バングラデシュ人民共和国
洪水対策
プロジェクト形成調査結果資料

（内部検討資料）

平成７年１２月

基　礎　調　査　部

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1．調査の概要

1－1　調査の背景・経緯

（1）１９８８年のバングラデシュにおける大洪水後、世銀主導により国際機関・我が国をはじめとする各国ドナーが９０年から連携して洪水防御を目的として洪水対策（ＦＡＰ；Flood Action Plan）を実施している。参加国は日・米・英・仏・独・蘭・加・スウェーデン・デンマーク・スイス・フィンランドの他、国際機関として世銀・ＡＤＢ・ＵＮＤＰ・ＥＣであり、全２６（２９）案件を分担又は連携し、実施してきている。

（2）我が国はＦＡＰのうち、「北西地域洪水防御・排水計画（ＦＡＰ２）」「ダッカ首都圏洪水防御雨水排水計画（ＦＡＰ８Ａ）」「洪水予警報（ＦＡＰ１０）」「農業ガイドライン調査（ＦＡＰ１２）」「維持管理問題調査（ＦＡＰ１３）」の５案件及びＦＡＰの関連案件として「国土測地基準点網整備計画」を実施してきた。このうち、「維持管理問題調査」及び「国土測地基準点網整備計画」は現在も実施中である。また、「洪水予警報」は専門家派遣であったが、他の案件は全て開発調査スキームによる協力である。

（3）上記ＦＡＰの各種協力の取りまとめの会議がバ国水資源省主催で参加各国・国際機関が出席するワークショップとして９５年５月に開催される事になり、この会議結果を受けて、ＦＡＰの最終報告書が作成される予定である。ＦＡＰそのものは右最終報告書の完成と共に終了するが、ＦＡＰの調査結果を受けて洪水対策の事業化のための経済協力についてバ国政府及び世銀をはじめとするＦＡＰに関係する国際機関・各国ドナーから必要な情報を収集・分析することが求められている。

1－2　調査の目的

世銀主導により国際機関及び我が国をはじめとする多くのドナーが連携して実施した洪水対策（ＦＡＰ）の調査結果を総括するための国際ワークショップに出席し、過去に実施したＦＡＰ関連の開発調査・専門家派遣等の総括を行い、バングラデシュ政府及び国際機関・他国ドナーと今後の協力の可能性について情報収集・意見交換を行うと共に、調査結果に基づく具体的な事業化に関する情報に関しても出来る限り積極的に収集・交換する。

1－3　調査団構成

（1）総括　　高木　量　外務省経済協力局開発協力課企画官
（2）協力企画　岩切　敏　ＪＩＣＡ基礎調査第２課課長代理

1－4　調査行程

１１月２８日（火）　東京　→　バンコク
２９日（水）　バンコク　→　ダッカ
15:00～18:00 在バングラデシュ日本大使館、ＪＩＣＡ事務所との打ち合わせ

３０日（木）　第４回ＦＡＰコンファレンス（於：首相府国際会議場）
10:00～12:00 開会式
13:00～18:00 テクニカルセッションⅠ、Ⅱ、Ⅲ、Ⅳ

１２月　１日（金）08:30～12:30 テクニカルセッションⅤ
13:30～19:00 テクニカルセッションⅥ
19:00～19:40 閉会式

２日（土）10:00～12:30 ドナー間準備会合（於：オランダ大使館）
13:30～19:00 サイト視察
（メグナ橋、メグナ・グムティ橋、ナラヤンガンジ・ナルシンジ（Ｎ－Ｎ）潅漑施設）

３日（日）　ＦＡＰドナー会合
09:00～10:30 開会式（企画省国際会議場）
11:00～14:00 ドナー会合（ＥＲＤ大会議室）
15:00～19:00 ドナー間会合（於：世銀ダッカ事務所）

４日（月）10:00～13:00 ドナー会合（ＥＲＤ大会議室）
14:00～17:00 ドナー会合（ＥＲＤ大会議室）
17:00～18:00 記者会見
18:30～19:30 大使館への報告

５日（火）10:00～11:00 ＪＩＣＡ事務所への報告
ダッカ　→　バンコク
６日（水）　バンコク　→　東京

１－５　調査対処方針

→別添のとおり

１－６　調査結果の概要

１－６－１　ＦＡＰコンファレンス

１１月３０日及び１２月１日の２日間にわたり、首相府国際会議場にて開催された。同コンファレンスには、調査団の他、在「バ」日本大使館より真田書記官、ＯＥＣＦ松澤所長、ＪＩＣＡ事務所より金丸所長、福田所員が出席。

（１）開会式

ア．主要ドナー国、国際機関、「バ」政府関係者、ＮＧＯ等、総数約５００名の参加を得て、水資源省モハメッド・Ｎ・イスラム次官、世銀事務所ピエール・ミルズ代表、ＵＮＤＰ事務所渡辺所長の順にスピーチが行われた。

引き続き、当初出席が予定されていたジア首相のメッセージが代読された後、マジッド・ウル・ハク水資源大臣から挨拶があった。（当初出席が予定されていたサイフール・ラハマン大蔵大臣も急用のため欠席した。）

イ．「バ」政府側からは、これまでのＦＡＰ５年間の成果を訴えるとともに、特に、住民参加や環境配慮のガイドラインを策定して、これらに十分政府として対応してきたことが強調された。一方、ＵＮＤＰ渡辺所長からは、今後も引き続き環境、住民参加、ジェンダーといった視点からのＦＡＰへの取り組みが重要であると認識している旨述べるとともに、世銀の代表からは、今後の水資源セクターへの取り組みにおいては、「バ」政府の組織改編・強化を図っていく必要がある旨強調した点が注目された。

（２）テクニカル・セッション

ア．本セッションは、１１月３０日が、「I. 水資源セクターにおける「バ」政府の戦略」「II. ＦＡＰ経過報告」「III. 水資源セクターにおける住民参加」、１２月１日は、「IV. ＦＡＰにおける環境配慮」「V. ＦＡＰプロジェクトにおけるプライオリティ」「VI. 水資源セクター関連組織の改編・強化」の各テーマについての発表と各参加者からの意見発表・質疑応答が行われた。

イ．本セッションにおいては、「バ」側から関連資料の配布が遅れる等の事前準備が不十分で、しかも、発表者は事前に事務局（ＦＰＣＯ）へ対し文書で意見を提示するこ

ととされていたこともあり、ドナーや国際機関からは殆ど意見が述べられず、わずかに、現地に出張に赴いた蘭外務省アジア局長が住民配慮の重要性を訴えるとともに、ＵＳＡＩＤ当地代表が環境配慮の必要性を述べるにとどまった。

他方、参加したＮＧＯからは、ＦＡＰの調査段階において住民配慮が十分になされていない、あるいは、環境配慮が行き届かず、零細農民や漁民への深刻な影響が出ていること等が発表された。

また、最後の組織改編・強化のセッションにおいては、その内容や是非等に議論が集中し、会議が紛糾する場面も見られた。

（３）閉会式

最後に、「ＮＥＸＴ　ＳＴＥＰ」と題して、ＦＰＣＯシドキ局長より、ＦＡＰの今後２０００年までの５カ年のアクションプランにつき説明があり、これらプロジェクト遂行にあたっては、本コンファレンスの成果も踏まえ、住民参加、環境等を十分配慮していく方針であることが述べられ閉会された。

１－６－２　ドナー会合

１２月３日及び４日の２日間にわたり、国家経済委員会にてドナー会合が開催された。調査団の他、在「バ」日本大使館より真田書記官、ＯＥＣＦ松澤所長、ＪＩＣＡ事務所より福田所員が出席。

（１）開会式

ア．主要ドナー国、国際機関、「バ」政府関係者の参加を得て、ラハマン大蔵大臣、マジッド・ウル・ハク水資源大臣、モヒーン・カーン企画担当大臣、マジッドＥＲＤ次官がそれぞれスピーチを行った。

イ．各大臣等からは、それぞれの立場から今般のＦＡＰの評価と「バ」政府の取り組みが真摯なものであったことが強調されるとともに、ドナー会合側の今後の協力を強く希望する旨の内容が述べられた。

（２）ドナー会合（１２月３日）

ア．会合の冒頭、イスラム水資源省次官及びシドキＦＰＣＯ局長から、概ねコンファレンスの説明と同様のＦＡＰアクション・プランについての説明があった。特に、住民参加、環境等スクリーニングの段階で十分配慮することとしたことを高く評価したいと述べるとともに、今後の最も議論を呼ぶ問題（Hot Issue）は組織改編・強化の問題

と考える旨述べ、今後O&Mを含め、十分「バ」政府自身も努力していく方針が決定されているので、ドナー側の協力が必要である旨述べた。

イ．これに対し、特に蘭代表団から、組織改編（FPCOが本年12月末をもってその使命を終え、引き続き水資源セクター全体の政策立案、法律策定、実施、モニタリングにいたる一切の業務をWARPOが引き継ぐとの「バ」政府の決定）に際し、現在継続しているプロジェクトの実施について、果たして十分な引継が可能なのか疑問を呈し、また、住民参加のプロセスや環境配慮、貧困層への配慮といった点が不透明であるとの理由から、これ以上議論を継続し、ドナーに対し何らかのエンドースを求めることは遺憾である旨の意見が提示され、これにUNDPをはじめ他の大部分のドナーが同調したことから、急遽会議を中断し、4日に再度議論することとなった。

ウ．その際、我が方に対しても意見を求められたところ、対処方針案に基づき我が国の基本的スタンスを説明するとともに、ドナー間での意見調整をまって再度協議する事が望ましい旨述べおいた。

（3）ドナー会合（12月4日）

ア．3日のドナー間の協議において確認された①住民参加、環境への配慮の強化、②組織改編・強化については、FPCOの機能をWARPOが十分引き継ぐ、③今般示されたFAPアクションプランへのエンドースについては今般会合においてはドナーが一致して行わないこと、等の諸点につき、各参加ドナーを代表して蘭代表団が申し入れた。

イ．これに対し、「バ」側からは、①②については、実施中の案件も含め、将来の案件を実施していく上で十分配慮する旨述べるとともに、③については、アクションプラン部分も含めドナーサイドから何らかのエンドースが得られないかとの提案があった。これに対しドナー側は、今般の「バ」政府が承認したストラテジー・ペーパー（アクションプランをANEXとして添付している）のコンセプトについては了解するも、個別のプロジェクトへの対応については、バイのベースで各ドナーが「バ」政府側と協議して決定していくこととしたい旨述べ、「バ」側も了解した。

ウ．我が方は、対処方針のラインを堅持しつつ、かつ、今般会合には具体的協力案件に対し何等コミットはしないとの立場から、我が国としても環境配慮、住民参加重視については重視しており、ストラテジー・ペーパーの方向性を歓迎する旨述べるに留めおいた。

なお、本件会合の合意事項に関し、ドナーと「バ」側との間で簡単な文書を確認することとなったところ、当該書簡を検討、右書簡は今般ドナー会合において議論された事項や方向性を確認した文書であり、対処方針の範囲内で対応可能と判断されたため、他のドナーとの足並みを揃え、右文書内容に同意した。（右書簡写しについては、別添資料参照。）

1－6－3　気付きの点

（1）今般コンファレンス開催に際しては、開催の1週間前においてもその実施の可能性や概要が「バ」国政府側から明快な説明が行われず、更に開催決定後もドナーへの説明ぶりや案内等の諸準備に多くの不手際が見られ、からくも「バ」国政府の行政能力の欠如を内外に示すものとなってしまった。更に、当初の予定では、ジア首相をはじめとする要人の出席も予定され、ドナー国側に「バ」政府のＦＡＰへの熱意を紹介する目論見が、逆に急遽出席を取りやめたことにより、より大きな不信感を持たせることとなったことは、皮肉な結果といえよう。

これら、ロジ面での不手際と不信感については、他の殆どのドナーが今般口々に訴えているところであり、実際、今回本国から代表団を派遣したのは、我が国の他に仏、独、蘭、世銀、ＡＤＢ（ドナー会合のみ）だけであることを見れば、「バ」政府へのドナー側の信頼が大きく失われていることの証左であるとも思われる。

（2）今後２０００年までの5カ年のアクションプランに対する各国の反応は、それぞれに係わっているプロジェクトの進捗状況や、住民参加、環境、ＷＩＤといった問題に対するドナー国側のスタンス（基本政策）の違いに応じ微妙に異なっていると思われる。（未だ調査を終了していない蘭は、ＦＰＣＯ解散後の実施体制が非常に不安であるとして、今般、ドナー会合においても始終ドナー国側の意見をリードし、「バ」政府に対し強硬なまでの対応を迫ったことは、非常に印象深いものがあった。）

また、現在「バ」政府が取り組もうとしている水資源セクター関連の組織改編・強化策に対しては、これまでの当国におけるドナー諸国の苦い経験から、殆どが懐疑的であり、膨大な資金を必要とする同プランへの協力についても、積極的に協力を申し出るドナーは皆無であった。今後は、世銀とＵＮＤＰ（一部カナダのＣＩＤＡも協力する用意がある旨表明している）が中心となり取り進めることで、一応の決着をみている。

（3）ＦＡＰのこれまでの評価が深く影響していると思われるが、住民参加をプロジェクトの各段階で実施していく必要があることが、多くのドナーのコンセンサスとなって

いることは注目に値する。

これは、単にプロジェクトの形成、準備、計画、実施、評価の各段階における住民の意見を反映させるべきとの意見が、ＮＧＯからだけでなく、多くのドナー国が共通して強く認識されていることは、当国における水資源セクターの協力を我が国が実施していく上でも十分考慮する必要があると思われる。

更には、これまでの調査結果等についてもデータベース等を整備することにより、関係住民のみならず広く国民一般に対しても情報を公開すべきといった点が、参加ドナーの大多数の意見であった。（これに対し、「バ」政府関係者からは、必要性は理解でき十分な対応を行っていきたい旨の回答が述べられたが、同時に情報・利益を享受するのみではなく、住民へのコストシェアリングも検討されるべきとの意見も述べられた。）

（4）ＦＡＰは、当初、８７年、８８年に連続して発生した未曾有の大洪水の被害に対し、ドナー国が協調してこれを援助していくという構想からスタートしたが、スタート以来５年が経過し、今や当国の水資源セクターへの総合的取り組みという形に姿を変えている。

これは、洪水対策という事業そのものが国民一般の生活と密接に関連しているといった事情から、一部では政争の具とさえなっていること、また、事業化にあたっては膨大な資金を必要としており、当国政府の財政事情や各ドナーの援助疲れもあり、その実現には多くの課題を抱えていると言わざるを得ない。

更に、今般の一連の会合を通じて強く住民参加の必要性が訴えられたが、当国政府の地方行政における縦割りの弊害や実施官庁を横断的に調整する能力のある政府機関の不在といったものが、住民参加を組織的に取り組んでいく上での大きな阻害要因となり、容易に実現していくことは多大な困難が伴うものと思われる。

１－７　日本側の主要面談者

（1）在バングラデシュ日本大使館　高橋　周平　公使
　　〃　　〃　　坂本　秀之　一等書記官（経協総括、円借款担当）
　　〃　　〃　　真田　　仁　二等書記官（開発調査・ＦＡＰ担当）

（2）ＯＥＣＦバングラデシュ事務所　松澤　猛男　所長

（3）ＪＩＣＡバングラデシュ事務所　金丸　守正　所長
　　〃　　〃　　西本　高司　次長
　　〃　　〃　　福田　義夫　所員（開調・ＦＡＰ担当）

〃	〃	松島　正明　所員（無償担当）
〃	〃	照屋　友彦　所員（派遣担当）
（4）日本技術開発（株）		嶋内　逸昌　部長代理（N－N潅漑視察同行）

対処方針案

第４回ＦＡＰカンファレンス及びドナーミーティングへの対処方針

１．第４回ＦＡＰカンファレンス（１１月３０日～１２月１日開催予定）

（１）基本方針

本会合はバングラデシュの洪水対策戦略を内外の関係者に紹介することが趣旨であり、基本的に参加者からの発言は期待されていないので、本会合の主たる目的は会議に参加し、ドナーサイドから以前申し入れていたストラテジーに対するコメントの内容が如何に本件会合において報告される最終的なストラテジーに反映されているかを確認することである（当方からの申し入れ事項は別紙の通り）。

本会合をもってＦＡＰへのドナーの協力は一通り終了したこととなるが、本会合においてエンドースされる予定であるのは現在までに行ってきた調査等の成果と住民参加・環境への配慮の重要性であり、今後の具体的プロジェクトの推進（Priority Project and Programme）については、「バ」国サイドの考え方を披露するのみとの認識から、他のドナーと同様、我が方としては何ら将来の協力をコミットするものでないことを予め先方に通報する。

（２）先方プレゼンテーションペーパー等への対応

先方の作成したプレゼンテーションペーパー及びストラテジーの最終版は本来の予定であれば９月頃には配布されるものが先方の事情により会合直前にまで配布がずれ込んだため（ストラテジーについては１１月２４日現在も当方未接到）詳細な検討時間もなく、十分なコメントは不可能。従って、今次会合では我が国からは特別なコメントは提出せず、会合終了後、会合の意義、引き続き開催される予定のドナーミーティングの協議結果等を踏まえ、要すればコメントを「バ」国及び世銀へ提出することとする。

２．ドナーミーティング（１２月３～４日開催予定）

（１）基本方針

今次ドナーミーティングについては議題すら提示されておらず、現段階で対処方針を検討することは困難である。おそらく、ＦＡＰの成果及びＦＡＰ以後「バ」国洪水対策に対するドナー国への期待について、「バ」国ＥＲＤより説明あるものと思われるが、本件に関しては、以下の発言要領にて対応する。

我が国の「パ」国洪水対策分野への協力のビジョンに係る質問を受けたとき
（応答要領）

１．「パ」国洪水対策に関しては、前年度の年次協議においても明らかにしたとおり我が国援助の重点分野の一つと考えており、今後とも積極的に支援していく考えであるが、一方、今後の具体的な援助の内容、対象、規模、方法等に関しては、ＦＡＰが一定の区切りを迎えたこともあり、我が国においても今後総合的な検討が必要と考えるところであり、現時点ではこれらに関する具体的ビジョンを提示できる状況にはない。

２．本件については、引き続き住民及び自然環境への配慮等において検討すべき事項が山積しており、今後の事業実施にあたっては、これらの問題点をも十分に整理した上で「パ」国の事業実施・維持管理能力をも視野に入れた慎重な対応が必要と考える。

３．また、ＦＡＰとしての協力には一定の区切りがついたところであるが、未だ遂行されていないスタディーもあることから、これらの早急な実施を我が国としても望みたい。

４．第４回カンファレンス及び今次ドナー会合の議論の内容は我が国に持ち帰り、関連する機関へ伝達するとともに、今後具体的に検討して参りたい。

なお、ストラテジー中のプライオリティープロジェクトとプログラムの内容について我が国としては貴国の考えが披露されたのみと理解しているので右参考まで。

3．出席者

第４回ＦＡＰカンファレンス及びドナーミーティングへの我が方からの参加者は、建設省、農水省の都合がつかないことから以下の通りとしたい。

（１）外務省

高木　量　経済協力局開発協力課企画官

（２）ＪＩＣＡ

岩切　敏　基礎調査部基礎調査第二課課長代理

（３）その他

在バングラデシュ大、現地ＪＩＣＡ事務所から参加する。

＜参考＞

洪水対策に係る今後の課題

（１）残されたスタディーの完成

（２）資金目途

（３）人材育成

（４）ＮＧＯとの連携

（５）住民配慮（参加）

（６）環境配慮

（７）「バ」国内実施体制の強化及び国内関係機関の連携強化

（環境行政、農政、インフラ行政、その他多岐に渡る行政間の調整）

（８）包括的な経済評価

（９）明確なポリシーの打ち出し

（他の政策との関連における洪水対策の位置づけ）

(10)「バ」国の実施能力の評価

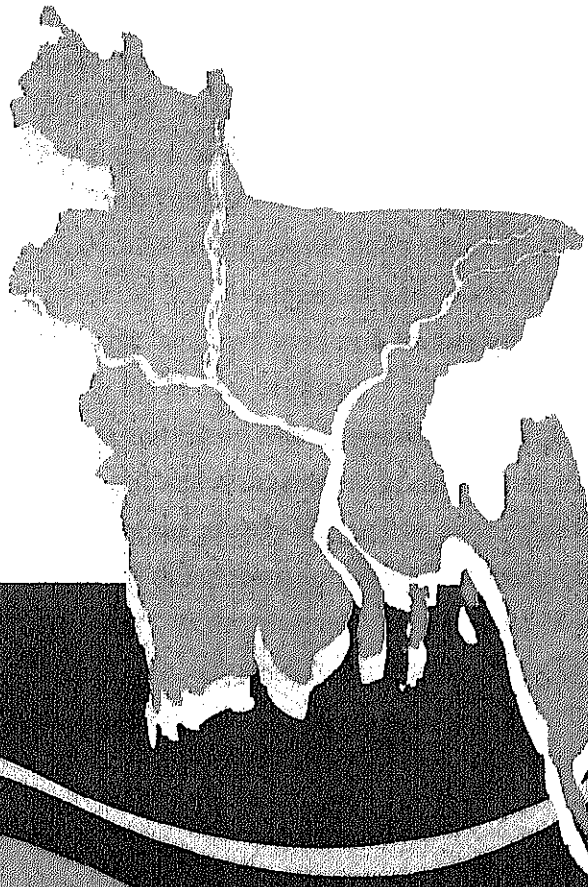
（了）

2．第４回ＦＡＰコンファレンス関連資料

GOVERNMENT OF PEOPLE'S REPUBLIC OF BANGLADESH
MINISTRY OF WATER RESOURCES

BANGLADESH WATER AND FLOOD MANAGEMENT STRATEGY

FLOOD PLAN COORDINATION ORGANIGATION
Dhaka September 1995



بسم الله الرحمن الرحيم

প্রধান মন্ত্রী

PRIME MINISTER
THE PEOPLE'S REPUBLIC OF BANGLADESH

22 November 1995

MESSAGE

The annual cycle of water from over-abundance to scarcity is a fact of life in Bangladesh. While much of our life and living have emanated from the water upon and beneath the surface of this earth, the mighty rivers along with their tributaries and distributaries hold our tradition and culture in an unflinching bond.

The acts of Nature by themselves alone have become untenable today when additional food and living space are needed for an increasing population. Moreover, the problem of scarcity has been further compounded by human interventions beyond our borders. Perhaps, nowhere else in the world does water pose such challenge and at the same time offer such potential for development as it does in this riverine delta. It is thus imperative that this resource be developed and harnessed to its optimum for our very survival as a vibrant society in the 21st century.

The report on Water and Flood Management Strategy provides a sense of direction for the integrated development and management of this precious resource, keeping in view the needs of all with emphasis on poverty alleviation, environment and, above all, people's participation at all stages of development which has been the avowed policy of our Government. Only this way, can development be pursued in harmony avoiding unfair competition and conflicts among various water users.

I sincerely hope, pursuit of the suggested strategy will bring about the desired growth and economic emancipaiton of the people, especially the vast under-privileged rural populace.

Khaleda Zia

Minister
Ministry of Water Resources,
Government of the People's Republic of Bangladesh
Dhaka.

Major General M. Majid-ul Haq (Retd.),

Message from
The Hon'ble Minister,Water Resources

The people,good soil and water are the most important resources of Bangladesh.Our economy is dominated by agriculture which in turn is critically dependent upon occurrence of water.Apart from agriculture,water is also vitally required for pisciculture,for inland navigation,for domestic and industrial usage and most importantly for sustenance of and maintaining the fragile ecology of our riverine delta.

Due to our geographical location, occurrence of water is erratic. We get much more than required in one season which totally disrupts normal life and far less than required in another season restricting water related activities severely. The problem of scarcity has been further aggravated by unilateral upstream withdrawal of river water beyond the borders resulting in severe degradation of life and living.It is,therefore,imperative that water must be managed and utilized prudently to the best advantage.

The report on Water and Flood Management Strategy is the outcome of a five year study initiated in the aftermath of the catatastrophic flood of 1988 in order to find a sustainable long-term solution to this recurrent menace of flooding.I am happy,the study wisely widened its horizon from the narrow focus on flood alone to year-round water management.The report sets the stage for high priority interventions and careful planning aimed at optimum utilization of every drop of our water resources to meet the needs of all competing subsectors.Beside its comprehensive nature the study emphasizes and introduces stakeholders' active participation which holds the key to success of all development efforts.

Hopefully,our professionals will now be able to embark upon the formulation of a comprehensive National Water Plan and subsequently a National Water Policy guided by the management Strategy.

26/11/95

GOVERNMENT OF THE PEOPLE'S REPUBLIC OF BANGLADESH
MINISTRY OF WATER RESOURCES

BANGLADESH WATER AND FLOOD MANAGEMENT STRATEGY

FLOOD PLAN COORDINATION ORGANIZATION
Dhaka September 1995

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GLOSSARY

AFPM	Active Flood Plain Management
BADC	Bangladesh Agriculture Development Corporation
BBS	Bangladesh Bureau of Statistics
BRE	Brahmaputra Right Embankment
BIWTA	Bangladesh Inland Water Transport Authority
BMD	Bangladesh Meteorological Department
BWDB	Bangladesh Water Development Board
CIP	Chandpur Irrigation Project
DAE	Department of Agricultural Extension
DOF	Department of Fisheries
DND	Dhaka Narayanganj Demra
District	The country has been divided into few districts for civil administration
DMB	Disaster Management Bureau
DPHE	Department of Public Health Engineering
EIA	Environmental Impact Assessment
EIP	Early Implementation Project
EIRR	Economic Internal Rate of Return
FAP	Flood Action Plan
FCD	Flood Control and Drainage
FCDI	Flood Control, Drainage and Irrigation
FPCO	Flood Plan Coordination Organization
FMD/I	Flood Management, Drainage, Irrigation
GDP	Gross Domestic Product
GK	Ganges Kobadak Project
GIS	Geographic Information System
GOB	Government of Bangladesh
GPP	Guidelines for People's Participation
LGED	Local Government Engineering Department
LB	Left Bank
M&E	Monitoring and Evaluation
MPO	Master Plan Organization
MOA	Ministry of Agriculture
MOEF	Ministry of Environment and Forest
MOFL	Ministry of Fisheries and Livestock
MWR	Ministry of Water Resources
NEMAP	National Environment Management Action Plan
NGO	Non-Government Organization
NPV	Net Present Value
NWP	National Water Plan
NWMP	National Water Management Plan
O&M	Operation and Maintenance
POE	Panel of Experts
RAJUK	Rajdhani Unnayan Kartipakha
REMC	Regional Environment Management, Research and Education Centre
RRI	River Research Institute
RB	Right Bank
SOB	Survey of Bangladesh
SRP	System Rehabilitation Project
SWMC	Surface Water Modelling Centre
Thana	A subdivision of a district
UNDP	United Nations Development Programme
WARPO	Water Resources Planning Organization
WASA	Water and Sewerage Authority

SYNOPSIS

This report presents a framework for the development and implementation of a strategic national water management plan for Bangladesh. It builds on the extensive programme of work undertaken under the Flood Action Plan (1990-94) and the earlier National Water Plan, Phases I and II. It recommends a five-year programme involving (a) preparation of a national water management plan, (b) strengthening of water sector organizations responsible for planning, construction, operation and maintenance, and (c) implementation of a compact portfolio of high priority projects.

The report is divided into four chapters. Chapter 1 presents an overview of water resource planning in Bangladesh, summarizes the work undertaken under the two phases of the National Water Plan (NWP) and details the evolution of the Flood Action Plan (FAP) and the accomplishments of its 26 planning and supporting studies. Chapter 2 discusses the key issues and options for development and management of water resources in Bangladesh and focuses on key issues (e.g., people's participation; social and environmental assessment) and options that need to be taken into account in water sector planning. Chapter 3 presents short- and long-term strategies for water resource and flood management, and Chapter 4 presents a development programme for the next five years (1995-2000), within the context of likely longer-term activities in the sector.

The three main water resource development options open to the Government of Bangladesh are:

(a) **minimum intervention:** strengthening the capacity for flood forecasting and disaster management, and improving the operation and maintenance of existing projects, but leaving water sector development to the private sector (e.g., minor irrigation and water supply);

(b) **selective intervention:** in addition to (a), protecting densely populated urban areas and key infrastructure from floods and erosion, ensuring water supply and providing flood proofing for vulnerable rural communities, possibly with development of water and flood management projects to enhance agriculture and fisheries; and

(c) **major intervention:** in addition to (a) and (b), implementing large-scale measures such as embankments and river engineering works to prevent flooding and erosion by major rivers, and multi-purpose barrages on the main rivers.

Options (a) and (b) are both feasible and probably affordable in the short- to medium-term, though their successful implementation would require substantial institutional reform of planning and implementing agencies. Option (c) may be a long-term possibility, if the macroeconomic, environmental and other issues could be satisfactorily addressed.

The recommended development programme to the year 2000 would involve:

- **Formulation of a strategic national water management plan** for the first twenty-five years of the next century, which will identify an investment programme that balances the conflicting demands of different water users (e.g., wet and dry season agriculture, fisheries, water transport, water supply, salinity control). Planning criteria and guidelines would be developed to ensure that all programmes and projects are developed with full participation of local communities, and are technically, economically, socially, environmentally, and institutionally sound.

- **Institutional strengthening of water sector organizations,** involving reorganization and strengthening of planning organizations (FPCO, WARPO), enhancing the capacity of the main agencies responsible for designing, constructing, operating and maintaining projects (BWDB, LGED, WASA, DPHE, BIWTA, MOA/BADC, R&H, Railway, DOF, local councils, and increasingly the private sector); and facilitating inter-ministerial and inter-sectoral coordination and cooperation. Emphasis would be given to training and human resource development, upgrading of inter-disciplinary planning and technical skills in key areas, and institutional reforms.

- **Implementation of a portfolio of priority projects** designed to protect from flooding over 10 million people living in urban, coastal and some riverine areas; protect vulnerable industrial areas in Dhaka and other cities and towns; improve flood preparedness and flood proofing, especially for people living in unprotected areas, enhance agricultural and fisheries production in some areas, and implement environmental management plans.

1. WATER RESOURCE PLANNING

INTRODUCTION

The people of Bangladesh have for centuries adjusted their way of life to normal flooding. In most years, measures such as raising homesteads above normal flood level and adjustments in farming systems, can mitigate flood damage. But, with the increase of population, growth of infrastructure and other economic development, the intensity of flood damage has increased. Every few years, catastrophic floods cause enormous damage and loss of life. The severe floods in 1987 and 1988 killed about 1,500 people and caused damage to crops, infrastructure, schools and houses, estimated at about $2 billion, and severely disrupted the economy, reducing potential GDP by about 4 per cent. The nature of flooding varies between different regions (see Box 1). Periodic droughts also cause severe crop losses and hardship to farmers and labourers. Besides, progressive reduction of dry season flows of transboundary rivers like the Ganges, the Teesta and many others due to increasing upstream withdrawal across the borders is causing severe strain on the agro-economic condition and the overall eco-system in large areas of the country.

The purpose of this report, which builds on the earlier FPCO reports, is to present a strategic framework for the development and implementation of a national water management system for Bangladesh. The strategic frame-work is based on GOB's water sector goals, examination of past experience and critical review of the issues and options for water resource development in the future.

HISTORICAL PERSPECTIVE

National water planning in Bangladesh dates from the 1960s. The predecessor of the present Bangladesh Water Development Board (BWDB) prepared in 1964 a Master Plan comprising 58 large-scale projects for flood control, drainage and/or irrigation projects. Many of these projects were implemented between the mid-1960s and late-1980s. These projects were mostly justified in terms of increased crop production and did not fully take account of the potential impacts on fisheries, navigation, forests, domestic and industrial water supply, biodiversity and salinity management.

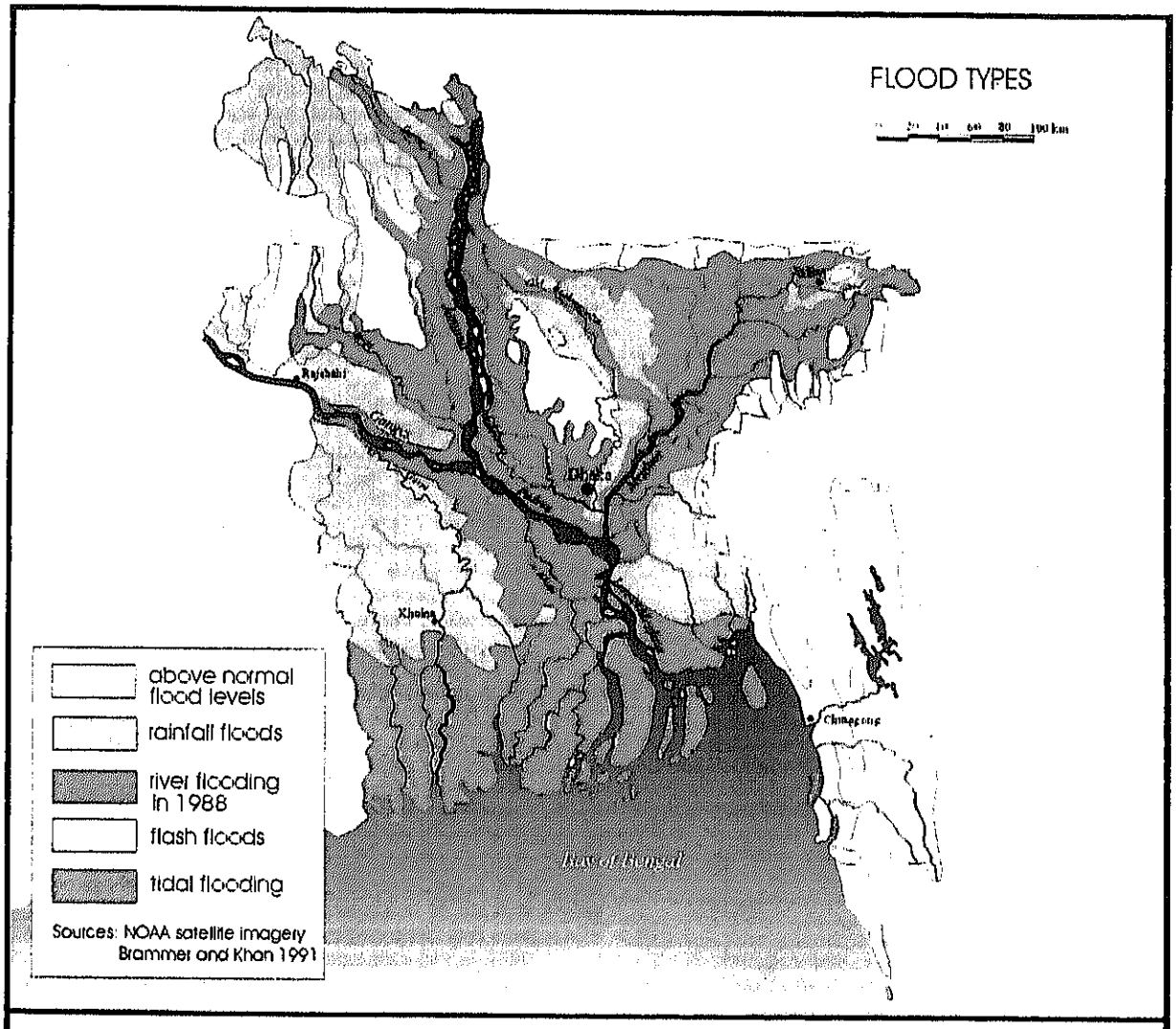
The World Bank's 1972 Land and Water Sector Study advocated smaller-scale development, especially minor irrigation. Through the 1970s and 1980s, small-scale irrigation spread rapidly, initially under government agencies and later through the private sector. By the early-1980s, however, the need for a long-term water resources development plan became apparent and the Master Planning Organization (MPO) was established in the Ministry of Irrigation, Water Development and Flood Control. The MPO produced the National Water Plan (NWP) - Phase I in 1986, focusing on the assessment of water resources and future demand by different users. Phase II of the plan was completed in 1991. The NWP assembled a substantial amount of information, developed a range of planning models and analytical tools, and recommended strategies and programmes, many of which were adopted by the government and endorsed by donors. The MPO also prepared a draft water code and made other proposals to institutionalize the process of water planning and long-term water resource management.

Despite these achievements, the MPO reports fell short of a comprehensive national water plan. First, its perspective to the year 2010 was inadequate for evaluating large-scale programmes, impacts and requirements. Second, it failed to evaluate properly and integrate a number of major projects and programmes within the sector. Third, programmes in other ministries (fisheries, navigation, public health, industries, municipalities, etc.) were inadequately addressed, and their requirements taken as constraints rather than incorporated within an overall water sector demand position. Fourth, in the absence of agreements on international rivers, the plan dealt only tangentially with the different water supply scenarios. Other planning exercises (on international waters, flood control by other agencies) have also taken place independently of NWP, with similar lack of strategic focus on the needs of the entire sector. There is also a real danger that the substantial data gathering and analytical achievement of the NWP will be at least partially lost if they are not followed up and supported on a permanent basis.

MPO was renamed as the Water Resources Planning Organization (WARPO) in 1991. Its objectives are to upgrade the National Water Plan with an intersectoral focus and an interdisciplinary approach, particularly emphasizing environmental issues. One of its main mandates is to evolve national policies and strategies for utilization and conservation of water resources.

The work of the organization has, however, been impeded by budgetary constraints. Besides, staffed mostly by BWDB engineering professionals, it needs to be balanced by the appointment of economists, social scientists and environmentalists. This multi-disciplinary structure is particularly important if the organization is to interface effectively with other agencies.

Box 1: Nature of Flooding in Bangladesh



Flash Flood: In the north-eastern region, the main problem is flash flooding during the pre-monsoon months which causes damage to dry-season boro rice and also to towns and other infrastructure.

River Flood: In the middle of the country, a broad strip of land is flooded by bank overflow from the main rivers - Jamuna, Ganges, Padma, and Meghna, and their tributaries and distributaries. Heavy rains also cause flooding, as drainage is impeded by high stages in the main rivers.

Tidal Flood: The coastal areas suffer from tidal and storm surges that lead to loss of life. Siltation in the tidal channels block drainage, adding to the problem.

Besides flooding and inadequate drainage, river bank erosion is another major problem that renders thousand of families homeless and landless.

The Flood Action Plan

Following the severe floods in 1987 and 1988, a number of studies was undertaken (in addition to GOB's own report) supported by funds from UNDP, French, Japanese and US Governments. It became evident from these studies that critical information on technical, socio-economic and environmental factors, needed for deciding between different alternatives, was lacking. In June 1989, the Government requested the World Bank to coordinate the various efforts, and to prepare a programme of studies and pilot projects to get a better understanding of the flood problems. This approach was endorsed by the G-7 summit in Paris in July 1989. A proposal to prepare the Flood Action Plan (FAP), involving a set of 26 studies and pilot projects, was endorsed at a meeting convened by the World Bank in London in December 1989.

The Government set up the Flood Plan Coordination Organization (FPCO) in 1990 to supervise, coordinate and monitor FAP activities, aided by a Panel of Experts (POE) and specialists. The Government also set up mechanism for the technical review and approval of FAP project proposals and reports. Terms of reference for the 26 FAP components and studies were drafted by FPCO, using multidisciplinary teams of government officials and relevant donor representatives, and were reviewed by the Technical Committee for approval of GOB (see Box 2).

Inception, interim and final reports of each study and pilot project were submitted to FPCO. FPCO and POE reviewed these reports before final versions were forwarded with recommendations to the Technical Committee. FPCO produced quarterly reports to inform the Government and donors of progress. Three international review conferences were held in Dhaka in 1990, 1992 & 1993 (following a number of district and local level meetings during the preparation of different FAP reports), and a draft final report on the first 5-year phase of FAP activities was presented and extensively reviewed, nationally and internationally in 1994.

CURRENT STATUS

The NWP

The National Water Plan was completed in two phases, the last in 1991. One of the objectives of the second phase, which started in 1988, was to develop planning methodology and guidelines for selection of priority projects, and to prepare a comprehensive list of water projects and assess their economic viability and priorities. As noted earlier, the plan prepared by MPO fell short of a comprehensive water plan and no further work was done since 1991. The data collected to assess environmental viability and impacts are, however, inadequate and further studies are needed.

The FAP

Most of the original programme of studies under FAP has been completed (Figure 1). The regional studies identified and evaluated projects at pre-feasibility level, and possible flood mitigation projects have been identified within a regional context. A few priority projects, such as the protection of Dhaka city and a number of secondary towns, erosion protection on the Brahmaputra right bank and the rehabilitation of the coastal embankment, are either underway or ready to commence.

Work still remains to be done on a number of important long-term studies and pilot projects, including the compartmentalization pilot project (FAP20), bank protection (FAP 21), river training and active floodplain management project (FAP22), GIS (FAP19), and river surveys (FAP24). A number of additional follow-up studies are about to begin, such as the Chittagong Coastal Area, Meghna Estuary studies, Morphological Impact Assessment Study on Major Rivers, and follow-up studies of the second phase of the O & M study and a fisheries pilot project, flood forecasting, and environmental and participatory planning for the Jamalpur Priority Project. Follow-up pilot flood proofing projects are being taken up by NGOs, and discussions are in progress regarding the continuation of the environmental, and Geographical Information System (GIS) studies. Completion of these pilot projects and supporting studies is necessary to provide essential data and criteria for future water resource development.

2. DEVELOPMENT AND MANAGEMENT OF WATER RESOURCES IN BANGLADESH: ISSUES AND OPTIONS

ISSUES

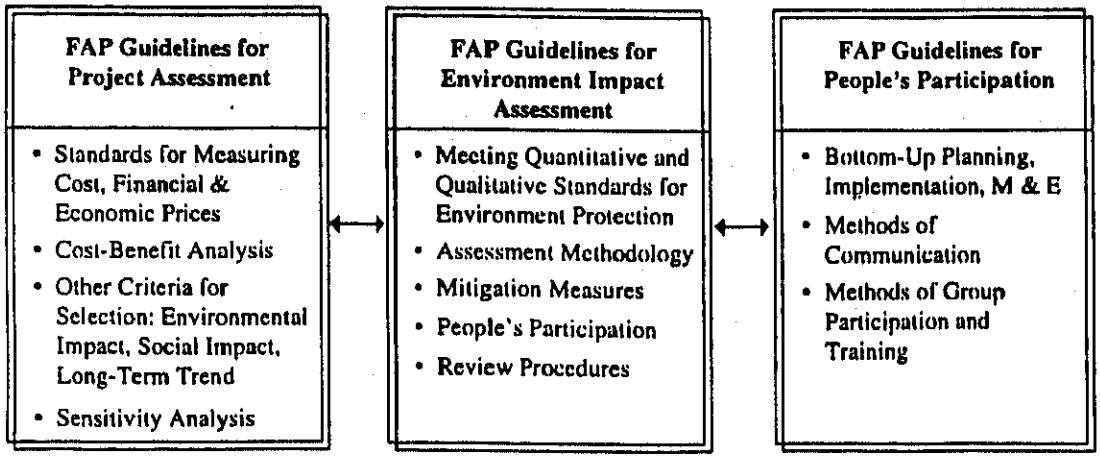
A broad based National Water Management Plan (NWMP) will be guided by the goals and objectives of the National Water Policy, which is yet to be formulated. The water management plan will cover many more aspects than just the issue of flooding. It will have to examine the supply of water in the context of international rivers and groundwater, and the demand from irrigation, fisheries, navigation, drinking and municipal needs, and other important areas. Drought mitigation and water quality regulations will also be very important aspects of this plan.

Box 2 : FAP Evolution and Major Issues

The FAP started with 11 main components and 15 supporting studies and pilot projects. The main components were made up of several regional and urban planning studies, feasibility studies for projects, and special programmes on flood forecasting, early warning, and flood preparedness. The supporting studies were intended to provide the planning principles, criteria and data inputs for the planning studies. These studies indicated the structural and non-structural measures needed to minimize the impact of flood damage. The key structural measures suggested by the five regional studies included (i) in the N.W., sealing of the BRE, Green River intervention in the Lower Atrai River and Teesta Right Bank Protection; (ii) in the N.C., Jamalpur Project; (iii) in the S.W., Gorai Augmentation and small FCDI projects; (iv) in the S.E., Noakhali North Drainage and Gumti Phase-II projects; (v) and in the N.E.; forty-four different projects. The major non-structural measures suggested included programmes to mitigate loss of capture fisheries, mitigate health hazards, improve navigation, etc.

During its five years, the FAP evolved from its original focus on physical control interventions to a more comprehensive approach towards water management. Amongst its considerable achievements have been the formulation of standard guidelines for project assessment, participatory planning and environmental impact assessment (see Figure below). A manual for EIA was also prepared. National and international workshops, attended by experts within and outside Bangladesh, academics, NGOs and donors were held. Despite these achievements there are still areas that need strengthening, for example:

- o considerable strengthening and restructuring of FPCO, WARPO and BWDB and improvements in their links to other government agencies will be required before any substantial water development programmes can be contemplated. Future institution building would also require a clear perspective of the role of the private sector. The necessary legal and regulatory environment for inducing private investment in water resource development will have to be ensured;
- o further development and testing FAP's participatory approaches to planning, implementation, O&M, and evaluation are needed;
- o proper emphasis on poverty, employment, resettlement, gender bias, etc. has to be placed for socially acceptable development;
- o the guidelines for environmental impact assessment and research and training programmes, carried out under FAP, need to be built on and expanded in a more decentralized, regional programme for sustainable development; and
- o the different FAP regional and associated project planning studies will have to be brought together into an overall national water management plan.



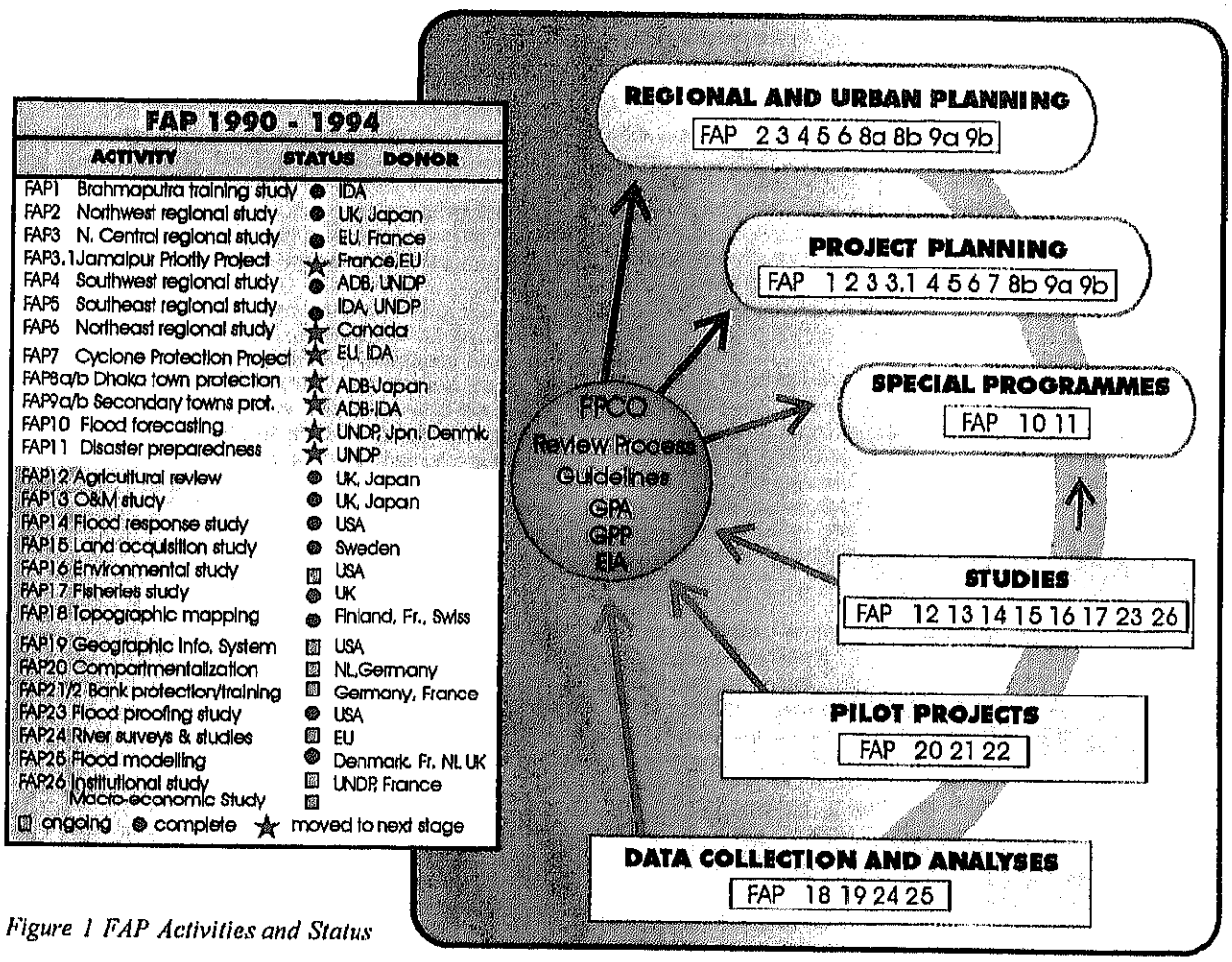


Figure 1 FAP Activities and Status

The major issues in the formulation of macro water plan are:

A. Establishment of Goals and Objectives of Water Resource Management

Many countries in Asia, like India and Thailand, have published statements on national water policy. Others, like China, Philippines and Indonesia, have embedded water policies in legal codes. Bangladesh does not have an approved national water policy, although NWP did prepare a comprehensive set of water sector policies. There have been several attempts to articulate goals and objectives to guide long-term water resource development and management. The 1986 and 1991 National Water Plans set their goals to maximize foodgrain production and to maintain adequate supplies for potable and industrial water needs, navigation, fisheries and salinity management. The previous national water plans, however, have been limited in their scope.

The FAP started in 1990 with the basic objective of minimizing flood damage to life and livelihood, to increase monsoon crop through control of flood water thus providing greater flexibility for crop diversification in the dry season, and to meet the basic water needs of fisheries, navigation and public health. However, flood control was the dominating theme in its eleven guiding principles. This changed over the years, as awareness about environmental issues became more pronounced through studies under FAP and NEMAP. Consequently, a reformulation of the national water planning goals and objectives has now become necessary to guide future planning efforts and to produce an integrated national water plan.

B. Water Management and Development Issues

Bangladesh's problems as a Lower Riparian in the River Basins: As the lower riparian of the Ganges, Brahmaputra River and Meghna rivers, Bangladesh occupies only about eight percent of the total area of the three basins but is located at the point of concentration for monsoon floods generated by runoff from the Himalayas. Continued development of upstream basins will increase the disadvantages of being the lower riparian and floods are likely to increase because of deforestation of the Himalayas as well as land degradation and erosion. On the other hand, during the October-May lean period Bangladesh receives only the residual flow after diversion and upstream use. Reduction of dry season flows in Bangladesh due to increasing upstream withdrawal is causing severe water shortage across the country and in the south west region in particular, reduced streamflow is also aggravating saline intrusion. If appropriate measures are not taken urgently to restore Bangladesh's rightful share of the Ganges, it may face further morphological and environmental hazards. Similar diversion of water in Meghna at the Barak dam could have effects on the eastern region, including on poor occupational groups such as fishermen. Efficient water and flood management and assured shares of the dry season flows of the trans-boundary rivers have, therefore, become imperative for the survival of Bangladesh.

Flood and Cyclone Hazards: During the June-September monsoon, Bangladesh receives about 80 percent of annual precipitation, averaging 2300 mm, but varying from as little as 1200 mm in the west to over 5000 mm in the east. Runoff from adjacent riparian is generated by rainfall which averages 5000 mm over the Himalayas, and exceeds 10,000 mm over the Meghalaya plateau north of Sylhet. Together inflows and rainfall cause peak floods in the Ganges, Brahmaputra and Meghna rivers in the period July-August, and on average 22 percent of the country is flooded annually. In the eastern regions flash floods from the surrounding hills are a hazard in the early summer and cause extensive damage at the time of harvesting the winter boro rice crop. In coastal areas, tidal floods and cyclonic surges cause serious problems.

Design Implications of Flood Frequency. When the peak flows of the Ganges and Brahmaputra coincide, as they did in 1988, almost 60 percent of the country is inundated. In terms of frequency, the areal extent of 1987 flood was an event to be expected about once in every decade, while the 1988 floods could be expected about once in every 100 years. Protecting against a one hundred year event requires very high capital and O&M expenditures, and its payoff is debatable. In addition, structural solutions take 5-15 years to implement, and temporary non-structural flood proofing are needed as an interim measure. Guidelines, indicating the levels of protection for vital infrastructure, and property and people living in major cities, regional towns, villages and for agriculture are also needed. These levels may vary for different subsectors, depending upon their needs and socially acceptable priority. For example, agriculture may only justify low levels of protection, in which case, in addition to structural flood protection, flood proofing and other mitigation measures would need to be identified for protecting villages, towns and infrastructure.

Drought: Drought is also a problem in Bangladesh, particularly in the North-Western regions during the spring where there are few surface water resources, and agricultural production is heavily reliant on groundwater resources. However, drought is not only confined to the dry season but also scanty rainfall during the monsoon, as happened in 1994, severely affects floodplain fisheries and late monsoon aman rice. Groundwater recharge for the following dry season is also adversely affected. The National Water Management Plan has to address and balance the conflicting needs of too much water in the monsoon and too little in the dry season which would need tapping the resources of both surface and ground water.

Erosion and Sedimentation: River bank and island erosion is also a major issue, and is probably the most important natural cause of landlessness and forced resettlement. FAP 3.1 and FAP 16 studies show that the completely unprotected active floodplains of the Jamuna, Ganges, Padma and Meghna are inhabited by 4.3 million people, of whom 2.2 million live on charland. Erosion caused displacement of more than 728,000 people over the period 1981-93, and in the same period 462,000 permanently emigrated from the high erosion risk areas. Sedimentation, in general is a blessing for a deltaic country like Bangladesh, but at times it becomes a hazard by reducing navigability and by blocking offtakes from main rivers (such as the Gorai). Coarse sediment deposit may affect soil fertility and other ecosystem. Fine sediment deposit may improve soil fertility, but have adverse effect on fisheries, flora and fauna. Therefore, a thorough study is needed to improve the understanding of the effects of sedimentation.

Feasible interventions in the short- and long-term. Given the high cost and long gestation period of public sector projects, a very important aspect of the national water management plan will be to balance long-term seasonal water availability/ excess against various water demand scenarios from all users including quantities required for environmental management and to determine the types and extent of large scale interventions required, and the policies needed to stimulate efficient water use by both public and private sectors.

Operation and Maintenance: Operation and maintenance (O&M) of public sector water projects is a chronic problem. This has been extensively studied, most recently under FAP 12/13, and FAP 26. The problems identified were (a) project formulation, design and O&M do not include stakeholders and project beneficiaries, (b) many projects are partially completed before funds run out, indicating serious design, land acquisition or supervision problems, and (c) insufficient funding.

A major issue is that projects are often approved for construction without the essential O&M budget. The collection of user fees is also poor. The Systems Rehabilitation Project (SRP) for flood control, drainage and irrigation has had some success, on a pilot basis, in collecting water charges in the Chandpur, Karnaphuli and Muhuri surface water irrigation projects where the benefits are obvious to farmers. In contrast, collection has been poor in the G.K. Project because of uncertainty of water supply. Benefits of Flood Control and Drainage projects are more difficult to assess as they vary across the protected areas. Application of uniform rates is also inequitable. The compartmentalization pilot project (FAP 20) is now testing several new innovative approaches whose results will be known within 2-4 years. The development of an efficient monitoring and evaluation(M&E) system is essential for a good O&M system.

C. Social and Environmental issues

The Government of Bangladesh has given top priority to the alleviation of poverty and to the integration of social and environmental concerns into economic planning, at all levels. The impact of potential water sector projects on poverty and on the environment must be key concerns in developing a national water resource development strategy.

Impact of water resource projects on poverty: A prime objective of water development projects in Bangladesh is to enhance economic growth by increasing production. The main beneficiaries are those who own assets (e.g., farmers, businessmen), although the landless poor may also benefit. The rural and urban poor can benefit from water sector

projects through (i) short-term increases in employment (e.g., in project construction and agriculture) and wages, due to increased local demand for labour; and (ii) medium- and long-term employment increases resulting from forward and backward 'linkages' (e.g., in agro-processing, rickshaw pulling and petty trade) and diversification of rural and urban economies. However, flood protection and flood management projects may also have adverse impacts on specific occupational groups (e.g., fishing and boating households) and on the poor generally by reducing the area of common property resources (e.g., floodplain fisheries).

People's Participation: Flood protection and management projects require the full participation of the affected people taking account of their needs and priorities. Enabling local people and communities to participate in project formulation and planning is a key issue in efficient system management.

