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BANGLADESH FLOOD ACTION PLAN
Flood Plan Co-ordination Organization

FAP-18

(5)

BN - 517
A - 643

Topographic Mapping (FAP-18)
and
Establishment of Mapping Cell



Progress Report

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FAP

April 20, 1995

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In order to assess up-to-date progress of work of FAP-18 and establishment of the Mapping Cell, a discussion meeting was held on April 20, 1995 at 10 AM with the Chief Engineer, Hydrology, BWDB in the Chair. Mr. Abdus Salam, Superintending Engineer, RM&RC along with Mr. A. Hakim, Survey and Mapping Consultant, Bangladesh FAP attended the meeting.

The Chronology of activities of FAP-18, the justification of the Mapping Cell and steps so far taken for establishment of the Cell were discussed. The Chief Engineer appreciated the decision of the Government for establishment of the cell towards making the Water Board self-dependent in respect of needs of topographic maps for Water Resources Management of the country.

Basic objective of FAP-18 was to obtain up-to-date aerial photographs and accurate maps for the purpose of undertaking various studies, facilitate planning, design and implementation of projects and establishment of a Mapping Cell to ensure availability of large scale topomaps for BWDB. The following specific tasks were planned for execution under this project:

- a) Black & white and infra-red aerial photography on medium and large scale will be taken covering respectively the North-Central Region and the pilot project areas of Jamalpur, Tangail and Sirajganj.
- b) Establishment of adequate GPS points in the NCR and NWR.
- c) Establishment of about 2300 kms of 2nd order level net for the NC Region including the Jamuna river banks.
- d) Preparation of photo contour mosaics for Jamalpur, Tangail and Sirajganj areas.
- e) Arrangement for printing and supply of 1:50,000 revised maps to all the FAP Consultants.
- f) Acquisition of multi-spectral spot images (France) for 1989 and 1990 through 1995 (both for dry & wet seasons)
- g) Enforcement of quality control on survey and mapping works through SOB.
- h) Establishment of a Mapping Cell.

Progress of work so far made under FAP-18 is summarized as follows:

A. Through Finida Assistance:

1. 1:50,000 scale aerial photography for about 22,000 sq. kms covering the North Central Region and 1:20,000 scale photography for 10,000 sq. kms. covering the pilot project areas of Jamalpur, Tangail and Sirajganj have been completed and supplied to the consultants.
2. A GPS net of 146 stations over North Central and North Western Regions was established and the station co-ordinates were supplied to Consultants.
3. A second order level net of 2477 kms and a 3rd order level net of 312 kms in the North Central Region were

- established and adjusted heights of BMs based on the West Bank datum were supplied to the study consultants.
4. For photo-contour-mosaicing, 3920 kms of spot heighting for Jamalpur, 460 kms for Sirajganj and 453 kms for Tangail have been completed.
 5. 1:20,000 scale photo-maps with 0.50m contour interval prepared by FINNMAP for Jamalpur and 1:10,000 mosaics with 0.25 m contour interval for Tangail and Sirajganj prepared by FINNMAP, examined by the Department of the Survey of Bangladesh were received in FPCO and supplied to the Consultants.
 6. While connecting right bank BM heights with those of left bank of the Jamuna river, a datum difference of about 20 cms was observed by Finnmap. SOB checked this datum change through geometrical level crossing over Jamuna and found correct. BM adjusted heights of North Central Region were supplied to Consultants.

B. Through France Assistance:

1. Six additional sets of photomaps of A/5 above were received in FPCO and supplied to Consultants.
2. Spot Image on 1:50,000 scale: Multi-spectral spot mosaics of March, 1989 for the entire FAP area and those of March & October 1990, 1991, 1992, 1993 and 1994 covering the main rivers were received and supplied to the relevant FAP study consultants. Further arrangements have been made with SPOT IMAGE France for supply of 1:50,000 scale spot images covering the main rivers upto 1995.
3. 44 Nos. of 1:50,000 scale topo-maps revised by SOB have been printed off with fund provided by the Government of France. SOB also printed additional 37 nos. of revised maps at their own cost. Maps were supplied according to the demand of the Consultants.

C. Through CIDA Assistance for FAP-6 (North-East Region)

Arrangements have been made with SOB to carry out nearly 2870 kms of 2nd order levelling in the FAP-6 (North East Region) area. Construction of monuments and field levelling have been completed with connections to BWDB 77 water level stations. Connection levelling with FINNMAP works of NCR were in progress.

D. Through EEC Assistance:

1:50,000 multispectralial spot image for main rivers were received and supplied to FAP 24 Consultants. Approval for supply of spot images for March and October, 1995 was also given to the supplier.



E. Existing Data:

Existing photos on 1:30,000 and 1:50,000 respectively of 1975 and 1983, 1:30,000 photos of coastal area taken during 1990 by FINNMAP, 4"=1 mile, 8"=1 mile maps of BWDB and existing SOB BM data have been supplied to the Consultants and the prints of 1:50,000 scale topo maps of SOB covering FAP areas other than FAP-3 have been supplied to the consultants.

