

CHAPTER XI

IMPLEMENTATION AND MONITORING

11.1 Introduction

11.1.1 Like any other Plan, the success of the Fifth Five Year Plan will depend on the proper implementation of its programmes and projects, implementation monitoring and post-implementation evaluation. This is particularly important in view of the fact that it is a flexible plan and plan projections will be revised based on evaluation of actual performance. Annual Development Programme (ADP) is the operational document of a Five Year Plan in respect of the public sector. It is basically a list of all public sector development projects undertaken during a fiscal year. While ideally, it should be a list of approved projects duly appraised by appropriate authorities, the list in reality consists of projects at different stages of approval including unapproved ones. The implementation of the public sector part of a plan involves the implementation of these projects in ADPs and policies supporting them. While for all practical purposes, plan implementation was essentially viewed as the implementation of the public sector projects, monitoring and evaluation of the projects, policy planning and policy implementation have received less attention. But with the reorientation of the economy towards a free market, the private sector will assume greater role and public policies, greater significance. So monitoring of their impact on the private sector and on the economy as a whole will demand greater attention.

11.2 Implementation of Plan/Projects

11.2.1 In the project cycle, project implementation is the most critical phase as it is determined by realities and contingencies. It is further determined by the initial conditions such as project approval status and timely commitment of fund. As mentioned above, ADP is traditionally composed of many unapproved schemes which affect project implementation. Project implementation consists of the following main stages which may overlap with one another:

- a. Feasibility study;
- b. Appraisal of project and acceptance by development partner (for aided project);
- c. Approval of projects and assigning responsibility of implementation to an agency;
- d. Appointment of project director (PD) and project staff;
- e. Setting up of project office (where applicable);
- f. Appointment of consultants (where applicable);
- g. Allocation and release of fund;
- h. Land acquisition (where applicable);
- i. Procurement of goods and services;
- j. Execution of projects;
- k. Evaluation of completed projects; and
- l. Impact evaluation.

11.2.2 Project approval : Strictly speaking, approval of projects should pre-date its implementation. However, due to delays in processing of projects or exigencies, sometimes implementation of a project begins even prior to its formal approval. In the recent past, there has been a marked improvement in the process of approval of projects. The government is also seriously considering delegating more power of approval to administrative ministries in

order to expedite implementation. This will, however, require further strengthening of the planning wings of some of the ministries for ensuring quality of project formulation and evolving an alternative institutional procedure for co-ordination.

11.2.3 Assigning responsibility of implementation to an agency : While there is no bar against ministries directly implementing projects, this is generally left to their subordinate agencies like autonomous bodies (e.g. Water Development Board for irrigation projects), directorates and departments. Usually, project formulation and preparation are also the responsibility of the implementing agencies in so much as they conceptualise most of the projects in line with the policy parameters given by the relevant ministries.

11.2.4 Appointment of project director and project staff : Once a project is approved, the relevant agency appoints a Project Director with the concurrence of the administrative ministry. The PD then has to appoint the project staff some of whom may be seconded from the ministry and/or the agency. The selection of a suitable PD is crucial to the project's success. Project implementation suffers frequently due to the selection of a wrong type of PD. Project implementation also suffers from frequent transfer of PDs and absence of PDs at project sites during implementation. Forward planning to complete the preparatory works of a project may help in partly resolving this problem. This issue needs serious attention of implementing agencies.

11.2.5 Allocation/Release of fund : The procedure for release of fund has become simpler than before. Yet it still remains one of the major causes of slow utilisation of financial resources for project implementation. Every year a new circular detailing procedures for fund release is issued by the Finance Division. The delay in its circulation along with occasional changes in the provisions make it difficult to get early release of funds. Release procedures for approved and unapproved projects are different and are more stringent in case of the latter. Financial powers delegated at different levels need to be re-examined and where necessary, may be enhanced. Standard procedures of fund release will also be put in place.

11.2.6 Land acquisition : Land acquisition, particularly in case of infrastructure projects has remained a sore point in project implementation. The legal procedures are cumbersome and delay the implementation of projects. The social cost due to displacement of people from the project land is sometimes high. Recently, however, large development projects like the Bangabandhu Bridge Project has put in operation the resettlement/rehabilitation of people affected by land acquisition. The government is also considering a set of guidelines for land acquisition and resettlement for private sector infrastructure development. All these procedures need to be made uniform and a clear legal and institutional framework will be introduced during the Fifth Five Year Plan. An important way to minimise social cost of land acquisition is to involve the beneficiaries of a project at the project formulation stage through formation of advisory committee. Quantum of land will be determined judiciously so that no land is acquired which will remain unutilised.

11.2.7 Procurement of goods and services : Delay in procurement of equipment and hiring of consultancy services are major problems affecting project implementation. The problem is particularly intractable in case of aided projects because the multi-lateral and bi-lateral development partners tend to pursue their own standards for procurement of goods and services. Such diversities compound the problems of procurement at the users end. The problem may be further confusing in case of co-financing (from more than one sources). To overcome these problems, after a careful study in the late 1980s, new procurement guidelines were issued by the Economic Relations Division (ERD) in 1992. Project directors and agency

officials need to be trained in the use of these guidelines. The effectiveness of the new system should also be reviewed and problems which may still persist should be resolved.

11.2.8 Construction management : Most investment projects entail construction of physical facilities like buildings, roads and embankments. But weather condition of Bangladesh tends to limit the construction season and so the pace of physical work varies over seasons. This together with the programme of mobilising financial and physical resources need to be spelt out in a time-bound critical path. Some components may be time-specific while others may float. A critical path analysis must identify both, while some flexible work may be delayed. In the sphere of physical works building codes are needed in order to speed up implementation. More importantly, in construction of public buildings, the role of the Public Works Department should be one of providing technical support to the project authorities in respect of design, tender evaluation and verification of work quality and the project authority should get the work done through private contractors. When a Ministry has a large number of building works like the Ministry of Education it may contract out designing works in a time-bound frame.

11.2.9 Execution of projects : Project implementation means strict adherence to design specification, approved cost, time-schedule and quality. Project authority should prepare a work plan for project implementation including a bar chart, critical path analysis, synchronisation/programming of various activities, identify milestone decisions, implementation procedures and techniques, review and monitoring mechanism. A project launching workshop, particularly in big and complex projects, should be held before the project starts and all rules, procedures and systems for implementation and monitoring should be discussed and agreed upon.

11.2.10 Evaluation of completed projects : In a real sense project implementation cannot be deemed to have been completed without its evaluation. The executing agencies are required to furnish to Implementation Monitoring and Evaluation Division (IMED) in a given proforma certain information. On the basis of such information and also field verification, project completion reports are prepared and submitted to NEC. At present a very limited number of projects are taken up by IMED for ex-post evaluation. Some ministries/agencies carry out impact evaluation of some of their activities through consulting firms. Efforts should be mounted to get an increased number of programmes/projects evaluated about their impact on the society at large.

11.3 Monitoring of Projects

11.3.1 Monitoring implementation of development projects is a relatively new idea. Many developing countries undertook large number of projects under their development programmes since the middle of the century. But no institution was created to monitor the implementation and evaluate the results of those development projects until recent years. Bangladesh experienced monitoring problems after independence and new institutions had to be built up. The primary responsibility of monitoring of projects rests with the sponsoring ministry/agency itself. Along with the officials of the executing agencies officers of the ministry, particularly in the development and/or planning wing, should undertake regular field visits to keep abreast of the progress of work and to help resolve bottlenecks of implementation. Monitoring by Implementation Monitoring and Evaluation Division in its present form cannot be all-embracing. This Division has neither the resources, nor the time to look into the details of some 1200 projects being implemented annually. In fact IMED was initially conceived to monitor critical projects in order to expedite their execution, not to obviate sectoral responsibilities.

11.3.2 For the purpose of effectively carrying out monitoring and evaluation activities several institutions and practices have developed in Bangladesh. From the government side these have emerged both at the central level as well as at the levels of corporations and departments. The development partners in Bangladesh also introduced their own monitoring and evaluation system. Although both of these systems operate fairly independently in the country, institutional linkages are often set up and used.

11.3.3 Besides, IMED and the planning wings of the administrative ministries, monitoring cells of some executing agencies, project implementation units (PIU) of some large projects, etc. Planning Commission, Statistics Division, Economic Relations Division, etc. also undertake some sectoral reviews of performance.

11.3.4 Monitoring arrangements

- a. Planning wings in administrative ministries :** Planning wings of the administrative ministries were created to strengthen their project planning and monitoring capabilities. Except for the planning wings of the Ministry of Agriculture, Fisheries and Livestock, Irrigation and Flood Control and Education, most of the other planning wings in other ministries are understaffed and ill-equipped to carry out the planning, monitoring and evaluation functions effectively. Monitoring is carried out mainly through obtaining progress reports from the project management, field inspections and monthly review meetings in the ministries. Representatives from Ministry of Finance, Ministry of Establishment, Planning Commission, ERD and IMED attend these meetings.
- b. Economic Relations Division of Finance Ministry :** ERD is responsible for aid mobilisation and also for programming of external resources for projects. They undertake quarterly and annual reviews of fund utilisation, especially foreign aid. Development partners also maintain constant liaison with ERD and inform them of disbursement situations from time to time. A cell to keep track of the issues related to aid line-up and utilisation is functioning in the ERD. The information collected and collated by this cell provide important inputs for the policy makers.
- c. Finance Division :** With the assistance from UNDP, the System for Autonomous Bodies Reporting and Evaluation (SABRE), as a computerised database is in operation at the Autonomous Bodies Wing of the Finance Division. The objective of the system is to provide standardised financial information on autonomous and semi-autonomous bodies which are regularly required for budgetary and financial control, economic planning and performance evaluation. SABRE envisages to cover all autonomous and semi-autonomous bodies as well as their units or enterprises falling under the budgetary control of the Finance Ministry. The Development Wing monitors progress of claims and disbursement of Reimbursable Project Aid (RPA).
- d. Development Partners :** Most of the development partners have developed their own system of progress monitoring, namely Tri-partite Review Meetings (TRM mainly by UNDP), Review Meetings, Review Mission Reports, Consultants' Progress Reports and Local Mission Reports, etc. Except for UNDP, the World Bank and the Asian Development Bank who pursue intensive monitoring techniques, the other development partners rely more on consultant's progress reports and review meetings with the government.

11.3.5 Monitoring by IMED : IMED is involved in the entire life cycle of a project - pre-project appraisal, monitoring during implementation and reporting on completion of projects as well as ex-post evaluation as discussed below.

- a. Pre-project stage :** Identification, formulation and appraisal of projects are undertaken at this stage. During pre-project stage IMED contributes as under:
- i. Undertakes cost rationalisation prior to submission of the PCP for approval (This has been discontinued from February 1997);
 - ii. Involves in the preparatory stage of ADP;
 - iii. Represents in the NEC/ECNEC/SPEC/DPEC/DSPEC;
 - iv. Checks rationale of estimate of costs;
 - v. Checks reliability of implementation schedules;
 - vi. Checks duplication, overlaps, if any, with other projects;
 - vii. Compares with experience of similar project(s) implemented before; and
 - viii. Checks manpower size, reliability and also the suitability of institutional framework planned for implementation of the project.
- b. Monitoring during implementation:** IMED monitors progress during implementation of projects through :
- i. Periodic Reports>Returns;
 - ii. Field inspection; and
 - iii. Co-ordination/Review meetings.
- i. Periodic reports/returns:** IMED has introduced a system of progress reporting for collection of various information on project implementation. The system attempts in translating the work schedule of projects into quantifiable work components and to relate the physical performance with the financial expenditure. In fact, the system follows 'PERT' (Program Evaluation and Review Technique) management system which the government desires to introduce in case of all development projects in the country. IMED presently uses different proforma for the purpose of collection of information about physical and financial progress of projects/programmes for their evaluation. The reports on the progress of implementation are examined by IMED and consolidated into Ministry/Agency-wise reports on physical and financial achievements vis-a-vis targets. Various implementation problems are identified on the basis of these reports and information collected by the officers of IMED during their inspection. These reports are then placed before the National Economic Council (NEC), Executive Committee of the National Economic Council (ECNEC) quarterly/periodically along with the recommendations of IMED for removal of bottlenecks in order to speed up the implementation of slow-moving projects. The NEC/ECNEC takes decisions on major issues which become binding on all concerned.
- ii. Field inspection :** On-site inspection of progress of implementation of projects is one of the basic responsibilities of the IMED. All the officers of IMED visit projects to identify problems/bottlenecks of the projects. In fact every month each sector officer is to inspect at least three projects grouped as follows :
- Project targeted for completion;
 - High priority projects;
 - Sick projects; and
 - Other aided projects.
- Projects targeted for completion during a financial year are generally inspected every quarter, high priority projects twice a year and other aided/sick projects once a year. Bottlenecks identified during inspection are conveyed through

inspection reports to the concerned Project Director/Agency/Ministry for corrective action.

- iii. **Co-ordination/review meetings:** IMED officials hold Co-ordination /Review meetings with the ministries/ divisions/agencies at appropriate levels and attempt to resolve problems/bottlenecks standing on the way of smooth implementation of projects. The unresolved problems are taken up by the Secretary/DGs with the concerned heads of ministries/ divisions/agencies. Some problems are required to be attended to at the level of the Ministers. Problems of more intricate nature which cannot otherwise be resolved are placed before the ECNEC/NEC for their decisions which are followed up by IMED until those are implemented.
- c. **Reporting on completed projects :** A project management is required to submit certain information through the administrative ministry to IMED as soon as a project is completed. Generally this takes place at the end of a financial year. IMED completes reporting on the projects completed in the preceding year in about 3/4 months of the following year. The findings form a part of the annual report presented to the NEC about overall implementation of development projects in the country.
- d. **Ex-post evaluation :** IMED also carries out ex-post evaluation of a few selected projects on a limited scale. The Population Development and Evaluation Unit (PDEU) of the Planning Commission was transferred to IMED. The personnel of this Unit are being used to gear up ex-post activities of IMED.

11.3.6 Monitoring of post-implementation operation (Sustainability monitoring)

- a. Sustainability monitoring is a recent concept. In Bangladesh, institutional arrangements for sustainability monitoring has not yet developed in most of the agencies. Some agencies undertake this function in a very limited way. These are Bangladesh Water Development Board, Bangladesh Rural Development Board, Bangladesh Academy for Rural Development, Bangladesh Institute of Development Studies, etc. The Ministry of Finance through SABRE made efforts to install performance evaluation of public sector agencies with limited success. IMED undertakes sustainability monitoring function on an *ad hoc* basis on assignments from the ECNEC, the Planning Commission and upon request from the ministries/agencies.
- b. Sustainability monitoring, though a very necessary tool in the development process, has not yet taken its desired shape in Bangladesh. The government is aware of this fact and this is emphasised in the Fifth Five Year Plan.
- c. The Environmental Impact Assessment that needs to be carried out during formulation of projects should be observed by all the concerned agencies and truthfully followed up during and after implementation. It is high time that adequate attention is focused on the issue of environment in the formulation and implementation of all development activities.

11.4 Project Evaluation

11.4.1 Formative or on-going evaluation : Formative or on-going evaluation or diagnostic study is undertaken both by the executing agencies as well as IMED. This type of evaluation is done during the implementation of large projects which are of programme nature and implemented over many years on a continuous basis. The projects are selected from major

sectors facing implementation problems. ECNEC and the Planning Commission sometimes ask IMED for undertaking on-going evaluation. In addition, agencies also request IMED for undertaking such evaluation. Data collection is done through field visits, discussions with project implementation authorities and study of the project document, previous reports, inspection reports, review papers, etc. These data are compiled and analysed and the evaluation report is prepared. A simple format for such evaluation is used. It contains information on objective of the project, approval status, date of actual commencement, expected date of completion, original and latest implementation period, original and latest estimated/approved cost, cumulative and component-wise latest physical and financial target and progress, existing implementation problems, general observations with suggested solutions/recommendations etc. These reports are published as a part of the Annual Report prepared for review by the National Economic Council. The NEC directs all concerned to implement the recommendations made in these evaluation reports. IMED follows up the implementation of the recommendations. Some agencies also undertake on-going evaluation of their respective projects, e.g., Population Control & Family Planning Department, Rural Electrification Board, Bangladesh Rural Development Board, etc.

11.4.2 Summative or terminal evaluation : Since 1983/84 IMED started evaluation of completed projects on a limited basis immediately after its implementation is declared complete by the executing agency. Subsequently, from 1986/87, all the projects declared complete during a particular FY are being evaluated. Evaluation of projects immediately after its implementation is complete, is termed as "terminal evaluation". Data collection procedure for terminal evaluation is similar to that of on-going evaluation. Collected data are collated, compiled and analysed for preparation of the evaluation reports. A simple format for terminal evaluation is used which contains mainly information on project's latest approved estimated cost and implementation period, actual expenditure and implementation period, cost and time over-run analysis, component-wise planned physical target and actual achievement, planned objective and actual achievement, etc. Measurement of "outputs" as against the PP targets is mainly emphasised in these evaluation reports including the reasons for non-completion or partial completion, if any, of any component as per project document. Problems faced during implementation of the projects are analysed and possible measures for avoiding such problems during planning and implementation of similar future projects are identified and incorporated in these evaluation reports. These reports are also prepared as a part of the Annual Report for review by the National Economic Council. Ministries/ divisions/ agencies prepare a project completion report (PCR), designed by IMED, for each of the projects declared complete by them. These reports contain information on seven major areas : (a) Project Description; (b) Implementation Position; (c) Financial and Physical Program (d) Achievement of Objectives of the Project; (e) Benefit Analysis; (f) Monitoring and Auditing; and (g) Descriptive Report.

11.4.3 Ex-Post or impact evaluation :

- a. Impact evaluation studies are comparatively a new activity in Bangladesh. As per the current monitoring and evaluation practices, the lead agency in this area is IMED though the basic responsibility of such evaluation lies with the respective administrative agency of projects.
- b. The IMED could not take the function of ex-post/impact evaluation on a systematic and regular basis owing to lack of well-trained manpower in the techniques of ex-post evaluation and other logistic support. However, since 1983/84, IMED started ex-post evaluation of selected projects and incorporated them in the Annual Reports. In the recent past IMED also implemented a pilot project with the

assistance of ADB, to strengthen evaluation capabilities of the division. More comprehensive technical assistance projects for enhancing evaluation capability of IMED and the relevant ministries are required to be developed during the Fifth Five Year Plan period. It is hoped that IMED will be in a position to undertake the function of ex-post evaluation in a more systematic manner on regular basis after the evaluation capability of IMED is increased through extensive training of the existing manpower, increasing the existing manpower strength and other logistic support. It may be mentioned that intensive impact evaluation has been carried out in the population sector since 1992. However, in a limited scale within the existing manpower of IMED, ex-post evaluation work has been taken in hand for all sectors.

- c. Some agencies also undertake impact evaluation. Among them Bangladesh Institute of Development Studies (BIDS), Bangladesh Rural Development Board (BRDB), Bangladesh Academy for Rural Development (BARD), etc. may be mentioned. Some of the development partners also undertake independent impact evaluation of their aided projects.

11.5 Monitoring and Evaluation Experiences

11.5.1 Pre-project appraisal

- a. IMED was assigned from FY 93 the function of rationalisation of cost estimates of development projects before the Project Concept Papers (PCPs) are finalised for submission to the Planning Commission for processing the PCPs for approval. The exercise was being carried out through discussion meetings. Cost rationalisation by IMED was recently discontinued. IMED, however, strongly feels that cost rationalisation is a very useful tool in project appraisal and must be carried out diligently by whatever agency entrusted with the task.
- b. IMED is represented in the different levels of project appraisal before investment decisions are taken. Officers at the minimum of Director level are to attend such meetings. But officers of appropriate level can not always represent IMED in these meetings owing to a limited set-up. Other organisations also are not always represented appropriately. This tells on efficient decisions.

11.5.2 Monitoring during implementation

- a. **Project inspection** : On-the-spot inspection of physical progress of a project is the most effective tool for monitoring its implementation. It has been observed that higher physical progress was achieved in the years with greater field-level inspections. With a view to achieving higher achievement of physical target, IMED inspection program needs to be intensified. The IMED inspection reports are sent to all concerned with foreseen identified problems and suggested solutions thereof. Recommendations made in the inspection reports do not always get proper attention of concerned quarters. Many senior officials including the Finance and Planning Ministers observed on various occasions that if IMED recommendations were implemented, there would be no obstacle to achieve desired progress in development programmes. Inspection of projects by the concerned administrative ministries and the executing agencies is also reported to be inadequate.
- b. **Review meetings** : Review of progress of implementation of development projects/programmes at the Ministers'/Secretaries' level has established to some extent a system of management accountability and closer interactions and mutual

appreciation of problems between the decision makers and project implementers facilitating actions and on-the spot decisions. It has been experienced that review meetings at higher levels contributes greatly to the progress of implementation. It is important to mention here that some ministries lack proper administration of monthly review meetings. They take long time to record and communicate decisions which jeopardise the subsequent corrective actions.

- c. **Special monitoring** : In order to improve the progress of implementation, initially 40 projects were identified as high priority projects and are being intensively monitored since January '92. To utilise the project aid allocation to the maximum, some 16 ministries/ divisions having large share of ADP allocation of budget (around 80%) have been identified and their projects are also being monitored very intensively since July '92. IMED also monitors progress of large procurements under development projects (above Tk. 20 million for goods & works and above Tk. 5 million for consultancy services). These measures of special monitoring are showing improvement in the case of high priority projects and the selected large aid utilising ministries/ divisions thereby showing improved overall performance under ADP.
- d. **On-going evaluation** : IMED undertakes on-going evaluation as diagnostic studies in a very limited way. This is mainly due to (i) inadequate knowledge of such evaluation techniques on the part of the IMED officials and (ii) want of adequate manpower. This aspect of monitoring during implementation needs more attention. It is hoped that IMED will try to have improved on-going evaluation of development projects.
- e. **Overall absorption capability of ADP** : ADP implementation capability has improved significantly from 56 percent of total ADP allocation in 1972/73 to 96 percent in 1995/96. But it is also observed that except for 4 years (FY'78, FY'81, FY'89 and FY'90), during the remaining 19 years ADP allocations could not be utilised fully. In case of PA, the allocation was utilised fully only in FY 1988/89. It may be mentioned here that, during the recent years, ADPs have been reduced in revised budgets. This situation of under-utilisation of even reduced ADP allocations may be attributed to over or un-realistic programming. In pursuance of an NEC decision a separate list of projects where foreign aid could not be lined up is inserted in the ADP.
- f. **Identification of implementation problems** : Identification of implementation problems and recommendation of measures for their solutions are very important aspects of monitoring of projects during implementation. It has helped reduce the number of implementation problems as well as the number of projects affected by those problems. As against 33 different implementation problems in FY'82, the IMED's 1995/96 annual report identified only 10 major problems as follows :
 - i. Delay in approval of project/revised project;
 - ii. Delay in release of fund;
 - iii. Delay in land acquisition and handover;
 - iv. Delay in lining up of project assistance;
 - v. Delay in calling tender and observing formalities;
 - vi. Delay in appointment of consultant;
 - vii. Delay in executing agreement with donor country/agency;
 - viii. Delay in completion of civil works on deposit fund;
 - ix. Delay in appointment of project personnel; and

- x. Delay in fulfilment of conditions precedent for loan effectiveness and disbursement.

Effective steps and decisions will be taken by the government to resolve these problems during the Fifth Five Year Plan.

11.5.3 Ex-post evaluation : The function of ex-post evaluation is very limited in Bangladesh as has already been discussed earlier. However, IMED undertakes evaluation of all completed projects immediately after those are declared complete. But impact evaluation function is still insignificant both in volume and in quality. This is attributed to the fact that there are very few officials in the IMED with necessary skill and experience to undertake impact evaluation. This area needs immediate attention in the interest of sustainability of development projects. IMED has recently taken up an expansion program for its organisation and hopes to undertake this function more systematically and effectively in future.

11.6 Monitoring of Private Sector Projects

11.6.1 Private Sector is visualised to be the engine of growth during the Fifth Plan. The government policy is to pave the way for rapid expansion of the private sector for transformation of the economy into a more effective market economy. The government will play "promotional" rather than "regulatory" role for the private sector and act as a catalyst through the sponsoring agencies, i.e. BSCIC for small and cottage industries, BEPZA for industries located in export processing zones and Board of Investment for all other cases. To facilitate the process, a Privatisation Board has been set up in order to review the performances of the public sector enterprises and to privatise them in order to sustain efficiency in operation. There is an Industrial Development Council under the chairmanship of the Minister for Industries. The concerned sponsoring agencies collect information and data on quarterly and yearly basis and furnish them to all sanctioning/registering authorities.

11.6.2 The Fifth Five Year Plan envisages 56 per cent of the Plan outlay to be in the private sector. It is, therefore, imperative that monitoring of the private sector projects be given proper importance. The Development Financing Institutions (DFIs) have their own system of monitoring the progress of their own financed projects. But so far, the national monitoring agency, IMED, has not covered private sector projects in its monitoring system. Considering the importance of the private sector, IMED should devise a system to monitor the implementation of the private sector projects also. In the process, Bangladesh Bureau of Statistics, Board of Investment, Privatisation Board, Export Promotion Bureau, Bangladesh Bank, BIDS, etc., may be involved.

11.7 Strengths and Weaknesses of Monitoring and Evaluation System

11.7.1 Strengths

- a. Through IMED a system has been institutionalised and integrated for project monitoring, information gathering and dissemination, problem solving, etc.
- b. IMED's linkages with the planning processes of the country provides it with the necessary planning-implementation feedback which is very vital for proper monitoring of projects.
- c. IMED's assessment of inherent weaknesses of the project managers in planning and implementation techniques finally culminated in the creation of the Academy for Planning and Development imparting regular training to managers in the techniques of project preparation, implementation and management.
- d. The system of field inspection and holding of review meetings at the minister/secretary level has established to some extent management accountability and

closer interactions and mutual appreciation of problems between the decision-makers and project implementers facilitating actions and on-the-spot decisions.

- e. In sum, the benefits of the central monitoring system have been manifold such as establishment of some management accountability, improvement in implementation and identifying institutional linkages between planning and implementation.

11.7..2 Weaknesses : In spite of the aforementioned contributions of the present monitoring system, the following weaknesses may be recognised which affect its operational efficiency :

- a. The need and importance of efficient monitoring and evaluation(M&E) activities is yet to be fully understood by the rank and file in the system;
- b. The lack of proper and prompt response from top managers on monitoring reports often frustrates the reporting authorities and agencies who then neglect the importance of quality reports. This results in inconsistent reports, which in turn, affects accurate decision-making;
- c. Implementing officers often consider the problems as personal failures, and thus instead of seeking help in solving these, try to hide them. They only report achievements and sometimes put the deviations and delays in the dark. Top management's lack of sensitivity and failure to appreciate problems and difficulties faced by the lower functionaries have to a great extent, contributed to this situation;
- d. Quality control of progress reports is absent or neglected at the project, agency and ministry/division levels;
- e. There are too few people in the central monitoring organisation to manage the monitoring of large number of projects efficiently;
- f. There is a lack of updated knowledge and techniques for efficient monitoring and evaluation both at the centre as well as in the ministry/agency levels;
- g. IMED's own lack of authority and at times inability to initiate problem-solving actions seriously demoralise the project managers who in turn lose interest in reporting problems. This also contributes to low quality and lack of accuracy of the reports.
- h. Monthly project review meetings in some ministries are not held regularly and others lack proper administration. It takes a long time to distribute decisions thus jeopardising the subsequent corrective actions.
- i. Submission of project completion reports after a project is declared complete by the ministries/divisions has not yet been developed as a regular practice.
- j. Physical units of measurement are sometimes not mentioned in the project documents as also in the progress reports from projects, thus rendering any meaningful interpretation of progress monitoring a difficult task.
- k. Even large projects do not always have full-time PDs.
- l. Sustainability monitoring lacks proper attention at all levels making investment ineffective.
- m. Monitoring and evaluation of private sector development activities have not been developed.

11.8 Policy Measures for Implementation of Fifth Five Year Plan

11.8.1 In order to achieve a successful implementation of the Fifth Five Year Plan, weaknesses mentioned in the previous sections will be removed. The following are some of the steps which will improve the situation:

a. Capacity building

- i. There must be increased capacity building in executing agencies, planning wings of ministries and IMED on project preparation, cost analysis and implementation techniques.
- ii. Monitoring and evaluation capability at agency/ministry level as well as at IMED will be strengthened by providing specialised training to the relevant officers both at home and abroad. Training institutions like the Planning and Development Academy, Bangladesh Institute of Administration and Management, Bangladesh Institute of Management, etc., may be conveniently used for this purpose.
- iii. Planning wings in the ministries/divisions will be strengthened with appropriate officers from the economic cadre so as to make them well equipped to handle monitoring and in-house evaluation of projects.
- iv. The administrative ministries/executing agencies will carry out close monitoring of projects under their jurisdiction so that IMED can concentrate more on selected priority projects.

b. Project preparation

- i. Project preparation with correct identification of components, appropriate design and specification, cost analysis, site selection, implementing agency, implementation strategy/mechanism including review, monitoring and evaluation procedure will be ensured.
- ii. Donor and the government requirements for project preparation need to be synchronised.
- iii. Strategic objectives will guide development planning.
- iv. Manpower requirement after completion of a project will be standardised and incorporated in the P.P. In cases where fresh decision is required as to the actual number of manpower to be retained it will be resolved jointly by Ministry of Establishment and Ministry of Finance within 3 months of project completion.

c. Approval of projects/Revised projects

- i. All unapproved projects in the ADP will be approved by September every year.
- ii. ECNEC decisions will be communicated immediately and preferably within a week after the ECNEC meeting for their speedy implementation.
- iii. Approval of revised projects : More authority will be delegated to the implementing Ministries to approve revised projects involving :
 - cost increase up to 25 per cent without exceeding sectoral/sub-sectoral allocation;
 - In case of approved projects, inter-project reallocation (upto 25%) without exceeding sectoral allocation;
 - however, project revision involving additional sectoral allocation, change of site, change of objectives, impact on environment, large-scale displacement of people will need Planning Commission's/ ENCEC's approval irrespective of cost involved; and
 - In case of aided investment projects decision on implementation issues arrived at tri-partite meetings will be considered as the basis for future project revision, if necessary.
- iv. A maximum time-limit of 3 months for approval of revised projects by competent authority will be adhered to.

d. Execution of projects

- i. Manual for procurement of goods, works and services for non-aided projects will be prepared by the Cabinet Division.

- ii. Building codes will be updated and administered properly.
- iii. Strict adherence to existing specified time limit in case of procurement of goods, works and consultancy services will be ensured.
- iv. Following time limit will be observed against respective activities :
 - Appointment of PD's and project personnel during appraisal/ preparatory stage;
 - Setting up project office within 3 months of approval of the project;
 - Fulfilment of conditions precedent for loan effectiveness and disbursement as specified in PRODOC/Credit Agreements;
 - Land acquisition/purchase: 3-6 months;
 - Examination of bills : 7-10 days;
 - Decision on payment of bills: maximum 2 weeks from the date of receipt; and
 - Submission of claims for RPA : maximum 2 weeks from the date of receipt.
- v. Project director/evaluation committee must strictly follow evaluation criteria/ procurement guideline of the government and donors for bid evaluation. Any irregularity or deviation on the part of PD/evaluation committee will be penalised. Likewise, any bidder trying to influence the decision of the project director/evaluation committee or any other authority will be summarily disqualified.
- vi. Any complaint or allegation against bid evaluation or procurement decision will be disposed of within 2 weeks at the maximum.
- vii. Existing Secretaries' Committee on Finance and Development will be used where necessary to resolve serious inter-ministerial issues.
- viii. Immediate hand-over of completed projects for operation and maintenance will be ensured.

e. Project Director

- i. All large projects will have full-time PDs and their continuity in office will be ensured even in promotion cases by upgrading their existing positions, if necessary.
- ii. Irrespective of their belonging to government or an autonomous organisation, all PD's will be delegated the same financial and administrative power.
- iii. Experienced persons will be appointed on contract as project directors in accordance with the ECNEC decision.
- iv. PD must promptly bring to the notice of his administrative ministry/higher authority any shortcoming/problems in project implementation which he himself cannot solve and the administrative ministry must promptly resolve the issue either on its own or through the appropriate Secretaries' Committee depending on the scope and nature of the subject.
- v. Training of PDs and project staff is a critical input in efficient project implementation. Appropriate measures will be initiated to promote institution building, hold regular courses on project implementation procedures and techniques, as well as refresher courses for PDs and to prepare handbook on project implementation.
- vi. A system for reward for good performance and punishment for unsatisfactory performance will be introduced. Risk-taking and initiative will be encouraged.

f. Monitoring

- i. Monthly project implementation review meetings in all the ministries/division will be held regularly and chaired by Minister/Secretary. Regular stock-taking of assets and level of utilisation will also be carried out.
- ii. Recommendations made in the IMED inspection/evaluation reports will be regularly reviewed in the monthly meetings of the ministry/division concerned and corrective actions taken.
- iii. Head of executing agency and PD when not resident at site will regularly visit project site and thoroughly supervise the work of consultants and contractors to ensure adherence to design/specification, cost, time-schedule and quality of work.
- iv. Joint field visits by the Planning Commission, IMED, concerned Ministry and PD will be undertaken from time to time, particularly in respect of important projects/programmes.
- v. Planning wing officers will inspect projects as per government decision regularly.
- vi. There will be frequent interaction with donors as soon as problems are identified. Donors' review missions may coincide with the quarterly co-ordination meetings of concerned ministries/division.
- vii. Micro-management of projects/programmes by any second agency other than the relevant one should be avoided. Donors also will be discouraged from micro-management of individual projects/programmes.
- viii. General Economic Division of the Planning Commission and Bangladesh Bank and BOI will develop a working mechanism for monitoring implementation of private sector projects : a Private Enterprise Council of the Prime Minister composed of businessmen may be appointed to this end.
- ix. There will be a standing liaison committee between the government and private sector to resolve problems encountered by the private sector investors as practised in the Ministry of Agriculture; BOI will be revamped and strengthened to this end.
- x. An effective system for penalisation of consultants/contractors for bad performance will be reviewed for either continuation or cancellation.
- xi. Small projects, within Tk. 100 million, if not started within 3 months of approval will be reviewed for either continuation or cancellation.
- xii. Seminars on monitoring and evaluation for senior managers and decision-makers will be arranged for effective functioning of the system.

11.8.2 Other measures : The Planning Commission will continue to oversee the implementation process and to co-ordinate with the relevant ministries and agencies to solve any problem that may arise. Special attention in this context will be given for delegation of implementation responsibility to local government bodies and to devise an institutional procedure to co-ordinate implementation in relevant administrative units of the country.

11.8.3 Operations and maintenance : Following implementation adequate attention will be given to operate and maintain the project. Needless to say, ICVR of the project will suffer if operation and maintenance are not proper. Involvement of beneficiaries and local government institutions will be the cornerstone of measures directed to this end. Besides, adequate funds will be made available and contracts to the private enterprise given in suitable cases for operation and maintenance.

CHAPTER XII

RESOLUTION OF CONFLICTS

12.1 Introduction

12.1.1 Development or growth implies change in the relevant field. Any such change affects the status quo in terms of position, entitlement, benefit or loss and expectation of the relevant people. The relevance is connotive of their roles or ambits of work as producers, consumers, change-agents or interested citizenry. In addition, change initiates, carries and at times completes transformation of the environment and the eco-system. Control of river flow, use of ground water, mining of hard rock and coal, building roads through hills and forests, use of insecticides and pesticides, and other manifestations and ramifications of the development drive transform the natural backdrop and the environment hitherto untouched, unexploited, unmoulded out of quiet serenity and stately tranquillity acquired over years of motivational and technological stasis and so much adored by the naturalists.

12.2 Need For Resolution of Conflicts

12.2.1 The resulting change in the status quo, the environment and the eco-system has to be accepted and supported by those who are affected or benefited, touched or hurt. As the theory has it, a change is justifiable when benefits emanating out of it are socially assessed to be more than costs or hurts it imposes. In the process those who benefit may do well by carrying with them those who may be adversely affected or are indifferent. Non-acceptance of, and opposition to changes yield conflict, which may, at times and on occasions, lead to rebellion. The process of acceptance and gaining support is a process of resolution of conflicts. If conflicts are not resolved yielding acceptance of, and support for the change, the scope of the latter does not widen desirably, and its rate immerses back into the status quo, the unchanged environment and the undisturbed nature or even worse. On the other hand, if conflicts are resolved institutionally and without disruptive societal abrasions, stability in socio-economic management is attained and sustained, the role players in all relevant fields of production and consumption are provided with an enabling environment and motivation to contribute their best and the desired change takes place to the end of socio-economic development of the society. All these contribute to increase of capital accumulation or creation of productive capacity and increase in efficiency of resource use. In the context of participatory planning, resolution of conflicts, around the planned change in the status quo, the environment and the nature is important in as much it defines, lays out, widens and sustains the conduit of change or development. Indeed, resolution of conflicts is the spirit of participatory planning.

12.3 Existing Elements of Conflict

12.3.1 In the situational context of Bangladesh, a number of elements contributing to the process of resolution of conflicts exists: contiguous location (excepting a few small enclaves) of the country, linguistic unity (excepting some areas in the hill districts), constitutionally accepted democratic ideals and commitment to prosper in freedom and rapid improvement in roads and tele-links throughout the country in recent years and demonstrated public support for them have brought the constituents of our society closer and made it more cohesive. To the end of sustaining and strengthening solidarity these positive elements ought to be further applied and used. Opening up of remote areas in hilly districts by roads and telelinks, signing of peace treaty

with the insurgent tribals in hill tracts, connecting the offshore islands with regular water transports, and out reaching tribal communities in Mymensingh and Rajshahi regions through spread of education and communication facilities will have definite contributions in removing conflicts latent in some regional differences and disparities. The opening of the Bangabandhu Multipurpose Bridge in June '98 will serve as the single most unifying bond between the southern and the northern regions of the country. Despite these well identified positive elements, in a number of areas, especially in the process of formulating and implementing planned socio- economic change, possibilities of conflict need to be recognised and steps delineated to resolve them over time.

12.4 Conflicts in Objectives and Mechanics

12.4.1 To start with, by way of enumeration, there may be conflicts while determining the Plan objectives. Conflicts on this count may arise in terms of both vision and mechanics. The vision of the society 15 or 20 years hence is likely to be different to different persons or groups. The enterprising and the rich may like to work for a society different from the one aspired by the labour or the poor. The expectations of the landless are likely to be different from that of the land-rich. The consumer's views of societal interest may be different from that of the producer's seeking protection. The difference in mechanics may centre round relative emphasis to be given on relevant indicators as well as variables of growth: this may demand answers to questions like those pertaining to, for example, employment creation or productivity generation, protection or liberalisation, generation of surplus in agriculture for financing investment in industrial development and others.

12.5 Constitutional Guidelines

12.5.1 The basic objectives of planned growth is constitutionally defined in Bangladesh. In Article 15 of the Constitution, provision of basic needs in terms of food, clothing, shelter, education, health service, gainful employment, reasonable recreation and social security to the citizenry through planned economic growth is accepted as a fundamental responsibility of the state. In this process, the state is to pursue (a) emancipation of the toiling masses, the peasants and the labour, and the backward communities from all exploitations (Article 14), (b) gradual removal of disparity in standard of living of the rural and urban areas through promotion of an agricultural revolution, provision of rural electrification, development of cottage and other industries and improvement of public health (Article-16),(c) adoption of free and compulsory education and removal of illiteracy (Article-17), (d) equality of opportunity and removal of social and economic inequality between man and man, equitable distribution of wealth and uniform level of economic development in all areas (Article-19), and (e) creation of conditions in which unearned income cannot be enjoyed (Article-20).

12.6 Promoting Consensus

12.6.1 Determined constitutionally as aforesaid, the objectives of planned growth have to be taken as given by all role players. In other words, the vision that we all have is the vision of a society meeting the basic needs of the people in an exploitation-free informed environment encompassing social, economic and opportunistic equality. Within their broad frame, discourses and deliberations in the parliament, political parties, professional associations, local government bodies and research institutions are likely to build up consensus on components of these objectives and relative emphasis to be given to them in changing contexts. In this process the

parliament may serve as the apex deliberative body taking into account deliberations and discourses in other bodies. Deliberations in the parliament will yield legislative decisions on policies, projects and programmes and manifest as contributions of the relevant political parties to the national strive at planned economic growth for meeting the basic needs of the people as mandated by the constitution.

12.7 Mechanics of Growth

12.7.1 There are two main components of mechanics for attaining the set objectives of planned development. In the first place, the constitution has laid down a set of premises. These are: (a) affirmation of the national will to prosper in freedom (preamble); (b) recognition of the people as the source of all powers of the Republic (article-7) and owners and controllers of all instruments and means of production and distribution (article-3); (c) meeting basic needs of the citizenry through attaining a constant increase of productive forces' (article-15); (d) return to individuals on the principle of 'from each according to his abilities to each according to his work'; and (e) taxation and authorisation of expenditures under the authority of the parliament (articles-83 and 90). Secondly, subject to the conditions set by the constitution, causative process of change in one sector because of changes in the inter-related ones is to be taken into account. Elsewhere, aggregatively these intersectoral relations have been spelt out in their composition and effects, changes and ramifications. In the present context, these, in turn, are implicative of gains or losses for individuals and groups and thus need to be understood, evaluated and accepted. The question centring round distributive justice vis-a-vis incentives for productive investment, or increase in defence expenditure vis-a-vis investment in education, for example, will have to be answered in this context.

12.8 Parliamentary Conduit

12.8.1 For continuous resolution of conflicts and differences in the process of attaining these objectives, subject to the constitutional mandates, the most effective conduit again is the parliament. Exogeneously, free, fair and regular elections to the parliament coupled with the freedom of information media will strengthen the parliamentary process. The other important contributing element in this process will be freedom of speech, conscience, movement, association and assembly for all citizens as guaranteed by the constitution. Endogeneously, from the functional point of view, for an in-depth analysis of issues and realistic delineation of the paths to be taken, strengthening of the relevant standing committees in the parliament seem to be in order. Open hearings and deliberations in these committees working throughout the year will contribute to transparent, accountable and responsive policy directions and decisions in this regard. Dialogues and deliberations instead of boycott and confrontation are likely to facilitate and converge at answers to issues at hand.

12.9 Role of Public and Private Sectors

12.9.1 Pertaining to this process, the parliament at the present time is expected to decide on two major issues. These centre around the choice of the public sector in complementation or supplementation of the instrumentality of the private sector as the major vehicle of growth. In recent years, there has been a relative relegation of the public sector as the constituent of 'commanding heights' usable by the state to regulate and to promote the economy. All sectors of the economy have been opened up for investment, production and operation by the private sector. Despite such an opening, the role of the public sector in development of infrastructure is acknowledged. Even in such an area, given the constitutional mandate to meet the basic needs

of the people through planned economic growth based on 'a constant increase in productive forces', choice between public and private sectors as a conduit for attaining productivity should centre around considerations of relative capability and efficiency in production and equity in distribution. If for building infrastructure facilities in certain areas or sectors, private enterprise lacks in capacity, the public sector may be deployed. If following setting up a public utility by the public sector, inefficiency in operation creeps in, a case for privatisation is built-up. For directly productive investment in agriculture, industry and in services, if the private sector has built-up capacity, generally public sector has no reason for deployment of additional resources or for interference unless social circumstances warrant it in the interest of both producers like small farmers and poor consumers. A consensus built on these principles will definitely contribute to constrain as well as to rationalise roles of public and private sectors to the societal benefit. Such a consensus will facilitate expeditious privatisation of the bloated and unprofitable state owned enterprises. The process, in its all constituent parts will contribute to shape up ethos involving market-orientation of the economy in support of democratisation of the political system.