The Charland Issue: Over four million inhabitants of the chars in the major rivers including active floodplain (Jamuna, Ganges, Padma and Meghna) comprise one of the most vulnerable groups in Bangladesh. These people suffer from seasonal inundation, which often means that they have to leave their houses and move to safer ground, and suffer severe loss of property in major floods. In addition, over 60,000 people a year are made landless by bank erosion along the main rivers, as about 9000 ha of mainland and 5000 ha of charland are reworked each year by erosion. These high risk areas are remote from government centres and are poorly served by public services.

Land Acquisition and Resettlement Issue: Current procedures for land acquisition in Bangladesh are lengthy, bureaucratic, inefficient, and a main cause of delays in project implementation. Results of the Land Acquisition and Resettlement Study (FAP15) show that people whose land is acquired receive inadequate compensation, are often subject to intimidation and fraud, and may receive their payments after delays of many years.

There is a need to revise the laws and procedures for land acquisition and resettlement to reduce fraud and make the process more streamlined and equitable. Besides streamlining procedures, there is also a need to design projects so that land requirements are kept to the minimum. Since FAP15 was completed in 1992, further lessons have been learned from the experience in implementing the Brahmaputra Right Embankment (FAP1), the Coastal Embankments Rehabilitation (FAP7) and Compartmentalization Pilot Project (FAP20).

Environmental Issues: Bangladesh, with a population of 120 million, is one of the most densely populated areas in the world. Over 75 per cent of the people live in rural areas and are dependent of floodplains and rivers for their livelihoods. The poor in urban areas often live in low-lying areas and may also be adversely affected by high floods and poor drainage.

Flood protection, flood management and flood proofing projects are designed to improve the environment for people by reducing flood damage and enabling more productive use of land and water resources. However, such projects may also have adverse impacts. Among the most common of these are reductions in capture fisheries. Possible agro-chemical contamination of surface and ground water due to agricultural intensification can be injurious both to humans and fish.

The importance of environment issues was recognized from the outset of the FAP. The FAP16 environment study (i) developed guidelines and a manual for EIA, (ii) undertook research on the impact of flood management projects on soil fertility, vector-borne diseases, fish biodiversity and charland communities, and (iii) trained policy-makers and Department of Environment (DOE) staff in EIA.

Although the regional and other planning studies had to start before the FAP guidelines on EIA were introduced in late 1992,. they all carried out environmental assessments, that were reviewed by FPCO and DOE. Some project feasibility studies (e.g., FAP3.1 - Jamalpur Priority Project) were required to undertake additional EIA before completing their environmental management plans. A lesson learned is that thorough EIA for water development projects takes a minimum of 18 months (allowing one full year of fieldwork) and this is now being taken into account in scheduling other FAP feasibility studies.

Navigation: The country is criss-crossed by numerous waterways of various size and capacity. These water courses provide for inland navigation which is yet the cheapest means of transportation, facilitate surface drainage during monsoon, conserve water in dry periods as well as harbour the riverine fish population. Unfortunately, all these activities have been severely disrupted by siltation of the rivers over time. BIWTA carries out dredging on some specified routes to maintain navigability which is meager compared to the need. This issue merits serious consideration, specially because channel improvement for navigability will also expedite surface drainage relieving drainage congestion, promote the fish resources, as well as help push back saline front near estuary. FAP 6 has taken up a pilot dredging scheme on Kalni-Kushiyara in North East region with these ends in view. The canal digging programme of the government is also a part of this important issue. Future water plans would address the issues of navigation, fisheries development, water conservation and drainage in a consolidated and cost-effective manner.

Fisheries: Fisheries is one of the most controversial aspects of modifications to annual flooding of the floodplain. Open flood plain capture fisheries are a common pool resource and an important source of nutrition for the very poor (providing on an average about 80 percent of animal protein). Fish migrate along the rivers and during the annual floods disperse across the floodplain to feed and breed. Embankments, constructed for roads or flood control, prevent the movement to the floodplain, which results in a reduction of catch, a decrease in biodiversity and increase the risk of disease. FAP 17 study of several FCD projects has shown contrasting impacts on fisheries, some positive and some negative, and their findings highlight how little is known about the floodplain fisheries ecosystem in Bangladesh. Unless more is known, caution must be exercised in planning and implementing new flood control and drainage projects. Economic studies by FAP 12 of existing FCD projects show that project benefits are sensitive to fisheries losses caused by project intervention.

D. Institutional Issues

Institutional arrangements for developing and managing water resources are the critical link between policy objectives and field-level performance. Institutional frameworks are established by legislation that provides basic operative norms, and its various elements (customs, laws, regulations, organizations) are closely interdependent. Deficiencies frequently arise from inconsistencies between them. Institutional deficiencies can take many forms, such as lack of effective linkages among various agencies, lack of staff training and incentives, absence of legislative procedures for implementing specific tasks, etc. Institutional changes may be made incrementally, but they must be made in the context of the entire water resources sector. The three primary areas of government institutional involvement are legislation, regulation and operation.

Water legislation has two basic functions:

(i) conferring necessary powers over water and land on the government, while preserving or granting such rights to individual users as are consistent with the goals of the country; and

(ii) establishing a basic administrative framework and necessary institutions to execute the various functions assigned.

The regulatory area comprises the enforcement and monitoring of established laws, agreements, rules, regulations, and standards. Typically, this includes water and land-use rights, water quality, pollution and environmental considerations, etc. Unfortunately, the FAP studies have not adequately covered areas of water legislation and regulation. For example, there is an urgent need to revise the laws and procedures for land acquisition and resettlement to streamline the process and make it more equitable. Disaster management laws are yet another area of development. These and other regulatory issues need to be addressed in the continuing FAP programme.

The operational area includes data collection, planning, design, construction and operation and maintenance (O&M). In Bangladesh, as in most other countries, sectoral integration is limited and sector-specific agencies at different levels of government dominate the operational area. There is a need for movement towards both integration and decentralization of responsibilities to local authorities, for-profit private enterprises, and non-profit beneficiaries. FAP 26 has extensively reviewed the operational aspect of institutions, including the major water sector institutions in terms of their capabilities for efficient water resource management, linkages between multiple government agencies, facilities for people's participation in planning, disaster management, flood proofing and other non-structural activities. Restructuring of institutions is the next step of the study.

Institutions for Planning

The national capacity for sectoral planning with inter-sectoral priorities, particularly at WARPO, is weak. For feasibility studies, reliance on the private sector is important because of the multidisciplinary nature of water development projects. The planning division of BWDB has a significant role in the supervision of these studies.

Institutions for Design and Construction

Construction of physical facilities is mainly carried out by BWDB, though the Local Government Engineering Department (LGED), Water and Sewerage Authorities (WASA), MOA/BADC and Public Health Engineering Department (DPHE) undertake smaller schemes. The private sector is involved in minor irrigation, water supply and some project planning and design. A number of reviews over the past 20 years have pointed to serious weaknesses in the organizational planning and implementation capacity of BWDB, including:

- inadequate project design and poor quality control;
- failure to focus on inter- and cross-sectoral issues;
- problems in project programming and unsatisfactory procurement performance causing serious delays and cost overruns;
- poor project management capacity; and
- poor delegation of decision making power at the field level.

Institutions for O&M

The lack of monitoring of O&M activities by top management has created a relaxed atmosphere for O&M personnel and there are no standards for performance evaluation with which these individuals could be judged. Beneficiary participation in O&M activities is almost non-existent and the sheer volume of the requirement makes it difficult for the government to carry the financial burden alone.

Institutions for Disaster Management

Disaster management in Bangladesh is not a new concept. The Famine and Relief Code, written over 100 years ago, laid down the procedure for coping with major disasters. These codes and procedures are, however, outdated and need modification. At present, there are a number of Standing Orders and Codes laying down procedures to be followed by a large number of ministries and subordinate agencies. They are, to a large extent, not very specific to different types of disasters and do not provide coordination among different agencies. GOB has recently established a Disaster Management Bureau and consolidated the standing orders for disaster relief.

Overall, there is need for (a) expansion of flood forecasting and warning services, (b) disaster management programmes of the Government and NGOs, and (c) promulgation of specific laws and codes for disaster management.

Institutions for Flood Forecasting and Warning, Flood Proofing and Other Non-Structural Solutions

Flood forecasting and flood proofing are measures to avoid or reduce flood damage and disruption without increasing damages to others. The findings and recommendations of the FAP 26 study are:

- considerable institutional and technical resources are available for rapid implementation;
- education of stakeholders (investors and beneficiaries) is necessary for institutionalization of flood forecasting and warning and floodproofing concepts on a national scale;
- it is necessary to develop strong but flexible policy and management leadership, preparation of manuals covering applications for flood forecasting and warning, flood proofing measures and training of government officials; and
- it is necessary to utilize the services of the Thana level staff of BWDB, BRDB, LGED and MOA/BADC, who have been involved in making development plans of roads, irrigation facilities, flood control embankments and water and land use.

Institutions for People's Participation

Given the large number of often conflicting interests in water and land resources in Bangladesh (e.g., farmers and labourers, fishing and boating households, highland and lowland farmers) a participatory planning approach which tries to assess and balance the different needs and priorities is essential. The FAP is the first government programme in Bangladesh to make people's participation a mandatory part of project planning, implementation, operation and maintenance. Guidelines for People's Participation (GPP) were produced in 1993 and evolved from the experience gained in involving local communities and stakeholders in the regional studies. The GPP deals mainly with participation at the project level and BWDB has operationalized GPP. In addition, the FAP has undertaken many district level meetings with local elected representatives and others to understand local priorities and discuss possible projects coming out of the regional studies.

Important lessons from the participatory planning approaches being learnt from FAP are that the process should be (i) genuinely 'bottom-up', with the planning teams spending time listening to the local people and assessing their needs and priorities before identifying projects; (ii) undertaken by inter-disciplinary planning teams of social scientists, farming systems specialists and engineers; and (iii) as transparent as possible, with the local people provided with as much information as possible about proposed schemes, in a form that they can understand.

NGOs are generally experienced in working in a participatory way with poor people, and have a potentially important role to play in helping to further develop the FAP methodology, in working with local communities on water sector planning and training. Notable steps in this direction have been made by GOB working with NGOs in resettlement planning in the Riverbank Protection Project (FAP1) and the Coastal Embankment Rehabilitation Project (FAP7).

Public Accountability

It is important that the planning and review process for FAP is open and transparent through various consultation measures. Broad discussion of FAPs findings through three national conferences, involving politicians, journalists, academics and NGOs, and district level consultations with stakeholders, have provided this transparency to a large extent. A public documentation and information centre for water sector planning at WARPO and an information dissemination center at BWDB project sites will be required.

OPTIONS

In the medium- to long-term, Bangladesh will have to formulate and adopt a mix of economic, management and engineering policies to balance demand and supply of water. Water resources development and management have to be planned for future conditions, and over the medium- to long-term. The agricultural sector will be unable to absorb excess labour and the key source of future agricultural growth will be productivity. The only way to increase agricultural productivity will be through intensive agriculture. Planning to meet agricultural demand on water resources, needs of environmental management, as well as ensuring an orderly development of flood free infrastructure and housing, will be a formidable challenge in the future.

Broadly speaking, there are three options as far as management of water resources is concerned:

1. *Minimal public sector intervention*: Government strengthens its capacity for flood forecasting and disaster management, but leaves implementation of water sector projects (e.g., minor irrigation) to the private sector and local councils. The basic premise would be to allow free rein to market forces, which have been successful in meeting demand for minor irrigation in the last decade. Thus further deregulation of government water supply monopolies, and devolution of authority to regional and local levels would be appropriate measures. As the economy grows, there may be increased demand for flood protection and large scale irrigation, which could be financed out of taxation and the local mobilization of resources.

2. *Selective public sector interventions*: In addition, the Government, with local community participation, would provide infrastructure to protect urban areas and key infrastructure from floods, storms and erosion hazards. It would promote flood warning, flood proofing for vulnerable communities, where possible through local institutions, and could involve selective development of FMD/I projects to enhance agricultural and fisheries production.

3. *Major interventions*: In addition, Government would implement engineering measures to manage floods, by stopping flooding from major rivers with embankments and river training works and, in protected areas improved drainage, possibly by pumping. Water shortages in the dry season would be mitigated through provision of suitable structures on the major rivers along with sharing arrangement with co-riparians. Another option could be regulation and augmentation of the main rivers in their upper catchment in India and Nepal.

Options 1 and 2 are both feasible and probably affordable in the short- to .medium-term, though their successful implementation would require substantial institutional reform of planning and implementing agencies.

Option 3 was seen early in FAP as a possible long-term strategy. The work under FAP and experiences of other countries have shown that control of major rivers is difficult and needs to be implemented over a long period of time. Such protection may also carry risks of catastrophic breaching during extreme floods that would require sophisticated disaster management system.

Social and Environmental Options

All water sector project feasibility studies should include a thorough social impact assessment and the proposed projects should, on balance, benefit the poor as a whole. Another option may be to include the full cost of any mitigation programmes in the project analysis.

The options for people's participation are:

- maximizing the benefits to the poor, and especially poor women by such means as carrying out earthworks through manual labour, and providing access to resources created by the project, such as borrow-pits for fish culture, social forestry on embankments, involving women's groups in routine project maintenance;
- minimizing social conflicts between different groups such as highland and lowland farmers, people inside and outside the project, farmers and boatmen, etc. so that the project performs effectively and public 'cuts' are avoided;
- minimizing adverse impacts on common pool resources (e.g., capture fisheries by incorporating fish passes) and addressing ways of improving community management of such resources (e.g., remaining areas of wetland); and
- minimizing the number of people being displaced and resettled.

For addressing the charland issues, an option is to take care of the problems by flood proofing and stabilizing the chars and developing techniques for river bank protection. Another option is integrate the river and coastal charland communities into the national development process.

To ensure environmental sustainability, it is necessary to establish institutional capacity for updating EIA, commissioning and supervising research and updating guidelines and manual.

Planning Institutions

WARPO and FPCO would be merged to form a new national water resources planning organization responsible for:

- strategic planning and review of the NWMP;
- interfacing and coordinating with all interrelated water sector institutions for ensuring complementarity of schemes and avoiding potential conflicts (e.g., that a new road does not adversely affect drainage); and
- maintaining and expanding the data bases developed by WARPO and FPCO, BWDB, BIWTA, BBS, BADC/MOA and DOF for water resources planning, and to make these data accessible to all users.

The new organization should, ideally, be established by late 1995 when FPCO ceases to exist. Its location in the Ministry of Planning would be desirable, but if that is not possible in the short-run it could be within the MWR. This new organization will have to collaborate with institutions like the BWDB, RRI, LGED, DPHE, DAE, DOE, WASA, SOB, SPARRSO, BIWTA, MOA/BADC and the private sector.

Design and Construction Institutions

Despite its shortcomings, BWDB has to continue as the lead public sector agency for undertaking major water development projects and programmes. However, its mission, goal and mandate would have to be redefined in view of the accepted role of public and private sectors in the economy, and the role of other institutions in related sectors.

The appropriate mission of BWDB may be to provide large scale engineering support for the implementation of the national water sector strategy and plan. The firm establishment of WARPO, as the national agency for sector planning and development of the NWMP, would provide the macro framework within which BWDB could carry out micro-planning and implement schemes.

The role and structure of BWDB might see the following changes:

- it would not be involved in sector planning, except for providing specific assistance to WARPO;
- feasibility studies would be supervised/undertaken by BWDB with appropriate strengthening for economic, social and environmental analyses;
- BWDB's responsibility for project design should be limited to the design of large-scale schemes developed by WARPO. The actual design work of some project components may be contracted out to the local consulting industry, but BWDB should develop strong capability for supervising and reviewing the consultants' work;
- implementation and monitoring programmes may be prepared by BWDB with the support of a small group of highly qualified experts;
- it would evolve a proper O&M system in collaboration with beneficiaries and stakeholders and develop requisite institutions for involving NGOs, local bodies, and beneficiaries from the start of the project. This would facilitate the latter's preparedness and cooperation during operation and maintenance;
- BWDB's institutional linkages with other Government agencies (e.g., LGED, WASA, PHE, BMD, BIWTA, BADC/MOA, Roads and Highways, Railway and Fisheries Departments, Department of the Environment, SOB), local councils and NGOs, would be strengthened;
- strengthening of the financial management and accounting system and improvement of the management information system would be undertaken to provide transparency, necessary control and accountability within the organization; and
- the new mandate and focus of BWDB may necessitate some restructuring, redesignation of positions, functions, responsibilities; development of incentive packages, recruitment and training of personnel.

O&M Institutions

Some of the options for improvement of O&M performance are:

- keeping implementation personnel in the area until the stipulated benefits are realized;
- devolution of authority to regional and local levels; and
- turning projects over to local stakeholders, right after completion, so that the beneficiaries management committee determines O&M policies and rates through mutual agreement.

Disaster Management Institutions

As proposed by FAP Study 26, the recently created Disaster Management Bureau (DMB) of the Ministry of Relief, could become the focal point for GOB disaster management activities in both normal times and at times of emergency prior to and following a disaster.

Flood Forecasting and Warning and Flood Proofing Institutions

Possible options in this area are:

- establishment of a National Risk Information Centre to provide for rapid release and application of existing data on flood forecasting, flood hazards and a prompt start on educational efforts;
- initiate a pilot project for Flood-Proofed Infrastructure that will include expanded support like standards and training for flood warning and flood forecasting key infrastructure;
- strengthen Flood forecasting and warning centre at central and local level; and
- consider initiation of Flood Emergency Centres at Thana level to lead education and preparedness, as well as to provide floodfighting and relief operations.

Institutions for People's Participation and Accountability

An important option in planning (both sector and project) is to develop people's participation through regular interface with the beneficiaries and other interested parties in the Thanas. A second, but not exclusive, option is to have representation from the local councils and NGOs in the planning and implementation activities of major water sector agencies.

To ensure public accountability, one option is to provide transparency through open annual conferences, direct consultation with the public, and establishment of a public documentation and information centre for water sector planning at WARPO and at field for project planning.

3. WATER RESOURCE AND FLOOD MANAGEMENT STRATEGIES

The issues and options presented in the previous section provide essential guidelines for developing strategies for efficient management of the sector. Bangladesh also needs a clear strategic vision to guide its long-term goals and policies. The basic concepts that underlie such a vision begin with the understanding that water is a unitary resource, and that surface and ground water are an interconnected system, which must be addressed with comprehensive planning. Water is also an economic good, as within each hydrological unit renewable fresh water is limited. Planning for water, therefore, requires intensive cooperation among different users, and objectives and priorities should be set jointly with stakeholders at all levels.

Long-Term Strategies

The fundamental strategies, based upon past experience in water resource management and the medium and long-term plans of Bangladesh, are:

Approach to long-term planning: This would involve (i) formulating a comprehensive set of criteria and time horizons for specific application in water resource planning and management, using a fifty-year time horizon, (ii) full accounting for social cost and externalities and linkages, and improving the quality and implementation speed of schemes; and (iii) evolving policies that meet the requirement of time and adjust to need for decentralization, privatization, stakeholder participation, cost recovery, sustainability and public accountability.

Undertaking Integrated Water and Land Use Planning:

Effective land and water management strategies would involve (i) fully protected, partially protected and unprotected areas, compartmentalization, drainage, irrigation, landuse, cropping pattern, environment, erosion/sedimentation control, fisheries, navigation and salinity management and provision of water supplies, (ii) development of floodplain zoning to accommodate necessary engineering measures and allocate space for habitation patterns, economic activities and environmental assets, (iii) protection against drought and tidal surge, and (iv) coordinated planning and construction of rural roads, highways and railway embankments with provision for unimpeded drainage.

Achieving Intersectoral Balance: This would require (i) reliance on multipurpose projects and programmes for achieving intersectoral balance and assuring water supply for a diversified sectoral needs, (ii) phased implementation of comprehensive water management plans, aimed at controlled flooding for rural areas to meet the needs of crop production, and (iii) fisheries, navigation, urban flushing and recharge of ground water resource with minimum dislocation to the environment.

Managing cross-border flows: This would involve seeking international cooperation with riparian countries to moderate peak flows and share the flows of the common rivers.

Basin wise development: This would be pursued through integrated surface and ground water development for water balance in the river basins.

Balancing structural and non-structural approaches to water management: This would require considering nonstructural measures (e.g., floodplain zoning, floodproofing) for flood damage reduction equally with structural measures.

Setting Environmental Priorities: This would require full integration of environmental priorities (e.g., protection of life and property from flash flood and cyclone damages, minimization of forced resettlement caused by erosion, etc.) with water development programmes in accordance with EIA guidelines and promotion of formal and non-formal environmental education and linkages among concerned institutions.

Institutional Strategies: In the next 10-20 years , a strategic institutional framework has to evolve that supports the sector goals and objectives with optimal efficiency (e.g., harmonizing environmental and social objectives with production and distribution objectives, balancing quantity and quality, etc.). The strategies would involve:

- defining the role of the government in management of both supply and demand for water, recognizing that market failure necessitates public intervention;
- providing and enforcing a legal/regulatory system for judicious use of land and water resources, by both the public and private sectors, that ensures sustainability of the fragile ecosystem dependent on water, in conformity with international agreements;
- rationalizing the function and structure of public water sector institutions to create and maintain public good such as infrastructure;
- providing the right environment and institutions for unobstructed private sector involvement in water resource management;
- increasing people's participation in the management of the system, at different levels of local government (Thana, District, etc.), through appropriate institutional mechanism;
- developing strong coordination among different public sector institutions through inter-organizational linkages and sharing of responsibilities; and
- increasing the operational efficiency and accountability of public sector institutions through appropriate monitoring, evaluation, and performance evaluation, and instituting a transparent reward and punishment system.

Short-Term Strategies (1995-2000)

In order to bridge the gaps in the knowledge about the optimal management programmes for efficient utilization of the water resources in Bangladesh, a short-term strategy has been developed to fully integrate the existing body of knowledge and take priority measures for addressing imminent flood and other water resource problems. The focus of this short-term strategy will be:

- formulation of a long-term national strategy for water resource management and a new National Water Management Plan using the knowledge base of the National Water Plan, FAP, lessons learnt from previous FCD/I projects, groundwater development, and urban and sectoral water need projections;

- enhancing institutional capacity for undertaking upcoming programmes, through development of necessary legislation, policy, organization, professional expertise, training and other necessary infrastructure;

- establishing economic, social and environmental norms and environmental quality standards to regulate agricultural, industrial, navigational, municipal and domestic water use;

- instituting plans for operation and maintenance and creating an appropriate institutional framework for expanded beneficiary participation in the planning, implementation, operation, and maintenance of water management infrastructure and facilities;

- speedy completion of incomplete projects to achieve stipulated targets in the shortest possible time; and

- implementing a portfolio of essential projects and programmes (e.g., flood warning, disaster management, information dissemination, river training, improved drainage, protection of urban, commercial, industrial and public utility centres), that meet very specific criteria, including appropriate analysis with social costs and accounting of externalities and linkages.

4. THE DEVELOPMENT PROGRAMME

As noted in Section 3, the next five years will focus on three main activities: the preparation of an integrated national water management plan, institutional development, and implementation of selected, high priority projects which are environmentally sound and are acceptable to the stakeholders (Figure 2).

Planning will involve completion of outstanding FAP studies and pilot projects, finalization of planning criteria developed under FAP, and production of the National Water Management Plan (NWMP) which integrates the outputs of FAP and the NWP, and provides by 2000 a development strategy and an implementation programme for the future.

Institutional development will involve the merger of FPCO and WARPO to form a new national water resource planning organization and strengthening of BWDB and related government agencies.

Implementation will take place of selected high priority projects, which meet the selection criteria mentioned below, including river bank protection, cyclone protection, urban protection and flood proofing schemes. Water management development would be confined to rehabilitation and improvement of existing projects and other high priority stand-alone projects, which are not dependent on the completion of FAP pilot projects and studies. The rationale for the proposed investment programme is shown in Box 3.

Beyond the next five years, a rolling plan with an updated NWMP will provide a consistent but evolving framework for water sector development. The programmes and projects will evolve with changes in the economy (e.g., patterns of urban and industrial development) and the development of technology.

Following specific projects taken up during the first five years (urban protection, river bank protection on critical reaches, cyclone protection), the programme might shift to overall water and flood management, drainage and irrigation, whose development criteria would have been established by the year 2000. Many lessons would have been learnt from pilot projects during this period and these will have to be incorporated into new project designs. Flood proofing may have to be expanded, together with other non-structural measures, and the private sector would probably come to play an increasingly important role. Protection of secondary towns and priority river works would continue.

SHORT-TERM PROGRAMME (1995-2000)

A. Completion of FAP Activities (1995-2000)

The pilot projects, supporting activities and sub-regional planning, critical to the preparation of a comprehensive NWMP, will be completed by 1998 to provide a sound basis for planning, designing and implementing the future generation of projects and programmes. The timing and estimated costs of this programme is shown in Table 1. This list represents the first stage of a comprehensive action plan. It does not include the existing on-going projects, rehabilitation of existing projects and O&M which are operated by various agencies. The project briefs are given in Annexure.

Box 3 : Rationale for Completion of FAP Activities and the Proposed Investment Programme : 1995-2000

The proposed programme for the next five years would comprise finishing up of the on-going FAP studies to complete the data base required for planning, preparation of the NWMP, institutional development, and planning and implementation of a small portfolio of disaster management projects.

- The **Planning, Pilot Projects and Supporting Activities and Studies**, started under FAP, would broaden the scope of water sector planning to include all sectors, and identify essential and justifiable structural and non-structural interventions.

- The **Flood Proofing, Flood Forecasting, and Disaster Management Projects** would improve the flood preparedness of floodplain communities, especially those living in unprotected areas. The flood proofing and flood warning projects on the Jamuna chars and in the north-east would be pilot projects that would develop approaches to flood proofing and flood warning which can be replicated in vulnerable areas throughout the country. Each of these projects would have a strong positive social and environmental impact.

- The **River Management and Coastal Protection Projects** would protect about seven million especially vulnerable people from severe river flooding, tidal flooding and storm surges. These projects would protect rural communities and agricultural land. They have generally positive social and environmental impacts and acceptable IRRs and NPVs, though these are lower than those for the urban protection projects.

- The **Urban Protection Projects** would protect about six million people and industrial areas in Dhaka, Chandpur, Bhairab Bazar, Munshiganj, and selected secondary towns. All the projects have overall positive social and environmental impacts and, with the exception of Chandpur, reasonable rates of return and good NPVs.

- The **Water and Flood Management Projects** would involve feasibility studies for a small number of projects in north-central, north-east and south-east Bangladesh, those are designed to increase agricultural and fisheries production in flooded areas. They all have reasonable rates of return and overall positive social impacts, although some may have negative environmental impacts whose mitigation will be provided for in the project design.

Planning

The **Overall Planning Study** and production of NWMP will be a major exercise extending at least to the end of 2000. The regional and sub-regional plans would provide the building blocks for NWMP. Their upgrading will ensure that the plan components have been assessed and evaluated according to the established social, economic and environmental criteria. The **Institutional Development Study** would utilize the results of the study under FAP 26 Institutional Development Programme and would suggest institutional arrangements of various organizations and would aim at increasing knowledge of local conditions through increased public participation in the planning, design, construction, operation and maintenance of water sector projects. The **Macroeconomic Study** will be continued to assess the impact of flood action projects on economic factors. The **Jamalpur Priority Project** requires refined feasibility study to fully address questions raised about impact on the floodplain, fisheries, and people's participation in project design, implementation and operation and maintenance. To complete the regional planning coverage and to enhance the existing plans, new sub-regional planning will be started. The first of these will be the **Meghna Estuary Study** which will carry out systematic surveys to assess estuarine behaviour, prepare a master plan for the reclamation and development of the land resource, and recommend mitigating measures for the population vulnerable to cyclones and storm surges. **Chittagong Coastal Area Study**, along with the estuary study and FAP5 South East Regional Study, would complete the coverage of the south-eastern region. It will be primarily concerned with the coastal plains which are subject to frequent floods as well as cyclones. The **North Central Sub-Regional Study** (Jamuna Left Bank Study) will establish a priority plan for year-round water development of the north central sub-region between the Jamuna, Bangsi and

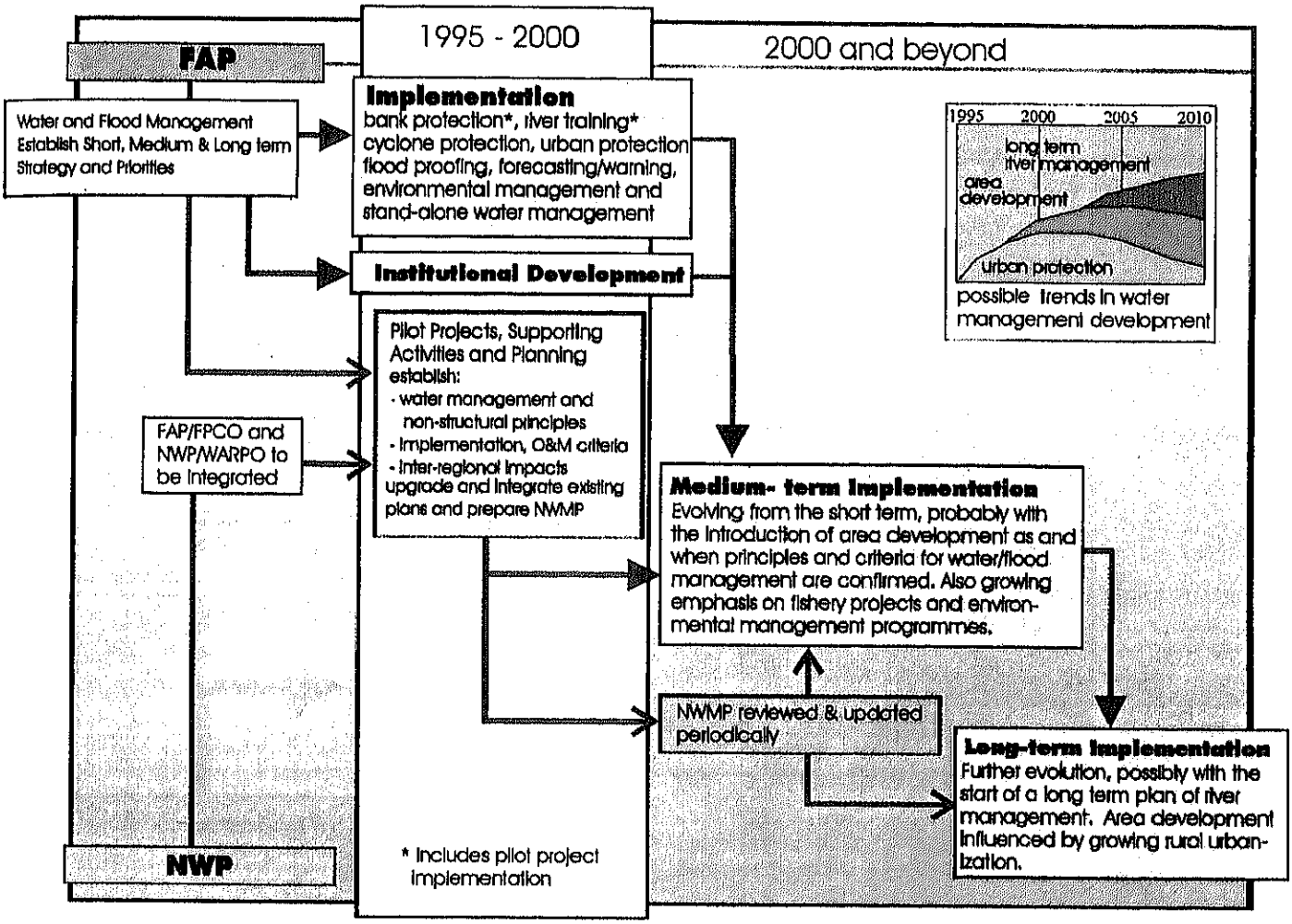


Figure 2 Development Programme

Dhaleswari rivers. The study will also cover flood proofing of the adjacent charlands. On the other bank of the Jamuna, a **North West Sub-Regional Study** is proposed for the Lower Atrai Basin to assess the Green River concept, formu-late an integrated plan for Chalan Beel and adjacent polder development, and prepare a feasibility study for priority rehabilitation. The **South East Sub-Regional Study** will assess plans for the development of the Dakatia-Little Feni river basins.

A **South West Sub-Regional Study** will be necessary to address the wider implications of comprehensive water management raised by the unilateral withdrawal of Ganges flows at the Farraka barrage and the effects of saline intrusion in south and the consequent environmental degradation, particularly on water quality and the Sundarbans. The study would investigate various development options, including the **Ganges Barrage** and **Gorai Augmentation**. The output of this sub-regional study will be a vital component of NWMP. The study will also incorporate on-going feasibility studies for rehabilitation works. **Priority Project Feasibility Study** of seven priority projects in the South-West Region is also included in the portfolio for 1995-2000.

B. Preparing NWMP

After the merger of FPCO and WARPO, consultants would be appointed to undertake the planning and preparation of NWMP. The set of projects emerging from the upgraded and completed FAP regional and sub-regional plans will be added to non-FAP projects from the 1991 NWP. Early Implementation Project (EIP), SRP, and similar projects from other agencies will also be upgraded. The integrated planning process would follow the following line (see Fig.3):

- revising the short term strategies, for the medium-term plan period, say upto 2010, ensuring they reflect the national goals;
- formulating project types or categories to accord with the strategies;
- identifying projects for each category;
- evaluating lessons from the first five years of operation;
- consolidating the plan components into a preliminary framework, establishing linkages and dependencies,and assessing cross-sectoral, inter-regional and national impacts;
- establishing and evaluating a range of development options, comparing their outputs and impacts; and

- establishing priorities, assessing plan constraints, determining costs and timing, and preparing the draft NWMP, with likely alternatives.

Institutional arrangements would be in place to enable full involvement of other ministries and departments. The planning exercise would be carried out under rigorous and transparent arrangements. A technical review of the NWMP by a panel of experts (national and international) will be carried out.

NWMP should be seen as a rolling plan to be reviewed and updated every five years. It would provide a firm plan for the next five years, an indicative plan for the subsequent five years and a perspective plan for the long-term. In this way, the plan would be sufficiently flexible to accommodate changes in the socio-economic environment and technological advances, while maintaining its direction.

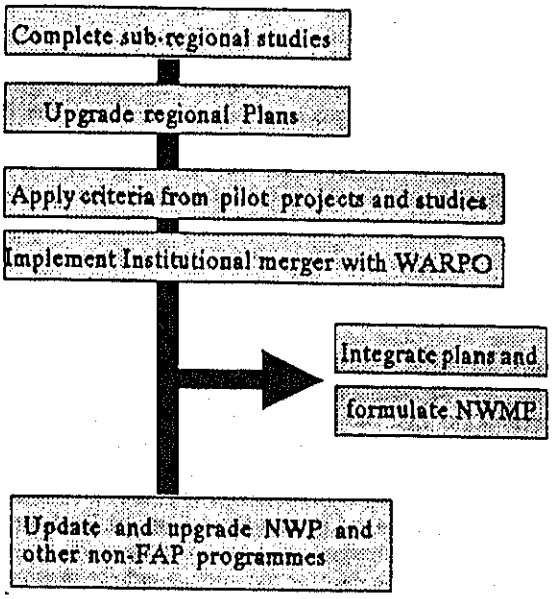


Figure 3 Preparation of NWMP

Pilot Projects

Pilot projects will constitute the major continuing FAP effort during this period. **FAP20 Compartmentalization Pilot Project**, if found to be economically and institutionally feasible, will provide the criteria needed for planning and designing water management systems in areas protected by embankments. It is testing the controlled flooding and compartmentalization concepts in the field under real operating conditions with management in the hands of local people. An effort was made for comprehensive people's participation to provide the essential base for designing the structural and non-structural measures. Public committees at various levels have been set up and the work for the first three sub-compartments should be completed in time for 1995 operations. The first test of the project concept and the experience of people's participation for part of the project will take place in 1995-96 and will help in future design of similar projects.

River bank erosion is a persistent, continuous and severe environmental hazard for people living on and close to the river banks. In some cases, erosion can lead to a radical change in a river's course with dire consequences. The sheer size and instability of the rivers and the lack of quarried rock or boulders in Bangladesh, make it difficult to find a cost-effective method of river training. **FAP21 Bank Protection Pilot Project** has been set up to develop technically sound and cost-effective bank protection methods. Valuable lessons will also be learnt from the river training associated with Jamuna Bridge.

An alternative to the traditional method of fixing the river banks by applying 'hard' measures, such as groynes and revetments, is to work with the river to induce it to change direction by training with 'soft' movable structures. **FAP22 River Training & AFPM Pilot Project**, to be completed in conjunction with FAP21, examines and tests the various ways of training the river in its active floodplain to stabilize its planform to the benefit of the riverine people.

Supporting Activities and Studies

The objective of **FAP24 River Survey Programme** is to enhance the data base by collecting reliable all-season hydrological and morphological data at key locations on the major rivers, emphasis being given to measurement of flood discharges and introducing improved technology, equipment and vessels. Special studies on the behaviour of the main rivers will be completed; the programme includes an important training element.

A new activity under consideration is the study of the inter-regional effects of project interventions such as embankments, bank protection and river training on river morphology. The **Morphological Impact Assessment Study**, is planned to start in 1995-96 and last for about three years. The aim is to assess and analyze historical data, produce morphological predictions for future development scenarios and build up national capability to undertake such assessments.

FAP13 Operation & Maintenance Phase I, completed in 1992, examined the constraints on effective O&M of FCD/I projects and recommended a range of social, technical, institutional and financial remedial measures. **O&M Study Phase-II** will evaluate these proposals, and others that may emerge from BWDB's System Rehabilitation Project, and pilot projects in existing schemes, and produce manuals for improved O&M practices.

FAP17 Fisheries Study, established baseline data on fish population dynamics and carried out impact assessments for a range of FCD/I interventions. The first phase, completed in 1994, will be followed by the **Fisheries Study Phase-II** which will complete a series of pilot projects to examine and demonstrate promising measures to mitigate the loss of capture fisheries.

National and regional water resource planning and design, flood forecasting, surface water modelling and geographical information systems all rely on a sound hydrological data base and as such **Extensions** of data collection programme are proposed. **Environmental Study under FAP 16** has provided important inputs to the regional plans and developed a manual with EIA guidelines. The work to expand its activities to all planning levels would continue. **FAP-18 Topographic Mapping** will continue to oversee the production and supply of aerial photography, maps and satellite imagery to meet planning and design needs. **FAP19 Geographical Information System** will continue until mid-1995. Its service will be maintained, in some form, using the trained unit with its hardware and software, to prevent loss of the valuable assets. **FAP25 Flood Modelling and Management** has provided FAP with a modelling capability and has developed a flood management model for simulating the effects of interventions on the flood regime. It was transferred to the Surface Water Modelling Centre in 1994.

C. Implementation

The criteria for selecting projects for implementation over the next five years are that they should:

- conform with national goals and strategies;
- satisfy a demand for urgent implementation;
- be technically sound, economically justified and financially viable;
- be socially acceptable to the intended beneficiaries and be planned in partnership with them, and also have no significant adverse internal or external environmental impacts;
- not perpetuate previous designs and practices which have proved inadequate and inappropriate;
- not prejudice future developments, either externally through future plan linkages, or internally allowing future adoption of concepts currently under development; and
- have adequate institutional capability and capacity for implementation.

Table 2 has listed the ongoing projects and programmes and the ones that are ready for implementation. These will form the core of 1995-2000 implementation activities and, subject to confirmation of viability, will be supplemented by projects and programmes from the candidate list shown in Table 3 . The project list which meets the above criteria, is broken down into specific categories. It does not, however include some other high priority environmental and institutional programmes which are not yet ready for implementation. For such programmes and any other water sector operation which fully meet the criteria set out herein, GOB in its development programme funds to the tune of Tk.13500 million over the period 1995-2000.

Flood Proofing, Flood Forecasting, Disaster Management

These are basically non-structural projects and programmes to alleviate the conditions of those living in flood-prone and cyclone-prone areas.

Flood Forecasting and Warning is a continuing activity, but at this stage the operational emphasis is on effective dissemination of warnings at the grass-root level. Following the establishment of the Disaster Management Bureau in the Ministry of Relief, the next stage **Disaster Management-II** will be taken up for increasing the capacities of communities and households to cope with disasters, and to increase pre-disaster preparedness and post-disaster recovery. The **North-East Flood Warning Project** is designed to provide timely and readily understood warnings in flash-flood prone areas and initially will be implemented on a pilot basis. The **North-East Village Homestead Pilot Project** undertakes improvement of homestead platforms in deeply flooded areas initially on a pilot basis.

Flood proofing activities - a combination of structural and non-structural measures - represent the start of an extensive programme for flood alleviation for people in flood-prone areas. Initially pilot projects **Jamuna Right Bank (RB) char flood proofing project and Jamuna Left Bank (LB) char flood proofing pilot projects** will be set up to test flood proofing measures in and along the Jamuna RB and LB concentrating on char dwellers. Works include flood proofing public buildings, assistance to households to raise plinth levels and providing shelter areas above flood levels.

River Management & Coastal Protection

These are mainly emergency and high priority works for the mitigation of potential disasters and to prevent further deterioration. **Cyclone Protection I & II** (renamed as Coastal Embankment Rehabilitation Project) involve the repair and strengthening of sea-facing embankments to protect lives from storm surges and agricultural land from saline tidal intrusion. As a first step in future river stabilization, the **Brahmaputra Bank Protection Project** comprises priority works to control bank erosion, particularly on the Jamuna right bank to prevent a breakthrough to the Bangali river at Sariakandi and to protect Sirajganj town. The **Kalni-Kushiyara river improvement pilot project,** is a river channel improvement project to reduce pre-and post-monsoon flood levels and to improve year-round navigation. The project will start with a pilot drainage programme.

Urban Protection

This set of projects comprises high priority town and infrastructure protection, the major emphasis at this stage being on Dhaka city and its industrial areas. The main part of the **Dhaka Integrated Flood Protection Project** is almost complete. The **Secondary Town Flood Protection Project,** covering six priority towns (Panchagar, Dinajpur, Kurigram, Khulna, Moulvibazar, Habiganj) and includes drainage, solid waste disposal and slum/squatter area improvement. **Greater Dhaka DND flood protection project** has been selected because RAJUK, the city development authority, has already started with some elements of the projects and because settlement is increasing rapidly. **Meghna Protection I** project has been identified as the priority for protection of two priority towns: **Bhairab Bazar** and **Munshiganj.**

Table 1: Completion of FAP Activities (1995-2000)

ACTIVITIES	Status	Cost (Million Tk.)			Annual Cost (Million Tk.)				
		Total (Est.)	Pre 1995-96	1995-2000	1995 -96	1996 -97	1997 -98	1998 -99	1999 -2000
Planning									
Overall Planning/NWMP Study	B	750		750	50	200	200	150	150
Institutional Development Study	B	100		100	10	20	20	25	25
Macro-economic Study	A	16	12	4	4	-	-		
Jamalpur Priority Project Study	A	189		189	40	80	69		
Meghna Estuary Study	B	260		260	60	100	100		
Chittagong Coastal Area Study	B	200		200	-	100	100		
North Central Sub-Regional Study	B	210		210	60	100	50		
North West Sub-Regional Study	B	100		100	20	40	40		
Southeast Sub-Regional Study	B	68		68	-	34	34		
Southwest Sub-Regional Study	B	300		300	50	150	100		
Priority Projects Feasibility Study	B	191		191	41	100	50		
Pilot Projects									
Compartmentalization Pilot Project	A	985	440	545	245	300			
Bank Protection Pilot Project	A	1570	500	1070	500	300	200	70	
River Training & AFPM PP	A	160	20	140	50	50	30	10	
Supporting Activities & Studies									
River Surveys Programme	A	530	230	300	200	100			
Morphological Impact Assessment	B	550		550	100	250	200		
Operation & Maintenance Study II	B	220		220	30	90	70	30	
Fisheries Study II	B	120		120	20	50	50		
Extensions (FAP 16,18,19,25)	B	900		900	100	180	220	200	200
Total Activities		7419	1202	6217	1580	2244	1533	485	375

Status : A. Ongoing B. Planned

Table 2: Implementation (1995-2000)

PRIORITY PROJECTS AND PROGRAMMES	Cost (Million TK.)			Population Benefited (Million)	EIRR %	NPV (MTk)	Probable Impacts		Status
	Total (Est.)	Pre 1995-96	1995-2000				Soc	Env	
Flood Proofing, Flood Forecasting, Disaster Management									
Flood Forecasting Expansion	331		331	-	-	-	++	n/a	OG
Disaster Management II	160		160	n/a	n/a	n/a	++	n/a	OG
NE Flood Warning	101		101	5.20	n/a	n/a	++	+	F
NE Village Homesteads Pilot Project	50		50	-	-	-	++	+	PF
Jamuna RB Char Flood Proofing Project	20		20	n/a	n/a	n/a	++	+	do
Jamuna LB Char Flood Proofing Pilot Project	40		40	n/a	n/a	n/a	++	+	do
River Management & Coastal Protection									
Cyclone Protection I	3450	3250	200	1.70	17.5	-	+	-	OG
Cyclone Protection II	3614	-	3214	1.30	18.2	-	+	+	D
Brahmaputra Bank Protection Project	3187	-	3187	0.25	17	287	+	+	D
Kalni-Kushiyara River Improvement Pilot Project	150	-	150	n/a	-	-	+	+	F
Urban Protection									
Dhaka Integrated Flood Protection Project	4516	3916	600	4.20	43	157	+	+	OG
Secondary Town Flood Protection Project	2846	1946	900	0.83	34	1556	+	+	OG
Greater Dhaka DND Flood Protection Project	4594	-	4250	0.45	15	371	+	+	F
Meghna Protection I (Bhairabbazar, Munshiganj)	828	-	828	-	18	522	+	+	PD
Water & Flood Management									
NE Fisheries Engineering Measures-Pilot Project	68	-	68	n/a	n/a	n/a	+	+	OG
Chandpur Irrigation Project Rehabilitation	63	-	63	0.50	78	79	+	+	PF
Total : - million Taka (million US$)	24018 (600)	9112 (228)	14162 (354)						

1) Total Costs include the costs already incurred pre 1995-96 and those to be incurred during 1995-2000 and beyond.
2) n/a = not applicable; OG= On-going; F=Feasibility; PF = Pre-feasibility; D = Designed, PD = Preliminary Designed.
3) Impacts (social & environmental:indicative only, subject to further analysis); + = positive; ++ = very positive;
4) In some cases, the nature of the pilot project is such that it does not permit quantification of benefits and hence the economic rates of return are not computed. In other cases, only alternative technical options are explored at the pilot project stage without carrying out any cost benefits analysis.

Water and Flood Management

NE Fisheries Engineering Measures represents a new water management initiative, which recognizes the need to improve and sustain fish habitats in existing and new FCD/I projects. The pilot project for the main programme will comprise fish passes, regulating structures and earthworks specifically designed for fish.

At this stage, FCD/I projects will be limited to urgent works, an example of which is the **Chandpur Irrigation Rehabilitation Project** which is suffering from river erosion and embankment breaches. The rehabilitation work (to come under SRP, with full people's participation) will comprise some embankment retirement and remedial earthworks.

D. Candidate Projects and Programmes for further study

Institutional Development

An immediate task will be to merge FPCO with WARPO. This would be followed by the transfer of SWMC from RRI if needed. The new WARPO will also need substantial strengthening. The recently initiated organizational reforms will be the forerunner of restructuring and strengthening of BWDB. The reforms in the first instance will focus on improved O&M of existing projects, better management of implementation and transparency in the accounting system. Since it is often difficult for an organization to restructure itself without bias, it may be necessary to look towards an independent management organization outside BWDB to undertake the task.

Institutional restructuring, reforms, strengthening and development will concentrate initially on WARPO (with FPCO), in its overall planning and data base roles, and on BWDB in its project preparation, design and implementation roles. These programmes, when well established, would ensure proper management of the projects.

Programmes to overcome the present weaknesses and constraints in O&M will be formulated and set in place. Critical review of SRP, FAP20 and the planned second phase of the FAP O&M study will be crucial to establish the criteria and guidelines for all new projects and the improvement of existing ones. The institutional development programme for O&M will cover BWDB's internal O&M structure, LGED and local government's role, local user groups and NGOs, and methods of ensuring full people's participation at all stages.

Table 3 Candidate Projects and Programmes for further study

PROJECTS AND PROGRAMMES	Status
Institutional Development	
Institutional strengthening & Development	IDEN
Environmental Management	
NW Wetland Pilot	PREF
SW Environmental Monitoring	PREF
NE Environmental Programmes	PREF
REMC Development	IDEN
Flood Proofing, Flood Forecasting, Disaster Management	
NE Village Homestead	PREF
Jamuna RB char flood proofing	PREF
Jamuna LB char flood proofing	PREF
River Management Works, Bank Protection	
Kaini-Kushiyara River Improvement	FES
Baulai River Improvement Pilot	PREF
Teesta Right Bank Protection	PREF
Urban Protection	
Greater Dhaka East Flood Protection	FES
Meghna Protection (Chandpur)	PRDS
Water and Flood Management	
Jamalpur Priority Project	FES
Upper Kangsha Basin Development	FES
NE Fisheries Programme/Engineering	PREF
Noakhali North Drainage & Irrigation	FES

IDEN - Identified; PREF - Prefeasibility
FES - Feasibility; PRDS - Priliminary Design

The 1995-2000 programme will see a significant shift to the multi-disciplinary approach needed for comprehensive water management and the increasing importance of environmental management. The institutional framework would ensure effective multi-sectoral participation at all stages of water sector development from broad planning right down to O&M in the field. Institutional development programmes during 1995-2000 will also cover the growing role of the private sector.

The rest of the projects and programmes are subject to further preparation, either by desk, field or pilot study. The fact that they are not as advanced as the priority list does not reflect their urgency. Social, environmental and institutional programmes will have a high priority, particularly the Institutional Development Programme without which there will be little effective water management development.

The overall institutional arrangement for water management will have to be developed during this period. The programme will involve continued strengthening of WARPO, BWDB, RRI, JRC, LGED, BIWTA, R&H, Railway, PHE, DOE, DOF, BMD, MOA/BADC etc. Expected changes in these organizations are shown in Box 4.

Environmental Management

Regional Environmental Management, research and education Centres (REMCs) will be established under FPCO/WARPO, in each of the five FAP regions. These will be based on the FAP-6 proposal for the North-east region and will monitor and research key environmental aspects of water resource development (e.g., biodiversity, water quality, pollution, fisheries impacts, land acquisition and resettlement, social impacts) and ensure feedback for management of on-going projects and the planning of new projects. The REMCs would establish regional data bases for water resource planning and evaluation, which would be open to the public, and would have active environmental education programmes. The programmes of the different REMCs would vary, but would include activities such as:

- strategic planning for biodiversity conservation and surface and ground water quality management;

- conserving biodiversity in important wetland and upland sites with locally based management, with special emphasis on rehabilitating, extending and managing threatened lowland ecology (e.g.,-reedswamps, floodplain grasslands);

- in conjunction with DOE, making an inventory of major sources of pollution (pulp and paper mill effluent, other sources of industrial pollution) which are likely to have adverse short- and long-term impacts on the biophysical environment and human health;

- monitoring and evaluating the social, economic and environmental impacts of existing and planned water resource development projects (e.g., impacts on social equity and on the livelihoods of the poor; on capture fisheries and thus the nutrition of the poor);

- participating in all WARPO pre-feasibility studies of water resource development projects; and

- reviewing the implementation of project environmental management plans (e.g., land acquisition and resettlement; design and construction of fish-pass structures).

The REMCs would be appropriately staffed by inter-disciplinary teams of experts including social scientists. They would, through WARPO, liaise closely with the DOE and other government bodies to ensure implementation of environmental regulations and laws to protect water and other environmental resources.

Flood Proofing, Flood Forecasting, Disaster Management

The main flood proofing programmes on the Jamuna chars and NE village homesteads will follow the pilot projects set up in 1995/96. People's participation and involvement, and the roles of NGOs and local government in flood proofing will be resolved before any extensive programmes are undertaken.

River Management Works, Bank Protection

The Teesta Right Bank Protection Project will be part of the programme to seal the existing Teesta right embankment to prevent overland flooding behind BRE to Gaibandha. It mainly involves river training to check bank erosion, and as such should await the results of FAP21 pilot trials.

Urban Protection

The next Dhaka project to be taken up is the Greater Dhaka East Flood Protection Project. It is in an advanced state of preparation, but implementation will depend on BWDB's capacity to execute its part of the work. Protection of Chandpur town is extremely urgent, but it is not economically viable. If this work and subsequent long-term protection are not provided, Chandpur town and part of CIP will gradually be eroded by the Meghna river, displacing large numbers of commercial establishments, residents, and destroying its industrial and commercial base. Difficult political and planning decisions need to be faced comparing the cost of town protection with resettlement and relocation costs.

Box 4 : Strengthening of Organizations

Overall Planning and Data Management

- WARPO: Strengthening capability through training, assistance and provision of equipment and facilities, and back-up support. The Environmental Cell to be established under FPCO will be included.

Project Preparation, Design and Implementation

- BWDB: Training in people's participation, EIA, land acquisition and settlement, technical methodologies and management procedures (including transparent accounting, consultant procurement and supervision), interdisciplinary water resource development, together with provision of equipment facilities and back-up support;
- LGED, BIWTA, MOA/BADC, DPHE, WASA, DOE, DAE, SOB, local government organizations and NGOs: Same as for BWDB, but appropriate to local contexts and with emphasis on methods of people's participation;

Operation and Maintenance

- BWDB: Training and assistance in setting-up and running effective O&M systems for major works, and appropriate systems for water management schemes involving local organization and beneficiary involvement;
- LGED, local government organizations and NGOs: Same as for BWDB, but appropriate to O&M systems to be managed wholly at the local level.

Monitoring and Evaluation

- BWDB, LGED, local government organizations and NGOs: Training and assistance in participatory monitoring, designing systems (particularly covering socio-economic and environmental aspects), collecting and analyzing data, reporting and feedback; and
- WARPO: Training and assistance in establishing a project M&E system which would include specifying/advising data requirements (particularly socio-economic and environmental indicators), methods of data management, analysis, reporting and feedback.

Water and Flood Management

The Jamalpur Priority Project comprises strengthening and supplementing the existing embankment system, inlet and outlet structures, drainage improvements, flood proofing of attached chars and a fisheries programme. The compartmentalization component will not be introduced unless FAP 20 or other pilot projects prove successful and guidelines are available from the pilot projects. The feasibility study is being refined to provide for full people's participation and a proper environmental impact assessment. The **Upper Kangsha Basin Development** also involves river and channel improvement to reduce flood levels. Pre-feasibility level studies indicated mild adverse impacts on regional bio-diversity and navigation. These will be addressed in the on-going feasibility study.

The NE Fisheries Programme/Engineering comprise activities to improve floodplain fisheries and appropriate engineering measures to improve fish habitat in FCD or stand-alone fishery projects.

The Noakhali North Drainage and Irrigation Project aims to relieve drainage congestion and supply irrigation water for low lift pumps through channel improvements and remodelled regulators. The feasibility study indicated that there was an adverse environmental impact on flood plain fisheries through improved drainage; but it had positive economic and social benefits. A special study on fisheries and nutrition in the impacted areas must be made before making a decision to implement the project.

LONG-TERM PROGRAMME (YEAR 2000 AND BEYOND)

The NWMP will form the basis for future water sector development programme. It will provide the strategies for short-, medium- and long-terms, and a programme of activities and an investment plan beyond 2000.

Institutional Development

By 2000, the major restructuring will have taken place and organizational strengthening at the centre completed. Institutional development and strengthening at the rural level will probably continue where people's direct involvement in running schemes is ensured. Opportunities for privatization will be pursued more vigorously. With the increasing emphasis on river management, restructuring of the RRI would be need of the time. Bangladesh has some of the world's major rivers, and RRI could become an international centre for research in river management. Supported by the main international hydraulic research organizations, RRI could attract top professionals.

Special Studies and Updating of NWMP

Although the FAP pilot projects and studies will be complete and will have produced the criteria needed for the NWMP, certain activities will continue. With the shift of emphasis from emergency river works to a longer-term programme, studies and pilot schemes will be needed to provide the basis for future river management. Building on the technologies established under FAP and continued during 1995-2000, river training, particularly works to stabilize river planforms will be taken a step further, and AFPM trials will continue. These advances will be very relevant to flood proofing.

During the preparation of NWMP the need for additional studies will arise; for example, testing FAP20's approach to public participation in other water management situations, extending FAP6's initiative in environmental management to other regions, making a concerted effort to give fisheries engineering the same emphasis as agricultural (irrigation) engineering and further study of the economic, social and environmental impacts of projects.

The improved information technology in WARPO (data collection, analysis, modelling and monitoring systems) will provide a new dimension for planning and designing water development projects and programmes, particularly for WARPO's monitoring and evaluation role.

