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FAP-21/22

FLOOD PLAN
COORDINATION
ORGANIZATION
(FPCO)

KREDITANSTALT FÜR.
WIEDERAUFBAU (KfW)

CAISSE CENTRALE DE
COOPERATION ECONOMIQUE (CCCE)

BANK PROTECTION AND RIVER TRAINING
(AFPM) PILOT PROJECT
FAP 21/22

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COMMENTS TO INCEPTION REPORT AND ANSWERS

JULY 30, 1992

CONSULTING CONSORTIUM FAP 21/22

RHEIN-RUHR ING.-GES.MBH, DORTMUND/GERMANY
COMPAGNIE NATIONALE DU RHONE, LYON/FRANCE
PROF.DR. LACKNER&PARTNERS, BREMEN/GERMANY
DELFT HYDRAULICS, DELFT/NETHERLANDS

In association with:

BANGLADESH ENGINEERING &
TECHNOLOGICAL SERVICES LTD. (BETS)
DESH UPODESH LIMITED (DUL)

BANK PROTECTION AND RIVER TRAINING (AFPM) PILOT PROJECT

FAP 21/22

FLOOD PLAN CO-ORDINATION ORGANIZATION (FPCO)

Project Office :
Consulting Consortium FAP 21/22
House 4, Road 125, Gulshan-1
Dhaka-1212, Bangladesh
Tel : (880-2) 600751
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To
The Chief Engineer
Flood Plan Coordination Organization
7, Green Road
Dhaka.

Our Ref: CC/FPCO/L/92-606 July 31, 1992

Subj : **Comments to Inception Report**

Dear Sir,

Referring to your memo No.1514/FPCO/A-021/22/90 dated 16.07.92 we have pleasure in submitting you 30 copies of the report on the comments. As verbally discussed we have also tried to answer to the best of our knowledge the comments relating to subjects dealt with by staff members who are at present not in Dhaka and who, due to the summer leaves in Europe, would only be available in approximately a month from now.

For easy reference we have included the comments and put them in italic.

As requested in your letter in caption we have answered only the comments of category 1 and 2.

We are at your full disposition for discussing any item you may require.

Thanking you for your excellent cooperation.

Yours sincerely,

Dr H Brühl
Project Director

HB/Amal

FLOOD PLAN
COORDINATION
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GOVERNMENT OF
THE PEOPLE'S REPUBLIC OF BANGLADESH
MINISTRY OF
IRRIGATION, WATER DEVELOPMENT & FLOOD CONTROL
FLOOD PLAN CO-ORDINATION ORGANIZATION
7, GREEN ROAD, DHAKA-1215
BANGLADESH.

FAP 21 / 22

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Memo No. 1514 /FPCO/A-021/22/90 Dated 16-07-92

To

Dr. H. Bruhl
Project Director, FAP-21/22
House no-4, Road no-125, Gulshan
Dhaka.

Sub: Comments on the Inception Report of Bank Protection and River Training/AFPM Pilot Project, FAP-21/22.

Dear Dr. Bruhl,

We received the Inception Report of FAP-21/22 in time and have the pleasure to furnish herewith the Comments on it, consolidating these in 3 Categories, Category 1, Category 2 and Category 3.

After receipt of the Inception Report, it was circulated to ~~the~~ members of POE, (local and Foreign), Concerned Ministries of the Government, Organisations etc. for review and comments. We received a good number of comments from different bodies which have been categorised to three different categories as follows :

Category 1. Comments to be discussed and/or resolved at the Review Committee meeting. These comments concern policy matters, terms of reference, basic approach, significant technical aspects and items that could affect the manpower schedules or workplans.

Category 2. Comments to be discussed and resolved between the Consultants and FPCO and, if required, with technical representatives of the donor and other agencies. These comments are of a detailed technical nature and would not normally be discussed at the Review Committee Meeting unless a member wishes to raise the matter.

Category 3. Corrections or comments of an informative nature which do not have to be discussed, unless the Consultant wishes to raise the matter with FPCO. These comments will not be supplied to the Review Committee members unless there is a special request.

You are requested to kindly submit your response to the comments on Category 1 and Category 2 only. If you wish we may discuss on Category 3 comments at a suitable time.

Hopefully you would be pleased to respond at your earliest.

Thanking you.

Yours Sincerely,

(S. M. A. Salam) 16/07/92
Superintending Engineer, FPCO

PRELIMINARY COMMENTS ON INCEPTION REPORT BY KfW

1. Item 4.7: Socio-Economic and Institutional Aspects

Investigations on socio-economic aspects should focus on areas which may be directly affected by related physical matters. Socio-economic aspects on regional and country-wide implications should be drawn from other relevant FAP-studies. No comments on proposed re-staffing as given under item 4.7.2.2.

Answer:
The comment will be taken into consideration during the second period of activities on these aspects.

2. Item 4.9 and Annex V: Study of Navigational Aspects

We support the need of this study. TOR and additional staffing is accepted.

Answer:
The Consultant took the necessary measures for fielding the staff required.

