

SUKKUR BARRAGE CANALS PROJECT
1919-20.

VOLUME XX.

REPORT

BY

Messrs. BAKER & LANE, 1919

AND

Orders of Bombay Government thereon

1920.

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Indus Barrage and Sind Canal projects—Orders
on a report of Messrs. Baker and Lane on the

GOVERNMENT OF BOMBAY

PUBLIC WORKS DEPARTMENT

Resolution No. W.I.—11055

Bombay Castle, 20th August 1919.

Letter from Messrs. C. M. Baker and C. M. Lane, Collector and Executive Engineer on special duty, respectively, dated 15th March 1919—Submit through the Commissioner in Sind their report* on the Indus Barrage projects.

Memorandum from Commissioner in Sind No. Rev.—997, dated 17th April 1919, as under :—

“The Commissioner in Sind has the honour to forward the report* on the Indus Barrage project submitted by Messrs. C. M. Baker, I.C.S., and C. M. Lane, Public Works Department; and desires to draw the attention of Government to the thoughtful care with which every detail of the important problems involved has been investigated and to the admirable lucidity with which the conclusions arrived at have been set forth. The Commissioner is aware that these conclusions are based upon most conscientious observation in the field and very elaborate calculation in the office.

“2. At intervals during the preparation of this report, the Commissioner summoned conferences of various officers concerned for the settlement of the points for enquiry and for discussion at early stages of the various theories and suggestions which are involved in an enterprise of this colossal magnitude. The conferences were held on the dates under-stated and attended by the officers noted :—

Conference of January 19th, 1918, attended by	Conference of January 20th, 1918, attended by	Conference of November 30th, 1918, attended by	Conference of February 3rd, 1919, attended by
1. The Honourable Mr. H. S. Lawrence, C.S.I., I.C.S., Commissioner in Sind.	The Honourable Mr. H. S. Lawrence, C.S.I., I.C.S., Commissioner in Sind.	The Honourable Mr. H. S. Lawrence, C.S.I., I.C.S., Commissioner in Sind.	The Honourable Mr. H. S. Lawrence, C.S.I., I.C.S., Commissioner in Sind.
2. Mr. T. R. J. Ward, C.I.E., M.V.O., M.I.C.E., Inspector General of Irrigation in India.	Mr. G. S. Henderson, Imperial Agriculturist.	Mr. T. R. J. Ward, C.I.E., M.V.O., M.I.C.E., Inspector General of Irrigation in India.	Mr. F. St. J. Gebbie, Secretary to the Government of Bombay, Public Works Department.
3. Mr. F. St. J. Gebbie, Chief Engineer and Secretary to the Government of Bombay, Public Works Department.	Mr. W. Roberts, Principal and Professor of Agriculture, Lyallpur.	Mr. F. St. J. Gebbie, Secretary to the Government of Bombay, Public Works Department.	Mr. F. Wright, Chief Engineer in Sind, Public Works Department.
4. Mr. F. Wright, Chief Engineer in Sind, Public Works Department.	....	Mr. F. Wright, Chief Engineer in Sind, Public Works Department.	Mr. C. M. Baker, I.C.S., Collector on Special Duty.
5. Mr. C. M. Baker, I.C.S., Collector on Special Duty.	....	Mr. C. M. Baker, I.C.S., Collector on Special Duty.	Mr. C. M. Lane, Executive Engineer on Special Duty.
6. Mr. G. S. Henderson, Imperial Agriculturist.	....	Mr. G. S. Henderson, Agricultural Controller.	Mr. A. A. Musto, Executive Engineer, Sukkur Barrage.
7. Mr. W. Roberts, Principal and Professor of Agriculture, Lyallpur.	....	Mr. C. M. Lane, Executive Engineer on Special Duty.	Mr. T. F. Main, Deputy Director of Agriculture, Sind.
8. Mr. C. M. Lane, Executive Engineer on Special Duty.	....	Mr. A. A. Musto, Executive Engineer, Sukkur Barrage.	Mr. V. A. Tamhane, Agricultural Chemist.

Copies of the minutes* of these conferences are attached as some proof that the questions involved have been considered from many different points of view by officers of varied experience who possess some claim to speak with authority.