WARPO's main planning task after 2000 will be reviewing and updating of the first NWMP. The frequency at which the rolling plan will need to be updated is not known, but five years can be assumed to be the maximum interval. With effective monitoring, a good data base, new information technology and modern evaluation and planning techniques, WARPO should have no difficulty in reviewing water sector performance and updating NWMP, whenever required.

Implementation

The projects and programmes beyond 2000 will have been determined through the comprehensive NWMP process. This will involve careful application of updated FAP criteria and guidelines. Social, environmental and institutional provisions will have been built in to produce a new generation of projects, which are formulated through people's participation, are locally acceptable and environmentally sustainable. The structural projects would probably fall into similar categories as in the short-run, but there would be changes in emphasis.

The new river projects would be the first step in a programme aimed at longer-term river management. New water and flood management projects should be introduced if they are technically, economically, socially,. environmentally and institutionally justified.

Non-structural activities would increase as more knowledge is gained on their effectiveness. Flood proofing, which could have a significant structural component, will involve long-term programmes to cover most char lands and other flood-prone areas. Environmental management programmes will be replicated in other regions.

Operation and Maintenance

While rehabilitation of existing FCD/I schemes will continue for some time, special projects will be needed to make O&M more effective. SRP generated initiatives will provide a sound pattern for the improvement of existing projects.

The results of FAP13-II (O&M study), should be available after 2000. Innovative methods tested in the field should include beneficiary management, sinking funds and privatization of BWDB's normal responsibilities. Effective solutions, including those emerging from SRP, will be built into the later projects.

The Future

Socio-political and economic realities are likely to change in the future and technological advances may alter the present thinking on agriculture, fisheries, river and environmental management. However the framework set in the short-term (1995-2000) will provide a basis for the future. The key task is to keep on updating criteria and water sector planning so as to cope with the inevitable changed circumstances.

GOVERNMENT OF THE PEOPLE'S REPUBLIC OF BANGLADESH
MINISTRY OF WATER RESOURCES

BANGLADESH WATER AND FLOOD MANAGEMENT STRATEGY

ANNEXURE
PROJECT BRIEFS

FLOOD PLAN COORDINATION ORGANIZATION
Dhaka September 1995

ANNEXURE - PROJECT BRIEFS
Table - 1 : COMPLETION OF FAP ACTIVITIES (1995-2000)*

1. **OVERALL PLANNING/NWMP STUDY:** The overall planning/NWMP would be a rolling plan to be reviewed and updated every five years. It would provide a firm plan for the next five years, an indicative plan for subsequent five years and a perspective long-term plan.

2. **INSTITUTIONAL DEVELOPMENT STUDY :** The study will help develop an overall institutional arrangement for water development which will ensure maximum people's participation in planning, design, construction and O&M. The study will also recommend steps to consolidate and strengthen WARPO/FPCO, BWDB, RRI and to ensure participation of other institutions such as LGED, BIWTA, MOA/BADC, WASA, PHE, SOB, Local government bodies and NGOs involved in water resources development.

3. **MACRO-ECONOMIC STUDY PHASE-II:** In a country like Bangladesh, where floods, cyclones, storm surge and tidal floods frequently devastate economy, large investment in flood control would seem to improve the overall growth prospects of the economy. The study aims at developing a set of corrective factors with respect to different project return periods by which standard direct benefits derived from controlled flooding may be adjusted upward reflecting the growth prospects due to large scale investment in Bangladesh economy that is likely to happen if floods can be controlled. The phase-II activities have been launched to improve/modify the model with updated data base.

4. **JAMALPUR PRIORITY (REFINEMENT OF FEASIBILITY STUDY AND DETAILED DESIGN):** Jamalpur Priority Project includes construction of embankments, inlet and outlet structures, flushing sluices, drainage works and pilot flood proofing schemes. It also involves a fisheries programme. To support all the above activities, the study will be refined following EIA and GPP guidelines and will use an updated data set.

5. **MEGHNA ESTUARY STUDY:** The outputs of the study are expected to include but not be limited to the preparation of an indicative master plan for the Meghna estuary. The study will provide: approaches and techniques for rapid and low-cost land reclamation, employing local labour and materials to the maximum extent; small scale interventions using locally available facilities; proposals for effective measures to protect existing land and potential reclamation areas against erosion; plans to enhance the security of the population in the coastal area and on the islands; plans to strengthen the technical and institutional aspects of water/land management on the coastal islands and proposals for surveys and studies required for updating the plan for Meghna estuary.

6. **CHITTAGONG COASTAL AREA STUDY:** The aim of the study is to prepare a water management plan at prefeasibility level for the Chittagong coastal plains which is crossed by three main rivers (Karnaphuli, Sangu and Matamuhuri) and by many smaller rivers and streams (Halda, Ichamati, Bagkhali etc.) running directly from the interior hills into the area. While the study will focus particularly on the resources, needs and potential of the coastal plains, it will be necessary to take into account environmental conditions in the upper catchment areas of rivers and streams entering the plains. Feasibility studies would be carried out of water control and development requirements for two broadly representative catchment areas on the plains: one area of the main rivers and the other of minor rivers or streams where small-scale structures and management might be appropriate.

7. **NORTH CENTRAL SUB-REGIONAL STUDY (JAMUNA LEFT BANK STUDY):** The feasibility study will have two-phases, the first of which is designed to establish the field and base line data, derived data and technical models (hydraulic, hydrologic, agricultural and economic) for round the year water management. The second phase will be a feasibility analysis of a selected area of 150,000 ha. to quantify accurately and reliably the benefits and costs of any proposed intervention or improvement of the area.

8. **NORTH WEST SUB-REGIONAL STUDY INCLUDING WATER MANAGEMENT (LOWER ATRAI):** The Lower Atrai sub-region forms a connected river basin system and as such has been considered as a whole. After analyzing different options, the proposed plan for development is based on Green River concept, in which the area close to the river is designed to carry peak flood discharge, whilst farther away are provided with full FMD facilities. The study will incorporate the round-the-year water management issue which was not included in NW Regional Study.

9. **SOUTH EAST SUB-REGIONAL STUDY (DAKATIA LITTLE FENI WATER TRANSFER INCLUDING SONAICHARI IRRIGATION DRAINAGE PROJECT):** The South East Regional Study will analyze the problems of, and suggest remedies for flash floods with heavy sediment load in the eastern area, drainage congestion in other areas, scarcity of irrigation water in the Dakatia and other areas and extension of irrigation in the Sonaichari area and transfer of water from Lower Meghna through Dakatia to Little Feni River for irrigation etc.

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* All these studies and programmes will be based on the criteria established in the BWFMS report with respect to the social, economic, environmental and people's participation considerations.

10. **SOUTH-WEST SUB-REGIONAL STUDY (GORAI AUGMENTATION PROJECT):** To meet the main problems of water resource management and acute shortage of water during the dry season mainly due to the construction of Farakka Barrage, the sub-regional study will consider the initial work done on the round-the-year water supply and demand for the region and will prepare a detailed feasibility study report on Gorai Augmentation Project in line with GOB development strategy and confirm the viability of the whole scheme including Ganges Barrage Project in terms of technical, economic, social and environmental aspects.

11. **FEASIBILITY STUDY OF SEVEN PROJECTS:** The objective of the study is to prepare detailed feasibility study on the following seven projects -- Chenchuri Beel Rehabilitation Project; Padma-Kumar Scheme; Narail FCDI Scheme; Arial Khan-Bisarkandi Scheme; Swarupkati FCDI Scheme; Barisal Irrigation Rehabilitation Scheme; and Bishkhali FCDI Scheme.

12. **COMPARTMENTALIZATION PILOT PROJECT (FAP-20):** The overall objective of the project is to establish an appropriate water management system for the development of protected areas so that criteria and principles for design, implementation and operation can be made available for the Flood Action Plan. This will entail the testing of the compartmentalization concept in the field under real operating conditions addressing all the relevant socio-economic, institutional and environmental issues, and trying out water control works and water management systems. These activities would be tested at Tangail and Sirajganj.

13. **BANK PROTECTION PROJECT (STUDY AND TEST) AND**
14. **RIVER TRAINING AND ACTIVE FLOOD PLAIN MANAGEMENT PILOT PROJECT (AFPM) (Study and Test):** Building on the past practical experience on the Jamuna and other rivers of Bangladesh and making the best use of other studies, the objectives of the project are two fold: (a) to investigate ways of refining the design criteria and improving the construction and maintenance of bank protection works, and (b) to investigate methods to stabilize the courses of the river channels and to reduce the risk of violent channel displacements, preferably by employing the river's own forces. The projects are under implementation.

15. **RIVER SURVEY PROGRAMME:** The objectives of the project are: to collect reliable all-season hydrological, morphological and hydrographic data at key locations on the country's main river systems with emphasis on the collection of data during monsoon season and to upgrade the institutional capability in Bangladesh for river hydrological, morphological data collection and study programme.

16. **MORPHOLOGICAL IMPACT ASSESSMENT (MIA) OF THE MAIN RIVERS SYSTEM OF BANGLADESH:** The aim of the Morphological Impact Assessment (MIA) is to develop the capability to conduct MIA as a part of framework within which the technical, social, economic, environmental and other effects of various alternative flood management and river training projects can be assessed. It also aims to develop guidelines for water resources planners on the morphological implications of bank protection and river training works etc.

17. **OPERATION AND MAINTENANCE STUDY-PHASE-II:** The 1st phase study identified O&M problems and constraints of FCDI projects and recommended various options for effective operation and maintenance. The 2nd phase would provide new approaches to development of effective O&M guidelines and operational manual through implementation of pilot projects. People's participation would be emphasized and institutionalized under this project.

18. **FISHERIES STUDY PHASE-II PILOT PROJECT:** The Fisheries Study (FAP-17) is the first study to look into the impacts on fisheries during the planning stage of FCD projects. The Phase-II programme includes a series of pilot projects designed to demonstrate feasible fisheries interventions/strategies which can minimize and compensate the loss of capture fisheries.

19. **ENVIRONMENTAL IMPACT ASSESSMENT (FAP-16) AND GEOGRAPHIC INFORMATION SYSTEM (FAP-19) EXTENSION:** The extension project has been named as "Environment and Geographic Information System Support project for the Water Sector". The objective of the extension project is to preserve the existing FAP 16 Environmental and FAP 19 GIS capabilities. The project will provide the means and a foundation for permanently strengthening the water sector capability to plan, design and implement environmentally sustainable development programmes through the use of spatial information technology and environmental assessment process and will provide support to WARPO.

TOPOGRAPHIC MAPPING (FAP-18) - PHASE II: This include aerial photography (87000 sq km), establishment of GPS, 2nd order levelling topographic survey and maps, spot images etc. and updating of the data collected during the past five years.

CONTINUATION OF FLOOD MANAGEMENT MODELLING (FAP-25) ACTIVITIES AT SWMC: The flood modelling activities are needed to support the new direction of water management in Bangladesh. The emphasis so far has been given to flood modelling. Further development of new models and refinement of the existing ones are needed to meet the new requirements e.g., water management, low flow simulation and forecasting, surface water-groundwater interaction etc.

Table - 2 : IMPLEMENTATION (1995-2000)

20. **FLOOD FORECASTING AND WARNING SERVICE - EXPANSION:** This is an expansion of 1989 project to provide improved, timely and localized information for flood forecasting and warning for disaster preparedness through the use of more advanced equipment such as Telemetry etc. The technical developments will enable to improve and expand the capabilities of the Flood Forecasting and Warning Centre so that it will function as a proper "operations centre"; extend the coverage of flood monitoring and forecasting to a larger proportion of the country with depth/area inundation; and to improve the dissemination of forecast outputs and develop public awareness at the grass-root level.

21. **DISASTER MANAGEMENT-II :** The phase-I of the study has shown that people evacuate to safer sites if they are convinced that their lives are in immediate risk, their land and property will not be stolen in their absence, and if there is time to reach known safer sites. The Phase-I made certain recommendations about disaster management which the Government has accepted and has established the Disaster Management Bureau to implement a Disaster Management Programme. The development objective of Phase II is to enhance national capacity to plan preparedness for disasters and to cope with their consequences.

22. **IMPROVED FLOOD WARNING:** To provide timely, readily understood, warnings to villagers in flood-prone areas of flash floods imminent in their locality and posing danger to them, and to promote their appropriate responses to the warnings. The initiatives to be undertaken on a pilot basis would cover flash flood-prone areas in the north-east region and include detection of rising river water levels corresponding to "moderate", "very" and "extremely" dangerous conditions through recognizably different audio and visual warning signals every 5 km along the flood's path. The pilot project also will include appropriate protective/evasive actions by villagers in response to each level of danger signal.

23. **IMPROVEMENT OF HOMESTEAD PLATFORMS:** The purpose of the project is to finance the earthwork required to enlarge and to raise homesteads, enlarge and repair partially eroded platforms, construction of new homestead platforms etc. above danger level. The present programme is to have a pilot programme for implementation in the north east region.

24. **JAMUNA RIGHT BANK FLOOD PROOFING PROGRAMME ALONG BRAHMAPUTRA RIGHT EMBANKMENT(BRE)+TEESTA RIGHT EMBANKMENT (TRE)-CHARLAND :** The purpose of the project is to mitigate adverse effects of flood in the unprotected areas flood proofing with non-structural or minor structural measures as a long-term solution. Flood proofing aims to minimize loss of human life, reduce disruption of normal activities during and after a flood, and provide people with the security and motivation necessary to make and sustain improvements in their economic and social welfare.
The recommended flood proofing measures include: in the charland areas, raised platforms, flood shelters (to serve as school/health centres), tubewells and pit latrines, relief centres for storage of food, medical supplies etc.; and NGO assistance to improve existing flood proofing effectiveness, particularly in more destitute families, Government initiatives to improve flood proofing effectiveness of public sector facilities.

25. **JAMUNA LEFT BANK FLOOD PROOFING MEASURES (CHARLAND, ETC.):** The main objectives of the project are: (1) to safeguard life and property of the people living in charland through flood proofing measures which include (a) construction of community infrastructure, (b) minor structural flood proofing, (c) engineering and technical assistance for the people living in Charland, and (d) NGO support to assist with implementation of flood proofing programme; (2) to initiate and implement other programmes like different income generating activities including diversification from agriculture to minimize risk. An initial three-year pilot programme featuring additional data collection and studies and construction of pilot flood proofing will lead to detailed definition of project design and implementation procedure. Pilot schemes and studies will cover five representative areas.

26/26a **CYCLONE PROTECTION PROJECT (Coastal Embankment Rehabilitation Project):Phase I and II**
The general objectives of embankments of the Cyclone Protection Project are the protection of Polders against inundation by saline water due to high tide and wave overtopping during monsoon condition to minimize flooding and water flow velocities in the polder during severe cyclonic storms and for protection of the Chittagong Export Processing Zone (EPZ) area, adjoining EPZ development areas and other major industrial areas: Patenga and the coastal embankments in greater Khulna, Barisal and Noakhali districts against inundation due to storm surge and wave overtopping during severe cyclonic storms. Phase-I of the project is being completed in greater Chittagong district. The Phase-II of the project will cover the polder/ embankments in greater Khulna, Barisal Noakhali and left-over polder of Chittagong. The embankments should be made motorable round the year for the benefit of communication.

27. **BRAHMAPUTRA RIGHT EMBANKMENT STRENGTHENING:** The Brahmaputra Right Embankment (BRE) is a 180 km long earthen embankment along the right bank of the Brahmaputra and 40 km along the Teesta built in the late-sixties for flood control. The objective was jeopardized due to the rapid and serious erosion of the Brahmaputra right bank. Some 146,000 people have become squatters due to the devastation of the river. The proposed programme under the Master plan will require 30 years to be implemented in stages. Stage one plans to complete the works at Sirajganj and Sariakandi/ Mothurapara to protect the bank erosion and control floods in the urban and rural areas on the right bank of the Brahmaputra river.

28. **KALNI-KUSHIYARA RIVER IMPROVEMENT PROJECT:** Based on the available information on sand and silt deposits a tentative five year programme of channel improvements has been prepared for pre-feasibility level investigations. Channel restoration works include the removal of 12.5 million cubic meter of sediments from the river and excavation of two further loop cuts. Benefits from the work include improved river navigation throughout the year, lower pre-monsoon water levels and faster post-monsoon drainage improved security of existing submersible embankment projects in the central basin, and construction of new village platforms from the dredged spoil. A pilot programme has been drawn up for dredging a portion of the Kalni-Kushiyara river which will help reduce pre-monsoon and post-monsoon flood levels on the rivers, and to improve navigation by a programme of maintenance dredging and loop cuts.

29. **DHAKA INTEGRATED FLOOD PROTECTION PROJECT:** The objective of the project is to provide a flood free and secure living environment, and to improve the urban efficiencies and environmental conditions (particularly for the urban poor) in Dhaka city.It consists of: (a) flood control and drainage works, and (b) environmental improvement programme including low cost water supply, sanitation, slum and squatter area development etc. The project covers, the most densely populated western part of the city comprising about 13,650 ha with a population of 4.2 million (87% of the city population). It covers mainly the completion of the flood protection and drainage programme initiated by the Government following the 1988 floods.

30. **SECONDARY TOWNS INTEGRATED PROTECTION PROJECT :** The project identified strategic secondary towns for priority protection and for each of the selected towns produced an integrated plan for flood control, drainage improvement, prevention of soil erosion, solid waste collection and disposal, and slum and squatter area improvement. The first priority towns are Khulna,Panchagarh, Dinajpur, Kurigram, Moulvi Bazar and Habiganj. The project proposes an integrated development for all the six towns and have been grouped under: Flood Protection Works, Drainage Works, and Environment Improvement Works. The project is now under implementation.

31. **GREATER DHAKA PROTECTION PROJECT (FAP 8A): Dhaka Narayanganj Demra (DND) Project Area:** The objective is to extend flood protection and drainage in the Greater Dhaka Metropolitan Area as per the Master Plan prepared under the Greater Dhaka Protection Programme (FAP 8A). Dhaka Narayanganj Demra (DND) project area, one of the nine areas of development, covers 5680 ha. with a population of 0.45 million. This project is in the priority list of Rajdhani Unnayan Kartripakkha (RAJUK). Feasibility studies for all these areas have been carried out.

32. **MEGHNA RIVER BANK PROTECTION (FAP-9B) (Bhairab Bazar and Munshiganj):** The project proposes protection against erosion at Bhairab Bazar township; railway bridge on the Meghna river and Munshiganj Town on the Dhaleshwari river. The problem of Bhairab Bazar is instability of land areas in Bhairab Bazar Town, deep scour holes near the piers of the railway bridge, and that of Munshiganj is erosion of banks mainly due to wave action during high river stages. The erosion threatens the infrastructure and commercial buildings.

33. **FISHERIES ENGINEERING MEASURES:** The project will specifically maintain or re-establish migration routes by providing fish pass structures in embankments, protect selected beels from sedimentation and increase beel water storage by constructing protective embankments which eliminate critical access between floodplain, beel and river habitats. New and existing FCDI projects can be made less inimical to fish by providing fish passes at key points in embankments. Fish passes will first require a pilot project to verify designs and impacts. The pilot project in Manu Barrage Project is under implementation.

34. **CHANDPUR IRRIGATION PROJECT RETIREMENT AND REHABILITATION:** The Chandpur Irrigation Project (CIP) completed in 1976 as an FCDI project, is located on the east bank of the Lower Meghna and to the south of the Dakatia river. The project now suffers mostly from the erosion problems and the consequent breaches at the most western point of the embankment along the Lower Meghna. Breaches occurring at different times are being overcome by retiring the embankment. The Lower Meghna left bank may stabilize if Eklashpur and Chandpur town are made into hard points. In the meantime, the SE Regional Plan recommended retirement of embankment and excavation of some canals and drainage channels. This will involve retirement of embankment at Haimchar and re-excavation of canals and drainage channels.

FOURTH CONFERENCE ON FLOOD ACTION PLAN

INTERNATIONAL CONFERENCE CENTRE, DHAKA

(November 30 & December 1, 1995)

PROGRAMME

(The programme may kindly be treated as invitation for the Technical Sessions) .

FLOOD PLAN COORDINATION ORGANIZATION
MINISTRY OF WATER RESOURCES
GOVERNMENT OF THE PEOPLE'S REPUBLIC OF BANGLADESH

Guests are requested to kindly bring the invitation card for entry in the Internat[illegible]

ORGANIZING COMMITTEE
FOURTH CONFERENCE ON FLOOD ACTION PLAN
(30th November & 1st December, 1995)

Patron in Chief: Mr. Mohammad Nazrul Islam, Secretary, Ministry of Water Resources.

Chief of Organizing Committee : Ms. Zakia Akhter Choudhury, Additional Secretary, Ministry of Water Resources

Coordinators:

1. Mr. M. H. Siddiqi, BU, Chief Engineer, FPCO
2. Mr. Afzalur Rahman, Superintending Engineer, FPCO
3. Mr. Ashfaqui Azam, Superintending Engineer, FPCO
4. Mr. M. A. Khaleque, Superintending Engineer, FPCO
5. Mr. Saeed A. Rana/Mr. Jan Weijenberg, FAP Coordinator, World Bank
6. Mr. Md. Nurul Huda, CTO, POE, FPCO

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5. Mr. Mesbah Uddin, Sr. Assistant Secretary, MOWR

Rapporteurs:

1. Mr. Giasuddin Ahmed Chowdhury, Director, BWDB
2. Mr. Azizul Haque, Executive Engineer, JRC
3. Mr. Nurul Ala, Executive Engineer, FPCO
4. Mr. Mir Abu Sufian, Executive Engineer, FPCO
5. Mr. Dhali Abdul Qaiyum, Executive Engineer, JRC
6. Mr. Md. Shahjahan, Economist, FPCO

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6. Mr. Md. Nurul Huda, CTO, POE, FPCO
7. Dr. Quazi Shahabuddin, POE
8. Mr. Mesbahuddin Ahmad, POE
9. Dr. Saleemul Huq, BCAS

& Dr. Mohiuddin Farooque, BELA.

FOURTH CONFERENCE ON FLOOD ACTION PLAN (FAP)
TENTATIVE PROGRAMME

(Venue: International Conference Centre)

NOVEMBER 30, 1995

INAUGURAL SESSION

0930 hrs	:	Registration
1030	:	Prime Minister arrives
1035	:	Tilawat-e-Quoran
1040	:	Welcome address by the Secretary, Ministry of Water Resources
1050	:	Speech by the World Bank representative
1055	:	Speech by the UNDP representative
1100	:	Speech by the Hon'ble State Minister, Planning
1105	:	Speech by the Hon'ble State Minister, Water Resources
1110	:	Speech by the Hon'ble Finance Minister
1115	:	Speech by the Chair, Hon'ble Minister of Water Resources
1125	:	Inaugural speech by the Chief Guest, Hon'ble Prime Minister, Government of the People's Republic of Bangladesh
1135	:	Vote of thanks by the Chief Engineer, FPCO
1140	:	Tea.

TECHNICAL SESSION-I

Chairman : Mr. Mohammad Nazrul Islam, Secretary, Water Resources

1200 hrs. : Presentation : "GOB STRATEGY IN WATER SECTOR" by - Mr. M. H. Siddiqi, BU, FPCO

1245 : Observations by the chair

1300 : Lunch

TECHNICAL SESSION - II

Chairman : Dr. A T M Shamsul Huda, Secretary, Banking Division

Rapporteur : Mr. S.N. Ala, FPCO

1400 hrs. : Presentation : "FLOOD ACTION PLAN : PROCESS" by - Mr. M. A. Khaleque, FPCO

1420 : Discussant : 1. Dr. Atiq Rahman, BCAS / Khushy Kabir, Chairman CEN
2. Mr. M. H. Siddiqi, BU, FPCO
3. Mr. Saeed A. Rana, World Bank

1450 : Questions and answers

1520 : Summing up by the chair

TECHNICAL SESSION - III

Chairman : Mr. M. Syeduzzaman
Chairman, General Advisory Services

Rapporteur : Mr. Dhali Abdul Qaiyum, JRC

1530 hrs. : Presentation : 1. "PEOPLE'S PARTICIPATION IN WATER SECTOR PROJECTS"
by - Mr. A. M. Shafi, FPCO

1550 : Presentation : 2. "PEOPLE'S PARTICIPATION"
by - Dr. Quazi Faruque Ahmed, ADAB

1610 : Discussants :
1. Syed Alamgir Faruque Chowdhury, Secretary, Local Government Division
2. Dr. Salehuddin Ahmed, D.G, NGO Affairs Bureau
3. Syed Anwar Yusuf, Member(Planning), BWDB
4. Mr. Fred Roos, Head, Asia Deptt., Ministry of Foreign Affairs, The Netherlands

1640 hrs. : Questions and response by authors

1715 : Summing up by the Chair

1730 : Tea and adjourned for the day

DECEMBER 1, 1995

TECHNICAL SESSION - IV

Chairman : Mr. M. Akhtar Ali, Secretary, Agriculture

Rapporteur : Mr. Azizul Haque, JRC

0830 hrs. : Presentation : 1. "ENVIRONMENTAL CONSIDERATION IN BANGLADESH FLOOD ACTION PLAN"
by - Mr. Mujibul Huq, FPCO and
- Mr. Raguib Uddin Ahmed, Consultant, FAP-6

0850 : Presentation : 2. "AN ENVRIONMENTAL APPROACH TO WATER SECTOR PLANNING IN BANGLADESH"
by - Dr. Saleemul Huq, BCAS

0910 : Discussants : 1. Mr. Md. Liaquat Ali, D.G, Department of Fisheries
2. Syed A.N.M. Wahed, D.G, Department of Environment
3. Prof. K. B. Sajjadur Rasheed, Dhaka University
4. Prof. Feroz Ahmed, BUET
5. Dr. Craig Anderson, Environment Officer, USAID

0950 hrs. : Questions and response by authors

1020 : Summing up by the chair

1030 : Tea

TECHNICAL SESSION - V

Chairman : Dr. Muhiuddin Khan Alamgir, Member, Planning Commission

Rapporteur : Mr. Md. Shahjahan, FPCO

1045 hrs. : Presentation : "PRIORITIZATION OF PROJECTS IN THE FLOOD ACTION PLAN - A REVIEW"
by - Dr. Quazi Shahabuddin, BIDS

1105 : Discussants : 1. Dr. Q. K. Ahmad, President, BUP
2. Dr. Muzaffar Ahmed
3. Mr. Saleem Samad, LMEAG
4. Dr. R. Faruqee, World Bank

1145 hrs. : Questions and response by the author

1220 : Summing up by the chair

1230 : Lunch

TECHNICAL SESSION - VI

Chairman : Mr. S. M. Al-Husainy
Chairman, Swanirbhar Bangladesh

Rapporteur : Mr. Mir Abu Sufian, FPCO

1430 hrs. : Presentation : "INSTITUTIONAL DEVELOPMENT IN WATER SECTOR"
by - Dr. Yusuf A. Choudhry
- Dr. A M M Shawkat Ali
Secretary, Industries.
- Dr. R. Faruqee, World Bank

1500 : Discussants :
1. Mr. Maruf Murshed, Joint Secretary, Establishment
2. Mr. Abdus Salam, Member (Impl.), BWDB
3. Dr. Mohiuddin Faruque, BELA
4. Mr. Barry Maude, Change Management Consultant, UK (ODA)

1540 hrs. : Questions and response by the author

1615 : Summing up by the chair

1630 : **Tea**

CLOSING SESSION

Chairman : Mr. Mohammad Nazrul Islam
Secretary, Water Resources

Rapporteur : Mr. Giasuddin Ahmed Chowdhury, BWDB

1645 hrs : Presentation : "NEXT STEP" by
Mr. M. H. Siddiqi, BU, FPCO

1700 : Discussants :
1. Dr. Akbar Ali Khan, Secretary, Finance
~~2. Dr. Sheikh Maqsood Ali, Ex-Member, Planning Commission~~
3. Dr. Qazi Faruque Ahmed, Chairman, ADAB
4. Mr. Saeed A. Rana, World Bank

1740 hrs. : Summing up by the chair

1800 : CLOSING OF THE CONFERENCE

Conference Support : Courtesy - The Royal Netherlands Embassy, Dhaka.

首相メッセージ

PRIME MINISTER
THE PEOPLE'S REPUBLIC OF BANGLADESH

30 November 1995

MESSAGE

I am indeed happy to know that the Fourth Conference on the Flood Action Plan is being inaugurated this morning. I recall my presence at the Second Conference in 1992, when I mentioned, "Our very existence is closely related to a meaningful solution to the flood problems". As the Head of an elected democratic government, I believe that people are the source of all power and it is only with the help and cooperation of the people, that the goals of sustainable development can be realized. I had advised during the second conference that people's participation at all levels of the Flood Action Plan studies should be ensured. I am happy to know that the Ministry of Water Resources has approved the Guidelines for People's Participation and its use is now mandatory in all water sector projects.

The first phase of the Flood Action Plan studies is now almost complete and the government has approved Bangladesh Water and Flood Management Strategy. This is now a core document in the development process in our water sector.

Water is our most important national resource. But it is also a very finite resource. We can no more treat it as an unlimited one. Sustainable development is only possible, if we have a long term water management plan. Our goal would be to avert the crises arising both out of over-abundance as well as scarcity. This calls for careful planning and management of this precious resource to formulate development options that are technically, economically, environmentally and socially feasible; projects that would save our people from the sufferings of natural calamities and ensure optimum utilization of our water resources for economic growth.

We highly appreciate the assistance and support of our development partners and international agencies in completing the first major phase of the FAP investigations and studies. The World Bank deserves special mention for its fruitful coordinating role.

I like to avail this opportunity to express my thanks to concerned Ministries, organizations specially FPCO as well as experts, academicians and professionals whose coordinated efforts have made the FAP studies possible. I also acknowledge with pleasure the contributions of former MPs both from the treasury and the opposition benches, NGOs and civil societies in the FAP process. It is time that we prepare ourselves to develop a long term water management plan and an effective and meaningful environment-friendly water management programme. Continued cooperation in this regard from friends and development partners will be very valuable.

I hope the deliberations in this conference will be pragmatic and meaningful. I wish the conference all success.

Khaleda Zia

水資源省大臣演説原稿

ADDRESS BY THE HON'BLE MINISTER OF WATER RESOURCES IN THE FOURTH CONFERENCE ON FLOOD ACTION PLAN

Colleagues,
Representatives of International Organizations,
NGO Representatives,

Excellencies,

Ladies and Gentlemen

On behalf of the Ministry of Water Resources and on my own behalf, I have the pleasure and honour to welcome you all to this 4th Conference pertaining to Flood Action Plan.

There can be no doubt that water is the most important natural resource for sustainable economic development of Bangladesh. It is, therefore, imperative to formulate a comprehensive National Water Plan that is not only technically and economically viable but also is environment friendly and based on people's participation at all stages. Therefore, judicious implementation without undue delay would pave the way to success.

We recall with pleasure the presence of Hon'ble Prime Minister in the second FAP Conference in 1992 wherein she had emphasized the importance of considering the people as the focal point of all development efforts and the need of people's participation while formulating water related projects. She advised that "people's participation must be ensured right from the planning stage of the projects for their long term sustainibility". It gives me a great deal of satisfaction to inform this august gathering, at the close of the five year period of Flood Action Plan Studies that all initiatives were taken to develop a consistent methodology for ensuring people's participation in FAP projects. After a great deal of hard work, discussions and scrutiny, in August 1994 the Ministry of Water Resources finally approved "The Guidelines for People's Participation in Water Development Projects." Its use is now mandatory.

Ladies and Gentlemen

The very geography of Bangladesh puts it in a somewhat disadvantageous position of having to constantly deal with periods of both floods and droughts which often are creations of man. The flooding is further exacerbated by hurricanes and cyclonic storms causing colossal loss of life and property. In the aftermath of 1987/1988 floods, preparation of a Flood Action Plan (FAP) was initiated entailing a number of studies to analyze the past studies and works in this area and to review the regional flood problems, develop solutions and test the proposed solutions through pilot programmes. The FAP studies which were originally started focussing

on physical control interventions as a major means for handling floods soon arrived at the obvious conclusion that what the country needs is a total water management policy. Floods do cause damage but floods cannot be fully eliminated nor is it desirable to aim for such a goal. If there is to be a goal in this regard, it ought to be towards an attempt at controlled flooding but what is more important was to find ways and means for a multi-dimensional and comprehensive year-round water management plan. It is not an easy task. It is not easy to find ways and means for a water management plan for an active delta through which three of the largest rivers of the world flow. The planners and the panel of multi-disciplinary experts had to look at the problem of round the year water management from various dimensions keeping in mind the environment in totality. The FAP studies have considered various alternatives including structural solutions and non-structural options and in the process they have also developed a Guidelines for Environmental Impact Assessment. I would not be so audacious as to claim that the Guidelines for People's Participation or Environmental Impact Assessment are perfect documents but they are now mandatory starting points in all water development projects and I am sure, in the years to come new ideas will generate and improvements will be made on these two Guidelines.

The FAP studies have generated a great deal of information and statistics and for many years to come they will form the basis of any water related study. Ultimately the five year FAP studies have evolved into a more comprehensive approach towards water management and have led to a basic document titled "Bangladesh Water and Flood Management Strategy." This document may be considered a milestone in the history of water development in Bangladesh. While many studies have been made in the water sector, this is for the first time that a water development related document has been approved and given a formal endorsement by the Government.

To-day and to-morrow in the various technical sessions of the conference we expect this document to be discussed from all relevant angles. We hope meaningful ideas will emerge from these discussions that will enable us to take the next step of formulating a National Water Plan. There is now no doubt that for us a sustainable development is only possible when we have a well defined and clear-cut national water plan that will chart the path of tackling the problems of over abundance of water in the wet season and the terrible scarcity in the lean season. We have to find a way to save our northern districts from turning into deserts, to save our mangroves, for keeping our rivers navigable throughout the year, to develop our fishery and our agriculture, to save the people of our char-lands from the constant vagaries of nature and to save our southwestern districts through augmentation of Gorai river from constant threats of salinity and shortage of water.

It is time for us to understand that water is a finite resource and surface and ground water must be addressed through a comprehensive planning. Like all other resources it is also not unlimited and therefore, we must pursue the objectives of the water management with stake-holders jointly. We need the co-operation of all riparian countries particularly that of India. But unfortunately the desired level of co-operation is not always forthcoming. Our Prime Minister has already raised the issue of water sharing not only with her Indian counterpart but also in the highest international body and we are always hopeful that a solution will be forthcoming.

The march of a thousand miles begins with the first-step and in completing of FAP studies we have taken that first step. We are now ready for the next step. The democratic Government of Begum Khaleda Zia is fully committed to the development of the water sector and Insha Allah we are now ready for the next phase.

I would like to conclude by thanking our bilateral developing partners and the multi-lateral agencies who have made it possible to undertake the gigantic task of completing the FAP studies. And I would also like to thank the World Bank for their co-ordinating role.

The nation now looks forward to our development partners for their active cooperation in the next phase of formulating a National Water Plan and in implementing a small port-folio of on-going and some new projects.

Thank you, thank you all, ladies and gentlemen.
Khoda Hafiz. Bangladesh Zindabad.

水資源省次官演説原稿

WELCOME ADDRESS BY MOHAMMAD NAZRUL ISLAM
SECRETARY, MINISTRY OF WATER RESOURCES
IN THE 4TH FAP CONFERENCE

Hon'ble Chairman
Excellencies
Distinguished Guests, Participants
Ladies and Gentlemen,

I have the privilege to express my pleasure and warm feeling on the occasion of the 4th conference on Flood Action Plan (FAP). The FAP, as I see, has shown us a new direction, a new concept and a specific strategy towards optimum development in water sector which is the most important for Bangladesh. FAP activities are nearly completed but this is not the end. I would rather call it a beginning of the actions to be taken according to the strategy produced by the FAP.

Distinguished Participants,

2. Water is no doubt a blessing to Bangladesh. But at times, particularly during the monsoon floods, this blessing turns into a curse bringing in immense miseries to the people. Some degree of flooding is beneficial for agriculture and fisheries. Major floods, however, play havoc with crops, property and people's lives undermining national confidence in development. Bangladesh has been accustomed to living with floods, counting on the tenacity and skills of its people especially its farmers, to help the nation withstand frequent flooding and minimize agricultural losses within a short period. This option, however, is becoming manifestly less applicable because :

- with the increasing population, pressure on land, already intense, will mount even higher;
- a dramatic increase in food production is required; and
- a more secure environment is required to foster institutional and individual confidence necessary to encourage and sustain Bangladesh's rural and urban economic growth.

3. Water resources development plays a vital role in the country's economy. Beside agriculture, there are other water using sectors too, such as, fisheries, domestic and municipal use, navigation, forestry, industry, salinity control, etc. But we have too much water during wet season and too little water during dry season. Such a seasonal variation of available water has been further aggravated by cross-border abstractions of the dry season

flows of major and minor rivers. Under the situation, it is necessary to take appropriate measures to meet the multi-sectoral needs in an equitable manner through year-round water management. For this purpose, active cooperation of the international community would be necessary.

Ladies and Gentlemen,

4. This conference has a special significance because of the FAP moving from now to the next step. The vital issues of environment, people's participation, prioritization and institutionalization would be presented and discussed. FAP introduced multi-disciplinary planning process and prepared guidelines on the vital issues. I hope, the valuable suggestions of the national and international experts, present here, would immensely help in taking follow-up actions for the next step.

5. As the emergent issues in the next step are preparation of national water management plan, national water policy and water code, an institutional arrangement must be made through which the FAP methodologies can be continued to settle the issues and enact necessary legislation, preventing unregulated use of water.

Ladies and Gentlemen,

6. Of all the vital issues, environmental consideration has become the crying need for the developing countries.It is no denying that any kind of development has to be environmental-friendly and sustainable.But possibly we cannot go back to primitive days of nature,abandoning all kinds of interventions as sinful. Bangladesh more than any country is vulnerable to frequent and disruptive flooding and therefore, needs to protect its population centers, road and rail links, industries, commerce and most importantly, its agriculture. To carry forward the commitment to development we may have to opt for interventions risking, however, minimum dis-impacts or in other cases provide for appropriate mitigation measures in consultation with those for whom the changes or interventions are stipulated.

7. May I state that the nation approved, for the first time, a strategy in water sector development and we should be sincere to follow it up. In view of the water crisis throughout the whole world, we should give due importance to efficient and optimum use of water and plan for the future. International cooperation in establishing national water right among the riparians should not also be precluded. Mutual cooperation is our basis for development and we expect to get it from you all.

8. Though this conference has been organized by the Govt.of Bangladesh I have all the pleasure to announce that we did not preclude anybody and all possible efforts have been made to bring NGOs, Public Leaders and Development Partners to its fold.Let me, however, say that there are voices of dissent and criticism of the FAP studies. A democratic atmosphere cannot propose to brush away

such criticism but it is also quite legitimate that criticism should be objective and purposeful. We must be aware that if there is any point in raising our voice it is for the security of life and property of our people. We cannot propose to abandon them entirely to the vagaries of nature. Moreover, government is constitutionally bound to provide for the safety and security of the people.

9. I recall with great satisfaction the arduous job done by the organizers of this conference. World Bank, as in the past, continued to be playing the key role in getting things moving towards making this conference a success. The Royal Dutch Embassy have obliged us by patronizing the conference generously. Thanks are also due to UNDP for its generous support in FAP coordination.

10. With these few words I welcome you most heartily to the Fourth Conference on Flood Action Plan and wish especially those who have come from the overseas a pleasant stay in this country.

Thanking you all once again.

FOURTH CONFERENCE ON FLOOD ACTION PLAN
INTERNATIONAL CONFERENCE CENTRE, DHAKA
(November 30 & December 1, 1995)

TECHINICAL SESSION -II

PRESENTATION : "FLOOD ACTION PLAN : PROCESS"

BY : Mr. M. A. Khaleque, FPCO

DATE : 30-11-1995 TIME : 1400 Hrs.

FLOOD PLAN COORDINATION ORGANIZATION
MINISTRY OF WATER RESOURCES
GOVERNMENT OF THE PEOPLE'S REPUBLIC OF BANGLADESH

FLOOD ACTION PLAN : PROCESS

- Md. Abdul Khaleque

1. BACKGROUND

Floods of 1987 & 1988 :

Bangladesh experienced two consecutive severe floods in 1987 and 1988. About 40% area of the country was inundated in 1987 and more than 60% area of the country was under flood water for several weeks in 1988 (Annex-1), causing heavy damage to crops, houses, lives and properties including infra-structure and communication system. After the flood of 1987 Government of Bangladesh (GOB) started relief and rehabilitation activities and reconstructed many of the damaged infra-structure. Unfortunately, however, the country again faced a most severe flood, in its history, in 1988, which led to widespread damages to new and reconstructed infra-structure creating untold sufferings to the people. The country suffered a major setback in its economy due to the recurrent flood damages involving large expenditures in repeated relief and reconstruction activities.

Flood Studies :

Following the severe floods in 1987 and 1988, the Government of Bangladesh (GOB) carried out a study on National Flood Protection Programme in November, 1988 to tackle the problems of recurrent floods in the country. The severity of the 1988 flood drew attention of the international communities and a number of countries offered to help Bangladesh in finding ways to mitigate the catastrophic effects of floods. In addition to the GOB study, four major studies were carried out in 1989 by bilateral and multilateral agencies to examine options for flood control mitigation. GOB-France carried out a Pre-feasibility Study for flood control; GOB-UNDP prepared a Flood Policy Study; USAID sponsored Eastern Waters Study; and Japan prepared a Report on Survey of Flood Control Planning. Besides, four bilateral studies were also conducted by GOB-India, GOB-Nepal, GOB-Bhutan and GOB-China. All the studies indicated different options of structural and non-structural measures for the solution of the flood problems.

G-7 Summit :

The studies, however, lacked some critical information and analysis on technical, socio-economic and environmental factors, which were felt necessary for deciding between different options and alternatives. On request of GOB in June, 1989, World Bank coordinated various efforts to prepare a programme of studies and pilot projects to get a better understanding of the flood problems. This approach was endorsed by the G-7 Summit in Paris in July, 1989.

As a first step towards its coordinating responsibility, the World Bank convened a meeting in Washington on July 11-13, 1989, attended by the leading experts from France, UNDP, USAID and Japan who were involved in the flood studies and by a delegation from the Government of Bangladesh. While the participants represented a range of views on long-term objectives and strategies, there was full agreement that any measures to mitigate flooding required thorough and detailed study. Thus, it was agreed to concentrate on an Action Plan for the next five years as the first step in formulating a longer-term flood control programme. Such a plan would include project

preparation and evaluation, regional studies, and a range of supporting technical, socio-economic and environmental studies. Arrangements to prepare such an Action Plan, put in place during the July meeting, provided for the Bank to be assisted by many of the key experts who had been involved in the UNDP, USAID, French and Japanese studies. A draft report was completed in August and finalized in consultation with Bangladesh officials during meetings in Dhaka and Washington in October 1989. The report proposed 26 components of which 11 are Main Components consisting of regional and project-oriented activities, and 15 are Supporting Studies. The Action Plan Report was presented to a meeting of donors held at Lancaster House, London on December 11, 1989. The donors expressed widespread agreement with the basic approach outlined in the Report. Within a short time after the meeting all of the 26 components of the Plan had received donor support, and UNDP had agreed to provide funding for coordination and technical review of the 26 studies.

The FAP :

The Action Plan report was actually a synopsis of the four major studies performed by UNDP, France, USAID and Japan. The document recommended an action plan based on specific objectives and eleven guiding principles (Annex-2) set by GOB. The GOB objectives for the plan were to :

- safeguard lives and livelihoods;
- improve agro-ecological conditions to increase crop production;
- enhance development of public facilities, commerce and industry;
- minimize potential flood damage;
- create flood-free land to accommodate the increasing population; and
- meet the needs of fisheries, navigation, communications and public health.

The action plan was programmed for five years (1990-1995) as the first of several stages in development of a comprehensive system of flood control to meet the GOB's objectives in the long term. Financial involvement in performing the 26 studies was estimated at about US $ 146 million. This plan is widely known as the Flood Action Plan (FAP).

2. FAP STUDIES

Coordination :

In January, 1990, GOB set up Flood Plan Coordination Organization (FPCO) under the Ministry of Water Resources to coordinate all the 26 FAP studies. FPCO organized the 1st FAP Conference in Dhaka in January, 1990 with the assistance of World Bank. The conference was attended by donor countries/agencies, GOB officials, experts and academics. About 15 donor countries/agencies committed to finance the FAP studies.

To begin the studies, necessary formal documents had to be prepared for each study such as, the Terms of Reference (TOR), Technical Assistance Project Proforma (TAPP) and the Project Document (PRODOC)/Memorandum/Financial Agreement. To expedite commencement of the studies, the Ministry constituted 9 groups of multi-disciplinary experts to assist FPCO in preparation of the TORs for all the 26 studies according to the outlines laid down in the Action Plan Report , December 11, 1989. The TORs were finalized through interaction with donor representatives.

FPCO prepared TAPPs of the studies in line with the respective TOR, prepared by the 9 groups and accordingly, the donors finalized PRODOC/Financial Agreements with GOB. A Panel of Experts (POE) was also established to assist FPCO in coordination and technical review of the studies. POE consisted of national and international experts of different disciplines, with a full-time Chief Technical Officer. Necessary financial assistance for the Flood Action Plan Coordination activities and POE was committed by UNDP while a FAP coordinator from World Bank assisted FPCO in executing all related functions.

Concept :

The concept of controlled flooding has been the main focus of the FAP studies. As the complete elimination of flood is neither possible nor desirable, the flood water would be allowed in the protected area upto an optimum level to meet the needs for agriculture, fisheries, navigation, socio-economic activities and environmental condition of the area. This was envisaged to be achieved through compartmentalization of an area with regulatory structures.

The FAP studies introduced a multi-disciplinary and multi-sectoral planning approach considering the issues of agriculture, fisheries, navigation, socio-economics, environment, public health industry, forestry, etc. Environmental examination has been made mandatory for any water development project planning. Particular emphasis has been given on people's participation at all stages of planning, implementation, operation and maintenance of a project. Besides, bottom-up approach has also been encouraged in project identification and planning to ensure real needs of the people.

The FAP studies are based on macro-level planning at pre-feasibility level. These would identify potentials for water development projects and prepare guidelines on multi-disciplinary issues for conducting feasibility studies and implementation by different agencies.

Study Process :

Each of the FAP studies was performed jointly by local and expatriate consulting firms involving multi-disciplinary teams of experts. Out of 11 main studies, there are 5 regional studies (Annex-3) and the remaining six studies include town protection, cyclone protection, major embankment strengthening and non-structural aspects of flood forecasting and warning and disaster management. The 15 supporting studies include various aspects of the planning process e.g., agriculture, operation and maintenance, flood response, environment, land acquisition, fisheries, mapping, geographic information system, pilot project, bank protection, river survey, flood proofing, modelling and institutional development.

FPCO, assisted by the POE, maintained continuous coordination with donors and other relevant agencies, monitored progress of activities and rendered technical guidance in conducting the FAP studies by the respective consulting firms. During the process of the studies, FPCO organized hundreds of seminars, workshops, conferences, inter-ministrial meetings and public meetings attended by all classes of people beginning from national, and international experts, donors, diplomats, political leaders, high officials, people's representatives and common people upto the level of farmers. These meetings immensely helped in concluding the studies with proper recommendation. The FAP was also discussed several times in the Parliamentary Standing Committee on Water Resources and was presented before the Prime Minister and the Cabinet Ministers as early as in 1992. In the Standing Committee FAP was discussed in the context of socio-economic and political condition of Bangladesh and their suggestions were utilized in the preparation of the guidelines on people's participation, project assessment and environment. The findings relating to environmental and other issues emerging from the supporting studies have been incorporated in the regional studies.

Changes in the process :

At the beginning, the names/titles of the 26 FAP studies were formatted on the basis of location, referred to river banks and issues in general. Some of these titles have been changed and the studies have been formatted on regional basis considering specific subjects involved and in view of donors sequence for financial assistance. Few additional studies have also emerged from regional studies. Previous commitment of the donors assistance was raised from US$ 146 million to US$ 150 million (Annex-4) out of which actual expenditure upto September, 1995 is about US$ 103 million. It is important to note that about 35% of the US$ 150 million is committed for implementing pilot and test projects including installation of mapping cell and equipment, remaining 65% has been provided for the FAP studies.

During the course of the studies, it was felt that the FAP, dealing with the floods alone, cannot serve the country in developing its water resources as a whole including groundwater. Droughts and shortage of water during dry season are also the burning problems of the country. It was, therefore, decided to address all sectoral issues in the FAP studies for a comprehensive planning and year-round management of surface and ground water resources. This necessitated revision and amendment of the eleven guiding principles(Annex-5).

Review Process :

The most important task for FPCO is the technical review of the consultant's reports - inception, interim and final. The review process is carried out in an integrated manner according to the TOR so as to ensure required consistency and comprehensiveness. Procedures have been formulated for the review taking due account of the need to obtain views of the various disciplines and organizations that would be involved in planning and implementation of the particular FAP component. Details of the review process is described in Annex-6.

The inception and the final reports are placed to the Technical Committee for formal approval after the review. The interim reports are also reviewed by the Review Committee, but not placed to the Technical Committee.

The Technical Committee consist of inter-ministerial representatives and is headed by the Secretary, Ministry of Water Resources and the Chief Engineer, FPCO acts as the Member-Secretary.

Linkages :

All the FAP studies maintained coordinated linkages with relevant agencies concerned. Objective of the linkage was to collect data and information of all water using sectors like BWDB, BBS, SPARRSO, SOB, IWTA, DOE, DOF, BMD, DMB, etc. Besides, all other GOB agencies related to water development activities, were discussed for conducting the studies. As BWDB is the country's major body for planning and implementation of water development projects, FAP maintained continuous linkage with the Board to have better information and identify problems in ongoing and completed projects and attempts have been made for the Non-Governmental Organizations to play their due role in water development process by involving local NGO groups in implementing some pilot projects to strengthen their contribution more effectively. The local administrative groups in District and Thana level have also been involved in the process to ensure the people's participation institutionally.

FAP Conferences :

The 1st conference on Flood Action Plan was held on January 20, 1990 at the International Conference Centre (ICC), Dhaka. The conference was inaugurated by the Hon'ble Minister of Water Resources. Donor representatives, GOB officials and experts attended the conference. As discussed earlier that the main objective of the conference was to register the donors commitment for financial assistance to the FAP studies and finalization of TORs.

The 2nd conference on FAP was held on March 1, 1992 at the ICC, Dhaka and was inaugurated by the Hon'ble Prime Minister. The conference was attended by Ministers, donor representatives GOB officials, national and international experts, teachers, researchers, journalists and NGOs. Papers on different issues of the FAP process were presented and discussed in the conference with particular emphasis on people's participation to be ensured at the very primary stage of the project for their long term duration.

The 3rd FAP conference was held on May 17, 1993 at the ICC, Dhaka and was inaugurated by the Minister of Water Resources. The conference was attended by Ministers, representatives from GOB and donors, national and international experts, teachers, journalists and NGOs. Various papers on regional studies, people's participation, pilot projects, fisheries and macro-economics were presented and discussed in the conference. People's needs and their active participation in the planning process have been considered as the main and most important issue in the conference.

All the three conferences collected useful information and suggestions on different aspects of the FAP studies which helped immensely in conducting the studies comprehensively. This 4th FAP conference is the final one which would present outputs of the FAP process. People's participation, environmental issues, prioritization process of projects and institutional aspects would be highlighted in the conference.

3. STATUS/OUTPUTS

FAP Studies :

Studies do not have physical outputs, but give a sense of direction and decision for implementing projects. However, FAP studies are accompanied with pilot and priority projects which have been either implemented or under the process of implementation. Virtually all the FAP studies have been completed so far, including the main regional studies except few pilot projects and data collection process e.g., Flood Forecasting and Warning (FAP 10), GIS (FAP 19), Mapping (FAP 18), Compartmentalization Pilot Project (FAP 20), Bank Protection Pilot Scheme (FAP 21/22) and the River Survey Programme (FAP 24). However, some subsidiary activities and few pilot projects are still ongoing under FAP-6.

In the meantime, few investment projects have been identified from the Regional Studies. Few pilot projects are also under implementation. The Jamalpur Priority Project (FAP 3.1) study and detailed engineering is scheduled to be completed by 1996. Six towns protection project of Khulna, Moulvibazar, Habiganj, Dinajpur, Kurigram and Panchagar under FAP-9A are under implementation and would be completed by 1997. The Dhaka Integrated Flood Protection (FAP-8B); Cyclone Protection (FAP-7) and the Compartmentalization Pilot Project (FAP-20)' are already under

implementation. The Bank Protection and Active Floodplain Management (FAP-21/22) is under implementation as a pilot scheme. Besides, the Brahmaputra River Training (FAP-1) project is ready for implementation. The River Survey Project (FAP-24) is also continuing collection of hydrological data in collaboration with BWDB. The Morphological Impact Assessment study (MIA) and the Jamuna - Dhaleswari Left Bank study (FAP-3.2) have also been initiated recently.

Outputs :

FPCO, assisted by POE, prepared draft final report on Flood Action Plan. The executive summary of the final draft report of the Flood Action Plan was released to the Press on November 24, 1994 by the Minister, Water Resources. The report was widely discussed in the national press. This report summarised recommendations and activities of all the FAP studies. The report indicated a sense of direction and strategic actions for the future and identified a list of 65 projects of water development for the next 10 years. It also identified criteria for prioritization of projects for their phased implementation.

Important guidelines on people's participation (GPP), environmental impact assessment (EIA) and project assessment have also been prepared. These guidelines would be used as planning tools for water development projects. EIA guidelines has been made mandatory for planning and implementation of water development projects.

Strategy :

The draft final report on Flood Action Plan was circulated in October, 1994 to the concerned government agencies, the World Bank and the donor countries/agencies. After a comprehensive discussion on the comments received from them, a strategic report has been prepared titled, "Bangladesh Water and Flood Management Strategy" (BWFMS). The report recommended strategy for formulating National Water Management Plan (NWMP) and policy in water resources development. It also recommended a list of project to be implemented during the next five years (1995-2000). Institutional aspects have also been indicated in the report and recommended that FPCO, after its expiry in December, 1995, would be merged with Water Resources Planning Organization (WARPO). The Strategy paper has been approved by GOB in a cabinet meeting on September 11, 1995 and it now constitutes a basic policy document of the Government of Bangladesh in water sector.

4. FOLLOW-UP ACTIVITIES

Strategy :

The follow-up activities would be based on the basic directives laid down in the Bangladesh Water and Flood Management Strategy (BWFMS), approved by GOB. The basic directives are briefed as follows :

a. A National Water Management Plan (NWMP) and policy would be prepared following the FAP guidelines and methodology keeping in view the national supply and demand situation for all water using sectors. Water codes would also be established and multi-sectoral allocation of water resources would be ensured aiming at the optimum

utilization of the scarce resource. NWMP would be a comprehensive year-round water management system at macro-level.

b. Ongoing and planned FAP activities (Annex- 7) and priority projects and programmes (Annex- 8) would be implemented during the next five years (1995-2000). Besides, several programmes of national importance would also be identified for implementation from the GOB's own resources. All the activities involve an amount of Tk. 45,000 million.