3. Item FIG.6.2: Revised Staffing Schedule - Advisory Board

Since no justification for one additional home office man-month is given for Advisory Board, revision of home office man-month is not acceptable.

Answer:
The Consultant took note on that comment in the preparation of the Interim Report (c.f. Fig. 6.2-1)

CATEGORY 1 COMMENTS BY FPCO

1. ***It may be advisable to agree at an early stage what the consultants are expected to deliver in the end. The TOR are not very detailed in this respect and consequently at this stage probably only an outline description can be made. For instance, the consultants stress on a few occasions that the structures that are to be built under the contract, are designed to served the purpose of trying to find optimum solutions. This may imply that in the end such structure fails, which is acceptable if that serves the purpose. However, it will be good if there is agreement on this principle from the beginning. (by POE, Expatriate)***

   Answer:

   The Consultant is fully aware of the problems and welcomes the idea of an early mutual agreement on the design philosophy. It is correct that for finding optimum design solutions the structures must be attacked ("certainty-of-attack" criterion) and under this attack should suffer certain (controlled) damage. Otherwise it will not be possible to find out whether the structure or parts of it are "over designed", i.e. carrying an unwanted high safety margin. In this respect a comparison with structural tests at site (i.e. pile load test) or at laboratory (material test up to yield or break point) may be made. The difference will be that in our case a complete failure of the structure should be avoided. This is aimed at by careful monitoring the behaviour of the structures and adaptation when and where necessary during the 3 to 4 years after construction. This procedure will lead to a continuous improvement of design criteria, and possibly also of construction methods. It is understood, however, that by this procedure the risk of total failure cannot be excluded totally, because the severety of impact by the river cannot be predicted years ahead. If, for instance, the structures have been designed to just withstand an event of 10 years return period, but a 100 years event follows the next year, this might be disastrous. On the other hand, a 2 years event will not show any result at all. The problematic is already explained in the Scope of Works, Sections F-5 and F-6 and will be further elaborated in the Final Report.

2. ***The review of the consultant's tasks should include his responsibilities with respect to the construction of the tests works. The TOR are very explicit on this point in para 4.3, where it is stipulated that the consultant may subcontract some of obligations, but that he remains responsible and liable for the project. Consultants use their own formulation, top P. 4-37, which may be intended to mean the same, but any misunderstanding on this point should be removed. (POE, Expatriate)***

Answer:

The Consultant is fully aware of the requirements according to para 4.3 of the TOR. The explanations as given under Section 4.3 of the Inception Report are to be understood as detailing of this task. Regarding Consultant's liability reference is also made to Article 6 of the Consulting Agreement.

3. ***Medium and long term solution to river bank erosion lies in FAP-22, while the short term solutions/local defence may come from FAP-21. IDA proposed flood protection-1 Project provisionally includes Sirajgonj, Sariakandi and Mathurapara along BRE for bank protection, with a provision for possible 75 km embankment retirement during next 5-7 years due to erosion. Pilot projects under FAP-22 (AFPM) to divert river away from the threatened reaches of BRE will be more appropriate and so may be advanced in the proposed activity schedule. (WDB)***

Answer:

The suggestion seems very valuable and will be considered in the last phase of the Planning Study. Note, however, that a Pilot Project is only meant for testing of recurrent measures (see Interim Report, Subsection 4.2.1)

4. ***Page 4-1 and onwards***

Work programme and First Study results needs discussion in FPCO to come to a consensus on investigation, preliminary design tests, and material selection etc.

Answer:

In the meantime the Consultant's Interim Report (16.07.92) has been submitted, based on the updated work programme and first study results provided in the Inception Report (20.03.92). It seems, therefore, to be appropriate to discuss the subject on the results presented in the Interim Report, after its scrutiny by all concerned.

The indication of physical modelling in RRI before going for 1:1 test at sites is to be elaborated. (POE, Local)

Answer:

Advantages of physical modelling in RRI before the construction of the test structures:

- A more accurate prediction of the depth of local scour holes is required for an optimal design.

- The rough estimation of the distribution of the maximum flow velocities around the test structures can be refined with the results of the model tests. This will improve the design of the test structures.

These advantages include also the variability of the maximum flow velocities for different channel geometries and different discharges.

The design of the model tests is based on a schematization of the channel geometry, which was measured during the field survey. This schematization is necessary because the future channel geometry in which the test structures will be tested, will be different from the observed channel geometry during the field survey.

5. *Page 4-1, Sub-section 4.1 (Last amendments, Annex-V)*

The navigation aspect in the Brahmaputra river is considered to be the life line of trade, commerce and communication in between the eastern and the northern part of Bangladesh. Therefore, the river training works are to be carried out with due consideration for this vital sector. The longer sailing route will not only affect the economy of Bangladesh but would also aggravate the sufferings of the passengers of water crafts.

The river training works should be undertaken in such a way that it would optimize the length of the travelling route vis-a-vis the operational cost of the water crafts and maintenance of the channel navigability. (JRC)

Answer:
The Consultant will give due consideration of this comment in the investigation on the influence of River Training / AFPM on Inland Water Transport, in the framework allowed.