F. Revised TAPP incorporating Survey and Mapping instruments with German Commodity aid for establishment of a Mapping Cell in order to facilitate large scale revision survey for BWDB has been approved by the Government.

G. After the approval of the revised FAP-18 by the Planning Commission on 31.12.93, Ministry of Water Resources approached ERD for allocation of necessary foreign currency against German Commodity Aid Programme for import of necessary survey and mapping instruments for the Mapping Cell and an amount of DM 3.09 million was allocated by the ERD. Subsequently it was decided with the concurrence of the Ministry of Water Resources that the Mapping Cell will be established in the Directorate of River Morphology and Research Circle of WDB. International Tender documents were then prepared in RM&RC. Subsequent actions i.e. scrutiny of specifications, floating of tenders, acceptance of quotations, issue of letter of intent, contracting with the suppliers and opening of LC are being done by the Water Board. The utilization period of allotted fund has been extended up to June, 1995.

Necessary steps may, therefore, be taken well in time, so that the fund is utilized within the extended period.

H. It was decided by the Board that the mapping cell was to be accommodated in a new building to be constructed in the premises of the Hydrology Complex in Green Road and an amount of Tk 34 lakhs was ear-marked out of the revenue earnings of the Board. The construction of the building was planned to be completed by April, 1995. But so far only foundation work of structural pillars could be completed. The progress of work has been hampered probably due to non-release of necessary fund. The Chief Engineer was of the opinion that if the fund is available the concerned building could be constructed within 2 months' time. However, the matter is being pursued. It is, indeed, necessary to complete construction of the building before import of the machineries. The dimension of rooms necessary for establishment of the cell (5000 sq ft.) was communicated to RM&RC from FPCO. These need to be taken into consideration for accommodating the machines and staff of the mapping cell. An opening (8' horizontal, 7' high) should be kept in the peripheral wall of the cell to allow entrance of some major parts of the machines.

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Further, the following installation and operating conditions of P-3 machine need to be taken into consideration while finalizing accommodation for the P-3 machines:

Input variations $\pm 10\%$ of nominal voltage
Floor covering and furniture - antistatic
Max. temperature range - 15°C to 28°C
Recommended Temperature range - 20°C to 25°C

For precision measurements in the machines:

Maximum deviation from mean - $\pm 1^{\circ}\text{C}$
Maximum temperature change - 0.5°C per hour
Maximum relative humidity - 30% to 80%
Recommended relative humidity - 40% to 60%.

I. These conditions necessitate the installation of Air Conditioners and dehumidifiers which are necessary for maintenance of SEG VI, film vault, theodolites, levels, GPS machines, system computers etc. Though provisions of Tk 7 lakhs and Tk 5 lakhs respectively for AC and dehumidifiers were made in the approved revised TAPP (FAP-18), under Commodity Aid programme these may not be imported now under the above aid programme as per instructions of ERD. These may be procured locally with GOB cost provided in the revised TAPP.

J. Mapping works in the cell will be done with topo data collected from field control observations, spot heighting and field completions. Therefore mapping cell personnel will need to stay in the field during field survey season. Adequate tentage is required for this purpose. The requirements of field tentage, specifications of various categories of tents and estimated cost were submitted to RM&RC. Further, total requirements of about 60 items of field, mapping and office equipments, their specifications and estimated costs were also given to RM&RC. Provision of necessary fund was also made in the approved TAPP. These items need also to be procured before the fund lapses. No GOB expenditure was incurred during 1994-95 fiscal for FAP-18. ADB quarterly sanctions may be sought for quarters for which no indent has yet been made.

K. Proposal for the mapping cell set-up has also been finalized in the RM&RC. Steps may be taken for its approval and availability of the cell personnel for familiarization training with the machines to be imported, their principle of working with the aid of diagrammes. Lectures on successive stages of work from field through printing of maps could be arranged if the cell personnel are made available.

L. As per tender documents manufacturers are to arrange training of cell staff in individual machines for about 15 days after installation and later on in the manufacturer's factory for some

period. For this suitable hands should be selected well in time.

A programme of detailed training in field, photogrametric, mapping and printing works was formulated in RM&RC and SOB was requested by the outgoing Chief Engineer, Hydrology to arrange this training and to inform the cost involved. But no reply from SOB appears to have been received in RM&RC. However, SOB was personally contacted by the consultant. Director, Defence Survey SOB verbally informed that the condition of their machines were not very good and therefore they could not allow others to handle these machines for training.

Later on Finnmap was contacted if they could impart this training as there was a provision of training of Bangladeshi personnel in the project "Mapping for Development 1st phase - Coastal Area". Mr. Heikki Perenius, Manger, Finnmap expressed that they could impart on the job-training to Water Boards personnel after import of the machines of the mapping cell. For this an official request may be made by the Chief Engineer, Hydrology to the Director, Hydrography, BIWTA who is the project Director of the Coastal Mapping project.

