

Revenue (1897) Department.

MISCELLANEOUS SERIES.

G.O., No. 1227

DATED 24th March 99

[Despatch Abstract.]

Communicating to the Board of Revenue
G. O. P. M. D. approving the recommendation of the
Chief Engineer for Irrigation for improving the
system of flood warnings as regards the Godavari
river and ordering that the Meteorological Dept. of the
Govt of India be addressed in the matter.

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 (1899) of Madras. PUBLIC WORKS.

Recd. } 21st March 1899.
Regd. }

Enclosures

Spare copies

G.O., No. 247 I., 14th March 1899.

MARCH.

G.O. No. 1227 of 24th March '99.
Communicated to the
Board of Rev

Flood Warnings

22.8.99.

Approving the recommendation of the Chief Engineer for Irrigation for improving the system of — as regards the Gadavari river and ordering that the Meteorological Department of the Government of India be addressed in the matter.

Note *Mr P. W. Draft order was comm*
initialed in the Rev Dept.

23-3-99

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

Irrigation.

Read—the following papers:—

Proceedings of the Board of Revenue (Revenue Settlement, Land Records and Agriculture), Mis. No. 3044, dated 7th May 1898.

Read—again Proceedings of the Board of Revenue (Revenue Settlement, Land Records and Agriculture), Mis. No. 4272, dated 3rd September 1896.

Read—again Proceedings of the Board of Revenue (Revenue Settlement, Land Records and Agriculture), Mis. No. 7560, dated 13th September 1897.

Read—also endorsement from Government, Revenue Department, No. 727 R., dated 22nd April 1898, transferring to the Board of Revenue (Revenue Settlement) the following letter from the Meteorological Reporter to the Government of India, No. 144-S., dated 25th March 1898:—

I have the honour to reply to the Resolution of the Board of Revenue asking me to favour them with an expression of my opinion as to the best method of providing for indication of coming floods in the Godavari and Kistna rivers.

2. Two methods are discussed in Miss Pogson's letter to the Board on the subject, dated 26th August 1897, viz., (1) the inclusion of daily telegrams from certain stations in the upper basins of the Godavari and Kistna which information would serve as a sufficient warning to the engineers concerned, or (2) the issue of flood warnings of a special character suited for the purpose to the Irrigation officers at Bezvada and Dowlaisweram by the Simla Meteorological office.

3. I have studied the methods of giving warning of river floods in Europe and America and more especially those used in the United States where they are, on the whole, very successful. In the United States where systematic flood warnings are given for the Mississippi and its large tributaries, it has, I believe, been fully established that (1) no sufficiently satisfactory estimate of the amount of probable rainfall due to a cyclonic or other storm over a drainage area can be made from a weather map to be of any real use in flood prediction and warning, and (2) that unless something is known about the customary stages of water in a river (or its regimen), no prediction of flood stages of any value can be made even from the knowledge of the actual rainfall at stations in the river basin as observed by rain-gauges, and the general character of the weather as shown by the daily weather reports.

4. My own limited experience in India is in practical agreement with these conclusions and hence I do not think that the publication of the additional data for the stations proposed in the Madras daily weather report would serve any useful purpose. Still less would it enable the Irrigation officers to forecast the height of the flood water in the Kistna or Godavari.

5. I am also of opinion that the Simla Meteorological office with its present information and staff would not be able to give effective flood warnings of the kind required. In order to test this I asked Mr. Dallas (who issues most of the storm and flood warnings from Simla) to take up the history of the floods which have given rise to this suggestion, the accounts of which were kindly furnished by the Madras Government and to compare them with the rainfall at the meteorological stations in the basins of the two rivers, and see whether with that information he could probably have given certain and effective warning of these floods. He went into the question exhaustively.

I forward a copy of his memorandum from which it will be seen that he does not think it would have been possible for this office with that information to have given accurate and reliable flood warnings to the Irrigation officers, Bezvada and Dowlaisweram, during the monsoon of 1896. Of course if the Government of India on the application of the Government of Madras were to order the Meteorological Department to give flood warnings to these Irrigation officers, we should do our best but we should have to work in the dark to a large extent and our warnings might and would probably be considered unsatisfactory.