“3. The Commissioner ventures to review briefly for the information of Government the agricultural economy of Sind as it exists now and as it will be modified when the Sukkur Barrage project is completed. On an average of seasons in round figures the province has an annual cultivation of 4,000,000 acres, of which 400,000 or 10 per cent. are dependent on rainfall, and 3,600,000 or 90 per cent. are dependent on irrigation from the river Indus. This project may be considered in three parts: the Right Bank Canal, the Left Bank Canal, and the far eastern canals known as the Eastern Nara system. In this last named system no change of the canals is proposed; the only effect of the barrage will be to give an assured supply to the existing canals. This improvement of the supply will, it is calculated, enable a further 200,000 acres to be brought under cultivation.

*Printed separately.

" 4. In the area, however, commanded by the right bank and left bank canals, the existing canals will be superseded and abandoned ; and very large areas will be brought under command of flow water which never had any water before or which only had water raised by mechanical appliances. In these latter areas the extension of annual cultivation would be from 1,000,000 to 1,600,000 on the right bank, and from 700,000 to 2,100,000 on the left bank.

" 5. Beyond the scope of the Sukkur barrage there will remain in Sind 700,000 acres of annual cultivation to the north which lie too high to receive this water ; and 600,000 acres to the south which are situated too far away to be reached by these canals.

" 6. To recapitulate : Out of 3,600,000 acres, the annual irrigational cultivation, this scheme does not touch 700,000 to the north and 600,000 to the south ; and on the remaining 2,300,000 it will provide an increase of 2,200,000 of annual cultivation, thus doubling the cultivation of the whole of the central area of Sind.

" 7. The increase of area, however, represents only a fraction of the advantages to be derived from the introduction of this system. Water will be under complete control ; and the losses due to the vicissitudes of supply, to the sudden floods, and to the prolonged droughts will cease. Perennial water will further provide agricultural employment all the year round in lieu of the prolonged periods of enforced idleness now prevailing. It will also enable the establishment of a dairy industry to which the province with its famous breed of cattle is admirably suited.

" 8. The increased land revenue earned by the triple project will rise through decennial stages of Rs. 83,00,000 and Rs. 1,23,00,000 to Rs. 1,72,00,000 in the 30th year. The present average land revenue of Sind is Rs. 110 lakhs; and these figures indicate that the existing revenue of the whole province will be almost trebled within 30 years of the completion of the project.

" 9. Detailed estimates of the cost of the project are not as yet available ; but it should be in the neighbourhood of 14 crores of rupees. It is calculated that the whole scheme will earn on this vast sum an interest of 6 per cent. in the first 10 years, of 8½ per cent. in the second 10 years and of 12 per cent. in the third 10 years and thereafter.

" 10. The Commissioner has the honour to express his complete acceptance of these estimates and his confident belief that this project may be carried through to completion with full assurance that it will effect a most beneficent revolution in the prosperity of the province ; and will prove to be one of the most remunerative irrigational successes of Government."

RESOLUTION.—Government concur in the remarks made by the Commissioner in Sind in paragraph 10 of his memorandum and are pleased to direct that the proposals made by Messrs. Baker and Lane should be accepted as a basis for the remodelling of the Left Bank Canal and the preparation of plans and estimates for the Right Bank Canal.

2. Government generally agree with the remarks made by Messrs. Baker and Lane in paragraph 56 of their Report on the Right Bank Canal regarding the proposal to irrigate a part of the Nasirabad Tehsil by a canal from the barrage. Mr. Musto, Executive Engineer, has submitted certain reports on this point and orders thereon will issue separately.

V. F. BARKER,

Acting Under Secretary to Government,
Irrigation and Railways.

G. R. No. W. I.—11055, P. W. D., dated 20th August 1919.

To

*The Revenue Department, Secretariat.

*The Commissioner in Sind.

*The Chief Engineer in Sind.

*All the Collectors in Sind including the Deputy Commissioner, Upper Sind Frontier.

*The Director of Agriculture.

*The Superintending Engineer, Indus Left Bank Division.

*The Superintending Engineer, Indus Right Bank Division.

*The Accountant-General, Bombay.

*C. M. Baker, Esq., I.C.S.

*C. M. Lane, Esq.

*All Executive Engineers in Sind.

*With copy of the Report.

Class A.

Exd. J. P. R.

No. of 1919.

Copy forwarded for information and guidance to

No. S.—217 of 1919.

Office of the Chief Engineer in Sind.

Karachi, dated 8th April 1919.

From—F. WRIGHT, Esq., Chief Engineer in Sind ;

To—The Commissioner in Sind.