12.10 Market Failures and Government Failures

12.10.1 Related to the choice between public and private sectors, general questions centring round market as well as government failures in the economic realm need to be answered. As the recent theory has it, the market may fail in cases of (a) externalities, (b) public goods, (c) poor information and (d) monopoly. Failure in this context in all these cases is connotive of inability or incapacity to attain the desired allocative efficiency. Each case of market failure provides a potential opportunity for government action garnering benefits in excess of costs. Consequences of market failure in case of poor information and monopoly are well understood; inherent conflict of interests that remain to be resolved through reformative measures in these two cases are also well-articulated, though each requires public interventions of its own kind more involved when information on market of future goods are non-existent. Such resolution may not, however, call for supplementation of the market mechanism. Externalities, in terms of costs, manifests in harmful effects of an individual's or a group's action on the welfare of non-involved secondary persons. In such an event, social costs exceeds private costs. In terms of benefits, externalities manifest in beneficial effects of group or individual action on the welfare of non-paying secondary parties. In such a case private return is less than the social return resulting in lower investment in the relevant ambit of production and consequent missed opportunities if left to the private enterprise alone. In the situation involving externalities the policy makers may carefully consider (a) the magnitude of external costs/benefits relative to the cost of government action; (b) the ability of the market to devise means of dealing with the problem without government intervention; and (c) the possibility that the political majority may take the intervention too far if the external costs imposed on the minority are not fully considered. Consumption of public goods result in spill-over benefits to secondary parties. It is costly or impossible to withhold such a good (e.g. national defence) from persons who do not pay for it. In such a case the market system breaks down as everyone gets an incentive to become a free rider. And when everyone tries to get a free ride, production of public good dwindles calling at times for intervention by the government. Private sector philanthropic and entrepreneurial solutions to certain public goods problems show us that the government action is not the only corrective way. In resolution of conflicts in such a field this limitation has to be considered.

12.11 Weaknesses in Public Sector Intervention

12.11.1 At least four factors weakening the case for public sector intervention or operation may be identified. First, possibility of voter ignorance and inability to recognise costs and benefits of public sector operation fully is quite high. In a representative democratic system, voters are the originators of public sector intervention and operation. The applicable self-interest postulate of free enterprise based democracy assumes propensity of voters to elect representatives offering greatest personal gains relative to personal costs. The group decision - making delinks outcome of an issue to the choice of the individual. Voters, as a result, are likely to remain uninformed on many such issues. They may make their evaluation of representatives on the basis of subset of issues that are of greatest importance at personal levels. In such a situation, legislative decisions are not always expected to pass the economic tests of productivity or efficiency. Second, working in the aforesaid backdrop, the politicians find it profitable to support special interests reflective of rent seeking and individual or group advantage at the expense of others. This follows from a postulate of public choice theory that pursuit of votes is the primary stimulus shaping the behaviour of politicians. More often than not, interests of bureaucrats may complement those of the interest groups in such cases. Bureaus may have propensities to expand their programmes to deliver benefits to special interest groups who in turn may work with the politicians to expand their bureau budgets and ambits and career prospects and pursuits. Constitutional provisions in respect of equal treatment of all under law, removal of exploitation and regional disparity, ensuring religious, racial and gender equality and their strict adherence is one definite way to limit the power of special interests in using the political process at the expense of others. Third, in the public sector, where decision-makers do not have private property rights over the resources they control, the short-sightedness is another source of conflict between good politics and sound economics. In the public sector, voters, politicians and bureaucrats may support projects and programmes that promise eye-catching short-run benefits at the expense of not easily-identifiable future costs. In such a situation, there is always a bias against legislation that involves projects with immediate and easily identifiable costs and high future returns. Finally, economic incentive for operational efficiency in public sector enterprises is small. This does not indicate that employees in the public sector are necessarily incapable. It means that in public sector operation there is no direct relation between work and creativity on the one hand and public compensation on the other. No individual or group of individuals can capture relatively small profits yielded by improved operational efficiency in the public sector. Research over the last several years have shown that private enterprise, compared to public ones, has provided goods and services in the same field more economically or efficiently.

12.12 Need For Developing Institutions

12.12.1 Public choice theory, in recent years, shows that political action or government intervention can and, at times, does reduce economic inefficiency emanating from market failure. At the same time it also indicates that unconstrained intervention may result in programmes that waste resources. Understanding the shortcomings of both the market and the public sectors is important if we want to improve our present economic organisations. In delineating reform of the system, the challenge before us is to develop political, social and economic institutions, capable of bringing, to the fullest extent possible, the interests of producers, politicians, bureaucrats and voters into harmony with the general welfare of the society. And this challenge can be taken up by the parliament functioning in a milieu of democratic environment and partnership within and around. Likewise the challenge can be met

better by the political parties and various interest groups through adequate awareness and dialogues across the relevant income classes and voters.

12.13 Supporting Private Enterprise By Public Sector

12.13.1 Taking all these into consideration, as of now, the public sector will do well if it is geared up and pressed into supporting the private enterprise in all productive sectors of the economy. To this end, building up infrastructures, especially for flood control and large scale irrigation and generation and transmission of power, will be important steps. Given the preponderance of small and marginal farms throughout the country, large investment and multisectoral approach are needed, and the riparian dimension of water management, flood control and large scale irrigation are likely to remain as areas of selective and major intervention by the public sector. Small scale and minor irrigation involving utilisation of ground and surface water by individual or group of farms will be better accounted by the private owners and operators. The other important area of intervention by the government seems to be the financial sector in its parts meeting the needs for long term investment in capacity creation in the private sector and targeted lending aimed at poverty alleviation. The structure of deposits as is prevalent now may not allow the system to meet the need for long-term credit for industrial development. Besides, there are requirements for sponsoring, if not setting up, venture capital institutions and investment companies for deepening the finance. Credit for the poor, like wise, in the current situational context of widespread assetlessness and pauperisation, needs innovative credit support for amelioration and guarding against large scale social discontent. Added to these will be provision for facilities for health care and human resource development. Private sector enterprises are not likely to provide these in most and remote areas. All these will be taken up as definite items in the agenda of action of the government. And finally, there remains quite a large room for public investment in adaptive research and development in both industry and agriculture. In this context governmental sponsorship and intervention may be well suited in such fields as development and export of computer softwares, CAD and CAP, biotechnology, genetic engineering, survey and exploration of natural resources, etc.

12.14 Organisational Reforms in Public Sector

12.14.1 Related to the governmental intervention in these and other areas in support and supplementation of the private enterprise, is the issue of making organisational reform of the public sector agencies. As experience has it, most of the public sector agencies (BADC, WDB, PDB, BFIDC, etc.) were set up to attain objectives laid down at the time of their setting up. Due to changes in circumstances and generations of demand for services or products in newer ambits or areas, the objectives as well as the size and the nature of the relevant organisations warranted change or modifications. As has been observed, such changes were not brought about in most cases. This has made some parastatals somewhat aimless and ineffective in public estimation. The recent decision to abolish or down-size BADC is a case in point. In order to sustain the government's capacity to make the right kind of intervention in changing circumstances, such organisational changes and modifications should be slated for. The process may create discomfort or generate protests on occasions and at times. But despite that, a charted course is likely to be cost-effective in the relevant field of service, regulation or promotion and consequently, eliminative of avoidable conflicts.

12.15 Fast Track in Public Sector

12.15.1 The other important area of reform in this field will comprise creating scope for fast tracks in careers of employees serving the government and the parastatals. As of now, the track is the same for all irrespective of merit and performance. As a result service and product emanating out of the public sector as a whole are almost always inept and sluggish and often unsatisfying. Really meritorious and ambitious people are not attracted into the government and the parastatals these days. To attract the best and the brightest into public service and to obtain the most out of them in their creative years, setting up a different and fast track for the best performers and the standard setters will have to be evolved on the basis of logical analysis and through consensus of the relevant role players. Service rivalry, postponement of reforms, politicised and indisciplined conduct as have manifested out of the malaise thus far, testify to both the extent of inherent conflicts and the urgency to resolve them expeditiously.

12.16 Relation Between Central and Local Governments

12.16.1 In Bangladesh context elements of conflict are existent in the relationship between the central and the local governments. Despite a clear constitutional mandate to promote local government institutions with special representation of peasants, workers and women (article -9), no consistent programme has thus far been undertaken to this end. As of now, zilla parishads at district level are without elected heads; union parishads so far formally delinked from political affiliations at national levels are still not adequately heard and attended to; co-ordinating roles of elected representatives at thana level are yet to be defined in legal and functional terms; and local government bodies in three hill districts need to be organised to give shape and meaning to the recently concluded peace treaty with the insurgent tribals. The local government as a system have inadequate sources of locally raisable resources. As a result, responsibility, responsiveness and accountability to the local people cannot be cherished very much as uniform principles of administration and management at various levels and throughout the country. This inadequacy has placed a limitation on the process of participatory development as is envisaged now.

12.17 Needed Reforms of Local Government

12.17.1 Promotion of local government institutions, in the present context, may call for reform in at least four areas. The process of reform in these areas, in turn, will require resolution of conflicts, explicit and implicit, amongst the relevant role players. In the first place, appropriate organisations headed by elected public representatives capable of management as well as development at thana and district levels have to be set up. These bodies along with union parishads and pourashavas should be given more functions (e.g. in fields of primary health care and education and local irrigation infrastructure) and adequate co-ordinative and cohesive authorities. Action along these lines may be conflictive with the current situation wherein local MPs and officers of the central government tend to interfere and dominate. Secondly, all local bodies should be made responsible to the local people. To this end, the relevant law should provide for recall or removal of chairmen or members following passing of no-confidence motions against them by the local constituents or other members of the local bodies. As of now, even if a no- confidence motion is passed, chairman of a local body is removable only by or under the authority of the central government. In such a situation, the representatives elected to the local bodies tend to forge allegiance to the power that be at the central government vitiating the principles of responsibility, responsiveness and accountability to the local constituents.

Reform along these lines may not be implicative of erosion of the authority of the central government; on the contrary, such reforms will yield desired societal gains for the local people and in the process reinforce the central government in the mechanics of development. Thirdly, all these bodies excluding city corporations and pourashavas may be given wider fields of taxation or alternatively keeping their current fields of taxation unchanged, a pre-determined percentage share, say 12% of all revenues raised by the central government. If decision to share the revenues of the central government with the local bodies is taken, a principle for their equitable distribution on the basis of, inter-alia, (a) population, (b) development needs, and (c) level of local resource raising may be adopted to stave off exogenous considerations in distributing the pie. Also, periodic finance commission may be set up and used in a continuously changing context for determining the over all share of the local bodies in the central government's revenue and its distribution amongst the relevant local bodies in accordance with appropriate principles. This may imply a transient erosion of power and authority at various levels of the central government. This is likely to be more than made up through strengthening realistically the local government bodies for providing more and better civic services and higher utilisation of physical and social capital in their respective areas. An overriding adherence to the constitutional mandate by the legislators together with a strong commitment of the executive organ of the state for obtaining the maximum yield out of a given investment in physical infrastructure and social investment is likely to result in actions in right directions and resolution of conflicts in this regard. The recently completed report of the Local Government Commission has delineated actions and steps to these ends, which needs expeditious consideration by the government and the parliament.

12.18 Functional Delegation

12.18.1 Finally, following the tradition built up in Japan, the central government may do well by delegating responsibility for implementing selected local projects planned and funded by it to the local government bodies. Primary schools within an union, health centres or bridges within a district, for example, may be given to the relevant union parishad or zilla parishad for implementing out of project specific grants made by the central government. This way the technical capability of the local bodies may be enhanced as well as local participation and more efficient use of resources ensured. In some cases, established facilities in fields of health care, education, relief or welfare funded and implemented by the central government may be given to the relevant local bodies for operation and maintenance. This way the delivery mode of services may be desirably improved.

12.19 Local Government and NGOs

12.19.1 In recent years, quite a number of NGOs -private voluntary development organisations- based largely on grants and assistances from external sources - have come up to cover almost the entire country. Management of all these NGOs, excepting a few set-up by religious orders, is in the hands of Bangladeshi nationals. They have come to cover disaster relief, education, health, children's welfare, care of the old and infirm, afforestation, environment improvement, conscientisation and even election monitoring and voter's education. Most of them are registered under the Society's Act; a few have been incorporated as non-profit making companies under the Company Act as well. In all cases responsibility for management and accounting are well defined and laid out under the relevant laws and by-laws as conditions for receipt of external support. Given the traditionally weak functioning of the local government bodies vis-a-vis rather resourceful operation of NGOs and their relative success in the fields of

education, health care and conscientisation in a few local areas, some seem like having an idea that NGOs may over years make the need for local government bodies minimal or even unfelt. In some local areas, seething conflicts as between the relevant local government body and operating NGO apparatus have also been noticed.

12.20 Supplemental Role

12.20.1 In the future course of development such perception of conflict may not have a room for serious consideration. NGOs in their resourceful and innovative operation in local areas may supplement efforts of the central and the local government in the relevant fields; they cannot, however, be projected or prepared for supplanting or substituting the formal bodies of the central and the local governments. In fields of health care and education, innovative processes and procedures developed by some NGOs may as well call for emulation and replication by the relevant bodies of both central and local governments. Consensus, based on assessment of needs, performance and resources need to be built up on canalising the efforts of NGOs and vamping up the roles of local government bodies in this backdrop. Discussions and deliberations across various fora and relevant organisations for example, in the recently formed government-NGO Consultative Committee will be called for to fine tune the calling from time to time in this regard.

12.21 Private Property Contractual Rights and Obligations

12.21.1 Use of the private enterprise as the main vehicle for development demands delineation and enforcement of (a) private property rights and (b) contractual rights and obligations expeditiously, firmly and at minimum costs to the parties or the disputants. As experience has it, scope and span of economic transactions amongst multitudes of private producers, suppliers and consumers cannot widen smoothly till these demands are met institutionally. The institutional components in this field are: (a) the laws defining property rights and contractual obligations and prescribing penal measures for their violations and (b) the administrative-judicial system enforcing these rights and obligations and awarding penalties for their violations. Knowledgeable observers in this field opine that the set of laws enacted till date and in force now, despite their need for some marginal modifications, is adequate. The major problem, however, lies in their enforcement. The administrative - judicial system seems to have wide scope to improve upon its present level of performance in this regard. The procedure followed and the pace maintained in enforcing this set of laws adjudicating disputes that arise in relation to them are cumbersome, time consuming and costly. Shortfall in enforcement is perceived as a weakness of the system and erodes public confidence on the system. This perception limits the span of *suo moto* acceptance of legal rights and obligations by a large number of economic transactors. It will remain yet another challenge for the leadership to reform the system and to account for speedier, firmer and economic enforcement and adjudication to limit if not, to remove, conflicts in the transaction process pursued by multitude of producers, suppliers and consumers. Commitment at highest levels of the executive and judicial organs of the state together with close monitoring and periodic target-oriented training of the relevant personnel seem to be in order to this end. For supporting newer and smaller producers, suppliers and users in this regard, setting up of small causes courts in selected urban centres is likely to be helpful also. Adjudication of small disputes among small but budding entrepreneurs expeditiously and economically makes the business environment beautiful for spurring small activists into larger ambits of innovation and production. Obviously, the magnitude of the problem of enforcement as a whole may appear somewhat awesome at the start. Initial success in this field, however,

will make the relevant role players to take their rights as granted and obligations invariably dischargable by the society. Following initial steps in a time-bound frame this realisation by the majority is likely to lessen down conflicts and extend the scope and the span of economic transactions in the free and primarily private enterprise system.

12.22 Modifications of Laws on Property Rights

12.22.1 The laws on property rights that need modifications, in order to meet the changed circumstances, call for an in-depth examination and delineation. This will be undertaken by the recently constituted law commission composed of legal experts and practitioners in the field. The work of the commission and implementative actions on its recommendations will be a continuous process.. In the interim period, a number of areas, however, may be identified for immediate attention and correction for exuding confidence all around and spurring economic activities across various classes of producers and entrepreneurs spearheading the free enterprise. These areas are:

- a. land tenancy and tenure, particularly in respect of definition of family/household, agricultural use and agriculturist, subsoil or subterranean rights of 'maliks' (owners), cognisance of offences and penal provision for violation;
- b. vested lands and properties in the plains and common land in hill districts and tribal areas;
- c. copy rights, particularly in relation to the Berne Convention 1954, patent rights vis-a-vis the Agreement on Trade Related Aspects of Intellectual Properties (TRIPs), administered by the WTO and penal provisions for violations;
- d. insolvency and liquidation of business firms and industries, particularly, in relation to jurisdiction, cognisance, and expeditious processing and disposal;
- e. execution of decrees in relation to money suits;
- f. protection of minority shareholders of public limited companies and employer-employee relations in formal or organised sectors;
- g. strikes and lockouts and civil commotions; and
- h. unfair or inequitable access to or treatment by public utilities.

12.23 Marketisation and Control of Private Property

12.23.1 Earlier, in the heat of the drive at development based primarily on collective efforts and the public sector, the emphasis, clearly unexpressed though, was on the control of private properties. Recognition of the people as owners and controllers of the instruments and means of production as in the constitution, in the current context of marketisation should be understood as an enabling provision for using private property rights as an effective spurrer of production and commerce i.e. promoter of `constant increase of productive forces' throughout the country for the benefit of people as mandated by the constitution. This understanding seems to have already converged out of deliberation within major political parties. The labour in the organised sector, however, still seems to remain largely outside this understanding.

12.24 Administration of Criminal Justice

12.24.1 Apart from the laws relating to property rights and contracts, administration of criminal justice is another conduit for resolution of conflicts amongst individuals. In recent years as a litany of the neglect and partisan administration in the past crimes did not decline. The crime combating machinery of the government has definite scope for improving upon their present

level of performance. Socio-economic development cannot be accelerated in a situation pegged by frequent and widespread crimes and criminality. Observers point out that the current crime situation is yielded by (a) eroded values; (b) inadequate and inequitable opportunities for livelihood and social mobility; (c) anticipation of criminals based on past experience that criminality is condoned for political partisans; and (d) loss of confidence in the establishment. Erosion of values is partly the resultant of emphasis on individual effort or private enterprise propelled by forces of greed and profit. There is no denying that greed and profit are the very forces that propel private enterprise. In a value system conducive to private enterprise, greed is satisfied and profit earned by savings, hardwork, and creativity, and not by peddling of patronages centring around influence over, and access to the power that be at various levels of the society or the government. In this context, greed and profit-centred values need to change emulating of virtues of austerity, hard work and creativity. Seeming erosion in current values may thus be corrected by including, sustaining and cherishing these positive elements of the free enterprise system. Such an acquisition may come over time through the educational system and, following cues and examples given by leaderships in respective ambits of production and management, may enter into the cultural norm of the society as an important constituent.

12.25 Ad-interim Steps

12.25.1 In the interim period, however, a number of steps seem to be in order for attaining and sustaining equal opportunity and social mobility. These are :

- a. quickest possible spread of primary education and health care;
- b. relatively more emphasis on scientific and technological education and training;
- c. merit-based and need-blind admission into higher educational and training institutions followed by need-based extensive and full financial support by central and local governments and private bodies and endowments;
- d. depoliticised merit-based affirmative recruitment, and performance-based promotion and deployment in government and parastatals and other organisations receiving public financial support or lawful recognition;
- e. equitable access to public utilities and credit institutions; and
- f. enactments enjoining, promoting, and compelling non-discrimination on grounds of gender, religion, race or political affiliation in all public and private organisations.

12.26 Role of Political Leadership

12.26.1 Confidence in the establishment may be sustained and cherished by the administrative-judicial system. The process is likely to be accelerated through provision of positive cues by the political leadership both within and outside the government. Within the government, the political leadership should always encourage dispensation and decision-making within the formal structure and following the formal procedure of the government. Informal structures and procedures may be used to supplement the formal ones - not to supplant them as has been the case in the past. All concerned may note, loudly and clearly that if in the process of governance informal structures and procedures supplant the formal ones, the state as an organisation, as the theory has it, ceases to exist. Likewise, the political leaderships outside the government has to be conscious of the societal requirement to correct the process of governance as constructive critics, and not to supplant it in their drive towards political ascent and power.

12.27 Impartial and Fair Dispensation

12.27.1 Impartial and fair dispensation by the administrative and judicial systems without fear or favour is a major building-block of public confidence. An apprehension of partial or unfair dispensation may make an accused, even if he is innocent, flee off as a fugitive or drive him out of the society as a rebel. Similar apprehension will encourage people at various levels or local areas to dispense out immediate justice as perceived by them without taking resort to the institutional course. The other important building-block is expeditious dispensation. Inexpeditious and cumbersome dispensation tantamounts to denial of decision or service desired by the people from the establishment. This makes them avoid and ignore the establishment and, at times, to take law in their own hands, thus undermining the establishment. Making dispensations and decisions expeditiously at all levels need, therefore, be aimed at as a conflict-preventive measure.

12.27.2 Three Needed Steps: At least three steps seem to be in order in transforming the administrative-judicial system in the right direction. First, as mandated by the constitution (article-77), the office of ombudsman should be set up. With powers to investigate any action taken by executive organs of the state, this will provide an important input to make the decision-making in the government appropriately transparent and create ethos cherishing accountability and responsibility in public service by all public servants and authorities. Second, parliament may expeditiously enact laws regulating service conditions of persons in the service of the republic as mandated by the constitution (article-133). Till such time an appropriate legislation follows, the constitutional recognition of the traditional government servants as persons in the service of the republic, dispensation of services and decisions by them may not be as impartial and fair as desired. Needless to mention, partiality and unfairness in this process are likely to generate discontents, protests and other manifestations of social conflict. Third, the most important conduit for resolving inter-personal and inter-body conflicts is an independent judicial system. At levels where adjudication by the judicial system touches, affects and benefits the multitudes, constituents of its independence, at times and on occasions may be lacking. To obviate discontents and conflicts arising as such, the founding fathers enjoined in the constitution separation of the judiciary from the executive organs of the state (article-22). Despite rhetorics over years, this has not been done in relation to the lower judiciary. The task of separating the judiciary from the executive organs of the state warrants completion for sustaining amity and consequent stability of the societal frame.

12.28 Corruption

12.28.1 The administrative and judicial systems are usually perceived as responsible for combating corruption. Corruption is a crime committing of which results through collusive arrangement between committing persons and persons legally and morally responsible for combating such crimes. When persons legally responsible for combating the relevant crime abets such committing they also commit the same or similar crime. Viewed as such, prevalence of corruption is indicative of not only scale commission of crimes but also erosion of the state apparatus legally and morally responsible for combating crimes and punishing the criminals. Corruption, as of now, is generally believed to be quite widespread. It is perceived as a societal disease impairing the vitals of the society. This, in turn, is ramifiable in obfuscating and limiting the process of socio-economic development of the country. Such an impairment and obfuscation make people lose confidence in the system and breed conflicts as between those

who are parties to and gainers from corruption and those who are not and as such stand to suffer or lose from corruption.

12.28.2 Categories of corruption: Analytically, corruption may be grouped into four categories. First, corruption may creep into the formal decision-making process of the state at high levels. The constitution, the laws in force under the constitution, the state organs and the authorities set up under the constitution or laws under the same, delineate the formal structure and the procedure for decision making in the state. If in this process informal structures and procedures supplant the formal ones, vital state decisions may not be taken in public interest. Decisions in such cases are either reflective of abuse of formal power or extension of authority not required or warranted under the relevant law. In such cases state decisions are the resultants of access, influence and patronage and serve vested interests of groups or quarters of the decision-makers. As theory has it, these are the cases of state corruption or corruption at high levels. Second, corruption creeps in administering regulations and providing services in non-economic fields of state activities or operations. This may be categorised as departmental corruption in non-economic fields or transactions. Undue and underhand payments for correcting land records, servicing or avoiding warrants and summons issued by lower courts and quasi-judicial authorities, issuing passports, admitting patients into hospitals or students into better schools or colleges and getting driving licenses or fitness certificates for vehicles are examples of corruption of this category. More often than not, such payments are made to expedite the process of certification in respect of conformity with the relevant regulation or receiving the needed administrative service. These do not result in giving benefits or services which the underhand payers are not entitled to; these merely expedite or smooth out the arcane or otherwise ineffective administrative process. The resulting transaction costs in such cases of corruption is relatively lower. Third, there are cases of under-hand payments to departmental decision-makers for economic transactions benefiting the payers at the cost of their competitors or peers. These may be categorised as departmental corruption in economic fields or transactions. Making specifications of a set of work or a plant in conformity with advantage to a chosen contractor, supplier or manufacturer in preference to others, award of contracts for or work orders to those having under-the-counter connections, false certification of works done or materials received are examples of corruption of this category. In most cases such payments yield direct pecuniary benefits to the payers to which otherwise they may not be entitled. The transaction cost involved in such cases is relatively high. As observers perceive, such cost usually accounts for a portion of pecuniary benefits accruable to the first party to the collusive arrangement. Finally, corruption manifests in avoidance of lawful pecuniary obligations and liabilities in collusion with those entrusted to enforce or adjudicate these. Evasion of tax payment, over-invoicing of imports and under-invoicing of exports, usurpation of other's properties, concealment and use of public properties for personal use, etc., are examples of corruption of this kind. In one way or other, these are cases of misappropriation of public resources or funds.

12.28.3 Corruption at High Levels: Of all these, corruption of the first category i.e. state corruption seems to be the most destructive. Corruption of this type, as already indicated, manifests in taking basic or vital decisions of the state on considerations other than public interest. Constitutionally, all powers of the republic belong to the people and their exercise on behalf of the people has to be effected only under and by the authority of the constitution (article-7). Exercise of these powers has to be thus in, and in furtherance of public interest by constitutionally defined authorities following constitutionally laid down procedures. Considerations other than public interest in decision making in such cases or levels may centre

round personal or group interest. Serving personal interest may yield pecuniary benefits to the decision-maker; serving group interest may strengthen the position of the decision-maker in the group to the detriment of others outside the group. The basic decisions emanate out of the well-defined organs of the state: the executive, the legislature and the judiciary. In case of Bangladesh, a sudden announcement of an erstwhile Minister for Foreign Affairs recognising the government of an intermittent rebel group in Cyprus or appointment of a junior officer as the head of our permanent mission in New York on the basis of his relationship with the head of the government in the 1980s or giving away unaccounted amounts to MPs of the ruling party out of the Prime Minister's Relief Fund as was done in the past may be cited as examples of state corruption originating from the executive organ; legislation providing for tax-exempt import of automobiles for the law makers themselves borders on being an example of not a very good law originating from the law makers themselves. Formation of a special tribunal outside the normal courts for trying persons allegedly committing offences under the ordinary law of the land as was done for the so-called Agartala conspiracy case and willing association of judges at the highest level of the judiciary in such a kangaroo court in the late 1960s may be cited as the other example of state corruption pertaining to or involving a few members of the judiciary. If basic decisions of the state by the executive, the judiciary or the legislature are taken on personal or group considerations, or sold to the highest bidders, then the very social contracts underlying the formation of the state are violated and the public trust reposed on state authorities or organs, betrayed and eroded. Entrenched behind the power of the state and its resources, corruption of this category is the most difficult to combat and contain. Despite the difficulty, given its serious destructibility, this type of corruption calls for utmost attention of all concerned.

12.28.4 Corruption in Non-economic Fields: Corruption involving administering regulations and providing services in noneconomic fields may be considered from the view points of both the collusive parties. From the side of those administering the relevant regulations and services, (a) low remuneration package (b) ineffective hierarchical supervision and (c) inadequate public vigilance are the propelling inputs into this collusive arrangement. From the side of those gaining or benefiting from administration of the relevant regulation or provision of the needed service (a) scarcity and consequent large size of the perceived or the realised value accruing from affirmative administration of the relevant regulation or expeditious receipt of services needed, (b) mad rush for competing out other potential receivers of benefits or services, (c) absence of group unity or action against unethical conduct of the relevant administrators, regulators, service providers and peers and (d) inadequate public vigilance are the originating elements. To combat corruption of this category, these propelling and originating elements need to be controlled or eliminated. Of these one important step will be to increase the remuneration package of the administrators of regulations and providers of services. In case of corruption in such a field, social cost (legal fees payable to the state + payments made to the collusive functionary for obtaining a service or a regulatory benefit) is more than the prima facie legal cost. A part of this divergence may be captured for increasing the formal remuneration package of the relevant regulators and service providers while giving the relevant benefits or service in a corruption-free way. This may be supplemented by decreasing the bloated size of the relevant organisation. The other important step will be in terms of reducing the scarcity value. This may be done by dismantling the unneeded regulation and increasing supply of the needed services. Opening of a clinic in the capital city for instance, may be made to require registration by one authority instead of permission from as many as 3 as is reportedly the case now. All citizens except insolvents and fugitives from the law may be made entitled to passports as a matter of right. Likewise, more schools, hospital beds and street lights may be set up in areas of scarcity

under well publicised programmes. Admission into publicly supported better colleges may be made contingent on merit alone encouraging the gifted students to converge to centres of excellence as a matter of course as is the case in Singapore.

12.28.5 Corruption in Economic Fields: Similarly, corruption involving economic transactions may be considered from the sides of both supply and demand. Underhand payments or gratifications may be demanded by a departmental decision maker only when he has sizeable control over pecuniary benefits of the potential gratification provider. By pursuing (a) vigorous deregulation, (b) expeditious privatisation, and (c) promotion of competition in all sectors of production and consumption in appropriate cases or areas such a position of control can be sized down to canalise departmental operations into promotion of economic activities. Likewise illegal gratification may be supplied or provided by a producing or consuming person or unit outside the government when such a supply is likely to (a) yield high pecuniary benefit, (b) goes unprotested by competitors and (c) is not noticed by the relevant supervisors of the gratification receiver. Promotion of competition in the relevant ambits of production and consumption coupled with internal and external vigilance on transparency or otherwise in decision-making obviously are the steps that are in order in this respect.

12.28.6 Other Corruptions: Corruption involving avoidance of lawful obligations and liabilities is indicative of inadequate adherence to the rule of law and prevalence of elements of a weak state or a banana republic. In such cases, avoiders reach collusive arrangements with the administrators and adjudicators of the relevant laws defining and executing pecuniary obligations and liabilities. Here again, from the side of demand (a) poor remuneration package, (b) lack of professional pride, and (c) inadequate internal and external vigilance are the collusive elements. From the side of supply, (a) ability to influence the enforcing agencies, (b) non-imposition of tax on unhonoured pecuniary liabilities and restrictions on further asset acquisition before meeting lawful pecuniary obligations and (c) inexpeditious adjudication by the relevant courts contribute to the miasma. To make the matter worse, the malaise has its lopsidedness: mostly the rich avoid meeting lawful obligations and liabilities while the poor face stiff enforcement. The widespread loan default in development financing institutions and nationalised commercial banks relative to default of small agricultural borrowers of the 2 agricultural development banks and almost no default in the Grameen Bank is indicative of this. The recent infusion of additional capital in the nationalised commercial banks through bonds guaranteed by the government has shown acquiescence of the state apparatus to absorb the loan default of comparatively big borrowers through permanent transfer of the burden on the shoulders of common tax payers. The legislation debarring candidacies of the loan defaulters for election to the local government bodies and non-imposition of similar restrictions on candidacies for election to the parliament is indicative of a not-very-well-appreciated discrimination breeding discontent in the society. To combat corruption of this category, the contributing factors both from the sides of supply and demand, need to be corrected. Commitment of the government in particular and the society in general will be the basic propellers to account for the needed corrections of the norm and associated circumstances.

12.28.7 Syndication of Corruption: As ardent observers in the field have it, corruptions in all these areas tend to acquire elements of syndication. Syndication in collusive crime committing yields benefits, pecuniary or otherwise, across hierarchies of relevant organisations responsible for providing services or enforcing cleansing in accordance with law. Needless to say when syndication covers the relevant segments of such an organisation, corruption becomes an inseparable procedural element in it in-as-much as it is supported and encouraged across the

relevant hierarchies. This makes it very difficult to combat. In such a situation, the sincere and honest in their minuscule minority fades out as nonconforming and inefficient. This means, in other words, corruption needs to be confronted at the beginning and, in the inherited situational context, right now.

12.28.8 Public Awareness and Vigilance Against Corruption: Ultimately, public awareness and vigilance turn out to be the price of a clean and corruption-free state. While building up public awareness and vigilance as components of a tradition sustaining and promoting democratic governance may take time beyond a life time, freedom of information and media and independent judiciary have much to contribute in the interim span of time. Fortunately for Bangladesh, the supreme court seems to have come up with effective guardianship in this respect. The recent justifiability of judicial proceedings against a former president and a number of ministers on charges of corruption irrespective of their future outcome in terms of innocence or guilt, as upheld by the higher judiciary of the country has set up a tradition of adjudicable public accountability at highest levels. Freedom of press, following recent amendments of laws relating to press and publications and special powers of the government and setting in of an environment of tolerance for views have also come as important bases of vigilance against such corruption. These need to be followed up by an enactment for and in favour of freedom of information entitling and enabling the citizenry to obtain information on matters relating to personal or public interest. Additionally, in the light of experience of other countries, full verbatim recording of deliberations and decisions of meetings of the cabinet, its subcommittees including the purchase committee and taking these outside the cover of secrecy or confidentiality (except in case of security matters) will be helpful. Such procedural reform will impart justifiability of executive decisions following the principle of open adjudication pursued by the judiciary. Formation and operation of an ethics committee in the parliament along with continuous functioning of standing and adhoc committees and open public hearings and deliberations in them will provide restraining elements against possible corrupt conduct at all levels. In addition to the public accounts and public undertakings committees, there should be a standing committee on finance and budget in the parliament. Arrangement should be made for holding more frequent sessions of the public accounts committee and providing adequate staff support for investigation and analysis. All budgetary measures comprising revisions in budget passed and supplementary appropriation should be processed through the committee on finance and budget deliberating and deciding through hearings open to the public. Needless to say, the legislative control over the budgetary expenditures of the executive may become meaningless in functional terms if statements of such expenditures are placed before the parliament after these have already been incurred as has been the inherited practice. To an extent these measures will desirably limit perceived interference of the legislators into executive actions and decisions at national, regional, and local levels vitiating the lawful procedure based on the principle of separation of powers for discharge of executive responsibilities at various levels of the government.

12.28.9 Two Other Steps: In addition to the measures specific to the type, at least two other steps of general nature and to an extent, overlapping with others already mentioned, need to be delineated to combat corruption. First, the political leaderships at various levels may provide cues to the bureaucracy and the society for discharging duties and responsibilities honestly and legally. Such cues should also encourage the political activists and the people to adopt the desired values sustaining and cherishing legal and moral incorruptibility. In this context one may cite examples of political leaderships in Singapore and Malaysia. It needs to be noted, corruption in its various categories will be impossible to combat successfully unless the political

leaderships at various levels of the government can and actually give cues in the right directions. Second, following provision of conducive cues from the political leaderships, the risk of the parties involved in corruption has to be demonstratively made higher than the pecuniary or other benefits accruing to them from the collusive arrangement. This is largely the responsibility of the administrative and judicial systems of the country-having a large scope to improve upon the current level of performance.

12.29 Gender Question

12.29.1 In recent years, questions centring round gender equality have become important and demand to be answered expeditiously. Women comprise 48 percent of the population of the country. Of this, 86 percent live in rural areas. The average age of women at marriage is less than 18 years; on average a woman produces four children in her life time. Social norm against remarriage of widows coupled with an average age gap of 10 years between men and women in wedlock result in 90 percent of widowed population being females. Likewise, women comprise 94 percent of the divorced population of which 54 percent are below 24 years of age. As of now, participation of females in labour force amounts to over 12 percent; in the manufacturing, female participation is over 34 percent; and over 20 percent of all households of the country are functionally female headed. Constitutionally, women in Bangladesh have equal rights with men in all spheres of the state and of public life; they cannot be discriminated against or subjected to any disability or restriction with regard to access to any place of public entertainment or resort or admission to any educational institution on grounds of being women; they are entitled to special provisions in their favour to be made by the state (article 28); they cannot be discriminated against in respect of any employment or office of the state (article-29). In addition to these fundamental rights, prevention of prostitution (article-18) and ensuring participation of women in national life (article-10) are constitutionally accepted as two fundamental principles of state policy. Further, guaranteeing of fundamental human rights and freedom and respect for the dignity and worth of the human person is adopted as a principle fundamental to the governance of the country (article-11).

12.29.2 Situational Considerations: Despite these constitutional rights and entitlements, women across both classes and religions, have quite a scope to improve upon their status and condition in terms of equality with men. If progress in this respect is not made or slowed down, conflict breeding out of gender inequality as already observed, will increase in intensity with fuelling from the borderless information media and fast changing economic circumstances. Specific to the conduits for making progress are the following considerations:

- a. Women's lives are organised, (particularly in rural areas) within a framework of biological, labour and social reproduction of a society in which management of female sexuality is central to the dominant male interest; in this frame high value is attributed to female sexuality; this makes females acutely insecure, requiring a cultural norm of isolation and protection to avoid possible female violation; in this cultural norm, a violated female irrespective of causes or manner of violation, is treated as a female fallen from virtue and left to earn her livelihood in any way she can; in this process, resort to the oldest profession or prostitution by her is acceptable without its being much stigmatic on male customers and patrons.
- b. Under changing economic conditions, the aforesaid cultural norm breaks down, a continuous deviancy from the acquired cultural norm about womanhood starts to win over degradation of women as human persons; to accentuate such a break-down, dynamics of those who break the norm, those who tolerate the breaking and those who

uphold the norm need to be assessed and understood; as is perceived such a breaking down has its class dimension; for the poor material or economic circumstances may make men encourage women to break the norm and come out of chains of isolation and protection.

- c. As women come out of isolation, veils and chains into a working and pulsating lives, they are likely to confront the 'double day' and consequently even 'double exploitation' through the interplay of gender and class relations; the prevailing gender relations do not usually release them from the primary responsibility for homestead chores even when and after they enter the formal work place or the job market. Thus an extension of female participation in male dominated work-world needs to be accompanied by changes in traditional codes of household duties enjoining amongst others, cooking of meals and rearing of children on females alone.
- d. Evidently, there is male bias in the set of family laws in force; women across both classes and religions have to struggle over their (i) inheritance rights in natal family; (ii) rights to choose husbands; (iii) sexuality and pregnancies in marriage; (iv) rights to the dowry which usually accompanies her at marriage; (v) property rights in the event of husbands' death; (vi) rights over property and to subsistence in the event of divorce or desertion; (vii) custody rights over children, their subsistence and education; and (viii) procedure of separation and divorce. The laws relating to nationality in marriage, equality of pay, maternity leave, protection against sexual harassment at work places, etc., are either absent or unenforced.
- e. Equality apart, research across countries in recent years shows that female education has marked negative relation with fertility and infant mortality and strong positive relation with life expectancy; likewise schooling is found to have important influence on choice of number and quality of children; these are effects that influence long term growth of a society. Specific to Bangladesh, equality of women with men is likely to have positive effects on poverty alleviation. The female headed households constituting over 20 percent of all rural households are about the poorest reflecting widowhood, divorce and abandonment, all virtually uncared for by the society.

12.29.3 Policy Measures: These five considerations point out as many mutually reinforcing policy measures fraught with elements of social and economic conflicts:

- a. Breaking the cultural norm centred round high valuation and consequent protection of female sexuality: this is likely to create and even intensify conflict with the fundamentalists and uneducated male chauvinists; widespread liberal arts education, female literacy and collective effort by conscious and educated women to break the traditional gender codes are likely to limit such conflict down to its ultimate winning over by the forces favouring gender equality;
- b. Providing women access to power through access to material resources: to this end some definite ways are: (i) credit support following the principles developed by the Grameen Bank and some NGOs working in the field; (ii) adopting a system or norm for joint registration of properties by married couples during marriage; (iii) reform towards equitable inheritance law; (iv) affirmative female employment policy; and (v) election of women members of the parliament and local government bodies (against seats reserved for women) by universal adult franchise of the relevant constituencies;
- c. Changing the traditional gender code of division of duties of males and females: this can be done through education, orientation and conscientisation; NGOs working in the field have already shown ways following which an initial and widespread break-through can be made; public debates, open dialogues and affirmative actions by women

organisations are likely to have positive effects; opening up all modes of employment in the government and parastatals to women is likely to provide the needed pilotage in this regard;

- d. Making appropriate reforms in laws relating to family, inheritance, parental responsibility, work place equality and nationality in marriage; these have to be taken up by the parliament in conformity with the constitutional provisions and mandates; and
- e. Extending education and health facilities with an effective and affirmative bias towards women: to this end, the recently adopted subventions and supports to female education in secondary schools and physically extended health care and family planning facilities are steps in the right direction; these steps need to be strengthened through curricular reform and improvement of the health and related service delivery system.

12.30 Structural Adjustment

12.30.1 In the economic realm, Bangladesh has already set its course on structural adjustment. The starting point on this course - macro-economic disequilibrium - has largely been corrected and already been almost passed. At this time, restructuring calls for (a) expeditious deregulation and privatisation in keeping pace with trade liberalisation and reform in the financial sector; (b) increasing savings and investments by linking them to high returns and profits; (c) decreasing the bloated size of government and parastatals and state owned enterprises and (d) increasing exports through more efficient use of labour. These are fully consistent with broad based growth sharable across all income groups and capable of reducing poverty over time. In the short run, programmes aiming at these objectives have elements of conflict; existing distortions and privileges are likely to be defended by politically powerful groups, e.g. protected industries and organised and politicised labour; domestic demand-reducing measures like withdrawal of subventions and subsidies are likely to hurt the poor; cuts in public spending at least in the short run may limit down social services, transfer payments and safety nets. Given the commitment for adjustment, these elements of conflicts may be sized down in terms of adverse effects, by carefully designing the adjustment programmes in the light of poverty profile and its short term indicators. These profile and indicators may be used to establish a base line for monitoring poverty so as to associate the structural adjustment programmes with the socially corrective measures aimed at target groups directly and by widening access to the relevant public services.

12.31 Areas of Attention

12.31.1 Specifically, three major areas call for attention in this context. First, reduction in the size of the government will call for shaking off redundant employees, mostly at lower levels and freezing the size of organisations in areas where marginal productivity is low or zero (e.g., defence and regulatory areas after some points). The pains in the process may be turned into gains by encouraging and attracting the throwouts and fresh employment seekers into directly productive self-employment through opening up access to technology and credit and cherishing higher productivity through increasing the size of return envelope for the remaining productive ones. This can be facilitated through reaching an understanding among major political parties and labour groups accepting structural adjustment as an economic *sine qua non* in the present situational context. Second, the problem of landlessness and assetlessness has to be addressed in the short and medium terms. The long term growth potential may not be justification enough to postpone ameliorative measures at the initial stages. At these stages, extensive investment in flood control and irrigation is likely to increase the labour component of agricultural production. In the process, intensity of land utilisation coupled with the spread of water-seed-fertilizer

technology will increase farm employment. Added to that will be required firmer enforcement of the provisions of Land Reform Act, 1984, prescribing the shares of the landlord and the sharecropper. At the same time, opening up opportunities for off-farm employment and providing access to credit and technology to this end will have to be targeted in order to obviate discontinuity in the social frame in the country side. And third, investment in social sectors will have to be increased. To an extent this will be possible through reduction in or freezing of unproductive expenditures in the government and parastatals. But even then, it needs to be noted, investment in social sectors can be increased sizeably only on the basis of deep political commitment of, and firm consensus amongst major political parties and interest groups.

