GOVERNMENT OF INDIA
CENTRAL WATER COMMISSION

COASTAL PROTECTION & DEVELOPMENT ADVISORY COMMITTEE (CPDAC).

MINUTES OF THIRD MEETING

Date :10-11 Sept., 1998 **Venue : Panaji - Goa.**

The Third Meeting of the Coastal Protection and Development Advisory Committee (CPDAC) was held at Panaji-Goa, on 10th Sept., 1998, followed by a field inspection of coastal erosion regions in Goa on 11th September, 1998. The list of the participants in the meeting and the field inspection is enclosed at Annexure-A. The report of the inspection of coastal erosion locations in Goa is at Annexure-B.

Shri S.C. Chitkara, Member (River Management), Central Water Commission and Chairman (CPDAC), welcoming the members to the meeting mentioned that India has a long coast line of around 5,700 kms spread over nine maritime States and Union Territory of Pondicherry. A large portion of this coastline is vulnerable to sea erosion and tidal overflow. Only a portion of the vulnerable sea coast has been protected so far and lot of efforts are required to be made to protect the remaining part within the limitations of the availability of funds and other constraints. The Central Government has been providing assistance to States for coastal protection upto 1991. But, subsequently the scheme was discontinued. Now, we have plans for seeking external assistance and a National Coastal Protection Project (NCPP) is under formulation under the auspices of CPDAC. He added that hopefully the Project will receive external assistance. He also indicated that the cost of protection works have now gone very high and on an average it is around Rs.2 crores per km. He emphasized that much R&D is to be carried out in this direction and also we have to pool our experience so as to come out with more techno-economically viable and cost effective

protection works. He thanked the Govt. of Goa for hosting the meeting as well as for making excellent arrangements for the meeting.

The meeting was thereafter inaugurated by the Hon'ble Minister for Irrigation, Govt. of Goa. The Minister, in his inaugural address, mentioned that the Govt. of Goa is extremely happy that CPDAC members have come to their State and it is hoped that the members will give proper advice and guidance in protection of coast line of Goa. He added that Kerala and Karnataka are economically, geographically similar to Goa and also have similar eco-system. The problems of coastal erosion faced by these States are analogous to Goa also. The voluminous waters of Mandovi and Zuari rivers draining into sea during monsoon periods aggravates the land erosion problems of the State. The State Govt. is experiencing much financial constraints in taking up the protection works. Even though Goa State contributes annually around Rs. 3,000 crores to Central Government by way of Central excise and other contributions, the State has not been getting any financial help from Centre for protection of its sea coasts. He emphasized that Govt. of India should look into the coastal management problems of the State and also should provide required Central assistance to the States. He wished the meeting all success.

The agenda for the meeting was thereafter taken up for discussions.

1. CONFIRMATION OF THE SECOND MEETING

The modifications in the minutes of the Second meeting suggested by Secretary , Minor Irrigation, Govt. of Karnataka was agreed by the members of CPDAC. As no other comments were received from the other members, the minutes was confirmed with the modifications suggested by Govt. of Karnataka.

1.1 TO ORGANISE A CO-ORDINATED PROGRAMME OF COLLECTION, COMPILATION, EVALUATION AND PUBLICATION OF DATA RELATING TO VARIOUS NATURAL PHENOMENA AND COASTAL PROCESSES WHICH AFFECT THE COASTLINE.

Member-Secretary, CPDAC, requested member States other than Goa and Karnataka (who have already nominated nodal officers in their respective States) to nominate nodal officers for collection of data from

various agencies involved in the coastal and related activities in the State and pass on the same to CWPRS, Pune, who will act as National Coastal data bank.