Field season of this year is almost over. Available experienced surveyors/D-men of the two survey parties can impart training on fair drawing to the new hands of the mapping cell under the guidance of the consultant during this recess season. In the next field season, surveyors of the above two parties experienced in traverse, triangulation, levelling and field verification can also give training in these trades to the new hands.

Further yearly scholarships awarded by Holand for training in the international training centre for earth sciences (on production-photogrametry, cartography, aerial photography), Holand may be availed of by the officers of the Mapping cell. Royal Dutch Embassy communicates availability of such scholarship to ERD. Final selection is done in the Establishment Division. Almost all officers of SOB including the FAP consultant was trained in that institution. Time is ripe now to initiate a request to the ERD through the Water Resources ministry for such scholarship.

M. Duration of completion of all works of FAP-18 will expire on June 30, 1995 except import of machineries under commodity aid and procurement of spot images for 1995 under CFD France and EC assistance. In order to ensure sustainability of the mapping cell, necessary budget provision should be made by RM&RC for 1995-96 fiscal year to meet expenditure in respect of pay & allowances of cell personnel, their daily field allowance for 5 months, contingencies for field operation (Tk 10 lakhs) for office (Tk 5 lakh) and misc. expenditure (5 lakhs) per year.



- N. If the drawing and disbursement responsibility of the mapping cell can be handed by the now introduced REC of the Board, it is fine. Otherwise, one drawing & disbursement officer (DDO) may be designated for this purpose.
- O. There was a provision of some transport in the TAPP for the mapping cell. A letter was initiated from RM&RC for this purpose. The matter was not pursued further. JICA handed over a large number of field transports to the Government transport pool. These vehicles were brought in Bangladesh under SOB's Geodetic project. An attempt may be made to convince the Government for allocation of 3 Nos. of vehicles from that pool. It is mentioned here that we provided 10 precision level machines from CIDA and 5 precision level machines from Finland to SOB for 2nd order levelling works of FAP-6.
- P. A large number of maps, aerial photos, spot images and field GPS and precision level data were collected for study works of different FAP components by FPCO and an inventory of these documents has already been prepared in FPCO. These are to be transferred to the Mapping Cell of RM&RC along with the accounts of FAP-18.
- Q. Details of up-to-date requirements and supply position of topographic data to various FAP-components are given in the following paras.

FAP-1

A. Data Supplied

- (a) Landsat (B&W) on 1:250,000 of the Jamuna River for 1973, 1976, 1977, 1987, 1980, 1981, 1984, 1985, 1987 & 1988;
- (b) Landsat (B&W) on 1:50,000 from Kamarjani to confluence with the Ganges-1987;
- (c) Spot (Multi-spectral) from France (1:50,000 scale) for entire Jamuna River-1989 (March); - 22 sheets.
- (d) Landsat (B&W) - 1:25,000 scale from Fulcharighat to confluence with the Ganges - 1990 (March);
- (e) Aerial Photos-1:50,000 scale (Jamuna) from Kauni to confluence with Hurasagar (Part)-1990 (December); 43 Photos.
- (f) Aerial Photos-1:20,000 scale 1990 (December); 102+23=125 photos.

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- (g) Topo Maps Latest editions as available: 1:50,000 scale - 79E/9, 10, 13, 14, 16, 78G/9, 10, 11, 12, 13, 14, 15, 16; 78H/9, 10, 11, 12, 13, 14, 15, 16, (21 Nos.).
 - (h) 1:50,000 scale revised and newly printed sheets: 78G/9 to 16, 78H/9 to 16, 79E/9, 13, 78F/12, 16 = 20 Nos.
 - (i) Spot Multispectral from France (1:50,000 scale), 1990 - 32 Nos. supplied on 20.10.92
 - (j) 2nd order level data from Finmap - 169 sheets supplied on 18.10.92
 - (k) Adjusted heights of 2nd order levelling - 84 sheets supplied on 20.1.1992
- B. Data available/can be supplied if required in future works to register changes through time.
- (a) 1:50,000 scale aerial photos of 1983, 1:30,000 scale photo of 1974
 - (b) 4"=1 mile scale BWDB Maps with 1' contour interval.
- C. Data can be made available:
- (a) GPS data (Finnmap) - These are now available in FPCO.
- D. Further data for future

- (a) Spot Image - 1:50,000 - (Multi-spectral) for March and October 1991, 1992, 1993 and 1994 are available in FPCO. These can be used to register changes in the river bank etc.
- E. Specific data: Large scale map (1:10,000) with 0.25m contour interval may be required before design works are undertaken.

FAP-2

A. Data Supplied

- (a) 1:50,000 scale aerial photos of 1983 from SOB - 718 photos.
- (b) 1:50,000 scale Topo Maps - variable dates) from SOB. - 74 sheets + 5 sheets in duplicate. Additional 17 sheets of maps on this scale were supplied on 10-2-92, while 19 Nos. of such maps each in two copies supplied on 25.2.92.