6. *Page 4-38, Section 4.4.1*

It is noted, from the detailed description of task 27, that the consultant may consider permanent structures that aim at changing the Jamuna from a braided river system to a meandering river. Such intervention would present a major environmental impact with potentially devastating and unpredictable consequences. Intuitively, find no justification for such proposals. (FAP-25)

Answer:
The Consultant fully agrees with that statement. Note should be taken that this ultimate modification is meant as an example rather than an objective.

7. *Page 4-54, Para 4.4.4, Pilot Project (FAP-22)*

Medium term plan at pre-feasibility level has been envisaged by the consultant due to restricted time and budget limits of the Planning study phase, which is a

deviation from TOR clause 3.1 which emphasizes on pilot trials at selected locations.

The Consultant in Task analysis (Ref. page G-65) has categorically stated that pilot trials will only to be carried out when river Training and Active Flood Plan management with relatively light measures appears to be feasible.

Without the provision of field testing of recommended river training/AFPM strategies, the very purpose of FAP-22 is frustrated. It is worth mentioning that implementation of FAP-21 after completing FAP-1 and FAP-9B has already minimised/reduced the scope of analytical works to the stage of review only. (WDB)

Answer:
See also TOR clause 5.3.1 :
" ... this limited objective option should be investigated and if practible, pilot trials carried out.
Incidentally, the Consultant has proposed pilot tests in his Interim Report.

8. *Page 4-83, Section 4.8.2.4, last para*

We should fulfil the objective of the study by taking a pilot project under FAP-22 and for which we should prepare grounds now and formulate the terms of reference. (POE, Local)

Answer:
The Consultant has already defined a tentative pilot project, see Interim Report, Section 4.2.

9. *Page 6-1, Para 6, updated staffing schedule*

The justification of changes and additional man-months are not complete. Further clarification necessary as this a deviation from the agreed TOR and TAP. Financial involvement should also be stated indicating the original cost, revised cost etc. (POE, Local)

Answer:
This has been done in the Administrative & Financial Report No. 1, covering the Project period until March 1992

CATEGORY 2 COMMENTS BY FPCO

1. ***Locations in the upstream of Teesta River have not been considered at all for assessment. A site adjacent to Chilmari could be a good candidate for Test area. (WBD).***

Answer:

The Consultant, in his search for suitable test areas has taken in consideration the Jamuna on its total length from the border to India until the confluence with the Padma. The fact that no site upstream of Teesta is included is, that in the Consultant's assessment, no site seemed to be suitable according to the criteria set for the preselection of test areas. In the case close to Chilmari the morphologic conditions seemed to be too unpredictable to give that area a closer consideration.

2. ***Page 2-1, Para-2***

It has been stated, "The Project will, building on the experience gained by the past Projects, investigate ways of refining the design criteria and improving the Construction and maintenance of bank Protection works, and, on the other hand, investigate methods of possibly employing the river's own Fluvial processes to stabilize its course and to reduce the risk of sudden channel displacement."

In view of dismal Performance of Bank Protection works built over the years, refinement of the design criteria is most desirable but then it is our bitter experience that in the past design concepts, thought not at all warranted by the field data was substantially if not altogether changed in consideration of inadequate fund and materials coupled with influence from political and influential quaters. Consultants yielded to the pressure but the end result proved disastrous the objective ending in a fiasco.

It is therefore felt indispensable that conceptual aspects of a project from designer's point of view must not be undermined.

Further more if the rivers own fluvial processes are to be stabilised, the blending of the concepts of FAP-21 and 22 must be made prudently in certain stretch of the river. (JMBA)

Answer:

The Consultant finds these comments rather important and will contact JMBA for further elucidating the aspects and to find ways how to avoid the dangers mentioned.

3. *Page 2-3, Article 2-3, FAP-22, Para-2*

The alleged Classical approach "To transform the now braided Jamuna river either into a river with one meandering channel which is kept in place by training works at the end-locations of the expected amplitude of the bends or into a more or less straight channel continuously fixed along his total length" appears to be unworkable and self-contradictory.

It is because the River Jamuna is basically a multi-channel braided river with lateral swing of more than 1 km in one season. To force it into a single meandering channel may well might be an impossible task apart from being antagonistic to morphological nature of the Jamuna which at times behave in an unpredictable manner and concepts of active flood plain management by allowing river's own fluvial processes to stabilise its course stand opposed to it.

FAP 21/22 Project is a supporting Type of Project within Flood Action Plan consuming about 30% of the total outlay. The fate of such projects are invariably associated with many many ifs and buts which in their turns only point to rethinking as regards judiciousness of such huge investment in order to develop future strategy to justify efficacy of such financial inputs. (JMBA)

Answer:
At the end of the para quoted the Consultant fully rejects the idea which is mentioned as an example. The meaning of the last para of the comment is not quite clear to the Consultant. If it means that great care has to be taken in planning the test structures he would certainly agree.