The representative from Tamil Nadu indicated that the Director, Institute of Hydraulics and Hydrology, Poondi, has been nominated as the nodal officer. He, however, indicated that sufficient staff is not available for observation and analysis of data. The proposal for strengthening of the Divisions engaged in coastal protection works has already been included in the National Coastal Protection Project (NCPP) proposals submitted by Tamil Nadu. He requested that formulation of the NCPP may be expedited. The representative from Orissa State informed that the Superintending Engineer, Eastern Circle, Cuttack can be nominated as the nodal officer. This Circle has 4 Divisions looking after the coastal protection works and one of the Divisions could be nominated as the Coastal Division for collection of data. The representative from Maharashtra informed that the nomination of the officer will be intimated officially in due course.

Regarding creation of the data bank at CWPRS, the Director, CWPRS, Pune, mentioned that so far no data have been received from the States. He added that even the data observed visually on waves, sediment movement, etc., will be useful. Another data which is relevant to coastal protection is historic data on performance evaluation of protection measures. He emphasised that some method of funding the collection of data by States may be evolved by CPDAC, so that States will be in a better position to collect reliable data.

Chairman (CPDAC) mentioned that general performance data on coastal processes are needed for studying and evolving low cost protection technologies . The services of National Remote Sensing Agency can also be utilised for data acquisition. He also added that all the nominations of nodal officers may be informed to CPDAC Secretariat officially. He also mentioned that the format for collection of the data may be forwarded once again to all members for their information as some of the members do not seem to have received it earlier.

1.2 TO ORGANISE GENERAL INVESTIGATION, STUDIES AND RESEARCH WITH THE HELP OF CENTRAL AND STATE ENGINEERING RESEARCH INSTITUTIONS.

1.2.1 INVESTIGATION FOR MUD BANK ALONG KERALA COAST

Director (Beach Erosion), CWC, Kochi, mentioned that the Centre for Earth Science Studies (CESS) had earlier submitted a project proposal "Monitoring of shore line Changes and Concurrent Dynamic Process along the Kerala Coast", which included the study on the phenomenon of mud banks. After preliminary examination of this proposal, the Indian National Committee on Hydraulics (INCH) suggested preparation of the state-of-the-art report may be attempted initially by CESS. Accordingly, CESS has submitted the present project proposal amounting to Rs.3.23 lakhs which was circulated as part of agenda for the first meeting of CPDAC. The same was approved by CPDAC and forwarded to Ministry of Water Resources. MOWR, however, indicated that the project proposal may be forwarded to INCH for funding. Accordingly, the proposal was sent to INCH. The INCH is yet to take up this proposal for funding.

Director, CWPRS, Pune, mentioned that several other agencies have already done considerable work on the phenomenon of mud banks which includes National Physical and Oceanographic Laboratory, Cochin, the Coastal Erosion Division of Cochin University, etc. He mentioned that the Project proposal is not R&D oriented. However, he suggested that CESS may organise a presentation at the INCH, so that its utility could be assessed.

Chairman (CPDAC) mentioned that such R&D proposals can also be funded by the Ministry of Water Resources out of its allocation for R&D. He also requested other maritime States to indicate their requirement for carrying out R&D in the field of coastal process and engineering.

1.2.2 SATELLITE IMAGERIES TO MONITOR SHORE LINE CHANGES.

Director, CWPRS, mentioned that the satellite imageries now available is not of sufficiently high resolution and it will not be useful for studying the coastal process. The representative of Tamil Nadu indicated that they have been purchasing satellite imageries which, however, are of 5-6 metre resolution. At least imageries of resolution around 1 metre is needed for studying the coastal process, shore line changes, coastal development, etc. It was indicated that when the Asia-Sat is launched, we will be in a position to obtain satellite imageries of higher resolution.