12.32 Dictates of Comparative Advantage

12.32.1 In an opened-up competitive economy, following the postulates of structural adjustment, production for consumption within and export abroad can continue and expand on the strength of comparative advantage. Potentially, we have 3 elements of such advantage: (a) gas-based cheap power; (b) abundant and cheap labour; and (c) efficient and economic management. For keeping unit price of power lower in comparison with that charged, say, in Myanmar, India, Nepal or Srilanka, enormous system loss that pervades power distribution in this country has to be arrested. This will bring the policy makers in serious conflict with the robbers and suckers of the system-unscrupulous users of power and predatory workers. Given the importance of power and its required cheap availability, an iron-fisted action is called for to eradicate the malaise. Any softening down in this regard will pose a threat to the nation's survival in the current globalised context. Likewise, despite rhetorics and platitudes poured out or used in the realm of labour relations, economic necessity will require us to keep labour cost in relation to a unit of production comparatively lower than that in other competitor countries. Given this starting point, wages of labour should be monitored and promoted so as to allow increase in them only in sync with increase in labour productivity. To attain and sustain societal success on this front, consensus will have to be built up among the major political parties and labour groups around the aforesaid postulates or principles. To this end, segmented collective bargaining within the bounds of the relevant laws instead of politicised control or manipulation at national levels as is the practice now, should be encouraged. This will yield higher wages in sub-sectors as will be permitted by increase in productivity without disrupting cost of production elsewhere. Considered currently, unquestionably management in private as well public sectors has wide scope to improve upon. This can be done over time through revamping the education system in terms of directions as well as quality of management. The newer and needed directions may include extensive facilities for turning out more MBAs and BBAs and lesser MAs and BAs in literature and culture, for example, emphasising newer fields like process engineering, construction management, quality assurance, technological development, informatics and even educational and health administrations. Besides a management culture based on hard work, sincerity, creativity, innovative attitude and hands-on approach to problems at hand need to be created, sustained and cherished. Various professional bodies may be encouraged as catalysts in the process. The advantage that a manager in Bangladesh equally productive on the floor as one in a developed country, for example, can be hired and retained at one-fifth of the modal cost in the latter has to be secured and turned into a continuous process of making profit and expanding production within and without.

12.33 Caveat in Population Control

12.33.1 Nutrition and Education: The country has already attained marked success in population control measures. This success is not, as observers in relation to experiences in other developing countries point out, without caveats. First, birth rate accounted by affluent families has gone quite down in relation to that accounted by the poor. One result of this is manifested in malnutrition of the majority of the nation's children. As an estimate has it, out of every 4 children born this minute in Bangladesh, given the continuance of the current nutrition pattern, only 1 will be physically and mentally healthy person in 15-18 years from now; the remaining 3, for want of nourishment and continuance of wastage will be physically and mentally handicapped or retarded. The possibility of the nation's becoming a collection of retarded lesser beings in its majority looms rather large. This needs to be attended through delineating long term general programmes as well as short-term target-oriented measures. Second, more children produced and reared by the poor seems to have put up a social demand on continuance and extension of the public education system. As experience has it, cost-based education in a private system mostly meets the needs of children of the relatively affluent. In this context, while encouraging setting up and operation of private schools and institutions for higher education, extension of education by the central and local governments and increasing their utilisation for overall human resource development will have to be provided for.

12.34 Promotion of Social Tolerance

12.34.1 Conflict in the process of socio-economic development is generated out of social intolerance as well. As tradition of tolerance needs to be created, sustained and cherished to accelerate and stabilise the process and as experience has it in other countries, educational system perhaps provides the most significant input for creating ethos sustaining and cherishing tolerance, freedom of thought and non-conforming attitude required to break through the frontiers of knowledge and technology. The inherited emphasis on madrasha education, in relation to religious education otherwise pursuable by other religious communities on their own and consequently, at the expense of scientific and technological pursuits in general, may be latent with elements of discomfort in this context. The education system on this ground needs moulding and reforming. In the absence of liberal arts based education and science-centred pursuit of knowledge, the system in its parts may degenerate into springboards of fundamentalism, intolerance and consequent conflicts. All relevant role players - politicians, educators, social opinion leaders and intelligentsia will do better by debating these issues for arriving at a consensus.

CHAPTER XIII

AGRICULTURE WATER RESOURCES AND RURAL DEVELOPMENT

Agriculture

13.1 Introduction

13.1.1 Agriculture plays a vital role in the growth and stability of the country's economy as is indicated by its share in GDP, employment and export earnings. At present, it accounts for about one-third of GDP and employs about two-thirds of the labour force. Exports of agricultural primary products accounted for about 12 per cent of total exports in 1996/97 and if exports of agriculture based intermediate and industrial products (leather, jute) are taken into account, its contribution comes to nearly 24 per cent. If the newly emerged ready-made garments which contribute as much as 51 per cent of export earnings is viewed in domestic value added terms, agriculture is the main source of export earnings of the country. Apart from these, the role of agriculture is unique for food security and nutritional status of people. However, as industrialisation proceeds, the output of agriculture will represent a declining share of the gross output of the economy while the share of manufacturing and services sectors will increase. Although the contribution of agriculture to the economy is likely to decline, it will continue to be the single largest contributor to income and employment of the rural population in the foreseeable future.

13.1.2 Crop agriculture represented a share of about 24 per cent in total GDP and about 73 per cent in agricultural GDP during 1996/97. Within crop sub-sector, foodgrain, particularly the rice crop dominated the country's agricultural scenario in respect of both cropped area and production claiming a share of 74 per cent and 54 per cent respectively in 1996/97. Thus, development of rice crop has substantial impact on the sector's performance. There has, however, been shift in the composition of agriculture over the past few years as indicated by gradual decline in the share of crop agriculture and increase in the share of non-crop agriculture (NCA) which consists of livestock, fisheries and forestry. The NCA, particularly the livestock and fisheries, have, of late, taken off largely through private sector initiatives showing robust growth of 7.98 per cent and 8.60 per cent respectively in 1996/97. Hence, it is envisaged in the Plan to develop an integrated agriculture including crops, along with food management, livestock, fisheries, forestry and environment through more efficient utilisation of available land and water resources for sustainable agricultural growth.

A. Crops

13.2 Review of Past Performance

13.2.1 Bangladesh made steady progress in crop agriculture in the post-Independence period. The cropping intensity increased from 148 to 179 per cent and foodgrain production almost doubled during the period from 1969/70 to 1992/93. Contributing about 75 per cent of the value added, crops form the largest sub-sector of agriculture. Rice is the dominant crop and largely determines the rate of progress in the agriculture sector and to a significant extent, that of the non-agricultural sectors. It covers about 75 per cent of the cropped area and accounts for about 70 per cent of the value of crop output. In fact, the entire growth in crop production is due to the growth in foodgrain production, particularly rice. Yield of other non-cereal crops such as pulses, oilseeds and vegetables almost stagnated, while that of wheat did not increase markedly.

13.2.2 In 1993/94 and 1994/95, foodgrain production declined as a result of depressed prices and natural disasters, particularly floods and droughts in the north-west, which is the country's surplus grain production region. The average foodgrain production during these two years dropped to 18.71 million metric ton (mt) from the average of 19.31 million mt during the preceding three years from 1990/91 to 1992/93. While drought conditions prevailed during these years, the decline in rice production in 1993/94 also was due to both damages by floods and the farmers' response to the fall in the price of rice in the preceding year as evidenced by more than 4 per cent decline in fertiliser consumption, more than 2 per cent reduction in area sown and similar decline in irrigation command area. In 1994/95, total foodgrain production was only 18.17 million mt as against the expected production of 20 million mt. This trend started improving from 1995/96 with a foodgrain production of 19.14 million mt. The year 1996/97 witnessed an all time high foodgrain production of about 20.43 million mt. Foodgrain production, though continues to depend on the vagaries of nature, increased substantially over the years, following the introduction of high yielding varieties (HYV) and application of modern inputs like fertilisers and pesticides; but its dependence on weather continues resulting in fluctuations in production. Wide fluctuations in production leads to large instability in foodgrain prices having serious implications for household food security and also for the welfare of the people.

13.2.3 Production of jute fibre reached as high as 8.66 million bales in 1985/86. The production level declined to 4.92 million bales in 1992/93 and hovered around this level since then. Sugarcane production has remained more or less around 7.50 million mt since 1987/88. Production of potatoes has shown a steady increase. It increased from 0.89 million mt in 1975/76 to 1.47 million mt in 1994/95. Other crops like pulses and oil seeds have shown only marginal improvement nationwide. However, implementation of a crop diversification programme (CDP) during 1990-95 in 125 thanas gave promising results in terms of yield per hectare of maize, pulses, oilseeds, potatoes, vegetables, etc.

13.2.4 As regards performance of modern inputs, the irrigated area increased to about 4.00 million hectares in 1996/97 from the level of 2.65 million hectares in 1990/91. Ground water irrigation covered 68.5 per cent of the total irrigated area while the surface water irrigation was only 31.5 per cent in 1996/97. The ground water irrigation witnessed significant expansion during the last two decades. Use of chemical fertilisers increased from 2 million mt in 1990/91 to 3.02 million mt in 1995/96. Public sector seed distribution (mainly rice and wheat) occupies only about 5 per cent of the total requirements. The large part of the seed requirement is met by the private sector.

13.2.5 The reforms of the agriculture sector have been quite pronounced and visible. For over a decade, a wide range of policy reforms have been implemented in the agricultural sector. Few of these are privatisation of input distribution, withdrawal of input and food subsidy, import liberalisation and a broadening of the scope of private investment in agriculture. In recent years, the coverage of policy reforms in the agriculture sector has substantially expanded to include minor irrigation equipment, agricultural machinery, seeds and agricultural trade.

13.3 Fifth Five Year Plan

13.3.1 Sustainability of high yield and environmental protection remain the principal concern in recent years. Loss of soil fertility followed by unbalanced use of chemical fertilisers, lack of adequate quantity of water in some areas as well as their appropriate conservation and management are the major factors causing divergence between potential and actual output of

major agricultural commodities. Various studies indicate that the yield potential of the existing HYVs of rice is more than 4 mt/ha, whereas the average yield of most of the other varieties of rice is around 2 mt/ha. Major tasks during the Fifth Five Year Plan will be to address these issues. The specific objectives of the Plan will be to:

- a. increase productivity and real income of farming families in rural areas on a sustainable basis;
- b. attain self-sufficiency in foodgrain production along with increased production of other nutritional crops;
- c. encourage export of agricultural commodities, particularly vegetables and fruits keeping in view domestic production and need;
- d. promote adoption of modern agricultural practices in dry land, wetland and coastal areas;
- e. ensure sustained agricultural growth through more efficient and balanced utilisation of land, water and other resources; and
- f. encourage comparatively large farm to graduate into commercial farming.

13.3.2 Policies and Strategies : In order to achieve the objectives, the strategies/policies will be evolved and adopted to bring about necessary technical change. The following will be the specific policies and strategies:

- a. improvement of the quality of seeds, particularly HYV and hybrid seeds and increasing their quantity;
- b. development of modern, irrigated and least-risk agriculture with greater reliance on competitive markets through supply of agricultural inputs at low cost; making public investment more effective and keeping it limited to key areas as required to supplement private initiatives;
- c. strengthening of the agricultural research and extension systems in order to develop new technologies relating to crop varieties, integrated farming system, organic farming, improved agronomic and agro-processing technologies, and for diffusion of the proven technologies;
- d. development and dissemination of ecologically sound and sustainable technologies such as integrated pest management (IPM) techniques, and organic and bio-fertiliser use;
- e. increasing profitable production of minor crops and thereby maintaining a balanced crop production and improving the nutritional status of the people;
- f. development of suitable technologies in rain-fed, dry land and wetland farming system to enhance the productivity;
- g. restoration/improvement of soil fertility through better management of the organic matter of soil to improve yields of crops; towards this end, production and use of bio-manure will be encouraged;
- h. assistance to small and marginal farmers in forming groups and associations which can (i) enhance production and productivity, (ii) sustain agro-business enterprises on their own, (iii) absorb more credit fund and (iv) adopt/disseminate technologies;
- i. participation of NGOs in the agricultural development process;
- j. improvement and conservation of plant and genetic resources through collection and conservation of germ plasm;
- k. facilitation of access to markets and the promotion of efficient marketing system;
- l. formulation of integrated land use policy conducive to optimum use of agricultural resources;

- m. implementation of measures to cushion and minimise the damage to agriculture and rural economy brought about by natural calamities;
- n. development of the capabilities of rural women and the youth to contribute more to agricultural and rural development;
- o. restructuring of the existing institutional set-up to cope with the changed need;
- p. development of human resources through education, training and motivation;
- q. development and dissemination of appropriate location-specific and cost-reducing production and post-harvest technologies for reduction of post-harvest losses and the removal of transport bottlenecks; and
- r. adoption of policies and regulations that will ensure sustainable agricultural development;

13.3.3 Major areas of public sector promotional activities : The crop production strategy of Bangladesh will be based on the following central thrusts: (a) increased distribution of high quality HYV seeds by the public sector; (b) accelerated transformation into irrigated agriculture to increase and stabilise crop yields; (c) intensification of the cropping systems; (d) decreased dependence on draft power through mechanisation and bridging of the yield gaps in irrigated areas; (e) improvement of productivity and minimisation of production risks in the rainfed, wetland, high land and coastal farming system; (f) diversification of farming systems to take advantage of favourable agro-ecological conditions; (g) responding to changing consumer demands and developing a more sustainable agricultural system; (h) vertical co-ordination of the production, harvesting and marketing chain; and (i) strengthening of extension, research and other support services.

13.4 Crop Production

13.4.1 Projection of crop production during the Plan has been worked out keeping in view the production possibilities, agronomic consideration, availability of production inputs and farmers' accessibility to resources and willingness to increase production within the prevailing agro-economic condition. Emphasis will be put on increasing yield per hectare rather than increasing cropped area and shifting from local variety to the HYVs. The purpose of foodgrain production, in addition to attaining self-sufficiency, will be to provide nutritious food for the entire population.

13.4.2 Bangladesh is endowed with favourable climate and soils for the production of a variety of crops throughout the year. The winter crops are greater in number than the summer monsoon crops. The production of major and minor crops lost balance in recent years due to greater emphasis given on cereals, especially rice and wheat. The situation needs to be improved for balanced diet of the people.

13.4.3 The production of minor crops such as pulses, oilseeds, vegetables, fruits, spices, etc., is currently inadequate to provide required nutrition in the daily diet of the people. Such situation will not be allowed to continue. Accelerated production of minor crops, complementary but not competitive with major food crops production as per requirement for reducing pressure on cereals, will be pursued during the Fifth Plan period. This will improve the daily diet of the people, generate rural employment by intensive cropping with improved technologies, increase farm income and thereby increase the purchasing power of rural masses. It will also improve the balance of payments by promoting import substitution and export oriented crops.

13.4.4 Fruits and vegetables are important sources of minerals and vitamins and provide a part of calorie requirement in the daily diet of the people. They also provide most of the food roughage which contributes to prevention of disorder of digestive system. Besides, vegetables protein appear to be superior to animal protein. The nutrition status of the Bangladeshi diet is on a declining trend due to low intake of vegetables, fruits and spices. The increased production and intake of vegetables by the people will help compensate for debilitating nutritional deficiencies.

13.4.5 The foodgrain production in the terminal year of the Fifth Plan has been projected to be 25.12 million mt. Out of this, rice production is expected to be 23.40 million mt as against the production of 18.88 million mt in 1996/97. The estimates of wheat and other coarse grain production have been made at 1.60 million mt and 0.12 million mt respectively in the terminal year of the Plan. The projected production of important crops have been shown in Table 13.1

Table 13.1
Projection of Important Crop Production During Fifth Plan

(area in million hectare

and production in million m. tons unless otherwise noted)

Crops	1996/97 (Benchmark)		2001/2002 (Projection)	
	Area	Production	Area	Production
1	2	3	4	5
Rice	10.40	18.88	10.11	23.40
Wheat	0.71	1.45	0.70	1.60
Sub-Total	11.11	20.33	10.81	25.00
Other coarse grain	0.10	0.10	0.12	0.12
Total Foodgrain	11.21	20.43	10.93	25.12
Potato	0.15	1.85	0.16	2.43
Sweet Potato	0.05	0.50	0.05	0.66
Oilseeds	0.50	0.37	0.70	0.76
Pulses	0.65	0.53	0.78	0.85
Spices	0.15	0.33	0.22	0.50
Vegetables	0.25	1.45	0.30	1.82
Fruits	0.19	2.14	0.26	3.54
Jute (million bales)	0.51	4.87	0.57	7.24
Cotton (million bales)	0.04	0.10	0.11	0.26
Sugarcane	0.18	8.10	0.18	12.37
Tea (million kg)	0.05	54.00	0.05	60.00
Tobacco	0.03	0.04	0.03	0.04

13.4.6 Maize and other coarse grains: Maize is now considered as a substitute for both rice and wheat since it can be grown in all seasons. From maize one may get food, oil, fuel, and fodder and feed. The present yield potential is too low. It can be increased to the level of HYV wheat provided adequate demand is created and fair prices to the growers can be ensured. The genetic yield potential of maize is very high. Bangladesh Agricultural Research Institute (BARI) has already developed five high yielding medium duration maize varieties with grain yield potential of 5-7 mt/hectare, suitable for flood prone areas. The maize production is planned to increase by 250 per cent to 12,500 mt in 2001/2002 from the benchmark production of about 5,000 mt. Besides maize, other coarse grains consisting of barley, sorghum, bajra, and millets have considerable importance from the point of use of water resource and development of agro-industries. Considering the increased importance of these minor crops as supplementary food, cattle feed and industrial raw materials, increased production programme for these crops will be taken up during the Fifth Plan period.

13.4.7 Fruits vegetables and horticultural products: Environment in Bangladesh is quite rich for production of a large variety of fruits and vegetables. Some fruits such as mango, banana, pineapple, jackfruit, etc., have world demand. The main problem of fruit production is its seasonal nature. Year-round production variety is yet to be evolved. Special efforts will be made during the Fifth Plan to produce at least major fruits and vegetables on a year-round basis and commercialisation of their production through appropriate research and development programmes. At the same time, emphasis will be given on the qualitative and quantitative improvement of various fruits and vegetables production, including production of mushrooms, flowers, orchids and shrubs, etc., Production of fruits and vegetables has been projected to be 3.54 million mt and 1.82 million mt respectively by the end of the Plan period.

13.4.8 Potato : Potato is suitable as a security crop in times of rice shortages due to its high carbohydrate content contributing to improved food security. This is also used as a vegetable by various income groups of the country. Since it is a short duration crop, its increased use can reduce the pressure on rice and wheat. Considering the production potential of the crop, potato production is projected to grow to 2.43 million mt in 2001/2002. The increased production is expected to come from expansion in cropped area and increase in yield per hectare. To this end, true potato seed technology will be encouraged and adopted.

13.4.9 Sweet potato : Sweet potato is considered as a subsistence as well as a poor people's food. Hence, its production will be encouraged on marginal lands, homestead areas, road sides and elsewhere as a low input crop to ensure its continued availability to, and affordability by low income consumers. Sweet potato production is projected to be 0.66 million mt in the terminal year of the Fifth Plan.

13.4.10 Pulses: The pulses of Bangladesh comprise of six major crops, namely, lentil, khesari, blackgram, mungbean, chick-pea and pigeon pea. Cowpea occupies an important place in the Chittagong area. The cropped area and production of these pulses have been on the decline over the past few years mainly because of the increased emphasis on HYV rice and wheat. But pulses are very important because of protein supply to the human diet and nitrogen fixation for soil nutrition. Since improved technology can increase per hectare yield of pulses substantially, pulse production is projected to grow to 0.85 million mt in the terminal year of the Plan as against the benchmark production of 0.53 million mt.

13.4.11 Oilseeds: Vegetable oil from oilseeds are the main sources of fats in the average Bangladeshi diet. Its present level of consumption is only 25 per cent of FAO/WHO recommended level. Efforts will be made to increase oilseeds production to 0.76 million mt by the terminal year of the Fifth Plan. Groundnut, sunflower and soyabean have been included in this projected production. New seed varieties are being used in the defined area to avoid cross-pollination. Production of foundation and certified seeds of improved varieties and demonstrations of modern technology are important strategies to increase oilseeds production of the country.

13.5 Cash Crop Production

13.5.1 Jute: Jute is the major fibre crop of the country. Despite the relative decline in importance of jute in agriculture, potential still exists for the fibre to increase its contribution to the economy through productivity increases and diversification. The share of raw jute and jute goods in the total exports of the country has been declining but this still remains significant. In this situation, special measures will be taken during the Plan period to

encourage farmers to further intensify jute production in order to satisfy domestic and export demand. To enable jute to compete with synthetics, emphasis will be given to related agricultural and technological research efforts. The raw jute production is projected to go up to 7.24 million bales in 2001/2002 as against 4.87 million bales in 1996/97 through per hectare yield increase, availability of better quality seeds, improved provision of extension and credit support to growers.

13.5.2 Tea: Tea is one of the most dynamic agro-based, labour intensive, export oriented industries of Bangladesh. It plays a vital role in the national economy in both export earnings as well as in employment generation. Plantation and production of processed tea are the two main activities in the private sector. In the public sector, green leaf production was promoted through development projects implemented by the Bangladesh Tea Board. With the introduction of high yielding varieties, quality planting materials, timely application of production inputs and installation of modern machinery, tea has undergone further improvement and enabled Bangladesh to compete more effectively with other exporting countries. Increased production is expected to come from higher yields and by reducing tea vacancies now existing in the garden.

13.5.3 Tobacco: Tobacco is one of the important cash crops of the country. The crop grows well in sandy, well-aerated, well-drained soils and cool climate. Hence, it is grown as a rabi crop and most of the area is concentrated in the greater districts of Kushtia and Rangpur. Due efforts to expand tobacco cultivation since 1973/74, through support from big cigarette manufacturing firms, made it possible to achieve self-sufficiency in tobacco production by 1980/81. However, recognising tobacco's adverse effects on health, policies will be adopted to limit its production with gradual reduction of cropped area in favour of cotton and pulses. The production of tobacco has been projected to be 0.04 million mt by the terminal year of the Fifth Plan.

13.5.4 Cotton: Cotton has played a very important role in improving the socio-economic conditions of the farmers during the previous Plan period. The production has gone up from 45,800 bales in 1983/84 to about 1,00,000 bales in 1996/97. The yield of seed cotton per hectare has reached a reasonably high level; yet the yield of cotton in the country is low compared to world standards. The major constraints to increased production are inadequate ginning capacity and seed multiplication programme, insufficient expertise and material resources, inefficient system of management and ineffective extension and marketing organisation. Textile mills should encourage commercial plantation through co-operatives in suitable cotton belts. During the Plan period, efforts will be made to provide loans to farmers to ensure supply of improved seeds, fertilisers, plant protection measures, irrigation and credit facilities to the growers along with the practising of improved technologies in the cotton fields. The cotton production has been projected to be 0.26 million bales by the terminal year of the Fifth Plan as against 0.10 million bales in 1996/97.

13.5.5 Sugarcane : Sugar is the country's most important agro-industry and sugarcane is one of the important cash crops. Sugarcane is grown as a 12/15 month crop in a two year rotation with aus rice crop during the monsoon season followed in the dry months by oilseeds, wheat, or vegetables. Sugarcane yields in the country are low by world standards and the quality is poor. The average yield of sugarcane is about 6.1 mt per hectare with a sugar recovery rate of 8-10 per cent. Sugarcane is grown on about 0.18 million hectares of land. Of this, about 0.95 million hectares are in the sugar mill zone areas and the rest in the non-mill zone areas which produces sugarcanes mostly for making gur consumed by the rural people.

Research efforts will be strengthened to raise yield per hectare through varietal improvement, better management of water resources, fertilisers and other inputs, improved cropping systems and development of sugarcane delivery system from farms to mills. Considering the past consumption trend, milling capacity and possible growth rate of production, sugarcane production is projected to be 12.37 million mt in the terminal year of the Fifth Plan as against the benchmark production of 8.10 million mt.

13.5.6 Crop diversification : Bangladesh is endowed with a favourable climate and soil for the production of a variety of crops all the year round. Thus, ample opportunities exist for crop diversification balancing the production of major crops with that of minor crops. The minor crop production has substantial potential, if seasonal fallow land is brought under cultivation with seed-fertiliser-irrigation technology packages. Crop rotation, i.e., exhausting crops followed by recuperative ones, shallow rooted crops by deep rooted ones, legumes followed by non-legumes, etc., is envisaged to enrich and maintain soil fertility. Besides, diversification of cropping pattern, particularly towards the production of high value crops, will contribute to enhance farmers' income and to help maintain a better soil structure for long term sustainability. Efforts will be made to explore the possibility of introducing a non-rice crop in between aman and boro through adoption of shorter duration rice varieties and shifting of the timing of crop establishment and harvesting. Lack of technological advancement is the main constraint to diversification of crops. In order to accelerate technological advancement, possible strategies will be to:

- a. develop HYVs and use hybrid technology and genetic upgradation of non-cereal crops and strengthen seed production programmes, particularly in the private sector;
- b. introduce diversified cropping systems in order to free upland areas in winter season for non-rice crops so as to facilitate introduction of third crop on the land and under irrigated condition; short duration mustard can be introduced in between boro and aman seasons; and
- c. introduce extensive extension services, improve drainage and water management, ensure timely planting and soil fertility management, develop infrastructure and post-harvest processing and provide marketing facilities.

13.6 Special Agricultural Zones

13.6.1 Apart from plain land agriculture, there are special agro-ecological zones which have quite high growth potentials. Specific development policy, strategy and programmes for these zones are needed to exploit the existing potentials of the areas: (a) the upland in the hilly areas of Chittagong, Chittagong Hill Tracts and Sylhet, (b) the wetland in greater Mymensingh, Sylhet, Jessore, Pabna, Rajshahi, etc., and (c) the coastal areas of southern part of Bangladesh. Each requires distinct set of policies, strategies and programmes because of differences in agro-ecological environment. Research, extension and input delivery will be so designed as to meet the specific requirement of these special agro-ecological zones.

13.6.2 Rainfed farming: Crop production in Bangladesh is predominantly monsoon dependent. Of the total rainfed areas, about 3 million ha is estimated to be prone to severe drought. The entire Barind and Modhupur Tracts constituting about 12 per cent of the total arable areas are characterised by shallow soil depth having low moisture holding capacity and heavy sub-surface clay. Crop production in these areas and in the Gangetic flood plains is mainly dependent on rainfall and on the inundation from the Ganges river and its tributaries. However, for the whole of the Ganges belt, including the Barind and Modhupur Tracts, no rainfed farming practice specially suited to the prevailing soil and agro-climatic condition has

yet been developed. There is, thus, an urgent need to develop drought tolerant crop varieties and drought mitigating technologies that will make maximum use of the land resources of the rainfed farming systems. Rainfed farming practices will also include supplementary irrigation which will help increase crop production during the kharif season.

13.6.3 Wetland farming: Large areas of wetland commonly known as beels, baors and haors in the greater districts of Sylhet, Mymensingh, Jessore, Rajshahi and Pabna hold quite high potentials for the development of crop agriculture and fisheries, in particular. Crop agriculture and fish production can grow simultaneously. Besides, preservation of biodiversity of the wetland will be given high priority. Greater attention will be given during the Fifth Five Year Plan to exploit the potentials of crop agriculture and fisheries through provision of situation specific package of development programmes for research, extension, input supply, etc.

13.6.4 Coastal farming: Coastal areas in the southern part of Bangladesh constitutes a specific ecological zone having its specific problems and possibilities. Cyclones, tidal bores, salinity, etc., visit these areas frequently affecting agricultural output. Therefore, there is need for developing salinity resistant variety of rice, for example, for these areas. Coconut, betel nut, palm and mangrove are major cash crops in these areas. Location specific research, extension and other programmes will be developed and provided for the purpose of exploiting the potentials.

13.6.5 Hill farming: The upland in the hilly areas of the greater Chittagong district, Chittagong hill tracts and Sylhet district constitute a special agricultural zone requiring location specific services and programmes. High potentials exist for production of fruits and vegetables in these areas. Agricultural development potentials in these areas are quite substantial. Resources will be provided to develop appropriate technology that are suitable for upland agriculture.

13.6.6 Cropping intensity : Bangladesh has, by 1996/97, achieved an estimated cropping intensity of about 185 per cent. Out of the net cropped area of 7.60 million hectare, about 55 per cent is double cropped and approximately 15 per cent triple cropped. However, about 30 per cent is still single cropped. Since all the suitable land is already under cultivation, raising the intensity of land use is needed. It is expected that cropping intensity will reach 192 per cent by the terminal year of the Fifth Plan. Cropping intensity from 1992/93 to 2001/2002 is shown in Table 13.2.

Table 13.2
Cropping Intensity From 1992/93 to 2001/2002

	Net Land Area	Total Cropped Area	Cropping Intensity
1992/93	7.64	13.70	179
1996/97	7.60	14.08	185
2001/2002 (Projection)	7.50	14.41	192

(area in million hectare)

13.7 Agricultural Inputs

13.7.1 Fertilisers: In Bangladesh, despite manifold increases in fertiliser consumption, per hectare use of it is still one of the lowest. With the privatisation policy of the government, fertiliser distribution programme has fully been handed over to the private sector. Total fertiliser consumption during 1996/97 was about 3.45 million mt — urea 2.41 million mt, TSP and SSP 0.69 million mt and MOP 0.35 million mt. These are projected to increase in aggregate to about 4.50 million mt, of which urea will be 2.90 million mt (64%), TSP and

SSP 1.00 million mt (22%) and MOP 0.60 million mt (13%) by the end of the Fifth Plan. Actual application of various types of fertilisers is disproportionate to standard NPK ratio of 1 : 0.5 : 0.5. Fertiliser use at farmer level is dominated by urea (about 70%) followed by TSP and SSP (20%) and MOP (10%) causing damage to soil structure and thereby constraining per hectare production of various crops. Following withdrawal of explicit subsidy from phosphatic and potash fertilisers and also transfer of its trade to private hands, relative prices of these items have gone up, while urea is reported to be sold at below the cost of production. The price of urea was reduced in July, 1994 and early, 1995. This distortion of relative price of urea is said to have aggravated unbalanced use of fertilisers in favour of nitrogenous fertilisers or inadequate application of non-nitrogenous fertilisers such as TSP and MOP. Therefore, in view of actual field position and experiences gained so far, it is realised that the public sector interventions might be required in case of market failure for (a) ensuring balanced use of fertilisers, (b) maintaining a buffer stock of fertilisers to meet emergency needs, (c) distribution of fertilisers in the remote areas, (d) encouraging increased use of organic and bio-fertilisers, and (e) training the farmers by the extension people in using appropriate doses and combination of fertilisers.

13.7.2 Seeds: Quality seeds in right quantity are recognised to be one of the key elements for enhancing agricultural production. At present, BADC, as per seed policy 1992, concentrates its efforts on the production of HYV seeds of paddy, wheat, potato, jute and sugarcane in the seed farms and also uses farmers to multiply seed on contract basis. Production programme of all other crops beyond foundation seed will be done by contract growers. With the introduction of seed policy, emphasis has been given to private seed growers development. However, the public sector will conduct basic scientific research, support or conduct breeding work for self-pollinated and minor crops for greater suitability to divergent agro-ecological zone. Public sector will also carry out programmes for training and support services for private research and development, variety testing and registration, plant material inspection and maintaining germplasm, supporting seed associations and promotion of farmer or community-based seed programme. The concerned agencies under the MOA will be further strengthened in order to ensure quality of seed at all stages of its production — breeder, foundation and certified seed. Emphasis will be given on creating facilities and infrastructure support for hybrid seed research, marketing and development. Farmers will be given training and technical assistance to extend improved methods of seed production, testing and storage. Total production of all types of certified and foundation seeds has been around 45,000 mt during 1996/97. This is expected to reach 62,000 mt by 2002. At present, only about 5 per cent of total certified seed requirement is met from BADC sources. This needs to be raised to at least 10 per cent to match 25.12 million mt of foodgrain production as projected in the Fifth Plan. To this end, BADC seed wing will be strengthened and restructured. Agricultural Research Institutes (ARIs) along with other research organisations under National Agricultural Research System (NARS) will upgrade and strengthen research in order to give full support to augmenting breeder seeds of new varieties. Seed development accounts for about 28 per cent of total financial provision for the agriculture sector during the Fifth Plan.

13.7.3 Irrigation: Availability of appropriate quantity of irrigated water from (a) surface water through gravity flow and LLP, (b) ground water through DTW, STW, HTW, FMTW, DSSTW and VDSSTW, etc., and (c) other sources will be the main factors behind the growth of agriculture during the Fifth Plan. Total coverage of irrigation through all these sources in 1996/97 is estimated to have been around 4.00 million ha which is projected to increase to 5.04 million ha in 2001/2002. This is about 67 per cent of total potential irrigable

areas of 7.56 million hectare. In addition, flood control and drainage facilities are projected to cover 4.90 million ha during 2001/2002 as against the estimated coverage of 4.20 million ha in 1996/97. Flood control and drainage programmes will support and assist increased agricultural production during the Fifth Plan.

13.7.4 Plant protection: Actual plant protection activities are in the private hands. However, the public sector programmes are confined to qualitative and quantitative aspects of plant protection: pests surveillance, monitoring and early warning against pest attacks, advisory service to farmers, traders and others dealing with pesticides and quality control of pesticides marketed by the private sector. In the Fifth Plan period, the integrated pest management (IPM) programme will be intensified and expanded in order to safeguard crops from pest and combat environmental degradation due to pesticide uses. Agricultural extension workers are responsible for providing advice to the farmers on appropriate plant protection measures. Collaboration among the local government representatives, extension workers and the NGOs will be sought to expand IPM programme. Farmers will be given training in the use of different pesticides through demonstration.

13.7.5 Agricultural credit: Till recently, the major part of agricultural credit to farmers has been channelled by informal sources catering to the needs of short term credit. Semi-formal institutions, NGOs, Grameen Bank, etc., also provide target groups credit in the rural areas. The third source in terms of credit volume is the formal sources comprising the nationalised commercial banks and agricultural and specialised banks, i.e., Bangladesh Krishi Bank (BKB), Rajshahi Krishi Unnayan Bank (RAKUB) and Bangladesh Samabaya Bank (BSB). During the Fourth Plan, the total volume of agricultural credit increased by 150.20 per cent; the highest increase being for fishery (831.50%) followed by livestock (341.30%), crop sub-sector (214.30%) and others (93.40%). However, in recent years, there has been a significant cut in the share of crop sub-sector in the total credit delivery to the agriculture sector from formal sources. The share declined from 46.38 per cent in 1994/95 to 42.29 per cent in 1996/97. A major reason for this is the serious problem of low repayment due to weak lending and recovery operations, inappropriate use of loans, frequent occurrence of natural calamities and loss of crops and weakening of the public price support policy. The low interest rate to this priority sector dissuades financial institutions from further lending to agriculture. Moreover, since 1991/92, central bank discontinued its refinance facility for extending agricultural credit except for the BKB, RAKUB and the Sonali Bank. These factors dampened the expansion of agricultural credit. In the Plan period, agricultural credit, especially for marginal and small farmers will be geared up in order to encourage steady expansion of agricultural output supported by appropriate public policies to ensure fair prices to farmers. Otherwise, over 6 million farm households will be exposed to uncertainty. In addition to the existing programme, special credit programme will be launched aiming at providing credit, particularly to the small and medium farmers. The commercial banks will be encouraged to provide funds to large farms to enable these to operate on a commercial basis. Keeping this in view, the Fifth Plan envisages to increase yearly agricultural credit disbursement. An amount of Tk.30,000 million is projected to be delivered as credit to agriculture in the terminal year of the Plan.

13.7.6 Mechanisation of agriculture: There is a serious dearth of animal draft power to cater for the growing needs of an expanding modern agriculture. The available animal draft power is inefficient and unreliable. As against this, agriculture mechanisation can help in improving productivity, reducing cost of production, increasing efficiency, increasing inputs use (water, seed, fertiliser, labour) and achieving timeliness of crop production operations.

Agricultural mechanisation is needed for quick turn-over time and high input use efficiency. Land preparation, irrigation, insecticides spraying, threshing, crushing and shelling, husking and milling have been partially mechanised and their magnitudes are expanding gradually throughout the country. There is a need for continuous development of more efficient and less costly equipment so that farmers can benefit. Since agriculture is still the mainstay of the economy, promotion and development of agro-related metal working industries to provide support to agricultural production is a major concern. Selective mechanisation based on the traditional devices conducive to productivity will be adopted. In the context of market economy, emphasis will be given to the collaborative role of public and private sectors in technology development and its diffusion. An appropriate policy framework for sustainable development of farm machinery manufacturing will be pursued in the Fifth Plan period.

13.7.7 Agricultural Insurance: Agricultural insurance has been recognised as an important component of agricultural development strategy. It seeks to protect farm investment through indemnification of losses to crops, forestry, livestock, fisheries and other farm resources that are vulnerable to natural hazards and other insurable perils and thereby provides security to farm income. It can also be significant to the agricultural credit agencies in times of natural calamities with insurance policies standing as collaterals for loans. With this end in view, crop insurance programme was at first launched in Bangladesh in 1977. Being entrusted with it, Sadharan Bima Corporation (SBC) carried out a pilot project to provide multi-peril coverage to major cereal crops (aus, aman, boro and wheat) as well as to major cash crops of jute and sugarcane for stabilising farm income. Livestock component was included in 1981. But, for various reasons, the performance of the project, particularly in respect of crop insurance was quite poor. Due to weak loss assessment system, indemnity payments far outstripping premium incomes resulted in mounting losses to SBC. In the absence of any new initiative to revamp the crop insurance programme, it was discontinued with effect from mid 1995. Livestock insurance has, however, been retained as it has continued to perform relatively well. During the Fifth Plan, efforts will be made for the development of a comprehensive agricultural insurance programme.

13.7.8 Agricultural marketing and prices: With a more intensive system of crop production and the increasing emphasis on diversification, marketing problems, particularly with perishable crops, have already multiplied and are likely to multiply further unless the needed remedies are introduced. Marketing costs are already high because of inadequate infrastructure, high price risks and the lack of credit to traders for marketing activities.

13.7.9 Among the vast number of primary and secondary markets in the country (about 7,800), the Department of Agricultural Marketing (DAM) is responsible for fixing market charges in 393 markets only. The market centres are under the control of the Ministry of Land which owns the land and collects marketing fees from sellers. The DAM, during the Fifth Plan period, will be strengthened to provide improved marketing services with a view to ensuring fair returns to the growers for their produces and adequate supply to the consumers at reasonable prices through the improvement of market conditions, reduction of marketing costs, regulation of market practices and market promotion for agricultural crops like maize, soyabean, potato, sunflower, etc. Wholesale market development, promotion of agro-processing industries, market management, creation of MIS in DAM, classification, grading and standardisation of agricultural products, improvement of storage facilities, particularly for marginal and small farmers, setting up an Agricultural Price Commission to make price forecast, production estimate and to make recommendations on the economics of productions and marketing are some of the specific programmes that will be undertaken during the Fifth

Plan in order to ensure (a) fair price, (b) quality of agricultural products both for domestic consumption and export and (c) increased production with stable price.

13.8 Agro-processing

13.8.1 Bangladesh experiences seasonal surpluses in several agricultural commodities of perishable nature. Development of agro-processing facilities can prevent post-harvest losses and enhance farmers' income. The agro-processing industries are at present in their nascent stage of development. Most of the technologies and facilities for handling, storage, processing and packaging of farm products and by-products are substandard and outdated as they cater primarily to the domestic market. There is considerable under-utilisation of capacity also.

13.8.2 The scope for the privatisation of support services such as research and extension is likely to remain limited. However, agricultural research institutes like BARI and BRRI will carry out research on technology development for agro-processing. Meanwhile, some technologies are already available with these institutes for the development and growth of agro-processing industries in the country. Nevertheless, some specialised extension activities could be delegated to the private sector such as those related to fruits and vegetables enterprises.

13.8.3 This process of supporting agrobusiness will be continued and strengthened during the Fifth Plan period. In this regard, two institutional developments in recent years are noteworthy: the establishment of HORTEx, a private board for horticulture promotion and the Agro-based Technology Development Project (ATDP) which conducts regular monitoring of the country's agrobusiness markets and provides information about the development in foreign markets and opportunities for agro-industries. These projects also support entrepreneurs with credit facilities.

13.9 Agricultural Research

13.9.1 Autonomous research institutes like BRRI, BARI, BJRI, BINA and BSRI were established with specific mandates for crop agricultural research in order to make the research system more service oriented and dynamic. National Agricultural Research System (NARS) with all the agriculture related research institutes under the co-ordinated leadership of Bangladesh Agriculture Research Council (BARC) has been established.

13.9.2 The research system needs to re-examine its focus and re-order its priorities, avoid fragmenting and duplicating its efforts, orient its approach from commodity based to farming system or integrated production system and strengthen its planning, programme monitoring and co-ordination. The research system should also strengthen its linkages with extension in the Plan period. Agro-ecological zone-based research will be undertaken. The criteria for evaluation of research programmes towards rates of adoption of research output by end-users and the system of accountability of individual research institution, research administration and personnel will be reviewed and made consistent with actual needs. Problem-solving researches will be given priority. Criteria for identification and selection of contract research programmes by the private sector and NGOs will also be developed in response to the changing environment at farm level. In the same way, priority list will be evaluated annually to accommodate changed needs and circumstances. Keeping in view these objectives and strategies, the following tentative research priority areas have been identified:

- a. improvement of foodgrain quality with more digestible protein;
- b. increase in efficiency in water use in rice cultivation;

- c. integrated plant nutrients and soil quality;
- d. post-harvest technology, preservation and relevant agricultural machinery;
- e. higher photosynthetic efficiency;
- f. nitrogen fixation by non-legumes;
- g. technologies for maximum use of commodities and their by-products for value addition;
- h. fruits and vegetables for off-season production including preservation, storability and tolerance to transportation damage;
- i. environmental issues and IPM;
- j. development of varieties tolerant to stresses (e.g. drought, salinity, water logging);
- k. development of hybrid technology for vegetables, maize and sunflowers;
- l. management of soil and plant nutrients with balanced use of organic nutrients;
- m. management of on-farm water resources in both irrigated and rain-fed agriculture;
- n. conservation of soil, plant and genetic resources;
- o. assessing the environmental impacts of declining ground water level;
- p. research on tillage operation to reduce turn-around time, multiple cropping and relay cropping;
- q. rainfed technology with major thrusts on development of crop cultivation and management practices (e.g. zero/minimum tillage, relay cropping, appropriate planting schedule and use of fertilisers including micro-nutrients);
- r. post-harvest handling and storage, primary, secondary and tertiary processing of farm products and by-products, including pulses, oilseeds, potato, vegetables and fruits;
- s. development and pilot testing of different scales of producers-processors agrobusiness schemes, including contract growing schemes;
- t. management of hill agriculture in the eastern and south eastern parts of the country, to harness the agriculture in largely mono-cropped Barind tract, characterised by drought, low organic matter and sub-surface heavy clay through identification of suitable crops varieties and soil/water management and agronomic practices; management of coastal saline soils; and
- u. genetic engineering and tissue culture.

In terms of financial outlay, the agricultural research will absorb about 12 per cent of this sector's total development outlay during the Fifth Plan period.

13.10 Agricultural Extension

13.10.1 Transfer of technologies and diversification and intensification of crop production programme through appropriate extension services are of crucial importance to Bangladesh agriculture. The extension services must be able to render the needed technical advice and management support at the appropriate time and place. Currently, the extension service draws its strength from research findings as well as from farmer's innovation. On the one hand, it acquires up-to-date findings from research and transfers them to the farmers, and on the other hand, it brings feedback in the shape of farmers' problems to the concern of research for possible solution and again takes back the results to the farmers for their field adoption. Strengthening of these three way linkages among research, extension and farmers community is vital for the development of a strong and effective new agricultural extension policy (NAEP). The Regional Technical Committee (RTC) and District Technical Committee (DTC) have been replaced by 18 Agricultural Technical Committees (ATC), each covering 2-6 districts in similar agro-ecological zone (AEZ). The composition of National Technical Co-ordination Committee (NTCC) has been amended to include representatives from NGOs

and farming community also. Agricultural extension together with nutritional awareness programme will receive about 8 per cent of the agricultural development Plan outlay .

13.10.2 Strategies to develop extension services: The following will be constituents of strategies to develop extension services:

- a. development of qualitative demonstration, field days, agricultural exhibition;
- b. farming system approach to extension system;
- c. non-commodity approach, i.e., irrigation technology, seed technology, on-farm water management technology and uses, IPM;
- d. strengthening of field level activities through proper delegation of authority from headquarters to field level;
- e. priority to marginal and small farmers;
- f. development and promotion of environmentally sound farming practices; and
- g. involving local government bodies, especially union and thana parishads in the process;

13.10.3 Local government bodies will co-ordinate, monitor and supervise the activities of agricultural extension service at the grassroots level. The NGOs, local government institutions and the extension personnel will work jointly for extension services. The role of BADC will be re-structured in accordance with the findings and recommendations of the recently formed Agriculture Commission.