4. *Page 2-3, Para-1*

Although FAP 21 is basically concerned with local defence works, these may well form part of an overall river stabilisation programme. (POE, Expatriate)

Answer:
The Consultant concurs with this comment and will take it into his consideration when elaborating possible River Training/AFPM strategies.

5. *Page 2-3*

There should be a paragraph on AFPM, with particular attention to land management (char stabilisation, controlled reclamation etc.). (POE, Expatriate)

Answer:
This comment will taken into consideration.

6. *Page 2-3, Para-2*

The river cannot be made too narrow but adequate regime width may be maintained. (WARPO)

Answer:
The Consultant certainly agrees.

7. *Page 2-3, Para-3*

The idea of reducing the braiding index and formation of branched river (stable multichannel plan-form) is considered helpful. (WARPO)

Answer:
It will have to be investigated which would be the means to achieve that goal and avoid unwanted side effects. Further, the time frame (possibly generations) and the funds required should be considered.

8. *Page 2-3, Section 2.3*

It has been noted that the River Training/AFPM (FAP-22) "Comprises a more "active" approach trying to divert the river and away from the threatened reaches and, in due time, to change the characteristics of the river". If it happens, it will have effects on some other related rivers too, as well as on the present geomorphological conditions of the concerned basin. So the consultant's "Task no.6, Morphological Analysis in the Work Flow Chart" should be extended to cover this point. (B.Zaman, POE)

Answer:
The Consultant suggests that this question may be taken up in the scope of work of a more in depth study which may come up after the completion of the present investigations. The expected result of the present study should allow for giving a more detailed frame work for the follow up studies.

9. *Page 2-4, Art 2.4*

We feel encouraged for the FAP-22 in preparing the technical feasibility of medium and long term strategy and large scale development of the active Jamuna Flood Plain on way to protect the river banks and train the river which is long cherished

by the affected people.

However, this will need proper interaction and co-ordination with FAP-21 and other FAP activities in the vicinity of the area. This may further necessitate the detailed study of the morphological behaviour and regime condition of the braided multichannel plan-form of the river. (WARPO)

Answer:
The proper interaction and co-ordination between the Project components FAP 21 and FAP 22 is assured by daily discussions of the respective team leaders.

As to the morphological study, reference is made to Sections 2.2, 2.3, 5.11 and 5.12 as well as to the Annex 2 of the Consultant's Interim Report.

10. Page 2-5, Para 6 (FAP 3.1)

The consultants should be more specific about Bahadurabad and to what extent FAP 3.1 can assume a protected point (or reach). Afterall, one of the criteria for FAP 21 site selection is the area to be protected. (POE, Expatriate)

Answer:
This question has been given due consideration in Consultant's Interim Report, c.f. Sub-section 2.2.1(2) and Fig. 2.3.2-2. The basic tools for this judgement were not available yet at the time of preparing the Inception Report.

11. Page 2-5, Para 3-33, and 4-24

At several points in the report reference is made to the FAP-1 prepared model of the Jamuna river, based on the General Model of SWMC. There is an obvious need that FAP-21/22 has free access to this model to avoid unnecessary duplication of modelling efforts in the FAP. Necessary steps may be taken to facilitate such free exchange of data and models between the various FAP components. (FAP-25)

Answer:
The Consultant welcomes that comment and is open to any such exchange of data. Given the different policies of the various GOB administrations on data exchange, clear guide lines would be welcome.

12. Page 2-6, Relation with FAP-16, last para

Explain where the FAP-16 Guidelines and Manual will not exactly suit and why not. (POE, Expatriate)

Answer:
In the first instance it should be realized that the environmental assessment (Task No.11) of FAP 21/22 is not an "Environmental Impact Assessment Study" (EIA). Furthermore, the FAP 16 Guidelines are mainly focussed on aspects related to regional development projects which by their nature imply a more pronounced impact to the environment than single and isolated works.

13. *Page 2-7*

There should be a relation with FAP-25. (POE, Expatriate)

Answer:
It is, see page 2-8.

14. *Page 3-3, Section 3.4*

It is noted that various existing information, data have been collected for review and preliminary assessment, but it has not given stress about the collection and analyses of sediment data, both suspended and bed materials in the river Jamuna and other major rivers. It is needless to say that excess of sediment load is the most important factor responsible for river problems particularly in the Jamuna-Brahmaputra.

Answer:
After completion of the Inception Report the Consultant has collected sediment data, which were measured in a cross section near Bahadurabad. The Consultant agrees that these sediment data are very important for the understanding of the morphologic processes in the Jamuna River. He is aware that these data have been analysed by previous projects and therefore the Consultant will examine the different analyses published.

It is mentioned that for the design of the test structures these sediment data have some indirect relevance.

15. *Page 3-4, Section 3.4.1*

It is stated that "... maps are not up-to-date..." On this point it may be noted that SOB has 1983 aerial photo-maps for the whole Country, 1990 maps for the Coastal areas. In addition, aerial photo-maps 1990 are made for certain reach of the Jamuna for JAMUNA MULTIPURPOSE BRIDGE AUTHORITY (JMBA). Interpretation of these maps will be helpfull to the Consultants initially to start with.