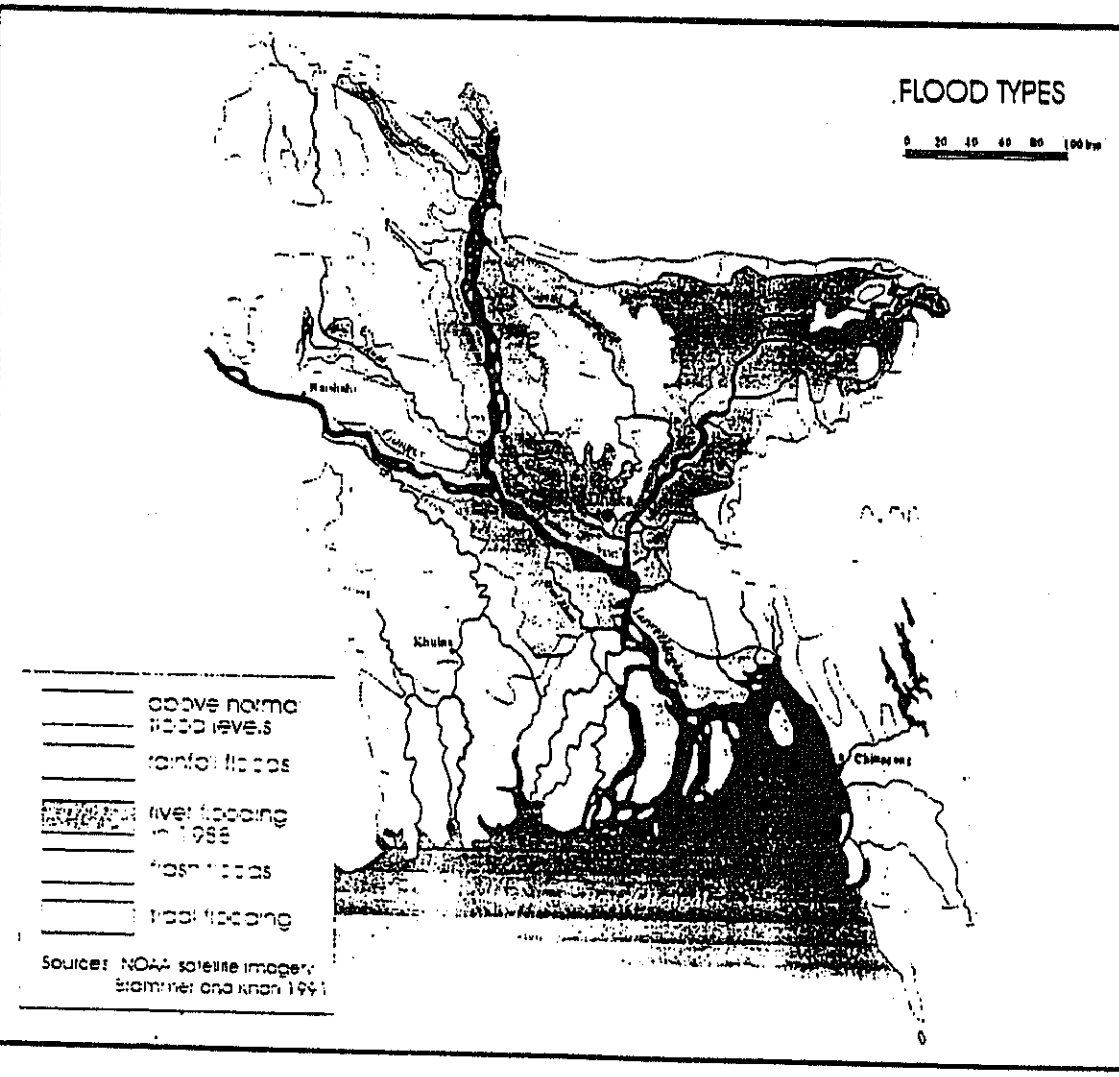
c. Institutional development would be achieved through strengthening of different organizations in water sector. Particular emphasis has been given on immediate strengthening of WARPO as an apex body for macro-level planning of water resources. BWDB and other related organizations would also be strengthened as per the national strategy. As FPCO expires in December, 1995, immediate action is necessary to merge FAP activities in WARPO.

Conference Objectives :

The 4th FAP conference is scheduled to hold comprehensive discussion on four vital issues of FAP. The issues are : People's participation, environment, prioritization of projects and the institutional development. After the conference, important findings on the issues would be the basis for necessary follow-up activities. However, the concept of FAP is under the process of examination through implementation of the Compartmentalization Pilot Project at Tangail. All FAP guidelines, issues and recommendations have been duly considered in implementing this pilot project. Results of the project are expected within few years which will guide the process of implementing water development projects in future.

Annex - 1

FLOOD - 1988



Flash Flood: In the north-eastern region, the main problem is flash flooding during the pre-monsoon months which causes damage to dry-season boro rice and also to towns and other infrastructure.

River Flood: In the middle of the country, a broad strip of land is flooded by bank overflow from the main rivers - Jamuna, Ganges, Padma, and Meghna, and their tributaries and distributaries. Heavy rains also cause flooding, as drainage is impeded by high stages in the main rivers.

Tidal Flood: The coastal areas suffer from tidal and storm surges that lead to loss of life. Siltation in the tidal channels block drainage, adding to the problem.

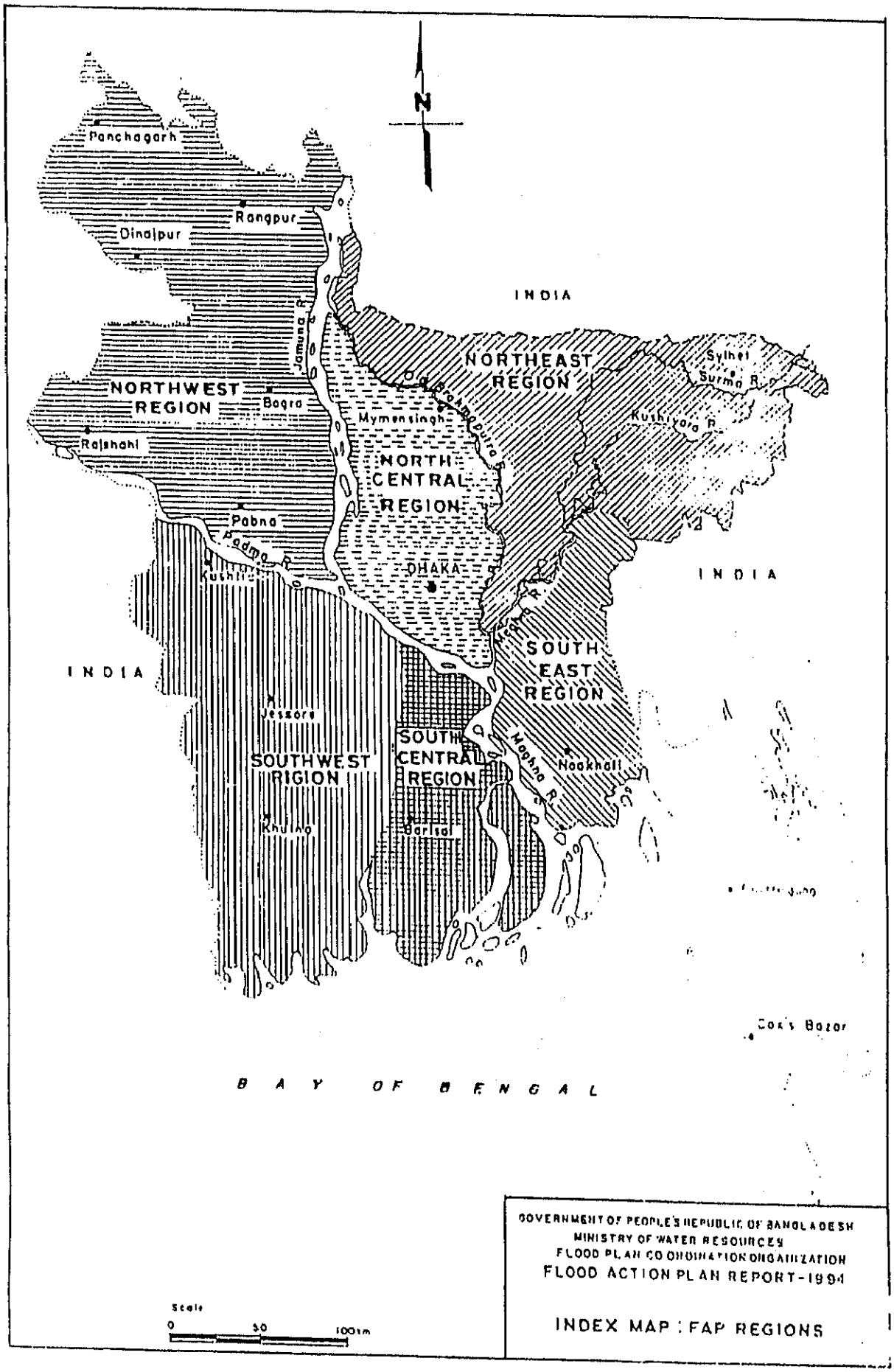
Besides flooding and inadequate drainage, river bank erosion is another major problem that renders thousand of families homeless and landless.

Annex - 2

Original Eleven Guiding Principles
(Source : World Bank 1989)

1.	Phased implementation of a comprehensive Flood Plan aimed at: - protecting rural infrastructure; - controlling flooding to meet the needs of agriculture, fisheries, navigation, urban flushing and annual recharge of surface and groundwater resources.
2.	Effective land and water management in protected and unprotected areas.
3.	Measures to strengthen flood preparedness and disaster management.
4.	Improvement of flood forecasting and early warning.
5.	Safe conveyance of the large cross border flows to the Bay of Bengal by channelling it through the major rivers with the help of embankments on both sides.
6.	River training to protect embankments and urban centres.
7.	Reduction of flood flows in the major rivers by diversion into major distributaries and flood relief channels.
8.	Channel improvements and structures to ensure efficient drainage and to promote conservation and regulation.
9.	Flood plain zoning where feasible and appropriate.
10.	Coordinated planning and construction of all rural roads, highways and railway embankments with provision for unimpeded drainage.
11.	Encourage popular support by involving beneficiaries in the planning, design and operation of flood control and drainage works.

Annex-3


N
Panchagarh
Rangpur
Dinajpur
INDIA
Jamuna R.
NORTHWEST REGION
Bogra
Rajshahi
Mymensingh
Old Brahmaputra
NORTHEAST REGION
Sylhet
Surma R.
Kushiyara R.
NORTH CENTRAL REGION
Pabna
Padma R.
Kushtia
DHAKA
Meghna R.
INDIA
SOUTH EAST REGION
INDIA
Jessore
SOUTHWEST RIGION
SOUTH CENTRAL REGION
Noakhali
Meghna R.
Khulna
Barisal
Cox's Bazar
B A Y O F B E N G A L
GOVERNMENT OF PEOPLE'S REPUBLIC OF BANGLADESH
MINISTRY OF WATER RESOURCES
FLOOD PLAN COORDINATION ORGANIZATION
FLOOD ACTION PLAN REPORT-1994
INDEX MAP : FAP REGIONS
Scale
0
50
100km

Annex-4

Flood Action Plan Studies
Fund Status

FAP NO.	The Studies	Funding Sources	Fund Commitment (million US$)	Expenditure upto September'95 (Approximate)
	Main Studies			
1	Brahmaputra Right Embankment Strengthening	IDA	3.36	3.36
2	Northwest Regional Study	UK, Japan	4.60	4.60
3	North Central Regional Study	EU, France	3.56	3.56
3.1	Jamalpur Priority Project	France, EU	2.85	2.85
4	Southwest Area Study	ADB, UNDP	3.83	3.83
5	Southeast Regional Study	IDA, UNDP	2.20	2.20
6	Northeast Regional Study	Canada	14.60	10.18
7	Cyclone Protection Project	EU, IDA	1.00	1.00
8A	Greater Dhaka Protection Project	Japan	3.00	3.00
8B	Dhaka Integrted Protection Project	ADB	0.57	0.57
9A	Secondary Town Integrated Protection Project	ADB	0.55	0.55
9B	Meghna River Bank Protection Project	IDA	1.15	1.15
10	Flood Forecasting and Warning+Expansion	UNDP, Japan + Denmark	5.70	2.20
11	Disaster Preparedness	UNDP	1.10	1.10
	Supporting Studies			
12	FCD/I Review	UK, Japan	1.60	1.60
13	Operation and Maintenance Study	UK, Japan	0.60	0.60
14	Flood Response Study	USA	0.92	0.92
15	Land Acquisition and Resettlement Study	Sweden	0.40	0.40
16	Environmental Study	USA	4.037	3.94
17	Fisheries Study and Pilot Project	UK	3.40	3.30
18	Surveys and Mapping	Finland,France, Switzerland, Germany	6.71	4.50
19	Geographic Information System	USA	4.36	4.05
20	Compartmentalization Pilot Project	Netherl & Germany	17.09	10.50
21/22	Bank Protection, River Training and AFPM Pilot Project	Germany,France	40.00	14.53
23	Flood Proofing Pilot Project	USA	0.30	0.30
24	River Survey Programme	EU	14.70	9.75
25	Flood Modelling and Management	Denmark,France, Netherland, UK	4.39	4.39
26	Institutional Development Programme	UNDP,France	3.60	3.35
-	Macro-Economic Study	France	0.41	0.36

Annex-5

REVIEW PROCESS

Following are steps of the review process :

i) The Consultant submits the report simultaneously to FPCO and the donor. In some cases, the report is submitted to FPCO through the donor. The donor carries out its internal review.

ii) The designated Superintending Engineer (FPCO SE) distributes copies to a predetermined list of reviewers.

iii) The main review is carried out over a five-day period by the following groups:
- Local Panel of Experts
- International Panel of Experts
- World Bank Co-ordinator
- FPCO Team (staff supported by local experts)
- Designated officials from concerned Ministries/Agencies

iv) The FPCO team will include professionals of the various disciplines to be covered by the particular FAP activity. FPCO will request the Ministry or Agencies to send their experts to participate in the review.

v) The comments are screened for duplication and any obvious inappropriateness are consolidated by FPCO SE. Copies with the consolidated comments are distributed to members of the Review Committee five-days before they meet.

vi) The review Committee discusses and agrees on the final form of the comments, approves technically the report and prepares a review paper. The Committee, which should not exceed 11 persons, comprises the following :

- Additional Secretary (MOIWDFC).
- World Bank Co-ordinator.
- Donor Representative (with result of donor review)
- Concerned Ministry/Agency Representative (as requested by MOIWDFC).
- Panels of Experts Representatives.
- Co-opted Experts.
- FPCO Chief Engineer, FPCO SE and FPCO Executive Engineer.

vii) The time taken for the work of the Review Committee should not exceed three days, including passing the comments to the consultants.

viii) The Inception Report with the Review Paper are placed before the Technical Committee for consideration and formal approval.

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Following are steps of the review process :

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Annex - 7

Ongoing and Planned FAP Activities (1995-2000)

ACTIVITIES	STATUS	Cost (Million Tk.)
Planning		
Overall Planning/NWMP Study	B	750
Institutional Development Study	B	100
Macro-economic Study	A	16
Jamalpur Priority Project Study	A	189
Meghna Estuary Study	B	260
Chittagong Coastal Area Study	B	200
North Central Sub-Regional Study	B	210
North West Sub-Regional Study	B	100
Northest Sub-Regional Study	B	68
Southwest Sub-Regional Study	B	300
Proirity Projects Feasibility Study	B	191
Pilot Projects		
Compartmentalization Pilot Project	A	985
Bank Protection Pilot Project	A	1570
River Training & AFPM Study	A	160
Supporting Activities & Studies		
River Surveys Programme	A	530
Morphological Impact Assessment	B	550
Operation & Maintenance Study II	B	220
Fisheries Study II	B	120
Extensions (FAP 16, 17, 19, 25)	B	900
Total Activities		7419

Status : A. Ongoing B. Planned

Annex - 8

Implementation (1995-2000)			
PRIORITY PROJECTS AND PROGRAMMES	Cost (Million Tk.)		
	Total (Est.)	Pre. 1995-96	1995-2000
Flood Proofing, Flood Forecasting, Disaster Management			
Flood Forecasting Expansion	331		331
Disaster Management II	160		160
NE Flood Warning	101		101
NE Village Homesteads Pilot Project	50		50
Jamuna RB Char Flood Proofing Project	20		20
Jamuna LB Char Flood Proofing Pilot Project	40		40
River Management & Coastal Protection			
Cyclone Protection I	3450	3250	200
Cyclone Protection II	3614	-	3214
Brahmaputra Bank Protection Project	3187	-	3187
Kalni-Kushiyara River Improvement Pilot Project	150	-	150
Urban Protection			
Dhaka Integrated Flood Protection Project	4516	3916	600
Secondary Town Flood Protection Project	2846	1946	900
Greater Dhaka DND Flood Protection Project	4594	-	4250
Meghna Protection 1 (Bhairabbazar, Munshiganj)	828	-	828
Water & Flood Management			
NE Fisheries Engineering Measures Pilot Project	68	-	68
Chandpur Irrigation Project Rehabilitation	63	-	63
Total : - million Taka	24018	9112	14162
(million US$)	(600)	(228)	(354)

1) Total Costs include the costs already incurred pre 1995-1996 and those to be incurred during 1995-2000 and beyond.
2) n/a=not applicable; OG= On-going; F=Feasibility; PF= Pre-feasibility; D= Designed; PD= Preliminary Designed.
3) Impacts (social & environmental : indicative only, subject to further analysis); + = positive; ++ = very positive;
4) In some cases, the nature of the pilot project is such that it does not permit quantification of benefits and hence the economic rates of return are not computed. In other cases, only alternative technical options are explored at the pilot project stage without carrying out any cost benefits analysis.

FOURTH CONFERENCE ON FLOOD ACTION PLAN

INTERNATIONAL CONFERENCE CENTRE, DHAKA

(November 30 & December 1, 1995)

TECHNICAL SESSION -III

PRESENTATION : "PEOPLE'S PARTICIPATION IN WATER SECTOR PROJECTS"

BY : Mr. A. M. Shafi, FPCO

DATE : 30-11-1995 TIME : 1530 Hrs.

FLOOD PLAN COORDINATION ORGANIZATION
MINISTRY OF WATER RESOURCES
GOVERNMENT OF THE PEOPLE'S REPUBLIC OF BANGLADESH

People's Participation in Water Resources Projects

A.M. Shafi
Flood Plan Coordination Organization

1. Introduction

Any development project should have as its primary goal the welfare of the people for whom the project is meant. The Government of Bangladesh has put a lot of emphasis on people's participation in the Fourth Five Year Plan, the National Environment Management Action Plan (NEMAP) and also in the proposed Participatory Perspective Planning Concept. In project formulation and implementation in various sectors in Bangladesh, the approach in the past has largely been top-down in nature. The tradition was for central authorities to formulate policies and oversee implementation with very little input from the people at local levels. This approach has often resulted in less than optimum benefits for the people of concerned areas. Due to lack of proper people's participation, people living within the project areas, did not develop a sense of ownership to the projects. As a result, the projects failed to achieve the desired benefits and the Operation and Maintenance (O&M) of the projects also suffered. The Flood Action Plan (FAP) studies identified that there was a general lack of public consultation in the planning, designing, construction, and commissioning of the Flood Control, Drainage and Irrigation (FCDI) projects. This has led to misunderstanding about intentions and has often been at the root of subsequent O&M problems. In recent years there has been a significant change in this approach and the merit of people's participation has been widely appreciated.

The objective of this paper is to present an account of the efforts taken toward people's participation within the water sector projects, so that feedbacks can be obtained from the distinguished members of this forum for an even more effective participation of the people. Before getting on to the discussion of people's participation in FAP, the paper puts forward, in section 2, the importance of people's participation as viewed by the professionals involved in this exercise. This is followed by a discussion in section 3 of the mechanism which can translate the ideals of people's participation into reality. Section 4 puts forward the efforts of FAP in ensuring people's participation in various activities. Section 5 deals with the future need in the context of people's participation in the water resources sector of the country. The paper ends in section 6 with a few concluding observations.

2. Importance of People's Participation

Today in the democratic society, the public wants to be involved and expect honest answers to its questions. All issues that arouse public concern require to work with the public in order to create projects that meet community needs, solve community problems and provide community services. The key question that we have is the need for public input not for public endorsement. We need to provide options beyond "win/loose and support/resist" propositions and therefore, create an informed, public which would contribute constructive suggestions, recommend ways to increase project acceptability and understand the larger and long-term ramification of public projects.

The very terms "public" and participation are so widely used as to be taken for granted and for being self explanatory. The definition vary but the source of concern is the same, namely, how to accommodate a mounting demand for greater degree of public involvement. We may consider Public Participation as a systematic process of mutual education and co-operation which provides the opportunity to those affected, political representatives, and technical experts to work together to create

a plan which combines and reflects common values, knowledge, experience, responses and best judgement in a democratic manner. In such definition of democratic involvement two key underlying concepts are those of representativeness and of public (common) interest.

The importance of people's participation derives from a number of factors of which the significant ones are the following:

- The people of a locality would through their age-old experience know what is in their best interest when it comes to development of their area. Thus, at the planning level it is important to incorporate feedbacks from the local people. On the basis of local people's concern suggestions, different project alternatives can be looked into keeping in view the technical and economic viability. The preferred alternative can be finalized after due consultation with the people.

- It is also useful to ensure people's participation at the design stage so that interests of different communities can be properly addressed, and the conflicts in interest, if any, can be resolved by the local people in a participatory manner.

- The people should have a voice in matters of implementation as well which will minimize different kinds of lapses. They should also be involved in the construction of the project to the extent feasible.

- One of the reasons for the poor performance of many development projects in Bangladesh has been the unsatisfactory level of operation and maintenance. It is very difficult for distant administrative bodies to ensure O&M of local-level projects. Only through the participation of local people can one achieve effective O&M.

- Local-level institutions which act as platforms for people's participation are often very useful at different stages of project development.

- Sense of ownership of a project by the beneficiaries is a necessary condition for the sustainability of any project; and people's participation can go a long way in achieving this end.

3. The Mechanism of People's Participation

3.1 Necessary Ingredients

Sustainability of projects can be ensured by creating opportunities to people who *want* to participate, by making people aware of the *availability* of participation opportunities, by making *adequate* information available to the public, and by establishing a process whereby relevant agencies can *respond* effectively to the whole gamut of people's participation.

3.2 Identification of Socio-Economic Groups

One of the initial tasks in ascertaining people's participation would be to examine the socio-economic stratification of people living in the concerned locality. Different socio-economic groups may be expected to have different interests, and hence different views, about any proposed project. Therefore, in ensuring effective participation of people it is of utmost importance that all such groups are identified at the outset. These groups are sometimes referred to as the 'stakeholders'.

3.3 Identification of Project-Affected People (PAP)

It is necessary to identify those among the general people of the locality who will be affected by the project, either beneficially or adversely. It will be important to seek feedbacks from them in deciding how the beneficial impacts can be further increased (through what is known in the literature of EIA as 'enhancement') and how the adverse impacts can be minimized (through mitigatory measures and adjustment of project plan).

3.4 Interaction with Different Strata of People

This interaction is to enable the people to participate in the true sense of the term. The way to let people participate is to create ample opportunities for them to voice their opinions. This may take different forms depending on the issues and purpose. One of the forms could be public discussion sessions with participation from different groups and communities. The advantage of this approach is the possible interaction among different interest groups and a degree of cross-fertilization of ideas. However, the disadvantage is that in such a forum the weaker sections may not get enough opportunities to freely voice their own opinions. At times it would prove more useful to let a homogenous group (in terms of its socio-economic belongingness, occupation or cultural background) meet and spell out its needs and views. On certain other instances, more micro-level discussions may become necessary; for example, in letting female-headed households voice their opinions.

3.5 Involving Local-level Government and Non-government Agencies as well as Elected People's Representatives

To channelize the opinions of different groups of people, important roles would be played by local-level government and non-government agencies as well as elected people's representatives. In other words, these can provide the institutional platforms for voicing the opinions of people and later follow through with implementation as well as O&M. It is important to involve representatives from these institutions in the process of people's participation so that they can appreciate the views of people and act as effective facilitators. One should however make sure that these institutions are not given a 'directive role' which is contrary to the very spirit of people's participation.

3.6 Forming Societies/Committees

The bottom-up approach of project development through people's participation would require a degree of formalization through the formation of certain societies and committees. For example, societies of occupational groups (farmers, fishermen, boatmen, traders etc.) and disadvantaged groups (landless, female-headed households etc.) would be able to convene and conduct discussion sessions as well as pass on their suggestions for project planning and implementation. A committee consisting of representatives from these different societies would allow discussions through which consensus decisions can be attempted. It would also be useful to form a committee consisting of representatives of community groups, elected people's representatives, NGOs and government agencies inclusive of project personnel. This committee would try to resolve any remaining conflicts in interest and also make preliminary judgements and recommendations on the financial and technical efficacy of various options put forward. Such committees need to be conceived not only for the planning and designing stage, but also for subsequent stages of implementation and O&M.

4. People's Participation in FAP

4.1 General

At the very outset of the FAP initiative, it was emphasized that the projects to be undertaken under FAP would have to be technically and environmentally sound and socially acceptable. This concept underlines the necessity of incorporating people's participation in various FAP activities. This was reiterated by the Hon'ble Prime Minister of Bangladesh in her address to the Second FAP Conference, where in she stated "We must remember that development is nothing abstract. Masses are at the centre of all development efforts. Development is for them so we have to pay due importance to people's participation while formulating flood control projects. People's participation must be ensured at the very primary stage of the projects for their long term duration".

To develop a methodology for ensuring people's participation in FAP activities, an early initiative was taken under the Flood Plan Co-ordination Organization to formulate appropriate guidelines to be used by planners and implementors of FAP projects. The culmination of this effort was the production of the *Guidelines for People's Participation* (GPP), in March 1993.

In the initial stage of FAP studies, the extent of requirement of people's participation was not clear and the provision in TOR of some studies were not sufficient for full scale process of people's participation. As such some of the FAP regional studies had to proceed concurrently with the preparation of the GPP, so the level at which people's participation could be effected varied from one study to the other. The range of intensity varied from public consultation and Rapid Rural Appraisals (RRAs) to rather rigorous efforts.

To ensure that people's participation gets proper attention in each of the FAP projects, the use of GPP has been made mandatory in the forthcoming feasibility level studies. This should help in meeting the deficiencies in people's participation from which some of the earlier FAP studies might have suffered from. As an example, the feasibility of Jamalpur Priority Project is now conducting refinement studies for extensive People's Participation and Environmental Impact Assessment.

The importance of people's participation has been highlighted in the *Environmental Impact Assessment (EIA) Guidelines* produced under Flood Action Plan. The section on people's participation in the document does not only point out the necessity of people's participation, but also discusses the ways and means of ensuring such participation for the EIA and preparation of EMP, commensurating with sustainable development.

As stated earlier, the Guidelines for People's Participation (GPP) was first prepared by FPCO in March 1993. The System Rehabilitation Project (SRP/BWDB) was also preparing a set of guidelines for people's participation. By combining these two guidelines, the Guidelines for People's Participation in Water Development Project was prepared and approved by the Ministry of Water Resources (August 22, 1994). This document outline a multidisciplinary team for effective implementation of people's participation programme, consisting of ecologists, social scientists, engineers, economists, agronomists and other appropriate specialists. Through extensive consultation meetings with the local people, this team will elicit predominant development issues and concerns of the people, describe development alternatives, likely benefits/disbenefits and the environmental and socio-economic impacts of each. These project-wise consultation programmes for needs assessment and appraisal of environmental and social effects would be effective provided all concerned parties receive appropriate essential information and opportunities for consultation at different stages.

i) **Project Identification Stage:** This involves the primary consultation process for broad-based groups covering the potential project beneficiaries, Project affected persons (PAPs), elites, institutional and social groups and different development agencies in the area. In this process, assessment of local perception/needs through extensive consultation with local people and social groups both inside and out side the programme area and analysis of conflicting interest likely to affect the project will be made. If the reconnaissance and the preliminary consultation reveal that a pre-feasibility investigation will be worthwhile, a **Project Council (PC)** comprising representatives of GOB, beneficiaries, PAPs and NGOs will be constituted to take policy decision, coordinate and monitor the project activities (Ref.Annex-I).

ii) **Prefeasibility Study Stage:** Local people, their elected representatives and local officials are to be involved in needs assessment. This includes technical, environmental and social appraisal of an area's problems, analysis of alternative project options and possible selection of project or programme. The results may be used to adjust any existing project concept in accordance with the findings.

iii) **Feasibility Study Stage:** As a project takes shape, local people are to be involved in more detailed technical, environmental, social and economic appraisal. Also at this stage, the representatives of diverse local socio-economic groups and the local councils can interact, discuss and concur in project concept including mitigation and compensation measures. This process will help develop methods of people's involvement in project design, construction, management, operation and maintenance, monitoring and evaluation.

iv) **Detailed Design Stage:** Once a project is deemed feasible, there must be an ongoing interaction between local people and technical planners in developing criteria and specifications for many vital project facilities or programme considerations, e.g. the location, size, and distribution of project works, land acquisition, relocation plans and mitigation measures.

v) **Implementation (Construction) stage:** PC will monitor implementation in order to ensure that design standards and implementation are carried out as agreed. Both formal and informal communications with local people including PAPs should be as open as possible, the plan itself and any modifications there of should be explained to them and their views taken into account. It may also seek expert advice if problems are severe or threaten the project proposal. The process of formation of **Water Users Group (WUG)** and other groups is to be initiated simultaneously at this stage (Ref.Annex-II).

vi) **Operation and Maintenance Stage:** The operation and maintenance stage should directly involve the WUG. However, the degree of direct local control and management will vary according to the nature of the infrastructural works. Operational manuals must be drawn up with this in mind, including the legal responsibilities for ownership; labour and financial resources provision, day to day operation, routine and emergency maintenance and repair work. The criteria for deciding operational procedures must be drawn up with the consensus of the Water Users Group to be formally established at this stage. This group should have its formal representation in PC.

vii) **Monitoring and Evaluation Stage:** In order to learn from experience of a project and to influence future development, the PC, should constantly monitor the performance of project and initiate remedial actions as necessary, this will require intensive liaison

with WUG/local people affected directly in the area and outside. It will need to address both the positive and negative ways in which people are affected at all stages of project development.

The FAP studies which were able to address the issue of people's participation relatively rigorously include FAPs 6 and 20 on which some information is provided in the following section.

4.2 Examples of People's Participation in FAP

4.2.1 Northeast Regional Study (FAP 6)

The different components of people's participation effected by FAP 6 are summarized below:

- the multidisciplinary study team consulted people at grassroots level through RRA;
- people's participation was sought extensively in the preparation of the *Water Management Plan;*
- extensive people's participation was also ensured within the special studies aimed at understanding the resource base and its utilization in the region;
- a number of seminars were organized at eight district headquarters with participation of:
  - members of Parliament,
  - elected representatives (chairmen of UPs/Thana Parishads),
  - government and non-government agencies,
  - various socio-economic classes,
  - various occupational groups, and
  - journalists.

In these seminars, results obtained from the special studies (relevant to the districts concerned) were presented and initial feedbacks sought from the participants. At the end of this dialogue, the participants were divided into small groups to ensure a more intensive discussion among them on the issues involved. The findings of each of the groups were later presented in a plenary session by those who were selected as rapporteurs by the group members. These presentations highlighted the problems and prospects faced in the water resources sector of the area and also came up with recommendations for solving specific problems. The proceedings of these meetings including the recommendations made were recorded and subsequently made available to the participants. These recommendations were a key to the identification of projects for pre-feasibility study. And, as mentioned earlier, the multidisciplinary pre-feasibility team continued the process of people's participation through consultation at various levels. In this way, the North East Regional Water Management Plan incorporates policies, programmes, projects and actions which are the result of an intensive process of people's participation.

4.2.2 Compartmentalization Pilot Project (FAP 20)

FAP 20 included the strategy of 'involving people in all phases of compartmentalization with the aim that they will operate and maintain these compartments, so as to ensure sustainable development'. Three different phases were identified for the process. An indicative diagramme on People's Participation process as followed in this project is shown in Annex-III.

a. *The Needs Assessment*

Identification of the existing water management related situation and the

problems caused by flooding and water congestion and the finding of people's opinion on the potential structural and non-structural solutions.

b. *Consultation*

Through consultation, determination of the option and finalization of the interventions (the different stages of the consultation process were initial meeting with interest groups, follow up meetings if required with representatives of different interest groups and combined meeting with elected representatives, local elites and members of different interest groups and concerned government and non-government agencies). The project has been divided into 15 sub-compartments including 183 villages with a total population of 201, 143. As many as 175 consultation meetings were conducted with the participation over eight thousand people.

c. *Institutionalization*

Creation of various bodies for the implementation, operation and maintenance.

Specific actions of FAP 20 with regard to people's participation included the following:

- formation of Project Council (is in progress)
- formation of Chawk committee (80 completed out of 100)
- formation of Sub-compartment Water Management Committee (SWMC) (7 completed out of 16)
- implementation through Labour Contracting Societies (LCS)
- operation and maintenance of embankments, canals and structures through Embankment Maintenance Group (EMG), Structure Maintenance Group (SMG).

5. Future Needs

For proper development of the water resources sector of Bangladesh, a macro policy framework is urgently needed. This framework can be effectively put together through participation of people from all walks of life. An institutional setting which is sensitive to local needs and capable of facilitating interaction among different government and non-government agencies is essential. An appropriate local government would have to play a crucial role in ensuring the participatory approach toward sustainable development in the country.

6. Concluding Observations

The role of people's participation in sustainable development cannot be overemphasized. The perceived needs of people should be reflected in all development initiatives. The process of people's participation recognizes a decision making process which takes into account preferences and interests of those clearly affected by a particular decision; and, finally, produces decisions which are not only acceptable as legitimate but are also the result of a balance between what is socially desirable, economically viable, technically and ecologically sound, legally pertinent and politically feasible.

The Ministry of Water Resources has initiated the process of people's participation in a systematic way by making use of the Guidelines for People's Participation. But it is a complex process and the Guidelines needs to be improved from time to time. In this process the experience of other agencies including the NGOs will be useful and can be incorporated for further improvement of the Guidelines. It my be stated that for ensuring proper people's participation, effective local government bodies, at union, thana and district levels are essential.

Annex - I

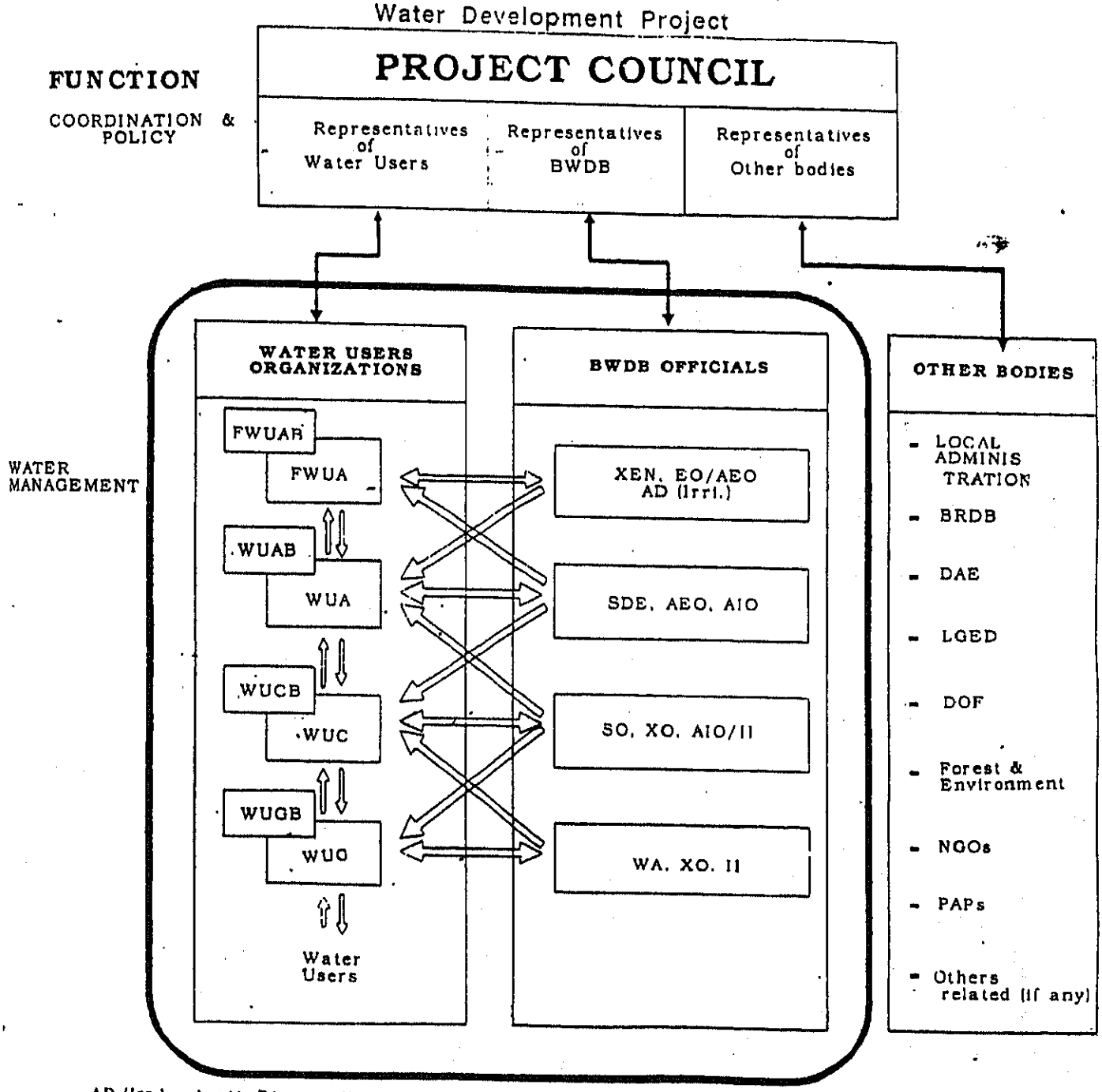
PROJECT COUNCIL

The Project Council shall constituted by the following members:

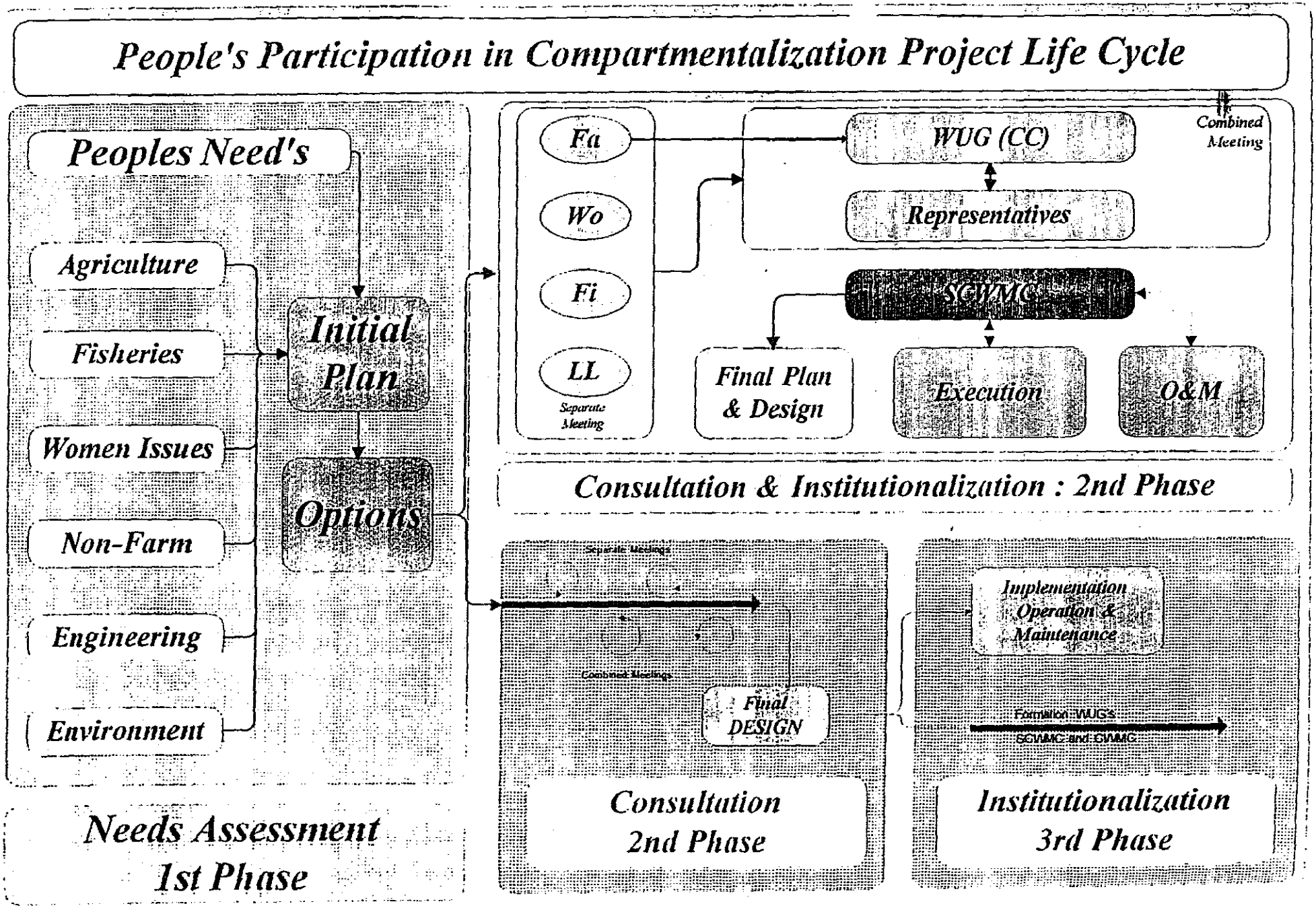
a) The concerned Honourable Member of the Jatiya Sangsad will be the adviser of the project council;
b) The Deputy Commissioner, who shall also be its Chairman in case a project has a command area encompassing more than one Thana;
c) The TNO, who shall also be its Chairman in case a Project has a command area within one Thana;
d) The TNOs, among whom one TNO shall be nominated to the position of Vice-chairman of the Project Council, in case a Project has a command area involving more than one Thana;
e) Members of the Union Council: Two Male members and one female member from each Union within the Project Area;
f) The Chairman(s) of the Union Parishads, among whom one Chairman shall be nominated to the position of Vice-Chairman of the Project Council, in case a Project has a command area concerning one Thana only;
g) An Officer of DLWU, BWDB (as appropriate);
h) A Fishery Officer of Thana or District level;
i) A Women Affairs Officer of the Thana or District level
j) A Co-operative officer of the Thana or District level;
k) An officer of the DAE, responsible in the area;
l) An Officer of the BRDB, responsible in the area;
m) An Officer of the LGED, responsible in the area;
n) A Representative of the Forest and Livestock division, responsible in the area;
o) A Representative of an NGO for organizing beneficiaries and PAPs to be nominated by concerned D.C/T.N.O;
p) Minimum 11 representatives of the users/beneficiaries/PAPs to be nominated by the people during the pre-project meeting. They will cease to function as soon as the representative of WUO/beneficiaries or PAPs representatives should represent the different interest groups of people engaged in farming, fishing or performing any other subsistence activity in the area affected by the project;
q) A BWDB Officer not below the rank of Sub-Divisional Engineer shall be its Member-Secretary;
r) The office of the Chairman will be the office of the Council

Annex - II

Institutional Framework for People's Participation in Water Development Project



AD (Irr.)	Asstt. Director (Irrigation)
AEO	Asstt. Extension Officer
AIO	Asstt. Irrigation Officer
BRDB	Bangladesh Rural Development Board
BADC	Bangladesh Agricultural Dev. Corpn.
DAE	Department of Agricultural Extension
DOF	Department of Fisheries
EO	Extension Officer
FWUA	Federation of Water Users Association
FWUAB	Federation of Water Users Association Board
II	Irrigation Inspector
LGED	Local Government Engineering Department
NGOs	Non-Government Organizations
PAP	Project Affected Persons.
SDE	Sub-Divisional Engineer
SO	Sectional Officer
WA	Work Assistant
WUA	Water Users Association
WUC	Water Users Committee
WUG	Water Users Group
WUAB	Water Users Association Board
WUCB	Water Users Committee Board
WUGB	Water Users Group Board
XEB	Executive Engineer
XO	Extension Overseer


People's Participation in Compartmentalization Project Life Cycle
Peoples Need's
Agriculture
Fisheries
Women Issues
Non-Farm
Engineering
Environment
Initial Plan
Options
Needs Assessment
1st Phase
Fa
Wo
Fi
LL
Separate Meeting
WUG (CC)
Representatives
Combined Meeting
SGWMC
Final Plan & Design
Execution
O&M
Consultation & Institutionalization : 2nd Phase
Separate Meetings
Combined Meetings
Final DESIGN
Consultation
2nd Phase
Implementation Operation & Maintenance
Formation WUG's
SGWMC and GWMC
Institutionalization
3rd Phase

FOURTH CONFERENCE ON FLOOD ACTION PLAN

INTERNATIONAL CONFERENCE CENTRE, DHAKA

(November 30 & December 1, 1995)

TECHNICAL SESSION - III

PRESENTATION : "PEOPLE'S PARTICIPATION DEMOCRATIZATION OF DEVELOPMENT PROCESS"

BY : Qazi Faruque Ahmed
Executive Director, Proshika
and Chairman, ADAB

DATE : 30-11-1995 **TIME : 1550 Hrs.**

FLOOD PLAN COORDINATION ORGANIZATION
MINISTRY OF WATER RESOURCES
GOVERNMENT OF THE PEOPLE'S REPUBLIC OF BANGLADESH

People's Participation
Democratization of Development Process

Qazi Faruque Ahmed
Executive Director, Proshika
and Chairman ADAB.

If one assesses the development projects of the past 40 years, particularly those in the water sectors, one cannot but conclude that these are unsustainable. The reasons are:

1. These projects have often produced results contrary to the intended benefits and even if benefits did occur they accrued to a small minority of elites.

2. Interest of the poor and the women was undermined resulting in exacerbation of poverty and not it reduction, which was often the declared objective of these projects.

3. Majority of these projects have either a small or negative economic rate of return.

4. Often the cost overrun was phenomenal and operation/maintenance in shambles.

5. Above all, environment and natural resources were often damaged irreversibly.

Let us have a few examples to enunciate these problems.

Example 1:

Thirty years ago a system of flood control infrastructure was created in Beel Dakatia (between Khulna-Jessore district) to prevent flooding due to high tides. The result after a few years: silt that used to spread over the flood plain was prevented from doing so. The silts stayed in the canals and the rivers raising the level of their beds and clogging up the sluices. The gates no longer operated properly and the canal beds rose higher than the field. Water flooded in, but could not drain out. This is a classic example of a flood protection project turning out to be a "permanent flood creation project".

Example 2:

The DND embankment, built in the 1960's, was supposed to keep flood waters out and allow crop yields inside the project to almost triple. "When the project was built and our village was left outside. we felt cheated, and now farmers are happy their land is not inside the project", says Mr. Shafique Alam an elderly farmer of Dharmikpara village, 10 km from Dhaka. Farmers in Dharmikpara grow two crops a year and during the months when their fields are inundated turn to fishing instead. But for the village Paradogar inside the embankment the dream of three crop a year turned sour. Things went well for the first few years. But then yields began to slide, while farmers struggled to keep production high by applying increasing amounts of chemical fertilizer. "Today we get barely 500-600 kilos of rice per hectare", says Sarkar a farmer of Paradagor. By contrast Dharmikpar farmers achieve 1000-1500 kilos a hectare. "Sometimes we use chemical fertilizer"

explains Alam, a farmer of Dharmikpara, "but the main source of nutrient for our soil is natural silt that washes in with the monsoon floods".

Example 3:

"Though the project has boosted rice production, it has also thrown 10,000 fishermen out of work" said the Executive Engineer of the Chandpur scheme.

Many landless people support themselves by fishing during the rainy season and working as agricultural labourer during the dry months. But they say that since the embankment was built and waterbodies inside the project area were disconnected from rivers outside, fish migration into the flood plain for feeding and breeding almost totally restricted. Result of this was alarming decline of availability of fish in open water bodies and consequent denial of this free gift of nature to the poor.

Example 4:

Embankment, frequently plagued by problems of drainage congestion and polluted stagnant water, have been implicated in the spread of diseases. In the Meghna Dhonagoda Project area about 40 km southeast of Dhaka, Dr. Mohammad Yunus said number of patients had been increasing in the Matlab area during the hot weather peak. About 200,000 people are treated for diarrhoeal diseases every year at the local ICDDRB centre where he works, and most of the patients were from the villages inside the embankment. Dr. Mohammad Abdus Salam of ICDDRB said three times as many people (620) were admitted on a day in November 1993 as on the same day the previous year. Most of the Dhaka patient came from Lalbagh, Demra, Sutrapur and other areas inside Dhaka Flood Protection Embankment. Mr. Stephen Minkin, a US consultant who has worked on health issues in Bangladesh over a period of two decades says the risk of kala-azar infection a deadly disease was found to be more than 17 times higher among people living inside embankments than among their neighbours living outside.

One can go on giving scores of such examples. The conclusion is unavoidable-*these projects are unsustainable*. Then, the question is why they are unsustainable ? The answer is simply they all *lacked people's participation*, which is one of the most important input into the different stages of decision making in a project cycle. Lack of people's participation causes:

* *Mismatch of perceptions between project initiators and major stakeholders regarding the problem to be solved.*

  Example: FAP-20 project initiators believe controlled flooding with embankment and sluices will solve th problem. Many people of the area particularly the poor however, believe that floods like 1988 are few and far between and cannot be prevented by the project. But what the project would be able to prevent is the regular monsoon flood which brings silt and fish and recharges the ground water. Without these, livelihood of poor farmers, fishermen and women will be jeopardized.

* Mismatch of perception between project initiators and stakeholders regarding needs and priorities to be addressed in the project.

Example: Most of project initiators believe that flood is major problem for agriculture and to boost agricultural production embankment and sluices are to be built. However most people in the project area do not consider flooding a major problem for agriculture. On the contrary, they think it to be often beneficial. As such, they want drainage and water storage project for the dry season. Thus, they often want reexcavation of canals, rivers and restoration of open water fisheries.

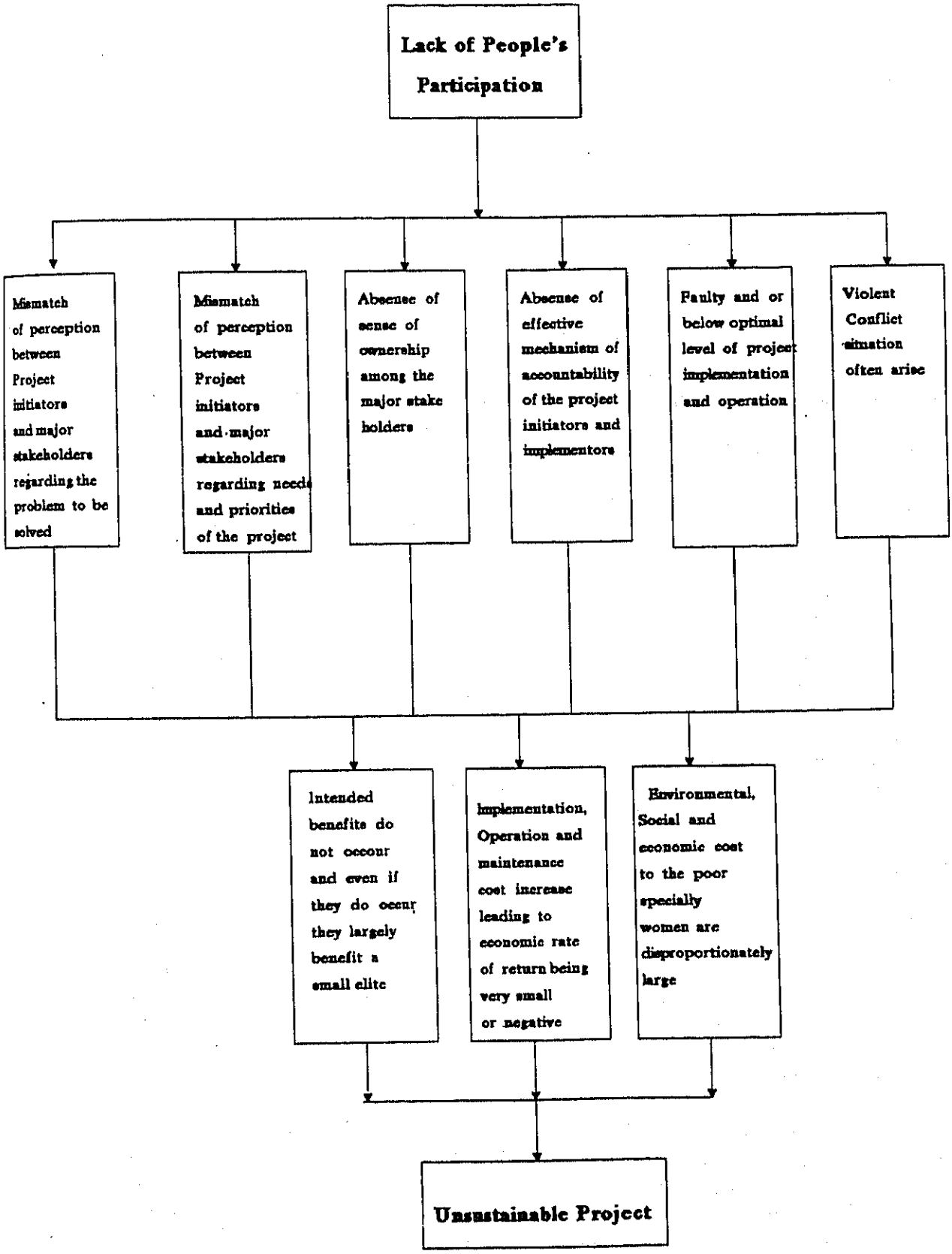
* *Absence of sense of ownership among the stakeholders.*

There are scores of examples where people have refused to participate in O/M work of the project and often they have destroyed embankment known as "public cut".

* *Lack of accountability of project initiators and implementators.*

Examples are abundant in this regard. Project initiators and implementators are pretty much free to do and not to do according to their own understanding with scant regard for the priorities of major stakeholders. As a result most of the project are not only inappropriate but also costly and that the cost is borne by the people and not by the project initiators.

* Violent conflicts are often caused between different interest groups in the project area and also between project insiders and outsiders.


Lack of People's Participation
Mismatch of perception between Project initiators and major stakeholders regarding the problem to be solved
Mismatch of perception between Project initiators and major stakeholders regarding needs and priorities of the project
Absence of sense of ownership among the major stake holders
Absence of effective mechanism of accountability of the project initiators and implementors
Faulty and or below optimal level of project implementation and operation
Violent Conflict situation often arise
Intended benefits do not occour and even if they do occur they largely benefit a small elite
Implementation, Operation and maintenance cost increase leading to economic rate of return being very small or negative
Environmental, Social and economic cost to the poor specially women are disproportionately large
Unsustainable Project

Genuine People's participation can ensure

* Close match of perceptions between project initiators and major stakeholders regarding the problem to be solved.

* Close match of perceptions between project initiators and major stakeholders regarding the needs and priorities to be addressed in the project.

* Generation of a sense of ownership among the major stakeholders.

* Effective accountability of project initiators and implementators.

* Efficient and optimal level of project implementation, operation and maintenance.

* Avoidance of violent conflicts by reconciling apparently divergent interests.

The above beneficial effects contribute enormously to the sustainability of the project i.e. it becomes economically productive and profitable, socially just and equitable; and environmentally sound and regenerative.

What is genuine people's participation?

Genuine people's participation involves major stakeholders in all the critical stages of the project cycle and has the following characteristics.

It involves people -

1. In the problem/opportunity and issue definition stage.
2. In the phase of enunciation of needs and priorities of the project.
3. In the designing stage of the project.
4. In implementation, operation and maintenance of the project
5. In the evaluation and monitoring stage.

What is pseudo participation:

If people are not involved in the stage 1,2,3 and 5 of the project cycle but are involved only in the stage 4 level then people's participation can be described as pseudo participation and, therefore, it can provide only a very limited benefit.

How to have genuine people's participation:

A full commitment on the part o project initiators for genuine people's participation has to be made based on the realization that it is one of the most important input for a sustainable development project. Pseudo participation and tokenism have to be avoided. Multidisciplinary team has to be composed who should keep their mind open and slate clean, allowing people's wisdom to combine with theirs for a holistic view of things. With this value orientation, the following methodologies can be pursued at different stages of project cycle:

1. Pre-feasibility stage: In order to capture people's views and perception regarding issues and problems/opportunities in a particular areas, Participatory Rural Appraisal (PRA), Focused Group Discussion and Opinion Survey can be conducted.

2. Feasibility stage: In this stage needs and priorities as well as basic strategies of the project can be developed by enlisting people's views on these aspects using the method of organizing participatory workshops, such as those used in NEMAP process, involving major stakeholders of the project.

3. In implementation stage people's participation is only useful if people had participated in the earlier two stages and their views, concerns and ideas are taken on board in the project. If such is the case, different tiers of management committees of people can be organized in the project area.

4. In the evaluation and monitoring stage people's participation can be ensured through method of PRA, Focussed Group Discussions. etc.

From the above it is apparent that there is a cost to people's participation interims of time and resources, but the cost of failure and unsustainability due to lack of people's participation is many times greater. Therefore, all project should have a built in cost of people's participation which will certainly more than pay up interms of better quality of project. Democratization of development through people's participation is not only ideologically correct out also sound in practical terms.

References:

1. Rivers of Life, PANOS/BCAS 1994

2. Beel Dakatia, The Environmental consequences of a Development Disaster, Atiur Rahman 1985

3. Guidelines For People's Participation, FPCO, March 1993

4. Monitor, A Journal by Research and Advisory Services. Vol.1 Number 1 April 1995.

Note:

This paper is prepared for presentation in the Fourth FAP conference.