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- (c) Spot (Multi-spectral)-1989 from France - 72 sheets.
 - (d) 1:125,000 Planning Maps-M.P.O.
 - (e) 1:125,000 Soil Association Maps.
 - (f) 4" & 8" = 1 mile BWDB Maps with 1' C.I. - 583 sheets.
4" - (124+84); 8" - (249+126).
 - (g) 1:50,000 aerial photos of 1990 (Jamuna) - R. Bank - 162 Nos. + 4 Nos. = 166 Nos.
 - (h) 1:20,000 scale aerial photos of 1990 (Finnmap) - 24 Nos.
 - (i) Existing Level B.M. data covering 6 Nos. of 1/50,000 scale sheets as available with SOB.
 - (j) 1:50,000 scale revised and newly printed topo sheets 30 Nos. each in duplicate. Additional 10 Nos. of sheets were supplied in January, 1992.
 - (k) 1:250,000 sheets from SOB = 9 Nos. of Maps. Additional 2 Nos. of sheets each in two copies were supplied in February, 1992.
 - (l) Additional 1:250,000 sheets from SOB = 5 copies of 78G and 2 copies of 78H have been supplied to FAP-2 on 8-6-92.
 - (m) Additional 1:50,000 scale Topo maps from SOB = 2 sets of 41 maps were supplied to FAP-2 on 15-4-92.
 - (n) 3 sets of 5 Nos. of Topo maps on scale 1:50,000 were supplied on 8-6-92.
 - (o) Adjusted BM heights of 2nd order level lines as demanded have been supplied - 16 sheets.

B. Data available

- (a) 1:50,000 scale spot (Multispectral) - 1990, 1991, 1992, 1993 and 1994 covering right bank of the Jamuna. These are available in FPCO.

C. Data Surveyed

- (a) About 42 Nos. GPS-Finnmap. These are now available in FPCO.

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FAP-3

(A) Data Supplied

- (a) 1:50,000 scale aerial photos of 1983 (SOB)
- (b) 1:50,000 scale aerial photos of 1990 (Finnmap) - 236 photos.
- (c) 1:20,000 scale aerial photos of 1990 (Finnmap) - 546 photos.
- (d) 1:50,000 scale spot (multi-spectral) - 1989 (France) - 44 sheets.
- (e) 1:50,000 scale topo maps of latest editions - 20 sheets as available.
- (f) 2nd order level data including river crossing data (Jamuna) has been supplied.
- (g) 1:50,000 scale revised and newly printed maps: (30+11) = 41 Nos. Additiuonal 11 copies of 11 Nos. of sheets were supplied on 05-01-92.
- (h) 4" & 8" - 1 mile scale BWDB maps with 1' contour interval. 4" (144 sheets), 8" (50 sheets) Total 194 sheets.
- (i) Adjusted heights of 2nd order level BMS -(80 sheets) have been supplied.

B. Data avialable in FPCO

- (a) 1:20,000 scale photo maps for Jamalpur pilot project area with 0.50m C.I. (Finnmap).
- (b) 1:10,000 scale photo mosaics with 0.25m. C.I. for Tangail and Sirajganj pilot project area (Finnmap).
- (c) 99 GPS-Finnmap. These are available in FPCO.
- (d) 1:50,000 scale spot (multispectral) 1990, 1991, 1992, 1993 and 1994 for Jamuna river area are available in FPCO.

FAP 3.1A. Data Supplied

- (a) 1:50,000 topo maps 6=2 new + 4 recent edition from SOB = 6 Nos.
- (b) 1:50,000 spot (Multi-spectral), 1989 from France = 8 Nos.
- (c) 1:50,000 scale aerial photo-1990-Finnmap - 35 Nos.
- (d) 1:20,000 scale aerial photos - 1990 - Finnmap - 140 Nos.
- (e) 2nd order level data for line Nos. 51,52,53 including location index map has been supplied on 7.5.92.
- (f) 1:50,000 scale spot Imagery of 1990 - 16 sheets.
- (g) Adjusted heights of 2nd order BMs have also been supplied.

B. Data available in FPCO

- (a) Photo-maps on 1:20,000 scale with 0.50 C.I. for Jamalpur area.

FAP-4A. Data supplied

- (a) 1:50,000 scale topo sheets from SOB - 73 Nos.
- (b) 4"= 1 mile scale BWDB maps with 1' C.I. = 486 Nos.
- (c) 8"= 1 mile scale BWDB maps with 1' C.I. = 33 Nos.
- (d) 1:50,000 scale aerial photos (B&W) of 1983 - 610 Nos.
- (e) Spot image on 1:50,000 scale of 1989 from France - 62 Nos.
- (f) 1:250,000 scale topo maps from SOB - 10 Nos.
- (g) 1:50,000 scale aerial photos (B&W) of 1983 - 388 Nos. supplied on 23.4.92.
- (h) 2nd order level data for line Nos. 64, 81, 82 with location index has been supplied on 13.5.92.
- (i) 1:50,000 scale spot imagery of 1990 - 30 sheets.