Further, the interpretation of recent maps by JMBA for the Jamuna may be applied by the Consultants for their purpose. Apart from this BWDB Hydrology has bank-line survey maps, based on field survey for several years since 1965/66, where superimposition of Bank-lines of the Jamuna reach from Bahadurabad to the confluence with the Ganges can be seen or used for interesting interpretation. It is not understood why the Consultants have not mentioned about these information. (S.Islam,POE)

Answer:

The maps and information mentioned in the comments have been used. For the specific purpose of FAP 21/22, 1983 maps may be out of date, due to the rapid changes of the bank lines, and these are the Project's main interest. Therefore it was planned from the outset to undertake own surveys of the test areas and to have repeated control surveys of certain cross-sections after the monsoon.

The Consultant used all available information of previous bank line surveys including geo-corrected Landsat imagery since 1973.

16. ***Page 3-5, Section 3.4.2***

Regarding Morphology, mention has been made of the review of available reports and literature. Simple mentioning of these reports will not help others to make any comments. Had some highlights or findings of certain important points of relevance not been described in short, a thorough understanding of inherent problems and issues that need to be resolved, is not possible for giving any observations. What were the consultants observations on those reports could not be known either. (S.Islam, POE)

Answer:

In the course of the study other reports and literature will be summarised as required. A more in detail literature survey is included in Annex 1 and 2 of the Interim Report.

17. ***Page 3-5, (Art 3.4.2)***

Area, characteristics, topography, hydrology etc of the catchments for the Jamuna-Brahmaputra and the Ganges differ very widely. Owing to these differences, the two rivers have different hydrographs, plan form geometries, cross-section, sediment transport characteristics etc over the years. These two rivers have so far been identified in this country by their variation in the above properties. Studies have shown that the characteristics of the Padma (below the confluence of the Jamuna and Ganges) is more comparable to the characteristics of the Ganges than to that

of the Jamuna. Moreover, the lower Meghna (below the confluence of the Padma and upper Meghna) is neither comparable to the Padma nor to the upper Meghna. Therefore the statements made here need to be corrected/modified. (Dr. M. Hossain, POE)

Answer:
The Consultant is aware of the fundamental differences, the Jamuna being braided and the other river meandering. On the other hand, on the stretch downstream of Sirajganj the morphology seems to be on the limit between meandering and braiding.

18. *Page 3-6*

With respect to the Consultants' ref. to Klaassen et. al (1988-1992), it is worthwhile to mention that an article written by G.J.Klaassen, co-authorising with M/S. J.W. Burger of NEDECO and A. Prins of Haskoning, on "BANK EROSION AND CHANNEL PROCESSES IN JAMUNA RIVER, BANGLADESH", was presented at an International Symposium on the Impact of River Erosion, Flood Hazard and the problem of Population Displacement, Dhaka, Bangladesh, April 11-13 1988. In that article, Bank erosion and channel processes of the Jamuna were discussed. Further, what was more interesting is that they studied 12 cross-sections of the Jamuna from Bahadurabad upto the confluence, based on field survey by BWDB Hydrology from 1965/66 onwards. Their study results and Consultants' observation thereof, should have been given for better understanding of Policy planners.

Causes of Bank-erosions vary river to river and as such, the nature of Bank protection will vary depending on varied behavioural erosion and sedimentation pattern, phenomenol characteristics of different major rivers. (S.Islam, POE)

Answer:
The Consultant is utilizing the results of that study and is fully aware of the problems. Mr Klaassen is the Consultant's morphologist and this assures the continuity.

19. *Page 3-8, Section 3.4.3.1, last para*

The consultant is advised to consult WARPO and FAP-25 regarding the accuracy of collected hydrological data.

Answer:
The final report of FAP 25 has been published in June 1992 after completion of this Inception Report at the 20th March, and just before the end of the hydrology study of this project Consultant received some preliminary information from FAP 25 regarding the accuracy of collected hydrologic data. Therefore Consultant made some

own analysis and as this is in line with the results in the final report of FAP 25, Consultant will use these results in the continuation of this project.

20. *Page 3-18, Section 3.4.5*

Under this section, executed Bank protection works and their success and failures have been discussed. But causes of failures have not been properly identified. In some cases, due to time and fund constraint, works could not be executed in accordance with the original design and specifications apart from the difficulties faced with high flow velocity and river depth for which High-tech. methods are to be evolved to maneuover these difficulties. In Sirajganj (Raniganj Groyne) the plan was to execute 3 solid spurs, besides the main Groyne and a diversion channel. Instead, only the main Groyne was constructed with Bell-mouth in place of Hockey-head. In Chandpur, time was lost in procurement of Geo-textile bags, being not on the list of importable items and as best season could not be availed, great difficulties were faced in proper placement of bags due to high river stage and velocity. (S.Islam, POE)

Answer:

The Consultant sees this comment in line with comment no. 2 and should like to refer to the respective answer. In fact, it seems that one of the major problems for solving bank erosion problems seem to be of an administrative and institutional kind. In his Final Report, the Consultant will take this issue up and try to propose solutions which should both be appropriate to solve that problem and to be acceptable for GOB and the Administration.