1.2.3. COASTAL ATLAS

The Director, CWPRS, mentioned that the Space Application Centre, (ISRO), Ahmedabad, is preparing maps for all maritime States. These maps of scale 1 **:** 2,50,000 may be useful for preparation of the coastal Atlas. The Joint Secretary, Ministry of Environment & Forests mentioned that the mandate given to CPDAC includes identification of coastal zone to be developed behind the coastal protection works as well as preparation of long-term and short-term plans for coastal protection and development of the coastal zone. During 1991 Ministry of Environment & Forests has issued a notification on Coastal Regulation Zone, which provides statutory mechanism for restrictions on industries, operations and processes in the coastal regulation zone. The notification stipulates the distance up to which development is to be regulated which depends on the High Tide Line (HTL). Thus, demarcation of the High Tide Lines as well as Low Tide Lines in all the coasts of the country are very critical and also very important. During discussions on a public interest petition filed in the Supreme Court during 1996, the Ministry of Environment & Forests has reported to the Supreme Court that satellite imageries of 1:25000 shall be used for demarcation of the coast line. However, many States have not carried out this work. The public interest petition is still ongoing in the Supreme Court and thus it is very important that States prepare the coastal atlas. He emphasised that CPDAC should impress upon the States about the need for preparation of coastal atlas. He also added that during the discussions on the subject it is found that there is lack of conceptual clarity and direction in preparation of the coastal atlas. Therefore, CPDAC may give proper directions for preparation of the atlas.

After discussion on the subject it was decided that a Sub-Committee of CPDAC may look into this issue and may decide the contents, scale and

other details to be included in the coastal atlas. It was decided that the composition of the Sub-Committee shall be as follows :

1.	Dr. Shailesh Nayak, Scientist SF, Space Application Centre, Ahmedabad	… Convener
2.	Director, Geological Survey of India Marine Wing, Cochin.	… Member
3.	Director, Beach Erosion Dte. CWC, Cochin	… Member-Secretary
4.	Director, Coastal Erosion Dte. CWC, New Delhi	… Member
5.	A representative from National Institute of Oceanography, Goa.	… Member

1.2.4 STRENGTHENING THE FACILITIES FOR COASTAL ENGINEERING RESEARCH BY THE STATES.

The Director, CWPRS, indicated that so far no proposals from the States for strengthening the facilities in the States have been received. Unless States send their proposals it will not be possible for the Indian National Committee on Hydraulics (INCH) to comment on the proposals and fund the same. He also mentioned that individual sponsoring research stations should come to INCH and make presentation of their proposals. The representative of Tamil Nadu indicated that for improving the infrastructural facilities in their States, funds are available under the Water Resources Consolidation Project being implemented in their State with World Bank assistance. However, the main constraint is shortage of staff, because the State Government policy is not to sanction any new posts. The representative from Orissa indicated that their research stations at Cuttack may be strengthened for carrying out coastal engineering research. The Director, CWPRS, mentioned that the Water Resources Consolidation Project ongoing in Orissa may be in a position to fund the requirements of Orissa Govt. He also added that since mathematical modelling is cheaper than physical modelling, this may be widely adopted. The mathematical

modelling also does not require much infrastructural facilities as compared to physical modelling. Professor J. Dattatri mentioned that there should be much interaction between research stations and academic institutions, so that meaningful research in coastal process and engineering could be carried out.

1.3 TO LAY DOWN PRINCIPLES IN CONSTRUCTION TECHNIQUES OF COASTAL PROTECTION MEASURES FOR THE GUIDANCE OF STATE AUTHORITIES.

1.3.1 USE OF FLAT STONES.

Representative from Karnataka Engineering Research Station was not present in the meeting. However, Karnataka Govt. has informed that presently they are using cubical stones only. Since no further discussion in this matter is required, this item is dropped.

1.3.2 USE OF COIR IN MARINE APPLICATION.

The representative from Government of Kerala was not present in the meeting and hence the latest position on the subject could not be ascertained. The Chairman indicated that when the report on the subject is received from Kerala Government the same may be circulated among the members.

1.4 TO REVIEW THE PERFORMANCE OF THE WORKS CARRIED OUT BY THE STATES AND EVOLVE IMPROVED DESIGN TECHNIQUE BASED ON SUCH EXPERIENCE FROM TIME TO TIME.

1.4.1 MODIFICATION IN THE DESIGN OF SEA WALL.

Professor J. Dattatri mentioned that the main reason for failure of the toe of the sea wall is scouring and in this regard the CWPRS design could be considered as a better design. The Director, CWPRS, also added that the toe and the filter of the sea wall are the most critical items for avoiding failure of the sea walls. Chairman indicated that the Government of Kerala may be addressed to submit the report early. He also added that the Standing Technical Committee of the States could look into these aspects.