13.10.4 Agricultural and rural training: In addition to higher education at agricultural colleges and the University, several other training institutions teach and train personnel who serve the agricultural sector. These institutions are Central Extension Resources Development Institute (CERDI) at Joydebpur, Graduate Training Institute (GTI) attached to Agricultural University at Mymensingh and 12 Agricultural Training Institutes (ATIs) located throughout the country; although the training facilities vary considerably among institutes, they are generally inadequate and need support for overall improvement. The curricula equally emphasise both academic and field trainings. During the Fifth Plan period, two ATIs will be established to meet the growing needs of extension personnel including women extension agents. Besides, Academy for Rural Development at Comilla and that at Bogra will train agriculture personnel of the Ministry of Local Government, Rural Development and Co-operatives in addition to pursuing their training programme for model farmers and managers of village co-operative societies on various aspects of agricultural development. To make the agricultural extension service efficient and effective, the training and communication support of extension system needs to be reorganised, strengthened and improved. The ATIs and CERDI will emphasise the qualitative aspects of training in agricultural management, instruction in the production of training materials, training of trainers and of extension agents. Training institutes will be given responsibilities for extension work in the nearby villages of their locations with the objective of achieving better organised extension work in the rural communities which will, in turn, result in an improvement in the quality of training. In support of the agricultural extension services, agricultural information service will concentrate on the systematic planning of multi-media communication activities to assist crop production and on taking initiatives in other relevant areas and fields.

13.11 Agricultural Education

13.11.1 The objectives of agricultural development can be realised through the effective spread of education and application of science and technology. The improvement in the prevailing educational system is essential, if progress and development are to occur in

agriculture. Increased levels of literacy and education among rural people are important factors conditioning the rate of adoption of improved technologies.

13.11.2 Recognising the need for development of scientific base for modernising agriculture, the country requires a continuing flow of efficient and qualified human capital to upgrade, maintain and implement development programmes and projects in a wide variety of public and private institutions serving agriculture. The responsibility of training these people lies mainly with the system of higher agricultural education. There is already a base of physical facilities at Bangladesh Agricultural University (BAU) at Mymensingh, Bangabandhu Agricultural University at Joydebpur and in agricultural colleges at Dhaka, Patuakhali and Dinajpur. The existing infrastructural base for higher agricultural education at Mymensingh and Joydebpur is under-utilised, though broad enough to meet the requirements of the country for various levels of agricultural experts and extension personnel.

13.11.3 Agricultural education system will be reorganised and strengthened and will be brought in line with the country's agricultural needs. Teaching will be linked to actual farming practices in specific farming conditions. Syllabi for agricultural education will be suitably modified so as to contribute effectively to the requirements of a dynamic agricultural sector. The major attention will be given to improve the quality of teaching and training and related student output so that the overall response of the system of agricultural education is sufficient to underpin the development of human capital and the science and technology base for agricultural modernisation.

13.11.4 Setting up of agricultural colleges in the private sector will be encouraged in the Fifth Plan period. Agricultural education has already been introduced at the secondary and higher secondary levels which will be further improved in years to come. Special emphasis will be given to the training of the teachers.

13.12 Private Sector

13.12.1 During the Fifth Plan, private sector investment in agriculture will be encouraged, particularly in areas of manufacturing of farm machinery and implements, irrigation equipment, fertilisers and pesticides, development of quality seeds, processing and storing of food, vegetables, fruits and others agricultural products. Adequate fund is likely to be available for these purposes. For a sustainable growth of the agricultural sector, appropriate fiscal and monetary measures will be framed taking into account the economy-wide and transboundary circumstances and issues. The public sector will provide public goods and services (research, extension, agricultural education, etc.), which may not be efficiently and adequately supplied by the private sector, support development of technical know-how and promote access to foreign markets, technology and capital.

13.13 Land Use

13.13.1 The Bangladesh National Conservation Strategy identified six important areas of conflicting land uses in rural areas. These are: crop agriculture vs. shrimp and capture fisheries, forest land vs. shrimp and capture fisheries; crop agriculture vs. livestock; agriculture vs. settlements; agriculture vs. brick fields; and agriculture vs. newly accreted char lands. Traditional systems found ways to make these various land uses compatible. These manifested in traditional seasonal shrimp culture and rice cropping, fallow periods and community grazing land for livestock. Due to population pressure on land, however, these traditional approaches are breaking down; available agricultural land per capita is roughly half of what it was 25 years ago. As a result, more intensified uses such as intensified mono-

cropping, intensified shrimp cultivation, and extensive brick fields are degrading soil fertility. Cropping on fragile char land before it has stabilised invites rapid erosion. Flood control and drainage structure have altered land and water use pattern and led to the decline of fish stocks and production by more than 25 per cent in recent years.

13.13.2 To replace traditional land use systems, more careful attention will be given to the impacts of current land uses. More can be done to maximise land productivity in order to continue to maintain per capita level of agricultural output. Bangladesh can functionally expand its 'land' base by more intensive cropping, better use of water and coastal resources, rational forest management, more attention to integrated land use and development of mixed cropping systems.

13.13.3 Resolving land use conflicts will be given special attention for sustainable agricultural development. Formulation of appropriate land use/zoning policy to ensure optimum use of land, prevent the use of prime agricultural land for brick making and industrial production, protect land from degradation, reclaim unutilised or degraded land for suitable use and improve the land resources for future generation will be taken up.

13.13.4 Priority of use of land between competing sectors is to be fixed in consideration of different physiographic units and sub-units which have different use potentials. While agriculture will receive a high priority in allocation of all the naturally fertile land, other sectors of production of renewable resources like forestry, fishery and livestock should also receive due importance. Forestry will have additional consideration in the policy due to its importance in environmental protection. The land use policy will clearly enunciate that good agricultural land is not allotted for or converted to non-agricultural uses like indiscriminate urban and industrial development.

13.14 Agricultural Development and Poverty Alleviation

13.14.1 Crop agriculture and minor irrigation served as the prime generators of income and employment in the rural Bangladesh over the past two decades. There is no doubt that the modern HYV seed-fertiliser-irrigation technology has made a significant impact on rural poverty alleviation. Modern agricultural technology has also helped generate employment in the rural areas, particularly for the landless. The diffusion of agricultural technology has also helped changing the nature and terms of the tenancy market impacting on income distribution and poverty. Some possible technology interventions with reference to the asset status of households in the Fifth Five Year Plan period will be the following:

- a. assetless:** Value adding activities utilising the biomass available within the village, raising plant nursery, seedlings, compost making, processing fruits and vegetables, feed preparation for poultry and livestock, mushroom production, silk worm rearing, etc. and development of common property resources including utilisation of wastelands, road sides, embankments and derelict ponds for fisheries;
- b. marginal and small farmers:** Labour intensive production activities such as dairy and poultry raising, vegetable growing, flower production, hybrid seed production, integrated resource management systems including recycling and value added agricultural products;
- c. medium and large farmers:** Technology interventions including those which will save farm inputs, e.g., bio-fertiliser, bio-pesticides including integrated pest management system and inter multiple and relay-cropping systems;

- d. promoting rural small-scale enterprises:** Small-scale enterprises in fertilisers, seeds, irrigation equipment and other agricultural machinery and small-scale processing units by the rural poor; and
- e. support to rural women:** Investments in collective and labour-saving activities such as grain mills, alternative sources of water within easy reach of households, appropriate technology for food processing like homestead horticulture, post-harvest processing and storage of agricultural produces, small scale agro-based industries and child care centres.

13.15 Agriculture and Nutrition

13.15.1 The objectives of nutrition in agriculture commensurate with those of the crop production consist of crop diversification and increased production of fish, livestock and poultry. However, specific objectives in this respect will be to: (a) create nutritional awareness at the farm family level for changing food habits and to create effective demand for nutrient-rich food items; (b) increase balanced production and consumption, especially of oilseeds, pulses, nutrient-rich vegetables and fruits in order to ensure household food security; (c) encourage homestead gardening for production of fruits and vegetables; (d) adopt and promote rearing small scale poultry and fisheries at the household level to ensure nutrition security as well as income generation; and (e) minimise post-harvest loss through food processing and preservation at household level to ensure gender equity and empowerment of distressed people.

13.15.2 Following actions will be pursued for creating awareness and increasing consumption of nutritious food during the Fifth Plan period:

- a. nutritional consideration and objective will be incorporated in development projects and programmes of agriculture as one of the themes of International Conference on Nutrition (ICN);
- b. the nutritional problems in all the agro-ecological zones (AEZ) will be identified as a basis for developing crop production plan to improve nutrition situation in the country;
- c. short term nutrition training programmes for the personnel of the Department of Agriculture Extension (DAE), Department of Livestock and Department of Fisheries and informal training for social workers, religious leaders, farmers and consumers will be organised;
- d. workshops and seminars at thana level will be arranged and farmers rally and field-days at farm level will be held;
- e. incorporation of nutrition into curriculum of agricultural education and training will be made;
- f. training on nutrition and food demonstration for wider dissemination of nutrition rich practices will be organised;
- g. nutritional motivation through mass media campaign and school and mosque based campaign in collaboration with extension workers/agencies and NGOs will be organised;
- h. food and nutrition fair to create increased nutrition awareness through demonstration of proper cooking and food preservation methods will be undertaken;
- i. all actions and programmes identified in the National Plan of Action for Nutrition (NPAN) for the agriculture sector will be implemented through government organisations, NGOs, and other relevant agencies; and

- j. the Bangladesh Institute of Research and Training on Applied Nutrition (BIRTAN) will implement and co-ordinate all nutrition activities in the agriculture sector.

13.16 Environmental Protection

13.16.1 Strategies for sustainable development of the agriculture sector during the Fifth Plan period will be devised to ensure environmental protection/conservation by way of addressing the major problems such as:

- a. resource utilisation according to potentials;
- b. policy options for environmental protection; and
- c. location-specific technologies and their proper diffusion;

13.16.2 Agricultural development policy will pay due attention to environment protection. Efforts will be made to combat natural hazards like floods, storm surges, drought and river bank erosion and consequential environmental problems such as salinity, drainage, etc. Human induced problems such as accelerated soil erosion, desertification, deforestation, salinity, organic matter depletion, soil degradation, water logging, etc. will also be effectively addressed to improve environment. In course of utilising physical resources of land and water and human resources for agricultural development and making other related development intervention, an appropriate protection measures for the country's complex environmental system will be carefully adopted.

13.17 Women in Agriculture

13.17.1 One of the major advances made in the last two decades in the agricultural sector is the recognition of women as important contributor to the food security in Bangladesh. The role of women in increasing yield potentials of agricultural production, in post-harvest operations, in homestead or home-based activities, in resource conservation and in agricultural decision-making is now well recognised. Policy will be formulated for implementing WID in all programmes that will be undertaken in the sector. Women's participation will be envisaged in all development programmes/projects. Increased female participation will be encouraged at the planning, implementing and evaluation stages of any programme. Raising gender awareness, enhancing access of women in agro-business and strengthening equal participation are some of the specific areas on which development programmes/projects will be taken up during the Fifth Plan. NGOs will be directly involved in WID.

13.18 Area Development

13.18.1 During the last two decades, the government has initiated a number of area development projects, focusing on regional agricultural and infrastructural development. Increased understanding about the nature of underdevelopment in the rural area and concern for balanced and regional development have led to the emphasis upon undertaking regionally based agriculture-led development projects. Also, the need for target programmes for disadvantaged groups such as landless, marginal and small farmers and women is widely recognised. Therefore, programmes envisaged for less developed regions and disadvantaged groups have been developed with assistance from various donor agencies and by the government's own initiatives during the Third and Fourth Plan periods. Their impact on reducing rural poverty and accelerating socio-economic development of the lagging areas has been moderate and vast number of the target group population and many lagging areas are still without effective programme support. The objectives of the area development programmes are poverty alleviation, reduction of malnutrition and assurance of food security

for the disadvantaged people. There will be three strategic thrusts in such programmes during the Fifth Plan:

- a. an integrated farming and resource systems approach to area development;
- b. special consideration of the major disadvantaged groups in all programmes; and
- c. increased co-ordination with, and contracting out to, the Grameen Bank and NGOs.

13.19 Financial Outlay During Fifth Plan

13.19.1 The public sector financial outlay for crop agriculture has been estimated at Tk. 21,425.38 million. The programme wise financial outlay is presented in Table 13.3.

Table 13.3
Financial Outlay for Crop Agriculture During Fifth Plan
(at 1996/97 prices)

Programme	Total	Percent
1	2	3
Agricultural Extension	1,650.00	7.70
Applied Nutrition	50.00	0.23
Agricultural Research	2,500.00	11.67
Crop Diversification	1,900.00	8.87
Seed Development	6,000.00	28.00
Fertiliser and Soil Improvement	550.00	2.57
Agricultural Marketing	500.00	2.33
Women in Agricultural Development	50.00	0.23
Environmental Protection	500.00	2.33
Human Resources Development	250.00	1.17
Other Essential Agricultural Sector Investment Programmes/Projects		
(a) Area Development Programmes	3,860.00	18.02
(b) Agro-business Development, Mechanisation and Private Sector Development	2,600.00	12.14
(c) Agricultural Rehabilitation Programmes	950.00	4.43
(d) Agricultural Insurance Programmes	5.00	0.02
Agricultural Statistics and Others	60.38	0.29
Total	21,425.38	100.00

13.19.2 In addition to the public sector outlay, an amount of Tk. 65,038.91 million is expected to be invested for the development of crop agriculture in the private sector.

B. Food Management

13.20 Past Performance

13.20.1 Vulnerability of domestic production of foodgrain necessitated the building up of an elaborate public food distribution system (PFDS) over the years. PFDS aimed at both meeting emergency needs as well as normal demand of the poor households in addition to meeting institutional demand originating in hostels, hospitals, jails, etc. While the distribution of public foodgrain continued to expand, it acquired a new emphasis through domestic procurement on a voluntary basis as a tool for stimulating foodgrain production with price support and open market sales (OMS) for price stabilisation at consumers level. Thus, it has both consumption and production objectives and in respect of both, of late, it has undergone changes with the growth of domestic output and greater availability of foodgrain in markets.

13.20.2 During the Fourth Plan period, sale of foodgrain through the statutory rationing channel of the PFDS was almost withdrawn. As a result, there was a significant change in the

shares of foodgrain distribution through monetised and non-monetised channels. For example, the PFDS distribution through monetised and non-monetised channels were 63 per cent and 37 per cent respectively in 1990/91 which reversed to 32 per cent and 68 per cent correspondingly in 1994/95. During the period, overall increase in the production of HYV boro rice due to expansion of irrigation facilities in the dry season, expansion of foodgrain trade with the development of transport system, opening of import of foodgrain to the private traders and improvement in the institutional capability to face crisis situation like drought, flood, cyclone, etc., largely contributed to much dampened seasonal fluctuations in the supply and prices of foodgrain.

13.20.3 In support of the public food distribution system, foodgrain storage capacity built up to about 1.80 million mt till 1985 increased to 1.86 million mt at the end of the Third Plan (1985-90). The Fourth Plan proposed to maintain this capacity keeping in line with its privatisation policy. During this period, its main emphasis was on repair and rehabilitation of the existing silos, CSDs, LSDs, etc., and construction of storage capacities at strategic places.

13.21 Fifth Five Year Plan

13.21.1 Objectives: Attainment of foodgrain self-sufficiency and food security remain the stated objectives of the national food policy and strategies. However, the objective contents of the food sub-sector during the Fifth Plan are as follows:

- a. ensuring food security for all, elevating nutritional status of the people living below poverty line;
- b. preservation and maintenance of security stock of foodgrain to meet any natural calamities, production shortfalls and supply hazards;
- c. development of a social safety net programme for vulnerable groups through improvement and enlargement of targeted food distribution;
- d. maintenance of price stability within a band to protect interests of producers and consumers;
- e. expansion of private sector in storage, distribution and trade of foodgrain; and
- f. development of a sound quality control, grading and standardisation system of all foodgrain and foodstuff.

13.21.2 Policies and strategies: Food sector has undergone major structural improvements over years both in market operations and in Public Foodgrain Distribution System (PFDS). The present policy and strategy to further liberalise the food trade will continue. However, though the private sector is expected to play a greater role in foodgrain management and trade in future, the government involvement in some specific areas will be continued in foodgrain management in consideration of the susceptibility of domestic production to natural hazards. The following issues relating to food security in particular, will continue to engage the government's attention:

- a. **Maintenance of buffer stock:** Buffer stock will be maintained to make up anticipated production and stock losses due to periodical droughts, floods and cyclones. An estimated 0.80 million mt of foodgrain will be required to be maintained as security stock.
- b. **Procurement of foodgrain:** Internal procurement of foodgrain will be continued to (i) ensure floor price to the growers and (ii) provide incentive and confidence to growers for further production.
- c. **Price stabilisation:** The government will formulate an effective mechanism to avoid wide price fluctuations. One of the current public policy is to hold food security stock for price stabilisation. Open market sale is one of the short term instruments used for avoiding temporarily wide fluctuations in market prices.

Private sector will be encouraged to own food storage facilities at strategic places such as food deficit/surplus areas. This will enable the traders to augment market supply in response to rise in prices, reducing thereby both seasonal and regional price spreads.

- d. **Targeted support for vulnerable groups:** National level foodgrain availability does not necessarily mean household food security. In spite of increasing foodgrain production and falling real prices of rice, over half of the country's population cannot afford an adequate diet. Hence, the case for public intervention remains strong and clear. Consequently, targeting the poor for supply of food remains squarely within the public domain. Vulnerable Group Development, Food for Work Programme and Food for Education in wider ambits will be some of the specific programmes of public interventions.
- e. **Government role:** To meet any shortfall in the flow of required quantum of food, the public sector may have to intervene for:
 - i. preservation and maintenance of security stock;
 - ii. development of a safety net programme by improvement and enlargement of targeted food distribution;
 - iii. providing incentive to growers through procurement of foodgrain at remunerative prices;
 - iv. stabilisation of price of foodgrain in relation to production cost and purchasing power of the consumers; and
 - v. modernising and maintaining existing storage capacity by renovating old food godowns and, if necessary, constructing new godowns in strategic areas of the country.
- f. **WTO and measures for food security:** Members of the World Trade Organisation (WTO) are currently implementing various reforms agreed upon in the area of agriculture during the Uruguay Round of multilateral trade negotiations. The central element of these reforms which will vitally affect the foodgrain price and food security of net food importing countries like Bangladesh is substantial progressive reduction in agricultural protection so as to establish a fair and market-oriented agricultural trading system. This measure, though expected to eliminate protections and to correct distortions in world agricultural markets, is likely to push domestic prices of agricultural products up, at least in the short and medium terms. As a result, Bangladesh, a least developed and net food importing country, may experience negative effects in terms of availability of adequate supplies of imported food-stuff on reasonable terms and conditions, and short term difficulties in financing normal level of commercial imports of basic food-stuff. To offset these adverse effects and, thus strengthen food security, Bangladesh will have to initiate negotiations in appropriate forums to establish a level of food aid commitment sufficient to meet its needs and to adopt measures to ensure that an increasing proportion of food-stuff be provided as grants for meeting needs of the target groups. Bangladesh will also pursue the case for increased quantum of technical and financial assistance to improve its agricultural production/productivity as well as relevant infrastructure. Besides, Bangladesh will work out with its development partners an arrangement under food aid for domestic procurement of foodgrain from the surplus regions and for distribution to deficit regions.

13.21.3 Food balance: The necessity of food budgeting and management in Bangladesh arise due to a variety of factors. The country is densely populated having a small area and bulk of the population suffers from malnutrition. The food crops are often affected by vagaries of nature such as drought, flood and cyclone. Thus, there is continued insecurity in domestic food supply which remains one of the major concerns for the country. In spite of efforts to reach food self-sufficiency, the country remains food deficit mainly because the

population growth could not be controlled as desired and the growth of food production could not be achieved to a level as required for feeding the additional population. However, the situation is projected to improve during the Fifth Plan period. The projected food balance during the terminal year of the Plan vis-a-vis the base year is shown in Table 13.4.

Table 13.4
Projected Food Balance in Fifth Plan

(in million mt)

	1996/97 (Base Year)	2001/2002 (Terminal Year)
Population (million)	123.80	132.50
Food Requirement *	20.50	21.94
Production of Foodgrain	20.43	25.12
Seed and Wastage (10%)	2.04	2.51
Net Production	18.39	22.61
Food Balance	(-) 2.11	+ 0.67

*Total foodgrain requirement has been calculated on the basis of per capita per day requirement of 453.59 grams (16.0 Oz).

13.21.4 During the terminal year (2001/2002) of the Fifth Plan, the total size of the population is estimated to reach at 132.50 million. In order to feed them, the country will need 21.94 million mt of foodgrain. Foodgrain production has been projected to be 25.12 million mt in 2001/2002. After deducting 10 per cent for seed and wastage from the gross production, 22.61 million mt of foodgrain will be available for consumption. Thus, the country is likely to attain food self-sufficiency and may have a surplus of 0.67 million mt by the terminal year (2001/2002) of the Fifth Plan. But since this estimate is based on a normative demand at the rate of 453.59 gm a day per capita, while effective demand will be lower due to lack of purchasing power from income and employment, actual surplus will be correspondingly higher. Lest this causes a slump in domestic price level and consequently, discourages farmers to increase production, public intervention will be necessary to ensure a remunerative price to farmers. On the other hand, shortfall in effective demand will need income transfer to the poor households till income and employment generation can raise purchasing power adequately.

13.21.5 Financial outlay: The programme-wise financial outlay in the public sector for the Fifth Plan is given in Table 13.5.

Table 13.5
Financial Outlay for Food Management Facilities in Public Sector During Fifth Plan
(at 1996/97 prices)

(in million Taka)

Programme	1997/98	1998/99	1999/ 2000	2000/ 2001	2001/ 2002	Total (1997/98- 2001/2002)
1	2	3	4	5	6	7
Repair and rehabilitation of existing silos, CSDs, LSDs etc.	195.00	214.00	214.00	220.00	225.00	1,068.00
Construction of silos/new storage capacity at strategic places and the related infrastructural facilities.	140.00	140.00	140.00	150.00	186.00	756.00
Establishment of food testing laboratories throughout the country.	1.00	24.00	25.00	-	-	50.00
Research/Monitoring/ Training on food management /operation and strategy/ computer network.	100.00	100.00	100.00	20.20	-	320.20
_Total	436.00	478.00	479.00	390.20	411.00	2,194.20

C. Fisheries

13.22 Past Performance

13.22.1 Fisheries play a major role in nutrition, employment and foreign exchange earnings. About 60 per cent of animal protein is supplied by fish alone and about 1.2 million people are directly employed by this sub-sector. Another 11 million people indirectly earn their livelihood out of activities related to fisheries. The production of fish was estimated to be 1,373 thousand mt during 1996/97 as against 847 thousand mt in 1989/90. It is estimated that production of inland fish was 1,079 thousand mt and that of marine fish about 294 thousand mt. The growth rate of fish production during the last seven years averaged at 6.5 per cent which fell short of increase in demand; however, the present rate of fish production has increased to 8 per cent per year. Over the last decade, price of fish increased at an annual rate of 2.5 per cent.

13.22.2 There are various impediments to fisheries development, some of which are particular to sources of fisheries. In case of capture fishery, inadequate knowledge, over-fishing and indiscriminate killing of juveniles and destruction of spawning grounds, obstruction of migration routes due to unplanned construction of dams and embankments under the flood control, drainage and irrigation projects, degradation of water quality, breakout of fish diseases, defective fish conservation laws and inadequacy of processing, marketing and other facilities are some of the major factors affecting the desired rate of development. The major constraints limiting fish culture relate to problems of property rights, competing water uses and related conflicts, lack of equipment and credit, lack of trained manpower and quality fish feed, etc. In case of marine fishery, inadequate knowledge and information of fisheries resources, lack of proper management policy and modern fishing know-how, use of inefficient fishing equipment and inadequacy of harbour and landing facilities as well as credit are important impediments.

13.23 Fifth Five Year Plan

13.23.1 Objectives: The major thrust for fisheries development will be on culture and capture fisheries, promotion of rice-fish farming system in the vast flood plains and conservation and management along with institutional and manpower development for equitable distribution of benefits from common property water resources through research on social engineering. The major objectives of fisheries sub-sector development during the Fifth Plan are to:

- a. generate additional employment opportunities in fisheries and ancillary industries to help poverty alleviation;
- b. increase fish production and improve nutritional level;
- c. improve the socio-economic conditions of the fishermen, fish farmers and others engaged in the fishery sub-sector;
- d. increase export earnings from shrimp, fish and fish products;
- e. improve environmental conditions;
- f. improve the biological and institutional management mechanisms for judicious use of fisheries resources; and
- g. strengthen research, extension, management and co-ordination in order to transfer technology and encourage production activities in the private sector and to ensure sustainable development of fisheries resources, particularly utilising water resources of the vast flood plains.

13.23.2 Policies/Strategies: Keeping in view the objectives stated above, the policies/strategies to be taken up for the development of fisheries are as follows:

- a. semi-intensive poly-culture of fish will be ensured in all ponds, dighis and other closed and semi-closed water bodies;
- b. stocking of fish fry in flood plains and semi-closed water and flood control, drainage and irrigation (FCDI) project areas will be continued to halt the declining trend of open water capture fisheries;
- c. sanctuaries will be established to conserve fish spawning grounds at different areas of the country; measures will be taken to stop indiscriminate fishing of gravid female and undersized fish; spawning grounds of the main fish species like Rui, Katla, Hilsa, Pangas, Golda Chingri, etc. will be identified to establish fish sanctuaries;
- d. adequate credit facilities for the fish farmers will be created and credit guarantee scheme will be introduced for marginal farmers; import of machinery and equipment for private sector hatchery, feeds and feed ingredients will be further liberalised and duties and taxes thereon will be reduced;
- e. training facilities for development of suitable manpower and entrepreneur groups will be extended both in the public and private sectors and multi-sectoral development approach will be followed;
- f. bio-technological elements will be applied in conservation of fisheries resources in all large water bodies, viz., baors, haors, beels, rivers, canals, and lakes;
- g. fisheries management policy will be implemented to improve the socio-economic conditions of fishermen;
- h. all precautionary and mitigatory measures will be taken so that fishing grounds may not be affected during the development works of other sectors like flood control, drainage and irrigation projects, agriculture, industries and urban development programmes;
- i. physical facilities like electricity, roads, transports, fresh water, etc., will be created and made available to develop brackish water fish and shrimp resources;
- j. traditional methods of shrimp culture will be improved by introducing modern technology for increased production; shrimp culture extension service will be strengthened to take necessary steps for the establishment of shrimp hatchery at private level;
- k. marine fisheries resources survey will be strengthened to ascertain the exact stock of resources in the interest of fish harvest at maximum sustainable yields;
- l. programmes will be undertaken to improve the socio-economic conditions of the coastal fishermen communities;
- m. quality of fish and shrimps will be ensured for the export of fish and shrimps through creation of facilities and modern quality certification system; and
- n. khas ponds, dighis, canals, road-side ditches, etc., will be excavated/re-excavated/developed for fish culture through participation of the rural unemployed youth, marginal farmers and distressed women;

13.24 Major Programme Areas

13.24.1 Open water capture fisheries: A 2.8 million ha fish habitats in the flood plains remain as unutilised resources of fish production. In order to increase production in open water fisheries, programmes will be undertaken to (i) conserve resources through rigorous implementation of the laws on fish protection and motivation of fishermen, (ii) establish fish sanctuaries, (iii) increase production by massive stocking of fast growing carp fingerlings in the natural depressions and flood plains, and (iv) develop fish culture in paddy fields through protective measures against adverse effects of flood control, drainage and irrigation projects, roads and high ways projects and township and housing projects. Observing the declining

trend of the stock of open water fisheries in the recent past, efforts were made to augment the stock through release of fish fries in the flood plains. But these programmes did not yield good results. Appropriate procedural and management systems will be evolved to ensure accountability and transparency in the execution of programmes for open water fisheries in the Plan period.

13.24.2 Closed water culture fisheries: There are over 1.3 million ponds covering an estimated area of 147,000 ha, some 6,000 ha of ox-bow lakes and over 130,000 ha of shrimps farms. Currently, the average production in fresh water ponds is 1.4 mt./ha. and that of brackish water shrimp farms only 160 kg/ha. Programmes will be undertaken to bring all of 1.3 million ponds under extension programmes of DOF, BFDC, FRI and NGOs during the Plan period to raise the present total production of 331,900 mt to at least 450,000 mt of fish.

13.24.3 Brackish water aquaculture: An estimated 0.143 million ha of coastal land is under brackish water shrimp farming. The method is largely traditional where an average production of 160 kg/ha is currently obtained. Recently, farmers, especially in Bagerhat and Perojpur areas, have started shrimp farming in their paddy fields. Farming area is rapidly expanding. Development of brackish water fisheries will be contingent upon the provision of infrastructures, supply of seed, feed and other inputs, security, technical advice, disease control and training of the farmers on improved scientific farming system. With more support from DOF, BFDC, FRI and other extension agencies, it will be possible to raise production in shrimp farms to a level of 400 kg/ha which will yield an additional production of at least 60,000 mt by the terminal year of the Plan. Semi-intensive farming is currently practised in 5,000 ha area by a number of entrepreneurs where production of 3-5 mt/ha has been achieved. The DOF is currently identifying suitable areas for semi-intensive farming and suitable sites for establishment of shrimp hatcheries. Private entrepreneurs will be encouraged to invest in hatchery operation. The government will support development of suitable land with road, electricity and other infrastructures. Private sector joint venture investment including foreign investments in hatchery operation, feed production and other related activities will be encouraged .

13.25 Marine Fisheries

13.25.1 With the extension of exclusive economic zone (EEZ) upto 200 nautical miles beyond our shore lines in 1974, Bangladesh resumed the responsibility for exploitation and management of living and non-living resources within its 1,64,000 sq. km. sea area. Since unlike the mineral resources, fish is a renewable living resource, only judicious exploitation and scientific management and development can ensure maximum benefit out of it. Over the last two decades, the share of marine fisheries in the total national landing rose from 10.6% in 1970 to about 22% in 1996. If appropriate technology can be adopted, this can be increased manifold.

13.25.2 The increasing pressure on the coastal resources in Bangladesh has caused decline of many marine fishes and shell fishes in the Bay of Bengal. The artisanal fishing which contributes about 95% of the total marine landing is largely composed of post larvae and juveniles which are seriously damaging the stock due to use of crude traditional technology. The number of artisanal fishing gears including estuarine set bag nets, beach seine nets and shrimp seed push nets are increasing alarmingly causing serious over exploitation of stocks. So, the following measures/programmes will be undertaken to improve the marine fisheries resources during the Fifth Plan period:

- a. assessment of pelagic, demersal and other marine resources and their development;

- b. studying and monitoring of oceanographic parameters of the EEZ of Bangladesh;
- c. imparting training to the coastal fishermen and providing support services to improve the socio-economic conditions of coastal fishermen community ;
- d. issuance of licences to mechanised and non-mechanised boats and identity cards to fishermen;
- e. continuous supervision and monitoring of fishing;
- f. ensuring replacement of destructive gears like estuarine set bag net and beach seine nets by other appropriate fishing gears;
- g. reduction of mortality of fish and shrimp larvae during shrimp seed collection;
- h. conservation of marine fisheries resources in the mangrove reserve forest;
- i. stopping sea piracy by trawl fishing of neighbouring countries with the help of the Coast Guards/Naval Forces;
- j. pollution control and environmental conservation through strict enforcement of marine fisheries laws; and
- k. proper utilisation of trash fish, now thrown away by the trawlers;

13.25.3 Post-harvest technology and marketing: Fish marketing carried out at four different stages, largely in the hands of the private sector, is managed, financed and controlled by a group of intermediaries known as "aratders" and "mahajans." The "aratders" provide advances to fish traders who in turn are required to bring fish to them for sale. The fish marketing system is thus traditional and complex though not very competitive. However, it faces serious problems including heavy losses, waste and poor fish quality. It is believed that in Bangladesh, 30 to 33 per cent of all fish caught become unsuitable for human consumption. This economic waste will be reduced through provision of cold-storage facilities, insulated and refrigerated transport systems and adequate supplies of ice. The marketing system will also adjust to (a) expanding export demand for quality frozen sea food, (b) expanding domestic demand for quality fresh and frozen fish and (c) large seasonal fish catches in areas far from the main markets and fish landing centres.

13.25.4 Peoples participation in fisheries: Fisheries sector is considered to be the thrust sector for sustainable development and socio-economic advancement of rural fishermen and fish farmers. Almost all the activities of fish breeding, nursing, feeding, fisheries training, harvesting, transportation, marketing, exporting and other ancillary activities are done by the private sector. Research, development, extension and regulatory activities are performed by the public sector. Twenty five technology packages have already been developed and are being implemented on experimental basis from 1996/97. Recently, some NGOs and private development organisations are involved in group formation, motivation, training and income generating activities of the fishing community and marginal farmers. A strong and effective linkage system will be developed between the government, especially local government bodies, non-government and private organisations in respect of planning, implementation and monitoring of the fisheries development programme. About 10,000 entrepreneurs will be developed in different fields of fisheries during the next five years. Job opportunities for 42,500 poor people will be created in this sub-sector.

13.26 Fisheries Research

13.26.1 Lack of technical knowledge, fish seed, proper management, disease control and suitable manpower account for the present low level fish production in Bangladesh. The onslaught of viral epidemics destroying substantial quantity of pond and fresh water fishes as well as brackish water shrimps has caused concern to the government and the people. Appropriate research support will be provided to address these issues. In particular, it is

proposed to commission a comprehensive study to analyse the sources and causes of fish and shrimp diseases and find out remedial measures.

13.27 Production and Export Projection During Fifth Five Year Plan

13.27.1 The current level of per capita daily fish consumption is about 25.6 gm. In order to raise the level of consumption to about 34.43 gm per capita per day at the end of the Plan period, the required production of fish will be 1.67 million mt. This is based on estimated projection of 132.5 million population by the terminal year of the Plan. In addition, it is assumed that during 2001/2002, the export of shrimp and fish and fish products will be 95,000 mt and another 15,000 mt of fish will be required for industrial and other uses. In view of this demand, the fish production target at the terminal year of the Fifth Plan has been set at 2.075 million mt. Table 13.6 gives the details of projection of fish production in the terminal year of the Fifth Plan.

Table 13.6
Projection of Fish Production During Fifth Plan

(in '000' metric Tons)

Source of production	1996/97 (Benchmark)	2001/2002 (Projection)
1	2	3
1. Inland Fisheries	1,079.00	1,675.00
Ponds	331.90	450.00
Baors	3.50	27.00
Coastal aquaculture	85.00	100.00
Rivers and estuaries	165.00	180.00
Beels and haors	70.00	95.00
Kaptai lake	7.60	9.00
Flood plain	395.00	751.00
Irrigation canals, road side ditches, fresh water polders and enclosures, etc.	21.00	63.00
2. Marine Fisheries	294.00	400.00
Total (1+2) :	1,373.00	2,075.00

13.27.2 Export earnings from shrimp, fish and fish products and other aquatic organisms during 2001/2002 are expected to be Tk.38,045.00 million as against estimated earnings of Tk.16,000.00 million in 1996/97. The export projection for the Fifth Plan is shown in Table 13.7.

Table 13.7
Export Projection of Fish and Fish Products in Fifth Plan Period

(Qty in '000' m tons, Value in million Taka.)

Items	1996/97 (Benchmark)		2001/2002 (Projection)	
	2	3	4	5
1	Qty.	Value	Qty.	Value
Shrimp	28.00	13,150.00	70.00	32,900.00
Fish and fish products	9.80	2,250.00	20.00	4,600.00
Others	5.50	600.00	5.00	545.00
Total :	43.30	16,000.00	95.00	38,045.00

13.27.3 Financial outlay: In order to implement the fisheries development programmes, Tk.5,861.80 million has been earmarked for the public sector during the Fifth Plan. Programme-wise financial outlay is shown in Table 13.8.

Table 13.8
Financial Outlay for Fisheries Development in Public Sector
During Fifth Plan (at 1996/97 prices)

Programme	Financial Outlay
Survey, investigation, feasibility study, research, etc.	400.00
Fisheries education, training, extension and community development	890.00
Culture and capture fisheries development (including inputs and waterbodies development)	4,360.00
Fish landing, storage, processing, marketing, transportation, distribution, etc.	211.80
Total :	5,861.80

(in million Taka)

13.27.4 Private sector: Appropriate programmes and projects will be promoted for implementation in the private sector with support services from the public sector in such areas as fish hatchery, feed mill, culture of fish and other aquatic organisms, fish processing, fish preservation, fish production, domestic sale and export. An amount of Tk.21,847.00 million is expected to be invested by the private entrepreneurs--local and foreign, for implementation of these programmes/projects. Expectedly, investment by the private entrepreneurs will be much more than what is envisaged for the public sector.

D. Livestock

13.28 Past Performance

13.28.1 Livestock sector has the makings of a highly viable sector for generation of employment and income for the landless, unemployed youths and destitute women. Little attention was given to livestock sub-sector until the recent past. In spite of that, about 50,000 private poultry farms, 26,000 duck farms and 26,000 dairy farms have been set up in the country in the private sector. Consequently, there has been a 60 per cent fall in the import of milk powder. Implementation of various development programmes as well as changes in fiscal and commercial policies resulted in the establishment of 26 thousand dairy farms in the private sector. The production of milk, meat and eggs between 1991 and 1995 as against their requirements are shown in Table 13.9.

Table 13.9
Requirement and Production of Livestock Products During Fourth Plan

Year	Population (million number)	Milk (million mt)		Meat (million mt)		Egg (million number)	
		Requirement	Production	Requirement	Production	Requirement	Production
		1	2	3	4	5	6
1991	108	9.86	1.34 (13.59%)	4.26	0.45 (10.56%)	8,985.60	2,046.60 (22.78%)
1995	121	11.04	1.41 (12.77%)	4.77	0.51 (10.69%)	10,067.20	2,539.00 (25.22%)

13.28.2 The production of milk and meat increased by an annual compound growth rate of 1.3 per cent and 3.2 per cent respectively. The growth rate of egg production was, however, satisfactory which was 6.5 per cent between 1990/91 and 1994/95. There are ample potentials for increasing production of milk, meat and eggs in the country. The main problems of this sector are inadequate supply of vaccine, medicine, equipment, feed, health care facilities, quality breed, parent stock, credit facilities and other inputs.

13.29 Fifth Five Year Plan

13.29.1 Objectives: The main objectives for the development of livestock sub-sector during the Fifth Plan are to :

- a. increase people's participation through development of entrepreneur groups and create new employment opportunities for small farmers, landless labourers and women and other target groups in livestock development;
- b. generate income and alleviate poverty of the rural poor through livestock development;
- c. increase the supply of milk, meat, birds, eggs, hides and skins, etc., through improvement in breed, feed and disease control of animals and birds;
- d. undertake adaptive research on breeding, feeding, disease control for cattle, Bengal goat and sheep and poultry bird by BLRI and to transfer appropriate technologies to the users;
- e. improve the quality of draft power of both cattle and buffaloes through genetic improvement, better veterinary services, adequate feed supply and improved management;
- f. increase foreign exchange earnings through the export of quality hides and skin, and to reduce dependence on import of powder milk;
- g. involve the private sector, local government bodies and NGOs in livestock industry for credit distribution, production of cattle and poultry feed, milk processing, input supply and marketing and to improve distribution network for these products in collaboration with Department of Livestock and Livestock Research Institute;
- h. privatise input supply and to provide fiscal support, if needed, for sustainable development of the sub-sector.

13.29.2 Strategies: In order to achieve the above objectives of the Fifth Plan, the following strategies will be adopted:

- a. improvement of the quality of animals and birds through genetic upgrading, preservation of native breeds and selection of exotic breed;
- b. wider provision for treatment of infectious diseases and parasitic infections and large scale production of vaccine at home;
- c. increasing fodder supply through intensive use of available land;
- d. improvement of livestock management through manpower training and skill development;
- e. improvement of the quality of draft animals and expansion of single animal ploughing system;
- f. emphasising development of dairy cattle and encouraging establishment of mini dairy farms through support services;
- g. encouraging goat and sheep production through supply of inputs;
- h. giving special emphasis on poultry husbandry for increased supply of meat and eggs;
- i. giving credit for livestock and poultry farming on reasonable terms in the private sector;
- j. improvement of marketing facilities for realisation of competitive prices by the farmers;
- k. discouraging import of powder milk and other livestock products;
- l. strengthening of the organisational and institutional framework of the Bangladesh Livestock Research Institute for undertaking research on livestock production and expanding the data base on socio-economic aspects of livestock development;

- m. training of the target groups like the landless, destitute women, unemployed youth and poor farmers in livestock management, inputs production, product processing and marketing for poverty alleviation and income generation.
- n. pricing of vaccines for cost recovery and commercialisation of Veterinary Vaccine Productions Laboratory under the Department of Livestock Services.

13.30 Major Programmes

13.30.1 Feed and fodder development: Feed mill will be established in the private sector at important places of the country. The government will provide support services in the form of credit and technologies. Fodder production will be encouraged through crop diversification, inter-cropping and plantation of fodder trees with timber trees.

13.30.2 Animal health and disease control: The programme consists of diagnosis, prevention and treatment, vaccine and medicine production and distribution. Qualitative and quantitative improvement will be made in disease control. Facilities will be expanded and number of veterinary surgeons will be increased by 350 during the Plan period. About 10,000 youths will be trained as veterinary health workers.

13.30.3 Animal breeding and breeder multiplication: Programmes will be directed towards multiplication of breeding of cattle, buffalo, goat, sheep, fowl and duck. Increase in milk, meat and egg production will be achieved mainly through quality improvement of local cattle by cross-breeding with deep frozen semen through artificial insemination and improvement of poultry through introduction of high breed commercial birds for eggs and meat production. The poultry population is expected to increase significantly during the Plan period.

13.30.4 Extension training and education: In order to increase livestock productivity, improved production technologies will be spread all over the country. Training of farmers, farm owners and NGOs for all kinds of related activities of this sector will be given through extension services and formal and informal education. Number of veterinary colleges and veterinary training institutes will be increased from 2 and 3 to 6 and 21 respectively which will be located in 6 divisions and 21 former larger districts.

13.30.5 Input production: Input production like production of vaccine, semen, day old chick, duckling and eggs through different projects included in the Plan will increase significantly. Vaccine production will increase from 350 million doses in 1996/97 to 400 million doses in 2001/2002, semen production from 1.8 million doses to 4.5 million doses, day-old chick production from 4 million to 6 million, duckling production from 0.5 million to 1.0 million and egg production from 2,815 million to 4,730 million during the Plan period. Limited input production still in the public sector will be gradually transferred to the private sector. Meanwhile, existing input supply programmes in the public sector will be run on full-cost recovery basis.

13.30.6 Employment creation and poverty alleviation: Programmes undertaken during the Fifth Plan will create positive impact on self and wage employment in livestock farming, chick and goat rearing, feed selling, and other income generating activities under different package programmes of the Department of Livestock. Credit programmes of various NGOs are supporting women's involvement in livestock production around homesteads using surplus labour and agricultural by-products. The government encourages these programmes. The total number of man days involved in the livestock development activities is likely to

increase from 12.50 million in 1996/97 to 16.00 million in 2001/2002. The beneficiaries like poultry workers will increase from 22,600 to 45,000, chick rearers from 8,000 to 12,000, key rearers from 5,00,000 to 14,00,000, feed sellers from 1,000 to 3,000, egg collectors from 2,600 to 6,500 and mini hatcheries from 200 to 1,000.

13.30.7 Projection of livestock products for Fifth Plan: The production of milk, meat and eggs will show a significant increase during the Fifth Plan period. Details may be seen in Table 13.10.