PEOPLE'S PARTICIPATION IN WATER SECTOR PROJECTS

Fred Roos, Director, Asia Department
Ministry of Foreign Affairs
The Netherlands

Discussant

Mr. Chairman,

It is an honour and privilege to have the opportunity to be one of the discussants in this session on People's Participation. The Government of Bangladesh and the Government of the Netherlands have a long-standing development relation in the area of water management. One of the first projects in the water development sector supported by the Netherlands was the Early Implementation Projects (EIP). This project, which was started in 1975 and is still ongoing, was followed by several other water sector projects. Most of these projects started off as pure technical interventions. However, during the course of time the focus of attention shifted to socio-economical development and gradually, the local population got involved in different phases of the project cycle. EIP introduced the involvement of Landless Contracting Societies in the implementation of construction works in the water sector. Other projects, such as the Land Reclamation Project and the Delta Development Project, established sluice and polder committees to ensure participation by different population groups in the operation of water control works. The Systems Rehabilitation Projects (SRP), which aims to rehabilitate existing water works and improve the operation & maintenance of these works, introduced Embankment and Canal Maintenance Groups, often composed of groups of destitute women who are given the opportunity of long-term, gainfull employment. The Compartmentalization Pilot Project (FAP-20) seeks to involve the local population not only in implementation and operation & maintenance but also in planning, design, monitoring and evaluation. After conducting the needs assessments, extensive consultations were held both in and outside the project area in order to incorporate the wishes of the population while designing the physical infrastructure for the different compartments. Water management committees composed of representatives of different occupational groups will be responsible for operating the compartments.

During the last 20 years, there has been an increased awareness of the Government of Bangladesh regarding the importance of the issue of People's Participation. I would like to acknowledge and at the same time commend the Government of Bangladesh for the importance it attaches to this subject. The paper of Mr. A. M. Shafi gives a good overview of the guidelines which have been drafted for people's participation in water development projects and the way people's participation has been effected in FAP 6 and FAP 20. The establishment of guidelines for people's participation in the water sector is a very commendable achievement, one which is rather unique when compared with the planning processes established in many other sectors and in many other countries.

Experiences of Flood Control, Drainage and Irrigation projects, including EIP and SRP, have amply proven that schemes are neither maintained nor operated in a satisfactory

manner because of a perceived lack of ownership of the beneficiaries who have not always been involved in the design or the implementation of the project. The paper of Mr. Faruque gives some examples of water development projects which failed or caused serious side effects because of a lack of genuine people's participation in critical stages of the project cycle. We have learned from mistakes made in the past as cited by Mr. Faruque and that is precisely why people's participation became one of the basic premises of FAP-20. That is also why the concept of *controlled* flooding was choosen, as this would preserve the beneficial effects of flooding on soil fertility, fishing and ground water. The land within the compartment is still flooded, but in a more controlled way. At the same time, fish-friendly structures have been installed and provisions have been made for boatmen. I would also like to point out that FAP-20 is a pilot project and that the real testing still has to start. Of course, in such a process mistakes can be made, but they will be addressed properly. The project will be accurately monitored and evaluated so that a professional judgement can be given regarding the technical, economical, social and, above all, institutional feasibility of the concept of controlled flooding.

Both papers emphasize the importance of genuine people's participation in every phase of the project cycle. In this respect Mr. Shafi also points out the need to improve the existing Guidelines for People's Participation from time to time. We understand the suggestions by Mr. Faruque on how to have genuine people's participation as a request to be invited to make a contribution to the further improvement of the guidelines for people's participation. We would heartedly endorse such a invitation.

Based upon experiences obtained from Netherlands' assisted projects in the watersector, I would like to take this opportunity to elaborate on some of the remaining issues and constraints which need to be addressed in the immediate future.

ISSUES/CONSTRAINTS

The Bangladesh Water Development Board (BWDB)

Without going into an in-depth analysis of the performance of the BWDB, which is being addressed by the Water Sector Reform Programme and SRP, it is evident that the BWDB has neither the means nor the professional expertise to be the main agency for people's participation. At the same time, the BWDB does not currently have a mechanism for accountability to the people, and as such does not fully tally with the concept of people's participation.

Status of the Project Council

Another serious constraint is the fact that the Project Council, as proposed in the Guidelines for People's Participation, has no legal basis. The same problem is encountered in FAP-20, where established water management committees at different levels lack a legal status. In case of conflicts, the decisions made by these committees have no legal authority. The Project Council needs to be given legal powers as well as some funds which will enable it to function properly. Within the Project Council provisions should be made for the empowerment of vulnerable groups, such as landless people and women.

Operation & Maintenance - Cost recovery

The SRP project has learnt that it is extremely difficult to establish a sustainable operation & maintenance system. This refers not only to technical aspects, such as needs based planning, but especially to the involvement of beneficiaries. Here the lack of any cost-recovery mechanism remains one of the crucial issues for which not only a technical solution but, even more importantly, a political (sanctions) commitment is needed. The Small Scale Water Resources Development Project, where beneficiaries have to make a contribution before starting the implementation of any water works, may be a step in the right direction. The best illustration of ownership is when, ultimately, people are willing to make a financial contribution because they can see or have experienced the benefit of the project.

Administrative versus hydrological units

This issue may at the same time be read as micro versus meso versus macro planning. Any small-scale intervention in the regulation of a given water regime will likely have an impact somewhere else. The process of assessment of these local impacts necessitates a higher planning level which which will have a final say in any proposed intervention and may have to "impose" decisions. Such a regional planning mechanism should be, as a second layer, built upon organisations at a lower administrative (thana) level. This should not interfere with the bottom-up approach, which is a condition *sine qua non* for people's participation. People's organizations are therefore needed at different levels to ensure participatory planning at both micro and macro layers.

Sectoral-Occupational issues

It is a well known fact that water development projects may have adverse impacts. This has been recognised and the concept of Project Affected Persons has emerged. Projects such as FAP-20 pay a great deal of attention to compensatory measures. Nevertheless, instruments for conflict-management are needed. In order to effectively deal with conflict management, a legal status is needed for the earlier discussed Project Council. Besides, it is also necessary to establish a process by which contending forces can come to a consensus.

Process approach/administrative reality

A process approach which is closely related to effective people's participation is not on good terms with the reality of the GOB's administrative procedures (TAPP's, ADP). Mechanisms should be developed to let a project "grow" without being hampered by lack of funds, or by so-called "blueprint" documents. A phased implementation approach, as introduced by SRP, is an example of how difficult it is to have a system whereby investment is conditional upon the progress of other components (in this case institutional development).

People's participation / costs involved

Perhaps one of the biggest obstacles in the field of people's participation is the cost

involved. Sometimes, the Technical Assistance component outruns the Financial Assistance component in order to meet the requirements of effective people's participation, making it not only a costly affair but often also jeopardizing the original cost/benefit ratio of a project. The financial complications of an effective people's participation should not be underestimated and *realistic* planning should prevail.

NGO's and People's Participation

Within the process of people's participation, NGOs can play an important role as they often have a strong capability to work at grassroot level. It is at the same time a fact that NGOs have their own development objectives and do not want to be "contracted" just for implementation purposes. Many NGOs have emphasized that they want to be involved in all phases of the project cycle, including in the planning process. However, NGOs are to a great extent dependent on outside funding and their long-term commitment is therefore not guaranteed. This uncertainty needs to be properly dealt with, for instance by drawing up "guidelines for NGO-involvement" which articulate the role of NGOs in the water sector. The Netherlands Government has in the past indicated, and I wish to repeat this offer here, that it is willing to support any action (be it a study, a conference, etc.) which further enhances the collaboration of NGOs and the Government in the water sector of Bangladesh.

I hope that the issues and constraints I have described clarify that there is still a long way to go. In order to address these issues in an effective way, I would like to finish my contribution as discussant in this conference by making two strong recommendations.

RECOMMENDATIONS

1) The Government should immediately establish the new national water planning organization with a socio-economic planning division which can solve the constraints described above. It goes without saying that improved information dissemination will have to be an important component of this socio-economic planning division.

2) A process of effective decentralisation including the delegation of financial powers, seems to be a prerequisite for any effective people's participation at field level. Effective decentralisation will take place by reinforcing local government and by providing the Project Councils with a legal and financial basis. There is a need in Bangladesh to strengthen local level organizations which can offer an effective platform for people's participation. In this context I would like to conclude my observations by referring to the fact that in the Netherlands Water Users Organisations were already established well before there was any form of people's participation in the functioning of the State. In fact our water user organizations have laid the foundation for our democracy.

Thank you for your attention.

FOURTH CONFERENCE ON FLOOD ACTION PLAN

INTERNATIONAL CONFERENCE CENTRE, DHAKA

(November 30 & December 1, 1995)

TECHNICAL SESSION -IV

PRESENTATION : "ENVIRONMENTAL CONSIDERATION IN BANGLADESH FLOOD ACTION PLAN"

BY : Mr. Mujibul Huq, FPCO and
Mr. Raguib Uddin Ahmed

DATE : 01-12-1995 TIME : 0830 Hrs.

FLOOD PLAN COORDINATION ORGANIZATION
MINISTRY OF WATER RESOURCES
GOVERNMENT OF THE PEOPLE'S REPUBLIC OF BANGLADESH

Environmental Considerations in Bangladesh Flood Action Plan

Mujibul Haq and Raguib Uddin Ahmed

Abstract: Floodplain constitute 80% of Bangladesh. These floodplain including the wetlands which form an integral part of the ecosystem, supports much of the country's most diversified biological resources, some of which are of global importance. Many rural economic activities and the country's valuable and diverse open water capture fishes are totally dependent on the fluctuating water regime. But almost every year flood exceeds the expected water level, causing disruption to economic activities and adversely impacting the quality of life.

Earlier water and land resource development activities have caused significant deterioration in Bangladesh's environment, although the actual amount of reductions has been poorly documented. The devastating floods of 1987 and 1988 brought global response that led to consideration for protection of people and properties from damaging flood. Donors and the Government of Bangladesh jointly initiated a series of regional and supporting studies on water management including the relevant components under the Flood Action Plan (FAP). The main consideration of FAP was focus on sustainable water resource management. To ensure environmentally, socially and economically sound water management, an Environmental Impact Assessment (EIA) process has been initiated under FAP. The Environmental Study (FAP 16) component of FAP prepared an EIA guideline (October, 1992) and an accompanying EIA manual, use of which have been made mandatory for all water resources management activities in Bangladesh.

Conservation of the last remaining ecosystems and sustainable management of environmental resources under conditions of increasingly intensive land and water management requires updated and accurate inventory of information and appropriate institutional support. Emphasis on flood control in the FAP has shifted to round the year water management through an evolutionary process and multi-criteria analysis, in addition to the earlier practice of only economic analysis, has brought in social and environmental considerations in FAP. Integration among agencies, public participation in real sense and week data base are the existing shortfalls of FAP and need to be overcome in the near future. Implementation of environment related laws and acts is essential as well.

Key Words: Bangladesh, environment, flood action plan, water management, floodplain ecosystem, wetlands, fisheries, wildlife, impacts, flood control, irrigation, drainage.

INTRODUCTION

Bangladesh is situated between 20° 34' and 26° 38' north latitude and between 88° 01' and 92° 41' east longitude and lies between India and Myanmar. The country has a total area of 148,393 km^2, of which about 80 percent comprises one of the largest deltaic plains in the world, formed by the confluence of the Brahmaputra (Jamuna), the Ganges and the Meghna rivers. The remaining 20 percent comprises of the undulating, forested Hill Tracts. The climate is sub-tropical monsoonal, with three seasons - winter (November-February), summer (March-June) and monsoon (July-October). Average annual rainfall varies from 1200 mm in the drier northwest to more than 6000 mm in the northeast.

Seasonal flooding through over-bank spillage from rivers and heavy rainfall is normally extensive, affecting an average of about 20 percent (ranging from 5 to 60 percent) of the total surface area of the country and an average of 60 percent of the cultivable area (World Bank 1992). Wetlands are consequently abundant over the landscape and comprises permanent rivers and streams (4800 km^2), estuaries and mangrove swamps (6100 km^2), shallow lakes and marshes (1200-2900 km^2), large water storage reservoirs (900 km^2), small ponds (1500-1800 km^2), shrimp ponds (900-1150 km^2) and seasonally-flooded floodplain (57,700 km^2), all estimates made by the Asian Wetland Bureau (1989).

Flooding is an annual and common phenomenon in the Bangladesh floodplain to which agriculture and community lifestyles are highly attuned (the Bengali term *barsha* refers to normal, beneficial flooding of agricultural land which does not significantly affect homes and villages). Damage to crops and properties take place when floods exceed the average annual level of inundation. Large-scale destructive floods such as occurred in 1987 and 1988 are comparatively rare, but of sufficient negative impact to infrastructure and livelihoods as to have prompted an international commotion and response.

FLOOD PLAIN ECOSYSTEM

The flood plain ecosystem of Bangladesh covers about 80% of the total land. The ecosystem consists of perennial and seasonal wetlands like, rivers & their tributaries, lakes, beels, baors and haors. The hydrology of floodplain are influenced from the discharge and water levels in the major river system namely the Ganges, the Brahmaputra, and the Meghna and their distributeries. Inflow through these rivers coupled with locally generated rainfall runoff is responsible for the fluctuation in water level in floodplain. This fluctuation contributes significantly in the maintenance of the wetland ecosystem.

Four types of floods occur in Bangladesh:

- flash floods;
- rain induced floods;
- monsoon floods from the major rivers; and
- tidal flood.

Flash floods, which occur between April and May, mainly in the eastern and northern rivers are caused by sudden onrush of water from upstream hilly areas. They occur suddenly and are of relatively short duration. The flash flood overtops river banks and water readily enters the floodplain. Because the drainage system generally is inadequate, water remains in the lowlands and submerges crops to depths and for durations beyond their tolerance limits. As a result, crops (usually rabi crops and *boro* rice at various growth stages) are damaged. These floods do not occur every year and are very unpredictable.

Rain induced floods are generated by very high rainfall intensities and duration in the monsoon season exceeding local drainage

capacity. These are localized in nature, damaging crops and properties. Duration of such floods depend on the water levels in the main rivers.

Monsoon season floods are large and normally last from July to October. The monsoon season floods are a combination of river inflows, seasonal rainfall, and backwater effect from the rivers. Agricultural damage from these floods tends to be less than during the pre-monsoon season because farmers either leave their land fallow or plant low yielding deep water *aman* rice capable of elongating with the gradual rise of flood levels. Crop choice, specially the scope of growing rice varieties with higher yield potential, is restricted by monsoon season flood depth. The hydrological cycle renews natural stocks (silts, sediments, fish, etc). The biological cycles of aquatic and wetland dependant creatures are synchronized with the hydrologic cycle. That is why these ecosystem support the bio-diversity, fish and wildlife. Human activities are also adapted to the flood plain ecosystem.

Tidal floods take place in the coastal areas of Bangladesh, often with storm surges generated by tropical cyclones, causing extensive damage to life and property. Worst of all is the intrusion of saline water which has a lasting affect on biological and human resources.

Bio-diversity: More than 5,000 species of flowering plants and 1,500 species of vertebrates, of which 578 are birds and over 500 are coastal, estuarine and fresh water fish species, occur in the country (Ministry of Environment and Forest 1991a). Of these, some 400 vertebrate species and 200-300 plant species are judged to be dependent on ecosystems for all or part of their life cycles.

Fisheries: The inland fishery is the most important sub-sector in terms of total catch, source of employment and supply of animal protein, providing about 50 percent of total annual fish production (Department of Fisheries 1989) and about 72 percent of actual fish caught. It is based on the country's vast fresh water resources and some 270 species of fin and shellfish which inhabit them. Essential habitats for the inland fishery comprise open and closed water habitats, including rivers, canals, flood plains, large seasonal water bodies (*haors*), smaller wetlands (*beels*), oxbow lakes (*baors*) and small roadside depressions. Although discrete in the dry season, inland water bodies become interconnected during the monsoon and provide critical habitats for the completion of the life cycles of a large number of fish species.

Wildlife: Ecosystems provide habitat for an estimated 300 species of resident and migratory waterfowl (AWB/IWRB 1993). Bangladesh lies within the Indo-Chinese flyway and provides essential staging habitats for a large number of migratory birds. There are about 840 species of wild amphibians, reptiles, birds and mammals in the country, including a population of royal Bengal tigers in the coastal mangrove forests of the Sundarbans. Small but regionally significant populations of larger mammals such as elephants are restricted to the hill tracts. About 578 species of birds are found in the country. Twenty-three species occurring in Bangladesh are listed as endangered by the International Union of Conservation of Nature and Natural Resources (IUCN) (Ministry of Environment and Forest 1991b).

Other economic values of the Bangladesh wetland ecosystems include extraction of reed and other plant products, harvesting of aquatic vegetation as human food, medicinal herbs, green fertilizer for agricultural fields, poultry and cattle feed. Many local varieties of rice, conservatively estimated to number in the thousands, as well as existing or potentially useful plants provide a valuable gene pool to ensure continued development of improved varieties for the future. Tourism remains an infant economic activity,

with a substantial potential in the coastal mangrove forests (Sundarbans). Wetlands become navigation routes during the wet season and play a vital role in rural cultural activities.

The International Wetland Research Bureau (1992) has listed an extensive number of functions and services provided by wetlands, all of which are applicable to Bangladesh. These include groundwater recharge and discharge, flood storage and desynchronization, shoreline stabilization and reduction of erosion, sediment trapping, nutrient retention/removal, support for food chains, fish production, and habitat for wildlife.

Despite a burgeoning human population, currently estimated at 110 million (Bangladesh Bureau of Statistics 1992), a human population density exceeding 740 persons per km^2 and an annual growth rate of 2.17 percent, the country retains significant fish and wildlife resources, many of which are dependent on the extensive ecosystem.

ADVERSE IMPACTS OF FLOOD

Flood is considered to be a blessing so long it remains within the limit of annual average inundation which provides fish stock and habitat for wetland dependent flora and fauna. Sustainable production of these biological resources are very much dependent on some level of inundation and seasonal fluctuation in water level. Popular belief is that such inundation also enriches soil fertility which is yet to be established.

Flood, exceeding the expected level of annual inundation, is a major concern for the people of Bangladesh. At this point it must be emphasized that the well-being and quality of life of the people should be considered central to all environmental components. With the increase in population, floodplain are being gradually encroached for extending homesteads as well as for agricultural crop production. So the magnitude of flood that did not draw any attention in the 1950s, have now become a major concern for saving the life and livelihood of the people.

Adverse impact of flooding may be felt in several areas, field crops being the most vulnerable. Damage to standing crops due to floods is a very common phenomenon in the pre-monsoon, monsoon and even the post-monsoon season. Depth and duration of flooding are all very important factors that dictate cropping intensity and the scope of growing local as well as High Yielding Varieties (HYV) of rice, the staple food for the Bangladeshi's. Burial of land by sand deposition during flood takes these land out of cultivation, at least temporarily. Repeated deposition of sand is a common phenomenon in the alluvial fans where soil fertility is adversely impacted.

Inundation of homesteads by flood water adversely impacts the quality of life by disrupting routine household activities like cooking, bathing, sanitation, fetching drinking water etc. all of which are usually performed by women who suffer most with problems of privacy. Life become risky through confinement due to flood. Snake bite, burglary, forced sale of belongings at cheaper rate becomes rampant. People take shelter on temporary platforms. Incidence of death of minor children by falling from such temporary platforms occasionally occur.

Damage to infrastructure due to floods causes dislocation to communication and all sorts of economic activities. Prices of essential commodities which are to come from outside goes up while people have to sell their produces at low price because of lack of storage facilities. This hold good specially for livestock which are to be disposed for want of space. During flood, educational institutes remain closed, hospital facilities can not be availed, utility services get disrupted, so on and so forth.

The foregoing paragraphs suggest that floods be managed such a way in such manner that the beneficial effects are derived and the adverse impacts avoided. The need therefore is to be aware of what level of flooding is to be accepted from an environmental point of view.

PAST FLOOD CONTROL EFFORTS & IT'S CONSEQUENCES

Bangladesh's natural resources have been markedly impacted in both quantity and quality by habitat loss and changes due to water development projects, and unplanned agricultural extension. All are directly related to the effects of human population attempting to fulfill basic needs for food, clothing and shelter. Very little attention was paid to environmental considerations at the national level and there are no reliable data monitoring system to indicate trends in the ecosystem. Specific types of negative impact of past flood control activities include the following:

Loss of natural ecosystem occur through flood control for agriculture and urbanization. An example is the Dhaka-Narayanganj-Demra project, completed in the early 1970s and intended to benefit agriculture. But the area was rapidly engulfed in the 1980s by urban sprawl from adjacent Dhaka city.

Changes in ecosystem status and quality have occurred through diversion of water for irrigation, domestic use or industrial purposes. Within the controlled area of Flood Control, Drainage and Irrigation (FCD/I) projects, the low lands were converted to agriculture mainly monoculture of rice. The recommended High Yielding Varieties (HYV) in place of local varieties resulted in increased production but the input costs also increased. The higher input caused hazards to other components of environment. The pollution from agricultural pesticides caused significant damage to fish and other aquatic resources.

Micro-nutrient deficiency was detected in soils which remained wet throughout the year. This occurred in places where the land was irrigated for growing rice in the winter season after the monsoon season when the soil remains wet due to intensive rainfall and flood.

Reductions in water quality occur through inflows of urban and industrial effluent and sewage. The intensive levels of agriculture practiced in the country require increasing quantities of nitrogenous fertilizers, much of which is manufactured within the country. Industries set up for producing fertilizers discharge ammonia, sulfuric acid and caustic soda to water bodies. Fertilizer runoff from lands leads to eutrophication in shallow wetlands, with water hyacinth (*Eichornia* spp.) a major problem. DDT and other chlorinated hydrocarbons are still in use, often illegally, and high concentrations of such pesticides have been found in water and fish tissues (ISPAN 1992).

Fish and fisheries is the most impacted sector of ecosystem disrupted by flood control activities. Most of the FCD/I embanked projects prevented fish migration by cutting off the migration route between floodplain within the project area and the adjacent main stream of river out side. Fishes (migratory) spawn in main river streams and as such during early monsoon they migrate from perineal water bodies and floodplain through intermediate connecting minor rivers or canals, which are either blocked by closures or gates. The gates are not opened when the outside water level is high.

Biological cycle of fish is again cutoff while fish fry are dispersed from the main flow of river to the floodplain for feeding. The disruption of migratory pattern of fishes by flood control efforts ultimately cause low annual production and for some species question of local extinction arises.

Sedimentation reduces depth in water bodies (*beels*) and adversely affects bottom fauna and flora. Suspended sediment loadings in Bangladesh rivers are normally high because of the high rate of erosion throughout the river basins. But the additional increases in sedimentation in some areas appear to be related to the increasing incidence of flood control embankments.

Harvesting rates of vegetation, timber, fish and wildlife populations are in many cases unsustainable. The trend of fish harvests throughout the country show a downward trend (Department of Fisheries 1989) due to the increasing catch effort by increasing numbers of fishermen, fishing during biologically critical periods, and more rapid turnover of fishing leases. Introduction of exotic fish species as an attempt to bolster declining fish harvests is being financed by the multilateral development banks and has caused concern for further declines in native stocks through competition and over-fishing. Uncontrolled wood-cutting for domestic use, commercial logging and overgrazing by domestic livestock have impacted shoreline areas.

To date, virtually all developments which have affected floodplain ecosystem, have been planned and executed without any consideration of their impacts on habitats or populations. All major roads and railways fall into this category, as do most embankment, drainage and irrigation projects.

Construction of flood control, drainage and irrigation projects dating back to the 1950s considered only the agricultural benefits, chiefly cereal production. By 1990 about 30 percent of total deltaic land area had been enclosed within water control project areas. In the Ganges-Brahmaputra floodplain alone, an estimated 2.1 million ha of wetland have been lost due to such development (Asian Wetland Bureau 1989). Internationally significant wetlands such as Chalan Beel, which was renowned for the numbers of migratory waterfowl using it as staging habitat, have been seriously degraded in both area and quality. Irreversible ecological changes in other key wetlands such as the haor basin of Sylhet and the Sundarbans mangroves, have been predicted unless remedial steps are taken (AWB/IWRB 1992).

The FCD/I project planning was generally carried out by BWDB or by consultants, with little or no collaboration with other relevant Government Departments or with the intended beneficiaries. However, in the few cases when there was local consultation at the planning stage, projects were generally better conceived, and their implementation and subsequent operation were facilitated. The planning of some projects was carried out without undertaking essential regional hydrological studies.

Embankment alignments were sometimes poorly planned, leading to failure and frequent retirements. Designers sometimes had inadequate data on hydrological and subsoil conditions, and as a result their designs have at times proved inappropriate and led to, physical failures. Almost all the projects suffer from moderate to severe drainage congestion due to faulty hydrological assessments and the absence of an adequate drainage network. A common symptom of drainage problems is **public cuts** and these are often so serious that they compromise the scheme's viability. Regulator gates were found to be leaking everywhere and the use of wooden fall-boards on some projects was found to be ineffective.

On several occasions projects were not constructed as designed. Embankment compactions was often inadequate. Drainage canal excavation was almost invariably either inadequate or not implemented at all.

Inadequate operation and maintenance is the most frequent immediate constraint on effective achievement of FDC/I goals (Final Report FAP 12, vol.-1, Feb. 1992)

Although the loss of the larger scenic wetlands such as Chalan Beel draws attention from conservationists, the gradual and incremental loss of small wetlands is probably no less significant in terms of declines in habitat, wildlife populations and overall bio-diversity. Such changes are presently neither monitored nor quantified. Within the FCD/I projects a quick road development were demanded and mostly fulfilled by CARE and LGED. A recent nation-wide survey of the environmental planning requirements for hundreds of road maintenance operations (CARE, pers. comm.) revealed that impacts to local small wetlands were very common.

ENVIRONMENTAL CONSIDERATIONS IN FAP STUDIES

Concern about environment is a recent phenomenon in Bangladesh. Although environmental planning and assessment were not adequate at the beginning of FAP, the improvements in environmental planning that have since been accomplished are gratifying. High population density and the people's direct dependence on the environment for survival have necessitated the creation of many custom-tailored features in the EIA process and procedures. Focus in the next few years will be on the environmental management measures that need to be developed to ensure that the adverse environmental impacts associated with FCD/I development are minimized.

Environmental planning is an evolving process in the context of Bangladesh. Essential to this is the underlying motivation on the part of all interested parties, whether they are government officials, NGOs or local residents, to help improve development planning steadily while performing the environmental assessment and management which are of extreme practical significance for the future of the country.

The Environmental Study component of FAP (FAP 16) was initiated in early 1991, the main target was to prepare an EIA guideline and a manual for water development activities under the FAP. The guideline was officially issued in October 1992 but the project continued with testing the guideline thorough three case studies in three different places of Bangladesh. These were Surma-Kushiyara Project (FCD/I); Comp-artmentalization Pilot Project, Tangail; and Bhelumia-Bheduria Project (FCD, in costal belt). The case study findings helped to trace some drawbacks of the EIA guideline and subsequently it was rectified. The FAP, environmental study component also undertook some data generating projects in the name of special studies. These studies were expected to fill in some data gaps in the overall EIA process. But most of these studies could not establish reliable data base. The study came to an end after undertaking an elaborate month long EIA reviewers training program which included TOT and a series of professional training. The participants were mainly from BWDB and it's sister concerns, limited number persons were included from other Government agencies and a few from the private sector.

The regional study teams under the FAP produced lengthy volumes of reports along with environmental reports. These were completed before the final EIA Guidelines were circulated. As a result, the treatment of environment was not adequate in some studies and the consultants were obliged to produce supplementary reports. This allowed coverage of the important environmental concerns in a manner which prompted better understanding of the problem.

Report of the proposed hardpoints for Brahmaputra Right Embankment Strengthening accompanied an environment report delineating details of likely impact of the construction on physical, biological and socio-economic components of the environment (FAP 1, 1993). The environmental management plan dealt with

mitigation aspects of negative impacts of the physical works. Topics such as dredging and reclamation, spill discharge, bilge water disposal, liquefaction, brick making, fisheries and wildlife received consideration in the report. A detailed and comprehensive resettlement plan was also produced in a report as a document accompanying the environment report. The suggestions and plan in the resettlement report, if adequately and properly implemented and adhered to, will usher in a new era of distributive justice, unlike in the past, when the poor used to suffer disproportionately in most development schemes.

The Northwest Regional Study Report is accompanied by two reports specific to environment in addition to producing an EIA Report for the Gaibandha project (FAP 2, 1992).

The Northcentral Regional Study was aimed at developing a regional water development plan with emphasis on flood control and drainage to ensure a socially and environmentally sound development that will be sustainable (FAP 3. 1993). An overall trade-off was sought in analyzing the possible interventions and adverse environmental impacts. Environmental assessment of the development interventions was undertaken to enhance positive impacts and mitigate negative impacts under an environmental management plan.

The Southwest area is a complex of inter-linked ecosystem including agricultural lands with freshwater supplies in the north and northwest, the transitional lands within the coastal polders, the Sundarbans and the coast (FAP 5, 1993). The area is subject to coastal process which include tides causing periodic variations in water levels and current, consequential saline intrusion, wave attack on the coastal fringe, surges and extreme wave attack due to cyclone and possible sea level rise due to global warming. The methodology adopted for environmental assessment has been directed at identification of the main issues, isolation of major negative impacts of proposed interventions and ways to mitigate the negative impacts. Important environmental components were examined against project options subjectively. The evaluation took into account the importance of each component - its special magnitude, the permanence of impact, reversibility and possible cumulative impacts. A Resource Allocation and Optimization Model (RAOM) was used to facilitate understanding of the land and water resource limitations. The model investigated feasible allocation of both land and water resources and sought optimal solution to best satisfy a set of declared objectives.

The environmental report for the Southeast Regional Study was comprehensive enough to provide a good base including major resources and various options of structural and non-structural interventions with their merits highlighted. Based on that, interventions in the natural system were proposed. Water and land resources were dealt with at length indicating surface and ground water potentials and limits, micro nutrient and organic matter deficiencies and plough pan problems of soils in certain parts under intensive cultivation were discussed. Climatic extremes including possible sea level rise and its effects in the region came under consideration. Wetlands, lowlands and waterbodies form a very vital link in the chain of landscape formation, maintenance of species diversity, cycling of nutrients and substance of the food chain and in controlling pollution. The aquatic and terrestrial flora and fauna which they support are the basic ingredients of the survival strategies of many poor people. A whole group of people will be adversely affected if these resources are not wisely used. These were considered with due care. How the linkage works and services the system were key elements in the Environmental Management Plan (EMP) developed subsequently.

Northeast Regional Study conducted a series of specialist studies on wetlands, fishery, river morphology, sedimentation, water resources, agriculture, population characteristics and the state of human resource development, local initiatives and people's participation in the management of water resources (FAP 6, 1994). Insight gained through these specialist studies included identification of driving forces which are inducing changes in the resource base. The specialist study on wetlands identified 9 key sites of international importance. This implies that major development activities (FCDI, floodplain fish stocking, roads and highways, industrial development) in these areas, need to be planned, implemented, operated and maintained with high degree of sensitivity to wetland values.

One of the major environmental issues identified in the Northeast Regional Water Management Plan is that conservation and degradation of natural ecosystem, both wetland and upland, for human use has been a dominant historical mode of land use transformation. The inhabited and cultivated landscape of today is the result of this process. Yet the remaining ecosystem, in particular the region's wetlands, provide immense economic and social benefits to local people. The issue today is how best to serve the needs of current and future generations: what is the proper balance between conservation and its benefits and continued conversion and degradation and their benefits such as increased cropped area. The 'best use' of each particular site or regime needs to be decided upon: are the remaining large haors to be managed for maximum sustainable yield of natural wetland products including the open water fishery or are they to be flood protected and/or drained where possible for rice cultivation? These fundamental issues were dealt with in details in this study.

Environmental issues emerging out of the special studies were considered in the preparation of the Northeast Regional Water Management Plan. The water resources management strategy proposed in the plan aims at managing the water resources on an environmentally sound basis that is compatible with sustainable management of water-linked renewable resource system such as soil, fisheries and forest. The strategic planning process included thrusts on biodiversity enhancement and sustainable management. In addition to conducting Initial Environmental Examination (IEE) for each of the proposed initiatives, specific non-structural initiatives of remedial nature aimed at checking environmental degradation have been proposed (FAP 5, 1995).

The Compartmentalization Pilot Project (FAP 20, 1994) adopted the FAP 16 EIA case study for CPP Tangail. The study was jointly conducted by FAP 16 and Geographic Information System (GIS) FAP 19 with assistance and cooperation of study team of FAP 20. The EIA was carried out considering all the expected recommendations in the guideline. FAP 20 prepared an Environmental Management Plan (EMP) on the basis of the EIA report. The EMP is made up of four elements, namely environmental protection plan, environmental monitoring plan, public participation programs and implementation framework. The EMP gives special emphasis on the following issues:

- implementation of community wetland in one or two beel areas;
- social forestry program in about 20 km of embankment/road and in two pilot areas of homestead;
- waste treatment program in some pilot areas of village pond/canal and handloom factory effluent;
- soil fertility monitoring in some selected sites;
- groundwater availability monitoring in some selected sites: and
- water pollution monitoring in 7 key sites.

SHORTFALLS IN ENVIRONMENTAL CONSIDERATIONS IN THE FAP

It is only normal that like every activity, FAP has its achievements as well as shortfalls and this holds good in respect of environmental considerations in the FAP. Future improvements in this area depends on identification of the deficiencies with a view to adopting corrective measures. Lapses in respect of environmental considerations in the FAP are listed in this section before suggesting recommendations for improvements of the situation in the next section.

Ideally the environmental study under the FAP should have been taken up first for developing the EIA Guidelines which could then be used by the main studies. But all the studies were initiated at the same time. Environmental study started late because of the Gulf war and the EIA Guidelines was issued in October, 1992 by which time most of the main studies were almost complete. This resulted in unequal level of environmental treatment and difference in approaches for environmental evaluation by each study.

Environmental consideration has recently been initiated in Bangladesh. Number of experienced environmentalist in the country being very limited, most FAP studies depended on expatriate environmentalist some of whom did not have enough understanding of the Bangladeshi floodplain ecosystem.

Environmental study under the FAP conducted training for EIA reviewers in late 1994 and early 1995. No training course for EIA practitioners was taken up. Creating more trained EIA practitioner should have been given priority over training of EIA reviewers.

An effective EIA Review process is yet to be established in the country. More importantly, involving stakeholder in the review process has remained a grey area. Institutional arrangements for the review process of EIA has also not been established. There is a need to implement the EIA review process suggested in the EIA Guidelines. The Department of Environment (DOE) is the authority for giving final clearance on EIA Reports, but its capability to perform such a gigantic task for the whole of Bangladesh is doubtful. Institutionalization of the EIA process also remained unattended.

The EIA Guidelines and the EIA Manual is dependent on a reliable data base which is almost non-existent in Bangladesh. Application of the EIA Guidelines could be very difficult for want of such a strong data base. The FAP studies generated huge data, but there was no arrangements for preserving these data. So most of the data generated in the FAP studies have either been taken away by the consultants or were not preserved by them. FPCO should have taken care of these data base and integrate them with the data base in WARPO.

ENVIRONMENTAL CONSERVATION AND MANAGEMENT PRIORITIES

The shortfalls in environmental considerations, identified in the previous section, calls for the following corrective measures:

1. Application of the EIA Guidelines and the EIA Manual for all future water management projects must be ensured. Deferring implementation of projects for proper EIA, as has been done in case of Jamalpur Priority Project (FAP 3.1, 1993), should be done for other projects where environmental considerations were not adequate.

2. Good number of Bangladeshi professional have acquired proficiency as Environmentalist by practically working in the field. They participated in the preparation of the EIA Guidelines and the

EIA Manual. The EIA case studies were largely done by the Bangladeshi professional. Some of them have also conducted EIA for water development projects. It is time that they are given proper recognition by giving them opportunity to work in this field. Bangladesh must reduce dependence on expatriates and increasingly use local professional in the field of environment.

3. The need to have a stronger Department of Environment (DOE) can not be over-emphasized for Bangladesh. With all the awareness created and activities going on in the country, environmental consideration will remain a far cry without a strong and properly equipped DOE.

4. Special courses, designed for EIA practitioners should be organized. This should preferably be done by the Department of Environment (DOE) who may draw resource persons from different sources including NGOs and the private sector.

5. Special efforts should be made by FPCO to get back all the data generated during the course of FAP studies by the consultants. The concerned donors should come forward to help FPCO to get back the data from the consultants who have left Bangladesh. All these data as well as the reports should be obtained in CD disks and properly archived and preserved. Everyone working in the water sector should be allowed easy access to this data base. Arrangements for salvaging and updating the WARPO data base must be made before integrating the data generated under the FAP studies.

6. The EIA review process should be firmed up with definite role specified for the local people for whom the project would be built. They should be actively involved at all stages in the EIA process. Major aspects of the EIA report must be translated in Bangla and circulated among local people for review. Opinion of the local people on the EIA report should guide the decision makers either in going ahead or abandoning the project, as the case may be.

Bangladesh's problems in conserving and managing ecosystems in the face of intensified flood control and water management are generally similar to those listed for most developing countries (Table 1), but are exacerbated by the high human population densities, lack of conservation infrastructure and very intensive demands on ecosystems for food and fibre production.

Major problems with national base ecosystem onservation and with ecosystem conservation and management include the absence of an acceptable database from which to determine priorities, and the lack of an acceptable approach for economic assessment so that the values of ecosystems are fully reflected in project appraisals.

Table 1. National base ecosystem conservation issues

1. Inadequate knowledge of the status and dynamics of the hydrology, ecology and socio-economic aspects of ecosystems.

2. Potential loss of rare and endangered fish and wildlife resources.

3. Land-use conflicts due to increasing population and changing resource use needs and values.

4. Lack of environmental policy guidelines & management plans to ensure the con- servation of important resource values.

5. Limited institutional structure and capability to address issues of a complex bio-diverse nature in a comprehensive and integrated way.

6. Inability to make assessments or predictions of the impact of development projects or changing resource use patterns.

A previous severe handicap was the lack of an EIA process to study and evaluate water resource projects. This gap has now been filled up within the Flood Action Plan (FPCO 1992) by developing the EIA Guidelines and the EIA Manual.

A key step in environmental conservation occurred in 1992 when Bangladesh became a signatory to the Ramsar Convention. The Government is presently considering the designation of the Sundarbans reserved forest as its first Ramsar site. A second notable step in conservation has been the Environment Policy and Implementation Program, published by the Ministry of Environment and Forest in May 1992. In addition, the Fourth Five Year Plan, 1990-95, contains pertinent sections on environment and sustainable development.

Because of the high human population densities and the intensive uses made of environmental resources, their conservation and retention as viable habitats for fish and wildlife will have to depend on sound multiple use and adequate environmental planning for such use.

The following steps will have to be taken to ensure sound level of future national base environment conservation.

1. Development of a strong conservation department with fully trained and motivated staff to enforce existing and future legislation on fish and wildlife use and conservation

2. Application of enlightened fisheries policies which accentuate the values of habitat quality and diverse native species and less emphasis on hatchery-based restocking with exotic species.

3. A national inventory of existing environmental resources to establish a base for prioritization of environment conservation measures and allotment of budgetary and other scare resources (Ahmed *et al.* 1993).

4. Establishment of sanctuaries for endangered and threatened species.

5. Avoiding ecologically unsound land use practices through agricultural extension and advisory services to farmers.

6. Full accounting of ecosystem values, including habitats and biological diversity, in all EIAs of projects which affect them, including roads, railways, water management and urbanization

7. Evaluation of previous water developmental projects to document adverse impacts to environments and to establish a knowledge base for improved handling of future developments.

8. Reduction of pesticide inputs to floodplain through reduction in their general use. Persistent pesticides such as DDT and Dieldrin are still in widespread use, and their reduction will only come about with improved extension and advisory services to farmers and the general public, and with the availability of alternative and more cost-effective approaches such as integrated pest management.

9. Reduction of industrial pollution of environments through technology transfer in pollution controls and more stringent environmental impact assessment, permitting and environmental monitoring

10. Research on the dynamics of environments and their resource uses, to provide a better base for management decisions.

11. Enhancement of the capability of NGOs to deliver educational and ecological awareness programs to rural and urban peoples.

12. Human population stabilization through economic development and family planning through education and awareness

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FOURTH CONFERENCE ON FLOOD ACTION PLAN

INTERNATIONAL CONFERENCE CENTRE, DHAKA

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TECHNICAL SESSION - IV

PRESENTATION : "AN ENVIRONMENTAL APPROACH TO WATER SECTOR PLANNING IN BANGLADESH"

BY : Dr. Saleemul Huq, BCAS

DATE : 01-12-1995 **TIME : 0850 Hrs.**

FLOOD PLAN COORDINATION ORGANIZATION

MINISTRY OF WATER RESOURCES

GOVERNMENT OF THE PEOPLE'S REPUBLIC OF BANGLADESH

An Environmental Approach to Water Sector Planning in Bangladesh

By

Dr. Saleemul Huq, Executive Director
Bangladesh Centre for Advanced Studies

1. Introduction

Bangladesh's geography and morphology as a deltaic and riverine country mean that water is one of its major resources if not the major one. The use of and attitude to water is therefore something that is of paramount importance to the citizens of the country. The range of uses and attitudes is extremely varied and location specific, for example in the coastal areas salinity intrusion and tidal flooding are the main concerns, in the charlands and some floodplains excessive flooding may be the main concern in some years while too little water may be the concern in other years, in the north west and south west too little water in the dry season is already the main concern, not least because of withdrawals upstream of Bangladesh. Therefore the range of concerns regarding water are extremely varied ranging from too little at some times (resulting in droughts) to too much at other times (resulting in floods) and including water quality (e.g. pollution and salinity in the coastal areas). There is also a similarly wide range of uses of water from drinking water (using both surface and increasingly ground water), to agricultural uses (again both surface and ground water), to industrial and other uses (e.g. fisheries). Therefore, there are a wide range of users of water, all of whose interests and needs have to be taken into account in any water sector planning exercise.

The problem with the Flood Action Plan (FAP), therefore, was that by focusing almost exclusively on one aspect of water planning, namely flood mitigation it took too narrow a focus, at least in the earlier phase. It is heartening to note that a more integrated approach is now being planned for the next phase of National Water Plan from 1996 to 2000. It is in the light of this new thinking towards an environmentally sound national water plan that this paper will discuss some of the issues that need to be addressed and suggest ways of dealing with them in a manner that is both environmentally sound as well as more likely to be acceptable to the people in general.

2. Water Issues

As has been mentioned there are a great many different water issues in Bangladesh in different parts of the country and also for different group of people. A recent nationwide environmental consultative exercise undertaken by the Government of Bangladesh through the Ministry of Environment and Forest with the cooperation of the NGO community through the Coalition of Environmental NGOs (CEN) and Association of Development Agencies in Bangladesh (ADAB), namely the National Environmental Management Action Plan (NEMAP) found that water issues were considered the fifth most important environmental issues on a nationwide basis (this, of course, varied on a region by region basis). Also within water issues they expressed considerable concern about floods as well as droughts and also expressed equal concern about water quality. The results make it clear that although water is considered a major concern the perception varies from place to place and from group to group. We will therefore briefly consider some of the issues that are of common concern regarding water.

2.1 Floods

There can be no denying that floods are an important concern for large numbers of people in Bangladesh. However, it would be wrong to regard floods as one single phenomena which is necessarily bad for all people. There are many different types of floods in different parts of the country. Some are benign while others are destructive. At the some time floods may bring destruction and misery for some while bounty for others (e.g. fisheries). They can also be naturally occurring or man made. Therefore, it would be incorrect to regard all floods of whatever magnitude and wherever they occur in the country as being an unmitigated disaster and therefore concentrate efforts exclusively on preventing the floods from occurring. The approach that is needed, therefore, is to take a differentiated approach to floods in different parts of the country including the river floodplains (e.g. the floodplains of the Ganges, Brahmaputra and Meghna basins which have different characteristics), the coastal areas and flash-flood prone areas. In each of the separate areas the specific impacts of floods need to be studied (e.g. in some places the need may be to protect boro rice, in others to protect infrastructure, etc.) with inputs from local people and only then come up with possible solutions. The particular solution in any given area may vary from improving drainage to flood protection to flood control. It is, of course, probable that full protection in the form of embankments may be the most preferred option in some specific places. If that is so then there can be no objection to examining that option at greater depth always ensuring the environmental soundness of any proposed intervention as well as its social acceptability.

2.2 Droughts

In large parts of the country, particularly in the north-west and south west the lack of water during the dry season is probably of much greater concern than excessive water in the monsoon period. This problem is aggravated by the withdrawal of waters upstream of Bangladesh including but not exclusively at Farakka. The result is major negative impacts on fisheries and the Sundarbans mangrove forest while also affecting irrigation and drinking water in the area. The obvious solution is to go for water augmentation examining all options e.g. ground water, holding monsoon period water, diversions from different rivers, etc, while stepping up the campaign with our upper riparians for a fair share of the common rivers.

Here a point may be made regarding the strategy to take on this issue. Past efforts have been almost entirely at government to government level between Bangladesh and India only and have focused mostly on Farakka. This has proved largely futile so far. It would make sense to broaden the issue beyond purely government to government talks and include people to people exchanges and discussions between all the countries, namely Bangladesh, India and Nepal around the issue of "Environmentally Sound Management of the River Basins". It is probable that results may be more fruitful as there are groups and communities along the stretch of all the major rivers who have concerns about the management of the river who should all have a say in how to manage these rivers.

2.3 Drinking Water

The issue of safe drinking water for the citizens of Bangladesh is critical for their health. The main cause of morbidity, if not mortality, in the country continues to be water borne diseases. However, it is heartening to note that through the efforts of the government, NGOs and international agencies the provision of safe drinking water, primarily through hand tubewells has made a major positive impact on people's health. However, from a water resources point of view this reliance on ground water, particularly using deep tubewells in urban areas, like Dhaka city is an area of concern that must find a prominent place in any national water planning process.

2.4 Irrigation

For the past several decades irrigation has been the main area of the most investments in the water sector, both surface as well as ground water. It has no doubt resulted in Bangladesh's near self sufficiency in cereal production. However, several points may be noted here. First, the increased production in the past two decades has been mainly from irrigating dry season Boro rice rather than flood protection to rainfed monsoon varieties. It may of course, be argued that this option is rapidly being exhausted and protecting monsoon crops from floods is the only option to continue expanding high yielding rice cultivation. This strategy needs to be re-examined in the light of whether the emphasis on rice to the exclusion of other crops is really necessary or even for rice whether improving yields under rainfed and flooding conditions may be the answer rather then expensive flood protection. The second issue is the need to re-examine the past practice of making irrigation water available at practically no cost. The resource is simply too valuable to treat it as a no cost one and hence serious thought has to be given to costing the use of water and thereby trying to get the users to pay the real costs of this precious resource.

2.5 Industry

Although industry is still not a major water user, as Bangladesh continues to develop, the needs of this sector will grow very rapidly and therefore must be considered closely in any national water sector planning exercise. In particular the specific industrial sectors being pursued, for example textiles and leather industries have large water needs which need to be taken into account.

2.6. Fisheries

Bangladesh has made major strides in developing aquaculture fisheries in most parts of the country over recent years. Nevertheless the open water fisheries consisting of rivers, floodplains, beels, haors, etc. remain the single major source of fish for the country as a whole. They also account for over 10 million people's employment or livelihoods. Thus the open water fisheries resources and the people living off those resources are an important parameter in any national water planning. Unfortunately in the past the open water fisheries resources were almost totally ignored while preparing water sector investment plans It is heartening to see that this is now no longer the case and that this sector is beginning to receive its due importance.

2.7 Sanitation

The disposal of solid waste in both rural as well as urban areas is increasingly becoming a major problem and lack of sanitation is probably the main cause of water pollution and water borne diseases. Despite strong efforts by the government, NGOs and international community the prevalence of modern sanitation is still very low in both rural as well as urban areas. Therefore, any further national water plan must take into account the issue of sanitation or more importantly how lack of modern sanitation is likely to impact water quality.

2.8 Water Quality

As has been stated above lack of modern sanitation is still probably the main cause of water pollution in most parts of the country. However, other forms of water pollution are also becoming more and more important. These include agro chemical pollution which encompasses both chemical fertilizers as well as pesticides (which are more harmful). The use of chemical pesticides has been increased rapidly in recent years and many of them are extremely toxic and persistent (e.g. the

organocholorines). The other source of pollution is industrial pollution which can be acute in some specific spots like the tanneries of Hazaribagh in Dhaka which have rendered the Buriganga river already biologically dead and the paper, pulp and other mills on the Karnaphuli river in Chittagong. These problems are likely to get worse with time.

Other areas of concern with respect to water quality are salinity intrusion in both surface and ground water in the coastal areas affecting drinking, irrigation and biodiversity particularly in the Sundarbans. The downstream cross border flow of pollutants from across the border into Bangladesh are also an important concern. For example, the river Ganges has been found to have extremely high levels of certain heavy metals during certain times of the year as it enters Bangladesh.

All the above issues need to be addressed in the national water planning exercise.

3. Stakeholders in the Water Sector

The water sector is so important to the country and the lives of its people that virtually every citizen can claim to be a stakeholder in the water sector. However, there are some clearly identifiable groups whose inputs are crucial in order to make any further water sector planning exercise practical and fruitful. These include government as well as non-government groups.

3.1 Government of Bangladesh

It is of course the responsibility of the government of Bangladesh to carry out the national water planning exercise. However, the government is not a single, monolithic structure but has within it a multitude of ministries, agencies, research institutes and official bodies. Quite a few of the important ministries and agencies must be involved in the national water planning exercise if it is to be effective as they have important roles to play in this sector. A few examples of agencies and their roles are mentioned below.

a) WARPO : As things stand at the moment WARPO seems to be the main statutory body with the mandate to carry out national water planning. However, it is hopefully under review and must be substantially restructured if it is expected to fulfill the more environmentally sound and socially sensitive vision of water planning in future. Also its location within the Ministry of Water may need to be re-examined in the light of the need for much more inter-ministerial coordination.

b) BWDB : The Board has probably the single biggest repository of technically skilled professionals particularly in the field of water engineering However, it suffers from an over emphasis on civil engineering approach to surface water issues only and is lacking in other skills such as environment, social issues, agronomy, etc. It role should therefore, be one of providing hard engineering project implementation and O&M rather than planning.

c) DAE/BADC/BARC : The organizations involved in the agriculture sector most play a crucial role in further water sector planning since much of the planning will address irrigation for agriculture. In the past this has been an extremely weak link with the water engineers building structures expecting the agricultural organizations to take up their long term viability. However, agricultural experts have time and again questioned the over reliance on surface water engineering options in the name of enhancing crop production. Their voices must now be heard loudly.

d) LGED : The local Government Engineering Department (LGED) has become increasingly active in recent years, particularly with respect to developing small scale infrastructure such as roads and embankments. As these structures have important consequences in changing the hydrological conditions of the area it is important that LGED be an important player in future water planning. They will also bring a very important element of local level input to the planning process as they have professionals at the lowest administrative levels who are familiar with local conditions.

e) DOE : As environmental issues are likely to play an increasingly large role in future water sector planning and since the Department of Environment (DOE) under the Ministry of Environment and Forest has been mandated by the Environment Act of 1995 to be the clearing authority for Environmental Impact Assessments (EIA's) it is important that DOE be involved in the water sector planning both in order to give its inputs as well as develop its capabilities to assess water sector EIAs in future.

f) BRDB : It is envisaged that future water sector planning and projects will be more socially conscious and try to incorporate the poorer sections of the local community as beneficiaries. As the Bangladesh Rural Development Board (BRDB) is the key government institution working for the upliftment of the rural poor it is essential that they be a party to the National Water Planning process both to give inputs as well as to act as a liaison with their local groups.

3.2 University/Research Institutes

Several of the Universities and research institutes in Bangladesh have substantial capabilities in different technical and professional areas which may be harnessed on a regular and institutionalized basis for developing the next National Water Plan. To cite just a few examples:

a) BUET : The premier engineering and technology institute in the country has considerable expertise in the technical aspects of water engineering, river morphology, hydrology and many other water related fields.

b) BIDS : The Bangladesh Institute of Development Studies (BIDS) has a well established reputation for excellence in research on rural development in Bangladesh which should be used in formulating the National Water Plan. They are particularly well versed with the policy aspects which will play a crucial role in future.

c) BARD : The Bangladesh Academy for Rural development in Comilla has played a pioneering role in rural development, particularly through cooperatives and should be used in future planning.

3.3 NGOs

The Non government organizations in Bangladesh have become over the years one of the most thriving sectors in the country, particularly in the area of working with the poor. They range form small, local organizations to relatively large ones with nationwide coverage. None-the-less they have commonality of interest and experience, primarily in accessing, organizing and working with the poorest sectors of society. The NGOs work under different umbrella bodies on particular issues. Many of them have a relevant role to play in the water sector.

a) ADAB : The Association of Development Agencies in Bangladesh is the apex body of most NGOs in the country and is the organizational focal point for any discussions, between government or donors with the NGO community as a whole. They have a particularly important role to play in terms of policy matters regarding NGO involvement in planning or projects.

b) CEN : The Coalition of Environmental NGOs (CEN) is a network of over one hundred NGOs who are active in the field of environment. Many of them have a great deal of experience on the ground with dealing in national resource issues including water issues and would be able to make a significant contribution to the water plan.

c) Individual NGOs : A number of individual NGOs such as Proshika, BRAC, BCAS, NACOM, etc. have both expertise and experiences which they can and should be able to share with the National Water Planning exercise.

3.4 People

Besides the government, research institute, universities and NGOs the other stakeholders are of course the people themselves. Here it would be useful to identify a few relevant groups whose inputs and consent would be essential for viable planning in the water sectors.

a) Farmers : In the past they were seen as the main beneficiaries of water development schemes. However, it, must be noted that there are many different types of farmers ranging from the large rich ones to small and landless farmers. The interests of all these groups must be taken into account.

b) Fishermen : This represents a very large number of people, particularly in the open water and floodplains who earn their livelihoods from the open water capture fisheries. In the past they were almost completely ignored in planning water structures but must now play an important role in approving any proposed interventions in the water bodies that may adversely affect their livelihoods.

c) Boatmen : These are another group who have been adversely affected by water control structures in the past but have been totally ignored. They must be an integral part of any future planning process and be taken care of as possible Project Affected Persons (PAP).

4. Environmental Issues

So far we have discussed the water issues and stakeholders. Now let us briefly look at the main environmental issues that need to be addressed.

4.1 Wetlands

There are many different wetlands in Bangladesh ranging from the coastal wetlands, to rivers, floodplains, haors, baors, lakes and many others. It is important to note that wetlands are a distinct ecosystem with their own habitat and in some cases containing important and sometimes even endangered plant and animal species. The protection of wetlands has been recognized internationally through the RAMSAR Convention of which Bangladesh is a signatory and under which Bangladesh has several wetlands of international significance.

However, the protection of wetlands is needed not just to protect endangered species of plants and animals only, important as this is but for more direct and economically important reasons such as a means of livelihood for the local people, particularly the poor. The wetlands also act as important storage of water during the dry season. The tendency in the past has been to regard wetlands as unimportant and to drain them and dry them in order to grow an extra crop of rice. This has caused some of our most important wetlands, such as the Challan Beel in the northwest to virtually disappear.

Any future National Water Plan must include a serious look at the role of wetlands and must make provision for the protection of the most important wetlands.

4.2 Open Water Fisheries

The open water fisheries of Bangladesh are in many cases important wetlands in their own right, but deserve to be treated separately due to their major environmental, economic and social significance. There are over 200 species of fresh water fish and prawns in Bangladesh making it one of the richest countries in terms of aquatic biodiversity in the world. Many of these species are becoming endangered due to a combination of factors including over fishing, destruction of habitats, changes in hydrology, changes in water flows, etc. They are not only important environmentally but also economically as the major part of the country fish catch still comes from the openwaters and since fish is the main source of animal protein in the people's diet, it has important nutritional consequences as well. The social aspects of openwater fisheries are equally important due to the fact that it is the poorest of the poor who are able to use this common access resource and catch fish. Altogether, over 10 million people are said to be dependent on fisheries in Bangladesh. Any loss of open water fisheries, even if compensated in terms of increased fish production by aquaculture, would have major negative consequences on the livelihoods of fishermen who are often the poorest in the community.

4.3 Water Quality

As has been mentioned above one of the most important environmental impacts has been a deterioration in water quality in Bangladesh over the years. The one saving grace is that the monsoon rains and floods wash away most of the pollutions during part of the year. However, during the dry season water quality deterioration can have significant negative impacts on people's health, industry, agriculture and also the natural eco-systems.

The most important one to cite here would be the increasing salinity intrusion in the Sundarbans which is definitely causing a change in the natural ecosystem and is probably contributing to the top dying of Sundari strees.

5. An Environmental Approach to Water Sector Planning

Based on the water issues, stakeholders and environmental issues described above it is possible to develop a preliminary methodology or approach to Water Sector Planning which is likely to be both environmentally sound as well as socially acceptable. The following are some possible steps in this directions:

5.1 Baseline

Step 1 Divide the country into convenient regions from a water planning perspective. The Water Planning Units developed and described by the Water Master Plan

Organization (MPO) in the eighties may be a good starting point as sufficient data had been collected earlier. The updating of the data base on these units would therefore be the first requirement.