21. *Page 3-19, Section 3-4 and 5-3*

Groynes and Spurs

While listing the causes of failures or damages of the protective works, the following points should be mentioned among others.

1. *Deviation from the design Computations on account of scarcity of fund and political pressure ultimately resulting into wastage of whole investment.*

2. *Where groynes and spurs are subject to severe degree of attack specially along the Jamuna, a series of groynes rather than a single groyne is likely to be more effective. In developing future strategy special emphasis ought to be laid on it.*

3. *Monitoring of the Protective works when they are attacked are seldom done specially at the initial stage in respect of scour holes and discharge and velocity data until things have turned topsy-turvy. It ought to be made mandatory to observe with utmost vigilance operation of any protective works particularly when interaction of the forces of attack are looming large.*

For monitoring separate organizational arrangement other then execution set-up is must because those connected with the execution more often feel hesitant to report the prevailing conditions of the test structure under load conditions. (JMBA)

Answer:

1. Refer to answer to comment no. 20.
2. This is taken into account by the Consultant, see Section 2.3 of the Interim Report.

3. The Consultant agrees that maintenance and monitoring is very important for avoiding collapses. In the present Project a Monitoring Phase is explicitly asked for and the Consultant intends not only to develop guidelines for the design and the construction of bank protection works but also for their monitoring and (preventive) maintenance.

22. *Page 3-19/20*

Although in Bangladesh bandalling did not have the purpose of bank protection, it should be considered. There is information on previous experiences in the records of shipping companies. On which river have permeable groynes been applied in Bangladesh ? (POE, Expatriate)

Answer:

Use will be made of existing (in Bangladesh !) experience with respect to bandalling, see Interim Report, Section 3.7.

Permeable groynes have been applied in Gumti River, Bangladesh (see Interim Report, Subsection 3.3.4)

23. *Page 4-1, Section 4.1, Para 5*

Bandalling is to be mentioned in this respect. (POE, Expatriate)

Answer:

Refer to answer to Comment No.22

24. *Page 4-4, Section 4.2.2.1(3), Section 1*

The consultants will be aware of the necessity to test the homogeneity of hydrological data: once water levels rise above the banks, they belong to a different population and discharges, if measured at that stage, relate to flow between the banks only. If such data are fed into the model without proper scrutiny, the results could be misleading.

What is the purpose of the analysis described in the last para of this section ? (POE, Expatriate)

Answer:
In FAP 21/22 hydrologic data are required mainly for the determination of the value of the design parameters (flow velocities and water levels) for the design of the test structures, and some characteristic data for the study of the application of recurrent measures for river training in the Jamuna river. For this study of recurrent measures some characteristic and representative situations are selected for the calibration of the developed calculation methods. This means that no site specific calibration on historic hydrographs is required.

The Consultant is aware of the complexity of measured hydrologic data, and intends to accept the results of the Flood Hydrology Study, FAP 25.

The determination of uninterrupted periods of low water are important for the design level of the transition (often a berm) between the construction method of a bank protection above the water level and the construction method under water. As a consequence of these different construction methods often different materials for the toplayers have to be selected, and these methods and materials will influence the total cost estimate for the test structures.

25. *Page 4-4, Sub-section 4.2.2.1 (4) Section 2*

What criteria are proposed to be derived from the average water level during August and September ? What is meant by "smooth weakly data" in para 3 ? (POE, Expatriate)

Answer:
In the analysis of the flood in 1988 the return periods of the water levels and the return period of the discharges differ considerably and also from location to location. To characterise a flood with a single parameter and a single return period can be misleading, especially if related to bank erosion, which is more or less a continuous process. This has to be distinguished from the almost instantaneous damage caused

by a maximum flow velocity just surpassing the design flow velocity. Therefore the Consultant intends to relate morphologic phenomena as bank erosion to the average discharge and the average water level during July, August and September. Initially only the average value during August and September was determined but by including July a probably more representative value for the flood is obtained.

For morphologic computations a time-step of one day is smaller than the required time step and therefore increasing the computation time. A time step of one week based on the average water level and the average discharge during a week is often more appropriate and safes computation time.

"Weakly" is a typing error and should be read as weekly.

26. *Page 4-4, Sub-section 4.2.2.2 and (1) Second Remark*

Cross-sections developed from the satellite imagery maps and on the basis of the existing BWDB sections may lead to grossly approximated sections with subjectivity. Therefore, the Consultant should endeavour to collect the field data in order to formulate the design criteria. Otherwise, assumed data may end up in an under designed or over designed structure. (JRC)

Answer:
The use of satellite images for cross-sections refers to the determination of the bank lines for morphological study purposes only. They are used to follow up the shifting of the bank lines and are obtained from processed - geo corrected - Landsat images in a remote sensing study. No structural design will be based on satellite images since there resolution would not be sufficient.

