

DRAIN

SOUTH PUTHAR

CAUVERY RIVER

COLEROON RIVER

MANNIYAR

UMBAKONAM

PALAIAR DRAIN

VIRASOLAN

KIRTHAMANAR

ARASILAR RIVER

TIRUMALRAJAN RIVER

VADAVAR

NORTH RAJAH VAIKAL

SOUTH RAJAH VAIKAL

KUMIKI MANNIAR

17 LOWER ANICUT

Wodiarpalliam Taluq

Pattukottai Taluq

① PARAYAN VAIKAL
② MANJALAR
③ SOUTH PUTHAR

LIST OF PRINCIPAL MASONRY WORKS

		Mileage from Head of Delta Miles	feet
1	Upper Anicut	"	"
2	150 Yards Calingulah	3	594
3	Grand Anicut	17	3630
4	Cauvery & Vennar Regulators	17	3630
5	Do. Kodamuruti Dam	27	3531
6	Vadugakudi Surplus Sluice	33	4980
7	Perumalkoyil Do.	48	1452
8	Cauvery Arasilar Dam	48	1914
9	Do. Virasolan Do.	62	2376
10	Kodumuruti Tirumalrajan Regulator	49	2871
11	Arasilar Nattar Do.	60	4356
12	Do. Nular Do.	79	4356
13	Vennar Vettar	38	132
14	Do. Pamaniyar Corayar Do.	64	"
15	Do. Pandavayar Do.	71	1617
16	Do. Vellayar Do.	72	4686
17	Lower Anicut	67	1760
18	Erayangudi Dam		
19	Vallam do.		
20	Idumbavanam do.		
21	Pirinjimulai do.		
22	Devanadi do.		
23	Vadugacheri do.		
24	Pamani do.		
25	Umbalacheri do.		
26	Vennar Old Head		
27	Kachchamangalam Anicut		
28	Melattur do.		
29	Sellur Anicut		
30	Kodamurti Mudikondanar Head		
31	Doppen Dam		
32	Serangulam Dam		
33	Vedachimulai Anicut		
34	Peruvalandan Anicut		
35	Tapadanavelli Anicut		
36	Korayar Dam & Regulator		
37	Devadanam Anicut		
38	Adiviraramanar Vennar Anicut		
39	Pallivirthi Anicut		
40	Yervakadu Anicut		
41	Kalligudi Escape		
42	Avarani Anicut		
43	Tirukannangudi Anicut		
44	Nariangudi Dam		
45	Pundiveli Anicut		
46	Kalligudi Anicut		
47	Pandi Anicut		
48	Kunnalur Anicut		
49	Malaperumalai Anicut		

Name	Area irrigated 1st Crop acres	2nd Crop acres	Revenue 1st Crop Rs	2nd Crop Rs.	Total. Rs
Cauvery Delta	8,88,485	1,07,370	34,33,103	3,23,737	37,56,860
Lower Coleroon Anicut	106445	6215	3,57,818	19,214	3,77,032

Register No. 2346—Copies 250

Photo-Print Survey Office Madras.
1895

OF IRRIGATION
22 JAN 30
1383

Note by the Chief Engineer for Irrigation on Memorandum by Lieutenant-Colonel A.W. Smart, R.E. on the investigations in connection with the irrigation of the Tanjore District.

Lieutenant Colonel Smart in his Memorandum has brought forward the salient points which require immediate attention, as well as others which may be temporarily deferred, and states that in his opinion a term of three years will be required for a full and satisfactory solution of all the questions involved.

The works that are clearly of an urgent nature, are the alterations in design connected with the Upper and Lower Coleroon Anicuts and the Grand Anicut. The undersigned had already recognized the necessity for dealing with the first two works in the manner indicated, and with this view, experimental shutters for taking the place of the Masonry dams in each of these works were fixed (in the case of the Lower Anicut) and entered for execution (in the case of the Upper Anicut) during the coming official year. The expenditure proposed as regards the Upper Anicut is very large indeed, although as Lieut:Coll: Smart puts it is but comparatively small when the enhanced revenue derived from the resettlement in Tanjore is taken into consideration. I am not myself, however, in favor of such sweeping measures as are laid down in Lt:Coll"Smart's proposals. The height of the dam at the Upper Anicut is 8', and if the level of water be raised as suggested by 2', and the dam removed a shutter 7' in height would be required. I do not however consider that the whole of the dam need be removed especially if the Cauvery dam be raised 2' also as is proposed. In such case, of 2' feet in height of the existing Upper Anicut Dam be retained, all that would be required would be a shutter in two lengths of 17' each worked by screws lifting them clear of the M.F.L. The cost of these alterations to the existing works North and [illegible] Branch would not exceed 1½ lakhs of rupees o[illegible] of that suggested by Lieut:Coll:

Smart

Smart, with the attainment of at least five-sixths of the efficiency of his proposals.

The Lower anicut may be treated as indicated in his Memo-randum, as here the utility of having a free water way in floods is more clearly demonstrated, and Stoney's Shutters, although very expensive in themselves, may be adopted for the centre vents of the work.

The lowering of the crest of the Grand Anicut may also be undertaken on the lines indicated.