Step 2 In Addition to updating the water related, mainly hydrology and ground water aquifer data in each planning unit a through environmental baseline must also be prepared. This would include an inventory and mapping of other parameters including wetlands, biodiversity, agro-ecological system characterizations, fisheries, etc. The output of this exercise would not be merely collection of data for purely academic purposes but rather as a tool for future planning. Therefore it is essential that adequate care be taken to produce the outputs of this exercise in a manner that is comprehensible and useful both to ordinary people as well as planners. The Department of Environment along with other non-government research and academic institutions could play an important role here.

Step 3 Along with an simultaneously with the environmental baseline a social-economic consultation-cum-baseline information gathering exercise should be carried out. This would be primarily the responsibility of the Water Planning Organization but it would need to engage experts as well as involve other institutions including local government bodies, NGOs etc. The outcome of this exercise would be a reasonably clear understanding of who were the important groups of people in the area and what their opinions were regarding water sector problems and their possible solutions. The experience gained in the NEMAP process of government and NGO cooperation would be extremely useful in this phase of activity to solicit people's opinions and preferences.

5.2 Planning

Step 4 Only after steps 1 to 3 complete and their outputs given would the next phase of actual planning begin. The planning options would respond to the people's concerns and opinions and be framed in a manner that does not endanger the environment. This would probably lead to a list of possible options rather than a single one and may include both structural as well as non-structural measures. The proposed options need to be examined, at too great a depth at this stage.

Step 5 Once a list of possible option is developed by the planners those would then again be presented to the people of the area for their opinions and choices. It is important that this process be carried out in as sensitive and non-confrontational a manner as possible. This requires good presentation materials for explaining the options to people (e.g. maps and drawings in Bangla rather than reports in English) and skilled facilitors who would ensure that all sections of the community are given a due hearing. As the selection of any given option will necessarily require trade offs between different groups it is important that all groups are heard and any group that is likely to be adversely affected by the selected option should agree to any mitigation and/or compensation measures proposed.

5.3 Feasibility

Step 6 Only now will the full fledged feasibility assessment be undertaken by the experts based on the options identified. This will require all the areas of expertise including engineering, hydrology, agronomy, socio-economic and environmental expertise. It will also require an Environmental Impact Assessment (EIA) to be carried out if necessary.

Step 7 Once the feasibility study with EIA is complete it should again be shared with local people for their feedback and opinion. Again this should be done in a manner which is easily understood by them. If there is any substantial feedback that should be accommodated in the plan at this stage.

5.4 Implementation

Step 8 This is when the actual implementation of the proposed intervention can begin and again must have some opportunity for both feedback from the people and ensuring their active participation in the work wherever possible. Environmental monitoring should be an integral part of the work.

5.5 Operation, Maintenance and monitoring

Step 9 Once completed the project output should be handed over to the management and control by local groups for the long term. Some level of environmental monitoring, preferable by the local people themselves will be necessary as well.

Conclusion

The discussion above gives a very brief sketch of how future water sector planning may be carried out in both an environmentally friendly and socially acceptable way. It will certainly not be easy but is probably achievable given goodwill on all sides, particularly from those in charge of the planning process.

Figure 1 : Suggested steps and Phases of Water Sector Planning

Phase	Steps	Main Actor	Expertise required
1. Baseline	1. Selection of Planning Unit 2. Water data collection and analysis 3. Environmental baseline 4. Socio-economic analysis and consultations	WARPO	Water resource Planning, environment and Participatory planning
2. Planning	4. Preliminary analysis of above information 5. Preparation of possible options for interventions 6. Consultation with people on possible options 7. Selection of preferred options	WARPO	Planning engineers, sociologists, environmental experts.
3. Feasibility	8. Feasibility Studies of preferred options 9. EIA of certain proposed options 10. Consultation with people based on Draft Feasibility Studies 11. Finalization of Feasibility based on feedback	Consultants	Engineers, environmenta-lists and sociologists.
4. Implementation	12. Contracting out work to consultants and contractors 13. Ensure peoples participation 14. Ensure environmental monitoring	Consultants & Contractors	
5. Operation	15. Involving local people	BWDB/Local People	Local Groups
6. Monitoring	16. Involving local people 17. Environmental monitoring	Local People/ WARPO	Local People/ Environmental Experts

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PRESENTATION : "PRIORITIZATION OF PROJECTS IN FLOOD ACTION PLAN - A REVIEW"

BY : Dr. Quazi Shahabuddin, BIDS

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FLOOD PLAN COORDINATION ORGANIZATION
MINISTRY OF WATER RESOURCES
GOVERNMENT OF THE PEOPLE'S REPUBLIC OF BANGLADESH

PRIORITIZATION OF PROJECTS IN THE FLOOD ACTION PLAN -- A REVIEW

-- Quazi Shahabuddin

I. Introduction

Given her unique topography, the agricultural growth performance in Bangladesh is largely influenced by the problem of flooding and drainage and proper management of her water resources. In fact, the management of water resources has become a critical need for Bangladesh due to its growing demand and increasing conflict between alternative uses. It is, therefore, imperative to develop a strategic framework and formulate comprehensive plan for management of this critical resource.

Formulation of a plan requires the identification of a clearly defined set of objectives and strategies. FAP is no exception. The strategies of FAP have been developed within the broader framework of the strategies for achieving the goals and objectives of the national development plans. A coherent set of strategies developed subsequently formed the basis of conducting regional studies and formulation of regional plans. In particular, it has been recognized that the strategy for water resources development should not be pursued in isolation; it should take into account social, institutional, environmental and national planning consideration. An effective strategy has to be based on a mix of structural and non-structural initiatives to attain maximum developmental effectiveness and create a sustainable pattern of development which balances the requirements of agriculture, fisheries, navigation, domestic and industrial water use.

It need to be recognised here that from purely economic considerations, one can prioritize projects by selecting a set of projects which yield maximum net benefits with the quickest rates of benefit achievements. However, any intervention with human and natural environment give rise to multidimensional externalities -- technical, social and environmental -- many of which cannot be quantified or even foreseen and internalized. As such, selection of projects cannot be done on economic considerations alone. Prioritization of projects also ought to be guided by the imperatives of prevention of environmental degradation and minimization of social conflicts. At the same time, maximum possible benefit should occur to the economy. The considerations of prioritization of projects are also based on national, regional, sectoral and sub-sectoral priorities such as safeguarding lives, property and livelihoods in highly distressed areas, protecting the ecosystem and mitigating natural disasters salinity, deforestation, to name a few.

Section II of this paper outlines the approach to project evaluation embodied in different FAP guidelines to ensure that all FAP planning studies and feasibility studies adopt a common approach to project appraisal and impact assessment. The process of identification and prioritization of projects in different regional studies are discussed in Section III. Section IV makes a critical review of this process identifying some of the weaknesses and inadequacies in the regional planning exercise. Concluding observations are made in Section V suggesting areas of further investigation.

II. Approach to Project Evaluation in the Flood Action Plan

The Guidelines for Project Assessment (GPA) were prepared by FPCO to ensure that all FAP planning and feasibility studies adopt a common approach to project appraisal and impact assessment that is consistent with the appraisal of investment elsewhere in the economy. The aim was to ensure that all project impacts, positive and negative, were fully considered in the evaluation of FAP projects. The Guidelines, therefore, required that the economic analysis be complemented by an assessment of other effects, in particular social and environmental impacts. For that reason, the assessment comprises a multi-criteria analysis, which organizes and brings together in a single framework, costs and benefits, impacts and effects of a project whether these were valued (in money terms), quantified (in physical units) or only amenable to qualitative assessment. The Guidelines set procedures for economic analysis following widely accepted techniques for the appraisal of investment projects as used by international financial institutions and development agencies. At the same time, the Guidelines alert the user to problems and issues specially relevant to water management projects in Bangladesh.

Assessment of water management projects in Bangladesh requires that special attention be given to distinguish the conditions that are likely to prevail with or without a project, and to separate activities that are not necessarily contingent on an FCD or flood proofing project such as slum improvement or minor irrigation. Past approaches to water resources planning have also tended to be mainly concerned with agricultural benefits and investment costs while overlooking or explicitly ignoring other impacts. The Guidelines require that special attention be given to data collection and analysis of potential impacts on fisheries, non-agricultural activities, different social groups and the bio-physical environment. The Guidelines provide assistance through specific technical annexes on each of these topics. These include Agricultural Impact Assessment, Fisheries Impact Assessment, Assessment of Non-Agricultural/Fisheries Flood Damage, Social Impact Assessment and Ecological Impact Assessment. The Guidelines have been followed in all the regional studies and in most of the feasibility studies completed so far.

In addition to economic and financial analysis, other potential effects, including the social and environmental impacts resulting from a project intervention are taken into account. Where possible, these other effects will be quantified, valued and included in the economic analysis. Since it may not always be possible to quantify and value all such impacts, a multi-criteria analysis is be used. This would complement the results of the economic and financial analysis by simple quantitative and qualitative assessments of project outcomes and impacts, which in turn will facilitate integration of all these considerations into a common format for decision making.

The main benefits of water management come from controlling the water regime so that farmers can consistently achieve higher yields and cropping intensities. Most of the areas subject to flooding from rivers and rainfall have cropping intensities of around 150%. Farmers may raise this to an average of 200%, and at the same time increase yields by switching from B. aman to T. aman and planting more HYVs. The main impact would be on the wet season crop, since the area planted to boro crops is in general independent of flood control measures. But, in some areas, especially the northeast, embankments are needed to protect the mature boro crops from early flash floods. The per hectare returns from agriculture in flood control and drainage tends to be fairly low, but this is matched by low per hectare costs because FCD projects tend to protect large areas with low-cost infrastructure. This way reasonable economic rates of return are attainable.

Disbenefits (sometimes called negative impacts) can result from changes in water regime. These effects may occur both inside and outside the designated area of a project. These include

impacts on capture fisheries and incomes of fishermen and boatmen, increased flooding in neighboring areas, and other possible adverse environmental impacts. The treatment of disbenefits depends on whether mitigation or compensation measures are envisaged. This would be taken into account in project analysis as a cost item, if measures to mitigate or compensate are envisaged, or alternatively cost should be deducted from the stream of benefits if mitigation measures are not envisaged. Similarly, any reduction in income or quality of life experienced by different groups resulting from the project intervention need to be clearly identified. There may also be additional cost of transport due to disruption of water transport in and around the project area.

The preparation of the GPA has highlighted several factors of particular relevance to the analysis of projects in Bangladesh:

- distinguishing between benefits from improved water management and benefits from flood damage avoidance;
- with and without project scenarios have to be selected with care to exclude future autonomous developments which are not dependent on the project (for example, in some areas, low-lift pumping or tubewell irrigation);
- economic effects of projects on capture fisheries;
- economic price of rice (which would become the appropriate economic price with the attainment of self-sufficiency and generation of exportable surplus);
- flood damage potential in the "without project" scenario is likely to increase with economic growth since economic activities on the floodplains are likely to increase faster than the growth of population in these areas; and
- improvements in flood preparedness, flood management and flood proofing, to be expected inside and outside the project areas, need to be taken into account.

People's Participation

The Guideline for Peoples Participation (GPP) were prepared in March 1993 showing how the affected people could be involved in water projects right from inception through O&M. This is a radical shift from the traditional concept of planning, execution and running of projects in which the local people had hardly any say.

The Guidelines for People's Participation (GPP) provided the framework and a basic methodology for assuring the people affected by recurrent flooding of a decisive role in establishing improved control over natural resources to safeguard life and property, and to create a sustainable pattern of development that balances the competing needs of agriculture, fisheries, navigation, groundwater and the environment.

While the Guidelines for Project Assessment (GPA) underscore the need to unify technical and economic analyses of potential investment decisions with comprehensive impacts assessment, the GPP fills the gap of a much-needed methodology to stimulate people's participation and reinstates the affected people at the heart of the decision-making process. It emphasizes the importance of cross-fertilization and strengthening of the decision-making process by integrating the considerable knowledge, experience and insights of people living in a given area with professional expertise,

resources and efforts to ensure the fullest realization of project objectives and sustained, long term delivery of planned benefits.

Environmental Impact Assessment:

In the past, FCD/I project planning was sector specific in nature and due attention was not paid to environmental impacts. Growing more food to feed the growing population was the main focus of interventions in the water sector. The bio-physical components of the projects often suffered. The FAP studies, entrusted with the task of looking into the water resources of the country in a holistic way for sustainable development, have evaluated the interventions taking into account their impacts on environment.

Environmental Impact Assessment (EIA) is now a mandatory study process to assess/predict the environmental consequences of an existing or proposed project and to delineate any environmental management measures which must be integrated into the plan to ensure that the project will be technically, economically, socially and environmentally acceptable. FAP promotes EIA as an early planning tool with the inclusion of people's participation as an integral part. Environment is defined broadly to include both bio-physical and socio-economic components.

Based on past experiences with FCDI projects, the Guidelines for Environmental Impact Assessment were developed by FPCO and vetted by DOE. These Guidelines have been used in the environmental evaluation of regional plans and projects proposed under FAP. The Guidelines specially address EIA at the pre-feasibility (regional) and feasibility (project) levels, called initial environmental evaluation (IEE) and environmental impact assessment. The Guidelines were intended to be and have been used in close conjunction with the Guidelines for Project Assessment. The EIA Guidelines have provided a consistent and common basis for application of the assessment process to ultimate water development by ensuring that only environmentally sound projects are designed and implemented.

EIA has been carefully integrated into the overall Guidelines for Project Assessment. Two types of information - (1) summary of positive and negative impacts and (2) costing of the Environment Management Plan to address the impacts of each proposed development - are the outputs of the EIA that enter into the multi-criteria analysis of the GPA. This way, the costs, benefits and risks of environmental impacts and their management are kept in the forefront of decision making on the overall viability of each water management project that is proposed.

III. Identification and Prioritization of Projects in FAP Regional Studies

The main stages in the development of the regional water management plans within the framework of overall regional development have been to:

- develop a set of water management strategies;
- identify priority areas of development;
- conduct pre-feasibility studies of all the identified regional schemes; and finally
- prepare and present the regional water management plan.

The regional studies recommended a number of projects based on the analysis of alternative development options and scenarios in the respective regions. The regional studies generally followed the methodology and approach outlined in the Guidelines for Project Assessment (GPA), wherein economic analysis was complemented by an assessment of other impacts, in particular, social and environmental impacts that are difficult to quantify in financial and economic terms. The assessment comprised a multi-criteria analysis which incorporated a unified framework of costs and benefits and impacts of a project whether these could be valued, quantified or only amenable to qualitative assessment. In fact, these studies placed considerable emphasis on the importance of multicriteria analyses as a guide in the selection of projects.

The focus of FAP was initially on flood mitigation. However, it was gradually considered desirable that FAP should pay attention to the complete hydrological cycle, and develop an integrated water management plan covering issues relevant not only to flood but also to drainage, irrigation, navigation, environment and overall socioeconomic development. This is also reflected in different regional studies in their planning approach and subsequent identification and prioritization of projects in the respective region. Primarily because of this and also because the regional studies reflect a new dimension in water management planning in Bangladesh - a dimension that recognise profound regional differences in the water regions, the planning approach as well as the process of formulation of alternative development options and prioritization of projects differ across different regions.

The regional studies, it may be emphasized, are the key elements of FAP involving major multi-disciplinary investigation of complex land and water regime. Their aim was to develop water management plans that are technically, economically, socially and environmentally sound. Five regional studies have now been completed. For the north-west and north central regions, the focus was mainly on flood protection and drainage, the initial concerns of the FAP. The studies for the other regions covered wider issues of year round water management. These regional studies provide the basis of further studies at project feasibility level.

(a) Northwest Region

The study places considerable emphasis on the importance of the multi-criteria analysis as a guide to policy makers in the selection of project. The results of economic analysis are entered into the multi-criteria analysis (MCA) and should be considered in conjunction with the other indicators making up the MCA. It had been intended to use an extended cost-benefit analysis (CBA) approach in the economic analysis, in order to value impacts which might conventionally be excluded from analysis. This extended CBA approach has been used to some extent, particularly in regard to economic valuation of capture fisheries to take account of current and future depletion of stocks, but data limitations mean that a number of possible impacts have not been valued. Sensitivity analysis have been carried out to assess impacts on soil fertility (as well as analysis of potential for navigation and a hazard analysis for the Gaibandha priority project area) but where valuation has not been possible, quantified impacts have been entered into the Environmental Impact Assessment (EIA), and important indicators from there have been included in the multi-criteria analysis. The MCA is, therefore, an important focus for policy makers since it integrates the impacts, which have been given monetary values and those which have not.

For every proposed project and scenario, three measures of economic viability have been calculated: net present value (NPV), economic internal rate of return (EIRR) and net present value ratio (NPVR). The NPVR is the appropriate economic measure to use where ranking projects, on the assumption that public investment funds are the major limiting constrain on investment in the

country. NPVR is defined as the net present value of all net benefits minus project cost (evaluated in economic prices), divided by the public capital and O&M costs in financial prices.

It need to be emphasized here, however, that although the NPVR should be used for ranking on economic grounds, an overall assessment of a projects viability must include other factors which in reality can determine the success or failure of a project. For that purpose, the multi-criteria analysis, which incorporates the economic analysis and impact assessment, is the appropriate approach to guide decision-making.

A large number of sensitivity analysis were carried out on the options/scenario in the plan. These tests were of four types: (a) to calculate switching values for different elements in the benefit-cost analysis (b) to test the particular role of rice prices in the viability of a project (c) to test the impact of two key assumptions made in the analysis i.e. the assumption that crop yields would increase in the future, and the assumption of a scarcity premium on the price of fish, and (d) to test the impact of other specific factors (e.g. the effect of loss of natural soil fertility due to embanking). The results are presented in Table III.1.

Impact Assessment

The impact assessment summarises the overall effects of the lower Atrai strategy and the regional projects. The economic analysis and regional planning time scale consider the short to medium term future under certain given conditions. The impact analysis complements these by assessing long term processes, a range of development trends, other risks and hazards and cumulative effects.

Table III.2 summarises the physical, biological, human and development impacts of different scenario and project interventions. This presentation show net incremental difference between the "future without" and "future with" situations to distinguish their differential impacts. These impacts will occur against a backdrop of on-going trends in society and the natural world. Understanding these trends is important to judge if even small project-induced changes might cause critical thresholds to be exceeded. The main purpose of the matrix used here is to highlight contrasts between the various tactical options. The matrix shows these differences adequately for most components. However, it does not represent the assessment of the final status after either interactions or potential mitigations have been accounted for. At this planning stage, it is more important to arrive at a sustainable strategic approach. Details of mitigations will be subject of future research and feasibility studies.

The various planning scenario and options for individual areas which were considered in the regional planning process are summarized in Table III.3 and III.4. This gives summary details for each of the options considered, together with their scores against a number of key indicators for ranking purposes.

The criteria used for ranking are based on the National Water Plan priorities and analysis of experience of flood control projects to date. These are briefly summarized below:

Net present value Ratio

The use of this measure (the present value of benefits minus present value of costs at shadow prices divided by the present value of public sector capital and O/M costs at market prices), as pointed out earlier, is now widely accepted as the appropriate method of economic ranking of projects, in the case where the availability of public sector funds is the greatest constraint on development.

Changes in Rice and Fish Output

Rice output is generally increased by the proposed intervention, while fish output decreases. High economic returns are generally a reflections of increased rice output while decline in fish output constitute a measure of disbenefit to the poor and the disadvantaged groups.

O and M Cost per hectare

The difficulties of effective O & M are widely acknowledged to be major constraints on FCD development. While these are wide range of factors which contribute to these difficulties, it is thought that the O & M cost per hectare provides a reasonable indication on the degree of difficulty, which will be experienced on any particular project.

Social Impact

It has become clear through the range of evaluation studies currently being carried out that the social impacts of FCD development are often as important as the likely increases in agricultural productivity from them. Values are given against three quantitative indicators, e.g. construction employment, incremental agricultural employment and land acquisition. while qualitative analysis (in terms of ordinal ranking) have been made with respect to other social impacts (such as the extent the project protects or creates hazards to life and property, and the extent to which it enhances or curtails their means of livelihood etc.).

Biophysical Impact

The approach to environmental evaluation has been in accordance with standard international practice and the guidelines being developed in FAP 16, in encompassing a broad range of environmental impacts. In ranking criteria, only biophysical impacts are included, as the key socioeconomic factors are included in the factors already discussed.

Social Conflicts

A key factor in the performance of past flood protection scheme has been the degree to which they cause social conflicts which can result in poor operation and maintenance, and in extreme cases, public cuts and serious damage. This criteria attempts to assess this factor.

Institutional Complexity

This factor attempts to assess the complexity of particular projects or scenario and the likelihood of possible failure. It is related to O and M costs per hectare, and social conflicts as discussed above.

Hazard

This criteria measures the susceptibility of the project to failure caused by natural or manmade factors, and the impacts that such failure would have on the protected area or adjacent and downstream areas.

External Impacts

The external impact of FCD development are in many ways as important as the internal impacts. One of the major features of the present situation is the very low tolerance of people for perceived disadvantage from FCD infrastructure. This is shown by the amount of embankment cutting now goes on. It is, therefore, important to try and assess the degree of impact on areas outside the project boundary. The smaller the impact, the higher the rank of the project.

Plan Ranking

The plan has not been formulated on the basis of putting each option into a rank order, nor it is desirable to do so. The best use of the ranking analysis is to provide a broad view of priorities. Other factors will also determine the order in which options are selected for implementation. Thus from Table III.3 it can be seen that, comparing the Lower Atrai scenarios analyzed, the Green River would be recommended because it has high economic returns (an NPVR of + 0.42) and generally scores well against other criteria. Notably it should reduce social conflict in the basin which at present causes significant economic and social dislocation. Full FCD in the Lower Atrai appears to give higher economic returns, but is the cause of severe social conflicts, is very susceptible to hazard, and is regarded as infeasible, taking into account all ranking criteria. Of the other scenarios analyzed, only the Little Jamuna right bank is feasible in conventional economic terms. This is a small and simple river embankment project with a low O&M cost per hectare and few negative impacts: it can be included in the short-term plan but will not make a major contribution to development in the region.

The larger scenarios investigated all had negative NPVRs, though the Gaibandha and Teesta Left bank projects should be classed as marginal, rather than infeasible. Gaibandha is preferred to the Teesta Left Bank development because it generally scores better against the ranking criteria. In particular it has beneficial impacts on downstream areas through the sealing of the Teesta.

In the case of project ranking on the Lower Atrai Green River most projects are feasible in conventional economic terms. Polder C and D score highly in terms of reducing social conflict and hazard to adjacent areas and should have first priority. Other projects in the middle and upper part of the basin are rather similar and can not be definitively ranked. Two of the Hurasagar options would be rejected on economic grounds: the third (CFD development in Hurasagar south) has reasonable economic returns but high O&M costs per hectare, moderately strong negative impacts on the biophysical environment, and high susceptibility to hazard. It can only therefore be recommended for the long term, since other developments would have higher priority.

(b) Northeast Region

Northest regional study used a strategic planning process in which the problem was defined in terms of internal and external environments. The internal environment here is the water system and the external environment consists of regional systems other than water, and relevant national and

international systems. In addition, the strategic planning method stressed action, in particular action focused on key points of intervention.

An interpretative description of the region was first prepared, to provide a profile of the region in terms of what is most important -- from a development perspective - to understand, rather than for comprehensiveness of enumeration. The information base for this was the NERP specialist studies which included review of the existing secondary data and documentation, meeting with key informants, plus primary field-based research at NERP field stations and case study sites.

Major driving forces likely to be significant in shaping the region's future development were identified. Some driving forces are internal to the regional water system, some are external, still others are national or international in scope. This analysis relies on forecast data on regional, national and international trends, content analysis of key media, interviews with influential and informal persons, review of futurist media and modelling.

The regional water management strategy starts with objectives for overall regional development and the regional water management plan. These were tentatively formulated as a first step in developing the strategy to provide guidance; once the strategy was finalized, these were revised to reflect the likely achievements and impacts. The strategy was prepared as a set of interventions cross-referenced by strategic thrusts (key action).

The strategy is based on three key tenets: a mix of structural and non-structural measures is required since there are limits to which nature can be controlled; a development-oriented stance is sought since it promises higher benefits than a defensive stance; and recognizing that most people of the region are poor, the strategy should impact a large number of people.

Eight strategic thrusts considered in the regional study are presented below:

1. Protect Urban Centres and Infrastructure from Flood and Improve the Urban Environment.
2. Intensive Agriculture for Urban Consumption
3. Enhanced Production Systems on Seasonally Flooded Areas
4. Integrated Development of Deeply Flooded Areas
5. Biodiversity Enhancement and Sustainable Management
6. Improve Liveability of Rural Settlements
7. Improve Water Transport in the Region
8. Institutional Strengthening and Development

Prioritization and Scheduling

The northeast regional water management plan proposed 45 initiatives - the term used to include projects, programmes, actions and policy. The proposed initiatives fall into two categories; flood control drainage and non-flood control drainage.

Non-flood control drainage initiatives were identified following a process which began with the preparation of sectoral specialist studies. The list of initiatives was refined further during subsequent steps in the planning process. This included the development of an interpretive description of the region, identification of driving forces, regional analysis and, most important, strategy formulation.

The flood control drainage initiatives generally followed a similar approach to that described in the previous paragraph but, in addition, required the identification of geographical boundaries to ensure that water management concerns were addressed throughout the region. The analysis of initiatives was undertaken in sequence leading from upstream to downstream to ensure that the downstream impacts of water management interventions were not overlooked. The list of initiatives was then finalized in conformity with the strategy.

The recommendation of projects is based on the general prioritization of strategic thrusts and on consideratins related to rational sequencing of initiatives. (For example, upstream to downstream for flood control, downstream for flood control, downstream to upstream for drainage interventions). The results of the multi-criteria analysis were not used to determine phasing, because the proper basis for phasing relates to the considerations noted above, not to the slight difference in indicators such as the Economic Rate of Return.

For the purpose of establishing a tentative scheduling of projects, the initiatives have been grouped into the following four categories:

(a) **Non-structural initiatives of a remedial nature (Group N).** Generally, these are initiatives for which implementation is overdue and is independent of other internal or external actions being carried out, and for which processing has some urgency.

(b) **Structural initiatives that are independent of other structural plan initiatives of external development (Group SI).** Implementation of these initiatives will not be affected by other plan initiatives or upstream development. These include:

- 0 drainage improvement schemes having a large impact on the region and on subsequent initiatives;
- 0 iniatives not substantially affected by Tipaimukh dam;
- 0 projects in the upper catchments that are isolated from other recommended initiatives: and
- 0 projects requiring immediate action to avoid further deterioration of existing infratructure.

(c) **Structural initiatives that are internally dependent (Group SID).** Structural projects that are highly dependent on other plan initiatives and that cannot be implemented in isolation. These need to consider the impacts of other initiatives during feasibility analysis, planning and design.

(d) **Structural initiatives that are externally dependent (Group SED).** These initiatives will be strongly affected by future developments outside the region which are largely beyond the control of the Government of Bangladesh (such as Tipaimukh dam in India). Ideally, these

initiatives should incorporate the expected impacts from Tipaimukh dam into their planning, design and schedule for implementation. However, given the present level of uncertainty associated with Tipaimukh, this can only be done in a very preliminary fashion. Therefore, in the implementation schedule for the initiatives this group of projects has been shown as commencing in the fourth year of the plan to allow additional time for resolution of the Tipaimukh dam issue.

Portfolio of Initiatives

A portfolio fo 44 initiatives was developed from the regional strategy discussed earlier. Table III.5 shows the initiaties, categorised by priority groups and strategic thrust, with a brief introduction of rationale. Priority groups, it may be emphasized were derived from factors such as dependencies between Plan projects and dependencies on factors external to the Plan. Each initiative conforms to the proposed strategy and has been subjected to the multicriteria analysis specified in Guidelines for Project Assessment (GPA). The results of multicriteria analysis for some selected initiatives (projets) are presented in Table III.6.

IV. Review of Regional Studies

A lot of effort and expertise has gone into the preparation of regional studies, which among others, has identified and prioritized projects albeit at a pre-feasibility level in the respective regions. However, a review of these studies reveal number of weaknesses which require further investigations. These are noted below.

(a) Impact analysis in the regional plans has not fully benefitted from the new methodologies and recommendations coming out of various guidelines and supporting studies due to mismatch in timing.

(b) The interdependencies and linkages among the recommended projects in space, time and resource allocation remain unclear.

(c) Investment programme impact for the region as a whole has generally not been carried out. The northeast study (FAP-6) seems to be the only study which consider flood control and drainage within the overall context of regional development needs, constraints and priorities.

(d) The emphasis and findings of non-flood aspects of water resources management varies considerably among regions.

(e) The vast majority of recommended projects in the regional studies has, as mentioned earlier, been conducted at the pre-feasibility level. It is necessary to apply adequate time and effort to secure field information and conduct analysis at the feasibility level to examine if these projects meet the basic criteria.

(f) The relative emphasis given to environmental issues in the regional studies varies considerably from rudimentary in most cases to the reasonable in FAP-6. Given the general lack of attempts to collect baseline information on important water-related environmental features of these regions, it can be regarded as a missed opportunity. Also, it is not clear what institutional arrangements will be introduced in the future to integrate environmental considerations into flood management projects.

(g) Even with the emphasis on flood protection, FAP has not come forward with an overall strategy of flood protection taking into consideration the different causes of floods in different regions and seasons, different impacts of floods on different groups of population, and different measures to protect lives and livelihoods.

(h) FAP efforts to elicit peoples' preferred solutions in designing flood protection plans has been inadequate. More attention need to be paid to people's own traditional coping strategy related to flood and cyclones. Even flood and cyclone warning and other disaster management strategies have not received adequate priority.

(i) FAP has adopted the guidelines on project assessment and people's participation. However, the project planning and management process is still not able to fully internalize poverty, gender and environmental concerns in formulating and implementing its programmes and projects.

(j) All regional studies need to be brought to a common standard as the basis for integrated regional planning.

(k) No effort has been made to weave FAP proposals into a national water management plan and relatively no effort to put FAP proposals into the context of national development programme. FAP study and the resulting programme should be an integral part of the national water resource management plan.

V. Concluding Observations

The FAP has produced a number of valuable studies and innovative methodologies to cope with the complex water management problems in the country. It is important to preserve and extend this capacity. During its five years, the FAP evolved from its original focus on physical flood control investment to a more comprehensive approach towards water management. Amongst its considerable achievements have been the formulation of standard guidelines for project assessment. A manual for EIA was also prepared. Moreover, some comprehensive exercise in regional water management planning have been carried out. Despite these achievements, however, there are still areas which need further attention. These are:

(a) Considerable strengthening and rehabilitation of FPCO, WARPO and BWDB and improvements in their links to other government agencies (e.g., Local Government Engineering Department-LGED) will be required before any substantial water development programmes can be contemplated. Future institution building would also require a clear perspective of the role of the private sector. The necessary legal and regulatory environment for assisting private investment in water resource development will have to be ensured.

(b) Further development and testing FAP's participatory approaches to planning, implementation. O&M and evaluation are needed. ..

(c) Proper emphasis on poverty, employment, resettlement, gender bias, etc. have to be placed for socially acceptable development.

(d) The guidelines for environmental impact assessment and research and training programmes, carried out under FAP need to be built on and expanded in a more decentralized, regional programme for sustainable development.

(e) The different FAP regional and associated project planning studies will have to be brought together into an overall national water management plan.

In particular, it is important to recognize that the overall goal of an integrated national water management plan has not yet been achieved. There is a need to bring the regional plan to a common standard, and to study the cumulative effects both within and between regions. Much of the progress towards achieving the goal will be lost if concerted efforts to put FAP on solid foundation are not undertaken. The formulation of an integrated plan would necessitate improving those regional studies which are inadequate and initiating a multi-objective planning criteria including those for sustainability with appropriate institutional reforms. This exercise should draw on the knowledge base of the National Water Plan, the Flood Action Plan, lessons learnt from past FCDI projects, as well as urban and sectoral water need projections. The national water management plan should be seen as a rolling plan to be reviewed and updated every five years. It would provide a firm plan for the next five years, an indicative plan for the subsequent five years and a perspective plan for the long term. This way the plan would be sufficiency flexible to accommodate changes in the socioeconomic environment and technological advances, while maintaining its direction and momentum.

Table III.1

Sensitivity Analysis for Scenarios and Projects

		BASE CASE	NO PREMIUM FOR FISH	NO CHANGE IN YIELDS	INCREASE RICE PRICE BY 20%	DECREASE RICE PRICE BY 10%	DECREASE RICE PRICE BY 20%
A. SCENARIO							
LOWR ARTAI GREEN RIVER	IRR	21	21	18	23	20	16
	NPV	581	630	346	779	493	215
	NPVR	0.42	0.46	0.25	0.57	0.36	0.16
BANGALI FLOODWAY	IRR	5	5	4	6	4	3
	NPV	-388	-381	-450	-333	-426	-478
	NPVR	-0.27	-0.27	-0.32	-0.23	-0.3	-0.33
GAIBANDHA IMP PROJECT	IRR	10	10	9	11	10	9
	NPV	-112	-113	-185	-66	-163	-217
	NPVR	-0.02	-.02	-0.04	-0.01	-0.03	-0.05
TEESTA LEFT BANK	IRR	9	10	6	11	7	5
	NPV	-37	-26	-79	-12	-62	-90
	NPVR	-0.06	-0.04	-0.13	-0.02	-0.1	-0.15
MOHANANDA 20 YR	IRR	5	5	2	8	2	-VE
	NPV	-38	-39	-49	-27	-49	-61
	NPVR	-0.27	-0.27	-0.34	-0.19	-0.34	-0.43
B. LOWER ATRAI PROJECT AREAS							
BOGRA POLDER 2	IRR	24	24	21	26	22	19
	NPV	161	168	103	201	125	83
	NPVR	0.8	0.83	0.54	1	0.62	0.41
BOGRA PLDER 3	IRR	21	21	21	22	21	20
	NPV	49	45	48	52	46	43
	NPVR	0,55	0.5	0.54	0.58	0.52	0.49
CHALANBEEL POLDER A	IRR	14	13	12	17	13	11
	NPV	15	10	1	42	5	-6
	NPVR	0.1	0.07	0.01	0.29	0.04	-0.04
CHALANBEEL POLDER B	IRR	19	20	14	22	15	10
	NPV	66	76	14	105	29	-13
	NPVR	0.45	0.52	0.1	0.72	0.2	-0.09
CHALAN BEEL POLDER C	IRR	15	15	12	17	12	10
	NPV	23	27	2	42	2	-19
	NPVR	0.15	0.18	0.02	0.28	0.01	-0.13
CHALAN BEEL POLDER D	IRR	17	19	11	21	13	7
	NPV	63	101	-10	120	14	-44
	NPVR	0.29	0.46	-0.04	0.55	0.06	-0.2
SIRDP	IRR	35	35	34	36	35	34
	NPV	223	217	204	235	214	201
	NPVR	1.61	1.56	1.47	1.69	1.54	1.45
HURASAGAR NORTH	IRR	-VE	-VE	-VE	-VE	-VE	-VE
	NPV	-120	-120	-122	-118	-121	-122
	NPVR	-0.58	-0.58	-0.59	-0.58	-0.59	-0.6
HURASAGAR S. CFD	IRR	21	22	17	24	19	16
	NPV	57	62	30	76	40	19
	NPVR	0.74	0.8	0.39	0.98	0.51	0.25
HURASAGAR S. GREEN RIVER	IRR	7	7	4	8	5	4
	NPV	-15	-15	-20	-12	-18	-21
	NPVR	-0.23	-0.24	-0.31	-0.18	-0.28	-0.33

Notes:

1. Base case includes premium on fish price of 25% deflated by SCF=.87
2. No fish price premium: market price deflated by SCF=.87
3. No increase in yields: future yields assumed the same as present yields
4. Changes in rice price, e.g. 20% increase in market price, deflated by converstion factor=.88

IRR **Internal Rate of Return in %**
NPV **Net Present Value in million Tk.**
NPVR **Net Present Value Ratio**

Table III.2

Summary Analysis of Impacts within Target Areas - Lower Atrai Strategy and Regional Sub-Projects

IMPACT ISSUE/Important Environmental Component	Mohananda	Lower Atrai		Hurasagar	Bangali Drain		Gaibandha		Teesta R.B.	Teesta L.B.	
	1	1	2	1	1	2	1	2	1	1	2
PHYSICAL RESOURCES											
Flood Frequency/Duration	+4	+1	+1	+3	+4	+2	+1	+4	+4	+1	0
Drainage Conditions	-2	-1	-1	-2	+3	-3	+1	+4	+2	-2	-2
Morphological Change	0	0	0	0	0	0	-1	0	+2	+2	+2
Seasonal groundwater availability	-1	0	0	-2	-4	-2	-1	-1	-1	0	0
Water Quality	-2	0	0	-2	-3	-2	-3	-4	-1	-2	-2
Soil Quality	-2	0	0	-2	-2	-2	-2	-2	-2	-1	-1
Disposal of Construction Spoil	-1	0	0	-1	-5	0	0	0	-1	-1	-1
BIOLOGICAL RESOURCES											
Diversity Terrestrial Species/Habitats	-1	-1	-1	-1	+4	+3	-1	-1	-1	-1	-1
Diversity Aquatic Species/Habitats	-1	-1	-1	-1	-1	-1	-1	-1	-2	-2	-1
Habitats for Threatened Species	-1	0	-1	-1	-1	-1	-1	-1	-2	-2	-1
Pest and Disease Levels	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
Wetland Functions and Productivity	-2	-1	-1	-3	-4	-4	-1	-1	-4	-4	-3
SUSTAINABLE RESOURCE USE											
Crops and Livestock	0	0	0	-1	-1	-1	-1	-1	-1	0	0
Fuel and Energy	0	0	0	0	0	0	-1	-1	0	0	0
Capture Fisheries	-1	-1	-2	-2	-2	+5	-2	-2	-2	-2	-1
Cultural Fisheries	+4	+1	+2	+2	+4	+4	+3	+3	+4	+2	0
ECONOMIC EFFECT											
Construction Employment	+2	+3	+4	+3	+5	+5	+2	+3	+4	+3	+4
Farm Income & Employment	+3	0	0	+2	+3	+3	+4	+4	+3	+2	+2
Fishery Income & Employment	-2	0	-1	-2	-2	-1	-3	-3	-3	-3	-2
Navigation Income & Employment	-3	0	-1	-2	-4	-4	-1	-1	-3	-3	-2
Income & Employment for Landless	+5	0	-1	+2	-2	-1	+2	+4	+5	+4	+4
Equity	-4	-1	-2	-4	+4	-4	-1	-1	-1	-1	-1
INFRASTRUCTURE											
Road Networks	+3	+1	+2	+3	+3	+3	+1	+2	+3	+3	+4
Navigation Networks	-4	-1	-2	-3	-3	-3	-1	-2	-3	-2	-2

Table III.2 (Continued)

IMPACT ISSUE/Important Environmental Component	Mohananda	Lower Atrai		Hurasagar	Bangali Drain		Gaibandha		Teesta R.B.	Teesta L.B.	
	1	1	2	1	1	2	1	2	1	1	2
SOCIAL EFFECT											
Community and Family Cohesion	-4	0	-2	-4	-4	-4	+3	-3	-3	-3	-2
Minority Groups	-4	0	0	0	0	0	0	0	0	+2	+2
Attitudes to Flood Risk	+4	0	+1	+3	+3	+1	+5	+5	+4	+1	+1
Access to Flood Survival Strategies	-2	0	+1	0	+1	+1	+3	+3	+3	+2	+1
Land Acquisition/Displacement	-4	2	-3	-3	-4	-4	-2	-3	-3	-3	-3
HEALTH AND NUTRITION											
Nutritional Disorders	-1	0	-1	0	-1	-1	-1	-1	-1	-1	-1
Water Related Diseases	-3	0	-1	-4	+3	-3	-2	-5	-5	-4	-5
Sewage and Sanitation	-3	0	-1	-3	-3	-3	-2	-4	-3	-3	-3
INSTITUTIONAL											
Public Participation	-3	+4	0	-3	-3	-3	+4	?	-3	-3	-4
Institutional Complexity	-3	-1	-2	-3	-3	-3	0	-4	-3	-3	-3
HAZARD DAMAGE											
Design Criteria Floods	+3	+4	+4	+3	+4	+4	+4	+4	+4	+4	+4
Exceptional Floods and Disasters	-1	0	0	-1	-1	-1	0	0	-1	-1	-1
Drought (field crops)	-2	0	0	-1	-4	-3	-1	-1	-2	-1	-1
Liquefaction	-2	-1	-3	0	0	0	0	0	-4	-3	-3

+1 = Slightly Beneficial, +2 = Somewhat Beneficial, +3 = Beneficial, +4 = Very Beneficial, +5 = Highly Beneficial, 0 = No Response or Effect Detectable
-1 = Slightly Negative, -2 = Somewhat Negative, -3 = Negative, -4 = Very Negative, -5 = Highly Negative,

Mohananda 1 = 1:20 Year CFD Embankments
Lower Atrai 1 = Green River and Partial Protection
L. Atrai 2 = Green River with Max. Feasible CFD
Hurusagar 1 = 1:20 Years CFD Embankment (N.B. Option included in L. Atrai Green River)
Bengali Drain 1 = Drain with Full Excavation
Bengali Drain 2 = Drain without Excavation
Gaibandha 1 = 1:20 Year CFD, without Drainage Compartments
Gaibabdha 2 = 1:20 Year CFD with Drainage Compartments
Teesta R. Bank 1 = 1:50 Year CFD, River Training and Regulators (N.B. option = "do nothing")
Teesta L. Bank 1 = 1:20 Year CFD, River Training and Regulators
Teesta L. Bank 2 = 1:20 Year CFD, River Training and Backwater Embankment

N.B: Matrix measure absolute difference between the "future with" and "future without" impacts only for the target area.

Table III.3

Scenario Summary and Ranking Analysis - NW Region

	Lower Atrai Full FCD	Lower Atrai Major drain	Lower Atrai Gr. River	Up. Karatoya (Bangali F. way)	Gaibandha (incl. Teesta RB)	Teesta LB (B. water Embakt)	L. Jamuna R. Bank	Mohananda 20 Year
Net Cultivable Area (ha)	382756	382756	355692	(180000)	(197780)	51021	9500	15073
Total Cost (Tk. '000)	4161000	16023000	1498010	2182147	1670080	452397	33584	159418
O&M Cost (Tk. '000)	133000	480000	47138	57802	42619	13033	898	4088
IRR (%)	24%	2%	21%	5%	10%	9%	16%	5%
Ranking Criteria								
NPVR (1)	+1.02	-0.5	+0.42	-0.27	-0.02	-0.06	+0.16	-0.27
Rice Output (000t)	-	-	1879(+4%)	310(+7%)	335(+8%)	248(+3%)	-	29(+20%)
Total Fish Output (mt)	-	-	19968(-11%)	826(-31%)	675(-3%)	274(-62%)	-	269(-3%)
O&M Cost/ha nca (Tk.)	348	1254	132	(321)	(215)	225	94	271
Const. Empl ('000 days)	-	-	10035	30360	9760	4280	290	1300
Ag. Empl ('000 days)	-	-	99149(+4%)	19016(+5%)	20037(+6%)	15530(+2%)	-	2191(+8%)
Land Acquisition-ha	-	-	601	3421	425	293	30	166
Biophysical Impacts	-2	-3	-1	-2	0	0	-1	0
Social Conflict	-5	-2	+3	+1	0	+2	0	+1
Inst. Complexity	-2	-3	-1	-3	+1	-1	+2	0
Hazard	-5	-2	0	-1	0	0	+1	0
External Impacts	-3	-3	0	0	+2	0	0	0
OVERALL RANKING	N	N	1	3	1	2	1	3

Source: NWRS estimates.

Notes:

1. Impacts range from +5 (very positive) to -5 (very negative).
2. Overall ranking: 1-high priority, 2-medium priority, 3-low priority, N-not recommended.
3. Economic indicators for Lower Atrai full FCD and Major Drains based on analysis in Interim Report.
   Some ranking criteria for these scenarios are excluded since they were calculated on different basis from 1992 analyses.

Table III.4

Project Summary and Ranking Analysis - Lower Atrai

	Polder 2 Gr. River	Polder 3 Gr. River	SIRDP Gr. River	Hurasagar S Gr. River	Polder A Gr. River	Polder B Gr. River	Polder C Gr. River	Polder D Gr. River	Hurasagar N CFD	Hurasagar S
Net Cultivable Area (ha)	52089	55578	64275	6225	27716	29411	42498	52650	25250	6225
Total Cost (Tk. '000)	223589	98270	153704	63145	159171	162901	163184	239466	226281	86804
O&M Cost (Tk. '000)	6156	2770	9115	1958	4622	4565	4431	7115	6456	2265
IRR (%)	24%	21%	35%	7%	14%	19%	15%	17%	-ve	21%
Ranking Criteria										
NPVR (1)	+0.8	+0.55	+1.61	-0.23	+0.1	+0.45	+0.15	+0.29	-0.58	+0.74
Rice Output (000t)	283(+6%)	340(+3%)	228(+2%)	29(+5%)	122(+4%)	148(+13%)	193(+5%)	221(+12%)	120(+4%)	35(+30%)
Total Fish Output (mt)	1587(-14%)	1636(+25%)	4137(+5%)	387(+2%)	1037(+18%)	833(-30%)	2020(-6%)	1774(-42%)	341(-3%)	229(-40%)
O&M Cost/ha nca (Tk.)	109	49	68	315	169	155	98	133	256	264
Const. Empl ('000 days)	1558	637	1340	500	1490	1390	1280	2340	2080	510
Ag. Empl ('000 days)	13453(-7%)	15975(+1%)	12978(+1%)	1657(+3%)	6625(+3%)	8914(+8%)	10645(+4%)	12989(+8%)	7132(+4%)	2242(+40%)
Land Acquisition (ha)	108	35	77	13	55	84	76	130	23	13
Biophysical Impacts	-1	-1	-2	-1	-1	-1	-1	-1	-1	-3
Social Conflicts	+3	+3	+3	0	+1	+1	+3	+3	-1	0
Inst. Complexity	-1	-1	-1	-1	-1	-1	-1	-1	0	0
Hazard	+1	+1	+1	0	0	0	0	0	-1	-3
External Impacts	0	0	0	0	0	0	+2	+2	-1	0
OVERALL RANKING	1	2	2	N	2	2	1	1	N	3

Source: NWRS.

Notes:

1. Impacts range from +5 (very positive) to -5 (very negative).
2. Overall ranking: 1-high priority, 2-medium priority, 3-low priority, N-not recommended.

Table III.5

PRIORITIZATION OF PROJECTS IN THE NORTHEAST REGION

ITEGIC IST	INITIATIVE	RATIONALE
Priority group N: Non-structural initiatives of a remedial nature		
	Urban Potable Water	Essential services for urban development
	Urban Sanitation	
and structure ction	Regional Water Quality Characterization	Immediate attention is required to obtain information on water quality.
	Industrial Pollution Abatement at Smaller Industrial Facilities	Immediate action is required. REgional industrial pollution is likely to double over the next decade.
	Duckweed-Based Domestic Waste Treatment	Immediate attention required for the enhancement of health standards.
nced ction on nally ed Areas	Ground Water Investigation	Immediate attention required to avoid over-extraction of ground water.
	Jamuna Flood Plain Floodproofing	This area is subjected to regular Brahmaputra River inundation resulting in greatly reduced qualify of life.
	Pond Aquaculture	Improved socio-economic conditions for small and landless farmers.
grated lopment eeply ded e	Applied Research for Improved Farming Systems	Immediate attention required so that mixed farming systems can be introduced into the deeply flooded area.
	Fisheries Management Program	Immediate attention required to increase open water fish production and to ensure the long-term sustainability of fish production.
	Pulp and Paper Mill Effluent Treatment	Immediate attention required to arrest environmental degradation.
versity ncement inable agement	Upland Biodiversity Conservation Studies	Immediate attention required to arrest environmental degradation.
	Locally Based Management of Internationally Significant Wetland Sites	
	Threatened Ecological Community Recovery Programme	
	Recovery Plans for Threatened and Commerically Threatened Lowland Plant and Animal Species	
roved ability ural ements	Village Water Supply and Sanitation	Immediate attention required for the provision of essential services.
	Village Afforestation	Immediate attention required to arrest environmental degradation.
	Pilot Project to Institutionalize Public Consumption	Immdediate attention required to improve the planning process.
utional ngthening elopment	NE Regional Environmental Management, Research, and Education Centre (NEMREC)	Immediate attention required to arrest environmental degradation. This initiative linked to other environmental initiatives.
	Surface Water Quality Management Strategic Planning Exercise	
	Biodiversity Strategic Planning Exercise	
	BWDB Strengthening	

STRATEGIC THRUST	INITIATIVE	RATIONALE
Priority group SI: structural initiatives that are independent of other Plan structural initiatives		
Urban and Infrastructure Protection	Habiganj-Khowai Area Development	Project includes urban protection for Habiganj town and the reduction in flood damages to homesteads, infrastructure, and crops.
	Manu River Improvement Project	Project includes urban protection for Moulvibazar town, rehabilitation of Manu River Irrigation Project, and the protection of adjacent road and rail links.
	Bhairab Bazar Erosion Protection	Immediate action is required to avoid further damage to Bhairab Bazar town, railway bridge, and electeical line.
Intensive Agriculture for Urban Consumption	Narayangj-Narsingdi Project	Future plans need to focus more on agriculture for consumption by the Dhaka mega urban area.
Enhanced Production System on Seasonally Flooded Areas	Upper Kangsha River Basin Development	Consists of several sub-projects in te upper catchment. Benefits include improved operation of the existing downstream Kangsha-Thakurakona Project.
Integrated Development of Deeply Flooded Areas	Fisheries Engineering Measures	Immediate attention required to arrest the deterioration of fish habitats and to restore open water fish production.
	Baulai River Improvement Project	Drainage improvement scheme having a large potential impact on the region. Incorporates drainage improvement component of Surma-Kushiyara-Baulai Basin Project.
	Kalni-Kushiyara Improvement Project	Drainage improvement scheme to rehabilitate lower Kalni-Kushiyara River.
Improved Liveability of Rural Settlements	Improvement of Homestead Plaforms	Homestead conditions are deteriorating rapidly and population is increasing.
Institutional Strengthening and Development	Improved Flood Warning	Better warning systems are critical to reducing loss of life, damage to crops and property. A pilot project is proposed to determine an appropriate solution.

ATEGIC UST	INITIATIVE	RATIONALE
Priority group SID: Structural initiatives that are internally dependent (dependent on other Plan Structural initiatives)		
nced uction ems on onally ded Areas	Mrigi River Drainage Improvement Project	Project affected by upstream work on the Kamajhora River.
grated elopment eeply ded Areas	Jalukata Water Improvement Project	Project affected by Baulai River Improvement Project.
	Sarigoyain-Piyain Basin Development Project	Located in te upper catchment area but not affecting existing projects or urban centres.
	Dharmapasha-Rui Beel Project	Affected by Baulai River Improvement Project.
	Updakhali River Project	Affected by Upper Kangsha Basin Project and Baulai River Improvement Project. Lead time for testing fish pass structures also needed.
sive culture Urban sumption	Narsingdi District Development Project	Project affected by upstream development on the Old Brahamaputra channel.
gation rovement	Dredging for Navigation	Project affected by Baulai River Improvement and Kalni-Kushiyara River Improvement.
	Support ot Country Boats	Other action is needed before implementation as project as partly linked with water resource projects.
Priority group SED: Structural initiatives that are externally dependent (dependent on future developments outside the region, specifically, the Tipaimukh Dam project in India)		
nced uction ems on onally ed Areas	Surma Right Bank	Project is located upstream of other initiatives on Surma River. The project will be affected by Tipaimukh Dam if constructed.
	Upper Surma-Kushiyara Project	Project is located in the upper catchment area and will affect flood discharges in the downstram reaches of the Surma and Kushiyara channels. The project area will be affected by the Tipaimukh Dam if constructed.
grated elopment eedply ded Areas	Kushiyara-Bijna Interbasin Project	Project affected by Kalni-Kushiyara River Improvement, by other upstream initiatives, particularly Upper Surma Kushiyara Project, as well as by Tipaimukh Dam if constructed.
	Surma-Kushiyara-Baulai Basin Project	Project affected by Baulai River Improvement, by other upstream initiatives (Surma Kushiyara Project and Surma Right Bank Project) and by Tipaimukh Dam if constructed.

Table III.6

RESULTS OF MULTICRITERIA ANALYSIS FOR SOME SELECTED PROJECTS (INITIATIVES) IN NORTH-EAST REGION

I. Economic Analysis	Malijhee River Project	Updakhali River Project	Someswari River Project	Manu River Improvement Project	Gr Dampara Project	Mrigi River Drainage Improvement	Konapara Embankment Project	Upper Surma-Kushiyara	Kushiara-Bijna Project	Jadukata-Rakti River	Dharma-pasha Rui Beel	Surma-Kushiara Baulai Intervention
Indicator												
Economic Internal Rate of Return (EIRR) (%)	15	24	19	27	19	79	21	15	49	26	31	35
EIRR, Increase Capital Cost by 20% (%)	13	20	17	24	17	62	19	14	43	21	27	30
EIRR, Delay Benefits by Two Years (%)	12	17	15	24	16	35	16	12	31	17	21	23
EIRR, Increase Fisheries losses by 20% (%)	13	20	17	20	18	-	22	-	43	-	26	29
Net Present Value (000 Tk.)	61,879	43,189	31,102	69,426	53,304	130,132	28,099	254,079	549,465	147,489	140,328	1160
II. Quantitative Impacts												
Indicator												
Incremental Cereal Production[2] (Tonnes)	14030(12%)	+3891(26%)	9762(14%)	58000(33%)	9269 (19%)	11000(2%)	2377(9%)	68000(75%)	26000(13%)	8116(11%)	8000(19%)	81538(13%)
Incremental Non-cereal Production (Tonnes)	981(3%)	0	1661(12%)	3000(25%)	2000 (23%)	0	788(15%)	700000 (33%)	12000(46%)	1828(8%)	1000(1%)	11487(14%)
Incremental Fish Production (Tonnes)	-96(-13%)	-81(-24%)	-132(-7%)	-2927(97%)	-237 (-38%)	-23(-2.5%)	6(2%)	-700(-50%)	379(6%)	13(1%)	-58(-3%)	-3900 (-17.9%)
Change in Floodplain Wetland/Fisheries Habitat (Ha)	3200(29%)	70(50%)	-300(-2%)	8160(50%)	1150 (15%)	-4230 (-21%)	604(21%)	-14600 (-66%)	2300(3%)	0	-	248(1.7%)
Homesteads Displaced Due to Project Land Acquisition (No)	0	0	0	200(0.1%)	0	0	0	450(0.8%)	617(0.7%)	0	0	2450(50%)
Homesteads Protected From Floods (No)	16556(25%)	0	1645(5%)	53783(66%)	1107(5%)	1056(2%)	1000(10%)	30100 (100%)	26800(30%)	1010	0	0
Roads Protected From Floods (Km)	75(25%)	0	10(10%)	120(40%)	10(5%)	50(20%)	10(10%)	12(100%)	18(15%)	0	0	0
River Levels PWD	-	-	0.40	0.20	few cm	0	+0.5	+0.5	0.1(1%)	-	0.5	0.3
Incremental Owner Employment (mil.pd/yr)	0.123(2%)	0.021(3%)	0.173(12%)	0.67(8%)	0.23 (9%)	0.11(2%)	0.024(2%)	+2.36(68%)	0.94(51%)	0.109 (2.3%)	0.055	0.69(1.9%)
Incremental Hired Employment (Agri+Fishing+ Wetland)(mil.pd/yr)	-0.061 (-2%)	-0.043 (-8%)	0.166(12%)	0.06(2%)	-0.23 (20%)	0.41(16%)	0.01(15%)	0.03 (0.01%)	0.88(49%)	0.409(13%)	0.027	-3.81(-12.1%)

1. Figures in parenthesis show percent changes which are calculated relative future-without project values of: total production of cereal, non-cereal, and fisheries; total floodplain area; total number of homesteads (for displacement due to land acquisition); flood affected homesteads; flood affected roads; Kushiyara water level; and total employment for owners and hired labourers.