6. I believe the only satisfactory way of warning these officers of floods would be to introduce the methods that have proved to be serviceable and effective in the United States with the necessary modifications to adapt them to the requirements of India.

7. The practice of the Washington Weather Bureau is to have river gauges at suitable positions along the main stream and the larger tributaries, and to have regular systematic observations taken of the height of the river. These are forwarded to the Weather Bureau where a special study is made by the flood warning officers of these data and of the rainfall data of the river basin. By the study of these data and their comparison, the Bureau gradually accumulate a knowledge of the rate at which floods travel down the river and of the way in which floods in the various tributaries (singly or combined) affect the water-level in the main stream. They at the same time correlate the height of the floods due to the various causes with the contributing rainfall. If the work of observation and discussion of river floods and rainfall be carried out continuously and systematically in some such manner as this for Indian as is done for American rivers, the work of flood prediction and warning might be taken up by the Meteorological Department and would gradually pass from the purely empirical and doubtful stage to a stage of approximate certainty and of complete adaptation to the special requirements of the case.

8. While obliged thus to dismiss the two suggested methods of flood warning, I yet consider it to be a matter of great importance and one which should be taken up without further delay in the larger rivers of India, but it is of even greater importance that when it is taken up it should be done systematically so that the practical action based on increasing observation and knowledge may become more valuable and effective.

Resolution—Mis. No. 3044, dated 7th May 1898.

The papers read above will be referred to the Chief Engineer for Irrigation for favour of remarks with reference to paragraphs 7 and 8 of letter from the Imperial Meteorological Reporter, dated 25th March 1898.

(True Copy and Extract.)

(Signed) R. V. SRINIVASTAR,
Secretary.

Letter from the Chief Engineer for Irrigation, to the Secretary to the Commissioner of Revenue Settlement, Land Records and Agriculture, dated 18th May 1898, No. 176 M.

With reference to the Board's Proceedings, No. 3044, dated 7th May 1898. I have the honour to state that I entirely agree with the views expressed in paragraphs 7 and 8 of letter, No. 144/S., dated 25th March 1898, from the Meteorological Reporter to the Government of India. From the map printed with volume III of the Indian Meteorological Memoirs, it would appear that the only stations on the Godavari where observations of the flood levels would enable officers to forecast the height of a flood at Dowlaisweram are Chanda and Sironcha. On the Kistna there are no meteorological stations, but all the information required can be got from the Tungabadra and Kistna stations on the Madras and Great Indian Peninsula Railways. I shall make enquiry as to the warnings now received of approaching floods and address you again on the subject.

To the Superintending Engineers, I and II Circles, No. 8 G., dated 18th May 1898.
From the " Engineer, I Circle, No. 495 G.D., dated 31st May 1898.
To the " " I " No. 63 " " 11th June "
Proceedings of the Board of Revenue (Revenue Settlement, Land Records and Agriculture), No. 3531, dated 8th June 1898.
From the Superintending Engineer, I Circle, No. 816 G.D., dated 10th July 1898.
To the " " I " No. 86 " " 25th " "
From the " " I " No. C/152 " " 31st " "
To the " " II " No. 135 K.S. " " 13th August 1898.
From the " " II " No. 2971 K.E. " " 23rd September 1898.
To the Board of Revenue (Revenue Settlement, Land Records and Agriculture), No. 328 M., dated 13th October 1898.

Proceedings of the Board of Revenue (Revenue Settlement, Land Records and Agriculture), Mis. No. 7033, dated 6th December 1898.

Read—again Proceedings of the Board of Revenue, Mis. No. 3531, dated 8th June 1898.

Read—also letter from the Chief Engineer for Irrigation, No. 328 M., dated 13th October 1898.

Resolution—Mis. No. 7033, dated 6th December 1898.

In the circumstances reported, the Board would suggest that the Chief Engineer should address Government in order that arrangements of the sort proposed at the end of his last letter may be made before another flood season comes round.