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- (j) Adjusted BM heights of 2nd order level lines have been supplied - 37 sheets.
 - (k) 1:30,000 aerial photos of 1987 - 60 Nos. supplied on 19-01-93.
 - (l) 4" - 1 mile land use map of BWDB - 30 Nos. also supplied on 19-01-93.

Data available

- (a) 1:50,000 scale aerial photos of 1974-75 (SOB).
- (b) 1:50,000 scale spot images for 1991, 1992, 1993 and 1994 (The Padma area) are available in FPCO.
- (c) Arrangement for 1:50,000 scale spot (multi-spectral) for 1995 for main rivers has been made with spot image, France.

FAP-5

A. Data supplied

- (a) 1:50,000 scale aerial photos of 1983-SOB - 314 photos.
- (b) 1:50,000 scale spot (Multi-spectral) images, 1989 (from France) - 31 sheets.
- (c) 1:50,000 scale revised topo-maps from SOB supplied before - 4 Nos.
- (d) 4" = 1 mile scale BWDB maps with 1' C.I. covering the FAP area.
- (e) 1:30,000 scale aerial photos (B&W), 1990-Finnmap/SOB-681 photos.
- (f) Existing B.M. data covering 5 Nos. of 1:50,000 sheets from SOB.
- (g) 1:250,000 scale topomap (Transfrontier) - 1 No.
- (h) 1:50,000 scale spot imagery of 1990 - 6 sheets.
- (i) 1:50,000 scale Topo maps (8 sheets) supplied on 16.11.92
- (j) Another batch of 1:50,000 scale topo maps (revised) - 3 sheets supplied on 25.11.92.
- (k) Existing BM data from SOB - Descriptions and height - 67

pages.

- (1) 1,5,000 scale photo enlargemnets from 1:30,000 scale 1990 photographs have been supplied - 3 Nos. enlargements on 24.10.92 and 2 Nos. on 15.11.1992.

B. Data available

- (a) FCD/1 maps of BWDB - Gumti Area

C. Specific data for future requirement

- (a) 1:10,000) scale rectified photo :mosaics of North Noakhali Area. These are now avilable with SOB.

FAP-6

A. Data supplied

- (a) 1:50,000 scale aerial photos (B&W) of 1983 from SOB - covering the FAP area.
- (b) 1:50,000 scale spot (multi-spectral), 1989 from France - 50 Nos.
- (c) 1:50,000 scale topo-maps of editions (1965-1978) 54 maps.
- (d) 4" = 1 mile scale BWDB maps with 1' C.I. 383 sheets.
- (e) 1:40,000 scale irrigation maps with 5' C.I: 50 sheets.
- (f) 1:50,000 spot image of 1990 have been supplid: 29 Nos. on 25.11.1992, 5 Nos. on 3.12.92, 1 No. on 3.12.92 (of 1989).
- (g) 1st order BM heights with locations from Mymensingh to Sylhet supplied on 23.11.93 - 84 sheets.

B. Specific data

- (a) 2nd order level data-2400 kms. The work has been completed by SOB and draft completion report submitted to water board. All the level monuments have also been constructed. An additional length of about 425 kms. of 2nd order levelling has been completed by SOB during last field season with connections to nearest water level gauge stations and FINNMAP BMs established on the eastern side of the Jamuna.

FAP-7 Data Supplied

- A.
- (a) 1:50,000 scale spot (Multi-spectral), 1989, France: 45 sheets.
 - (b) 1:30,000 scale aerial photos of 1990 (coastal area) Finnmap/SOB - 162 photos.
 - (c) 1:50,00 scale topo sheets - 12 Nos. from (SOB).
 - (d) 1:30,000 scale aerial photos of 1974-75 - 41 Nos.
 - (e) 1:50,000 scale aerial photos of 1983-84 - 37 Nos.
 - (f) 1:30,000 scale aerial photos of 1974-75 were supplied to Cyclone Protection Project of FAP-7: 41 Nos. on 12.10.92, 3 Nos. on 21.11.92.
 - (g) 1:50,000 scale photos of 1983 for Cyclone Protection Project supplied: 37 Nos. on 12.10.92, 25 Nos. on 21.11.92 and 7 Nos. on 23.12.92.
 - (h) 1:30,000 scale aerial photos of 1990 - 30 Nos. on 27.1.94 and 12 Nos. on 20.2.94

B. Specific data

- (a) GPS and 2nd order level data-coastal area completed by Finnmap.
- (b) 1:10,000 scale coastal development maps under preparation by Finnmap. May be available in 1997.