2. Includes incremental production foregone due to acquisition of cultivated land.

Table III.6 (Continued)

	Malijhee River Project	Updakhali River Project	Someswari River Project	Manu River Improvement Project	Gr. Dampara Project	Mrigi River Drainage Improvement	Konapara Embankment Project	Upper Surma-Kushiyara	Kushiara-Bijna Project	Jadukata-Rakti River	Dharma-pasha Rui Beel	Surma-Kushiara Baulai Intervention
III. Qualititative Impacts (ranked from -5 ...0 ...+5)												
Impact												
Regional Biodiversity	-1	-2	-1	-3	-1	-1	-1	-3	-1	+3	-	-3
Road Transportation	+5	-	+5	+5	+5	+1	+5	+1	+5	0	+2	+3
Navigation	0	-4	-1	-1	-1	+3	-1	-3	0	+5	-3	-3
Flood Levels Outside Project Area	0	-	-3	-3	-2	+3	-2	-2	-1	+2	-	-4
Conflicts	-3	-3	-1	-5	-1	-1	-3	-3	-2	-1	-3	-3
Socioeconomic Equity	-1	-	-1	-1	-1	-2	-1	-4	0	+1	-3	-4
Gender Equity	+2	-	-3	+2	+2	-1	+3	+1	+3	+3	+2	-2
Decentralized Organi-zation & Management	-2		-1	-3	-1	-	-1	-4	-2	-2	-2	-4
Responds to Public Concerns	+3	+3	-4	+3	+4	+3	+3	+2	+5	+5	+4	+2
Conformity to Regional Strategy	+4	-	-4	+4	+3	+4	+4	?	+3	+4	-	+2
Ecological Character of Key Wetland Side				-5				-4	0	+2	-	-2

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FOURTH CONFERENCE ON FLOOD ACTION PLAN

INTERNATIONAL CONFERENCE CENTRE, DHAKA

(November 30 & December 1, 1995)

TECHNICAL SESSION - VI

PRESENTATION : "INSTITUTIONAL DEVELOPMENT IN WATER SECTOR"

BY : Dr. Yusuf A. Choudhry, World Bank
Dr. A.M.M. Shawkat Ali, Secretary
Ministry of Industry and
Dr. R. Faruqee, World Bank

DATE : 01-12-1995 **TIME : 1430 Hrs.**

FLOOD PLAN COORDINATION ORGANIZATION
MINISTRY OF WATER RESOURCES
GOVERNMENT OF THE PEOPLE'S REPUBLIC OF BANGLADESH

INSTITUTION DEVELOPMENT IN WATER SECTOR

Dr. Yusuf A. Choudhry
Dr. A.M.M. Shawkat Ali
Dr. Rashid Faruqee

Introduction

The Bangladesh Water and Flood Management Strategy, prepared in September 1995, presents a strategic framework for the development of a national water management system for the country. (see Box 1). The strategy outlined will require a sound system for managing and developing water resources in Bangladesh. This system has to serve the wate sector goals, keeping in perspective the resource constraints and the need for dynamism to make it responsive to the changing times. In Bangladesh, where water is a prime economic resource for agriculture (contributing 30 percent to GDP), water transport (contributing 4 percent to GDP), energy, water and sanitary services (contributing 2 percent to GDP), its value as an economic good cannot be underrated and the need for efficient management overemphasized.

In designing this system one hs to carefully consider the goals and objectives of water resource management, issues and constraints facing the sector, and the policies that the country has evolved (or needs to evolve) to realize the objectives.Subsequently, the system could be defined in terms of three elements, the process involved, the functions needed to manage it, and the institutional requirements to perform the functions efficently.

The Goals and Objectives of Water Management in Bangladesh

The goals for the development and utilization of water resources in Bangladesh have not been explicitly enunciated. However, in perspective of the nation's broad socio-economic goals, they could very well be:

"Making efficient use of water resources, originating from different sources, to optimize the growth of agriculture, including fisheries, forestry, and livestock, ensure health and sanitation for all; provide navigational facilities for growth of commerce, industry and transportation; facilitate small scale activities of the poor and disadvantaged; prevent land, water and environmental degradation through erosion and pollution; and minimize the adverse effect of flood on rural and urban communities; in a consistent, equitable and sustainable manner."

The objectives of water management, stated in measurable terms, will evolve in the initial stages of the national water planning. They should, however, include the following aspects:

1. Irrigation objectives. including major surface water irrigation and minor irrigation[1]. Conjunctive use of both surface and groundwater is also a major objective to meet agricultural demand in the critical months, February-April, when surface water availability is low. Surface and groundwater are hydrologically interconnected, except for groundwater stored in confined aquifers.. Concurrent planning for both are therefore essential.
2. Agriculture. fisheries. livestock and forestry objectives, particularly in areas of dry season agriculture. fish culture. open area capture fisheries. forestry expansion, etc.

[1]The former consists of primary pumping plants and gravity diversion schemes in canal distribution systems and the latter consists of small manual and powered pumps to lift surface or ground water with earthen distribution systems constructed by farmers water ways for all the above purposes.

Box 1. Bangladesh Water and Flood Management Strategy

The strategy formulated by the Government of Bangladesh calls for:

Addressing long-term needs of the water sector management: This would involve (i) formulating a comprehensive list of criteria and time horizons for specific application in water resource planning and management, using a fifty-year time horizon, (ii) full according for social cost and externalities and linkages, and improving the quality and implementation speed of schemes; and (iii) developing policies that meet the requirement of time and adjust to need for decentralization. privatization, stakeholder participation, cost recovery, susainability and public accountability.

Undertaking Integrated Water and Land-Use Planning. This would involve: (i) drainage, irrigation, landuse, cropping pattern, environment, erosion/sedimentation control. fisheries, navigation and salinity management and provision of water supplies, (ii) protection against drought and tidal surge, and (iii) coordinated planning and construction of rural roads, highways and railway embankments with provision for unimpeded drainage.

Achieving Intersectoral Balance: This would require (i) reliance on multipurpose projects and programs for achieving intersectoral balance and assuring industrial and domestic water supply to a diversified agricultural system, (ii) phased implementation of comprehensive water management plans, aimed at controlled flooding for rural areas to meet the needs of crop production, and (iii) fisheries, navigation, urban flushing and recharge of ground water resource with minimum dislocation to the environment.

Managing cross-border flows: This would involve seeking international co-operation with riparian countries to moderate peak flows and share the flows of the common rivers.

Basin wise development: This would be pursued through integrated surface and ground water development for water balance in the river basins.

Balance structural and non-structural approaches to water management: This would require considering nonstructural measures (e.g. floodplain zoning, floodproofing) for flood damage reduction equally with structural measures.

Setting Environmental Priorities: This would require full integration of environmental priorities (e.g. protection of life and property from flash flood and cyclone damages, minimization of forced resettlement caused by erosion, etc. with water development programs in accordance with EIA guidelines and promotion of formal and non-formal environmental education and linkages among concerned institutions.

Developing appropriate institutions: In the next 10-20 years, a strategic institutional framework has to evolve that supports the sector goals and objectives with optimal efficiency (e.g. harmonizing environmental and social objectives with production and distribution objectives balancing quantity and quality.

3. Flood Management objectives, including protection of critical urban and rural areas and control of land erosion from river actions. Additional objectives may include storage of flood water in river channels, ponds, and floodplain depressions dry season irrigation.
4. Industrial objectives, particularly the provisions for industrial growth, type and location of industries.
5. Energy and power generation objectives, specifying the use of dams and other control structures.
6. Navigation objectives, specifying the use of water for inland navigation of commercial and domestic crafts.
7. Roads and bridges objectives, specifying the development of roads networks that complement without obstructing the flow of
8. Poverty alleviation objectives, specifying availability of water for disadvantaged groups like women, rural communities and the urban poor.
9. Environmental objectives, related to conservation of land, forestry, pollution control of river and still water, sea, etc.
10. Economic stabilization, including macro-economic reforms,public sector rationalization in the water sector,private sector development,poverty alleviation,health and human services, etc.
11. Decentralization objectives - shifting the point of control to the lowest decision level for developing water plans, implementation, O&M, etc. with increased people's participation and their active involvement in managing water programs.
12. Objective of evolving a viable water market, one which forces users to use water efficiently.

Water Management Issues and Constraints

Comprehensive management of water resources in Bangladesh is a relatively new concept because in the past activities generally hinged around the target of controlling flood or facilitating irrigation. Separate agencies in different sectors followed their own plans for water utilization without linking them to other user's interest. Perhaps the only attempt to integrate water use with a multisectoral analysis was made in the first and second National Water Plans, but that too was partial and inadequate. When we attempt a comprehensive overview of the water management process--one that embraces every sector and every actor, many issues and constraints pose themselves for solution. At the very macro level, the major issues are:

- Demand and supply management, including:
  - o Proper monitoring and estimations
  - o Establishing priorities for provision of water services
  - o Establishing water rights and the basis for an efficient water market in the private sector
- Establishing an institutional framework for enabling effective macro-management of the sector in coordination with other sectors
- Defining the legitimate role of the public sector and setting the ground rules for public and private involvement in the water sector, with attention to participatory role of the public.

At the micro level. the issues deal mainly with operational aspects of public water management, such as:

- Development of water control structures
- Distribution, O&M, sales and pricing of water at primary points
- Micro-level coordination between users using a participatory approach
- Implementation of water laws and codes.

Demand and Supply Management Issue

In the past, investments in dams, reservoirs, wells, pumps and canals provided adequate access to fresh water supplies. But with growing demand imposed by increasing population and modern intensive usage of water, the supply-side approach to water planning is meeting its limitation. The availability of surface water in Bangladesh has declined with greater upstream use by India part of the year, and groundwater potentials are fast depleting with increasing usage, particularly agricultural. The option remaining is to look for improved demand management to bring water use into balance with supply.

Demand management for water transcends the standard techniques of using market clearing price, because water is both a public and a private good. Its benefits cannot be denied to those who cannot pay for it and at the same time it is an economic good that should be consumed with its value in mind. Many developed countries have addressed the problem through regulatory measures that allocate water, encourage conservation and protects its quality. These have, however, been costly and mostly inefficient to administer. In recent years there has been a tendency to employ alternative approaches such as economic incentives to encourage voluntary control by the users and encouraging growth of water markets where water is traded between different users.

For establishing priorities of water allocation the government has to examine water needs of various sectors pursuing their respective goals based on the national objectives. Although at present agriculture is the largest consumer, demand from municipalities and industry are rising. Municipal water supplies are mostly from groundwater sources at present, but overexploitation has denuded aquifers and there are critical shortage of groundwater specially in large metropolitan areas like Dhaka. The country's industrial concentration is also around Dhaka and rising industrial demand for water is likely to become a problem in the near future. It is possible that the constrained water supply for domestic and industrial usage will require cutback of groundwater irrigation in many areas. There is no consolidated policy for this yet, but this has to be developed in the immediate future.

Preservation of natural fisheries must be weighed against expansion of irrigation and FCD, as the latter have already affected river and open area capture fisheries in many places[2]. Dams and diversions for irrigation also affect inland navigation and their respective importance have to be determined by policy makers.

Similarly, provisions for environmental use of water has to be made to combat salinity and deforestation.

Unfortunately, the need for management of water has been given relatively little importance in the past. This is evidenced by:

- The absence of a close monitoring system for water demand and supply on a continuous basis.
- Lack of a plan-strategic for meeting long-term needs and tactical for balancing short-term differences between supply and demand during different periods.
- Lack of a system for prioritizing the needs of different sectors and a public supported allocative mechanism for establishing water rights and optimizing its use between different users.

[2] See Bangladesh Water and Flood Management Strategy, FPCO, Dhaka September 1995; Water Resource Management in Asia, by Herald Frederiksen, et al. Volume 1, World Bank Technical paper No.212, Washington D.C. 1993.

Managing the supply of water is another critical issue that has been addressed in piecemeal fashion in the past. Bangladesh's problems as the lower riparian in the Ganges, Brahmaputra and Meghna river basins are amply manifested in the drying and siltation of the rivers in dry season and heavy outpour and flooding in the wet season. The management of flood has been a top priority for decades, but the mechanism for doing so have not been always friendly to other sectors and sub-sectors such as navigation, fisheries, etc. This is evidenced by:

- Construction of water control structures that have negatively impacted on fisheries in many places.
- Flood control structures that have impeded navigation, particularly for small boats.
- Flood control structures that have negative impacted the natural environment.
- Flood control structures that have having negatively impacted the landless and the poor.

Institutional Issue

As a scare national resource with immense social and economic value, water has to be regulated at the macro level by the state. It has to have the institutional system for planning at the highest level, environment friendly system for development of supply and distribution, a system for allocation at principal points of distribution, and regulation for efficient use and sustainability. The current problem in Bangladesh is that there are no effective institutions (i.e. organizations, laws, procedures) for management of the demand for water. Past efforts to plan and develop the infrastructure were mainly confined to one institution-the Bangladesh Water Development Board. This is manifested by the:

- Independent and isolated planning for water use and development by different sector agencies like BWDB, PHE, IWTA, etc. and the absence of multisectoral linkage and coordination in water use.
- Absence of uniform water codes and legislation and lack of implementation of existing regulations.
- Lack of public understanding and participation in efficient and environment friendly development of water resources.

Distinction of public and private sector role and function in the water Sector.

Because of its singular characteristic of being a public and a private good, water management belongs both in the public and the private sector depending upon the nature and location of its use. Unless clear cut ground rules for its development and use are established, private investment will shy away from the sector. In Bangladesh, decentralization and private sector involvement in the water sector, outside the development of Minor Irrigation, had not received adequate attention in the past. This is evident by:

- Dominance of public sector agencies in all aspects of water management.
- Lack of people's participation in water planning, implementation and O&M.
- Absence of ground rules for public and private involvement in the water sector, particularly in respect to construction of structures, management of irrigation and drainage systems, operation and maintenance of community systems, collection of water fees, ownership of water rights, private sale of water, etc.
- Absence of established rights and responsibilities for preserving quality and environmental standards (e.g. water codes, implementation responsibility, etc.)

Water Management Policies of the Government

Policies guide actions to meet prescribed objectives. In a few specific areas, particularly the management of complex interlinkages between sub-sectors such as irrigated agriculture, fisheries, domestic water supply, etc. there has to be a coherent and consistent water policy that reconciles differences. Many countries in Asia, like India and Thailand, have published statements on national water policy[3]. Others, like China, Philippines and Indonesia, have embedded water policies in legal codes. Bangladesh does not have an approved national water policy. Although the National Water Plan (NWP) did suggest a set of water sector policies, they were not comprehensive and never formalized. Consequently, planners and managers of water resources have no guidelines for actions, which may prove detrimental to the national interest. Disjointed policies also create conflicts between sub-sectors and different aspects of water use. Flood mitigation policies, (through FCDI projects), have had negative impact on fisheries and navigation. Uncontrolled groundwater extraction have lowered the water table in many areas, adversely affecting drinking water supplies. To deal with such inconsistencies, gaps and overlaps in water management, a coherent and consistent water policy is essential for Bangladesh.

Water policies may cover many areas of endeavor, but certain aspects deserve special attention to help the development of a viable long-term sustainable system. These are:

Water Pricing: For preserving the financial viability of a public water supply institution and for establishing a water market for private sector activities, it is essential to price water according to some reasonable standard. Determining the opportunity cost could be a important step in guiding policies for pricing of water and to establish the magnitude of penalties to be imposed on polluters. Water charges could be applied on a graduated scale such that beyond a set standard, the user has to pay increasingly higher amounts.

Cost Recovery: Besides setting the right prices, government policy also has to address the issue of cost recovery. Nonpayment and non-collection of water dues are sadly common in many parts of the world including Bangladesh. Two reasons for this failure are low incentive to collect and low willingness to pay due to lack of quality service. The former is mostly due to political reasons and the latter almost a consequence of the former. Failure to recover cost results in low financial outlays and reduced services which again leads to non-payment of dues by beneficiaries. These problems should be addressed through appropriate policy measures.

Private Sector Management and Investment: An important step to counter the persistent sluggishness in public investment and current low aggregate demand in Bangladesh is to boost private investment. In the water sector, private agencies can provide investment and management resources that could increase its efficiency manyfold. Under ideal conditions, the government should assume responsibility for overall management of the resources for the benefit of society, undertake major development programs and provide public services of purely public good nature. The private sector should invest in developing the commercial aspects of water system production and delivery within legal bounds established by the government. Private sector participation in providing water services can take many forms[4]. But no matter what type of privatization measure are adopted, it is essential to provide proper policies for their success. These include action regarding:

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[3]See Water Resource Management in Asia, by Harold Frederiksen,et al.World Bank, ibid.

[4] See "Improving Water Resource Management in Bangladesh." by Yusuf Choudhury and Rashid Faruqee, paper presented at the conference on Bangladesh Agriculture in the 21st Century, Dhaka, Bangladesh; November 5 - 8, 1995.

- Legislation establishing water property rights.
- Water trading rights
- Quality standards
- Dispute resolution mechanism.[5]

Public Sector Management and Investment: Among other things, it would necessitate the development of the:
Legal and Regulatory Framework: The principal areas needed to be covered by regulations and water allocation and rights, trading principles, ease of entry in the water services industry, service standards, water quality and environmental standards, watershed management principles, soil and water conservation principles, prices charged by regulated utilities in a free water market, etc.

In Bangladesh there are but few regulations in the books for covering the areas listed above (see Table 2), and more alarmingly they are badly administered or not administered at all.[6] This is partly due to the multiplicity of agencies administering water rules, each following its own agenda without regard to the effect it has on the others. For example, the Agriculture Ministry's plans for groundwater irrigation conflict's with the Public Health Engineering Department's plans concerning use of groundwater for drinking Pricing policies are also inconsistent, as for example irrigation water is priced well below municipal water price. Under these conditions, the need for centralized policies for water resources becomes indisputable.

Administrative Rules: Clear administrative procedures for determining priority of use, allocation mechanism, timing, duration and the quantity and quality of supply are important for protecting both government and private sector investments and assuring fair water allocation in the market. The source of water, geographical restrictions on its use (including linkages to land use), limitation on class of use, restrictions on source and return flows, and rules for any transfer of rights by the holder, also should be well defined. Similarly, comprehensive standards for monitoring the allocation and usage of water, and measurement of compliance with environmental objectives must be undertaken. In establishing administrative procedures special attention should be given to pollution standards for effluent discharge, fertilizer and pesticide use, etc. for checking environmental degradation.

It is efficient to integrate land use and water use issues both in planning and operation. Appropriate rules and procedures should guide the administration of a system of rights/licenses and the working of an efficient water market. There should be a clear mechanism for assuring consistency and timeliness of implementing water rights and interlinked land rights. Project delays are common due to ineffectiveness of procedures for land acquisition.

The formulation of rules to administer water standards entail a wide range of action, from clarifying legislation to preparing manuals and guidelines. Well administered service standards and regulations are as essential to sustaining good water services as the physical facilities themselves. Where comprehensive standards are prepared and enforced, service quality is high and the beneficiaries are more able and willing to pay. Furthermore, the system developed must be capable of providing an acceptable service under reasonable O&M costs. Administrative rules must also cover institutional arrangements for coordinating mutually agreed upon priorities and policies of different water-related agencies.

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[5] See "Water Markets: Opportunities and Concerns", by K. William Easter, in Water Policy and Water Markets, World Bank Technical Paper No.249, Washington D.C, 1994.
[6] In 1985, the Groundwater Management Ordinance was promulgated but it has been kept under suspension since then.

Institutions (Organizations): There are three main participants in water resources development and management: government, non-government entities and the private sector. The appropriate role of the government is to control overall exploitation and management of the resources for the benefit of society (through appropriate laws and regulations), undertake investment programs of a public good nature, and fill-in the gaps caused by market failure. Non-government entities should develop and manage resources for their members' benefits within bounds established by the government. Private sector activities parallel those of the non-governmental entities except for scale and a profitability motive.

People's participation in water resource planning, execution, operation and maintenance, monitoring and evaluation have been limited in Bangladesh, although there is good scope for this.[7]

Developing a Process for Water Management in Bangladesh

The main elements of a national water management system are shown in Figure 1. Some of these elements (marked with solid lines) are already present in Bangladesh, and for these specific improvements to increase efficiency will be examined in the following sections. Others, which are currently missing (marked with broken lines), will have to be developed.

Formulating the National Water Policy

This is the first step towards a comprehensive water management plan. There have been many ad-hoc directives from the government in the past, but these are disjointed and often conflicting. The initial task will be to review all the existing policies in conjunction with:

i. Development objectives and strategies for the agricultural, industrial, energy and power, fisheries, livestock, forestry, navigation, and public health sub-sectors.
ii. Flood and drought management objectives and strategies.
iii. Environmental protection objectives and strategies.
iv. Poverty alleviation and women-in-development objectives and strategies.
v. Decentralization objectives and strategies.
vi. Private use of water.

The review should reveal any inconsistency between existing water policies and the needs of the different sectors and targeted development areas. It should also identify need for new policies to integrate and harmonize the objectives of different development agencies and the private sector.

Formulating Policy on Water Pricing and Cost Recovery

Policy on water pricing is a sensitive issue for any country and fraught with political pitfalls. However, as discussed earlier, rationalization of water pricing is essential for ensuring judicious use and availability for the poor, eliminating waste, allowing development of an efficient water market with private participation, and reducing the strain on government budget.

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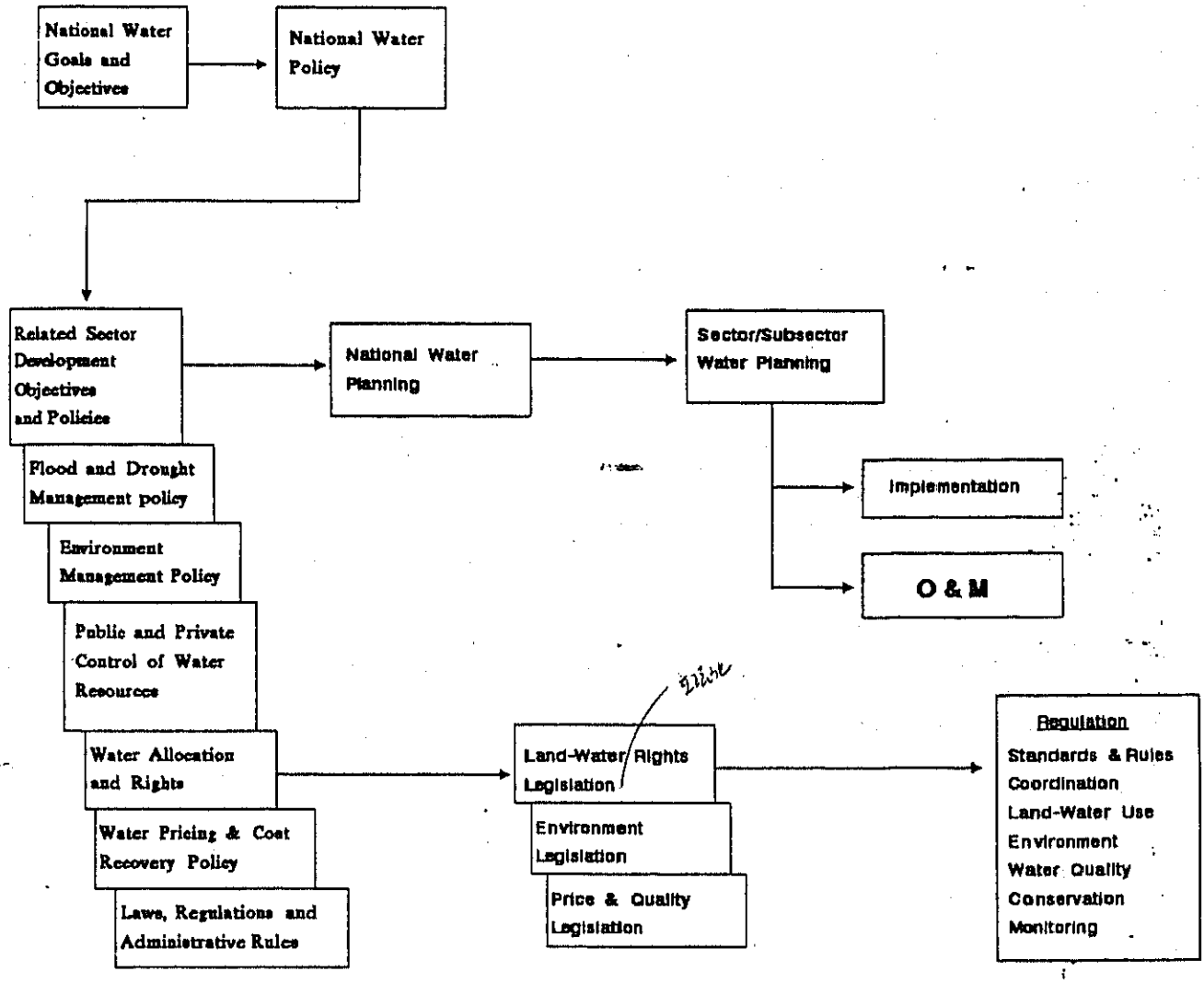
[7]This has been discussed elaborately in "Improving Water Resource Management in Bangladesh," by Yusuf Choudhury and Rashid Faruquee, paper presented at the conference of Bangladesh Agriculture in the 21st Century, Dhaka, Bangladesh; November 5 - 8, 1995.

Figure 1 : The Water Management Process



A number of options may be considered for formulating water pricing policies such as (i) allocation of water by government decree, (b) setting price high enough such that low-value users release it for higher-value users, and (iii) enabling active trading among users. Each of these measures create third-part effects where groups that do not get direct allocation suffer, as for example recipients at the lower reaches of a water channel. This may be of particular concern, particularly when the people adversely affected are the poor. Some kind of a balance needs to be reached between the three, although option three provides the best economic solution. There are other concerns on water prices, including the necessity of checking environmental degradation, that may have to be addressed.[8]

Laws and the Regulatory Framework

Water codes generally specify four important things, (i) the rights, powers and duties of individual users and government over natural water, (ii) ancillary power over land, (iii) registration and licensing of rights to water, and (iv) creation of the administrative structure to implement the code (UNECAFE 1973). The first three involve legislation and the fourth involves regulation.

Bangladesh should enact comprehensive legislation which could clarify principles of water usage (water and land-use rights, pricing, conservation, environmental protection and water quality), as done in many countries in South and East Asia.[9]

Land-use rights also needs to be examined along with water-use rights. Issues like land zoning in major urban areas for meeting environmental objectives; settlement on floodplains, uptake of land for flood control, detention basin and flood proofing facilities, siting restriction on industries to control pollution; restricting high water users' access at times of shortage; etc. should receive proper attention.

Environment and water quality regulations should receive high priority in Bangladesh because of the high density of population and the general lack of public sensitivity to these issues.

Administrative Rules

Rules and procedures for administration of water legislation and regulation must be kept simple and easily implementable. Allocation mechanism should be flexible and adaptable.[10]

The lack of enforcement capability may cause failure to administer the water codes and laws Indirect methods, such as taxes and subsidies could be considered for encouraging compliance with the law.

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[8]See "Improving Water Resource Management in Bangladesh." by Yusuf Choudhury and Rashid Faruqee, paper presented at the conference on Bangladesh Agriculture in the 21st Century, Dhaka,Bangladesh, November 5 - 8, 1995.

[9]Ibid.

[10]Various allocation mechanism have been discussed in "Improving Water Resource Management in Bangladesh," by Yusuf Choudhury and Rashid Faruqee, paper presented at the conference on Bangladesh Agriculture in the 21st Century, Dhaka, Bangladesh, November 5 - 8, 1995.

Principal Functions involved in the Process

In managing the water resources in Bangladesh, the principal functions that would be involved are shown in Table 1, along with the current situation and the gaps in the process.

Table 1
Principal Water Management Functions and Gaps in Bangladesh

Function	Current Situation	Gaps
Setting National Water Goals and Objectives	Loosely defined	Formal water goals and objectives
Farming the National Water Policy	Loosely defined	Formal National Water Policy
(a) Sectoral Objectives	Isolated and unrelated	Interrelated water objectives of different sectors
(b) Flood and drought management policy	Ambiguous and lacking intersectoral considera-tions	Incorporation of flood and drought management in the national water policy
(c) Water and the Environment	EIA guidelines prepared	Formal EIA policy on water development
(d) Policy on public and private water undertakings and participation	None defined	Clear definition of public private sector domains in management
(e) Water rights and allocation policies	None defined	Clear definition of private water rights
(f) Water pricing policy	Loosely defined	Clear policy on water pricing and cost recovery
Laws, regulations and administrative rules concerning land-water usage	Scattered and conflicting	An omnibus water law (National Water Act), uniform regulations and administrative rules for all sectors.
National water planning	Stagnant	A comprehensive water development, use and flood management plan
Public sector water investment planning	Ad-hoc and disjointed across sectors	Public investment program consistent with national objectives and intersectoral issues.
O&M planning and implementation	Ad-hoc and ineffective O&M plan	Implementable public and private supported
Water resources data and information collection	Scattered. insufficient and uncoordinated	Comprehensive water data for use of all agencies and interested individuals.

Setting national water goals and objectives: This is the first step towards the development of a national water plan Key elements of the objectives have been discussed earlier in this paper.

Framing the National Water Policy: This is a necessary first step towards developing a strategy for realizing the broad water objectives. Key elements of the policy involving multisectoral consolidation, flood and drought management, water and the environment, public and private undertakings and participation, water rights and allocation principles, and water pricing and cost recovery have been discussed earlier in the paper.

Laws, Regulations and Administrative Rules: The three basic principles recognized by most countries in regard to natural water rights are:

- Declaration of state title
- Declaration of water being subject to administrative control
- Declaration concerning private rights.

The first principle relates to the French doctrine of public domain. Under this doctrine, certain resources cannot be owned and managed by private person because of their overwhelming public significance.

The second principle flows from English Common Law traditions. It recognizes neither total state ownership of water resources nor total private ownership. It reserves powers to the state to control water for specific purposes. The Northern Indian Canal and Drainage Act, 1873 and the Bengal Irrigation Act, 1876 are examples of this principle.

The third principle relates to private rights over water resources. This principle is in effect a mixture of both public and private rights. The Philippines constitutional provision read with the provision of its Civil Code, and the South Korean laws illustrate the application of this principle.

The water laws designed in colonial British India established the right of government to control and regulate water for specific purposes. They also limit the extent of private control over water resources through such legislation as the Indian Easement Act of 1982. With the passing of the East Bengal State Acquisition and Tenancy Act, 1950, the common law treatment of the issue officially ceased and state rights over the subsoil was formally established. But this was never enforced and the controlled and regulated use of water have continued on the traditions set during British India.

The current laws, regulations and administrative rules for water management in Bangladesh, framed in response to the needs of individual sectors and specific demands of situation, are briefly listed in Table 2, below:

Table 2
Laws, Regulations & Administrative Procedures for Water Sector Management in Bangladesh

Title	Status	Purpose
The Bengal Irrigation Act, 1876	Act	Levy of Water Rates
Bangladesh Irrigation Water Rate Ordinance, 1983	Act	Levy of Water Rates
East Bengal Embankment and Drainage Act, 1952	Act	Construction, Operation & Maintenance of Embankment & Drainage Structure
Groundwater Management Ordinance, 1985	Ordinance	Siting installation & spacing of Minor Irrigation equipment
Acquisition & Requisition of Immovable Properties Ordinance, 1982	Act	Acquisition of land in public interest
State Acquisition & Tenancy Act 1950	Act	Regulates land ownership and declares subsoil resources belonging to the State
Transfer of Properties Act,1882	Act	Provides for disposal of immovable properties by gift, sale, mortgage, lease, etc.
Registration Act, 1908	Act	Deals with registration of properties & agreement between contracting parties.
Local Government ordinance,1983	Act	Deals with the structure, composition & function of Local Government institutions

The principal inadequacy in the above body of laws is the lack of updating and harmonization for internal consistency which obstruct enforcement. Many of the existing laws, such as the Embankment and Drainage Act, are outdated and need revision to suit present day conditions and requirements. This task has to be undertaken after framing the national water policy. The policy would reflect the principles of water rights and the extent of state and private ownership. As it stands now, only groundwater has been declared under the State Acquisition Act to be a subsoil resource belonging to the state. But the Groundwater Management Ordinance framed to regulate the use of groundwater for irrigation is dead. There are also multiple laws governing particular aspects of water use such as water rates levy, which need to be consolidated.

National Water Planning: The National Water Plan should follow the Water and Flood Management Strategy for future public sector investment and management programs in the water sector. This plan should draw heavily from the lessons of the FAP studies, other country experiences, and past experience of planning in Bangladesh.

Public Investment Program: The National Water Plan should lay down the basis of public water investment program in Bangladesh to be implemented by BWDB.

Implementation and O&M Program: Specific projects will have to be designed by the line ministries of the government in conformity with the public investment program. The O&M program, likewise prepared by the line ministries, should reflect joint public and private participation as specified in the National Water Plan.

Data and Information Management: The collection of hydrological data, its processing and dissemination to project designers, beneficiaries and the general public will have to be streamlined. Considerable improvement of the data and information management process has been accomplished under FAP. These have to be properly institutionalized and developed further.

The Institutional Requirements

Key Institutional Problems: The key institutional problems follow closely from the discussion of issues in the water sector,, presented in the beginning of this report. They are briefly recapitulated below for noting the institutional deficiencies.

1. **Lack of effective coordination of conflicting inter-sectoral activities at top levels of government.** The highest body for formulation of water policy including intersectoral coordination is the National Water Council. It is constituted of ministers from key water related ministries and makes recommendations to the cabinet on all water policy issues. However, this high-powered council has not functioned well in the past mainly because of lack of input from below. There is no effective down-the-line organization for examining water issues in a holistic manner and presenting them to the Coun- cil. The task has been partially performed by the Ministry of Water, which lacks appropriate resources to do this job effi- ciently. Although WARPO has the mandate for proposing national policies and strategies, it has never performed this task.

2. **Lack of a national plan identifying public and private responsibility in the water sector:** WARPO was intended to be the central body for water policy and planning in Bangladesh. However, it has not fared well due to problems such as.[11]

   - Lack of a firm agenda
   - Inadequate resources
   - Weak personnel policies
   - Little or no interaction with other agencies.

   The advent of the FAP also put a brake on WARPO's planning activities till such time the that FAP studies were completed.

3. **Lack of water sector planning and development of adequate water investment projects:** Sector planning and investment work was left to BWDB and the Planning Commission in the past, and has consequently suffered due to weakness of both these organizations.[12]

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[11]See FAP 26 Report No. 2 on the Institutional Development Program, February 1995
[12]These are listed in the FAP 26 POE Report, ibid.

4. **Lack of intersectoral coordination in water projects:** This problem is the result of a lack of mechanism to integrate planning by all institutions in the water and related sectors. Even the Planning Commission, in the past, had focused mainly on projects rather than an integrated approach towards comprehensive water planning.
5. **Lack of adequate environmental consideration in water projects:** This is also an upshot of disintegrated planning, aided by the lack of knowledge of environmental impacts.
6. **Lack of peoples support of water project:** This has been the result of excessive centralized planning without adequate local inputs and participation.
7. **Lack of adequate support and funding for maintenance of water structures:** This is related to the lack of skills in grass root institutional building for public support of water projects.
8. **Dearth of private investment in the water sector:** The absence of policy and legislation on private water rights and the failure of the government to develop a water market have added to the problems of resource constraints deterring private investment in the sector.

Major Institutional Needs

The foregoing discussions have clearly established the major institutional needs of the water sector as follows:

- o Legal and regulatory system reforms
- o Planning reforms
- o Improvement in data collection and processing
- o Execution efficiency
- o O&M improvements
- o Monitoring and Control efficiency

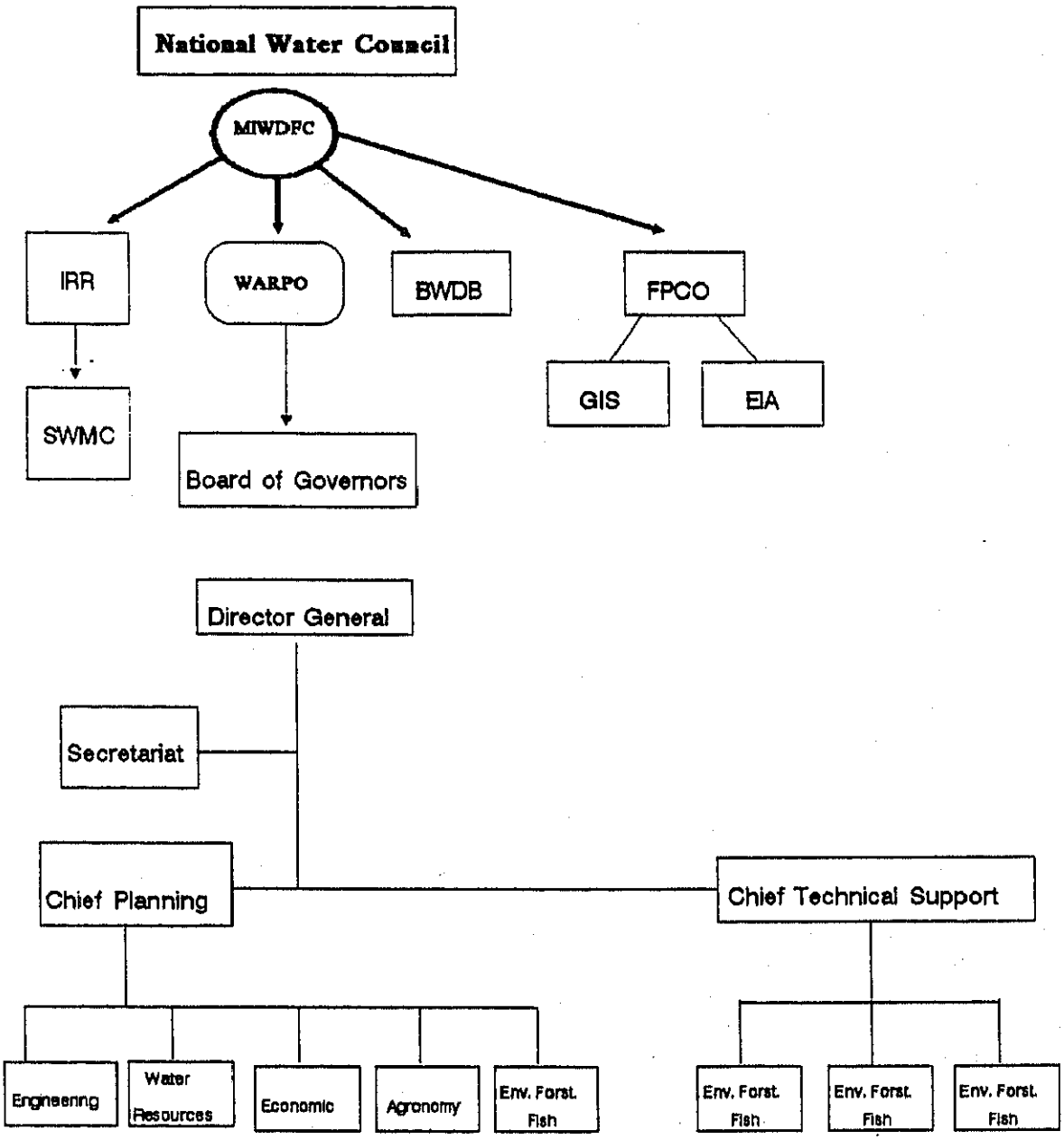
Review of Existing Institutions: The major organizations in the water sector are shown in Figure 2. The principal public organizations, under the Ministry of Water Resources, are the Water Resource Planning Organization (WARPO), Bangladesh Water Development Board (BWDB), River Research Institute (RRI) and Surface Water Monitoring Center (SWMC) under it. Organizations in other sectors that have interlinkages with this sector are the Public Health Engineering Department (PHE), Local Government Engineering Department (LGED), Water and Sewerage Authority (WASA), Department of Fisheries (DOF), Inland Water Transport Authority (BIWTA), Roads and Highways Department (R&H), Department of Environment (DOE), and respective municipal corporations. The National Water Council presides over all these institutions in matters of water policy and legislation.

The National Water Council, with representations from all water-related ministries, approves policy for presentation to the Cabinet. WARPO is supposed to evolve national policies and plans for water resources, ensuring optimum utilization among various users such as agriculture, fisheries, navigation, public health, industry etc.[13] WARPO is also supposed to consolidate data on water collected by various agencies. The organization, however, has not operated satisfactorily for various constrains and very little has been accomplished in sectoral planning or coordination. Individual line ministries have their own planning departments, which operate in more or less complete isolation of one another.

[13]See FAP 26: Institutional Development Program, Report No.2, Dhaka, February 1995.

Figure 2

Bangladesh Current Set-Up of Organizations in the Water Sector



The River Research Institute (RRI), which includes the Surface Water Modeling Centre (SWMC), is a research and data generation unit for hydraulic and river studies. It has limited function for collecting broad water resource data. Major investments in the water sector are made by the Ministry of Water through the Water Development Board (BWDB) and by the Ministry of Local Government and Rural Development through its Local Government Engineering Department (LGED). Besides other water related ministries have their own investment programs. There is very little coordination of activities between all these agencies.

A better management of water resource would require improved correction between these institutes. In particular, co-ordination with Roads and Highways Department (RHD), Local Government Engineering Department (LGED) and Bangladesh Inland Water Transport Authority (BIWTA) is important for two reasons. Firstly, activities of these organizations, such as construction of highways and rural roads, digging of canals, and dredging of channels for navigation have a direct impact on the hydrological regime. For example, narrowing of channels while constructing bridges/culverts reduces the carrying capacity of rivers and streams, an important factor causing floods. Road alignments cutting cross the terrain gradient (north to south in case of Bangladesh) also contribute to and aggravate the impact of floods. Unplanned digging of canals and construction of embankments, while alleviating localized problems, can disturb the overall hydrologic balance in a region and eventually cause serious problems for large areas. Any intervention in the hydrological regime should keep the overall situation in view. Secondly, large investments are currently being made in flood control and irrigation (BWDB), highways (RHI), rural roads, embankments and canal-digging (LGED) and cannel maintenace and improvement (BIWTA). Co-ordination of activities of these organizaions, from planning through implementation stage, will result in (i) better designed projects, and (ii) large economies in investment where structural components can be combined.

Annex-1 provides a summary of the function of the various organi- zations, and identifies critical areas of deficiency.A review of these functions and the problems encountered reveal the following:

1. The policy making institutions have not been effective for lack of resources and support from key line agencies
2. The legal and regulatory institutions have not performed satisfactorily for lack of specific mandate and necessary emphasis from top management.
3. The planning institutions have not been effective for lack of a strategic vision, shortage of human and material resources, clear mandate, and the inability to interface with other related water institutions
4. The implementing institutions have not been effective for lack of appropriate plans and programs, shortage of human and material resources and lack of supervision and accountability
5. The data and information management agencies have been constrained by lack of firm support and resources
6. Institutions have operated more or less in isolation, both in planning and implementation of schemes
7. The regulatory functions required of many of the related institutions were not performed adequately for lack of direction and coordination with the main water sector institutions.

The organizations that have responsibility for enforcement of water legislation and their specific responsibilities are shown in Table 3:

Table 3
Principal Organizations for Enforcement of Water Regulations in Bangladesh

Organization	Responsibility
BWDB	Flood control, drainage and irrigation
BIWTA	Maintenance of river channels for navigation
Ministry of land	Lease of open water and closed water fisheries. Regulated use of subsoil resources
WASA	Supply of drinking water to cities
Zila Parisad (District Council)	Optional function of construction and repair of embankments, supply, storage and control of water for agricultural purposes
Municipalities	Supply of drinking water to small towns.

Appropriate regulation of water resources is critically needed because of the importance of water allocation to meet competing (and often conflicting) demands, including the need for conservation. There are major gaps in institutional responsibilities and absence of a coordinating system with sufficient people's participation.

Requirements for Filling the Institutional Gaps

The following actions by the government are needed to address the institutional gaps discussed above.

- Formulating the National Water Policy including policies on water pricing and cost recovery
- Consolidating and rationalizing the existing laws, regulations, rules and procedures on water development and utilization and providing new legislation to safeguard unprotected interests.
- Developing a comprehensive national water plan including broad intersectoral interests
- Providing specific mandates for execution, monitoring and data collection organizations for implementation of the national water plan in collaboration with other related agencies.
- Providing specific levels of interaction between the major water and water related agencies for planning and coordination of water programs and schemes.

Options and Recommendations for Institutional Restructuring

The current institutional structure has the potential for fulfilling all the mentioned requirements for an efficient water management system. However, it needs some restructuring and substantial strengthening. They are examined below:

Strengthening the national water policy framework by providing proper support to the National Water Council.

The highest body for formulating water policies is the National Water Council (NWC). This body is constituted of ministries from respective ministries and makes recommendations to the cabinet on

all water policy issues. This high-powered council has not functioned well in the past because of lack of support. There is no effective organization for examining water issues in a holistic manner and presenting them to the Council.

Organizations that could provide the analytical and research support to the NWC are WARPO and the Ministry of Water Resources. It will be logical to strengthen WARPO to assume this responsibility because its mandate is to "determine national policies and strategies for the scientific utilization and conservation of water rsources." Also, if WARPO is made the apex organization for sectoral and macro planning, it would consolidate policy and planning in one organization. Of course the risk is that WARPO may not develop into the powerful water policy and planning organization envisaged here fo lack of support from the government in which case its ability to advise the NWC will be seriously crippled. Also, if WARPO maintains its strong engineering orientation, it may not develop the necessary breadth of vision required for macro planning of this scale.

MWR may be the alternative for providing the policy and information support to the National Water Council. The disadvantage of this option, however, may lie in the fact that the ministry is generally so entangled in administrative matters that policy work may suffer. The Ministry also does not have the resource base for processing extensive communication and information. The resources within the ministry are not sufficient to do sophisticated sector and multi-sector analysis for the complex water sector issues. Past performance of the ministry in this regard is evidence of this fact.

On belance, therefore, it is advisable for WARPO to assume the task of framing the national water policy and associated water legislation, rules and procedures.

Strengthening national water planning and programming by augmentation of WARPO.

In many Asian countries, there are organizations for planning and coordinating water management activities at the highest level, like the National Water Resource Board in Thailand, the National Water Resource Board in the Philippines and the Central Water Commission in India. They not only advises the government on water matters but are permanent organizations with broad powers for coordinating and integrating water resources development; administering rights; formulating criteria, rules and regulation; undertaking river basin planning; surveys and studies; and reviewing and approving water resource projects within the context of overall national, regional and river basin plans.[14] In Bangladesh, the alternative institutions for macro planning and administration of the water program could be the Planning Commission, MWR and WARPO.

The Planning Commission, whose mandate in the past used to be central planning, is not concerned with sector planning after decentralization. Even its capacity for macro planning has weakened over the years by exodus of trained personnel and diminishing technical backstopping. At present, its function is limited to coordination of intersectoral plans and intersectoral allocation of resources. It is therefore not a suitable organization for water planning.

The Ministry of Water Resources also lacks resource for undertaking broad based water planning, which requires inputs from professionals of many discipline. Also, the nature of the water management task requires certain degree of autonomy from normal government procedures, that could not be adopted by the ministry.

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[14]See Water Resource Management in Asia, op cit.

WARPO has the essential characteristics for a national water planning and management organization, which could be developed further to suit the needs. Its present mandate covers many of the major aspects of national water management. Others requirements could be easily incorporated.

However, one of the problems encountered with this type of organizations is the difficulty of ensuring that other agencies of the government accept its leadership and abide by its instructions. In India, for instance, the Central Water Commission was framed with almost similar intention in mind (its broad mandates are assessment and utilization of overall water resources, assistance to state governments for formulation of master water plans, data collection, flood forecasting, technical scrutiny of irrigation, flood control, drainage and multipurpose projects, etc).However, it has no direct authority over other related ministries' operation in the water area. In China, the Ministry of Water Resources has great powers, but also has an irrigation and flood control focus and experiences difficulty in managing relationship with other ministries and the provinces. Such difficulty, however, are generally related to the extent of power and control conferred upon the organization by the government. If WARPO is given the mandate and legally empowered to examine and approve water related activities of all government and private organizations, it might have the necessary impact. Leadership is a critical factor too. The organization's role could be further legitimized by bringing in elements of participative management from all other sectors and subsectors.

If this role of WARPO is accepted, it would have four major functions:

1. Planning national, regional and basin programs with overall assessment of water supply and demand in the country. Comprehensive multipurpose planning should combine the skills of many discipliness. It should involve specifications of alternatives (technical, institutional and phasing) by different specialists and their integrated evaluation at every level. The alternatives, conceived in the broadest sense, should reflect not only intersectoral issues but also resource interactions (land and water, conjunctive use of surface and groundwater, water quality and quantity), and varying approaches to resolving problems (structural versus non-structural solutions in flood protection, etc.).

2. Management of overall water resources through intersectoral coordination: Supply management should be done with medium and long-term perspective for new development and replenishment of fresh water resources including non-conventional sources such as wastewater treatment.Demand management should consider direct measures of controlling water use, and indirect measures to affect voluntary behaviour (market mechanism, financial incentives, public awareness programs).The organization's critical task would be macro managing water demands of all sectors in a cooperative venture.This could perhaps be best achieved through collaborative efforts and joint decision making under the guidance of WARPO.

3. Monitoring Evaluation and Data Collection: In Bangladesh,there are specialized government agencies that collect, process and transmit hydrological and hydrogeological data essential for planning and designing water programs.However,the efforts are disjointed.Three important data units, the Geographical Information System (GIS),Surface Water Modeling Centre (SWMC),and the Environmental Impact Assessment (EIA) unit were set up with donor assistance under the FAP. These are excellent units and must be retained after the termination of FAP in some form or other.

Considerable integration of data from different subsectors, such as agriculture,fisheries, forestry,municipal,etc. is needed for sector planning.WARPO already has a central data collection unit for this purpose.

4. Regulations: The regulatory aspects of water resource management often get lost in the bureaucratic maze of government agencies.Without one central body,systematically looking through various regulatory requirements and working like a watch dog to measure compliance by various entities, it would be very difficult to bring discipline in the sector. The National Water Policy Council sets the agenda for water use, conservation, and environmental renewal. However, it needs a mechanism for constant evaluation and updating of policies, something that should become the mandate of WARPO as the advisory body for the National Water Council. Rules for administering water rights, land-use rights,environmental quality standards,quality of service standards(e.g for urban water quality) must be framed and administered by WARPO.

Proposed changes in the mandate of WARPO: WARPO's mandate could be re-fixed to cover the activities mentioned above.The new mandates could be:

1. Advising the Government on national policies and strategies for balanced utilization and conservation of water resources,with a clear perspective of the needs of all users in the system and particularly socio-economically disadvantaged groups.

2. Administering water legislation through issuance of standards, regulations and administrative rules for governing water rights, land-use rights for the purpose of water resource management,including location of industries and urban centers,pollution control, limiting flood damage risk, and managing regional supply shortages.

3. Issuing environmental quality standards for water resources and regulation and rules for their administration,including comprehensive standards for measuring compliance with environmental objectives, public health and instream water quality and quantity conditions.

4. Issuing rules and regulations for quality of water service standards, including community water supply, standards for irrigation delivery,etc. for government owned,user group owned and private utility operations.

5. Administering water rights including issuance of license, etc. on national scale and overseeing of performance of the system, possibly through a decentralized system of enforcement.

6. Preparing revising and updating a comprehensive water resource master plan including detailed projections of supply, demand, balancing needs of different users (including disadvantaged socio-economic groups), environmental safeguards,economic efficiency,and long term preservation of national interests, using a system of participatory planning at various stages of the plan development.

7. Interfacing with other public and private organizations for evaluating and approving the water resource utilization plans of all subsector's and private and public user groups, in context of management of the scarce resources, environmental and water

quality maintenance, priority needs of specific communities, municipalities, industry,agriculture,fisheries, navigation, and various instream users.

8. Advising water resource users on balanced development of their facilities and provide guidance for long-term water use.

9. Monitoring, collecting, consolidating and disseminating standardized water resource data needed for planning and regulating the water-use environment, including data on surface and ground water,draught,flood,salinity,water quality,erosion,land-use,etc.

The Structure of WARPO: The proposed structure of WARPO after reorganization is shown in Figure 3.

The various units and their functions are:

Director General

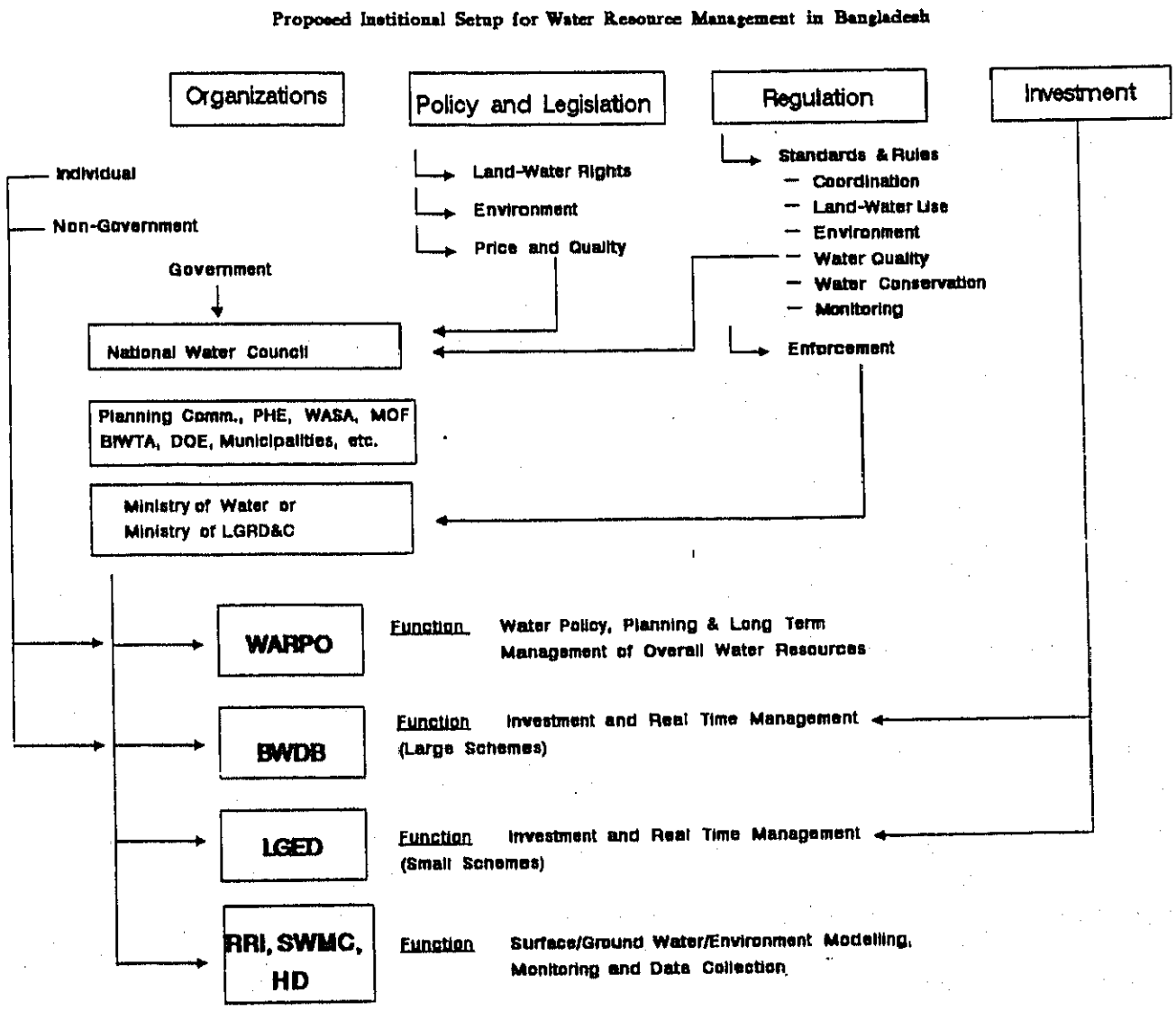
The head of the organization is the Director-General who is also Chief of Planning.He is assisted by a small personal secretariat.

Intersectoral Co-ordination Unit

The inter-sectoral coordination unit provides the interface between different concerned entities in the water sector.It is a permanent body, with representation from major water users,that advises WARPO on water schemes developed by any government or private agency.Each scheme has to be approved by WARPO and the coordination unit before implementation.A second, higher level interface between different institutions is at the level of the Board of Governors of WARPO;where matters undecided at the intersectoral coordination unit could be resolved.

The unit coordinates functions across all line ministries and related private sector organizations.The specialists in this unit will be on permanent assignment from the ministries of agriculture,finance,environment,the departments of LGED,PHE and also from WASA, IWTA,Municipalities,NGOs, and private sector organizations.The principal function of this unit would be to examine water related project proposals and programs prepared by different institutions in the country and to harmonize them with other agency plans and national and sub-sectoral objectives.The respective representatives in the unit will also provide communication links with their line agencies for efficient coordination.

Figure 3



Panel of Advisors

A compact panel of advisors drawn from the academia,industry experts and public representatives will provide guidance on broad technical and social issues.

Four Functional Divisions

Technical Planning Division: This would be in charge of the technical aspects of planning,including surface water planning, groundwater planning and flood management. Each of these planning units will have experts from agriculture,fisheries,navigation, industry,municipality and other relevant areas, respective to their needs beyond the experts on water resources.

Socio-Economic Planning Division: This division will have three units for economic planning, social planning and environmental planning, respectively.They will work jointly for preparing the national water plan.The Economic Planning unit will consolidate intersectoral demand for water with available supplies and carry out economic evaluation of alternative actions.The social planning unit will function as a conduit for participatory planning and for advancing vulnerable groups interest.The Environmental unit will evaluate all environmental impacts on water resource programs in the country.