Lt. Coll. Smart is adverse to the taking over by the P.W.D. of the minor distribution in the Cauvery Delta, and in the present state of things I, in the main, agree with him. Much however may be done towards mitigating the inefficient condition into which the irrigation channels are brought by the ingress of salt at the beginning of the irrigation season, by fitting the head sluices of the more important of them with shutters such as have been fixed at the head sluices of the Godavari and Kistna Systems and the interested ryots can be instructed how to work them for various levels of water in the main rivers.

The investigation of silt clearances in channels is an important matter and Lt. Coll: Smart's proposals may be carried out, as well as the improvement of the many drainage channels which serve for purposes of irrigation as well throughout this Delta.

The Puttoocottah Taluq Project is worth investigation although the effect of the channel in reducing the level of maximum floods in the Vennar will not, I consider, be very appreciable. But it is advisable in any case to conserve as much as possible by storage in reservoirs for purposes of ir-rigation so much of the flood waters as may not be required for flushing and scouring out the beds of the Vennar and its branches down to their junction with the sea.

The Bhavani Reservoir Project is in the condition indicated in Lt: Coll: Smart's Memo, but i[illegible]rations have also been in progress for some months [illegible]ation of the

Coimbatore District therefrom.

The Ponneri Tank in the Woodiarpolliam Taluq of the Trichinopoly district is probably the Project Lt: Coll: Smart alludes to in para 10 of his memo. This subject has been dealt with in G.O. dated 4th May 1895, NO: 1046. W.

After dealing with the points that demand investigation Lt: Coll: Smart goes on in para 11 of his memo to make proposals as to how this may be more efficiently carried out, and that is by the constitution of a Special Project Circle, consisting of a Superintending Engineer, 2 Executive Engineers, 2 Asst: Engineers and a suitable staff of subordinates and temporary es-tablishment. I do not support this proposal. Lt: Coll: Smart should, I consider, confine his attention to the Tanjore Delta, pure and simple, until all that is required has been decided upon in that locality; as for the Bhavani Reservoir, its construction can well be left to the local executive. The subject of the location of the Reservoir has been well thrashed out, and definite proposals arrived. The irrigation from the Reservoir in no way affects the Tanjore Delta.

As regards the investigation of projects in other districts experience has shewn, that unless funds are made available soon after this has been done, a large amount of the work has to be redone, estimates revised and works redesigned, when, after a lapse of time, funds are granted for the prosecution of the work.

Colonel R.E.

Chief Engineer for Irrigation.

MADRAS.

31st January 1896.

E. I.

P W C 1140

D. O. [illegible]

No provision has been made in the budget Estimates for any of the works to be proposed by Col Swart. When Estimates are sanctioned the necessary allotments ~~to~~ will have to be applied for to the Govt of India.

Recd 10/2

B.J. 8.2.96

PUBLIC WORKS DEPARTMENT,
IRRIGATION BRANCH.

PROCEEDINGS OF THE MADRAS GOVERNMENT.

UNDER date the

READ the following

Letter from Lieut:Coll:A.W.Smart, R.E.
Superintending Engineer, On Special duty,
Cauvery Completion Estimates------(H.E.NO:25, dated 26th January 1896)
Note by the Chief Engr: for Irrign (H.E.NOTE dated 31st Jany 1896)

Submitted to Government.

Col. Smart's proposals involve a possibly very large outlay - but that is no reason why they shd. not be investigated at once. I understand the C.E. for I. means to find funds for some of the works wh. can be started immediately, out of his budget allotment. How much can be spare for the Tanjore delta?
I think the draft order will do - but I do not think the local Executive can be left to deal with the Bhavani Reservoir. Its cost is to be 65 lakhs. Separate orders should be passed on this matter.

W
6 Feb

I think the C.E. shd. direct Col. Smart as to the order in which works should be investigated.

MJ
7/2/96

To

The Chief Engr: For Irrigation:
" Supg: Engrs: Fourth, and Fifth circle.
" DO---DO-on Special duty, Cauvery Completion Estimates.
" Revenue Department.
" miner of Public Works

Order thereon:-

No 150 I. dy 10 Feby 1896

Lieutenant Colonel Smart's pro-
s as modified by the Chief En-
r for Irrigation are accepted,
e necessary investigations
d be pressed forward as speedily
possible. As plans and estimates
are prepared for each section of ir-
-rigation under the Cauvery and Ven-
-nar for the more equitable distribu-
-tion of water under the main
branches of those rivers, they should
be forwarded for sanction and allot-
-ment of funds, so that some work can
be undertaken in this direction du-
-ring the next working season in the
Cauvery Delta.

Separate orders will be passed
Separate orders will be passed on the
Bhavani Reservoir
Col. Smart as to the
order in which works should

No. 3639 of 9-6-81 ✓
" 3683 " 27-11-67 ✓
" 1819 " 25-2-95 ✓
" 2469 " 12-3-95 ✓
" 3379 " 10-4-95 ✓
" 4859 " 15-6-95 ✓

Investigations in connection with the Irrigation of the Dawjna district

Urgent-

In order to issue endorsed on the note within.

1160

Govt. of India 1876 39

PUBLIC WORKS.

Dated

Rcd.

Rcd.

G.O. 1012 1876 No. 152

Investigations in connection
with Irrigation from the
Cauvery Delta

=

Accepting Estimate
for Rs 6
Notified by the Chief Engr
Irrig. and Navigation
Works, Trichinopoly
Circle, for Investigations
in connection with
Irrigation under the Kattalai
Channel. Kiey should be sanc-
tioned
Sanction called for
Ans.

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