FAP-8(a)

A. Data so far supplied:

- (a) 1:10,000 scale topo maps with 1' contour interval prepared in SOB with ground verification in 1989: 18 sheets x 2 = 36 copies.
- (b) All level data for the greater Dhaka Area-SOB.
- (c) The group Consulted aerial photo of 1983 on 1:50,000 scale and prepared their own maps.
- (d) Some levelling works were done by their own topographers.

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- (e) 1:50,000 scale spot (multi-spectral), 1989, France 10 sheets.
 - (f) 8" = 1 mile maps with 1' C/I - 36 maps.
 - (g) 4" = 1 mile scale BWDB maps with 1' C.I: 40 maps.

FAP-8(b):

A. Data supplied

- (a) 1:10,000 scale topo maps with 1' contour interval revised (Dhaka area) in 1989 by SOB - 18 sheets.
- (b) 8" = 1 mile BWDB maps with 1' contour interval - 20 sheets.
- (c) 1:50,000 spot (multi-spectral) imagery, 1989, France.
- (d) 1:50,000 scale satellite imagery from SPARRSO.
- (e) Borrowed large scale map prepared by FAP-8(a).

FAP-9A:

A. Data supplied

- (a) 1:50,000 scale topo maps (latest editions as available) covering different towns = (SOB). 28 sheets.
- (b) 1:50,000 scale spot (multi-spectral), 1989, France - 2 Nos.
- (c) 4" & 8" = 1 mile scale BWDB maps with - 1' C.I. - 2 Nos.
- (d) 1:50,000 scale aerial photos of 1983(SOB): 24 photos.
- (e) (Level) B.M. data - 20 pages.

FAP-9B: This is a Meghna river bank protection Project of BWDB. The consultant did not demand any topo data from FPCO. They have consulted data available with BWDB.

FAP-10: 4" and 8" = 1 mile scale BWDB/FCD maps with 1' C.I. may be helpful.

FAP-11: Disasters of enormous magnitudes use to happen due to Floods, Cyclone and tidal surge over deltaic Bangladesh.

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For a study on disaster preparedness, the data enumerated for study of regional Areas will be helpful.

FAP-12: A. Data so far Procured by the Consultant:

- (a) 1:50,000 scale topo maps from SOB: 28 sheets x 4 = 112 copies
- (b) 8" = 1 mile scale BWDB maps with 1' C.I. = 123 maps.
- (c) 4" = 1 mile scale BWDB maps with 1" C.I. = 189 maps.

FAP-13: No Topo data is necessary. Rapid reprisal report submitted.

FAP-14 & 15: No topographic data is necessary.

FAP-16: Every regional study group has an environmentalist on their strength. Topographical data enumerated for these FAPs may be consulted if necessary.

Specifically the following photographs have been supplied to FAP-16 as per their demand:

- 1:50,000 scale 1983-84 photos - 11 Nos.
- 1:30,000 scale 1974-75 photos - 17 Nos.

FAP-17: Data supplied

- (a) 1:50,000 scale revised and newly printed topo maps (SOB) - 30 sheets.
- (b) 1:50,000 scale spot, 1989 (multi-spectral) from France.
- (c) A 2nd batch of 5 Nos. of 1:50,000 scale topomaps were supplied.
- (d) A 3rd batch (23 Nos.) of 1:50,000 scale topo maps were supplied on 26.7.92.
- (e) A fourth batch of 5 Nos. of 1:50,000 scale topo maps were supplied on 27.7.92.
- (f) A fifth batch of 6 Nos. of 1:50,000 scale topo maps were supplied on 5.10.92.
- (g) 1:50,000 scale spot images of 1989 - 16 Nos.

- (h) 4" = 1 mile BWDB maps - 8 Nos. supplied on 26.8.92.
- (i) 8" = 1 mile BWDB maps - 35 Nos. supplied on 26.8.92.
- (j) 4" - 1 mile scale BWDB Maps - 75 Nos. were supplied on 4.10.92.
- (k) A sixth batch of 1:50,000 scale topo maps - 14 Nos. were supplied on 31.10.92.
- (l) A seventh batch of 5 Nos. of 1:50,000 scale topo maps were supplied on 11.11.92.
- (m) A eighth batch of 1:50,000 scale revised topo maps 3 Nos. supplied on 21.11.92.
- (n) 1:50,000 scale spot (multi-spectral) image of 1990 - 11 Nos. supplied on 31.10.92.

Specific Data available

- (a) 1:50,000 scale aerial photos of 1990 for NCRS.

FAP-18

Details have already been noted in the beginning of this report.