1.4.2 PREPARATION OF INDIAN SHORE PROTECTION MANUAL

Referring to the addendum to this agenda item, Member-Secretary Mentioned that due to pre-occupation of Director, CWPRS, the Indian Shore Protection Manual could not be prepared so far. In view of this it was suggested that Dr. M. Baba, Director, Centre for Earth Science Studies, Trivandrum, may be nominated as Convener of the Sub-Committee. The Director, CWPRS agreed that he could not take up the work of preparation of Indian Shore Protection Manual due to his preoccupation. He, however, doubted about the need for preparation of such a Manual when National Institute of Oceanography (NIO), Goa, have already published a manual on "Protection and Control of Coastal Erosion in India". He added that it will be worthwhile to attempt a performance overview of the coastal protection works so far undertaken in India and review the manual prepared by NIO by including the result of such a performance overview. The representative of NIO also indicated that there is no need of preparation of a separate Indian Shore Protection Manual when a manual has already been published by NIO, Goa.

The Director, Beach Erosion, CWC, Kochi, mentioned that the decision to prepare Indian Shore Protection Manual was taken in the 22nd Meeting of the erstwhile Beach Erosion Board. However, no progress in this regard could be achieved in these four years period of time. He added that the manual of National Institute of Oceanography, Goa, was published in 1980 and was mainly based on US Army Coastal Engineering Research Centre Manual published during 1973. Since then many technological advancements have already taken place and also much research work has been done in the coastal engineering scenario. The Shore Protection Manual of US Army Coastal Engineering Research Centre is understood to have been revised during 1996. In view of this it will be worthwhile to update the existing manual by including Indian experiences in the manual.

Chairman, CPDAC, suggested that we may write to the State Governments to make a performance overview of protection works so far

undertaken and submit a report to CPDAC, and send their comments/ feedback on the performance of the structures/ technologies suggested in the manual.

1.4.3 PROJECT PROPOSAL FOR SEEKING EXTERNAL ASSISTANCE (NCPP).

The position of formulation of National Coastal Protection Project (NCPP) was explained by the Member-Secretary. He mentioned that the finalisation of NCPP is in an advanced stage and hope to pose the same for external assistance as early as possible.

1.5 TO INTERACT WITH THE INTERNATIONAL AGENCIES ENGAGED IN THE WORK OF COASTAL PROTECTION AND TECHNOLOGY TRANSFER IN THE FIELD OF COASTAL PROTECTION.

1.5.1 TRAINING

The Director, CWPRS, mentioned that his research station will be in a position to organise trainings in coastal process if State Governments request for the same and provide necessary fund. Professor J. Dattatri mentioned that the Regional Engineering College, Suratkal, has been providing training in the subject and could also arrange trainings if requested by the States. The representative of Goa mentioned that the small States, like Goa may not be able to fund trainings and, therefore, CWPRS should arrange training of their officers along with other States.

1.6 TO IDENTIFY THE COASTAL ZONE TO BE DEVELOPED BEHIND THE COASTAL PROTECTION WORKS WITH THE HELP OF STATE GOVERNMENTS.

1.6.1 EXPERT COMMITTEE FOR FORMULATION OF GUIDELINES FOR COASTAL ZONE MANAGEMENT OF DEPARTMENT OF OCEAN DEVELOPMENT (DOD).

1.6.2 COASTAL LAND MANAGEMENT AUTHORITY (CLMA).

The item no. 1.6.1 and 1.6.2 above were clubbed with item no. 1.7 at the suggestion of representative of Ministry of Environment & Forests.