Sir,

I have the honour to say that I have read with care and much interest the excellent report on the Indus Barrage Projects prepared by Messrs. C. M. Baker and C. M. Lane. I am well acquainted with the controversy which led to the appointment of the Committee now reporting, and I can say, with confidence, that at length one can fairly feel no longer is there reason for many of the doubts which would arise in the mind of any Sind Officer of experience who had read some of the literature previously issued in connection with the barrage canals and the country to be served by them.

2. The Committee reports in chapter I that the cultivable areas both in the Left and Right Bank spheres of barrage water influence are in marked excess of what previous estimates adumbrated. That was a thing which I anticipated would be ascertained by a soil survey such as has now been conducted. And, further, I anticipated that this survey would be of the greatest possible value when it shall come ultimately to the aligning of water courses.

3. Chapter II of the Report deals with the selection of suitable duties in various canal situations. This is a matter which has already had careful consideration at several canal conferences within the last few years, and with the arguments advanced in favour of the figures chosen I have nothing to say beyond that in my opinion the Committee are very fair in their selection and that I expect time will prove that duties now common in the Punjab will be attained to after the Sindhi cultivator has accustomed himself to the enormous change this thing of established perennial water-supply means.

4. In paragraph 5 *et seq.* of chapter III of the Report the matter of the suitability of the Left Bank country for cotton cultivation is referred to. Messrs. Baker and Lane have explained quite clearly why it is impracticable, undesirable, and uneconomical that that country have provided for it canals other than those they stipulate for. I wish it to be understood that I am in full accord with the opinions of those gentlemen. At the same time I would point out that it is likely to be very important to extend to the utmost cotton cultivation in Sind in particular, and over and above the great area which it is provided the Left Bank canal can raise, it is not unlikely that in the Right Bank country, in definite areas, people who now would grow rice will hereafter take to cotton when they see what prosperity it is bringing to their friends on the other side of the river. Already there have been instances of the rice cultivator abandoning that crop in favour of cotton, and this may become a desirable feature of agricultural enterprise in the southern canal area on the right bank.

5. Without a more extensive knowledge of the facts I am not prepared to endorse what the Report says in paragraph 13 of chapter IV with respect to the perennial branch canal suggested for the irrigation of villages in Jacobabad and Nasirabad. Setting aside political aspects of the case, about which I am not in a position to offer any remarks; it seems to me quite clear that when perennial water can be brought to a place which otherwise would have no water at all, or else the fickle supply that an inundation canal can give, then the arguments in favour of any thing other than a perennial supply will be found unsound.

6. I have always been and am still very optimistic respecting the supply of the Indus in the cold weather. I have no fears of deficiencies in the rabi watering canals on that account. In this spring, after the remarkably feeble monsoon of 1918, the supply in the river at Sukkur has not been below 23,000 cusecs and that at a time when the Punjab canals were taking all the water they wanted. The coming of the Sind Sagar canal is no bug-bear to me.

7. Chapter V deals within the Eastern Nara. The Committee see no object in pressing for an extension of the irrigated area in this locality at an early date. With that view I concur. At the same time it must not be overlooked that in the Nara Valley between the Mithrao protective embankment and the Nara itself there is in the bay north of Kipro a very large area now without a water-supply, and also west of the Nara itself and for many miles south of Samara to the Rann there is a strip of country of considerable magnitude which can be brought under cultivation when canals and people are available for the purpose.

8. The irrigation of forests is touched upon in chapter VI. What I would like to see become an accepted policy of forest cultivation in Sind is the extension of areas under forest in many of the favourable positions which lie between the river's edge and the protective embankments, and the discouragement of forests (except in very exceptional circumstances) in areas

which can only derive a water-supply from Government canals. I favour very much the extension of "huris" over the country in irrigated areas, but I consider that such huris should be reserved rather as a source of food for goats and camels than as sources of fuel supply. Clumps of fresh young babul plantations over the countryside have merits other than utilitarian.

9. It is not necessary for me to venture to criticise the conclusions the Committee arrive at respecting the financial results of the Barrage projects. I am in perfect agreement with Messrs. Baker and Lane when they say that even though the final estimates of the cost of these works are so high as to make the project unremunerative yet are they necessary as protective works. The inundation of 1918 and its results give great force to that judgment.

I have the honour to be,

Sir,

Your most obedient servant,

F. WRIGHT,

Chief Engineer in Sind.

Accompaniment—

The Report on the Indus Barrage Projects.

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MAP.

Note.—The numbering of pages and paragraphs differs from the copy of the Report submitted to the Secretary of State.