FAP-19:

A. Data supplied

- (a) 1:50,000 scale topo maps from (SOB) (223 Nos.) 43 Nos. supplied on 6.6.91, 6 sheets on 10.6.91, 7 Nos. on 25.11.91 and 168 Nos. on 16.1.92.
- (b) 1:10,000 scale Dhaka area maps with 1' C.I. = 18 Nos.
- (c) 1:8,000 scale BWDB maps with 1' C.I. - 46 sheets.
- (d) 1:16,000 scale BWDB map with 1' contour interval - 62 maps
- (e) 1:50,000 scale spot, 1989 (multispectral) - 10 sheets supplied
- (f) 1:50,000 scale aerial photos taken during 1990 - Finnmap - 17 Nos.
- (g) 1:50,000 scale spot multispectral image (France) of 1989

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- 209 Nos. (2nd spell)
- (h) 1:20,000 scale aerial photos taken during 1990 - Finnmap
- 347+159 = 506 Nos.
- (i) 1:30,000 scale aerial photos taken during 1990 - Finnmap
- 60 Nos.
- (j) The consultant has collected all the 4" & 8" = 1 mile
BWDB maps from FAP-3.
- (k) 1:30,000 scale colored photos of 1990 (Finnmap) - 22 Nos.
have been supplied from SPARRSO on 29.10.92.
- (l) 8" = 1 mile BWDB maps - 37 Nos. supplied on 4.02.93.
- (m) Again aerial photos on scale 1:20,000 taken during 1990 -
64 Nos. supplied on 2-5-94.

B. Next possible requirements may be the following

- (a) 1:50,000 scale spot imagery for March 1990 through 1994.
Spot Imagery for 1990, 1991, 1992, 1993 and 1994 for main
rivers are available in FPCO.
- (b) 1:50,000 scale revised topo maps.
- (c) Large scale photo maps on scales 1:20,000 and 1:10,000
respectively with C.I. 0.5m and 0.25m for pilot project
areas of the North Central Region which are now available
in FPCO.
- (d) Soil Association Maps from Soil Survey of Bangladesh if
needed.
- (e) 16" - 1 mile cadastral maps from DGLR and S (Tejgaon).
- (f) IWTA Hydrographic maps.
- (g) Large scale Indo-Bangladesh joint survey maps of the
Ganges/Padma-1974 (SOB).
- (h) Adjusted BM heights of all 2nd order level lines in the
NCR.
- (i) GPS Data (Finnmap) north central region and right bank of
Jamuna). These are now available in FPCO.
- (j) All 1st order geodetic stations' Coordinates (SOB).

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- (k) All precision level B.Ms. heights/Descriptions.
 - (l) 1:50,000 spot (B&W) 1989 (Danida)
 - (m) CCTs - land sat.(SPARSSO)
 - (n) Rest of Aerial photos on 1:50,000 and 1:20,000 (B&W) - 1990 (Finnmap)
 - (o) Hydrological data - BWDB.
 - (p) Forest Development Maps - Dept. of Forest
 - (q) Agri-maps -- BARRI/BARC
 - (r) Statistical Maps/BBS.
 - (s) Various MPO maps (small scale) as available and as required.
 - (t) 4" = 1 mile scale contour maps for preparation of a National Digital Model.

FAP-20:

- (a) 2nd Order level data of line Nos. 67, 69, 71, 72 and 80 have been supplied on 5.5.92. Adjusted heights of 2nd order level data (14 sheets) have been supplied on 22.10.92.
- (b) 2nd order level data of 2 lines as desired have been supplied before.
- (c) 4 Nos. of Topo maps on scale 1:50,000 were supplied on 5.5.92.
- (d) Another batch of 4 Nos. of topomaps on scale 1:50,000 were supplied on 18.7.92.
- (e) 1:20,000 scale photo of 1900 (Finnmap) - 18 Nos. supplied on 24.11.92.
- (f) 1:20,000 scale photo of 1990 (Finnmap) - 42 Nos. supplied on 21.12.92.
- (g) 1:20,000 scale photo of 1900 (Finnmap) - 56 Nos. supplied on 29.4.93.
- (h) Photo-contour maps on 1:10,000 scale for Tangail and Sirajganj (Finnmap) - 20 Nos. supplied on 25.5.93.

Specific data:

4" & 8" = 1 mile scale BWDB maps are available.

FAP-21 & 22 Data supplied

- (a) 18 Nos. of maps each in 4 copies on scale 1:50,000 have scale been supplied. Additional 2 Nos. of sheet on 1:50,000 supplied later on.
- (b) 1:50,000 scale spot multispectral 1989 - 18 spot images each in duplicate.
- (c) 1:20,000 scale aerial photos of 1990 - 106 photos.
- (d) 1:50,000 scale spot imagery of 1990 - 79 sheets.
- (e) 1:50,000 scale photos of NCR of 1990 - 45 photos.
- (f) 1:50,000 scale spot images of 1991 (France) - 21 Nos. supplied on 1.11.92.
- (g) GPS data of 15 stations fixed by Finnmap supplied on 8.6.93. Description cards of ten GPS supplied on 10.7.93.
- (h) Adjusted heights of 2nd order level data - 28 sheets supplied on 11.10.92.
- (i) 1:50,000 scale spot image of dry season of 1992 supplied on 30.8.93 - 33 sheets.
- (j) 1:50,000 scale spot image of dry season of 1993 supplied on 29.11.93 - 33 sheets.
- (k) 1:50,000 scale Spot Images for wet season of 1991 and 1992 - 33 X 2 = 66 Nos. supplied on 20-4-94.