1.7 NEW ACTIVITIES ASSIGNED TO THE COASTAL PROTECTION AND DEVELOPMENT ADVISORY COMMITTEE (CPDAC).

Department of Ocean Development (DOD) under the Ministry of Environment & Forests had constituted Expert Committee for regulation of activities in Ocean part (Item 1.6.1) and the Central Water Commission had prepared draft model bill for Coastal Land Management Authority (CLMA) under the auspices of erstwhile Beach Erosion Board for regulation of activities on Beach Part (Item 1.6.2). The Joint Secretary, Ministry of Environment and Forests suggested that since the work of Committee constituted by DOD and that of draft model bill for CLMA and also the new activities assigned to CPDAC under Item 1.7 are almost identical, these items may be clubbed together and therefore requested for preparation of Master Plans for integrated and sustained development of coastal zone, i.e., Beach part and Ocean part.

1.8 COMPOSITION OF COASTAL PROTECTION AND DEVELOPMENT ADVISORY COMMITTEE(CPDAC).

The nomination of Dr. J. Dattatri, Professor as non-official member of CPDAC has already been approved in the Second Meeting. The nomination of Dr. Shailesh Nayak, Scientist SF, Space Application Centre, ISRO, Ahmedabad, was approved as a Member of CPDAC. The bio-data of Dr. Shailesh Nayak was circulated along with the agenda for Second Meeting of the CPDAC. The representative of Goa submitted the nomination of Shri G.N. Kapadi for considering as a non-official member. His bio-data was circulated in the meeting. The decision on selecting the third non-official member of CPDAC was deferred to the next meeting.

1.9NEW ITEMS

1.9.1 STATUS OF COASTAL PROTECTION WORKS IN MARITIME STATES.

Certain information on the subject regarding the coastal protection

Works in maritime States was sought from the member States. The information has already been received from the States of Maharashtra, Goa, Karnataka, Kerala, Tamil Nadu, and Andhra Pradesh. The information from the States of Gujarat, Orissa, West Bengal and U.T. of Pondicherry is still awaidted. Chairman, CPDAC, suggested these States to send the information within 15 days time.

1.9.2 SCOPE FOR MANGROVE PLANTATION.

The representative of Tamil Nadu explained about the mangrove Plantations in his State. It was generally felt that mangrove plantation cannot withstand high tides and severe waves. No other members present in the meeting could give information about the efficiency of mangrove plantation in protection of sea coast. They were requested to send the information at an early date to Secretariat of CPDAC to ascertain the utility of mangrove plantation.

1.9.3 BEROSIN TECHNOLOGY FOR COASTAL PROTECTION.

The technical aspects of Berosin natural sedimentation systems was Discussed. Since information on this is available only in the form of a brochure, no conclusion could be drawn on the efficacy of this system .It was decided that further exploration may be done about the modern day technology in this field through various reputed organisations.

2.0 CREATION OF SEPARATE COASTAL ENGINEERING DIVISION.

Director, Beach Erosion Directorate, CWC, Kochi, mentioned that as per decision taken in the 24th meeting of erstwhile Beach Erosion Board, a nodal officer was to be nominated for collection of coastal data from various agencies in the States pending creation of a separate Coastal Engineering Division. In view of this, he suggested that formation of one more Coastal Division under Irrigation Department of each State as suggested by Chief Research Officer of CWPRS may not be necessary. The CPDAC agreed to this proposal and it was decided that the agenda item may be dropped.

3.0 ANY OTHER ITEM WITH THE PERMISSION OF THE CHAIR.

The Joint Commissioner(ER), Ministry of Water Resources, stated that several proposals for Central assistance to States are being received in Ministry of Water Resources. He suggested that the State should first accurately identify the reaches which are vulnerable to sea coast erosion. Out of these vulnerable reaches, the most critical reaches which need urgent protection may also be identified. He also added that reply to several Parliament Questions on the coastal erosion problems in States have to be prepared by Ministry of Water Resources and often the information on status of coastal protection in States furnished from time to time to MOWR are inconsistent. He emphasised that accurate and consistent information as indicated in item no.1.9.1 of the minutes may be compiled. He also added that Central assistance to States are generally given as 50% grant on matching basis. Therefore, it is essential that the 50% of the cost of the protection works are allocated in the Plans of the States, so that another 50% matching grant could be considered by MOWR.