Table 13.10
Projection of Milk Meat and Egg Production During Fifth Plan

Products	Unit	1996/97 (Benchmark)		1997-2002 (Projection)				
		3	4	5	6	7	8	9
1	2	Projection	Achievement	1997/98	1998/99	1999/2000	2000/01	2001/02
Milk	'000' mt	1,600	1,510	1,680	1,764	1,850	1,942	2,058
Meat	'000' mt	600	575	630	662	702	744	788
Egg	million number	3,005	2,815	3,260	3,550	3,890	4,280	4,730

13.30.8 Marketing: Marketing of livestock products and by- products in our country is not properly organised. Livestock market places are under-developed and unhygienic. As marketing network of livestock products and by- products is not properly maintained, the producers are being deprived of their benefits. During the Fifth Plan, programmes will be taken up for improving marketing channel to ensure quality and equitable distribution of benefits at different stages of production process.

13.30.9 Research: Adaptive research on breeding, feeding, disease control, etc., will be undertaken by BLRI and appropriate technologies will be transferred to the users. Research result on fodder production, processing and preservation and vaccine production already tested and certified will be released shortly, while on going programmes in these areas will receive priority. Particular emphasis will be given to different aspects of poultry. Locally suitable poultry and cattle breed will be developed. Attempt for poultry parent and grand parent stock development will be made. Technology transfer through collaboration with international and advanced research institutions abroad will be promoted.

13.30.10 Role of NGOs: NGOs will perform major role in group formation, training, extension services, credit disbursement, supervision and recovery and conducting socio-economic studies related to development projects. Government-NGO co-operation will be more extensive for development of this sector.

13.30.11 Private sector: In the Fifth Plan period, one of the major and most important thrust of the public sector programme will be to support the private sector for the development of livestock and poultry. Towards this end, adequate technical, material and financial support, training on breeding, feed production, marketing, credit management, adoption of new technologies, disease control, etc., will be given to the private entrepreneurs. Some 23 technology packages have been developed and are being implemented on experimental basis since 1996/97. About 10,000 entrepreneurs will be trained up in different trades in the next five years. Major trainees will be poultry farmers, egg collectors, chick producers, chick rearers, feed producers, feed sellers, dairy farmers, goat rearers, etc. Integrated approach of developing livestock and fisheries will be encouraged. Fiscal supports

for importing quality breeds, feeds, feed-ingredients, equipment and medicine will be continued and further expanded, if necessary. Some productive units of the public sector will be transferred to the private sector to increase efficiency and for reduction of government subsidy for this sector.

13.30.12 Financial outlay during Fifth Plan: In order to implement the livestock development programmes during the Fifth Five Year Plan, an estimated amount of Tk.5,435.60 million will be spent in the public sector. Year wise break up is given in Table 13.11.

Table 13.11
Public Sector Financial Outlay for Livestock Development During Fifth Plan
(at 1996/97 prices)

Year	Financial Outlay
1996/97	690.00
1997/98	1,000.00
1998/99	1,000.00
1999/2000	1,012.00
2000/2001	1,164.00
2001/2002	1,259.60
Total (1997-2002)	5,435.60

(in million Taka)

13.30.13 In addition to the public sector development outlay of Tk.5,435.60 million, an amount of Tk.20,646.40 million is expected to be invested for the development of livestock by the private entrepreneurs. With increasing supports from the government, private individuals, groups and companies are coming up in a big way in different fields of livestock development. By and large, the main fields will be the establishment of poultry-duck hatchery, poultry-duck farms, dairy farms, goat farms and feed mills, fodder cultivation, beef-fattening farms, etc.

E. Forestry and Environment

Forestry

13.31 Past Performance

13.31.1 An estimated 2.45 million ha (17 per cent) of the total land of the country is under forest or potential forests. Out of this, 2.18 million ha is owned by the government as classified and unclassified forests and the rest 0.27 million ha is owned privately. In the past, wide-spread destruction, unplanned extraction, clearing of forest land for agriculture, etc., have reduced the forest coverage to about 8 per cent as against the minimum requirement of 25 per cent.

13.31.2 In the past plans, the main emphasis was to expand forests and to increase supply of timber and wood. Besides, qualitative improvement of natural forest through artificial regeneration was also given priority. During the Fourth Plan, extraction of forest resources and afforestation of the newly accreted lands continued. Later, due to increased need of environmental conservation, extraction was discouraged. Major thrust during the Fourth Plan was on people's participation and private sector investment in the management and development of forests. Forest plantation during the Fourth Plan was 43,619.84 ha against the

target of 46,947.50 ha showing 93 per cent achievement. The plan target of 16,158 km. of strip plantation was achieved by almost 100 per cent. Rubber plantation covered 1,261.78 ha of land and 7.83 million kg. of rubber was produced. Moreover, the coastal afforestation programme, bamboo, cane and murta plantation and industrial and strip plantation showed good performance.

13.32 Fifth Five Year Plan

13.32.1 Objectives: The main objectives during the Fifth Plan are to expand forest resources, make forests productive, develop institutional capabilities, and to encourage people's participation. By the end of the Fifth Five Year Plan, it is envisaged that the tree coverage will be increased to 14 per cent of the land area of the country and a sustainable status of existing forest resources will be achieved with the active participation of the local populace. Specific objectives will be to:

- a. expand and rehabilitate the forest resources to increase productivity;
- b. conserve and protect the eco-system for bio-diversity and overall environmental stability;
- c. continue and expand people-oriented afforestation programme to elevate socio-economic well-being of the people;
- d. promote multiple land use technology like agro-forestry to ensure increased productivity and supplement agricultural production;
- e. effectively conduct forestry extension activities to transfer improved technology and research information to end-users, e.g., local people and private homesteads;
- f. conduct need-oriented co-ordinated research and experimental works;
- g. initiate development of quantitative and qualitative human resources;
- h. achieve meaningful participation of local people, local government bodies, NGOs and government agencies in forestry programmes; and
- i. encourage private plantation of rubber, teak, mango, jackfruit and other high-value trees.

13.33 Policy Strategy and Programme

13.33.1 In line with the above objectives, policies, strategies and programmes for the forestry sub-sector during the Fifth Plan will be as follows :

- a. The natural forests of the country will be set aside for conservation purpose. That means, the productivity of plantations will have to be increased manifold. People's participation will be incorporated in all forest development as far as practicable including maintenance. In this regard, zoning system might be initiated. People's participation will be encouraged in the peripheral and buffer zones. Integration of tree plantation and crop cultivation will be practised. Multi-purpose trees will receive special attention.
- b. Existing low productive plantations, both mature and deforested, will be replanted in the hill forests. Scientific management principles will be strictly observed to restore productivity of these lands. A business enterprise system will be introduced to manage forests for profit. A total of 1,05,000 ha of plantations will be raised in the reserved, protected and unclassified state forest land of hilly areas during the Plan period.
- c. The existing coastal afforestation, including mangroves, will also be continued. The existing mature coastal plantations will be cut and replanted. An area of 18,000 ha will be planted and replanted in the coastal areas. The Sundarbans Reserve Forest

(SRF) is the largest single natural mangrove forest in the globe. However, SRF is presently engulfed with severe ecological problems. The most important species of this forest, Sundari is affected with top dying. Other aquatic, floral and faunal diversity are fast disappearing or on the verge of extinction. Following the integrated development approach for the forest sub-sector, an Integrated Resource Management Plan has been prepared. Another programme for bio-diversity conservation in SRF is in the pipeline. Extraction of top-dying Sundari trees and enrichment plantation is also a priority issue of the forestry sub-sector. During the Plan period, 2.5 million cft. of Sundari will be extracted and enrichment planting of 2000 ha will be carried out in the Sundarbans. The sal forests of the country has been degraded and deforested for many years. The programme to rehabilitate the sal forests will gradually be taken up as before. A total of 32,000 ha of agro-forestry and woodlot plantations will be raised under different projects in the sal forest regions.

- d. To prevent the extent of damage by cyclones and tidal surges, a programme will be undertaken under which 24,500 km. of strip forests will be raised during the Plan period.
- e. The reedlands of Sylhet has long been lying unutilised. In addition to the existing reedland development project under implementation in these areas, some more programmes will be taken up in future. Under the Fifth Plan, 7,000 ha of reedlands and 1,000 ha of wetlands will be planted by local government bodies with people's participation at grassroots level. In addition to this, 7,000 ha of char land will also be planted under the Forestry Sector Project.

13.33.2 Farmland forestry: Potentials for increasing productivity of the farmlands which are degraded due to drought condition and in the gully areas especially in the north west, exist. A project will be undertaken to afforest the farm lands/farm land ridges. Agro-forestry will be made popular gradually. About 8,000 ha of farm land plantations will be raised during the Plan period.

13.33.3 Social forestry: Social forestry has now become a social movement in Bangladesh. The programme includes expansion and strengthening of 335 thana nurseries, establishment of 2,000 union level nurseries, expansion and strengthening of 80 forest extension and nursery training centres, distribution of 40 million seedlings and raising of 19,000 km. of strip plantations. The local government bodies will co-ordinate the afforestation programmes at the grassroot level under this programme. During the Fifth Plan, NGOs will be more directly involved in afforestation programmes. They will be motivating people through informal training and other extension sources and will help the Forest Department to implement its programmes. In some cases, they will be co-sharers of benefits of the plantation projects.

13.33.4 Rubber plantation: Three hill districts and parts of greater Mymensingh, Sylhet and Tangail are specially suitable for rubber cultivation. Rubber plantation in Bangladesh was started on a pilot scale in 1961 by BFIDC. So far an area of 31,118 ha (1995) has been planted which yields 7.83 million kg raw rubber in the public sector. A total of 16,527 ha has, of late, come under rubber plantation in the private sector with a production of 0.25 million kg. Taken together, these account for about 35 per cent of the country's requirement for raw rubber. The yield rate, however, is not satisfactory. This is mainly because of poor seed and management, inadequate technical knowledge, lack of infrastructural facilities like access to roads and electricity, support services and credit. These problems will be addressed properly

in the Plan period. Inter-cropping with fruits and vegetables will be attempted. Joint participation of local and foreign investors will be explored.

13.33.5 Wood energy development : Wood energy contributes 13 per cent of the total fuel consumption of the country. Wood fuel is the most important form of energy for domestic use in rural areas. In Bangladesh, domestic cooking consumes 65 per cent of fuel wood and the rest 35 per cent is consumed by the industrial and commercial sectors. There is a wide gap between supply and demand of fuel wood in the country. To meet high demand relative to supply, recently through social forestry, short/medium rotation fast growing tree species have been planted along the roads and embankments, and on marginal and fallow lands with active participation of local people. BCSIR has developed efficient wood burning oven. Further research programmes on development of wood fuel, efficient use of wood, etc., will be undertaken in the Plan period to reduce strain on wood supply. Technical assistance may be required for this purpose.

13.33.6 Non-wood forestry products: As a subsidiary product of forests, non-wood forest products have substantial potentials for economic benefit. Bamboo, cane, murta, medicinal plants, honey, wax, gol-patta, etc., did not receive proper attention in the past. Non-wood forest products will be developed during the Fifth Plan in a systematic way. The Fifth Plan projects to cover 8,000 hectare with non-wood forest products.

13.33.7 Forestry survey and research: Emphasis will be given to homestead private forests in terms of genetic research (tissue culture) to improve productivity. Supply of inputs will be made cheaper and easier. Emphasis will be given for maximum utilisation and multiple use of land. Research on non-wood forest products, especially for rural use, will be conducted. The forest soil survey will be completed so that site-species matching can be ensured. In addition, detailed inventory of forest resources will be carried out to prepare specific forest management prescriptions. Moreover, detailed survey of about 400,000 ha forest lands will be conducted and forest areas will be demarcated to avoid unlawful encroachments.

13.33.8 Forest institutions, policies/legislation: The responsibility of development of forestry in the country rests largely with the Forest Department (FD). But the FD has long been constrained by shortage of skilled manpower, logistics and legal backing. Development of forestry to a large extent will be contingent on the institutional development/reforms of FD and other allied institutions. Future actions during the Fifth Plan will be in accordance with the new Forest Policy and the Master Plan. New laws pertaining to the conservation of forests and wildlife will be introduced. FD will be reorganised and participation of local people will be emphasised. The role of BFIDC as a public sector corporation will be reviewed, especially considering the declining scope of mechanical extraction from Chittagong Hill Tracts and opening up of rubber plantations to the private sector.

13.33.9 Extension and training: Recently, high emphasis is being given to participatory approach for development. Involving local people in implementing and maintaining development programmes is the cardinal principle of such approach. Thus, during the Fifth Plan, people-oriented programmes will receive special attention. There is a need for vigorous forestry extension activities and training to implement these programmes. The Fifth Plan projects to train about 100,000 persons, especially in social forestry at the grassroots level. Besides, as mentioned earlier, to develop the skills of manpower in the forestry sector, a total of 1,550 persons will be trained in professional, sub-professional and bottom level of the Forest Department and allied agencies.

13.33.10 Conservation: Presently, about 1.5 per cent of the total land area falls under protected land area category which is about 10 per cent of the total forest land. The protected area will be increased to 15 per cent during the Plan period. Effective management plan for all the protected areas will be prepared with the introduction of zoning system. People's participation will be effectively utilised in conserving resources in the respective zones. Along with this, eco-tourism will be introduced in a selective way based on the carrying capacity of the eco-system. Use of alternatives to forest products like steel/plastic furniture and aluminium structures will be encouraged. This will ease the pressure on forest products. Ban on the use of fuelwood in brick fields will continue and be made more effective and other modes of efficient use of energy will be promoted, e.g., improved cooking stove. Moreover, programmes will be developed and implemented to protect the threatened/endangered species of flora and fauna and the fragile eco-system. Wildlife farming of deer and reptile like crocodiles, iguana, snakes and frogs, etc., will be encouraged and promoted on a commercial basis through private initiatives.

13.33.11 Financial outlay: An amount of Tk.6,982.10 million has been provided for development of forestry in the public sector during the Fifth Plan. Details are given in Table 13.12.

Table 13.12
Physical Programme and Financial Outlay for Development of Forestry in Public Sector
During Fifth Plan

Item	Physical Activities	Financial Outlay
(in million Taka)		
FORESTRY SUB-SECTOR		
1. Plantation and Maintenance (hectare)	209,938	2,729.20
a. Hill forests (RF, PF, USF) (ha.)	105,000	1,365.00
b. Coastal afforestation and enrichment plantation in the SRF (ha.)	20,000	260.00
c. Reed land, wetland and charland plantation (ha.)	15,000	195.00
d. Agroforestry, woodlot and farmland afforestation (ha)	40,000	520.00
e. Strip plantation (24500 km) equivalent to (ha.)	19,000	247.00
f. Bamboo, cane and medicinal plants (ha.)	8,000	104.00
g. Vacant land in tea garden, around pond banks and in Barind tract gullys (ha.)	2,938	38.20
2. Seed orchard establishment (Seed orchard division)	4	129.74
3. Seedlings distribution (million number)	56.6	468.00
4. Jhumia Rehabilitation (family no.)	3,000	233.00
5. Development of Wildlife Conservation, Environment, Education, Recreation etc.	-	996.66
6. Physical Infrastructure	-	650.00
7. Vehicles/Equipment	-	191.00
8. Survey, Demarcation, Inventory and Work Plan Preparation	-	203.00
9. Manpower	3,000	708.20
10. Extension and Training	-	203.20
11. Research	-	270.00
12. Miscellaneous	-	200.10
TOTAL		6,982.10

13.34 Private Forests

13.34.1 In Bangladesh the village forest area is comprised of only 0.27 million ha. But this forest has been meeting most of the demand for forest products like timber, firewood, etc. Over the years the village forests including the homesteads have grown into a major source of forest products, especially with the initiative and involvement of local people. However, during the earlier plan periods, supports were provided from the government, mainly in terms of technical back-up and extension services. More support is necessary to establish this as a sustainable source of forest resources especially for promoting multi-purpose tree species of high productivity. Extension, training and credit facilities will be provided to encourage the private sector to undertake rubber, teak, jackfruit and other high value crop plantation on a commercial basis.

13.34.2 With the successful implementation of social forestry, thana afforestation, homestead forestry, farm forestry and agro-forestry programmes/projects, increasing investment is coming up in the private sector as well as in the public sector. An amount of Tk.4,732.00 million is projected to be invested by the private sector for nursery development, seedling raising, plantation, maintenance, etc., in the Fifth Plan period.

Environment

13.35 Past Performance

13.35.1 Bangladesh is facing a number of environmental problems. These have originated mainly from population pressure, extreme poverty, natural disasters, depletion of forest resources, energy crisis, unplanned urbanisation and industrialisation, water pollution, air pollution in major cities, soil degradation, etc. Bangladesh has been trying to combat environmental degradation and correct the same with limited facilities and resources.

13.35.2 The main theme of programmes of the Department of Environment (DOE) in the past was to develop institution and policy and programme tools to fulfil its mandate. During the last plan period, one of the vital projects of the Department was the "Improvement in Dhaka Urban Environmental Infrastructure Project" to the end of strengthening DOE's capabilities in environmental planning, pollution control and monitoring. Under this project, a laboratory and functional building was constructed at Dhaka along with procurement of 24 items of laboratory equipment and logistic supports. There was a plan for development of other regional laboratory/office building during the Fourth Five Year Plan. Due to various constraints these works could not be undertaken till the last financial year.

13.35.3 Ministry of Environment and Forest completed a comprehensive study on National Environmental Management Action Plan (NEMAP) for identifying probable environmental concerns/issues and their remedial measures in different sectors of the economy. A good number of programmes and projects have been recommended for implementation under different ministries/organisations. Subsequently, another TAPP 'Bangladesh Environment Project (BEP)' was taken up to formulate investment projects in the light of NEMAP recommendations.

13.36 Fifth Five Year Plan

13.36.1 Objectives: The main objectives of the Environment sub-sector during the Fifth Five Year Plan are as follows:

- a. promoting appropriate environment management system for sustainable development;
- b. ensuring conservation of bio-diversity and its sustainable utilisation;

- c. ensuring active participation of the poor, especially the women, in environment management activities;
- d. promoting environment-friendly activities in development programmes/projects;
- e. preserving and protecting the natural resource base;
- f. strengthening the capability of public and private sectors to manage environmental concerns;
- g. minimising environmental pollution from different industries;
- h. monitoring and controlling present environmental pollution and degradation related to soil, water and air;
- i. fulfilling obligations under international treaties and conventions for minimising adverse impacts on global environment;
- j. promoting co-operation with regional and international institutions/organisations to address global environmental problems;
- k. undertaking research and development for innovating technology in national perspective and application of modern technology, information exchange and benefit sharing with other countries; and
- l. creating public awareness in order to participate in environment promotion activities.

13.37 Policy and Strategy

13.37.1 The following policies and strategies will be taken up during the Fifth Five Year Plan to attain with the above objectives of the environment sub-sector:

- a. National Environment Council headed by the Prime Minister and Executive Committee of National Environment Council headed by the Minister for Environment and Forest will be more active for policy designs and programme directives;
- b. Environment committees at division, district and thana levels with people's participation will be strengthened; attempts will be made to form this committee at union parishad level also;
- c. Department of Environment will be strengthened in the light of existing Environment Policy, Laws and Action Plan in order to co-ordinate, monitor and implement these activities;
- d. Drafting of rules, regulations and guidelines under the Environment Protection Act (EPA) 1995 will be finalised soon in order to ensure effective enforcement of EPA;
- e. Sectoral legislations are to be reviewed and redrafted in the light of Bangladesh's commitment expressed through signing and ratifying a number of International Conventions and Protocols on environment;
- f. 'Polluters Pay Principle' will be followed in order to ensure strict compliance of environmental legislation; and
- g. Incentives in the form of tax-rebate, tax-holiday, etc., will be provided and incremental cost incurred by the environment-friendly entrepreneurs will be met in various forms and from multiple sources;

13.37.2 Programmes : In considering the socio-economic and environmental aspect of the country, the following activities/programmes/measures will be taken in the environment sub-sector during the Plan period :

- a. Raising manpower and infrastructure development of the DOE in order to fulfil its mandate; there is an urgent need to create and establish 2 (two) new divisional offices in Sylhet and Barisal Divisions and 12 (twelve) sub-regional offices with laboratory

- and other necessary facilities of local government at old districts of the country during this Five Year Plan period;
- b. Skilled manpower is essential for better environmental management and co-ordination. In this regard, DOE will undertake training programmes on different subjects concerning environment;
 - c. Survey, research and development activities in different fields and subjects will be taken up to combat environmental degradation and other environmental problems. A research and training centre will be set up during this Plan period;
 - d. Facility of data-base and documentation of different environmental subjects and fields will be created to help decision makers, other professional groups, institutions and government departments and ministries to formulate an appropriate plan of action to protect environment. United Nations Environmental Programme (UNEP) is going to establish electronic information network in DOE shortly;
 - e. Public awareness is a key to achieve success in any national programme. With the help of electronic and other media, it has now become very easy to reach all the people within a short time. DOE is trying to use all kinds of modern media in order to disseminate information on environmental issues and encourage entrepreneurs to come up with more investment;
 - f. DOE will formulate projects and undertake activities to the end of environment protection of Bangladesh, Agenda-21 and NEMAP and take initiative to implement international protocols and agreements on environment;
 - g. "Environmental Court" may be established to resolve all cases of violation against any clause under the Environment Protection Act, '95 and other rules, regulations and policies meant for preserving and protecting the environment;
 - h. Establishing treatment plants for industries (e.g., cement, fertiliser, paper, textiles, handloom, leather, etc.) and making their use mandatory;
 - i. Introducing self-monitoring system in Export Processing Zones and other industrial areas; and
 - j. Strengthening drinking water quality surveillance.

13.37.3 Physical programme and financial outlay of the public sector for development of environment during the Fifth Plan are shown in Table 13.13.

Table 13.13
Physical Programme and Financial Outlay for Development of Environment
in Public Sector During Fifth Plan

(in million Taka)		
Programme	Physical Activities	Financial Outlay
Strengthening of DOE at regional and sub-regional levels.	18 offices	120.00
Phasing-out of ozone depleting substances	-	20.00
Biodiversity management	11 Centres	110.00
Environmental quality control, monitoring and management.	19 Air Monitoring Stations and 6 Treatment Plants.	120.00
Public awareness on environmental standards	-	10.00
Alternative energy development.	-	10.00
Agenda-21: Implementation follow up.	-	10.00
Total		400.00

13.37.4 Private entrepreneurs are expected to invest in environmental protection and development. In setting up and maintaining places of scenic beauties, in preventing wanton destruction of good and pulsating environment and in keeping Bangladesh beautiful, private sector is expected to come up in a larger way hitherto not accounted for in the recent past. Private investment for environmental development in the Fifth Plan is projected to be at least Tk.100 million, i.e., a fourth of the envisaged public sector investment.

Water Resources

13.38 Introduction

13.38.1 The twin problems of shortage of water during the dry season and its abundance in the rainy season are critical to the development and management of water resources in Bangladesh. During the winter months, optimum use of available water resources will have to be made taking into consideration the multifarious demand for use of water for domestic need, irrigation, navigation, fisheries, livestock, forestry, environment, etc. On the other hand, in the wet months, the main tasks, in addition to provision of supplementary irrigation, are controlling, regulating and managing of floods to protect human lives, properties, crops, etc. It is estimated that 7.56 million ha could be developed for irrigation as against the current irrigated area of 4.00 million ha while 5.76 million ha will require flood control and drainage (FCD) facilities as against 4.2 million ha covered in 1996/97. Bangladesh, being in the lower riparian areas of three major rivers of the world, the Ganges, the Brahmaputra and the Meghna, could not since long undertake any meaningful water resources development programme to harness the water flows of these rivers for the benefit of its people. Now, following the treaty for sharing the Ganges water with India, vista of opportunities have been opened up for regional, sub-regional, basin and sub-basin wise development and management of water resources for the benefit of all peoples of the region. It is in this backdrop that the Ganges Barrage is being taken up for implementation during the Fifth Plan period.

13.39 Major Issues: Physical Environment

13.39.1 Most of Bangladesh is located within the flood plains of the three great rivers mentioned above and their tributaries and distributaries.

13.39.2 The three rivers drain a total catchment area of about 1.72 million sq km, of which only about 7 per cent lies within Bangladesh. This limits the ability of the country without co-operation of the upper riparian to have any control over the inflow of water and sediment that flow over it to discharge into the Bay of Bengal. There are five major adverse effects of this which are described below:

a. Flood and drought

- i. The country's unique geo-physical setting makes it extremely vulnerable to both flood and drought. The annual minimum flow of rivers near the Bay of Bengal is only one-twentieth of their peak monsoon discharge. The high water levels in the major rivers during monsoon cause drainage congestion and over-bank spillage of their tributaries which is often exacerbated by runoff from coincident high local rainfall. Over the 1954-93 period, this resulted in seasonal and fairly predictable inundation over an average of about 26,200 sq. km. or about 27 per cent of the country's net cultivable area of 95,600 sq. km. However, periodic severe flooding is also common and during the aforesaid 39-year period, flooding covered 37 per cent or more of the country in one out

of every 10 years. The record was in 1988 when almost 60 per cent of the country was inundated.

- ii. Certain parts of Bangladesh are also subjected to drought during the monsoon season which adversely affects the cultivation of kharif crops. The upstream withdrawal of water from some rivers by the upper riparian during the dry season has aggravated the situation, giving rise to need for supplementary irrigation and combating salinity and other ecological problems.

b. Siltation: The combined annual average sediment load entering Bangladesh and conveyed to the Bay of Bengal via the main rivers is estimated to be about 0.77 billion mt, varying over a range of 0.45-1.84 billion mt during the period 1956-88. A part of this sediment load is deposited on the floodplains during the flood season, gradually changing its topography and drainage conditions. Bangladesh has an estimated total of 25,000 km of drainage channels and their water conveyance capacity and navigability have been seriously threatened by continuous morphological change of river beds. The problem has not been properly attended to in the past on the ground that dredging is expensive. However, such generalised assertions must be tested against specific cases where very selective dredging and desiltation programme, combined with developing raised platform could provide cost-effective solution of the problem and also assist in poverty alleviation and environmental upgradation.

c. River bank erosion

- i. The floodplains and coastal delta are in a constant state of slow morphological change. The large seasonal variation in river flow results in a varying sediment transportation capacity and causes river-bank erosion, migration of river-banks and meandering river channels. Recent satellite image studies of the Ganges-Brahmaputra-Meghna rivers show that 106,300 ha were lost to erosion, while only 19,300 ha were accreted over the period 1982-92. The net area of 87,000 ha lost to erosion is equivalent to an annual erosion rate of 8,700 ha. Most of it is agricultural land.
- ii. River bank erosion has significant economic and social impacts. The loss of land, crops and property has led to landlessness and impoverishment of thousands of households. A study showed that out of the total population of 1.88 million living in the Brahmaputra floodplains, 450,000 live within the banklines or riverine chars and the remainder within a kilometre of the river. Over the period 1980-92, land capable of supporting 405,000 people was eroded and new char land created from the eroded sediment could only support 55,000 people causing a net displacement of 350,000 people.
- iii. Since river training and river bank protection work involve huge sum of money, major investment in these areas was not encouraged in the past by our development partners. But lately, there has been a growing concern and reassessment of the economic and socio-political benefits of protecting important towns, infrastructure, hats and bazars as well as agricultural land.

d. Cyclonic storm surges: Natural calamities are recurring phenomena in Bangladesh, the most severe ones occurring in the form of cyclonic storms which mainly affect the coastal districts. The country has over 700 kms of coastline on the mainland and several offshore islands in the Bay of Bengal. Vulnerable areas include the important port towns of Chittagong and Khulna and heavily populated islands of Sandwip, Kutubdia and Hatiya. During the last 125 years, over 42 cyclones hit the coastal belt; 14 occurred during the last 25 years. Cyclones often take a heavy toll of human life, livestock, crops, properties, and physical infrastructure. Such cyclones also tax the country's institutional and financial

capabilities, since resources have to be diverted to provide immediate relief to the affected population and to restore damaged or destroyed physical facilities.

- e. Salinity intrusion:** Since the Farakka Barrage in West Bengal went into operation, the net availability of surface water to Bangladesh via the Ganges during the dry season was reduced below critical level. The impact of this reduction is demonstrated by a marked increase in salinity in southwestern Bangladesh. The southern part of this affected region is subject to tidal action from the Bay of Bengal and saline intrusion from the tides is normally pushed back by upland flows of fresh water from the Ganges through its tributaries in which the Gorai plays a vital role. Due to flow reduction since 1975, tidal limits and the salinity front have moved northward. Around Khulna, some 146 km. upstream from the Bay, the salinity (in terms of electric conductivity) has increased from 380 micro-mhos/cm in the pre-diversion period to 29,000 micro-mhos/cm. This is a major problem in over 25,900 sq. km of the Ganges dependent area and is causing both short and long-term problems in crop production, fishery, forestry, power generation, industrial development, health care and domestic water supply. Following the Ganges water sharing treaty with India signed on December 12, 1996, the situation seems to be improving; the desired improvement will not take place till the proposed Ganges barrage is constructed and water flowing down the Gorai and other relevant distributaries is augmented.

13.40 Water Resources Potential

13.40.1 The net cultivable area of the country is estimated at 9.03 million ha of which 7.56 million ha is suitable for irrigation. The primary mode for increasing agricultural production for the last two decades has been an expansion of irrigation coverage during the rabi season. Irrigated land in Bangladesh comprises approximately 3.99 million ha. Of this, large irrigation systems currently service about 0.40 million ha; shallow tubewells, about 2.23 million ha; low-lift pumps, 0.58 million ha; deep tubewells, 0.52 million ha and traditional and other methods, about 0.26 million ha.

13.40.2 Investment in barrages, reservoirs, pumps and canals is likely to provide adequate access to fresh water supply in the future. The Ganges water sharing treaty has removed some degree of uncertainty in the quantum of surface water available to south west Bangladesh during the dry season. However, with increasing use of water by a growing population and increasing industrial and agricultural uses, there may be a need for surface water storage and additional ground water augmentation. In this context, reaching agreement with the upper riparian in respect of sharing of water of other common rivers is of vital importance. Both for intermediate and long term planning accurate assessment of surface and ground water availability throughout the year will be necessary as only then conjunctive use could follow.

13.40.3 Proper drainage planning is also necessary for removing excess water during the wet season. Development in drainage infrastructure, both on public and private accounts, will have to be carefully thought out and the enabling environment created for public participation.

13.40.4 Managing the supply of water has been addressed in piecemeal fashion in the past. Flood management has been a top priority for decades, but an environment-friendly mechanism for doing so is yet to be designed for protecting the interest of navigation and fisheries. However, once the total resource picture is clear, the upcoming water management plan will address the issue properly.

13.41 Institutional Framework

13.41.1 Since time immemorial, water has been viewed in Bangladesh as a free gift of nature. Systematic exploitation of water resources began in the country in the early sixties with the start of the flood control, drainage and irrigation (FCDI) projects as prepared under the National Water Management Plan. It was then believed that crop vulnerability to flooding could be reduced by the construction of embankments and polders to create flood-free areas. Though Land and Water Resources Sector Study (1972) by the International Bank for Reconstruction and Development de-emphasised major FCD projects and recommended substantial public investment in minor irrigation, the preference for FCD along with major civil engineering work did not diminish very significantly. A National Water Plan (NWP) completed in 1991 proposed an ambitious programme costing US \$4.2 billion for 20 years for construction of FCD projects to increase monsoon rice production and to complement minor irrigation development. The plan also recommended studies to establish the engineering and economic feasibility of Ganges and Brahmaputra Barrages and measures to control salinity in the south-west region. The latest studies under the aegis of the Flood Action Plan (FAP) also stressed structural measures along with consideration for such aspects as impact of these on fisheries, project-affected people and environment.

13.41.2 The dominance of structural measures as the primary mode of water resources development led to the empoldering of over 3 million ha or about one-third of the net cultivated area at a cost of over US \$1 billion over the past 30 year period. This fixation has deeply influenced the institutional evolution of the BWDB.

13.41.3 Past water sector planning has been criticised on the ground of its heavy reliance on structural measures that caused major externalities and sacrificed the interest of other groups like the fisherman, boatman, landless labourer and women. In a country with severe water imbalances during different periods of the year, it is inevitable that any solution will have impact on one or the other users of water adversely to some extent. The issue then becomes one of minimising the hardships to all by developing an approach that will protect the minimum interests of the most important constituencies (the poor and underprivileged, for example), ensure water availability for critical needs (drinking water for example) and prevent environmental degradation (by taxing polluters for example). All of these require development of a systematic policy and programme for equating the demand and supply of water through economic measures and socially and environmentally friendly means keeping in mind the legitimacy of claims of all user classes.

13.41.4 The Water Resources Planning Organisation (WARPO) is charged with overall integrated water sector resources allocation and macro level planning while the BWDB is the principal executing agency for carrying out those plans into action after conducting micro level planning. The WARPO is a new organisation and is primarily run by engineers borrowed from the BWDB. There will be vast improvements in its institutional capability when its own multi-disciplinary staff will be recruited which is under way.

13.42 Review of Past Performance

13.42.1 Water sector development strategies and policies have undergone numerous changes overtime and consequently the medium and short term plans had to be modified and guided by these policy objectives. For example, minor irrigation, which covers about 90 per cent of the total irrigated area, was gradually privatised and now it is entirely operated by the private sector. During the Fourth Plan, emphasis was given on the small scale FCDI projects with minor irrigation development to optimise both irrigation coverage and flood control and

drainage improvement to the required direction. Necessary policy measures have been taken to reduce the capacity gap between big and small farmers through formation of water users groups and by providing technical support services and credit to small farmers.

13.42.2 At the end of Fourth Plan period (June '95), surface water irrigation covered an area of 1.14 million ha. On the other hand, cumulative achievement of ground water irrigation at the end of June '95 was 2.17 million ha as against the target of 3.02 million ha.

13.42.3 During the past plans, BWDB constructed about 8,515 km of embankment, 4,774 km irrigation canal and 3,462 km of drainage channel to protect valuable crops, lives and properties. It was estimated that an area of about 4,084 million ha was brought under flood control and drainage facilities at the terminal year of the Plan period.

13.43 Fifth Five Year Plan

13.43.1 Objectives: The objectives of the Plan in the water sector stretching over the period from 1997 to 2002 will be to:

- a. alleviate poverty and generate employment opportunities;
- b. ensure ecological balance;
- c. promote water conservation for irrigation and other uses;
- d. enhance conveyance capacity of water courses through desiltation;
- e. protect towns, commercial centres, agricultural lands, etc., from erosion of inland and border rivers;
- f. promote culture fisheries in the completed projects;
- g. promote optimum use of available flows of the common rivers in domestic, agricultural, fisheries, navigation and industrial sectors;
- h. fulfil the need of irrigation for achieving foodgrain self-sufficiency by ensuring year-round sustainable irrigation through conjunctive use of surface and ground-water thus avoiding over-extraction of sub-surface water;
- i. control floods to protect crops, lives and properties and promote both HYV rice and fish cultivation through controlled flooding;
- j. prevent saline water intrusion;
- k. ensure people's active participation in planning, implementation and maintenance of water sector projects; and,
- l. carry out studies on future water resources development projects.

13.43.3 Strategies: In order to achieve the Plan objectives, the following short and long term strategies will be adopted:

- a. short term strategy will lay stress on maximum utilisation of existing facilities through command area development, effective operation and maintenance and rehabilitation of existing projects, quick completion of carry-over projects and balanced use of surface and ground water and desiltation of rivers and channels. In case of new projects, an integrated basin/sub-basin planning approach will be followed. Avoidance of conflicts between in-stream and off-stream users of water, delineation of coastal areas for shrimp culture on a scientific basis and zoning of areas for shrimp cultivation and paddy cultivation, development of data base and encouraging local participation in project planning, implementation and operation and maintenance, protection of towns, commercial centres and agricultural lands from erosion of inland and border rivers including repair and maintenance of existing river bank protection works will be pursued;

- b. the long term strategy envisages major interventions. Ultimate solution to water resource problems lies in the development and utilisation of the major river waters. Investigations, surveys and studies must, therefore, start for a balanced long term development utilising major river waters through a system of barrages. The recently concluded the Ganges water sharing treaty has unveiled a new vista for a wide range of possibilities in this direction;
- c. comprehensive flood control/management measures will be undertaken to protect lives, properties, and crops keeping in view open water fishery production needs and requirements. Cropping patterns will be changed and improved varieties will be introduced in the protected areas for increased foodgrain and fish production;
- d. needs and programmes to sustain open water fish resources will be included in the irrigation and flood control and drainage projects for long term development; and
- e. As IWTA Master Plan for navigation is under implementation, its effectiveness will gainfully be used in the long term water resources planning, where applicable.

13.43.4 The core strategy: The following proposed measures will carry the water resource management strategy to the year 2010:

- a. **Increasing efficiency of completed projects:** In the previous section, it was noted that, in the past FCDI projects concentrated on irrigation, neglecting other competing needs for water. In addition, these facilities, for a variety of reasons, have not been able to perform to their optimal capacity. Given the need for irrigation expansion, it makes good sense to try to rehabilitate these completed projects through redesign and suitable modifications to remove, as far as practicable, their negative impact on other sectors such as navigation, fisheries and environment. There has to be another parallel effort to organise the beneficiaries for command area development and its long term sustainability.
- b. **River bank protection and environmental upgrading**
 - i. The havoc created by continued erosion by all the rivers in Bangladesh has been highlighted in the previous section. Unfortunately, this problem so far has not been systematically handled. For long, the government has been spending quite a substantial amount on river bank protection. But its impact has been marginal for the reason that the resources are distributed over too many projects covering innumerable sections without completing any section. This type of piecemeal work does not lead to any permanent solution but, more often than not, results in wastage of scarce resources. There is a need for massive investment, and since everybody cannot be satisfied all at once there will be need for prioritisation.
 - ii. Towns, river ports and markets have traditionally been developed by the side of rivers for obvious reasons. These are the growth centres of Bangladesh and they constitute life-line of the economy. Scarcity of resources and larger claim of agricultural needs have so long prevented reasonable allocation for their protection. Out of 240 identified town protection schemes, only 75 have been completed upto June 1996, 96 are at various stages of implementation and the rest are yet to be taken up.
 - iii. Side by side with protection work, there is need for reasonable investment on upgradation of environment. Water supply, improved road network, sewerage disposal, drainage system and other municipal services will be developed fast. With donor support, a modest beginning has been made. This will be intensified and carried out further.

c. Increasing conveyance capacity of rivers

- i. Ever since the birth of Bangladesh, siltation has become a major problem. This has not only adversely affected the navigability in major parts of 25,000 km long riverine routes but has also increased the level of salinity. About one fourth area of Bangladesh has been subjected to the hazard of either desertification or salinity.
- ii. In the past, meaningful desiltation programmes for sustaining desired navigability and water conveyance could not be taken up due to huge cost involvement. The problem has now compounded and it can no longer be ignored. A few surveys and pilot programmes carried under the FAP have revealed the prospect of selective dredging. If a method for partial cost recovery can be found, selective dredging can be a viable programme.

d. Major new investments

- i. As has been mentioned elsewhere, regional surface and ground water development will be reaching near saturation by early next century. This indicates the urgency for development of major rivers by constructing the Ganges and the Brahmaputra barrages. The National Water Plan (NWP-II) recommended feasibility studies of the two major proposed barrage projects in the Fifth Plan. When fully developed, the Ganges barrage, according to the feasibility study carried out in 1984, will be able to irrigate 1.33 million ha. Additionally, round the year sweet water flow through the distributaries of the Ganges will push back salinity intrusion thereby restoring the ecological balance of the Ganges development area. All these will help pursue environment-friendly agricultural and industrial activities which, in turn, will help alleviate poverty.
- ii. The potential to expand irrigation further brings up the question of increasing crop production by increasing production in the kharif (rainy) season. For that, flood protection will need to be provided in order to reduce the risk of flood losses and /or boost production of high yielding crops. Studies carried out under the FAP provides a policy and implementation framework under which HYV rice and fish can be cultivated through controlled flooding.

e. Strengthening and developing relevant institutions

- i. Pursuit of the Plan as outlined above will call for requisite capable institutions. Water sector agencies, particularly BWDB, suffer from many deficiencies. These are well documented in the relevant reports. Through efficient restructuring and over time, steps will be taken to strengthen the institutional capacity of BWDB.
- ii. While doing this, special efforts will be made to develop institutions for local level planning, people's participation at all stages of the project cycle, for ensuring accountability, transparency and long term sustainability of completed projects. Programmes will have to be designed in such manner that these can ensure participation by women and the landless. Finally, allout efforts will be made to minimise the adverse effects of water sector projects on environment. The environmental impact assessment (EIA) guidelines developed under the FAP will be helpful in this regard.

13.44 Programmes For Fifth Plan

13.44.1 Since the scope of further exploitation of surface water from the minor rivers and channels is gradually declining due to shortage of water, more emphasis will be given on the

immediate harnessing and use of main river water to augment the supply in smaller rivers and channels.

13.44.2 Small early implementation projects implemented in the past and currently under implementation by BWDB have created water conservation facilities by way of regulating the post monsoon outflow of the drainage system. Development of such facilities by way of command area development of completed projects will receive priority during the Plan period.

13.44.3 Gravity flow, Low Lift Pump (LLP) and other methods of surface irrigation are, at present irrigating about 1.15 million ha of land. This area is projected to increase to 1.32 million ha (about 15 per cent increase) by the terminal year of the Fifth Plan. Double lifting will be necessary to augment water availability in secondary channels for irrigation purpose.

13.45 Flood Control and Drainage

13.45.1 During the Plan period, small flood control and drainage projects will be continued in addition to phased implementation of specific river bank protection programmes. It is expected that drainage programmes may extend further to cover an area of about 4.9 million ha by the terminal year of the Plan period as against the actual coverage of 3.8 million ha achieved by the end of the Fourth Plan. Comprehensive flood control and management measures will be undertaken to protect lives, properties and crops keeping in view the needs of fisheries, environmental and navigational requirements, etc. For augmenting flows of the Gorai river and other selected rivers and canals, re-excavation of river-beds under Food for Works Programme and also by capital dredging will be carried out during the Plan period.

13.45.2 A prioritised portfolio of strategic vulnerable location of river banks will be identified for phased implementation of river bank protection programme. FAP studies have so far identified a number of hard points along the Brahmaputra and the Meghna rivers. A number of hard points along the Padma banks have also been proposed for protective works. The protective works of other minor rivers proposed to be implemented will be studied carefully before making any investment on these projects.

13.46 A Special Note on Construction of Ganges Barrage

13.46.1 The signing of the historic treaty on the sharing of the Ganges Water at Farakka on December 12, 1996 between Bangladesh and India has added a new dimension to the water management strategy.

13.46.2 Background: The Ganges has been flowing through Bangladesh from time immemorial; the life and livelihood of its people, along with the flora and fauna, have been shaped by this great river. The well-being of more than 40 million people in the south-western region of the country is entirely dependent upon the Ganges. The river provides drinking water, sustains agriculture, forestry and fisheries, helps operate a quarter of the country's industrial activities, prevents salinity intrusion from the Bay of Bengal and plays a determining role in maintaining the ecological balance of the country. The balance between man and nature in the Ganges dependent area (GDA) in Bangladesh rests essentially on the Ganges water as this is the only major source of water in the area and all other rivers receive water directly or indirectly from it.

13.46.3 Past studies: Ever since the preparation of the Master Plan in 1964, the importance of development of the surface water resources has been stressed time and again and the barrage over the river Ganges in Bangladesh has been envisaged for more than three decades

for an overall integrated water resources development in the GDA in Bangladesh as well as for overcoming the adverse effects of large scale diversion of the Ganges water at Farakka. Studies conducted thus far have identified the tentative location of the barrage from the point view of optimal water use and various other engineering and environmental considerations.

13.46.4 Objectives: The proposed Ganges barrage will be constructed at a location near Pangsha about 64.40 km downstream of Hardinge Bridge on the Ganges River. The main purpose of the barrage will be to supply irrigation water to the south-west region of Bangladesh. The project will provide irrigation to an area of 1.35 million ha from the Ganges. The net benefited area of the project will be 1.31 million ha. The time for construction of the Ganges barrage is estimated to be about eight years and the full benefit will be achieved after nearly 18 years.