27. *Page 4-4 and 4-16*

FAP-25 has carried out frequency analysis on water levels and discharges at several stations along the Jamuna using both checked observed data and results from the socalled run 6 with the GM-FAP-25. The results are readily available to FAP-21/22 and there in hence no need to repeat such analyses. (FAP-25)

Answer:
In the continuation of the Project the results of run 6 with the GM-FAP-25 will be used, but these data were not available during the hydrologic study in the inception phase.

28. *Page 4-5, Section 3*

Before drawing conclusions, the level of accuracy of the historical data on discharge and sediment transport has to be assessed. (POE, Expatriate)

Answer:
The Consultant agrees and is cooperating with various institutions (e.g. SWMC, FAP 25) on this respect.

29. *Page 4-5/6*

For the establishment of design criteria, it seems to be useful to make an analysis of failure mechanisms of bank instability; for instance, does groundwater flow have a significant influence ? (POE, Expatriate)

Answer:
The question will be taken care of during establishing design criteria for the Final Report.

30. *Page 4-7, Para 4.2.2.4*

Pre-selection of Test areas for FAP-21 includes 12 (twelve) sites down of Teesta confluence.

Ranking exercise made for selecting Test areas appears to be not correct. Detailed design along with tender documents are available for Betel and Kazipur, while those were marked 'Zero' against availability of data. There exist strong arguments against ranking Chandanbaisa ahead of Betel and Kazipur.

The Consultant may review the ranking exercise. (BWDB)

Answer:
The Project includes a continuous check up of the suitability of the selected test sites and allows for a maximum of flexibility, including the shifting of test structures to other places if necessary. On the other hand, the Consultant is afraid that reviewing the preselection of test area would lead to unwanted time delays.

31. *Page 4-16, Section 2*

As the consultants change the assumed lifetime with respect to limited duration of the tests, they should indicate how the ultimately expected lifetime of a permanent structure relates to the outcome of the tests. (POE, Expatriate)

Answer:

The Consultant sees this as a difficult basic question in the understanding of the Project. He will carefully assess the various options, and should welcome any relevant suggestion after the Interim Report.

32. *Page 4-23 and 4-24, Section 4.2.4.2*

The approach of mathematical modelling in FAP-21/22 involves three levels of hydrodynamic models: 1-D model covering the whole reach of the Jamuna river, 1-D local model, and 2-D local model. The purpose is to generate boundary conditions for the physical models and to determine the consequences of the river training measures. It is not clear which model would give what type of input to the physical model studies and the impact studies. A flow chart would make the approach clear.

The size of local models are such that the area of interest would be under the strong influence of boundary conditions. Thus the accuracy of the imposed boundary conditions will dictate the quality of the local model output. The river training measures may also affect the boundary conditions. The velocity field in the 2-D models, to a considerable extent is dependent on the variation of boundary conditions as a function of distance along the boundary. These aspects need due attention at the inception stage of mathematical model studies.

Sensitivity analysis is to be made in order to assess the reliability of model results in terms of data error, geometric schematization error, and boundary condition error. Uncertainty in achieving a representative simulation may become crucial. These factors should be given due importance at the planning stage of mathematical model studies. (Dr. ZU, POE)

Answer:

The 1-D model covering the whole reach of the Jamuna River is the basis for the hydrologic study and the design parameters as design water levels and design discharges.

The 1-D local model results are used for the calibration of simplified calculation methods for the assessment of the effectivity of recurrent river training/AFPM measures (in FAP 22).

The 2-D local model will be used to determine the boundary conditions for the physical models (flow lines, discharges and water levels)

It is planned to make an approximate sensitivity analysis on the accuracy, however due to the tight time schedule it is impossible to execute an extensive and complete sensitivity analysis.

33. *Page 4-30, Section 4*

The consultants are advised to include in their survey the management capacity of local contractors, and if needed, to arrange for training in this field. (POE, Expatriate)

Answer:
Both is intended by the Consultant, see for example the description of Task 19 (page G-45).

34. *Page 4-42, ad 1*

The comparatively less silt charged upper part of the flow directed towards the main channel would pick up sediment quickly just downstream of the vanes and would be silt laden to deposit further downstream thus creating chars down of the pool. Therefore, the aim to deepen the main channel and sedimentation along the banks reshaping the cross-section may not occur for a longer reach downstream. (JRC)

Answer:
This method is meant to be possibly applied in outer branches suffering from bank erosion (see Interim Report, Annex 1, Subsection 5.2.3). First indications from model tests and prototype applications (see for example, Interim Report, Annex 1, Subsection 3.2.6) are promising. However, it is clear that the effect of reshaping depends on the number of vanes along the eroding portion of the bank. The effectivity, therefore, can only hold by using the vanes along a relatively long reach of the bank to avoid the mentioned effect of non reshaping.

35. *Page 4-45, Section 4.4.2.3, last para*

The statement regarding the equilibrium for a river like the Jamuna requires further explanation. Had it been verified and the Jamuna has the tendency to strive for a certain number of channels with definite dimensions ? (POE, Expatriate)

Answer:
The Consultant understands the equilibrium of the Jamuna to be a dynamic one allowing for certain planform changes. He is doing detailed investigations in order to understand the laws governing that dynamic equilibrium. For further details reference is made to Annex 2 of the Interim Report.