The Member-Secretary, CPDAC, suggested that the next meeting of the CPDAC may be held at Bhubaneshwar in Orissa around February, 1999. The representative of Orissa welcomed the suggestion and indicated that he will consult his Government for obtaining concurrence for the same.

The Meeting ended with thanks to the Chair.

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ANNEXURE 'B'

REPORT OF INSPECTION OF COASTAL PROTECTION IN GOA BY CPDAC ON 11-9-1998

The Coastal Protection and Development Advisory Committee members and invitees inspected the coastal erosion problems in Goa on 11-9-1998. The observations of the Committee are given below :

1. Erosion problems at Patnem, Colomb , Conacona Taluk

The erosion problems at the above location, which is situated around 37 kms from Margao, was inspected by the CPDAC members and invitees. It was reported that continuously for the last three years this stretch is getting eroded and with the passage of time almost 20 metre width of the coast has been lost to sea. The laterite walls near the coast is found to be damaged and an adjacent road is also threatened by erosion. The trunks of trees which were fallen due to erosion are also seen at the coast line. 500 metre in length of coast line needs urgent protection. It was suggested by the members of CPDAC that rubble mound sea wall construction may be taken up at this location. It was indicated that stone required for the sea wall construction would involve around 45 km of lead. It was suggested that the sea walls may be constructed with small size stones tied with nylon HDP rope. As the lead involved is considerable, i.e., around 45 kms, the cost of construction on an average may work out around Rs.3 crores per km.

2. Majorda beach, Salcete Taluka in South Goa.

The coastal erosion problems at the Majorda beach behind the Majorda beach Resort Hotel was inspected by the team. Even though the erosion problems at this reach are not critical the members of CPDAC felt that the beach should be protected properly to save valuable land and to avoid adverse effect on tourism.

2. Raj Bhavan Building located at Cabo Hill

The Raj Bhavan Building was constructed by the Portugese around 400 years back in Cabo hill. The Cabo hill is surrounded on three sides by sea, Mandovi and Zuari rivers. The hill is of laterite topping with consolidated clay beneath it. A sea wall was constructed around toe of the hill by the Portugese to protect the Raj Bhavan. Even though the sea wall constructed out of laterite stones was found intact, it was reported that at many places the same was damaged and sea is eroding the hill. Now a 6 inch wide crack has occurred on the extreme edge of the Cabo hill, which is threatening the Raj Bhavan Building. It is also seen that a small spring coming out of the Cabo hill at Canon Point has stopped flowing. It is reported that the Central Building Research Institute (CBRI), Roorkee, has studied the problem of cracks observed in the edge of Cabo hill. The horizontal and vertical movement of the cracked segment of the hill are also being observed by the CBRI.

The members of the CPDAC felt that the situation is very critical and urgent action needs to be taken to protect the toe of the Cabo hill, so that displacement of the cracked segment of the hill does not take place. It was also suggested that the spring at the Canon Point may be protected with suitable filter, so that the problem caused due to crack does not get aggravated. It was also suggested that the silt accumulated at the source of the spring as well as the water coming out at this location may be analysed for studying the nature of underground actions of water and sediment.

3. Anjana beach near Panaji.

This is an important sea beach which accelerated the tourism development of Goa. A portion of the beach at this location comprises deep laterite cliff. It was noted that the laterite cliff is eroded at the coast line and caves were formed at the bottom. Because of this caving effect large masses of laterite boulder was found crumpled down. The sea beach adjacent to

laterite cliff is also found eroded. The CPDAC observed that at least 230 metre of coast at this location need immediate protection. At the location of

laterite cliff the working space for construction of sea wall is very less. In view of this it was suggested that the sea wall may be constructed by Pellmell method of dumping stones. At other locations stone mound sea walls may be constructed urgently. As this location is an important tourist centre and adjacent roads and buildings are threatened by erosion, urgent protection measures need to be undertaken at his location.

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