13.46.5 Salient features: The following are the salient features of the Ganges barrage;

- a. the Ganges barrage, a 1,940 metre long structure is proposed to be constructed incorporating a road and rail bridge and gas, power and other services lines as required to be connected to either bank by the structure;
- b. a right bank main command canal, 74 km long, running south-west from the barrage to feed water into the Gorai, the Kumar, the Nabaganga, the Chitra and the Kobadak Rivers, with a headwork's capacity of 26,500 cusec will be one integral part of the project ;
- c. a second right bank main command canal, 43 km long, running south-east from the barrage to feed water into the Chandana, the Old Kumar and the Sitalakhya rivers, with a headworks capacity of 10,600 cusec will be the second integral part of the project ;
- d. a third right bank canal of 10 km long from the barrage pond near the Hardinge Bridge to serve the area to the west of the Ganges-Kobadak Scheme with headworks capacity of 3,000 cusec will be the third integral part of the project ;
- e. irrigation development by a combination of surface water gravity supplies, low lift pumps and shallow tubewells, which will serve an area of 100,000 ha will be the main components of operational ambits ; and
- f. drainage and flood control by embankments and sluices in low-lying areas covering 1.44 million ha within the command area will be the related objective in addition to irrigation.

13.46.6 Benefits: On its completion, the Ganges Barrage Project will:

- a. restore the basic resource (land) to its original position and safeguard it from further degradation;
- b. increase agricultural production through intensive use of modern techniques; increase in agricultural production following the introduction of irrigation, drainage and flood control will be from 2.20 mt/ha/year to 7.41 mt/ha/year, an increase of 5.21 mt/ha/year. The net economic benefit out of the increased agricultural production only will be about US \$1020 million a year;
- c. provide the required quantum of flows through the Gorai in the dry season to check the salinity intrusion in the south-west region of Bangladesh to maintain ecological balance and protect environment of the region;
- d. restore the natural bio-mass (including the Sunderbans) and safeguarding further destruction;
- e. safeguard the industries in the area;
- f. restore livestock and fisheries resources;

- g. improve soil moisture condition;
- h. increase job opportunities in many sectors including agriculture;
- i. provide crossings for traffic, gas and power across the Ganges and improve the communication system in the region ;
- j. revive economic potential for proper growth of regional economy ;
- k. safeguard public health and sanitation condition ; and
- l. help developing a balanced ecosystem of the region to safeguard environmental degradation.

13.46.7 Costs: The tentative cost of the project which includes barrage, main irrigation and drainage canals, has been estimated at Tk.141,000 million. A provision of Tk.17,175.50 million has been made in the Fifth Plan to undertake detailed feasibility and to prepare engineering works as well as to complete a part of the barrage construction.

13.47 Flood Action Plan (FAP)

13.47.1 Following the devastating floods of 1987 and 1988, Flood Action Plan (FAP) covering a number of regional and sub-regional studies were undertaken to find out the technical, social and environmental issues required to be addressed in formulating long-term flood control, drainage, irrigation and river management programmes. Based on the recommendations of some of the FAP studies, a number of follow-up investment projects have been taken up with donors' assistance. FAP started with 11 main components and 15 supporting studies and pilot projects for implementation during 1990-95. Most of the original programme of studies under FAP have been completed. The regional studies identified and evaluated a number of projects. Some other flood mitigation projects have also been identified in 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 embankments are currently under implementation. Besides, there are a number of on-going long term studies and pilot projects.

13.48 Ground Water Irrigation

13.48.1 Shallow tubewell (STW) and hand tubewell (HTW): There have been changes in the rate of growth and utilisation of irrigation equipment following changes in the government policy during the last few years. For example, it is observed that withdrawal of subsidies from irrigation equipment has slowed down the pace of minor irrigation development. Future growth of minor irrigation will, therefore, depend on adjustment of policies and implementation of suitable programmes to encourage the private sector and individual farmers' participation in minor irrigation development. Strengthening of institutional mechanisms and required support services to the private sector will be provided by the government for accelerated development of STW and HTW irrigation technologies.

13.48.2 Deep tubewell (DTW): Because of high capital and operating cost, DTWs are not commercially attractive to the farmers at full cost. As a result, DTWs are projected to cover an area of 0.51 million ha during terminal year of the Plan as against the current level of 0.52 million ha. It is, therefore, felt that in the areas where DTWs are the only technically feasible modes of irrigation, adequate measures will be taken to make DTWs attractive to the farmers. Such measures will include introduction of high value crops, increasing the command area of individual tubewells through improved onfarm water management practices and formation of DTW users' groups, strengthening support services to water users' groups, including access to electricity, credit, market facilities, etc. Irrigation coverage under traditional methods of ground water equipment, i.e., Deep Tubewell (DTW), Shallow Tubewell (STW) and Hand

Tubewell (HTW) is projected to decline from the estimated 2.81 million ha in 1996/97 to 1.31 million ha by the terminal year of the Plan. Continuation of policy changes in terms of withdrawal of site restriction and subsidy, non-availability of water at required depth, etc., resulting in higher cost, particularly of DTW, are likely to lead to a decline in the use of these equipment by the poor farmers. However, reduction in irrigation area through these traditional methods is expected to be compensated by additional irrigation coverage of 2.23 million ha under relatively new technologies of Forced Mode Tubewell (FMTW), Deep Set Tubewell (DSTW) and Very Deep Set Shallow Tubewell (VDSSTW). It is expected that private sector investment in irrigation development during the Fifth Five Year Plan will be about Tk.5,010 million.

13.49 Involvement of Women in Development

13.49.1 Participation of women in the development and construction of irrigation and flood control infrastructure was found to be insignificant in the past. Presently, local women are working along with men as construction workers in the Food for Works Programme, embankment construction, tree plantation and other projects implemented by the Water Development Board (BWDB). Under the Fifth Plan, steps will be taken to involve distressed and unemployed women in such projects/programmes implemented by the BWDB. In addition, more avenues for employment of women are expected to be created in O & M activities of flood control projects and tree plantation and fish culture activities of BWDB projects. It has been estimated that 0.92 million person-days of incremental employment will be generated by the terminal year of the Fifth Plan which will include a sizable share for women.

13.50 Private Sector Participation

13.50.1 The government is fully committed to promoting the participation of the private sector in increasing irrigation coverage and command area development. As per existing policy measures, sales, marketing, distribution of fertilisers, irrigation equipment, farm machinery, etc., have been entirely transferred to the private sector.

13.50.2 It is noted that irrigation need by farmers is closely linked to rice and commodity prices. For example, if the rice price is low, farmers will be discouraged to spend more for irrigation to produce more agricultural commodities and as such, the expected command area is likely to be diminished. It is, therefore, necessary to evolve mechanisms for price stabilisation. Import of irrigation equipment and machinery will be further liberalised and fiscal policy turned in favour of private sector's participation. At the same time, necessary measures will also be taken to encourage efficient domestic manufacture of irrigation equipment and farm machinery as well as maintenance spares.

13.51 Cost Recovery from Irrigation Projects

13.51.1 Presently, BWDB is collecting irrigation tax from 12 irrigation projects out of 22 completed projects as per Water Rate Irrigation Ordinance of 1963. BWDB started collection of water rate since 1976/77. During 1995/96, the target of collection of water rate was estimated at Tk. 25.00 million against which the amount realised was Tk. 8.77 million. During 1996/97, the revenue collection target was estimated at Tk.30.00 million against which the amount realised till April/97 was Tk.8.59 million. The reasons for low collection was due to evading practices, power failure for which timely irrigation was not possible and lack of proper legislation and punitive measures against the defaulters.

13.51.2 Water pricing will be such as to convey the scarcity value of this resource to the users and beneficiaries to foster their motivation in the economic and social context. The water rate/charge will be adequate to cover the recurrent O & M cost and part of the capital cost. The objective of pricing policies will be to improve efficiency in water use. The users will have incentives to use only the amount of water they need and additional quantities will entail higher cost per unit. The present system of collection of water rate from the irrigation projects is not satisfactory due to procedural reasons and as such revenue generation from the irrigation projects is much lower than expectations. The collection of water rate will be initiated from all irrigation projects as soon as irrigation infrastructure/facilities are created and the beneficiaries will be motivated to pay the price for irrigation soon after they start getting benefits from construction of irrigation infrastructure. The water pricing for surface and ground water irrigation will be rationalised and collection mechanism improved through legislation and improvement of procedural practices.

13.52 Physical and Financial Programmes

13.52.1 Physical: Benchmark position of irrigation, flood control and drainage as of 1996/97 and projection for the terminal year of the Fifth Plan are provided in Table 13.14.

Table 13.14
Irrigation Flood Control and Drainage Projections During Fifth Plan

(area in million hectare)

Programme	1996/97 (Benchmark)	2001/2002 (Projection)
1	2	3
I. Irrigation :		
A. Surface Water Irrigation		
i. Gravity Flow	0.40	0.59
ii. LLP	0.58	0.66
iii. Traditional	0.17	0.07
Sub -Total (A) :	1.15	1.32
B. Ground Water Irrigation		
i. DTW	0.52	0.51
ii. STW	2.23	0.73
iii. HTW	0.05	0.07
iv. FMTW	-	0.01
v. DSSTW	-	2.10
vi. VDSSTW	-	0.12
Sub-Total (B) :	2.81	3.54
C. Others (Minor Irrigation)	0.04	0.18
Sub-Total (C) :	0.04	0.18
Total (A+B+C) :	4.00	5.04
II. Flood Control and Drainage	4.20	4.90

Sources :
 i National Minor Irrigation Census (1995-96)
 ii National Minor Irrigation Development Project
 iii Bangladesh Water Development Board.

13.52.2 Financial: The projection for public sector financial outlay for the development of water resources during Fifth Plan is Tk.73,373.13 million. The detail break-up is shown in Table 13.15. In addition, an amount of Tk.5,500 million is likely to be invested in water resources development by the private sector.

Table 13.15
Public Sector Financial Outlay for Development of Water
Resources for Fifth Plan (1997/98-2001/02)

(in million Taka)

Programme	Financial Outlay
1. Surface Water Irrigation	12,961.00
2. Ground Water Irrigation	3,600.00
3. The Ganges Barrage	17,175.51
4. Flood Control and Drainage including River and Town Protection	34,131.00
5. Surveys, Studies and Investigation	4,640.00
6. Others (Satellite Imagery, Mapping, Char Development etc.)	865.62
Total	73,373.13

13.52.3 Private sector's investment in development of water resources is estimated at about 10 per cent of the public sector's. The nature of investment required for development of water resources limits the scope for an enlarged role for the private sector in the continuing situational context.

Rural Development and Institutions

13.53 Introduction

13.53.1 Bangladesh is one of the most densely populated countries of the world and a vast majority of the population live in the rural areas. Poverty is widespread in the country and more so in the rural areas. It is estimated that around 50 per cent of the population lives below poverty line and about half of them is considered to be the hard-core poor. The rural poverty is characterised by landlessness, over-crowding in agriculture, underdevelopment of rural non-farm sector, colossal unemployment, low savings and acute shortage of credit facilities. Women are the disadvantaged group in the country and more so in the rural areas in their traditional setting with little literacy and almost no skill training. Rural infrastructure in the country consists of 2,100 identified growth centres, 14,400 km of feeder 'B' roads, 87,000 km of rural roads and some 8,300 km of water ways during the monsoon. These infrastructure that contribute towards rural development are mostly underdeveloped and poorly maintained.

13.53.2 For socio-economic development of the country as a whole, reduction of rural poverty is a must. Towards that end, RDI programme will aim at increasing income through productive employment generation in the rural areas and rural infrastructure development, including development of marketing network, to boost up economic activities. These call for undertaking intensive, expanded and multi-dimensional programme during the Fifth Five Year Plan.

13.54 Performance During Fourth Five Year Plan (1990-95)

13.54.1 Under the Rural Development and Institutions Sector, three major types of programmes were under implementation during the Plan period. These were production and employment programmes for the poor, development of physical infrastructure and small scale irrigated agriculture, drainage and flood control works.

13.54.2 Under production and employment programme, about 0.78 million members were enrolled in various formal and informal groups. Most of these group members became self-

employed on receipt of certain amount of credits. The credit disbursed to various formal and informal groups amounted to Tk. 3,019.00 million under BRDB.

13.54.3 Under LGED, the targets for construction of feeder roads seem to have been largely exceeded. Over 3,709 km of roads were constructed against the target of 2,399 km. Similar was the case with construction and rehabilitation of bridges and culverts. Around 42,000 metres of bridges and culverts were either constructed or rehabilitated against the target of over 30,000 metres. Tree plantation on the slopes of the feeder roads, rural roads and embankments were inbuilt in the construction programmes. LGED created over 112.0 million person-days of employment against the target of 133.1 million.

13.54.4 Ministry of Land established some 384 self-reliant ideal villages to rehabilitate 17,315 landless and rootless families. Chittagong Hill Tracts Development Board undertook some programmes for development of the hilly areas, particularly in the field of community development. BARD, Comilla and RDA, Bogra implemented some small projects, mostly experimental and pilot ones. The targets and achievements under the various programmes during the Plan period are shown in Table 13.16.

Table 13.16
Targets and Achievements of Major Programmes for Rural Development and Institutions During Fourth Plan (1990-95)

A. Production and Employment Programme (PEP)			
Programme	Units	Targets	Achievements
Formation of primary societies/group	number	23,581	16,882
Enrolment of members	number	529,621	777,660
Skill training	number	166,695	616,800
Shares/savings	million taka	159.6	449.33
Credit	million taka	330.3	3,019.00
Realisation of credit	million taka	-	2,559.15
Small Farmers Development Programme (SFDP)			
Formation of groups	number	1,982	5,625
Enrolment of members	number	12,145	35,597
Share/savings	million taka	7.3	30.4
Disbursement of credit	million taka	60.7	166.4
B. Development of Physical Infrastructure			
Development of growth centres	number	316	277
Development of feeder road Type -B	km	2,399	3,709
Construction of bridges and culverts	metre	15,039	41,987
Rehabilitation of flood/cyclone damaged bridges and culverts	metre	15,057	
Rehabilitation of flood/cyclone damaged pucca roads	km	2,929	2,574
C. Irrigated Agriculture and Irrigation Management Programme (IMP)			
IMP coverage (DTW)	number	1,556	1,499
(LLP)	number	207	156
IMP training	persons	8,555	6,215
D. Other Minor Programmes			
Settlement of families in Adarsha Gram	number	35,140	17,315
E. Employment Generation			
Infrastructural programme	million person-days	133.1	112.0
Self-employment under PEP	million persons	0.53	0.78

13.54.5 The allocation for the RDI sector during the Fourth Five Year Plan was Tk. 16,500.00 million at 1989/90 prices. In the revised ADPs during the plan period, an allocation of Tk. 25,622.20 million was given to this sector against which an amount of Tk. 21,823.5 million was utilised. ADP allocations and expenditures incurred during the period are shown in Table 13.17.

Table 13.17
Revised ADP Allocations and Expenditures for Rural Development and Institutions
During Fourth Plan (at current prices)

(in million Taka)

RDI Agencies	Revised ADP Allocations	Expenditure
1. BRDB	2,845.97	2,460.00
2. BARD	133.45	75.20
3. RDA	21.78	17.60
4. Co-operatives	578.41	123.70
5. Ministry of Land	937.40	509.60
6. LGED	20,028.37	17,682.90
7. NILG	3.64	3.60
8. Ministry of Relief	112.04	108.70
9. Special Affairs Division	646.14	537.20
10. Ministry of Finance (Ag. Bank)	10.00	-
11. Ministry of Agriculture	5.00	5.00
12. Planning Division	300.00	300.00
Total	25,622.20	21,823.50

13.54.6 Performances during 1995/96 and 1996/97: All the three major programme components, i.e., production and employment programme, infrastructural development programme and irrigation related infrastructure were under implementation during 1995/96 and 1996/97. Under the production and employment programmes, employment for 0.39 million persons was created. These were mostly self-employed members of the various formal and informal groups. Under the infrastructure construction programme, some 2,856 km of metalled roads were constructed in addition to 20,800 metres of bridges and culverts. Apart from these, 163 growth centres were developed by constructing sheds, internal roads and lanes in the hats and bazars. An amount of Tk. 17,689.9 million was provided in the Revised ADPs for 1995/96 and 1996/97.

13.55 Fifth Five Year Plan (1997-2002)

13.55.1 Objectives: The following are the objectives of the Fifth Five Year Plan for the RDI Sector:

- a. reduction of poverty in the rural areas;
- b. productive employment generation in the rural areas;
- c. self-employment creation for the rural poor ;
- d. development of rural infrastructure; and
- e. development of small and landless farmers.

13.55.2 Strategies: The elements of the strategy for achievement of the above objectives will include, among others, the following:

- a. provision of skill training mostly for self-employment in non-farm sectors;
- b. formal and informal group formation and group development for co-operative activities;
- c. resource mobilisation through individual/group savings;

- d. creation of enabling environment for availing of credit facilities;
- e. social mobilisation for awareness creation on various aspects of rural life;
- f. development of small and landless farmers;
- g. development of rural infrastructure such as growth centres and roads, bridges and culverts connecting such centres;
- h. provision of small irrigation and flood control related infrastructure;
- i. preventing destitution through rural maintenance programme; and
- j. covering at least one full administrative district under any project with one or more of the programme components of productive employment, rural infrastructure and small scale irrigation and flood control infrastructure to find out the replicability.

13.56 Major Thrust

13.56.1 Facilities for self-employment: It is obvious that it will not be possible to create enough wage employment even for a significant proportion of the vast army of the rural unemployed and under-unemployed labour force. As such facilities for self-employment will be created through skill training and micro-credit, particularly in the non-farm sector under a well-conceived pro-poor programme. An employment bank will be set up in the Fifth Plan period to support self-employment. Since provision of microcredit from the public sector fund will not be sufficient to create enough employment, local resources will be mobilised through savings of the beneficiaries.

13.56.2 Facilities for Bittahen: There is a large number of landless and assetless people who are known as bittahen. They will have priority in the scheme of poverty alleviation and separate institute for the bittahen will be set up. To meet the credit needs of such people, opening separate counters in the existing banks for the bittahen may be necessary. Alternatively, separate banks for the bittahen will be established.

13.56.3 Social mobilisation and empowerment of the poor: On the top of all efforts towards reduction of poverty, social mobilisation for awareness creation on various social, economic, environmental, skill development and institution building matters and supporting local government bodies will remain in-built in the process of participatory bottom-up planning and poverty alleviation. Empowerment of the poor in identifying their needs and directly involving them in planning, designing and implementation of self and community based projects will be a mechanism for nation building activities in this context.

13.56.4 Women in development: Since women are the most disadvantaged group in the society and the victims of extreme poverty, special attention will be given to reduction of poverty among women. In appropriate cases, separate programmes for the women will be taken up.

13.56.5 Environment protection: Environmental concern is an important element in any programme of rural development. RDI programme will have elements of environment protection, environment conservation and re-generation, social mobilisation and input supply. Environment -friendly activities will remain in-built in all programmes of rural development.

13.57 Programmes

13.57.1 Poverty alleviation will be one of the major concerns of the RDI programmes during the Plan period, and conscious and deliberate attempts will be made to substantially reduce poverty, particularly of the hard-core rural poor. The programmes will include the following:

a. Production and employment programme: Under this programme various projects will be undertaken for skill training, awareness creation, human resource development and empowerment of the poor. Credits will be disbursed for undertaking income generation and for self-employment activities. There will be separate projects for rehabilitation of the landless and assetless people, particularly women. Specific projects will be undertaken for the bittaheens and the people of the special areas. Poverty alleviation programmes will be designed and suited to the need and creativity of the people and be financed with local resources as far as possible.

b. Rural infrastructure development programme: Under the rural infrastructure development programme, projects will be taken up for development of growth centres and growth centre connecting roads, bridges and culverts on the one hand and small-scale irrigation and flood control related infrastructure projects on the other. Road maintenance programmes, mostly rural roads, will be implemented through the rural destitute women and eventually they will accumulate savings to undertake income generating activities by themselves.

13.58 Projections for development of RDI in the public sector during the Fifth Plan are shown in Table 13.18.

Table 13.18
Projection for Development of RDI in Public Sector During Fifth Plan

Programme	Unit	Projection
Productive employment generation	million person	1.3
Employment under infrastructural programme	million person-days	175
Growth centre development	number	600
Feeder road category 'B'	kilometre	7,000
Rural road	kilometre	15,000
Bridges and culverts	metre	100,000
Small scale water management related infrastructure:		
- Embankment	kilometre	1,000
- Khal/canal	kilometre	4,000
- Water control structure	number	350
Maintenance of physical infrastructure	kilometre	10,000

13.59 Land Reform and Land Use

13.59.1 Control over asset, particularly access to land is a major determinant of household income in Bangladesh, particularly in the rural areas. Two-thirds of the rural people are landless or functionally so. The high degree of income inequality in the country is closely related to unequal distribution of land ownership. The average size of land holding is declining due to population pressure coupled with inheritance laws and the need for other uses of land such as human settlements and roads. Share cropping is widespread as the smaller pieces of land are not enough for subsistence.

13.59.2 The Land Reform Ordinance of 1984 has provision for the protection of tenants and sharecroppers. The basic issue is lack of enforcement of the ordinance. Farm holdings in Bangladesh are generally very small and big farms are limited in number. In this context, scope for a comprehensive redistribution of land and further reduction of land ownership ceiling is considered to be limited.

13.59.3 Against this backdrop, effective implementation of the ongoing land reform activities including Adarsha Gram, Khas Land distribution, ideal village programmes and providing rights to bargadars will get priority in the Fifth Plan period. Further, improving land records, distribution of appropriate land titles and speedy settlement of disputes on land will create opportunities for small farmers to avail of credit facilities.

13.60 Area Development Approach

13.60.1 Rural Development during the Fifth Five Year Plan will be undertaken following Area Development Approach which is commonly understood as comprehensive development or integrated multi-sectoral development. This approach conforms to the over all national sectoral development strategy. Under the Area Development Approach, programme for the total development of a particular geographical area covering development activities in various fields such as education, human resources, family planning, agriculture, water resources, infrastructure, housing, etc. will be undertaken. Projects will be drawn up by the concerned sectors and will be integrated and co-ordinated at some convenient administrative units. Considering the complexity of integration and efficiency at the operational level, one at administrative district, for example, may be considered as the point of co-ordination and integration of the projects which conform with the rural development strategy, presently being pursued under the RDI Sector.

13.60.2 Under the Area Development Approach, there will be one area development programme covering the projects of different sectors which will be co-ordinated at the district level for which appropriate mechanism will be developed as soon as the new local government structure becomes operational. The area development programme will essentially involve the local government authorities and will be co-ordinated by such authorities at the district level. The programmes of all development agencies including government, parastatals, NGOs and private organisations will be co-ordinated with a view to avoiding both duplication of efforts and unbalanced allocation of resources. The area development programme drawn for the comprehensive and multi-sectoral development of the entire geographical area of a particular district will be decomposed at the upazila level and further down to union parishad.

13.61 Financial Outlay During Fifth Plan

13.61.1 An amount of Tk.87,002.48 million has been projected for the development of RDI in the Public Sector. The programme wise breakup of the outlay is shown in Table 13.19.

Table 13.19
Public Sector Financial Outlay for Development of RDI During Fifth Plan

(in million Taka)	
Programme	Financial Outlay
Production and employment programme (PEP)	20,000.00
Infrastructural development programme (including irrigation related infrastructure)	56,000.00
Other programmes (including special programmes and action research)	11,002.48
Total	87,002.48

13.62 Given the nature of social investment, private investment for rural development and institutions will be very limited. Some investment outside the public sector will be based on savings mobilised and institutional investment by NGOs. A tentative amount of Tk. 2,000 million is likely to be invested for the development of RDI in the private sector during the

Plan period. The return against such investment is expected to be more per unit than what is projected to be in the public sector.

CHAPTER XIV

INDUSTRIES

14.1 Introduction

14.1.1 Manufacturing combines human ingenuity - science, technology and innovations with natural endowments of a nation. The fountain of the wealth of today's developed nations receives the perennial flow from trade in manufactures which lie at the back of their highly remunerative employment, high level of income and the high standard of living. This is why international trade is dominated by manufactures which accounted for around 75 per cent of the world merchandise exports of US\$ 4,880 billion in 1995. Primary products comprised the rest in which the shares of food, fuel, minerals and metals and agricultural raw materials were 9.1 per cent, 7.1 per cent, 6.3 per cent and 2.8 per cent, respectively. It is, therefore, no wonder that the demolition of the tariff wall against trade in manufactures had been at the top of the agenda of all multilateral and plurilateral trade negotiations conducted under the auspices of the General Agreement on Tariffs and Trade (GATT), the predecessor institution of the present World Trade Organisation (WTO), and that the developed countries, who are the greatest beneficiaries of trade in manufactures, have brought down the tariffs on manufactured goods traded amongst themselves to a level as low as 4 per cent only.

14.1.2 Failure of most of the developing economies, excepting the newly industrialised countries, to generate adequate purchasing power in their respective domestic market led them to look for purchasing power outside the national boundaries and pursue the export-led growth strategy. The bulk of exports from these countries, however, still comprises of primary commodities and historically, world prices of primary commodities have been volatile, unstable and least rewarding. Besides, these countries, more often than not, suffer from adverse terms of trade. As a result, trade has been neither a source of resource flow nor an 'engine of growth' for these countries. These stark realities, combined with the overwhelming weight of manufactures in the global export trade, make the success of the export-led development strategy contingent on the development of a viable manufacturing sector.

14.2 Past Industrial Development

14.2.1 Bangladesh is a late starter in the process of industrialisation. Before liberation, some simple process industries like jute, textiles and sugar mills, two pulp and paper mills, a small urea fertiliser plant, a cement factory, a 'mini' steel making plant with imbalanced downstream rolling facilities for making mild steel bars, sheets and plates, a few pharmaceutical units with capacities for formulation, bottling and packaging and several minor dockyards and light engineering workshops comprised the industrial base of the country. After liberation, within the overall objective of attaining a self-reliant economy, the First Five Year Plan (1973-78) of the country adopted an import-substitution strategy for industrialisation with emphasis on domestic production of basic needs and investment goods. However, with the unfortunate change in the government that was brought about in August 1975 a perceptible shift in the self-reliant economic goals and objectives occurred, making the country increasingly dependent on foreign aid and aid-financed imports covering all types

of commodities - food, consumer goods, consumer durables, raw materials, intermediate inputs and of course, investment goods.

14.2.2 During the last twenty five years, the nation's industrialisation efforts were channelled mainly through the public sector. A major portion of public investment was devoted to new capacity creation in chemical fertilisers and in the establishment of several basic engineering industries, while both the public and private sectors invested in textiles and clothing. Some investments were also made in balancing, modernisation and expansion of some of the existing jute and textile mills. Besides, significant promotional investments were made by the government by way of setting up a large number of industrial estates for small and medium sized industrial units as well as two export processing zones (EPZs) to provide infrastructural facilities, utilities and other services for the entrepreneurs - both foreign and local. However, most of the industrial estates remained under-utilised and the strategy for labour-intensive industrialisation as well as spatial dispersal of industries, by and large, ended in a failure. With the exception of export-oriented ready made garments industries (RMGs), which achieved a commendable growth over a relatively short span of time, the country's industrialisation efforts in other areas, particularly in producing consumer goods, RMG-linkage inputs and high value added consumer durables and producer goods, did not bear much fruit. The vast potential that exists for development and diversification of agro-based and agro-support industries remains to be tapped. Indeed, even the existing industrial units gradually lost operational viability due to lack of investments in balancing and modernisation as well as loss of protective domestic markets due to liberalisation of the trade regime at a pace which did not permit necessary adjustments and relocations. Industrial units awaiting privatisation also have landed in the same situation as uncertainty and apprehension about job losses have besieged both the management and the labour equally as a result of which they have lost interest in running these units. On the contrary, in the context of conscious policy decisions to allow progressive erosion of the public sector's role in the country's industrialisation efforts, a standstill position has been reached with respect to any significant investment by the public sector in the establishment of any new production capacity.

14.2.3 Bangladesh is a densely populated country, with a narrow natural resource base, an extremely limited per capita availability of arable land and very low purchasing power of the population. The low purchasing power of the population is responsible for the small size of the domestic market which has shrunk further, particularly in the 1990s, due to opening up of the economy with attendant liberalisation of the trade regime. Given the small size of the domestic market, Bangladesh has to pursue an export-led development strategy with emphasis on industrialisation for sustained economic growth and social development. Such a strategy holds out the potential for eventual solution of problems like acute unemployment, abject poverty, low rate of savings and investment as well as high dependence on foreign aid.

14.2.4 The country has a vast pool of easily trainable manpower resources. It also has the advantage of relatively low wage level. But its technological base is weak and it lacks dynamic entrepreneurship, managerial expertise and efficiency, work forces with requisite skills and above all, adequate investible surplus. To raise the manufactures' share from the present 9.28 per cent level to 12.70 per cent of GDP by the terminal year of the Fifth Plan obviously is a challenging task. This will not only call for the necessary enabling environment, but also require an upbeat efficiency of the private sector with ability to compete in a globalised market economy and liberalised trade regime. It is, nevertheless, achievable as has been demonstrated by a number of East and Southeast Asian countries.

14.2.5 The crucial and logical transformation of the Bangladesh economy that is needed for an accelerated pace of industrialisation, is yet to take place. Over the last quarter of a century, the economy of Bangladesh has gone through a slow and rather erratic structural transformation. It defied the classical relationship between the structural composition of an economy and its stage of development. The share of her agricultural sector, though dropped from about 58 per cent in 1972 to about 33 per cent in 1995, the share of the manufacturing sector limped from 9.0 per cent in 1973 to a mere 11.4 per cent in 1994/95. The services sector, on the other hand, jumped from 26 per cent to about 48 per cent over the same period. To bring about a visible improvement in the quality of life of the people, the pivotal role that the manufacturing sector has to play in the desired transformation of the economy, still remains to be displayed.

14.2.6 The sector's share in GDP for some selected years, including benchmark years of the past Plans, and its growth over the periods under discussion are shown in the Table 14.1.

Table 14.1
Manufacturing Sector's Share in GDP and Past Growth Rates
(at constant prices)

Year	Share in GDP (per cent)	Period	Annual Compound Growth Rate Over Period (per cent)
1972/73	9.00	1973 - 1978	7.35
1979/80	11.22	1978 - 1980	6.21
1984/85	9.86	1973 - 1980	7.02
1989/90	9.91	1980 - 1985	0.93
1994/95	11.36	1985 - 1990	4.22
1995/96	11.37	1990 - 1995	7.00
1996/97	11.08	1995/96	5.33
		1996/97	3.31

Source: BBS

14.2.7 Despite its potential for growth, the manufacturing sector in the past failed to meet expectations. In 1994/95 this sector achieved a growth rate of 8.6 per cent compared to 7.2 per cent in 1989/90. Over the period from 1990/91 to 1995/96, the manufacturing sector grew at an average annual rate of 6.3 per cent and there have been fluctuations also. The first year of the Fourth Plan registered the lowest growth rate (2.39 per cent), while the highest growth rate (9.1 per cent) was achieved during the year 1992/93. The growth rates during 1995/96 and 1996/97 were 5.3 per cent and 3.3 per cent, respectively. Among the industrial sub-sectors, ready-made garments (RMG) and pharmaceuticals recorded the highest growth performances (greater than 10 per cent), while growth rates of jute and cotton textiles declined.

14.2.8 The total investment during the period 1990/91-1994/95 stood at Tk.131,457 million, at current prices, in which the share of the private sector was 85.89 per cent, including foreign direct investment (FDI) of 10.54 per cent. Investment in the years 1995/96 and 1996/97 stood at Tk.34,919 million and Tk.34,513 million, in which the share of the private sector was 95 per cent and 97 per cent, respectively. Major portion of the investment went into fertiliser and pharmaceuticals as well as export production. Ready-made garments and knitwears jointly accounted for over 70 per cent of the total investment in the manufacturing sector. Details of year wise total investment as well as agency wise public sector expenditure in the manufacturing sector for the period under review are given in Tables 14.2 and 14.3.

Table 14.2
Investment in Manufacturing Sector¹
(at current prices)

(in million Taka)

Year	1990/91	1991/92	1992/93	1993/94	1994/95	1995/96	1996/97	Total
Total Investment	23415	22699	24319	25825	35199	34919	34513	200889
Public Sector Investment	8331	3338	1240	2273	2227	1718	1082	20209
Private Sector Investment	15084	19361	23079	23552	32972	33201	33431	180680
Domestic Private Investment	12579	17927	21248	20595	19053	16346	15003	122751
Foreign Direct Investment	1568	428	894	1367	12392	15555	15506	47710
Investment in the EPZs	937	1006	937	1590	1527	1300	2922	10219
Percentage Share								
Public Sector	35.58	14.71	5.10	8.80	6.33	4.92	3.14	10.06
Private Sector	64.42	85.29	94.90	91.20	93.67	95.08	96.86	89.94
Domestic Private Sector	53.72	78.98	87.37	79.75	54.13	46.81	43.47	61.10
Foreign Direct Investment	6.70	1.88	3.68	5.29	35.20	44.55	44.93	23.75
Investment in the EPZs	4.00	4.43	3.85	6.16	4.34	3.72	8.46	5.09

Table 14.3
ADP Expenditures by Major Ministries and Parastatals During Fourth Plan Period
(1990-95), 1995/96 and 1996/97

(in million current Taka)

Sl. No.	Name of Agencies	1990/91	1991/92	1992/93	1993/94	1994/95	Total 1990-95	1995/96	1996/97
01.	Bangladesh Chemical Industries Corporation.	7,694.47 (92.36)	2,575.94 (77.15)	465.939 (0.38)	1,046.41 (46.04)	851.927 (38.22)	12,634.69 (72.89)	666.40 (38.79)	105.811 (9.78)
02.	Bangladesh Steel & Engineering Corporation	16.20 (0.19)	24.70 (0.74)	-	-	-	40.90 (0.18)	2.50 (0.15)	-
03.	Bangladesh Textile Mills Corporation.	-	-	-	35.00 (1.54)	43.58 (1.69)	78.58 (0.45)	76.50 (4.45)	60.00 (5.54)
04.	Bangladesh Jute Mills Corporation (BJMC)	57.77 (0.69)	-	-	-	-	57.77 (0.33)	4.00 (0.23)	-
05.	Bangladesh Sugar & Food Industries Corporation (BSFIC)	189.25 (2.27)	74.90 (2.24)	214.70 (17.32)	301.22 (13.25)	107.13 (4.81)	887.20 (5.08)	68.00 (3.96)	20.10 (1.86)
06.	Bangladesh Forest Industries Development Corporation (BFIDC)	-	-	-	-	-	-	-	-
07.	Bangladesh Small & Cottage Industries Corp.	178.50 (2.14)	312.80 (9.37)	217.30 (0.18)	333.80 (14.69)	349.30 (15.69)	1391.70 (8.03)	287.50 (16.73)	118.40 (10.94)
08.	Bangladesh Handloom Board.	92.50 (1.11)	37.40 (1.12)	20.00 (0.02)	10.35 (0.46)	180.40 (8.10)	340.65 (1.97)	22.15 (1.29)	35.10 (3.24)

continued to next page

¹ Private sector investment figure has been taken from GED, Planning Commission (Table- 1.8, Chapter -1). Investment in EPZs has been Collected from BEPZA. Foreign Direct Investment has been estimated to be 40% of registered FDI with Board of Investment and it is based upon a survey conducted by BOI in 1993/94. Domestic private sector investment has been derived as residuary after deducting investment in EPZ and FDI.

Table 14.3 (continued)
ADP Expenditures by Major Ministries and Parastatals During Fourth Plan Period
(1990-95), 1995/96 and 1996/97

(in million current Taka)

Sl. No.	Name of Agencies	1990/91	1991/92	1992/93	1993/94	1994/95	Total 1990-95	1995/96	1996/97
09.	Bangladesh Sericulture Board.	40.00 (0.48)	80.00 (2.40)	61.90 (0.05)	115.00 (5.06)	146.25 (6.57)	443.15 (2.56)	121.90 (7.09)	15.00 (1.39)
10.	Bangladesh Export Processing Zone Authority(BEPZA)	50.00 (0.60)	220.00 (6.59)	220.00 (17.74)	280.00 (12.32)	249.20 (11.19)	1019.20 (5.12)	134.30 (7.82)	484.03 (44.73)
11.	Bangladesh Industrial Technical Assistance Centre (BITAC)	10.00 (0.12)	0.83 (0.02)	4.67 (0.38)	44.77 (1.97)	-	60.27 (0.35)	9.20 (0.54)	-
12.	Ministry of Industry	-	-	0.015 (0.0012)	29.648 (1.30)	15.167 (0.68)	44.83 (0.26)	15.00 (0.87)	-
13.	Ministry of Textiles	1.44 (0.02)	1.78 (0.05)	3.43 (0.28)	2.70 (0.12)	8.38 (0.38)	17.73 (0.10)	6.00 (0.35)	2.30 (0.21)
14.	Department of Textiles (DOT).	-	-	-	-	64.71 (2.91)	64.71 (0.37)	57.30 (3.33)	10.00 (0.92)
15.	Ministry of Jute (MOJ).	-	-	-	-	-	-	133.7 (7.78)	145.00 (13.40)
16.	Department of Jute (DOJ).	-	-	-	-	-	-	-	26.60 (2.46)
17.	Department of Printing, Stationery, Forms and Publications	-	7.50 (0.22)	28.67 (2.31)	40.00 (1.76)	52.75 (2.37)	128.92 (0.74)	5.0 (0.29)	59.89 (5.53)
18.	Patent & Design	0.365 (.005)	1.187 (0.04)	1.60 (0.13)	0.363 (0.016)	0.450 (0.02)	3.965 (0.02)	-	-
19.	Trade Mark Registry	0.365 (0.005)	0.900 (0.03)	1.60 (0.13)	0.400 (0.02)	0.360 (0.016)	3.625 (0.02)	-	-
20.	Board of Investment	-	-	-	11.20 (0.49)	67.40 (3.03)	78.60 (0.17)	1.10 (0.06)	-
21.	Tariff Commission	-	-	-	21.46 (0.94)	25.492 (1.14)	46.96 (0.27)	16.70 (0.97)	-
22.	NPO	-	-	-	-	-	-	0.10 (0.005)	-
23.	Privatisation Board	-	-	-	0.365 (0.16)	40.173 (1.80)	40.54 (0.23)	59.00 (3.43)	-
24.	Export Promotion Bureau (EPB)	-	-	-	-	23.200 (1.04)	23.20 (0.13)	15.00 (0.87)	-
25.	Bangladesh Institute of Management (BIM)	-	-	-	-	-	-	2.00 (0.12)	-
26.	Ministry of Commerce.	-	-	-	-	0.842 (0.04)	0.84 (0.005)	7.500 (0.44)	-
27.	Dhaka Chamber of Commerce and Industry (DCCI)	-	-	-	-	-	-	5.00 (0.29)	-
28.	Micro-Industries Development Assistance and Services (MIDAS)	-	-	-	-	-	-	2.30 (0.13)	-
	Total	8,330.86 (100)	3,337.94 (100)	1,239.82 (100)	2,272.69 (100)	2,226.71 (100)	17,408.02 (100)	1,718.15 (100)	1,082.23 (100)

Note: Figures in parentheses are corresponding percentages of total annual expenditures

14.2.9 Over the same period, manufactured exports grew at an average rate of 16 per cent per annum, reflecting a significant rise in the sector's share in the country's total export earnings, from 67 per cent in 1989/90 to 84 per cent 1996/97. In terms of value, export on account of manufactures increased over the period by US\$ 2,554 million, from US\$ 1,150 million in 1989/90 to US\$ 3,704 million in 1996/97. Share of the ready-made garments and knitwear was the largest (about 67 per cent) in this increase.

14.2.10 The share of the manufacturing sector in country's total employment is 7.4 per cent only. It provides employment to about 3.63 million people (of ages 15 years and over) in which the share of the private sector is just over 95 per cent. Women folk accounts for some 37 per cent of the sector's employment. About 62 per cent of this employment is in the rural area in which the share of women is about 39 per cent. Informal sector accounts for about 52 per cent of the sector's total employment. The large, medium and small industries account for one-third of this employment while cottage industries employ one-third and the remaining one-third is in the handloom sub-sector.

14.2.11 Production of major consumer goods, however, remained low partly due to closure of a large number of medium and small manufacturing industries and partly due to the depressed demand for domestic manufactured goods in the context of liberalisation of imports. In their place, non-traditional exports such as garments and frozen food have become important sources of industrial growth. In recent years, major source of industrial growth has been textiles, with ready-made garments manufacture expanding from an insignificant level in the early 1980's to the present position of the country's leading export earner. Leather exports have also grown modestly.

14.3 Objectives and Strategies for Industrialisation

14.3.1 The government has clearly enunciated its industrialisation objectives and strategies. These are: industrial development with emphasis on optimum utilisation of indigenous endowments, promotion of employment and catalysing the growth of production and exports.

14.3.2 In the above context, the specific objective of the industries sector during the Fifth Plan will be to bring about a structural change in the economy to make it conducive to accelerated growth of overall GDP and to face boldly the challenge of a free market economy in the twenty first century. This will be brought about, within the overall context of poverty alleviation, through maximisation of its contribution to:

- a. **Gross Domestic Product** : The sector will not only contribute to the growth of the total value added directly but also will facilitate the growth of overall economy indirectly through forward and backward linkages.
- b. **Balance of Payments** : This will be strengthened through efficient import substitution and export orientation. The key aspect of this will be to attain international competitiveness through efficient allocation and use of resources and enhancement of total factor productivity.
- c. **Strengthening of Technological Base** : This will be achieved through building of indigenous capacity in science and technology as well as enhanced access to the frontier of international technology shelf by way of adoption and adaptation. Such access to modern technology will be both an end as well as a means to industrial development during the Fifth Plan.
- d. **Generation of Productive Employment and Poverty Alleviation** : Skill development will be a hallmark of the Fifth Plan in order to exploit the country's comparative advantage in the international market. At the same time, development of

self employment with particular focus on the poor and the disadvantaged especially women, will be a major thrust of the industrial development during the Fifth Plan. As such entrepreneurship development with easy access to complementary resources and inputs will receive high priority.

14.3.3 For modernisation and expansion of the sector, necessary steps will be taken to gear up production and distribution system for supplying necessary inputs to the sector. Practical steps will be taken for skill development of people engaged in various vocations. Principles of free market economy will be pursued and all assistance and encouragement will be given to the private entrepreneurs. All laws, regulations and procedures related to industries, trade and investment will be reformed and simplified. For balanced industrial growth and spatial dispersal, appropriate policies will be designed and implemented for establishing industries at District and Thana levels. For the unemployed youth, employment opportunities will be created through the establishment of labour-intensive medium, small and cottage industries. Efficiency and productivity of the parastatals will be improved by bringing about radical change in their operation and management so as to enable them to be competitive and commercially viable. While pursuing the free-trade policy, adequate measures will be taken to remedy the imbalance between the import and export trade as well as to prevent unfair trade practices. Necessary reforms of the economy will be implemented at a faster pace. Specific strategies to achieve the overall objectives of the Fifth Plan will be to:

- a. promote the private sector as the main agent for industrial development, while at the same time undertaking public investment in some strategic industries as well as in those areas where the private sector is not forthcoming; public-private joint ventures will particularly be encouraged in all areas as may be expedient for industrial growth;
- b. strengthen the enabling policies and remove all distortions to the extent possible in order to achieve efficient operation of the market and at the same time uphold the interest of the consumers;
- c. undertake massive efforts to develop efficiency culture in all walks of life particularly in industrial premises; particular attention will be given to improve the efficiency of the public sector;
- d. pursue and accelerate the process of privatisation of state-owned enterprises in an efficient manner;
- e. encourage domestic and foreign investment for overall industrial development;
- f. develop export-oriented, export-linkage and efficient import-substitution industries;
- g. promote diversification of markets as well as products; such efforts will include, but not limited to, marketing assistance to the exporters and implementation of appropriate package of incentives including flexible exchange rate;
- h. exploit the opportunities opened up by the General Agreement on Trade in Services of WTO, and to develop, with an eye to the export market, those service sectors in which Bangladesh enjoys comparative advantage;
- i. develop data base at the frontiers of international technology shelf and disseminate the same to the users in both private and public sectors; in particular, modern technologies will be required in areas such as electronics, biotechnology, cybernetics (both hard and software); R&D facilities will be developed in these and other modern technology areas. To facilitate this, research in basic science will be encouraged;
- j. develop skill, extend vocational training;
- k. develop entrepreneurship in general, particularly in rural areas through extensive training, both formal and informal and easy availability of complementary resources and inputs;

- l. undertake appropriate measures to build healthy and productive relations between employers and employees;
- m. encourage development of labour intensive small and cottage industries through acquisition and development of appropriate technology;
- n. encourage development and diversification of agro-based and agro-supportive industries;
- o. encourage development of industries based on indigenous raw materials and indigenous technology;
- p. formulate policies and strategies for balanced industrial growth in different regions of the country;
- q. put special emphasis on the growth of productivity in industries and to ensure optimum utilisation of the existing capacities;
- r. explore modalities and establish institutional arrangements for revitalising and rehabilitating sick industries through shared responsibilities and obligations of all concerned parties;
- s. strengthen quality control practices so as to ensure that the country's manufactures conform to international quality standards; and
- t. take appropriate measures for preventing environmental pollution by the industries and maintain ecological balance.