FAP-23: No demand of photo and maps have been placed.

FAP-24: Data supplied

- (a) Adjusted BM heights of all 2nd order level lines in the North Central Region has been supplied on 21.11.92 - 1016 sheets.
- (b) Aerial photos covering the main rivers (various scale and years as relevant) - SOB.
- (c) 1:50,000 scale revised topo maps - SOB - 47 Nos. supplied on 20.2.93.

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- (d) Spot Imagery on 1:50,000 of 1990 (France) - 79 Nos. have been supplied on 12.10.92.
- (e) All BM data of BWDB (hydrology Directorate) have been supplied.
- (f) Coordinates of GPs Stations (Finnmap) - 33 stations supplied on 2.5.93.
- (g) Parameters of Everest ellipsoid and those for WGS-84 have been supplied.
- (h) 1:50,000 scale spot image, France of dry season of 1991 and 1992 supplied on 25.9.93 - 33X2=66 sheets.
- (i) 1:50,000 scale spot image of dry season of 1993 supplied on 23.11.93 - 33 sheets.
- (j) 1:50,000 scale spot image of dry season of 1989 supplied on 12.12.93 - 59 sheets.
- (k) 1:50,000 scale Spot Imagery for the wet season of 1991 and 1992 - 33 X 2 = 66 Nos. supplied on 7.3.94.

FAP-25: Data supplied:

- (a) 1:50,000 scale topo maps (revised and recent edition) - 43 maps have been supplied on 14.12.92.
- (b) 1:50,000 scale aerial photos of 1990 - 236 Nos.
- (c) 1:20,000 scale photo contour maps of Jamalpur area supplied on 22.12.93 - 21 sheets.
- (d) 1:50,000 scale Spot Images (October 1992) - 33 Nos. supplied on 6-3-94.

Possible Requirements:

- (a) Hydrological data - Director, Hydrology, BWDB.
- (b) 2nd order level data. 2nd order level data for both banks of the Jamuna and beyond are available in FPCO. Some have been collected by the Consultant along with the location index. SOB's checking report of levelling works over the Jamuna and the Ganges done by Finnmap has also been supplied.

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Surface Water Modelling Centre (WARPO)

2nd order level data for line Nos. 17, 51, 52, 53 to 83 along with BM location index has been supplied on 14.5.92.

Adjusted heights of all BMs of 2nd order level lines in the NCR are available in FPCO.

Directorate of Hydrology, BWDB

Location cards of BMs of 2nd order level lines in the NCR have been supplied along with height differences of successive Bench Marks. 1:50,000 scale spot images for the dry and wet season of 1990 - 2 sheets and dry season of 1991, 1992 and 1993 - 3 ssheets supplied on 2.2.94.

Adjusted heights of the above BMs can be supplied.

Survey of Bangladesh, Tejgaon:

1. One full set of 1:50,000 scale spot multispectral images for dry season of 1989 (France) has been supplied to SOB as per decision of the GOB.
2. 79 sheets of 1:50,000 scale spot images taken dry and wet seasons of 1990 were supplied on 31.12.92.
3. Photo contour mosaics on scale of 1:10,000 of Sirajganj and Tangail area supplied on 26.12.93 - 20 sheets.
4. Photo contour mosaics (maps) on scale 1:20,000 of Jamalpur area supplied on 26.12.93 - 21 sheets.
5. 1:50,000 scale spot image of dry season of 1991, and 1992 33 x 2 = 66 sheets supplied on 13.9.93 and spot image of dry season of 1993 supplied on 26.12.93 - 33 sheets.
6. 1:50,000 scale Spot Images for wet season of 1991 and 1992 - 33 X 2 = 66 Nos. supplied on 30.3.94.
7. 1:50,000 spot images for wet season of 1993 and dry season of 1994 (66 sheets) supplied on 12.9.94.
8. 1:50,000 spot images for wet season of 1994 supplied on 27.2.95 (33 Nos.)

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Thana Afforestation Development Project

1:50,000 scale spot image of dry season of 1989 supplied on 23.11.93 on special request and received back on 26.12.93 - 44 sheets.

Central Zone of BWDB

1:50,000 scale spot image of dry season of 1993 supplied on 2.12.93 on special request for showing to the Honourable Prime Minister and received back on 23.12.93 - 7 sheets.

Delegate CFD

1. 1:50,000 scale topographical maps - 8 Nos. supplied on 4.5.93. (78 G/11,12,15,16; 78H/9,10,13,14)

1:50,000 scale topographical maps - 8 Nos. supplied on 8-6-94.(same sheets as above).

2. 1:30,000 scale photo-contour mosaics of Jamalpur area - 21 Nos. supplied on 29-5-94.

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