(True Extract.)

(Signed) C. BENSON,
for Secretary.

No. 317 L.

Note by the Chief Engineer for Irrigation.

In his letter No. 144 S., dated 25th March 1898, addressed to the Government of Madras, the Meteorological Reporter to the Government of India suggested certain improvements in the methods adopted in India of flood warning. He advocated a system being adopted in India similar to that adopted in America, where river gauges are placed at suitable positions along the main stream and the larger tributaries and systematic observations are taken of the height of the river. The height of the floods due to various causes are correlated with the contributing rainfall, and the Meteorological Reporter thought that, if such a system was continuously and systematically carried out in India, the work of flood prediction and warning might be taken up by the Meteorological Department and would gradually pass from the purely empirical and doubtful stage to a stage of approximate certainty.

2. These remarks of the Meteorological Reporter were made in reply to a request that had been made to him by the Board of Revenue, asking for his opinion as to the best method of providing for indication of coming floods in the Godavari and Kistna rivers.

3. 5. The papers having been forwarded by the Board of Revenue for remarks, the undersigned, in his letter, No. 176 M., dated 18th May 1898, intimated that he entirely agreed with the views of the Meteorological Reporter to the Government of India and would, after making enquiry as to the warnings now received of approaching floods, address the Board further.

4. Accordingly, in letter No. 328 M., dated 13th October 1898, the Board was informed that it has been ascertained from the Superintending Engineer, II Circle, that, as regards the Kistna river, a system of flood warnings similar to that contemplated by the Meteorological Reporter is already carried out by the Public Works Department—gauges are fixed in the Tungabhadra at Kurnool and in the Kistna at Pagatur about 12 miles from Kurnool. In the flood season these gauges are read

three times a day—in the morning, at noon and at 6 o'clock in the evening. A lascar takes these readings to Kurnool, whence a telegram is sent by the Executive Engineer, Kurnool, to the lock superintendent at Bezwada. Such warnings of a flood are generally received about 36 hours before the river begins to rise at Bezwada. At the beginning of the season when the river is very low, a flood will frequently, it was reported, not be noticed at Bezwada for nearly a week after the receipt of the warning. This system of flood warning, the Board was informed, appears to be sufficiently good.

5. As regards the Gôdâvari river, the Board was informed that the Superintending Engineer, I Circle, reported that on two occasions in 1894 and in 1896 telegrams were received at Dowlaishwaram from the Deputy Commissioner, Bhandara, when the river Weinganga began to rise. On other occasions the only warnings received were the telegrams from the Meteorological office at Simla of which the Superintending Engineer furnished copies. These telegrams for the most part convey general information, such as "Fresh depression developing over bay, will probably cross coast within forty-eight hours giving heavy rain," and do not give reliable information on which definite action could be taken. It was therefore suggested to the Board that it would be of very great advantage in conveying intimation of approaching floods in the Gôdâvari, if gauges could be set up at Chanda and Sironcha and the readings telegraphed to the Superintending Engineer at intervals whenever the river was above the level which experience may show to correspond with important floods at Dowlaishwaram. Sironcha is about the same distance above Dowlaishwaram (about 200 miles) as Kurnool is above Bezwada.

6. At the suggestion of the Board of Revenue that the undersigned should take the necessary action, it is recommended that the arrangements proposed in the preceding paragraph may be made before another flood season comes round.

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

17th December 1898.

ORDER—No. 247 I., dated 14th March 1899.

The recommendation of the Chief Engineer for Irrigation is approved.

2. The Meteorological Department of the Government of India will be asked to take the necessary steps for giving effect to the arrangements proposed in paragraph 5 of the foregoing note.

8. Ordered that a copy of these Proceedings be forwarded to the Government of India.

[Here enter No. 248 L., dated 14th March 1899.]

(True Extract.)

Under Secretary to Government,
Irrigation Branch.

To the Chief Engineer for Irrigation.
 " Superintending Engineer, II Circle.
 " " " I "
 " Revenue Department.

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RECAP AGAIN C.O., No. _____, DATED _____
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