36. *Page 4-51, Section 4.4.3-6*

In an ideal case as in the model, the uniform aggregation of the channel bed is possible. But it is apprehended that in reality the sediment deposition may not be effected in the manner as predicted by the model. It is obvious that rate of deposition/scouring is contingent upon the discharge volume, bed and water surface gradients (both are variable in natural channel), shear stress and sediment particles. Therefore, a uniform and parallel rate of rise of the bed level as predicted by the model may not occur in real life situation and particularly in the case of the Brahmaputra river. (JRC)

Answer:
As indicated in Figure 4.4.3-6 of the Inception Report, the output of the model is meant for one specific location in the outflanking channel. A uniform and parallel rate of rise of the bed level is not foreseen. An extensive elaboration of the model is given in Interim Report, Subsection 3.4.2 and Annex 5.

37. *Page 4-51 and 4-52, Figs. 4.4.3-6 and 4.4.3-7*

Bankful discharge through a particular cross-section of a channel is supposed to remain constant and accordingly the section B-B has been produced. But from the plotting at Fig.4.4.3-7 it is observed that the bankful discharge of channel 2 is variable. This phenomenon may occur with the sedimentation/scouring of the cross-section which may be elaborated in the report and reflected in the cross-section as well. (JRC)

Answer:
Fig. 4.4.3-7 is meant for a number of Jamuna conditions and can be considered as a set up of a design graph. The graph has to be produced from a number of calculations representative for channel cross-sections as they occur in the Jamuna. In this approach the bankfull discharge is constant for each situation.

38. *Page 4-55 (Art. 4.5)*

We do not fully endorse the conclusions drawn in this section

It has already been said that the hydraulic and morphological conditions in the Jamuna are not comparable to the conditions in the Padma or in the lower Meghna. However, the lessons to be learned from FAP-21 would be of immense value to strengthen the present status of knowledge/understanding of failures of large river defence works both in Bangladesh as well as elsewhere. (Dr. M.H. BUET)

Answer:
The Consultant agrees to the last statement of this comment and should like to make reference to point (3) of Section 4.5.

39. *Page 4-55, Sub-section 4.5, Conclusion (1)*

The Brahmaputra is a braided river. The experience to be gained out of the training works undertaken on this river may be very much different even for the upper and the lower reaches of the same river. The reach of the Brahmaputra below Aricha where it meets the Ganges is known as the Padma and thereafter meeting with the Meghna is named as the Meghna.

After meeting with the Ganges and the Meghna the river assumes a different hydromorphological condition which is quite different from its characteristics upstream.

As such, the Brahmaputra river training experience to be gained at the upper reaches may not be truly applicable for the lower reaches of the Brahmaputra even and not to speak of the Ganges, the upper reaches of the Meghna and other rivers of Bangladesh. Therefore, the idea of applicability of the Brahmaputra experience for other rivers of Bangladesh seems to be too much optimistic. (JRC)

Answer:
The Consultant understand the applicability in the sense that certain physical processes are comparable and lead to similar solutions. Applicability in that sense can never mean an uncritical transfer of technical solutions from one problem to another one. This should never be done and of course even less in the present case.

40. *Page 4-63, Para 2 and 3*

It needs to be kept in view that the objective of river training is to stabilize river channels and chars; also, that the kinds of intervention proposed will not prevent flooding of chars or deposition of sediments on them. The benefits of such interventions should outweigh possible ecological impacts: if they do not, the interventions would not be viable. (POE, Expatriate)

Answer:
The Consultant is working on exactly that line.

41. *Page 4-65, Para 2*

While theoretical considerations may make it plausible that the river bed could go

down, this still has to be confirmed. But even if it does, the zone of influence of the resulting lower low water level will not extend far inland. (POE, Expatriate)

Answer:
For moderate river training that statement is undoubtedly true. The Consultant, during the environmentalist's second assignment in October, will try to receive some more hydrogeological information.

42. ***Page 4-72, Section 4.7.2.2(2)***

How does this agree with para 4.5 of the TOR according to which the consultants have to give recommendations on the most cost effective methods for design, materials, construction etc. ? (POE, Expatriate)

Answer:
The cost estimates will be done by the construction management expert whose involvement in the project has been increased. Anyhow a fully fledge cost-benefit-analysis has not been intended since it would not be possible to do it for test structures. Therefore the economic and financial analysis of the pilot project will consist of a comparison of alternative investment and recurrent costs, possibly decreased by benefits impacted from an improved active flood plain management, see also page D-3 (comment to Clause 5.2.6 of ToR) of the Scope of Works, Consulting Agreement.

43. ***Page 5-1***

Updated work plan - The consultant should investigate all four selected sites Bahadurabad, Kamarjani (upstream of Manos Regulator) Chandanbaisa and Nakalia and recommended the design for test. (POE, Local)

Answer:
All four pre-selected test areas have been analysed. The details are given in Chapter 2 and Annex 2 of the Interim Report.