14.4 Thrust Sub-sectors

14.4.1 In keeping with the overall objectives and strategies of the industrial sector during Fifth Plan, traditional sub-sectors like textiles and clothing, jute, tea, leather and leather products, along with agro-based small and medium industries, will be given priority and the jute sector will be consolidated through privatisation, restructuring and rationalisation. In this context, given the demand condition at home and abroad, the following sub-sectors have been identified as the thrust sub-sectors for promoting actively during the Plan period:

14.4.2 Textiles and Clothing : The textiles sector, whose contributions to industrial GDP and employment are the highest and which supplies one of the basic needs of the economy will continue to be focused during the Fifth Plan. In pursuance of the implementation of the GATT-1994 and with the phasing out of the Multi-Fibre Arrangement (MFA) by the year 2005, the facilities that are being enjoyed by Bangladesh as a least developed country for export of its textile products will be phased out progressively. In the globalised trade scenario, the sub-sector will have to pursue the following objectives:

- a. To attain self-sufficiency in fabrics by ensuring availability of 17.0 metres of fabrics per capita per annum by the year 2005, to meet the requirement of RMG industry through establishing backward linkages and to ensure direct export of textile goods by expanding production of quality fabrics at competitive prices;
- b. To create enabling environment and to provide the means by which the textile industry can serve as the prime mover of industrialisation for generating employment, increasing export earnings and encouraging contribution to national income by enhancing value addition;
- c. To establish linkages among the various textile sub-sectors, both upstream and downstream, by ensuring their healthy and harmonious development, to undertake and implement various integrated and related plans and programmes for the development of spinning, weaving, knitting, hosiery, dyeing, finishing, and the export-oriented RMG industry, etc. on a priority basis and in keeping with the goals and objectives of the Fifth Plan; and

- d. To create a congenial industrial environment for attracting local and foreign investment in the expansion of local textile industry by taking all the necessary measures and to provide various incentives.

14.4.3 To remain competitive, productivity of the sector has to increase and so also the quality of products. Establishment of backward and forward RMG-linkage industries is a must. Besides, Bangladesh will switch over gradually to high value products. Adequate marketing skills will be developed so as to eliminate dependence on the middle-men. Facilities such as textile design training schools will be built. Development of fashion industry will be encouraged. Marketing assistance will be provided by the government to garments industry. Bangladesh will have to shift its emphasis from political diplomacy to economic diplomacy and all Bangladesh missions abroad will be geared up for rendering to the entrepreneurs all necessary services in connection with marketing of products and access to needed technologies.

14.4.4 Leather and Leather Products Industry : In view of its tremendous export potential, development of leather and leather products industry will be given priority. Joint ventures will be encouraged in this area. Varieties of high value added leather products can be made using locally manufactured crust and finished leather and, as long as domestic supplies remain inadequate, using finished leather imported on back-to-back basis in the same manner as fabrics for RMG industries. Appropriate measures will be taken to encourage investments in leather and leather products as well as linkage industries to support the sub-sector through supply of various accessories. To be successful, leather and leather product industry will be closely linked to the market as fashions change frequently; the industries will take measures to improve the quality of the product through upgradation of technology and skills. In this context, strengthening of the Institute of Leather Technology will be called for.

14.4.5 Computer Software Development and Data Entry Industry : Computer Software and Data Entry Industry has tremendous prospect in the international market and has the prospect of substantial employment generation. In 1992 the total world market for software and services was US\$190 billion, growing at an annual rate of over 15 per cent . The share of data entry/data processing segment in the global market was nearly 30 per cent in 1990 (about US\$ 43 billion). Bangladesh, which has one of the lowest cost of educated labour in the world has comparative advantage in the area of mid-level skill. In order to develop this industry following steps will be taken during the Fifth Plan:

- a. **Development of skilled manpower:** Some universities like BUET, Dhaka University, Shahjalal University of Science and Technology, etc. offer under-graduate and graduate programmes in Computer Science. These graduates may find gainful employment in the software industry. For increasing their numbers, intake capacity of all these institutions will be enlarged. However, for data entry/data processing industry lesser skill is necessary. In the private sector, several training institutes are providing training for data entry/data processing. There is, however, no quality control over the content and implementation procedure of such training programmes. Measures will be undertaken to extend and improve these training facilities and courses;
- b. **Marketing assistance:** In order to develop export in this area the private sector needs to be assisted with information on market. Export Promotion Bureau needs to be entrusted with the responsibility of building a data base on such market information on a priority basis. It should be assisted by the commercial section of the Bangladesh missions abroad. Overseas relation is vital in such industries. Hence, the commercial wings in these missions will have to play an active role in procuring orders for these

industries through directly approaching potential customers, organising trade shows, mobilising Bangladeshi communities abroad, etc. Formation of joint ventures with European and American companies established in the field will be encouraged;

- c. **Credit:** In order to encourage the development of this industry bank loans will be given on a priority basis;
- d. **Fiscal Measures:** Fiscal incentives will be given to encourage the development of this industry;
- e. **Monitoring:** Being an export oriented service industry, the personnel involved in its monitoring will be given extensive training on its nature and working; and
- f. **Telecommunication Facilities:** Development of telecommunication facilities is a prerequisite for development of this industry; increasing participation of private entrepreneurs will be encouraged in this area through removal of hurdles that stand on their way; policies in this area will be rationalised in order to reduce both cost and time of such services to this industry. Customs services will have to be improved and modernised to facilitate speedy development of the sector. Among the charges which need to be substantially reduced is the cost of dedicating the satellite time.

14.4.6 Electronics Industry : Electronics industry has tremendous prospect for efficient import substitution as well as exports. Through subcontracting substantial employment can be generated in this sector. An embryo of this industry already exists. Internationally some of the electronics industries, particularly those with low level of technology content, have become sunset industries in countries like Japan, Hong Kong and Singapore. During the Fifth Plan, efforts will be made to attract foreign direct investment in these areas. Trade in semiconductor is very large and it is relocating to developing countries. Feasibility of setting up such industries will be explored during the Fifth Plan.

14.4.7 Selected Agro-based Industry : Selected agro-based industries using agricultural inputs such as fish, vegetables, fruits, flowers, etc. will be developed in view of growing demand for such products in international markets. But as many of these are perishable goods, air cargo facilities at a competitive cost will have to be developed during the Fifth Plan on a priority basis. Private sector will be encouraged to expand services in this area. Besides, appropriate policies and strategies will be pursued for the establishment of more direct flights/routes to connect markets of major interest to Bangladesh which will be of great help in boosting its exports.

14.4.8 Fisheries Industry : There is a large domestic demand for fish; foreign markets are sizable and ever growing because of its proven superiority over meat proteins. Bangladesh currently exports shrimp worth US\$ 700 million each year. The fishing industry contributes about 3 per cent of the country's GDP which is also a significant foreign exchange earner. Given the large number of water bodies and excellent climatic conditions, the country has a great potential for development in fisheries industry including fish processing and canning and expansion of employment generation in this sub-sector. There is also a great potential for development of intensive and semi-intensive shrimp cultivation as well as for development of hatcheries in the country's 140 to 150 thousand hectares of coastal area.

14.4.9 Light Engineering Industries : Light engineering industries in Bangladesh produce a multitude of labour intensive goods including toys, consumer items, small tools, spare parts, and paper products for a large domestic market. Further development of these industries offers various investment opportunities.

14.4.10 Chemicals and Gas-based Industries : Bangladesh has a sizable demand for chemical products to meet local needs in industries such as food and agro-processing, pharmaceuticals, tanneries, cosmetics, paints and varnishes, printing, packaging and textile processing. At present, most chemicals are imported. There is also vast potential for gas-based down stream linkage industries and petro-chemical industries.

14.4.11 Garments Linkage Industries : To meet the challenge of time all out efforts will be made to develop garments-linkage industries and adequate promotional support will be provided in the Fifth Plan period.

14.4.12 Grameen Check and Dhaka Check : Handloom industry at present shares 61 per cent of the total cloth production of the country, meeting 36 per cent of the local demand. About 52 million metres of different types of cloth in the form of saree, lungi, bed sheet, curtain, shirting, grey cloth, etc. in intricate designs and texture are woven in handlooms. RMG-industries export a large quantity of handloom fabrics, in the form of different sorts of dresses and costumes. Different types, design and colourful match of check fabrics are used in making these dresses and costumes. Currently, Bangladesh imports about 120 million metres of check fabrics from neighbouring countries in order to meet the demand for check fabrics for the garment industries. It is expected that demand for check fabrics will exceed 300 million metres by the end of the Fifth Plan period. The same quality check fabrics can be produced in Bangladesh. Indeed, it is already being produced in the country by Grameen Uddog - a subsidiary organisation of Grameen Bank. Grameen Bank has succeeded in penetrating into the international market by exporting this item and also in generating sizable employment for the handloom weavers. At present, Bangladesh Handloom Board has given special attention for boosting up production of check fabrics. For easy identification, Bangladesh Hand Loom Board also developed Dhaka Check similar to Grameen Check. To fulfil the future demand for check fabrics about 125 thousand handlooms will be engaged exclusively for production of check fabrics generating employment opportunity for some 365 thousand people.

14.4.13 Hotel and Tourism Industries : With growing international interest in travelling through Asia, tourism has taken roots in Bangladesh. Attractive places like Sylhet's tea gardens, water-falls at Baralekha, sea-beaches of the Cox's Bazar and Kuakata provide attractive scenery and seclusion for the tourists. A glimpse of the Royal Bengal Tiger might be exciting on a trip to the Sundarbans, the largest mangrove forest in the world with unique bio-diversity. Historical relics and monuments, ancient mosques, Buddhist monasteries, Hindu temples, and other landmarks are witnesses to the country's glorious past. Most of all, in its tribal areas, Bangladesh harbours a history and culture which is still untouched by much of the changes occurring elsewhere. To cater to the increasing need of services in this sector, additional hotels and tourists resort facilities in the Cox's Bazar, Dhaka, Chittagong and elsewhere will be developed and necessary support services will be provided in terms of physical infrastructure and utility services.

14.5 Policy Issues

14.5.1 Achieving an average annual economic growth rate of about 7 per cent during the Fifth Plan period depends heavily on considerably faster growth in manufacturing, energy and services sectors. Amongst these, the share of the manufacturing sector is projected to rise from 9.28 per cent of GDP in 1996/97 to 12.70 per cent in the year 2002. Such a rise is expected to occur mainly through private sector investments. With 96 per cent of the total manufacturing sector outlay earmarked for investment by the private sector, the Fifth Plan

relies heavily on the private entrepreneurs-both local and foreign for investment in industries. Generally, the public sector will be more visible through policy and institutional support rather than investment in the industries sector through the ADPs. The public sector inputs will be provided mainly through right policies, institutional and infrastructural support, legal reforms and good governance. The public sector investment will be limited only to the BMREs of strategic and essential industries such as jute, steel, chemical, fertiliser, paper, newsprint, etc. The government does not intend to invest in new industrial capacity creation except in such areas where the private sector will not be forthcoming. Divestiture of existing industrial units will be accelerated. Private enterprises and joint ventures in Export Processing Zones will be encouraged. Special economic zones will also be set up.

14.5.2 Bangladesh enjoys Most Favoured Nation (MFN) status with the leading economies of the world. Besides, the country is a signatory to MIGA and International Centre for Settlement of Investment Disputes (ICSID). The Export Promotion Bureau (EPB) is facilitating country's exports in every possible manner. Fiscal and monetary policies have been tuned to faster growth in the manufacturing, export and services sectors. Bangladesh also enjoys GSP facilities. However, as the MFN tariffs will progressively be lowered in pursuance of the relevant WTO Agreements leading to increasing erosion in the margin of preference, the benefits out of the GSP schemes will soon become insignificant and the comparative edge of Bangladesh over others will disappear.

i. Industrial Policy

14.5.3 The policy environment surrounding the private sector started improving with the liberalisation of the industrial policy in July, 1974 and subsequent introduction of a series of promotional measures. These included virtual elimination of the investment ceiling, extended tax holidays, concessional rate of import duty on machinery, curtailing the reserved list of industries for public sector investments, introduction of a free list of industries for which no prior approval is required, enactment of a law for promotion and protection of foreign private investment, activation of the National Stock Exchange, and revival of the Investment Corporation of Bangladesh for underwriting public issues of shares and for providing bridge finance to private industrial units, etc. Perhaps, the most salutary effect had been the government decision for progressive disinvestment of the industrial units which, following Independence, had to be taken over by the government for management. During the period 1973-80, a total of 199 industrial units were disinvested by the government at a total sales price of Tk.115.8 million.

14.5.4 The industrial policy of 1982 was revised in 1986 providing further relaxation and changes in which all industries, except seven strategic industries, were opened up for private investment. No approval for investment was then required if the investors imported machinery and equipment using their own resources and/or through Secondary Exchange Market (SEM) provided imported raw-materials constituted less than 50 percent of total requirement. The public sector enterprises were intended to be converted into public limited companies in order to make up to 49 per cent of their shares available for public subscriptions and to facilitate their operation in a competitive market. They were given operational autonomy in pricing, procurement, etc. Under the Revised Industrial Policy (RIP) a large number of fiscal and other incentives were also introduced/expanded in order to promote rapid industrial development of the country. A number of import bans and quota restrictions were relaxed to promote industrial efficiency. During the Third Five Year Plan there was considerable investment in power loom and ready-made garments industry. The export of ready-made garments increased substantially.

14.5.5 The industrial policy of 1991 which was formulated in the light of promoting a competitive market economy and which was further revised in 1992 laid down basic strategies required for industrial development of the country. All industries have now been opened up for private investment, both local and foreign, except a selected few related to national security like arms and ammunition, nuclear energy, minting and security printing, mechanised extraction in the reserved forests and the railways. Under the policy, the government has been pursuing privatisation of selected public sector enterprises. A number of public sector units have already been privatised or downsized/closed down and others slated for privatisation. Main policy objectives under the Industrial Policy are to:

- a. develop industrial sector in order to increase its contribution to gross domestic product, income, resource mobilisation and employment;
- b. expand industries by putting more emphasis on development of the private sector and in this respect to make the role of the government more promotional rather than regulatory;
- c. encourage domestic and foreign investment in overall industrial development;
- d. develop export-oriented, export-linkage and efficient import-substitution industries;
- e. especially encourage the development of small and cottage industries;
- f. expedite development of the labour intensive industries through acquisition and improvement of appropriate technology;
- g. attain self-sufficiency in essential consumer goods through efficient and cost-effective production;
- h. encourage development of agro-based and agro-support industries;
- i. encourage development of industries based on indigenous raw-materials and indigenous technology;
- j. encourage balanced industrial growth in different regions of the country;
- k. encourage investment in the intermediate and basic industries;
- l. limit the role of the government generally to establishing strategic and heavy industries and to improve efficiency of the public sector;
- m. put special emphasis on the increase of productivity in industries and to ensure optimum utilisation of the existing industrial capacities;
- n. create possible opportunities for revitalising and rehabilitating sick industries;
- o. make effective arrangements for improving standards and controlling quality of products; and
- p. take appropriate measures for preventing environmental pollution and maintaining ecological balance.

ii. Fiscal and Monetary Policies for Industrialisation

14.5.6 Some important changes were made in the monetary management including interest rates to revive economic activities by increasing the flow of credit to the productive sectors of the economy including trade and industry. New interest rate bands were refixed for loans and advances by reducing floor and ceiling by different degrees effective from December 1, 1991. In order to make interest rate more market oriented and competitive, interest rate bands for all lending categories except agriculture, jute and jute goods exports, other export and small and cottage industries, were withdrawn and in these cases banks were given freedom to determine their own interest rates effective from April, 1992. In April, 1994 interest rate bands for priority sectors such as agriculture, export and small and cottage industries were fixed within 10-14 per cent, 8-10 per cent and 9-12 per cent respectively. The policy of liberalisation of interest rate, which was introduced for moving towards market oriented

competitive economy by reducing administrative control coupled with other necessary measures, will be further geared up to build up a healthy banking system.

14.5.7 Within the above overall framework, effective policy measures will be pursued to provide the entrepreneurs with the following incentives:

- a. Tax holiday, from five to fifteen years, depending on the type of industries as well as their locations such as the developed, less developed, least developed and special economic zones; the period of such tax holidays will be calculated from the month of commencement of commercial production; the eligibility of tax holiday will be determined by the National Board of Revenue and the time of commencement of commercial production will be certified by the respective sponsoring agencies;
- b. The National Board of Revenue in consultation with the Ministry of Industries will publish in the official gazette area-wise classification for the application of concessional duties and tax holidays and this will be revised from time to time to keep pace with industrial expansion;
- c. There will be no discrimination in case of duties and taxes for the same type of industries set up in the public and private sectors;
- d. Local industrial products will be protected through tariff rationalisation keeping in view the interests of the entrepreneurs and the consumers with a time-bound phasing for eventual elimination of protection;
- e. To create internal market for jute products and to discourage industries producing jute substituting and environment polluting synthetic fibres, especially polypropylene bag, necessary tariffs will be imposed on related imports; in addition, effective steps will be taken for compulsory use of jute bags for packing of foodgrains, sugar, cement, fertiliser, etc.;
- f. Duties and taxes on imports which compete with similar domestic goods will be rationalised so that the incidence of duties and taxes on imported raw materials and intermediates used to produce such goods remain at a level below that on the finished imports;
- g. Energy price equalisation measures, as deemed appropriate, will be put in place for those least developed areas where the price of fuel oil in BTU terms will be higher than the ruling natural gas prices, as long as gas can not be made available in those areas;
- h. In cases where credits/loans obtained from foreign institutions or government for private industrial investments are relented to commercial banks/DFIs through the government, the following conditions will be applicable:
 - i. The government will relend the above mentioned credits/loans through commercial banks/DFIs; the concerned banks/DFIs will disburse the credits/loans to the entrepreneurs with applicable service charge at relending rates as determined by the government; and
 - ii. The entrepreneurs shall undertake full responsibility for repayment of the loans/credits and the concerned banks/DFIs will provide guarantee to the government for repayment of the loans/credits. The concerned banks/DFIs will, however, be entitled to claim collateral from the entrepreneurs;
- i. Special incentives will be provided to encourage non-resident Bangladeshis for investment in industries. In case of their investment in Bangladesh they will enjoy facilities similar to those given to the foreign investors. They will be able to buy any newly issued shares/debentures of Bangladeshi companies. Moreover, they will be able to maintain foreign currency deposit in the NFCD account;

- j. Provision will be made for accelerated depreciation allowance, in lieu of tax holiday, if entrepreneurs so opt for; and
- k. Special financial incentives for small and cottage industries, particularly those located in the backward areas, will be provided.

iii. Sick Industries

14.5.8 A large number of industries, over years, have turned into sick ones. The main reasons for their sickness may be enumerated in terms of :

- a. depreciation of Taka in relation to dollar or yen or pound in which loan capital was obtained for setting up the relevant industries; this resulted in sizable increase in taka-burden of the repayable loan capital;
- b. technological obsolescence of the process or the product;
- c. withdrawal or lowering of protective tariff wall;
- d. management inefficiency;
- e. inadequate working capital support by the banking system; and
- f. pilferages by the sponsors, in collusion with the personnel of the lending bank or financial institution.

14.5.9 In the Fifth Plan period concrete steps will be afoot to remove the relevant causes of sickness. Ways and means will be found out to draw up realistic schemes for getting out of sickness through joint effort of owners, management, labour and the funding agencies, i.e. all the stakeholders.

iv. Some Specific Promotional Measures

14.5.10 In recent years, considerable reforms and positive changes have been brought about to promote the manufacturing, trade and services sectors. Tariff rates have been considerably lowered and rationalised generally in line with the trade liberalisation approach pursued by the government. The Board of Investment (BOI) is playing a positive role in facilitating private investment with focus on foreign direct investment (FDI). Some of the fiscal and other specific incentives that the government is offering to attract private investments, in general, and foreign direct investments, in particular, include but not limited to the following:

- a. Cent per cent ownership of enterprises by expatriates;
- b. Generous tax holiday for 5 to 7 years, depending on the industrial subsectors, and 10 years for all types of units established in the export processing zones; tax holiday for power generation plant will be 15 years;
- c. No import duty on capital machinery for 100 per cent export-oriented industries; for other industries, import duty on machinery and spares will be levied at the rate of 7.5 per cent ad valorem only;
- d. Facilities for easy repatriation of profits, invested capital, royalties, technical fees etc. for foreign investors;
- e. Exemption of taxes on wages/salaries of expatriates working in industries as well as on royalties and technical fees;
- f. Bilateral arrangements with different countries concerned for avoiding double taxation;
- g. Granting of citizenship to foreign investors who will invest in Bangladesh at least US\$ 500,000 or to those expatriates who will deposit at least US\$ 1 million in a non-repatriable account with a recognised financial institution, and granting of permanent residency to those foreign nationals who will invest at least US\$ 100,000 in Bangladesh;

- h. Issuance of multiple-entry visas as well as work permits to foreign nationals without any discrimination;
- i. Enactment of the Private EPZ Act under which the private sector will be allowed to set up EPZs; and
- j. Establishment of a Permanent Law Commission to make the administrative-legal system more responsive to the needs of the civil society, in general, and those of the entrepreneurs, in particular.

v. Trade Policy

14.5.11 Tariff Reductions : In the last decade, tariff rates have been lowered significantly. The average tariff has come down to about 22 per cent of the annual import value. While lowering the averages, attention was given to keep the rate of customs on raw materials and capital goods lowest, on intermediate goods in-between and on finished goods consumed by the affluent highest. The aim has been to make industrial production competitive and bereft anti-export bias.

14.5.12 Elimination of Non-tariff Barriers (NTBs): Like tariff rationalisation, substantive progress has been made in eliminating or reducing quantitative restrictions (QRs) to points where only a small number of items remain subjected to NTBs at present primarily on grounds of security, health and religion. Besides, the current Import Policy Order (IPO) covering the period 1995-97, brings about a greater transparency by restoring two separate lists - one for the banned items and the other for the regulated items. Non-tariff barriers to imports have been significantly eased also through the abolition of the need for maintaining import passbooks for industrial importers, except for regulated imports.

14.5.13 Tariff reductions along with overall improvement in other policy areas carried out so far have played a major role in liberalising and boosting imports. However, the surge in imports resulting from liberalisation of the trade regime has affected adversely some domestic industries.

vi. Supportive Institutions and Special Measures : In the Fifth Plan period institutional development will be pressed in for giving support to the private enterprise, specially for setting up and operating industries. The main emphasis will be on (i) improvement of development management (ii) creation and sustenance of private sector development and (iii) improvement of key public social and infrastructure services. These objectives will be achieved through reorientation and strengthening of the following major institutions and organisations:

14.5.14 a. EPZs and Special Economic Zones: At present, 73 industrial units in Chittagong EPZ and 23 industrial units in Dhaka EPZ are operational. Besides, 34 industrial units in Chittagong EPZ and 46 industrial units in Dhaka EPZ are under implementation. Total investment in the operational units has figured at US\$ 236.56 million with a total employment of over 46,000 persons. In order to accelerate economic development and employment generation during the Fifth Plan period, Bangladesh Export Processing Zone Authority envisages establishing as many as three more EPZs in various parts of the country.

14.5.15 The determinants and directions of international investment have been changing rapidly in the recent times. Because of new candidates like the East European countries and the CIS (Commonwealth of Independent States that emerged out of the erstwhile USSR), the share of both official development assistance and foreign direct investment to developing countries has been on the wane. In view of changed circumstances, EPZs, encompassing necessary infrastructural facilities, utilities and other support services, can be used as conduits to attract foreign direct investments. At a time when industries are being re-located to low

cost production areas, Bangladesh with its hard working, intelligent, and cheap labour force, should not miss the opportunity of making the best use of its EPZs to attract foreign direct investments. In order to attract foreign investment, besides development of infrastructure and support services, such as warehouses, communication network, gas and water supply, electricity, telephone and modern electronic links, etc. the government will also continue to provide the following incentives:

- a. income tax exemption for ten years and proportional income tax rebate between 30 and 100 per cent on export earning after this period;
- b. duty free import of raw-materials, machinery, construction materials and other materials used in manufacturing process;
- c. income tax exemption on salaries for foreign executives and technicians for three years;
- d. tax exemption on interest on foreign loans;
- e. tax exemption on royalties, technical know-how and technical assistance fees;
- f. tax exemption on the profits on account of transfer of shares by foreign companies;
- g. permitting export linkage inputs to be imported through back-to-back L/Cs by recognised export-oriented/export-linkage industries which will be provided with necessary bonded warehouse facilities, even if they are located outside the EPZ areas; and
- h. offshore banking facilities.

14.5.16 b. Board of Investment (BOI) : In order to boost up and promote private investment during the Fifth Plan, the Board of Investment will continue to perform its following mandated functions:

- a. promotion of investment;
- b. providing facilities for capital investment and rapid industrialisation;
- c. registration of industrial projects, foreign loan agreements, royalty, technical know-how and technical assistance agreement wherever required;
- d. providing assistance to provide infrastructural facilities for industries;
- e. issuing work permits to expatriate personnel working in the private sector industrial enterprises;
- f. providing import facilities to industrial units in the private sector;
- g. approval of the payment of royalty, technical know-how and technical assistance fee to foreign nationals/organisations beyond the prescribed limits; and
- h. recommendations for acquisition and allotment of land in the industrial areas/estates for industrial purpose.

14.5.17 The government has recently embarked upon a policy initiative for private participation in areas of infrastructure development and provision of utility services. Already a few economic sectors such as gas exploration and exploitation, power generation and telecommunication have been opened up for local and foreign private investment. Some projects in the areas of ports and shipping as well as roads and highways have already been identified by the concerned ministries/agencies for implementation by the private sector. In the Plan period, public sector areas of operation will be progressively reduced and private investors will be induced to take up the place.

14.5.18 One key element for the success of export-led growth is the availability of abundant skilled manpower. Skill development at all levels, therefore, will be given top priority in the Plan period. Environment will be created to attract more private entrepreneurs in the field of

training, research and development. In order to boost-up the private sector, the following additional measures will be taken:

- a. higher level of investment will be encouraged in manufacturing, infrastructure and service industries by the private sector;
- b. the existing list of reserved sectors will be reviewed to further widen the areas for private sector investment; and
- c. the pace of privatisation or denationalisation process will be accelerated.

14.5.19 c. Privatisation Board : The Privatisation Board was established by a resolution of the government in March, 1993. It is entrusted with the overall responsibilities of privatising state-owned enterprises (SOE) identified for privatisation. Ministries having state-owned enterprises under their control have set up privatisation cells for assisting the Privatisation Board in identifying, preparing, processing, implementing and monitoring SOEs for privatisation. The process of privatisation till the end of 1996 was not very satisfactory. During the Fifth Plan, the Privatisation Board will be reinvigorated to hasten the process of privatisation of industrial, commercial and state owned enterprises. With this end in view the Privatisation Board will take-up the following measures to:

- a. develop selection criteria, prepare list of enterprise for sale/transfer, and subsequently implement or arrange for the transfer of such enterprises to the private sector;
- b. determine the priority and sequencing of such privatisation, including a detailed work plan and time table for the various enterprises proposed to be transferred;
- c. identify the optimal methods such as public offering, private placement, sale of assets, management contracts, leasing or management/employee buy outs by which the process of privatisation will be implemented in particular cases;
- d. co-ordinate among and recommend to the Ministry of Finance, Ministry of Jute, Ministry of Textiles and other relevant ministries and agencies steps which may be necessary for the successful privatisation of the enterprises, such as revaluation of the enterprises, restructuring of debt in accordance with sound financial principle, retrenchment of redundant workers, closure of obsolete facilities of the enterprises;
- e. formulate policies for and advise the government with regard to private sector development, investment and participation in previously reserved sectors such as telecommunications, energy and power etc.;
- f. organise public information campaign about the merits and benefits of privatisation; and
- g. undertake any other activities connected with privatisation.

14.5.20 With a view to attracting private buyers, capital restructuring has been carried out in several manufacturing units like jute mills under the Bangladesh Jute Mills Corporation. Overdue loans of both private and government sector jute mills have been restructured through waiving one-third and rescheduling the remaining two-third. Around 39,000 workers were released from the jute sector between June 1990 and June 1995 under the normal 'severance benefit scheme'. Four jute mills have been closed down and one mill has been downsized. The Bangladesh Jute Corporation which was previously dealing in trade of raw jute was wound up, but its assets are yet to be disposed off. Non performing loans of the Nationalised Commercial Banks (NCB), due to public sector manufacturing corporations like the Bangladesh Textile Mills Corporation (BTMC), the Bangladesh Jute Mills Corporation (BJMC) etc. have been settled and process is under way for settling overdue loans of other public sector manufacturing units. Collection of debt service liabilities (DSL) and settlement of arrear dues among corporations have also been strengthened. Sale of 21 public manufacturing sector units have so far been finalised. The process has been stalled due to

non-payment of instalments by the buyers. The manpower of public enterprises remaining with the government is being rationalised and their overhead expenses curtailed with the objective of making these more efficient and dynamic.

14.5.21 With the exception of a few intermittent years, the jute industry has been passing through a critical time since independence by incurring huge losses due to manifold reasons-internal and external - which warrant some positive actions for restoration of its commercial viability. In order to address the deteriorating situation of jute sub-sector, the government has taken a number of reform measures under a programme implemented with the assistance of the World Bank. The main features of the programme are down-sizing of industry, rationalisation of employment, restructuring of past debt, loss financing for jute goods export, privatisation of the jute industry, reforming wage policy, elimination of government intervention in the industry, training of workers and managers in retained mills, social safety net programmes, etc.

14.5.22 The ultimate objective of jute mills privatisation programme is to maintain export of Bangladesh jute goods at the minimum level of 450 thousand tons per year. Towards this end, the programme aims at bringing down the public sector loomage capacity to 4,000 and raising that of the private sector to around 16,000 so that the sub-sector becomes viable, efficient and competitive. Under the programme, 23 public sector jute mills, out of 31, have already been enlisted for privatisation. The Privatisation Board almost completed evaluation of the asset values of these mills. It may be mentioned that the private sector jute mills have failed to operate their existing capacity; about two-third of its loomage capacity has remained in operation during the last four years resulting in the short fall of targeted jute goods production in and export from Bangladesh. During the Fifth Plan, attempts for privatisation of public sector jute mills will continue and privatisation programme will be followed vigorously.

14.5.23 Privatisation and private sector development have been very difficult till the end of 1996. During the 1993-96, the Privatisation Board managed to privatise only 12 industrial units. But due to restructuring of the Privatisation Board, the process of privatisation has gained momentum. The government is fully committed to privatisation and by the terminal year of the Fifth Plan, the process of privatisation will be completed. It may be mentioned here that the Privatisation Board has so far identified 217 SOEs for privatisation covering nearly all the economic sectors, out of which a total of 113 SOEs were taken up for privatisation until June 1998. Besides, the Privatisation Board is continually reviewing the existing policies and strategies for privatisation and recommending appropriate policy reforms for approval of the Cabinet Sub-committee on Economic Affairs. New strategies are also being formulated by the Board for efficient and effective implementation of the privatisation programme.

14.5.24 In accordance with the privatisation policy of the government, 24 textile mills under BTMC having 182,168 spindles and 681 looms are to be privatised. Out of these, 6 mills were privatised and handed over to the private owners, and remaining 18 mills are in the process of privatisation by the Privatisation Board/Ministry of Textiles.

14.5.25 d. Chamber of Commerce and Industries : Under the present policy of private sector led export-oriented growth, the responsibility of the private sector has increased tremendously. Private Sector is now considered to be the pivotal economic player. During the Fifth Plan the institutional capability of the Federation of Bangladesh Chambers of Commerce and Industry (FBCCI) and its member organisations will be developed and strengthened so that they can lead the private sector to perform its role so as to attain higher

growth target. To prevent unfair trade practices, in particular, circumvention of domestic and foreign laws, rules and regulations, these bodies will be encouraged to put in place appropriate code of conduct for their members to observe. With this end in view necessary promotional and support services will be provided to FBCCI and other chambers to improve their institutional capability so that they can discharge their functions for promotion of trade, investment and industry.

14.5.26 e. Export Promotion Bureau : In the wake of the establishment of the World Trade Organisation to administer GATT 1994, GATS (General Agreement on Trade in Services) and TRIPS (Trade Related Aspects of Intellectual Property Rights) under an integrated Dispute Settlement Mechanism, the Bangladesh Export Promotion Bureau (EPB) will have to play a dynamic role to achieve the following objectives: (i) to identify obligations of the government to the business and industrial community of the country, to customers abroad as well as under contracts, agreements, arrangements, conventions, etc. of WTO and other relevant international/regional organisations and take all necessary steps towards meeting these obligations; (ii) to remove existing regulatory constraints; (iii) to provide policy support comparable with those of other competing countries; (iv) to provide improved services for export promotion activities; (v) to provide access to supportive infrastructure services; (vi) to improve entrepreneurial and managerial capabilities through human resources development and (vii) to implement export development programme to help expand and diversify the range of exportable products. Towards the fulfilment of the above objectives, EPB will be required to be revamped in conjunction with effective private sector co-operation and collaboration, including establishment of a joint institute of foreign trade involving representatives of both public and private sectors.

14.5.27 f. Bangladesh Tariff Commission (BTC) : The Tariff Commission will carry out in-depth studies and formulate policies for further tariff rationalisation, liberalisation of the import regime and evolving an incentive structure for strengthening the domestic production and export base. It will review, on a continuing basis, the tariffs on imported inputs - raw materials and intermediate inputs - as well as on capital goods. While rationalising the tariff structure, adequate attention will be given to ensure that inputs for any domestic product are not subjected to rates of duties and taxes higher than those on competing finished imports and that the domestic industries do not suffer loss because of dumping on the one hand and denial of access to foreign market on the other. The BTC will establish effective co-ordination with the National Board of Revenue (NBR), the Bangladesh Bureau of Statistics (BBS), the Bangladesh Bank (BB), the Ministry of Planning/Planning Commission and the Ministry of Commerce for establishment of a rational and dynamic tariff structure consistent with existing government policy of pursuing free market economy. For discharging its functions more effectively, BTC will build up its capacity further through necessary strengthening and upgradation as well as human resources development.

14.5.28 g. Bangladesh Standard Testing Institute : Standardisation is the gateway to trade and industrialisation. A well conceived standardisation programme lays the foundation for growth of domestic production, protection of consumer interest through ensuring requisite product quality and progressive assimilation of imported technology through adoption and adaptation. Standardisation of products as well as of inputs minimises wastage of resources and ensures compatibility of manufacturing processes and practices. In view of these factors, during the Fifth Plan period, the performance of the Bangladesh Standard Testing Institute will be reviewed and effective measures will be introduced to enhance its functional capability through necessary expansion and modernisation. Some vital components of

modernising the Institute will be strengthening its methodology, quality control and testing sections and induction of sufficient number of quality professionals into it.

14.5.29 h. Bangladesh Institute of Management : In the Fifth Plan period, BIM will conduct research on management development and will impart training on socio-economic and other functional areas of management. The main objectives of the institute will be to : (i) upgrade the existing centre to a self-sustained higher institute of training , research and learning, (ii) train and develop managers at all levels of the economy, (iii) assist, develop and maintain higher productivity in business and industry through adoption of technological and engineering innovation and services, (iv) give consultancy services for solving management and related problems faced by various sectors of the economy, and (v) carry out research in different fields of management, economics and business. Activities and courses will be designed and implemented to support private sector industrial and business units.

14.5.30 i. Bangladesh Industrial Technical Assistance Centre (BITAC) : The Bangladesh Industrial and Technical Assistance Centre (BITAC) has been providing technical and advisory services to the entrepreneurs. Presently BITAC Dhaka, Chittagong, Chandpur and Khulna are in operation. During the Fifth Plan the performance of existing centres will be duly evaluated and new centres will be established keeping in view the needs of the industrial areas. BITAC will assist the private sector entrepreneurs, particularly the small entrepreneurs, to solve their technical problems as well as in adopting/adapting new technologies in their production practices.

14.5.31 j. National Productivity Organisation (NPO) : The National Productivity Organisation (NPO) was established in 1989 under the Ministry of Industries. The institutional capability of this organisation will be further developed to create productivity consciousness and awareness to the people for launching productivity as a national objective to be pursued by a national movement in the country, undertake programme for human resource development for productivity improvement, build productivity infrastructure and convert industrial enterprises into an efficient and profitable organisation, work as a catalyst to promote plant-level productivity through consultancy services, conduct survey, study and research work on productivity, and assist the government in formulating productivity policy.

14.5.32 One of the major issues in the industrialisation of a country is to use trade and industrial policies in a co-ordinated manner so as to accelerate the pace of industrialisation. This was done in Japan and the Newly Industrialised Countries. For this purpose, a Trade and Industrial Policy Co-ordination Council will be set up during the Fifth Plan period.

14.5.33 Other General Measures : Other major institutional supports to the growth of private enterprises and industrialisation by the private sector will have to come through reforms in under-performing public administration, backlogged judiciary, costly banking system and also from reduction in transaction costs in getting services from the public utilities. These are monumental works and will be undertaken for completion with determination. As a general principle the government will support institution of the civil society, and rule of law and the private sector to help build constituencies that will in turn support accountable, responsible and responsive and performing public institution. Of the public utilities, power will be the major determinant of industrial investment. Concrete programmes in both private and public sectors have been drawn up to meet this need.

14.6 Development Programmes and Targets

14.6.1 Textiles and Clothing Sub-sector : Domestic supply of fabrics from the existing capacity was 1,129 million metres in 1995/96, including 200 million metres for the RMG

industry. Corresponding estimates for 1996/97 are 1,163 and 210 million metres respectively, while the supply from the existing mills in the terminal year (2001/2002) of the Fifth Plan is projected at 1,348 million metres, including 268 million metres for the RMG industries. On the other hand, the total demand for fabrics in the year 2001/2002 is projected to be 5,265 million metres, including 3,228 million metres for export. Consequently, the total demand-supply gap of fabrics will increase from 2,633 million metres in 1996/97 to 3,917 million metres in the year 2001/2002, out of which 2,960 million metres will be on account of RMG industries, unless more fabric manufacturing capacities are established, in the mean time, as backward linkage industries. The actual and estimated/projected demand for and supply of fabrics for the local and export market for the years 1995/96, 1996/97 and 2001/2002 and the corresponding supply-demand gaps are shown in Table 14.4.

Table 14.4
Demand-Supply Gap of Fabrics : 1997-2002

(in million metres)

Sl. No.	Fabrics	Actual 1995/96	Benchmark (Estimated) 1996/97	2001/ 2002 (Projected)
i.	Demand for Fabrics	3,520	3,796	5,265
	a. For domestic consumption	1,520	1,596	2,037
	b. For export (for RMG and other forms of export)	2,000	2,200	3,228
ii.	Supply of Fabrics From Existing Facilities	1,129	1,163	1,348
	a. For domestic consumption	929	953	1,080
	b. For export	200	210	268
iii.	Demand-Supply Gap of Fabrics	2,391	2,633	3,917
	a. On account of domestic consumption	591	643	957
	b. On account of export	1,800	1,990	2,960

14.6.2 The excess demand for yarn over the local production in 1995/96 was 390 million kg. which is expected to increase to 639 million kg. in 2001/2002. About 67 per cent of this total demand will be for cotton yarn, while the rest 33 per cent will be on account of yarn from man-made fibres. The projected demand for yarn by 2001/2002 and the demand-supply gap of all types of yarn for the same years are given in Table 14.5.

Table 14.5
Demand-Supply Gap of Yarn: 1996-2002

(in million kg.)

Particulars	1995/96 Actual	1996/97 Estimated	2001/2002 Projected
Demand of yarn	503	542	752
Production of yarn	113	113	113
Demand-Supply Gap	390	429	639

14.6.3 The demand-supply gaps of raw cotton and man-made fibres were 369 million kg. and 169 million kg. respectively in 1995/96 which are projected to reach 555 million kg. and 254 million kg. respectively by 2001/2002 assuming wastage for raw cotton at the rate of 10 per cent and for man-made fibres at the rate of 3 per cent. The existing and projected requirement, domestic production, and demand gaps of raw cotton and man-made fibres are shown in Table-14.6.

Table 14.6
Demand-Supply Gap of Raw Cotton and Man-made Fibres : 1996-2002

Items of Raw Materials	1995/96	1996/97 (Benchmark)	2001/2002 (Projected)
(in million kg.)			
a. Raw-Cotton			
Demand	374	403	560
Production	5	5	5
Demand Gap	369	398	555
b. Man-made fibres			
Demand	171	184	256
Production	2	2	2
Demand Gap	169	182	254

14.6.4 With a view to progressively increasing domestic production of yarn and cloth the Fifth Plan envisages to overcome the shortage of manpower through human resource development, creation of an investment friendly environment, reforming the textile sector through fine tuning of policy objectives, creation of new capacity in spinning and weaving and BMRE of un-economic units in the private sector and some selected public sector mills. The private sector will be at the cutting edge of investment and technological advancement keeping in view the global and domestic opportunities. The following strategies will be pursued for the overall development of the textiles and clothing sub-sector:

- a. New capacity will be created to cater to the needs of the export-oriented RMG industries as well as the domestic markets. To this end market response will determine the nature of investment to allow horizontal and vertical expansion. Investment fund will be sought from domestic banking sources, joint-ventures, foreign direct investment and relocation of units by foreign entrepreneurs either independently or through joint venture arrangement with local sponsors;
- b. BMRE of the old and uneconomic existing units in the private sector and in selected cases in the public sector will be undertaken to ensure their financial and commercial viability through increased productivity;
- c. The existing specialised textile mills and power looms will be organised into groups on area basis and around 200 looms in each area will be taken as a package for intra and inter-unit balancing;
- d. Till adequate domestic supply capacity is created, grey fabrics will be allowed to be imported under extended bonded warehousing facilities for dyeing and finishing locally; and
- e. Tariffs on all imported inputs for the textiles and clothing subsector will be rationalised on a continuing basis; raw cotton and synthetic chips/fibre will be treated at par while levying duties and taxes on them.

14.6.5 Handlooms : The growth of the traditional sector comprising handlooms and sericulture will promote rural employment, import-substitution and export industries. The handloom industry plays an important role in the economy of Bangladesh. Next to agriculture, it is the second largest source of rural employment and income. About 5 million people are directly or indirectly engaged in this industry. The Handloom Census 1990 recorded 1,027,407 weavers in the country and 501,834 handlooms out of which 317,026 were operable. Handlooms produce some 757 million yards of cloth. Monthly demand of yarn for handloom is 12.7 million kg. Fixed capital and credit demand per loom was Tk.10,008 and Tk.8,904, respectively. The Handloom Board has undertaken different programmes/projects for implementation in order to improve the handloom industry to a satisfactory level in

producing quality products. To address the problems of the handloom industry, well identified strategies will be undertaken during the Fifth Plan period.