Monitoring,data Collection and Evaluation Division: The function of this division would be to collect and consolidate data on water resources from all primary collection agencies in the country and to build a technical and management information base for all water users in the country.Its proposed components are surface water information unit, groundwater information unit,GIS unit,agriculture,fisheries,forestry,public health,and navigation information unit.environment data unit and social data unit.

Regulation Division: This division would propose policies, regulations and administrative rules in context of water policies of the government,and administer them through the line agencies.The three units of this division are the water policy unit,land-water use unit and water quality unit.

Although the overall planning for water resources should be the function of WARPO,individual sub-sector plans will still have to developed by line ministries.Irrigation and flood project planning will continue to be the responsibility of Bangladesh Water Development Board (BWDB).This is elaborated later in a discussion of that organization.

Organizations for Design, Implementation and Real-Time Management of Large Schemes:BWDB

Project development and implementation will have to be carried out by traditional organizations such as the Bangladesh Water Development Board and the Local Government Engineering Department.

The mission, goal,mandate and institutional form of BWDB in the future could be conceived with three important considerations.The first is a clear recognition of the legitimate role of public institutions in the water sector - the creation of infrastructure.Everything else should be encouraged through private efforts and an enabling environment should be created for private enterprise development.An essential focus of the Bangladesh Water Resource Management Strategy is people's participation.To implement this strategy,it is necessary for BWDB to devote its attention to development of beneficiaries capability for undertaking minor water control structures and O&M of facilitates.Only major upstream water development and management functions,where heavy engineering equipment and skills are necessary,should be retained by BWDB.Also,activities, such as monitoring and regulation of water regime in various parts of the country should receive its strong attention.

The second aspect is the mandate of BWDB in relationship to WARP0.After sector strategy formulation.long-term planning,intersectoral coordination, and regulation of water usage activities is taken up by WARP0,BWDB's mandate will have to be redirected towards real-time management of water resources including project planning,construction of FCD-I structures,and operation and maintenance.The third aspect is to inculcate a system of accountability and control in the organizational culture of BWDB which will ensure it efficiency.

Re-fixing BWDB's Mandate: There is already an urgent need for redefining mandate of BWDB, in view of separation of functions of WARPO and institutional strengthening of RRI and SWMC.The appropriate mission of BWDB should be to provide large scale engineering support for implementation of the national water sector strategy and plan for flood control, drainage and irrigation and real-time management of water resources.WARPO should provide the macro framework within which BWDB could design engineering schemes with due consideration of social and environmental parameters.The
sequence of activities, from strategy to national planning to project planning, implementation and maintenance are noted in Table 3.

Under the above scheme of things, the role and structure of BWDB should be redefined as follows:

Planning and Feasibility Study

BWDB would be the principal public agency for project and program planning, and for undertaking feasibility studies of FCD/I schemes, working within the national water plan and guidance of WARPO.

Project Design

BWDB's responsibility should be limited to design of large scale schemes based on the national water plan.A considerable portion of the design work should be contracted out to the local consulting industry who have shown substantial competence for this.It should be mandatory to include necessary inputs into the design from intended beneficiaries and other affected people, which is not currently practiced.This would avoid problems of inappropriate or inadequate water control structures.

Implementation and M&E Plan

The detailed implementation and monitoring should be prepared by BWDB for which adequate strengthening of the organization through training of technical personnel and social scientists would be necessary.The organization should restructure itself to have a considerably downsized group of highly qualified technical experts,social scientists and economists and management personnel for some design work,strong supervision of outside consultants,preparation of implementation and M&E plans,some construction and strong supervision of outside construction firms, and O&M.

Implementation of Schemes

Implementation of schemes should see significant changes from past practice.Sound implementation planning,with careful scheduling and pro-active measures like head start on land acquisition during the late phases of negotiation with donors, pre-qualification of contractors early on, etc. should make the process much more efficient than it is now.

Real-Time Management of Water Resources

All planning and design should be done with appropriate resource management actions that would ensure operation and maintenance of facilities and defined provision of services over time.Sensitivity analysis should be done to show how facilities might perform under differing outcomes to assess risk and guide operations for varying conditions.Design flexibility should provide capability for subsequent response to change.

Planning for O&M needs to reflect the practical aspects of funding, equipment, regulation, administrative procedure and incentives to ensure proper delivery of services.Project level Plans of Operation and Maintenance (POM) should be prepared by BWDB for all its projects.The POM must respond to the legislative framework and be consistent with established policies, rules and regulations (water rights, environmental standards, safety requirements, administrative and financial rules, etc.) Real-time management, requires reliable and timely data which should be strengthened in BWDB. Effective administration of regulatory functions is a necessary complement to ensure that actions are carried out properly so that real-time water operations and physical maintenance of facilities can be most effective for meeting their objectives.

Real-time management is predominantly concerned with managing supply and demand at scheme levels to meet allocation objectives.Integral to such activities are also issues related to water conservation, rationing at times of scarcity and other techniques to ensure that water demands are moderated to correspond in a logical manner to water availability.These should be the functions of BWDB.

Agency Accountability

Clear assignment of responsibilities and accountability will be critical to the future operation of BWDB.A particular need is to clarify responsibilities for completeness of facilities and quality of works.

Proposed Mandate for BWDB

1. Planning,feasibility study,designing and construction of large scale water structures (dams, barrages,reservoirs and other original works,irrigation embankment and drainage,bulk water supply to communities,water supply for needs of fisheries,navigation,and recreational use of water resources),in accordance to the national water plan and WARPO guidelines.

2. Flood control, including water shed management.

3. Prevention of salinity, water congestion and reclamation of land.

4. Except within the limits of sea-ports, maintenance, improvement and extension of channels for inland water transport, including dredging of channels but excluding all such operations as may be assigned by the Government to other agencies.

5. Regulation of channels to concentrate river flow for more efficient movement of water,silt and sand, excluding all such operations as in the opinion of the Government may be carried out by any other agency.

6. Real-time management of water resources, as may be prescribed by WARPO for balancing the needs of different sectors, including water allocation, rationing, diversion, and O&M of major structures.

Strengthening the national water resource data collection and processing system

Hydrological and geo-hydrological data collection, modeling and other types of processing of information are being done at three major institutions, BWDB (water investigation and surface water hydrology directorates, groundwater investigation and groundwater data processing and research

circles), RRI,SWMC, and under FAP (GIS and EIA). A number of proposals have emerged from FAP and other independent studies regarding rationalization of the institutional arrangements for information management. There is definitely a need for consolidating and systematizing the data management process to bring synchronization of activities, building synergy between the units and making information available to all users. Some of these are examined below in context of specific organizations.

The River Research Institute: RRI is a service agency, carrying out physical modeling of rivers for clients in the public and private sectors.It has revenue earning and self sufficiency capabilities, though not exploited adequately at present. As an autonomous organization governed by a Board of Governors it is chaired by the Minister for Irrigation.Its chief executive is the Director General.

In the next 5-10 years, RRI should become a fully autonomous and self sustaining private corporation, perhaps as the Bangladesh Hydraulic Institute.In the interim period,the following options are available for its continued existence.

Option 1: Continue as it is with minor modification of mandate and functions.

The pros of the option is that will have minimum dislocation on RRI.

The cons of the option is that RRI will continue to exist as a public corporation with little change in its organizational culture which lacks efficiency.

Option 2: Placing is under WARPO

The pros of this option is firstly that it will consolidate research and planning under one organization and facilitate necessary exchange between them. Secondly, it will reduce the number of institutions the government has to manage.

The cons of the option is that if WARPO itself undergoes changes and requires a period for stabilization, it may jeopardize RRI's position.

Option 3: Merging RRI with SWMC and the Hydrology Department (for ground and surface water) and setting them up as a public trust organization.

The pros of this option is that it will consolidate and rationalize data collection and management within a single organization in place of many discrete ones.By detaching it from the normal government budgeting process a long-term programe of excellence could be developed.

The cons of this option lies in the uncertainty of getting a government trust fund to establish the organization with financial independence.

More of this option is discussed with SWMC below.

The Surface Water Modeling Center: SWMC is under administrative attachment to RRI but it is managed by a project team under FAP under its own administrative rules. It is principally involved with mathematical modeling of major rivers in Bangladesh.It has developed a level of excellence and professional capability which should enable it to become a self sustaining profitable organization in the future.Like RRI, the long-term strategy should be to let SWMC become a private corporation.The options, in the interim period, are as follows:

Option 1: Continuing as it is.

The pros of this option is that it will retain the organizational form and culture of the organization which has been the basis of its success.

The cons of the option is that firstly its donor supported funding will cease after 1996. Secondly, it will be difficult to continue the organization with its present resources with government funding.Thirdly, government may not support it as an individual entity in the future because of its limited scope of work.

Option 2: Formal merger with RRI and continuing with it as a public corporation.

The pros of this option is that it would produce minimum dislocation and the single institution that will emerge from the merger for physical and mathematical modeling will be technically and economically justifiable.

The cons of the option are that the center might loose its efficiency and excellence under bureaucratic procedures of the government. Lower salaries may also result in flight of skilled personnel. Also, its prospects of future independence gets linked with that of RRI.

Option 3: Setting up a government trust fund for independent existence of SWMC.

This option is fairly attractive as it would provide a preferential status for SWMC among other deserving candidates such as RRI. Secondly, there is little logic in separating river morphology studies, physical and mathematical modeling in three different institutions. Thirdly, the size of endowment required for the purpose is not calculated and the source of funding uncertain. Possible sources may be donor grants and long-term public bond issue underwritten by the government.

Option 4: Merging RRI and SWMC and placing them under WARPO.

The pros of this option is that it would consolidate research and planning under one key organization.It would also result in fewer organizations for the government to manage. It would also facilitate better communications between research and development.

The cons of the option is that it will convert SWMC into a government establishment and probably cause a loss of its present excellence and quality.

Option 5: Merging with BWDB

The only pros of this option is that it will provide a home for SWMC as soon as the FAP ends.

The cons, however, are substantial. Firstly, it will be mired in the current inefficiency of BWDB and loose all its qualities in no time.Secondly, the merger will not provide ny significant synergy of operation between the two.Thirdly,it will seriously jeopardize the future possibility of SWMC becoming a self financed private corporation.

GIS and EIA units under FAP: GIS, presently under FAP19, is an information technology that provides data for flood management. It has provided valuable information on administrative boundaries, soil, hydrology, digital elevation model and digital satellite image mosaic.LGED is also developing a GIS incorporating population, road network, waterways, land-use character,etc.

The alternatives for housing future GIS activities are to place it under RRI & SWMC or LGED or WARPO.Since WARPO will not be involved with field activities,the best recourse will be to place GIS with RRI and SWMC.WARPO could directly access GIS data with the latter for national water planning.RRI and SWMC could also become the coordinating agency for all ongoing/proposed GIS facilities.Individual agencies (e.g. SPARRSO,DOE,LGED,etc.) could, however, maintain their own GIS databases to meet their specialized needs.

EIA was developed under FAP 16.Since environmental studies will be an integral part of water planning and evaluation of projects in all related sectors, the possible options for location of future EIA activities could be WARPO, or DOE.The best course of action will be to move EIA after termination of the FAP program into WARPO.

Recommendations: On balance, there are strong arguments for merging of RRI, SWMC, the Hydrology Directorates of BWDB, along with GIS, into a non-profit corporation under the Company's Act with a number of specific provisions, such as compensation outside the government rules, flexibility in hiring and firing, etc. The initial capitalization to be done through donor or public bond financed trust fund. After five years the organization to be divested in its entirety to the private sector.

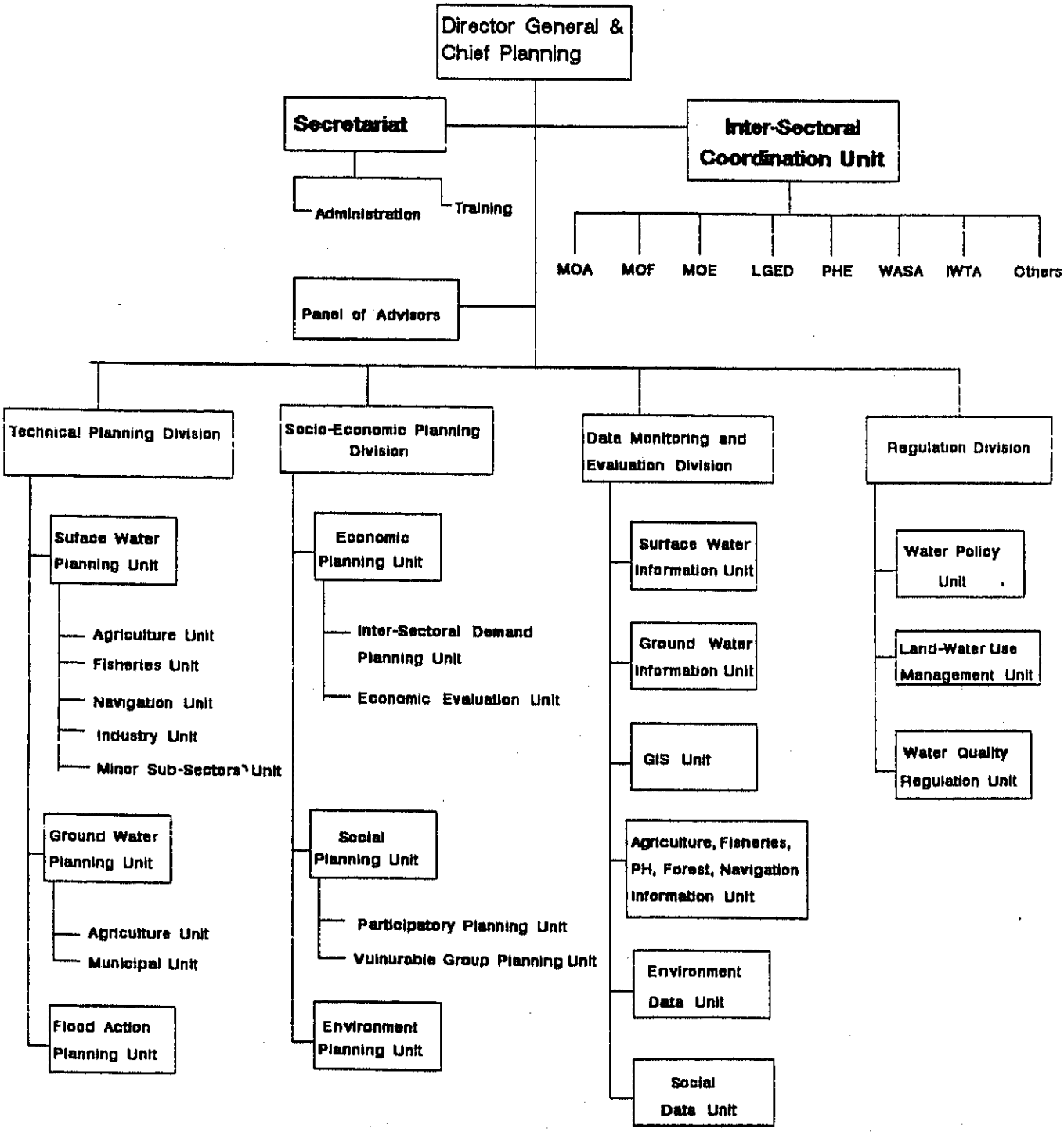
The Proposed Institutional Setup

Figure 4 shows the proposed institutional setup incorporating the essential aspects of water management.

The system as a whole consists of organization, policy and legislation, regulation, and investment-components. The roles of specific government organizations are also shown in the figure. Non-government organizations (such as NGOs and individuals) interact with the system at various levels, such as planning (with WARPO), scheme development and implementation (with BWDB). Policy, legislation and regulations are provided by the National Water Council (aided by WARPO) and enforcement is the responsibility of different line ministries and departments.

Figure 4

Proposed Operational Structure for WARPO



The activities and responsibilities of different organizations under the proposed scheme are given in Table 4.

Table 4
Activities in the Water Sector and Responsible Institutions

Activity	Institution	Responsibility
Producing Strategy and Plan, Monitoring and Regulation of the Water Regime	WARPO	Macro planning, intersectoral coordination, administration of water rights, regulation
Pre-feasibility Feasibility Studies at the Macro level	WARPO	National water Planning, regional planning, basin and planning
Review and Recommended Intersectoral Schemes for Approval	WARPO	Coordination of plans developed by different water use agencies, intersectoral balancing and prioritization of needs
Project Planning and Feasibility Studies	BWDB/LGED/ DOF/MOA/ BIWTA/PHE/ Municipalities etc.	Development of projects and schemes within the context of the overall national water plan. agricultural. fisheries, industrial, municipal, and social demands, etc.
Detailed Design	BWDB and other line	Design of large FCD/I schemes only should be undertaken by BWDB, with considerable outsourcing to the local local agencies consulting industry. Smaller schemes should be made the responsibility of other agencies like LGED,NGOs,etc.
Implementation Schemes	BWDB/LGED/etc.	Implementation of large FCD/I schemes should be the of responsibility of BWDB. Smaller schemes should, similarly, be undertaken by LGED, local government institutions and NGOs.
Construction	BWDB/Local Construction Industry.	BWDB should undertake major construction works on FCD/I projects, but in phases the local construction industry should be given increasing quantum of the construction work to help develop the private sector
Commissioning	BWDB/LGED	Bringing the schemes into operation, fixing and defects, and putting into use the operations and maintenance procedures on large scale FCD/I projects should be BWDB's responsibility. It should also be charged with development of local institutions for taking over as much of the O&M functions as possible after project completion.
Operation and Maintenance	BWDB/LGED/ Farmer Organizations	O&M of the major structures should be the responsibility of BWDB.Intermediate facilities should be handed over to LGED,and very small facilities to farmer's organizations.

The Action Plan

The matrix given below summarizes the action plan for institutional restructuring of the water sector.

The Action Matrix

Issue	Current Status	Recommended Action	Responsible Institutions
National Water Policy	No formal policy	Establish NWP	WARPO,NWC
National Water Act	Many scattered	Prepare & enact NWA	WARPO,NWC,parliament
Water-land use Regulation & Rules	Many scattered and disassociated regulations and rules	Prepare comprehensive water regulation and	WARPO
Apex organization for water sector planning & coordination	WARPO	Reorganize and strengthen WARPO after merger with FPCO	WARPO,MW
Implementation of policies & regulations	Rudimentary and uncoordinated	Make line ministries responsible for individual actions and WARPO responsible for overseeing enforcement.	Line ministries, WARPO
Water resource data and information	Scattered, insufficient and uncoordinated	Establish an independent public trust corporation with RRI,SWMC,Hydrology, and GIS.	WARPO,MW
		Make WARPO responsible for consolidation of data from all sources.	
National Water Plan	Incomplete NWP of 1989, insufficient water shed planning	Prepare comprehensive NWP with intersectoral inputs and attention to water shed development.	WARPO
Sub-sector plans	Uncoordinated and conflicting	Coordinate intersectoral planning through WARPO.	WARPO
Institutional Capacity	Inadequate capacity of BWDB to plan and implement water projects and programs.	Rationalize BWDB's organizational structure and strengthen capacity for project planning & implementation	BWDB,MW
	Possible over-extension LGED's capacity	Review LGED's activities and build capacity.	MLG

Annex-1

Bangladesh Major Water Sector Organizations and Related Agencies - Current Functions and Deficiencies

Organization	Current Function	Major Deficiencies/Problems
Planning Commission	o Establish multi-sector investment priorities o Recommend allocation of resources.	o Inadequate personnel resources
National Water Council	o Approval of national water policies	o Low frequency of meeting & inadequate service support from the Water Ministry
WARPO	o Collection & supply of hydrology, and other water data. o Preparing of reports on major water programs	o Water policy formulation o National water planning o Monitoring o Formulation of water legislation & regulations. o Intersectoral coordination of water plans. o Central data system
BRI	o Surface water modeling o River training studies	o Mathematical modeling inciuding environment & surface/ground water. o Inadequate Funding
SWMC	o Mathematical river modeling o Flood management modeling o Irrigation system modeling o National & regional modeling o Environmental modeling o Survey and data collection o Development of a national hydrological data base.	o Continued existence after FAP
FPCO	o Water resource management strategy development o FAP coordination	o Continued existence after FAP
The GIS Unit	o Collection of hydrologic topographic, soil and flood regime data.	o Continued existence after FAP.
The EIA Unit	o Development of EIA guidelines. o EIA study of projects	o Continued existence after FAP.

Organization	Current Function	Major Deficiencies/Problems
BWDB	o Water project planning and implementation o Flood control & water shed management o Salinity control o Maintenance of water channels for transportation. o Regulation of water channels	o Weak planning capability o Inadequate implementation capability o Inadequate O&M capability o Overgrown size
Hydrology Directorate BWDB	o Collection of ground and surface water data.	o Lack of adequate linkage with national water planning.
Flood Forecasting & Warning Center of BWDB	o Collection and dissemination of information	o Proper coordination and linkage with the national DCMU unit.
LGED	o Planning,designing and implementation of rural Infrastructural development projects o Thana/Union Drainage planning, irrigation planning,land and water use planning. o Small scale water resource schemes o Canal digging programs. o Town protection schemes.	o Little or no coordination with BWDB and other water sector agencies o Inadequate responsibility for enforcing water and Embankment regulations.
R&H Department	o Construction and maintenance of primary and secondary roads.	o Road networks have intervened with water courses and affected hydrological regime o Little or no coordination with BWDB and other sector agencies.
PHE Department	o Rural and urban water supply and sanitation	o Little or no coordination with BWDB and other water sector agencies o Inadequate enforcement of water regulations
DAE	o Information dissemination on agricultural technology including water and land-use.	o Little or no coordination with BWDB and other water sector agencies

Organization	Current Function	Major Deficiencies/Problems
BADC	o Operation of low lift pumps and tubewells o Harnessing of hill streams. o Salinity control Distribution of water for irrigation.	o Little or no coordination with other water sector agencies. o Inadequate responsibility for enforcement of water regulations.
BIWTA	o River conservancy work, including river training for navigational purpose o Disseminating navigational and meteorological information,including river charts. o Hydrographic survey o Programming for dredging and revival of dead or dying rivers, channels, canals, etc. o Develop, maintain and operate inland river ports. Develop rural water transport.	o Inadequate coordination with other water sector agencies. o Inadequate responsibility for enforcement of water regulations.
DOF	o Develop inland and offshore fisheries. o Development of rules and regulations for utilization of fisheries resources o Planning for fish cultivation	o Inadequate coordination with other water sector agencies. o Inadequate responsibility for enforcement of water regulations
DOE	o Monitoring pollution level of rivers, underground and drinking water. o Working with FAP agencies to develop environmental protection measures. o Collection & analysis of data concerning environment. o Monitoring and analysis of surface water for detection of pesticides and heavy metals o Analyzing waste water samples for different agencies. Assist in preparation of EIA for different agencies.	o Insufficient coordination with other water sector agencies. o Inadequate enforcement of water regulations.

Organization	Current Function	Major Deficiencies/Problems
Dhaka City Corporation	o Providing sanitation services o Manage underground sewerage systems o Supply water for public and private purposes. o Undertake schemes for provision, storage and distribution of water o Regulate, control and inspect all private sources of water within the city. o Sanction new wells o Sanction water pumps and other sources of drinking water in the city. o Provide a system of public drains within the city. o Control, regulate and inspect all private drains within the city. o Undertake drainage schemes within the city. o Regulate washing places such as "dhobi ghats" o Manage public water-courses within the city. o Regulate public fisheries in public water courses.	o Insufficient coordination with other water sector agencies. o Inadequate enforcement of water regulations.
WASA	o Construct,improve and operate water supply & sewerage works, & other facilities to improve environmental sanitation in the city	o Institutional inefficiency o High level of water losses in the system. o Poor maintenance of facilities. o Poor coordination with other water sector agencies. o Poor implementation of water laws and codes.
Engineering University Institute for Flood Control & Drainage Research and Environ-mental Engineering Division	o Education and research on flood control and drainage o Education and research on water quality and environmental management.	o Inadequate linkage with other water sector agencies.

FOURTH CONFERENCE ON FLOOD ACTION PLAN
INTERNATIONAL CONFERENCE CENTRE, DHAKA
(November 30 & December 1, 1995)

CLOSING SESSION

PRESENTATION : "NEXT STEP"

BY : M. H. Siddiqi, BU, FPCO

DATE : 01-12-1995 **TIME : 1645 Hrs.**

FLOOD PLAN COORDINATION ORGANIZATION
MINISTRY OF WATER RESOURCES
GOVERNMENT OF THE PEOPLE'S REPUBLIC OF BANGLADESH

NEXT STEP

The final output of the Flood Action Plan (FAP) studies titled 'Bangladesh Water and Flood Management Strategy' (BWFMS) presents a strategic framework plan of activities in the water sector for the next five years (1995-2000).

I. The Strategy

Bangladesh needs a clear strategic vision to guide the long-term goals and policies. The fundamental concepts underlying such a vision begin with the realization that :

- water is a finite resource;
- surface water and ground water are not isolated resources, they are hydraulically interlinked calling for comprehensive plan;
- water is an economic good and not an unlimited free commodity as renewable fresh water is limited within each hydrological unit.

Planning for water, therefore, requires intensive cooperation among different users, and the objectives and priorities should be set jointly with stakeholders at all levels.

Long Term

The fundamental strategies include :

Approach to planning :- comprehensive set of criteria and time horizon;
- social costs, externalities, linkages;
- implementation capability and quality control;
- flexible policy responding to needs for decentralization, privatization, people's participation, cost recovery, sustainability and public accountability

Integrated water and land -use planning :
- development of protected and unprotected land;
- irrigation, drainage, erosion control, salinity management, agriculture, fisheries;
- environmental protection;

- floodplain zoning;
- co-ordinated infrustructural development

Intersectoral balance:- multipurpose projects and programme;
- diversified non-agricultural needs;
- phased implementation of comprehensive plan to meet the needs of agriculture, fisheries, navigation, urban flushing, groundwater recharge and environment

Management of cross-border flows :
- moderation of peak flood flows and augmentation of low flows through co-operation with riparian countries

Basin-wise development :
- integrated development of surface and ground water for balance in a basin

Structural and Non-structural measures :
- improved warning, disaster preparedness, floodproofing, zoning etc. along with dykes, regulators etc.

Setting environmental priorities :
- full integration of environmental priorities with water development programmes;
- pursuit of EIA guidelines;
- formal and non-formal environmental education and linkages among institutions

Institutional evolution :
- strategic institutional framework to achieve sectoral goals;
- harmonizing social and environmental objectives with production and distribution goals;
- defining the role of the government in management of both supply and demand for water recognizing that market failure necessitates public intervention;

- providing and enforcing a legal/regulatory system for judicious use of land and water resources by both the public and private sectors that ensures sustainability of the fragile ecosystem dependent on water in conformity with international agreements;

- rationalizing the function and structure of public water sector institutions to create and maintain public good such as infrastructure;

- providing the right environment and institutions for unobstructed private sector involvement in water resource management;

- increasing people's participation in the management of the system at different levels of local government (Thana, District, etc.) through appropriate institutional mechanism;

- developing strong coordination among different public sector institutions through inter-organizational linkages and sharing of responsibilities; and

- increasing the operational efficiency and accountability of public sector institutions through appropriate monitoring, evaluation, and performance evaluation, and instituting a transparent reward and punishment system.

Short Term (1995-2000)

In order to bridge the gaps in the knowledge about the optimal management programmes for efficient utilization of the water resources in Bangladesh, a short-term strategy has been developed to fully integrate the existing body of knowledge and take priority measures for addressing imminent flood and other water resource problems. The focus of this short-term strategy will be :

- formulation of a long-term national strategy for water resource management and a new National Water Management Plan using the knowledge

base of the National Water Plan, FAP, lessons learnt from previous FCD/I projects, groundwater development, and urban and sectoral water need projections;

- enhancing institutional capacity for undertaking upcoming programmes, through development of necessary legislation, policy, organization, professional expertise, training and other necessary infrastructure;

- establishing economic, social and environmental norms and environmental quality standards to regulate agricultural, industrial, navigational, municipal and domestic water use;

- instituting plans for operation and maintenance and creating an appropriate institutional framework for expanded beneficiary participation in the planning, implementation, operation, and maintenance of water management infrastructure and facilities;

- speedy completion of incomplete projects to achieve stipulated targets in the shortest possible time; and
- implementing a portfolio of essential projects and programmes (e.g., flood warning, disaster management, information dissemination, river training, improved drainage, protection of urban, commercial, industrial and public utility centres), that meet very specific criteria, including appropriate analysis with social costs and accounting of externalities and linkages.

II. The Programme

Short-Term (1995-2000)

The programme for the next five years will focus on three main activities :

- completion of on-going planning studies and pilot projects including the formulation of an integrated national water management plan (NWMP);

- institutional development; and

- implementation of a compact portfolio of selected high priority projects that are technically and economically viable, environmentally sound and acceptable to the stakeholders.

Planning will involve completion of outstanding FAP studies and pilot projects, finalization of planning criteria developed under FAP, and production of the National Water Management Plan (NWMP) which integrates the outputs of FAP and the NWP, and provides by 2000 a development strategy and an implementation programme for the future.

Institutional development will involve the merger of Flood Plan Co-ordination Organization (FPCO) and Water Resources Planning Organization (WARPO) to form a new national water resource planning organization and strengthening of BWDB and related government agencies.

Implementation will take place of selected high priority projects, which meet the selection criteria mentioned below, including river bank protection, cyclone protection, urban protection and flood proofing schemes. Water management development would be confined to rehabilitation and improvement of existing projects and other high priority stand-alone projects, which are not dependent on the completion of FAP pilot projects and studies.

Beyond the next five years, a rolling plan with an updated NWMP will provide a consistent but evolving framework for water sector development. The programmes and projects will evolve with changes in the economy (e.g., patterns of urban and industrial development) and the development of technology.

Following specific projects taken up during the first five years (urban protection, river bank protection on critical reaches, cyclone protection), the programme might shift to overall water and flood management, drainage and irrigation, whose development criteria will have been established by the year 2000. Many lessons will have been learnt from pilot projects during this period and these will have to be incorporated into new project designs. Flood proofing may have to be expanded, together with other non-structural measures, and the private sector would probably come to play an increasingly important role. Protection of secondary towns and priority river works would continue.

Long Term (Year 2000 and beyond)

The NWMP will form the basis for future water sector development programme. It will provide the strategies for short-, medium- and long-terms, and a programme of activities and an investment plan beyond 2000.

Institutional Development

By 2000, the major restructuring will have taken place and organizational strengthening at the centre completed. Institutional development and strengthening at the rural level will probably continue where people's direct involvement in running schemes is ensured. Opportunities for privatization will be pursued more vigorously. With the increasing emphasis on river management, restructuring of the RRI would be need of the time. Bangladesh has some of the world's major rivers, and RRI could become in international centre for research in river management. Supported by the main international hydraulic research organizations, RRI could attract top professionals.

Special Studies and Updating of NWMP

Although the FAP pilot projects and studies will be complete and will have produced the criteria needed for the NWMP, certain activities will continue. With the shift of emphasis from emergency river works to a longer-term programme, studies and pilot schemes will be needed to provide the basis for future river management. Building on the technologies established under FAP and continued during 1995-2000, river training, particularly works to stabilize river planforms will be taken a step further, and Active Flood Plain Management (AFPM) trials will continue. These advances will be very relevant to flood proofing.

During the preparation of NWMP the need for additional studies will arise; for example, testing FAP 20's approach to public participation in other water management situations, extending FAP 6's initiative in environmental management to other regions, making a concerted effort to give fisheries engineering the same emphasis as agricultural (irrigation) engineering and further study of the economic, social and environmental impacts of projects.

The improved information technology in WARPO (data collection, analysis, modelling and monitoring systems) will provide a new dimension for planning and designing water development projects and programmes, particularly for WARPO's monitoring and evaluation role.

WARPO's main planning task after 2000 will be reviewing and updating of the first NWMP. The frequency at which the rolling plan will need to be updated is not known, but five years can be assumed to be the maximum interval. With effective monitoring, a good data base, new information technology and modern evaluation and planning techniques, WARPO should have no difficulty in reviewing water sector performance and updating NWMP, whenever required.

Implementation

The projects and programmes beyond 2000 will have been determined through the comprehensive NWMP process. This will involve careful application of updated FAP criteria and guidelines. Social, environmental and institutional

provisions will have been built in to produce a new generation of projects, which are formulated through people's participation, are locally acceptable and environmentally sustainable. The structural projects would probably fall into similar categories as in the short-term, but there would be changes in emphasis.

The new river projects would be the first step in a programme aimed at longer-term river management. New water and flood management projects should be introduced if they are technically, economically, socially, environmentally and institutionally justified.

Non-structural activities would increase as more knowledge is gained on their effectiveness. Flood proofing, which could have a significant structural component, will involve long-term programmes to cover most char lands and other floodprone areas. Environmental management programmes will be replicated in other regions.

Operations and Maintenance

While rehabilitation of existing FCD/I schemes will continue for some time, special projects will be needed to make O & M more effective. SRP generated initiatives will provide a sound pattern for the improvement of existing projects.

The results of FAP 13-II (O & M study), should be available after 2000. Innovative methods tested in the field should include beneficiary management, sinking funds and privatization of BWDB's normal responsibilities. Effective solutions, including those emerging from SRP, will be built into the later projects.

III. The Future

Socio-political and economic realities are likely to change in the future and technological advances may alter the present thinking on agriculture, fisheries, river and environmental management. However, the framework set in the short-term (1995-2000) will provide a basis for the future. The key task is to keep on updating criteria and water sector planning so as to cope with the inevitable changed circumstances.

ドナー会合関連資料

3．ドナー会合関連参考資料

ドナー会合プログラム

GOB - DONOR MEETING ON WATER SECTOR STRATEGY
3-4 December, 1995

Venue : **NEC Auditorium (For Inaugural Session)**
NEC Conference Room-2 (For Working Session)
Sher-e-Bangla Nagar, Dhaka.

PROGRAMME

December 3, 1995

INAUGURAL SESSION (9:00-10:30 hrs)

Chairman : **Mr. M. Saifur Rahman**, Hon'ble Minister for Finance

Chief Guest : **Maj. General. Majid -ul-Huq, (Rtd.)**, Hon'ble Minister for Water Resources.

Special Guest : **Dr. A. Moyeen Khan** , Hon'ble State Minister for Planning

8:50 hrs - Guests take their seats

8:55 hrs - Arrival of the Hon'ble Chief Guest & Special Guest

9:00 hrs - Tilawat-E-Quran

9:10 hrs - Opening statement by Mr. M. Lutfullahil Majid, Secretary, ERD (Background, objectives and expected outcome of the meeting).

9:25 hrs - Statement by the Hon'ble State Minister for Planning

9:45 hrs - Statement by the Hon'ble Minister for Water Resources.

10:05 Concluding statement by the Chairman & Hon'ble Minister for Finance

10:25 hrs - Vote of thanks by Mr. Mahbub Kabir, Additional Secretary, ERD.

10:30 - 11:00 hrs : TEA BREAK

December 3, 1995

SECOND SESSION (11:00-12:30 hrs)

Chairman - Mr. Mohammad Nazrul Islam, Secretary , Ministry of Water Resources.

11:00 hrs - Presentation : Discussion of Action Plan including conclusion of the conference in the four critical areas : people's participation, environmental management, priorities and institutional development — Mr. M.H.Siddiqi, B.U. Chief Engineer, Flood Plan Coodination Organisation (FPCO).

11:30 hrs - Discussion : Open to all partcipants.

12:30-13:30 hrs - LUNCH

THIRD SESSION (13:30-15:30 hrs)

Chairman : Dr. Shah M. Farid, Secretary, Ministry of Planning .

13:30 hrs - Presentation : Discusssion of the 5 years Action Plan (including investment) for the implementation of the Bangladesh Water and Flood Management Strategy (BWFMS), the present state of funding and institutional arrangements for the implementation of the Action Plan. - Mr. Mohammad Nazrul Islam ,Secretary, Ministry of Water Resources

14:00 hrs - Discussion : Open to all participants.

15:30 - 15:45 - TEA BREAK

FOURTH SESSION (~~15:45-17:15~~ 9:30 hrs)

Chairman : Mr. M.Lutfullahil Majid, Secretary, ERD.

15:45 hrs - Donors response including donors endorsement of Bangladesh Water & Flood Management Strategy (BWFMS) & Action Plan.

16:45 hrs - Response by GOB

December 4, 1995

FIRST SESSION (9:30-12:30 hrs)

Chairman : Mr. M. Lutfullahil Majid, Secretary, ERD

9:30 - 12:30 hrs : Expression of donors interest for funding of individual elements of the Action Plan including present and possible future commitments

12:30-13-30 hrs : LUNCH

CONCLUDING SESSION (13:30-15:30 hrs)

Chairman : Mr. M. Lutfullahil Majid, Secretary, ERD

13:30 - 15:00 hrs : Presentation and discussion of joint statement on agreement reached

15:00 - 15:30 hrs : Concluding remarks by Mr. Mahbub Kabir Additional Secretary, ERD.

WATER-A.DOC

Final

Joint Statement of Government of Bangladesh and its Development Partners on the Bangladesh Water and Flood Management Strategy

1. The Government of Bangladesh organized the 4th conference on the Flood Action Plan (FAP) on November 30-December 1, 1995 followed by GOB-Donor Meeting on December 3-4, 1995 to discuss the Bangladesh Water and Flood Management Strategy which is the final outcome of the FAP studies.

2. The Development Partners appreciated the GOB efforts to produce a Water and Flood Management Strategy (BWFMS) and have found the paper presented at the conference a major step forward in the ongoing process of development of a coherent water sector policy. It recommends a five -year programme involving (a) preparation of a national water management plan, (b) strengthening of water sector organizations responsible for planning, construction, operation and maintenance, and (c) implementation of a compact portfolio of high priority projects. They were further pleased to note that the Strategy meets concerns expressed in the past related to people's participation, environmental considerations and project assessment. GOB confirmed that the Strategy encompasses ongoing (wherever possible) and *all* future water development and flood management projects.

3. The Development Partners welcomed the formal steps announced for the merger of FPCO with WARPO from 1 January 1996, and the further restructuring of BWDB. They recognized the steps already taken towards reform of the BWDB, in particular to increase its cost-effectiveness and responsiveness to the community, and welcomed the Government's commitment to accelerate the reform process. They also accepted that restructuring and reforms of institutions will require time and a flexible approach. To provide a solid basis for new structural and non-structural investments, the Government of Bangladesh agreed to formulate a detailed time-bound plan of operations for institutional restructuring, including critical milestones, for the whole water sector. The Plan should provide for regular monitoring of progress and should provide effective and transparent mechanisms for cross-sectoral planning and collaboration among all stakeholders in the water sector.

4. The Development Partners particularly welcomed GOB's decision to take the necessary steps forthwith to make mandatory and fully implement the guidelines on project assessment, environmental impact assessments and people's participation for *all* activities and investments in the water sector. Their full application is crucial to ensure effective and sustainable implementation and maintenance of the projects.

5. The Development Partners appreciated the Government's willingness to continue and extend the cooperation with NGOs in water sector development. They further welcomed the commitment of NGOs to work with GOB in the water sector. The Development Partners welcomed Government's commitment to establish a mechanism for regular exchange of views with the NGOs, in an open and constructive dialogue, and to work jointly on people's participation, cost recovery and environmental aspects of future water sector projects.

6. Stakeholders in the sector include beneficiaries, affected people, government agencies, elected members of the local government, specialized agencies and NGOs. GOB and the Development Partners agreed on the importance of involvement of all stakeholders in all stages of the project cycle, from identification to monitoring and evaluation. The Development Partners welcomed the similarity in approach as reflected in the Strategy paper and NGO's objectives.

7. The Development Partners appreciated that Government of Bangladesh has recently adopted new approaches to land acquisition and resettlement. These include full compensation for loss of both property and income, as well as helping establish new sources of income for project-affected people so that they are at least not worse off than before the project was initiated. They took note of GOB's commitment to apply from now on the new approaches in on going (whenever possible) and *all* future water sector projects and to give priority to outstanding claims. In particular, attention will be given to mitigation against loss of fisheries, water logging, environmental damage, navigation obstruction, etc.

8. The Development Partners supported and appreciated the GOB's commitment to take immediate and concrete steps to improve the public information and relations systems. They welcomed GOB's commitment in the Strategy to create a public documentation and information centre for water sector planning at WARPO and on information dissemination centre at BWDB project sites.

9. The Development Partners confirmed that they will respect all their present commitments. While endorsing the Water and Flood Management Strategy in principle, the Development Partners informed the GOB that they will bilaterally respond to the Government on the future Development Programme (1995-2000).

On behalf of the following Development Partners: Dhaka, the December 4, 1995

Asian Development Bank

CIDA

European Commission

France

KfW, Germany

Japan

The Netherlands

ODA

USAID

Government of Bangladesh

Economic Relations Division (ERD)

Ministry of Water Resources (MOWR)

The World Bank

World Food Programme (WFP)

Food and Agriculture Organization (FAO)

4．その他参考資料

THE NEW NATION
... Nov: 29. / 1995.

NGOs demand stoppage of FAP activities

Coalition of Environmental NGOs (CEN) yesterday demanded that all activities of the multi-million dollar FAP be stopped to protect the environment and contain money laundering in the name of flood protection by a vested group, reports UNB.

Addressing a press conference at Jatiya Press Club, CEN Chairperson Kushi Kabir also demanded neutral assessment of the FAP (Flood Action Plan) projects which have been completed in different parts of the country.

"Audit and full assessment of FAP activities should be done. People's participation should also be ensured at all levels in water resource management and adequate compensation given to the affected people," she said.

The Coalition advocated coordinated water resource management and regional intiatives to solve any water related problem in a conferene on Monday. Some 350 representatives of donors consultants, NGOs, affected and landless peasents participated in it at BMDC auditorium.

The conference discussed the FAP process, flood protection, flood water management and role of the people in water resource management, the CEN chief said.

Affected people from Tangail, Gaibandha, Bogra, Jamalpur, Comilla, Chandpur, Khulna, Satkhira, Pabna, Sirajganj, Panchgarh, Sylhet and Rajshahi focussed on the adverse impact of embankments and sluice gates constructed under the FAP.

The Coalition alleged that authorties had forcibly occupied the land of the people without paying due compensation.

There is no accountability in project money expenditure and the FAP has gone against the existing law, it said.

The CEN Chairpeson said FAP not discussed in parliament intentionally and people were unaware of any information regarding the project.

Kushi Kabir said flood protection embankments were never successful in protecting Bangladesh, China, USA and Europe from floods. "Floods have increased due to flood protection emankments and enmity also rose alarmingly where the embankment has been constructed."

FAP did not emphsise on measures to check river erosion and drought and created wate stagnation in different project areas across the country, she said referring to stoppage of water flow in the mouth of Dhaleswary river for FAP-20 project.

The Coalition alleged that the FAP had led to unrest and terrorism in the society.

ADAB Chairperson Rasheda K Chwodhury, Dr Salimul Haq, Hamidul Haq, Jamila Begum, Md Abdul Keshem and Maloti Probha Dey, were present at the press conference.

THE MORNING SUN
... Nov. 29... / 1995

'Stop FAP activities'

Staff Correspondent

Environmentalists of local non-government organisations (NGOs) alleged that the Flood Action Plan (FAP) introduced by the government was causing sufferings to the people of the concerned areas and demanded stoppage of FAP activities immediately.

They suggested a coordinated water resources management process with regional cooperation as well as participation of people at all levels, keeping in view that water is life, not a problem for anybody.

Local NGOs are working to create people's pressure on the political leadership for the solution to the water problems as politicians have not succeeded to resolve the water disputes in this region.

This was disclosed at a press conference on FAP jointly organised by Coalition of Environmental NGOs (CEN) and Association of Development Agencies in Bangladesh (ADAB) at the National Press Club in the city on Tuesday.

NGO leaders suggested for coordinated water resource management process with regional cooperation as well as people's participation at all levels.

Those who prefer flood control do not view water as resource. So we are trying to create people's pressure. Water is not a cause but a resource which can be harnessed for the betterment of the people", CEN chairperson Khushi Kabir said.

One leader of NGOs said they would develop an alternative to the widely debated FAP. There was a 'technical fault' in the plan introduced by the government in cooperation with donor countries to protect the people from flood, because it was not developed through people's participation.

Dr. Atiq Rahman said that the NGOs were talking to cross section of people and experts to develop an alternative to FAP but it would take time.

Referring to a government sponsored meeting of donors scheduled to begin tomorrow (Thursday), NGO leaders said that the people from the grassroot level and the affected areas had demanded proper evaluation of FAP activities done so far, a complete audit report of money spent for FAP activities, guarantee of people's participation in the water resource management and compensation to the affected people. They also demanded integrated water resources management.

Hamidul Haque and Rasheda K Chowdhury of ADAB and three grassroot level activists from Tangail and Shatkhira also spoke.

The speakers in the conference, said, the FAP projects had given due importance to cities and flood control measures but did not take into account issues like river erosion and droughts.

The Independent
... NOV ... 29 .../1995

Suspension of FAP activities demanded

by Staff Reporter

Coalition of Environmental NGOs (CEN) and Association of Development Agencies in Bangladesh (ADAB) have demanded immediate suspension of all activities of Flood Action Plan (FAP).

CEN Chairperson Khushi Kabir in a press conference at the Jatiya Press Club yesterday made the demand. Director of ADAB Rasheda K Chowdhury and Dr. Atiq Rahman were also present.

Kushi Kabir also made six other demands. The demands were raised at a mass conference organised by CEN and ADAB at the BMDC auditorium on November 27.

The demands include neutral evaluation of all activities implemented under FAP, complete evaluation and audit of all money spent for FAP, ensuring participation of the people at all levels of planning water resources management, coordinated water resources management and initiative for regional co-operation in water resources management.

THE DAILY STAR
... NOV. 29 / 1995

Govt urged to suspend FAP activities

By Staff Correspondent

The Association of Development Agencies in Bangladesh (ADAB) and Coalition of Environmental NGOs (CEN) yesterday demanded immediate suspension of all activities of the Flood Action Plan (FAP) in the country as it was against the interest of the people.

"We have been campaigning for last four years against the FAP which does not help the people, rather it affects the crops and arable land in the project areas creating draught and water logging," said Khushi Kabir, Chairperson of the CEN while briefing journalists on the "mass conference" on FAP held on Monday at the BMDC auditorium.

Demanding ecologically balanced water management in the region she said river routes should not be disturbed using technology in the name of flood protection.

"Water is not our enemy but it is our resource which was not considered in the FAP," she said at the press conference at the Jatiya Press Club. Rasheda K Chowdhury, director of ADAB, Atique Rahman and Hamidul Haq both members of the ADAB and some affected people from FAP project areas were also present at the press conference.

Khushi Kabir said "it is totally impossible for Bangladesh to solve its water and flood problems alone, because the sources of most of the rivers flowing over the country are outside its territory."

In this regard, she informed the press that the NGOs, working in this region were trying to create a pressure group advocating a broader water management policy covering all areas of the South Asian region.

"The flood protection dam is a life and death problem to us," Abul Kashem of Tala thana in Satkhira district said referring to a flood protection dam which was erected by the government without considering the problems of the inhabitants of his area.

"We were forced to cut the dam partially to release the water which submerged 17 villages of Tala and Dumuria thanas, Kashem said. A total of 53 villages under those two thanas were affected by the 24 Number folder sluice gate, he said.

Malati Prova Dey, from a village in the FAP project area in Tangail, said no crop was harvested in her seven bigha of land this year due to draught.

THE FINANCIAL EXPRESS
— Oct. 29/ 1995.

CEN, Adab for immediate halt to FAP activities

Express Report

The Coalition for Environmental NGOs (CEN) and the Association for Development Agencies in Bangladesh (Adab) Tuesday demanded that all activities of the controversial Flood Action Plan (Fap), be stopped immediately.

They also demanded a neutral evaluation of the programmes already implemented under the Fap and audit of the expenditures, alleging massive misappropriation of funds of the project.

Khushi Kabir, chairperson of the CEN, said that a coordinated water management system ensuring participation of the people was needed to ensure proper utilisation of the country's water resource, which, she added, was described abroad as an "enemy" of the people.

Kabir, addressing a press conference at the National Press Club, also said that the problem of floods and the water management issue would have to be dealt with a regional approach, bringing the sources of waters in the overall planning.

For this government efforts would have to be directed towards developing regional cooperation, she said, adding very little was done in this regard.

The press conference was convened to brief the outcome of a one-day conference on the Fap held Monday at the Bangladesh Management Development Centre (BMDC) auditorium. Over 350 representatives from the World Bank, UNDP, Flood Plan Coordination Organisation (FPCO), NGOs, donors of the Fap, Fap authorities, journalists, experts and the people of the project areas participated in the conference.

Khushi Kabir said that instead of ensuring participation of the people in implementing the Fap, many anti-people steps were taken. A number of people who protested the Fap's implementation were harassed and tortured by the Fap authorities, she added.

She also alleged that many people, who lost their lands for the project, were not compensated as yet, while others who received compensation were exploited as the market value of the lands was not paid.

The press conference was attended, among others, by Hamidul Huq, executive director of the Unnayan Sahojogi Team (UST), Atiq Rahman of the Bangladesh Centre for Advanced Studies (BCAS) and Rasheda K Chowdhury of the Adab.

Hamidul Huq, describing the outcome of the Fap conference, said that people were kept totally in the dark about the impact of the Fap and there was no accountability so far the funds were concerned.

The project, despite being a nationally important one, was not even placed at Parliament for discussion, Huq said, adding it was also "illegal" as per the existing laws of the country.

He also said that the project was creating disputes among the local people and was being implemented taking into consideration the interest of the urban people.

He said that the project emphasised on floods, but did not take into account the problem of drought. It had created water logging in some areas, while obstructed the flow of river waters in other areas, he added.

Nov. 28, 1995

Plea for participatory approach to FAP

Express Report

Participants at a conference on Flood Action Plan (FAP) Monday demanded review of the multi-million dollar plan with more participatory approach, suitable for country's socio-economic and environmental perspective.

Speakers at the conference, mostly affected due to FAP constructions in various parts of the country, voiced concern over the haphazard constructions of embankment to control river flows.

The conference, jointly organised by the Coalition of Environmental NGOs (CEN) and the Association of Development Agencies in Bangladesh (DAB), highlighted the urgency for dredging of major rivers to minimise the effect of floods.

"Despite of FAP activities, most of the area of Kazipur in Serajganj was eroded by the river Jamuna. On the other hand, the embankments create waterlogging on crop lands, caused by flash floods", said Abdur Razzaque from Sirajganj demanding construction of groans instead of FAP embankments.

The participants observed that the FAP constructions obstructed normal flood waters, which carried silt resulting in degradation of land fertility.

Atiq Rahman of Bangladesh Centre for Advance Studies (BCAS) underscored the need for an integrated plan with the participation of local people taking into consideration of environmental aspects.

The conference, split into five sessions, was addressed, among others by water expert Ainun Nishat and BELA secretary general Mohiuddin Farooq, while Adab chairperson Qazi Faruque Ahmed moderated the conference.

The sessions included water management versus flood protection, people's participation and role in water management, Launching a book, "Rivers of life" and a Video cassette on FAP.

Donors endorse FAP

The development partners appreciated the government's efforts for a water and flood management strategy and described the paper presented in the 4th FAP conference as a major step forward in the ongoing process to develop a coherent water sector strategy, reports BSS.

A joint statement issued in Dhaka on Monday after the two-day donor-Bangladesh meet on water sector strategy said that they had also recommended a five-year broadbased programme in the field from 1995 to 2000.

The programmes involve preparation of a national water management plan, strenthening water sector organisations and implementation of a compact portfolio of high priority projects.

The donor-Bangladesh government meeting was held at the NEC conference room on Dhaka as a follow-up of the 4th FAP conference held at the International Conference Centre here on November 30 and December 1 to discuss at length all water related issues.

Secretary of the External Relations Division M. Lutfullahil Majid, who chaired the two-day donor-Bangladesh meet, read out the statement to the newsmen in Dhaka on Monday evening.

Among others, Secretary of the Water Resources Ministry Nazrul Islam, Additional Secretary Mrs: Zakia Akter Choudhury, Chief Engineer of Flood Plan Coordination Organisation M.H. Siddiquee, and representatives of donor agencies and countries were present.

When asked whether funding of future programmes in the water sector was discussed in the meeting, Lutfullahil Majid said it was not on the agenda.

"Funding of projects and programmes in the 1995-2000 period will be made bilaterally," he said adding that the donors had expressed their willingness to respect all their commitments in this regard.

"They have also agreed with all the issues that were discussed during the meeting," he also said.

The donors in course of the discussion have expressed their satisfaction to note that the strategy met concerns related to people's participation, environmental considerations and project assessment expressed earlier.

"Bangladesh government confirmed that the strategy encompasses, wherever possible ongoing projects and all future water and flood management projects," Mr. Majid said.

The donors were also appreciative of the formal steps announced for merger of flood plan coordination orgnisation with water resources planning organisation from January 1 next and further restructuring of the water development board.

To provide a solid basis for new structural and non-structural investments, Bangladesh government, agreed to formulate a detailed time-bound plan of operations for institutional restructuring for the whole water sector.

The plan should provide for regular monitoring of progress and effective and transpparent mechanisms for cross-sectoral planning and collaboration among all stakeholders in the water sector, the statement said.

The development partners also appreciated government's willingness to continue and extend cooperation with NGOs in the water sector development. They further welcomed the commitment of NGOs to work with the government in the water sector.

The Bangladesh Observe

5, Dec

出席者リスト

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Satoshi IWAKIRI	JICA	JAPAN
Hitoshi SANADA	Second Secretary,Embassy of Japan	JAPAN
Yoshiio FUKUDA	Deputy Resident Representative,JICA	JAPAN
Takeo MATSUZAWA	Chief Representative,OECF	JAPAN
PARPAILLON Eric	Head of delegation	FRANCE
GROS Claude Jean Yues	CFD	FRANCE
LANGLOIS Jean Pierre	CFD	FRANCE
Pin YATHAY	CFD Representative in Dacca	FRANCE
Romana MASSARI	in Cherye coop	ITALY
Hartmut BRUHI	KFW	GERMANY
Harry POHU	ODA	UK
John SCOTT	Canadian Niga Commissionor	CANADA
Richard BROWN	Director ,USAID	USA
Craig ANDERSON	Environmental Officer	USAID
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Zahir Uddin ADRMAD	Programme Officer(water sector), Royal Netherlands Embassy	NETHERLAND
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Jan WEIJENBERG	Head of Agr.& Nat.Res.Unit	World Bank
Saeeo A.RANA	FAP Coodinator	World Bank
Rashid FARUQU	Principal Economist and Head of Delegation	World Bank
Pierre Laudell MILLS		World Bank
S.A.M.RAFIQUZZAMROU	Project Officer、RMB	WorldBank
K.H.TALUKDAR	Senior Project Officer	ADB
Deepak BAJRACHARYA	Chief,Water and Environment Sanitation	UNICEF
Abn S.AZAL	Project Officer WOS SATRI	UNICEF
M.A.ASWRAF	Programme Officer	FAO
Andrew GOODWIN	Counsellor	EU
Steve JONES	Consultant	European Commision
J.DEYELL	Counsellor	EuropeanCommision
S.H.KHAN	Senior Project Officer	WFP
Saeed A.DALIA	Deputy Country Director	WFP
A.KHETIB	Deputy Director	
Mohammad SARIATULLD	Coodinator High Commission	
Md.Emdadul HUQ	Joint Secretary,Ministry of Water Resources	Bangladesh
Zakia K.CHOUDLWUY	Additional Secretary,Min.of Water Resources	Bangladesh
M.A.Manran CHOWDHURTY	It.Suty,Min.of Water Resources	Bangladesh
M.H.SIDDIRI	BU,EPCO	Bangladesh
Mesbahuldin AHMED	Chief Engineer,Monitaring,BWDB,Water Development Bureau	Bangladesh
Syeal Moazzem hassani	BWDB	Bangladesh
Syed Anworr YUSUF	BWDB	Bangladesh
Abdur Ronq CHUNFHY	Acting Chairman,BWDB	Bangladesh

Md.Alsaf ADI	Member (OTM),BWDB	Bangladesh
Md.Abdns SALDIE	Member(LAP),BWDB	Bangladesh
Amiyang Shu SEN	Member(ADMN),BWDB	Bangladesh
M.L.MAGID	Secretary,ERD	Bangladesh
Mahbul KALIR	Additional Secretary,ERD	Bangladesh
Nazuwl NLANI	Secretary,Min.of Water Resources	Bangladesh
Mesbahuddin AHMAD	Media Consultant POV,EPCO	Bangladesh
Md.Ashfagui HZAN	Superintenting Engineer,EPCO	Bangladesh
Afzalur RAHMAN	Superintenting Engineer,EPCO	Bangladesh
A.K.M.Halimug RAHMAN	Superintenting Engineer,EPCO	Bangladesh
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