14.6.6 The strategies for development of handloom sub-sector will include:

- a. strengthening of the Bangladesh Handloom Board (BHB) to perform promotional activities for boosting up production at competitive prices;
- b. revitalisation of idle looms and linking up demand sources through organising the supply sources of handloom products;
- c. improvement of loom technology and changing of traditional handlooms into power looms in phases;
- d. activating the institutional credit sources for financing the working capital requirements of the handloom weavers and mobilising banking institutions to meet their credit needs as well as to do profitable banking business;
- e. ensuring availability of yarn, dyes and chemicals at competitive prices to the handloom weavers and to make appropriate arrangements for marketing their products locally;
- f. establishment of export-linkages through more concerted efforts to market handloom products abroad and also to feed the export-oriented RMG industry by encouraging non-traditional product base to produce handloom woven shirting, suiting and furnishing fabrics of upgraded quality;
- g. improvement of technology of handloom through research and adaptation;
- h. reaping the productive potential of handloom weavers through re-organisation of co-operative societies as well as through development of skill and improvement of designs; and
- i. promotion of export of Grameen Check and Dhaka Check to overseas markets.

14.6.7 Sericulture: Sericulture is an important sector which can play an important role in generating employment and alleviation of poverty. About 8-9 hundred thousand families are engaged in this occupation directly or indirectly. It is not a primary occupation in Bangladesh. It is more or less a subsidiary occupation providing part time jobs for women at family level. This sub-sector is labour intensive and its value addition is high. But it is lagging behind due to some problems, such as scarcity of disease free layings, lack of capital or loan, traditional technology of rearing and reeling, low quality of cocoons, poor marketing facilities, shortage of trained and skilled manpower and slow expansion of mulberry cultivation. As sericulture farmers are unskilled and they do not have appropriate rearing house, about 25 per cent to 30 per cent disease-free layings and cocoons are damaged in the rearing process. This in turn makes sericulture farming uneconomic. Farmers lose their interest and leave the occupation. There is a strong need for increasing the number of skilled *bosnis* (small sericulture farmer) and skilled reelers. Therefore, the Fifth Plan envisages to set up chaki rearing-cum-minifiliature centres where intensive training will be imparted for development of skilled *bosnis* and reelers.

14.6.8 The strategies for development of the sericulture sector will include:

- a. restructuring and strengthening of sericulture activities to perform research and provide extension services, supply disease free layings, disseminate high yielding variety of mulberry cultivation and silk worm rearing technology and help increase of income of silk farmers through qualitative and quantitative improvement of products;
- b. encouragement of NGOs for greater participation in different stages of production and marketing activities;

- c. ensuring access of *bosnis* (small sericulture farmers) to various inputs and facilities conducive to production of quality cocoons through adopting appropriate policy measures;
- d. extension of mulberry plantation, production of cocoons, and local marketing of silk products of *bosnis* and large farmers by a combination of efforts by entities involved in sericulture sub-sector;
- e. development of export-linkage to market sericulture products abroad and to feed the export-oriented RMG industry;
- f. improvement of technology in the silk sector and design of silk products; and
- g. setting-up *chaki* rearing cum minifiliature centres where intensive training will be given for development of skilled *bosnis* and reelers.

14.6.9 To overcome the problems of this sub-sector the Fifth Plan envisages to undertake the following programmes to promote:

- a. expansion of mulberry plantation in all possible places;
- b. expansion of extension services;
- c. production of quality cocoon;
- d. new reeling technology for improvement of quality silk yarn;
- e. marketing and credit;
- f. establishment of *chaki* rearing and minifiliature centre (CRC) under the zonal or regional offices of Bangladesh Sericulture Board (BSB); and
- g. strengthening Bangladesh Sericulture Research and Training Institute (BSRTI) to enhance the skill of manpower engaged in sericulture farming and silk reeling.

14.6.10 In order to bring about sustainable development of the silk sector, the Fifth Plan seeks to undertake a long term multi-faceted programme for introducing improved technology through strengthening institutional arrangement and policy improvements. This programme envisages establishment of a non-profit private sector institution- Bangladesh Silk Foundation. It will be established to provide necessary support and training activities in silk sector as well as to co-ordinate the efforts and initiatives of the NGOs and private entrepreneurs. The main objective of Bangladesh Silk Foundation will be to assist in increasing the income of small scale silk producers, most of whom are poor women, through introducing improved technology and to develop institutional and policy support for sustainable development of silk and sericulture sub-sector. During the Plan period Bangladesh Silk Foundation will undertake programmes to (a) enhance productivity of silk worm through dissemination of improved technology and undertaking adaptive research through BSRTI, (b) develop Germ Plasm Maintenance Centre, (c) improve management of grainages, (d) disseminate silk worm rearing and reeling technologies to the farmers, NGOs, rearers and reelers, and (e) undertake product development, design improvement and market promotion of silk yarn and fabrics. These programmes envisage to enhance the volume of production of silk yarn from the present level of 29 tons in 1996-97 to 181 tons by 2002 and to raise silk farmers' income and create employment opportunities. Besides, appropriate steps will be taken towards rationalisation of tariff rate on the imported silk yarn to enable local production stand the competition of imported silk yarn.

14.6.11 Other strategies for overall development of the textile sub-sector will be as under:

- a. For development of human resources for the textile sector, the existing training institutions under the Ministry of Textiles (MOT), Department of Textiles (DOT), Bangladesh Handloom Board (BHB) and Bangladesh Sericulture Board (BSB) will be strengthened and some new training facilities will be created- to stay with time, additional trade courses will be designed and offered to the trainees;
- b. A central testing and quality control laboratory will be established in the public sector to serve both the public and private sector units;
- c. The facilities being created in the National Institute of Textile Training Research and Design (NITTRAD) will be utilised for product testing and adoption of market sensitive design enabling sophisticated marketing and merchandising high value added garments in the process of transforming fashion business into an economically viable proposition;
- d. Dependence on imported machinery and spares will be reduced through transfer, adoption and adaptation of technology and development of cost-effective indigenous technology;
- e. Currently women's participation in the export-oriented RMG industry of Bangladesh is more than 85 percent of total employment; but in other modern textile sub-sectors, it is very negligible compared to 50-60 per cent in developed countries; keeping in view the national objective of poverty alleviation of the socially disadvantaged groups particularly distressed women, adequate measures will be taken for greater participation of women labour force in the modern textile sector.

14.6.12 Projected Productions: The projected production of fabrics has been estimated at 3,651 million metres out of which fabrics for domestic consumption will be 2,037 million metres. If the projected production is achieved, per capita consumption of cloth will be 15.37 metres in 2001/2002. The estimated production for yarn and fabrics during the Fifth Plan period is shown in Table 14.7.

Table 14.7
Projected Production of Yarn and Fabrics 1997-2002

Textile Products	Benchmark (estimated) 1996/97	Projections 2001/2002
Yarn production ¹ (million kg.)	113	522
Fabric for domestic consumption (million metres)	953	2037
Fabric for RMG production	210	1614
Total fabrics ² production (million metres)	1163	3651
Population (million)	123.8	132.50
Per capita demand for fabrics (metres)	12.9 ³	15.37

Notes :

¹ Of total yarn requirement for projected production of fabrics, 100 per cent will be produced by 2001-2002.

² Cent per cent of domestic fabric requirement and 50 per cent RMG fabric requirement will be domestically met by 2001/2002.

³ Demand for domestic market in 1996/97 is estimated at 1596 million metres.

14.6.13 Fabrics from the modern sub-sector (which includes composite textile mills, specialised textiles and power looms and knitting and hosiery units), handloom, sericulture and others (tents, soft luggages, gloves, socks, tarpaulins, inter-linings, under-garments, umbrella-cloth etc.) is projected to increase from 564 million metres in 1996/97 to 2953 million metres in 2001/2002. The benchmark production and projected production in these sub-sectors during the Fifth Plan period are given in Table 14.8.

Table 14.8
Projected Production of Fabrics During 1997-2002

Textile Sub-sectors	(in million metres)	
	Benchmark (estimated) 1996/97	Projected Production (2001/2002)
Modern Sector	564	2,953
Handloom	595	690
Sericulture and others	4	8
Total	1,163	3,651

14.6.14 While fabric production in handloom is assumed to grow at an annual compound growth rate of about 3 per cent, in sericulture it is assumed to grow at the rate of about 15 per cent per annum, that in modern sub-sector at the annual rate of 39 per cent during 1997-2002. The overall annual growth rate of fabrics in the textile sub-sector is envisaged to be 25.7 per cent during 1997-2002. A comprehensive programme for the creation of new capacity in spinning, weaving, dyeing and finishing and export-oriented garments will be launched in order to attain self-reliance in fabric for domestic market by the year 2002 and to meet 50 per cent of the fabric requirements of export-oriented RMG industries. Table 14.9 shows the number of units proposed to be set up during the Fifth Plan.

Table 14.9
Number of New Units Proposed to be Established in Different Subsectors
During Fifth Plan

Sub-sectors	1997/98	1998/99	1999/2000	2000/2001	2001/2002	1997-2002
Spinning (Each unit of 25,000 Spindles)	42	42	42	42	45	213
Weaving (Each unit of 120 Shuttleless Loom)	46	46	46	46	46	230
Dyeing and finishing (Each unit of 10 million metres per annum)	49	49	49	49	53	249
RMG (Each unit of 0.6 million pieces per annum)	153	153	153	153	153	765

14.6.15 Employment Generation in the Textile Sub sector: In the textile sub-sector it is estimated that a total of 1,779,560 persons will be employed during the Plan period, of which 8,40,760 will be in the public sector and 938,800 will be in the private sector. In the private sector 130,800 persons will be employed in spinning, 46,000 in weaving and knitting, 373,500 in dyeing and finishing, 382,500 in RMG, 6,000 in specialised textiles and 6,000 in miscellaneous industries. In the public sector 1,500 persons in BTMC, 3,260 in Department of Textiles, 670,000 in sericulture and 166,000 in handloom will be employed.

14.6.16 Jute Industries: Jute is a vital sector of the economy from agricultural, industrial and commercial points of view. About 5 million bales of raw jute is produced in the country every year of which about 1.5 to 2 million bales are exported, 3 million bales are consumed by local mills and about 0.5 million bales are used for domestic consumption and kept as carry over stocks. About 50 per cent of world import demand for jute goods (approx. 0.90 million metric ton) annually is met by Bangladesh. Jute is the third biggest export earner (Tk.15,960 million annually) of the country.

14.6.17 As this sector provides large scale employment and earns substantial foreign exchange, the government continued to provide hidden subsidies and financial assistance to jute mills from the very beginning. Consequently the sector's debts to the banks stood at about Tk. 40 billion in 1993 when the government launched Jute Sector Reforms Programme (JSRP) with financial and technical assistance from IDA. The Programme envisaged to create

a viable, essentially privately owned jute industry to be operated on a commercial basis. Major thrust of the JSRP was privatisation of the public jute mills within 30th June, 1996. The Privatisation Board tendered and re-tendered a number of jute mills for privatisation during the last few years but not much satisfactory response was received from the market.

14.6.18 The performance of the private sector mills till the end of 1996/97 has been disappointing and frustrating. In spite of receiving debt write-off, restructuring facility and loss financing support from the government under JSRP, the private sector could not utilise its existing installed capacity of 10,000 looms. As a matter of fact, the private sector utilised less than 50 per cent of their capacity and closed down 8 mills.

14.6.19 The JSRP was a difficult and complex programme. The government made sincere efforts to carry it forward. The government spent more than double the amount of the IDA Credit Line (Tk. 10,000 m.) in this project. The government issued bonds worth Tk. 18,060 million to pay off the debts of BJC and 4 closed jute mills and provided loss financing support to the running jute mills. It also paid Tk. 3,360 million to meet the separation cost of the workforce of the public jute mills. But the purpose for which the programme was undertaken has not been achieved. The commercial viability of the jute industry has not been established. Privatisation was recognised as an effective means to strengthen the role of the private sector in trade and industry with a view to accelerating economic development and augmenting resources for the same. Accordingly, the government adopted a comprehensive privatisation policy and laid down detailed procedure to facilitate the process of privatisation. In order to create a viable, essentially privately owned jute industry to be operated on a commercial basis in a reformed policy environment, the government has been pursuing the jute sub-sector restructuring programme since July, 1993. The government has already decided to reduce its ownership of jute sector investment from 64 per cent to 20 per cent. Some 23 jute mills, out of 31 in the public sector, are enlisted for privatisation. The Privatisation Board has almost completed evaluation of the asset value of these mills with a view to unloading them to the private sector with utmost speed.

14.6.20 The loss of production of the jute industry to the extent of 15 per cent to 20 per cent is attributable to erratic power supply. It is expected that the power need of the jute industry will be met by the later part of the Fifth Plan. The future of jute and jute industry lie in their diversified uses and aggressive market promotion. For this, there is an immediate need for strengthening the R&D and institutional capacities of the Ministry of Jute and its various organs.

14.6.21 In order to achieve the objectives of the Fifth Plan, the following strategies will be pursued for the jute manufacturing sub-sector during the Plan period :

- a. **Improvement in Productivity and Capacity Utilisation:** Improvement in productivity and capacity utilisation will be done through rehabilitation of the existing jute mills through BMR programmes, enforcement of industrial discipline and exploring possibility of participation of labour through profit-sharing and participation in management, adequate and timely supply of raw-materials and spare parts, privatisation of maximum public sector jute mills and rationalisation of man power therein, improvement in managerial efficiency through skill development training and improvement in the quality of conventional jute products and reduction in the cost of production through improvement in per loom production and reduction in raw jute cost by increasing per acre productivity.

- b. Diversification of End Uses of Jute:** Diversification of end uses of jute through production of pulp and paper, geo-textiles, absorbents, hard-boards, handicrafts, mats, decorative wall covering, shopping bags, carpets, blankets etc. will be pursued through undertaking appropriate development programmes. Development and extension of appropriate varieties of jute, kenaf and rami fibre to enable round-the-year supply of these items for establishment and smooth operation of pulp and paper industry will be undertaken. Improvement in the quality of jute products will continue to remain a central strategy for attracting higher prices for Bangladeshi jute goods.
- c. Market Promotion:** Attempts will be made to promote and develop market for jute goods through identifying the constraints of the existing marketing system of jute goods and taking appropriate measures to overcome such constraints, assessing the market demand both at home and abroad, conducting studies on a continuous basis on the jute goods demand with a view to overcoming the demand and supply gap, formulating appropriate pricing policies, opening required number of sales centres in Bangladesh missions abroad, organising display of jute goods in major importing countries, participation in the international trade fairs and contacting foreign buyers to gear up exports, making institutional arrangement to monitor export prices of competing goods to prevent dumping by the competing countries and formulating appropriate export and import policies. Commercial Sections of Bangladesh Missions abroad will be revamped for this purpose.
- d. Financial and Other Policy Incentives:** Financial and other policy incentives strategy includes rationalisation of monetary and fiscal incentives, *viz.* reducing interest rate from existing 15 per cent to about 10 per cent or less, exemption of excise duty on electricity, reduction in the prices of oil and gas for generation of electricity for jute mills to the level fixed for Bangladesh Power Development Board (BPDB) and exemption of advance income tax in case of jute yarn and twine, adopting suitable and appropriate mechanism to maintain parity with dollar value among the competing countries to match the external competition for our jute and jute goods.
- e. Strengthening of Institutional Capability and R&D:** Strengthening of institutional capability and R&D involves evaluation of the existing R&D institutions for clear identification of technological gaps. In order to bridge the gaps, establishment of a new “Jute Industry Development Centre” under Bangladesh Jute Research Institute (BJRI) will be pursued with necessary technical assistance to undertake research activities to develop technologies for improvement of quality and yield of traditional jute fibres as well as for diversification of jute products. To evolve new high yielding varieties of jute seeds to increase per acre yield which, in turn, will lead to substantial reduction in the cost of production to make jute and jute goods competitive in the international market will be at the top of R&D priority. Research and Development of rami fibre by sharing experience with China will be promoted.
- f. International Jute Organisation (IJO):** For undertaking research and development in the areas of jute, jute goods and related products as well as accessing markets, necessary assistance will be sought from the International Jute Organisation (IJO).
- g. Improvement of Environment and Natural Resources:** Retting of jute is perceived to contribute to water pollution where there is insufficient availability of water. In such areas, canals and small ponds will be dug for retting of jute. If necessary, promotional measures will be undertaken to motivate the jute growers by the local government bodies for retting their jute in a proper way to reduce/eliminate adverse environmental

effects. New techniques for retting of jute will be explored. The government policy on banning the production of polythene bags as substitutes for jute bags will be enforced and towards this end, polythene bag factories may be converted into jute bag manufacturing factories. Setting up of more polythene industries in the country will not be allowed. To reduce the acreage under jute and at the same time maintain a higher volume of supply for its diversified end uses, including use of green jute for pulp making and thus to ease the burden on insufficient forest resources of the country, efforts will be made to produce jute throughout the year through necessary augmentation of soil nutrition.

- h. Social Safety-net Programme:** Programmes will be undertaken to provide retrenchment benefits and retraining for self employment to support affected workers.
- i. Planning and Implementation of Development Programmes Through Local Level Institutions:** With the introduction of proposed institutional structure at Zilla, Thana and Union levels, small and cottage industries planning activities could be included in the functions of such local government bodies. During the Fifth Plan, BSCIC will provide necessary services for industrial development including industry based on jute and will maintain effective liaison with the development programmes of such institutions. The process of interaction between BSCIC and the local level institutions will ensure effective local level participation in such industrial planning and development. Moreover, the NGOs who have emerged as a new force for development in the rural areas are expected to play an effective role in the skill development of the poor and disadvantaged groups through motivation and training and help them in producing varieties of industrial goods including jute goods.
- j. Employment Generation and Poverty Alleviation:** The jute and jute manufacturing sub-sector has immense potential for employment generation and poverty alleviation in Bangladesh. Jute production, jute industry and trade and the related services employ about 10 per cent of our labour force and jute industry is the second largest industrial employer after textiles. The new and diversified use of jute plants and fibres for pulp and paper, textile yarn blended with cotton and wool, geotextiles, jute reinforced plastic materials, luggages, shopping bags, handicrafts, accessories, etc. will open new horizon for employment opportunities. The women will find job opportunities in the rural areas by utilising finer jute yarn in cottage industries. In the agricultural sector, increased yield per unit area will bring down the production cost of jute which will help growers to alleviate their economic hardship by raising their income.

14.6.22 Chemical Industry: In the Fifth Plan, the objectives of the chemical sub-sector will be as follows:

- a. to increase the contribution of chemical industries sub-sector (fertiliser, paper, newsprint, etc.) to GDP;
- b. to meet the needs of the country in respect of fertiliser, paper, news print, etc.;
- c. to identify and exploit the comparative advantages of the economy in different sub-sectors and to direct public sector investment in those desirable sectors where private investment is still shy;
- d. to identify and give emphasis on thrust sectors;
- e. to develop human resources for efficient management and operation of enterprises;
- f. to develop a sound technological base in the country; and
- g. to provide facilities and services to attract private investment, including foreign direct investment.

14.6.23 In order to achieve the objectives and targets set for the chemical industries sub-sector, the following strategies will be pursued for accelerating the contributions of this sub-sector towards a self sustained economy:

- a. Public sector dominance in this sub-sector will be gradually reduced and the private sector will be encouraged to set up new industries either alone or jointly with the public sector. All the sub-sectors under chemical sector are open to the private sector. But the private sector has not come forward to take up the challenge except participating in a joint venture with a foreign company (KAFCO). The investment size, technological complexities and the mandatory price structure may be attributed as main reasons standing in the way of private sector participation in the fertiliser sector, particularly in urea manufacturing. A private company has recently come to set up a joint venture SSP fertiliser with BCIC. There are great prospects for participation by private sector in all areas of chemical sector. Necessary technical support such as project analysis, project preparation, demand and supply analysis, sourcing and pricing of machinery, market information, etc. will be provided to the private sector in setting up joint ventures and/or new enterprises in the private sector.
- b. Excess manpower in the corporations/enterprises will be rationalised to economise revenue expenditure. At the same time necessary power/authority will be delegated to the corporations/enterprises and they will be made accountable for failure and rewarded for success.
- c. One of the major problems and impediments to the growth of this sub-sector is the dearth of finance, technical know-how and skilled manpower. In this context, besides local currency support through ADP, the following source of financing will be vigorously explored:
 - i. alternate sources of financing for projects from the capital market will be explored. BCIC will be given freedom in exploring and arranging alternate sources of finance outside the country;
 - ii. more emphasis will be given on building projects on BOT/BOO/BOOT model; the public sector will identify viable projects, process them for approval and implementation; after implementation they will operate the projects for some time and subsequently transfer them to private entrepreneurs; and
 - iii. local currency financing, *inter-alia*, public subscriptions of shares through the capital market will be explored; joint venture companies, with participation of BCIC, will be encouraged to issue shares/debentures.
- d. In case of sick industries, viability where possible will be restored *inter-alia*, through screening out inefficient manpower and replacing them by efficient, dependable, sincere and committed manpower. Necessary training, both local and foreign, will be imparted for building up efficient management for restoring their viability. Technical support in the form of studies, equipment and machinery will be provided to put the industries/enterprises on a viable footing. All stakeholders - owners, management, labour and the concerned lending institution will be asked to bear out rehabilitation.

14.6.24 Projected production for some major chemical products during the Fifth Plan are as follows:

a. Urea Fertiliser: Bangladesh is a major producer of Urea Fertiliser in the region having 6(six) factories with annual installed capacity of 2,500 thousand metric tons of urea. In 1995/96 BCIC produced 2,134 thousand metric tons of urea. According to the projection made by BCIC the actual demand of urea fertiliser during 1995/96 was approximately

2,300 thousand metric tons. The projected urea production was 2,110 thousand metric tons. The demand of urea is rising by 10 per cent per annum. In 1996/97 the government has taken action to import 200 thousand metric tons of urea to meet the local demand. A recent study indicated that future demand of urea will further increase as shown in the Table 14.10 .

Table 14.10
Demand Projection of Urea Fertiliser (1997-2002)

Year	Urea Demand	Local Production	Net Import Requirement
1996/97 Benchmark	2.40	2.05	0.35
1997/98	2.45	2.10	0.35
1998/99	2.67	2.10	0.57
1999/00	2.92	2.10	0.82
2000/01	3.19	2.49	0.70
2001/02	3.49	2.55	0.94

(in million metric ton)

This leaves room for setting up more urea fertiliser factories in the country. For this purpose NGFF will be replaced by Shahjalal Fertiliser Co. Ltd. increasing annual production capacity from 106,000 metric tons to 330,000 metric tons and another new urea fertiliser factory will be set up in northern/southern part of the country by the year 1999/2000. There is a plan to increase capacity of urea production in JFCL and ammonia production in CUFL by 1999/2000 to 2000/2001.

- b. TSP:** The present annual demand of TSP in the country is about 700 thousand metric tons. TSP Complex produces about 150 thousand metric tons of TSP/SSP (TSP-50,000 metric tons and SSP 100,000 metric tons). The rest of the demand is met through import. In order to meet a big chunk of the demand the annual production capacity of TSP Complex will be increased to 275 thousand metric tons (TSP-75,000 metric tons and SSP-200 thousand metric tons) through balancing and full capacity utilisation. There is a plan for setting up a three hundred thousand metric ton SSP Factory by a foreign sponsor in collaboration with BCIC. There is also a plan for setting up a DAP factory with a capacity of 360 thousand metric tons in the country.
- c. Paper:** The present demand for writing and printing paper is 80,000 metric tons. The demand for various grades of paper has been increasing. In 1995/96 BCIC produced 41,889 metric tons of paper and the rest of the demand was met from the supplies of private sector and import. The projected production of paper in 1996/97 is 44,000 metric tons. The growth rate of demand for different grades of paper has been assumed to be 6 per cent to 10 per cent. In order to cater to the future demand the present capacity of producing paper and pulp in public sector including joint ventures will be increased through BMRE of the existing mills and setting up of new mills preferably under joint venture/private sector.
- d. Newsprint:** The demand for newsprint has increased rapidly during the last few years because of its use as writing paper and the government policy of cherishing the freedom of the press. The present demand for newsprint is about 60,000 metric tons per annum. The lone newsprint producer in the country, Khulna Newsprint Mill (KNM) having installed capacity of 48,000 metric tons per annum is no longer in a position to meet the domestic demand. In 1994/95 and 1995/96 KNM produced 43,061 and 40,479 metric tons newsprint respectively. A large quantity of newsprint is being imported into the country to meet the short-fall. To meet the demand for newsprint BCIC will undertake BMRE of KNM in the Fifth Plan period.

- e. **Cement:** The present annual demand for cement in the country is 0.28 million metric tons. In 1994/95 and 1995/96 BCIC produced 0.147 million and 0.153 million metric tons cement respectively. The only integrated plant Chhatak Cement Factory having a capacity of 0.233 million metric tons is under BCIC. There are about 6-7 cement mills in the private sector and based on imported clinker.

14.6.25 Under chemical industries sub-sector the major programmes/projects will include *inter alia* Shahjalal Fertiliser Factory, capacity increase of urea in Jamuna Fertiliser Factory, capacity increase of amonia in Chittagong Fertiliser Factory, Di-Amonium Phosphate Plant (DAP) at CUFL, setting up of a paper machine in SPPM, BMRE of Karnaphully Paper Mills, BMR of Khulna Newsprint Mill (KNM) and one Urea Fertiliser Factory in the northern or the southern zone. Projected production for different chemical products is summarised in the Table 14.11.

Table 14.11
Projected Production for Chemical Industries

Items	(in metric ton)					
	1996/97	1997/98	1998/99	1999/2000	2000/2001	2001/2002
Urea	2,049,810	2,150,000	2,150,000	2,150,000	2,330,000	2,363,000
TSP/SSP/DAP	104,181	150,000	176,000	209,000	220,000	220,000
Newsprint	23,903	45,000	45,000	45,000	45,000	45,000
Paper	23,239	45,000	45,000	53,400	72,600	79,200
Cement	107,300	150,000	186,000	221,000	221,000	233,000

Source : BCIC

14.6.26 Sugar Industry: Objectives of the sub-sector during the Fifth Plan is to increase the contribution of sugar sector to GDP, create new job opportunities specially in rural areas and reduce sugar import by increasing the domestic sugar production.

14.6.27 In the current industrial policy additional investment in sugar industry by the public sector has been discouraged and the private sector has been given preference with various incentives. But so far, response from the private sector in sugar industry has been disappointing. So the public sector will continue to play some role. BMRE programmes of existing sugar mills will continue to be implemented for their progressive unloading to the private sector.

14.6.28 Dry and low rain-fall belt in the north, north-west and western regions of Bangladesh comprising the greater districts of Rajshahi, Dinajpur, Bogra, Rangpur, Pabna, Kushtia, Jessore and Faridpur are considered as the best sugarcane growing areas of the country. In fact, almost all of the existing sugar mills are located in these regions where sugarcane has emerged as the main cash crop over the years. There is ample scope for capacity expansion of some existing sugar mills as well as establishment of new sugar mills in different locations of the cane growing regions.

14.6.29 Demand for sugar in the country is estimated to be about 371 thousand tons in 1996/97 for a population of 123.8 million based on per capita sugar consumption of 3.0 kg. a year. Assuming the consumption rate remains constant, demand for sugar will increase to about 400 thousand tons in 2001/2002 for an estimated population of 132.5 million. If per capita sugar consumption increases due to growing urbanisation and change of food habit, total demand of sugar will increase further. Against this demand, total sugar production capacity of the 15 operating sugar mills is now 215 thousand tons per annum based on total

cane crushing capacity of 21,044 tons per day, 120 effective crushing days and 8.5 per cent sugar recovery. However, depending on the availability and quality of sugarcane, actual sugar production may vary from 200 thousand tons to 225 thousand tons per annum. Thus, at present there is an annual deficit of about 150 thousand tons of sugar which is met through import at the cost of Tk.2,500 million in hard earned foreign currency. The deficit will increase nearly to 200 thousand tons in 2001/2002, unless additional sugar production capacity is created at suitable locations of cane growing regions of the country.

14.6.30 Estimated demand, domestic production and import of sugar up to 2002 are given in the Table 14.12.

Table 14.12
Estimated Demand for Production and Import of Sugar

Year	Population (million)	Demand @ 3.0 kg. (million ton)	Local Production (million ton)	Deficit/ Import (million ton)
1996/97	123.80	0.37	0.14	0.23
2001/2002	132.50	0.40	0.200-0.23	0.17-0.20

14.7 Obstacles to Growth of the Sugar Industry in Bangladesh

14.7.1 With the exception of a few, most of the sugar mills in Bangladesh do not have cane plantations of their own and they have to depend on a large number of small farmers in their respective mill zones for sugarcane supply. But owing to several factors including fragmented and small cane holdings, high initial input cost, year round waiting time for cane, incidence of pest and disease, lack of high yielding variety of cane, high risk involvement etc., per acre yield of sugarcane in Bangladesh (which is 20-21 tons/acres) is relatively low. As a result, sugarcane faces hard competition from other crops, especially paddy which has a much shorter growing period. Besides, sugar content in the cane is also low mainly because of climatic factors. This stands in the way of increasing the sugar recovery which at present varies from 8.0 per cent to 8.5 per cent.

14.7.2 Sugar industry in Bangladesh was originally started by the private entrepreneurs during the mid-thirties. But since then no further investment by the private sector has been made in the sugar industry. Investment in sugar industry is now open to both the public and the private sectors. In the new industrial policy, the role of the public sector has been shrunk and new investment by the public sector in sugar industry has been discouraged in order to encourage the private sector investors. Though private investment in different industrial sectors has increased significantly in recent years, no private entrepreneur has so far come forward to set up new sugar mills in the country. As it is neither desirable nor advisable to withhold investments from the sugar subsector altogether, an appropriate policy package, along with adequate incentive measures, will have to be worked out to make the sugar subsector attractive for private investments.

14.7.3 Total cane crushing capacity of the existing 15 sugar mills of the country is 21,044 metric tons cane per day (TCD) with which 200-225 thousand tons of sugar can be produced per annum. Based on present performance and future prospect of sugarcane production in their respective mill zones, cane crushing capacity of 8 (eight) of the existing sugar mills namely, Carew, Zeal Bangla, North Bengal, Natore, Faridpur, Kushtia, Mobarakganj and Panchagarh Sugar Mills, can be increased by 1000-1250 TCD each during the Fifth Plan. In addition to the expansion programme, 3 (three) new Sugar Mills of 2000 TCD each may be set up at Shibganj of Chapai Nawabganj district, Serajganj of Serajganj district and Jhikargacha of Jhenidah district. The private sector will be encouraged to establish these new

mills. This will increase the cane crushing capacity by another 6,000 TCD. On completion of the development programme proposed above, total cane crushing capacity of the country will increase from 21,044 TCD in 1996/97 to 35,294 TCD and sugar production capacity will increase from 215 thousand tons to nearly 400 thousand tons per annum by 2001/2002. This will help reduce sugar import. In addition, the proposed three new sugar mills will create direct employment opportunity for 3,225 persons (1,075 persons in each) and will also bring about benefits to a large number of people including marginal farmers in areas surrounding the mills.

14.7.4 Besides the sugar mills, there is a bright prospect for setting up an export oriented molasses-based distillery having a capacity of 5-6 million litres per annum. This project may be set up as a joint venture with foreign entrepreneurs who will ensure export of the same. This will increase the value-addition of molasses which is obtained as a by-product from the sugar mills and will also create job opportunity for about 200 persons.

14.7.5 Steel and Engineering: The engineering industries produce investment goods which determine the technological capability and consequently the production level and efficiency of an economy. The engineering industries are also suppliers of important consumer durables. This is particularly so in the electrical and transport equipment industries. In the developed economies, the growth of the subsector generally exceeds that of the manufacturing as a whole. In the developing economies, on the other hand, the sub-sector lags behind.

14.7.6 Bangladesh has a 'mini' steel plant at Chittagong which has been out of operation for quite sometime. Its engineering base is very weak despite the fact that the country has a machine tools factory, a diesel engine manufacturing plant as well as a plant for manufacturing general electrical equipment. The performance of the sector has not been satisfactory for various reasons though this is the basic sub-sector for industrial development. During the first four years of the Fourth Plan (1990-95), the production volume of this sub-sector showed downward trend because of the low capacity utilisation, low productivity, lack of investment fund in the public sector, major constraints in the private sector consisting of demand constraints, inefficient operation of existing units both in the private and public sectors, dearth of skilled and trained personnel, inadequate R&D, inadequate infrastructures, inconsistent tariff policies etc.

14.7.7 Under the current industrial policy, the growth of this sub-sector has come to depend on private sector initiative. In pursuance of the government's privatisation policies, BSEC is endeavouring to increase the efficiency of the enterprises under its control. Proposals for financial re-structuring of some of the enterprises are under consideration by the government. In the meantime BSEC has already issued public shares to the extent of 49 per cent in four of its enterprises. Again, the remaining 51 per cent shares (held by the government) of the two enterprises out of the above mentioned four enterprises have been earmarked for sale to the public. Dhaka Steel Works Ltd. along with two other enterprises (i.e. Quality Iron & Prantik Traders Ltd.) is under the process of handing over to one of the previous Bangladeshi shareholders. Besides, seven more enterprises namely, Bangladesh Machine Tools Factory (BMTF), Bangladesh Diesel Plant, Bangladesh Blade Factory, Bangladesh Can Co. Ltd. General Electric Mfg. Co. Ltd., Mehar Industries (B) Ltd. and Chittagong Steel Mills Ltd. are earmarked for outright sale. However, the disinvestment of SOEs is a continuous process and to be implemented in phases. Keeping in view the importance and prospect of steel, engineering, ship-building, electrical will be and electronic products, the objectives for the Fifth Plan of the steel and engineering sub-sector will be to:

- a. support the agricultural sector with the ultimate objective of transforming the age-old agricultural practice into a semi-mechanised one;
- b. supply capital goods and spares to various sectors of the economy, e.g., agriculture, power, gas, natural resources, transport, communication, construction as well as manufacturing sector itself;
- c. substantially reduce dependence on import of machinery and essential spares and components for jute, textile, sugar mills and electronic industries, thereby improving the balance of payments of the country;
- d. strengthen and diversify the existing export structure through production and export of engineering goods;
- e. maximise capacity utilisation of the existing capital intensive industries through necessary balancing, modernisation, replacement and expansion;
- f. provide linkage, through sub-contracting, to light engineering industries throughout the country and thus create gainful employment opportunities with special emphasis on rural employment through promotion and development of industries in rural areas;
- g. create employment opportunities through development of skills in major sectors like steel, engineering, ship-building and electronics;
- h. accelerate transfer of appropriate technology through establishment of project design and engineering company and thereby reducing dependence on expatriate consultants/experts with regard to undertaking feasibility study, project design, engineering services, etc.; and
- i. accelerate research and development activities for consolidating the industrial base as well as for the development of indigenous technology.

14.7.8 The general development strategies for the steel and engineering sub-sector as a whole are outlined as follows:

- a. consolidation and effective utilisation of existing capacities will be achieved through planned capacity expansion, product diversification, BMREs and introduction of additional working shifts;
- b. with a view to improving the balance of payments position, reducing dependence on imports and promoting self reliance, necessary programmes will be undertaken to diversify the industrial base and to set up import substitute industries for the progressive manufacture of agricultural equipment, jute textile, sugar, electrical machinery and equipment as well as their spares and accessories;
- c. measures will be taken to develop viable products which are high technology based and require venture capital for which private investment is not forth coming;
- d. a significant feature of the strategy for industrial development in general and for steel and engineering industries in particular will be to set up projects under joint-venture with the reputed local/foreign manufacturer mainly to create strong export base and thereby to improve country's balance of payments position;
- e. new capacity will be created in the areas of steel making, electrical cables and conductors and basic electronic components manufacturing; and
- f. viability of sick projects like Bangladesh Machine Tools Factory, Bangladesh Diesel Plant and other projects will be restored through improvement of management capability of the enterprises and also through phasing out of inefficient manpower for progressive transfer to the private sector.

14.8 Development Programmes

14.8.1 The government has undertaken a programme for restructuring of BSEC to make it commercially viable. To make Chittagong Steel Mills Ltd. (CSM) profitable, a restructuring proposal is under consideration of the government. All out efforts will be made to run CSM on commercial and profitable basis.

14.8.2 The other important projects which will be implemented during the Fifth Plan period are: a plant for production of 1,000 M.T. per annum of cross-linked polyethylene (XLPE) cables, a light engineering complex at a suitable location in the north-west region of the country, progressive manufacturing of buses, trucks and cars at Progati Industries Ltd., setting up of a plant for manufacturing of black plain steel sheet, an alloy and special steel manufacturing plant and a new plant to manufacture cars. At the same time the uneconomic enterprises under the corporation will be sold and some enterprises will be disinvested partially.

14.8.3 Projected Production of Major Engineering Products: Steel & Engineering Corporation mainly produces products like steel ingot, billet, corrugated galvanised iron (CGI) sheet, mild steel plate, GI/MS pipe, electric cables, fluorescent tube light, super-enamelled copper wire, ceiling fan, diesel engine, water vessel, bus, truck, jeep and motor cycle, etc. The projected production of major engineering products is given in Table 14.13.

Table 14.13
Major Products of BSEC (1996-2002)

Items	Unit	1995/96	1996/97 (Benchmark)	1997/ 98	1998/ 99	1999/ 00	2000/ 01	2001/ 02
Steel Ingot	M.T.	21898	60000	60000	60000	60000	65000	75000
Billet 110/85mm	M.T.	15197	15380	25000	30000	35000	35000	40000
Billet 50/65mm	M.T.	4624	10000	10000	10000	12000	12000	15000
C G I sheet	M.T.	5439	25000	15000	15000	20000	20000	25000
M S Plate	M.T.	3175	7500	7500	7500	7500	8000	10000
GI/MS Pipe	M.T.	6134	8000	8000	9000	10000	10000	10000
Electric Cables	M.T.	3172	3200	3000	3000	3600	3800	3850
FL. Tube Light	Mil.No	0.95	0.95	0.97	0.97	0.98	0.98	1.00
SEC Wire	M.T.	394	350	350	350	375	400	400
Ceiling Fan	Nos.	28491	60000	60000	60000	65000	65000	70000
Diesel Engine	Cyl.	604	2500	2500	3000	3500	4000	4000
Water Vessel	M.T.	2319	6200	6200	65000	6500	7500	7500
Bus, Truck, Jeep etc.	Nos.	1232	1200	1200	1225	1250	1300	1350
Motor Cycle etc.	Nos.	6700	7000	7000	7500	8000	8000	8000

14.8.4 Small and Cottage Industries: Small and cottage industries occupy a unique position in the economy of Bangladesh. Its contribution to poverty alleviation cannot be underestimated. During the Fourth Plan, against the projection of 0.4 million employment generation, 0.35 million job opportunities were created. The contribution of the sub-sector to the GDP is about 5 per cent. The SCI sector now employs 5 million people directly and indirectly which accounts for 82 per cent of the total industrial labour force. The agriculture sector is not likely to provide the required employment opportunity in the long run. The establishment of large scale industry to offer large scale employment is not considered to be a feasible option at the moment because of resource constraint. It is, therefore, imperative to develop means outside the agricultural sector for creation of employment opportunities. The SCI is an area where large scale employment opportunities exist. Compared to large and medium industries, the SCI has some inherent advantages; these are:

- a. lower capital investment;

- b. more jobs per unit of invested capital;
- c. lower capital-output ratio;
- d. lower infrastructure requirement;
- e. shorter start-up time;
- f. creation of micro entrepreneurial talent;
- g. lower consumption of energy;
- h. less environmental risk; and
- i. stimulation of personal savings and promotion of agro-industrial linkages.

14.8.5 Keeping in view the industrial and socio-economic policies of the government, the major objectives of SCI during the Fifth Plan are :

- a. to reduce unemployment through generation of new employment opportunities, especially for the rural people;
- b. to increase the income of poor people by self-employment through indigenous resources and technology;
- c. to generate employment through entrepreneurship development;
- d. to meet the local demand for essential commodities;
- e. to discourage influx of the rural people to the urban areas through rural industrialisation;
- f. to encourage geographical dispersal of industries and ensure balanced regional development;
- g. to promote sub-contracting linkages among the various types of large, medium and small scale industries;
- h. to encourage production of export-oriented and import-substitute products through promotion of small agro-based industries; and
- i. to increase the contribution of SCI sector to GDP.

14.8.6 In order to achieve these objectives of the SCI, the following strategies will be followed :

- a. to assist the SCI entrepreneurs through rendering pre and post investment promotion and extension services;
- b. to develop and improve efficiency of SCI entrepreneurs including women entrepreneurs through management training programmes;
- c. to obtain optimum utilisation of existing capacity through measures for balancing, modernisation, rehabilitation and expansion (BMRE) of existing industries;
- d. to assist and promote local industries with comparative advantage through tariff rationalisation and appropriate fiscal measures;
- e. to encourage growth of linkage industries and subcontracting, agro-based and agro-support industries, export oriented and import substitute industries, engineering, electrical and electronics industries;
- f. to extend credit facilities to the SCI entrepreneurs;
- g. to develop the quality of the SCI products;
- h. to develop marketing facilities of the SCI products;
- i. to strengthen co-ordination among the agriculture and others related sectors;
- j. to diversify the industrial activities in the new potential areas;
- k. to promote joint venture with local and foreign collaboration; and
- l. to take appropriate measures for ensuring optimum utilisation of the facilities created in the existing industrial estates; establishment of any new industrial estate, though being generally discouraged, will only be allowed if justified by regional needs.

14.8.7 In view of the objectives and strategies set forth the following projections have been made for the SCI sector in the Fifth Plan:

- a. to increase the SCI sector's contribution to GDP from 5 per cent to 7.5 per cent; and
- b. to create employment opportunities for 0.478 million people.

14.8.8 Programmes: In order to achieve the above objectives a comprehensive programme for development of small and cottage industries has been proposed. This programme can be classified into two types - public sector programme and private sector programme. An outlay of Tk.1,089.89 million has been envisaged for the public sector, while Tk. 125,246.97 million is earmarked for private sector investment. Of this, credit requirement has been estimated at Tk.12,800 million including a foreign exchange component of Tk.6,144.4 million during the Fifth Plan period for setting up small and cottage industries in the private sector.

- a. **Public Sector Programme:** In the public sector a number of projects will be implemented during the Plan period through investment of Tk.1,089.89 million. Out of these investment projects, 12 are spill-over projects and the rest will be new projects. Under technical assistance one project is a spill-over project. Public sector programme aims at providing infrastructure facilities including common facilities, dyes and chemicals, credit facilities, training to the entrepreneurs, extension services and research, market promotion and also self employment facilities for the people. Besides, some new projects such as development of salt industry in Khulna-Satkhira region, Women Entrepreneurship Development (4th phase), Skill Development Centre at Gopalganj will be established during the Plan period. Bangladesh Small and Cottage Industries Corporation (BSCIC) has been constantly monitoring the utilisation position of developed industrial plots in the existing industrial estates. It also takes appropriate measures to expedite allotment process whenever there is a genuine need. Construction of any new industrial estate will be undertaken only in response to a clearly demonstrated demand for it.
- b. **Private Sector Programme:** In the private sector a programme of Tk.125,246.97 million is proposed for investment. The objective of the private sector programme is to encourage establishment of small and cottage industries in various important areas. These are: agricultural tools and equipment, affixation pumps, motors and other equipment, fertiliser and insecticides, dyes and chemicals, leather and rubber products, rural transport and transportation equipment, sports good and toys, food, fruits and vegetables, preservation and processing of semi-intensive shrimp culture, fish, poultry and cattle feed, cotton spinning, textiles, handloom, hosiery and silk products, machine tools, electrical and electronics equipment and goods, spares and accessories, intermediate products, dairy supplies and services etc. Also priority will be given to the development of rural, cottage and handicrafts industries.

14.9 Benchmark Production and Terminal Year Projection for Major Manufactures

14.9.1 Benchmark production of major manufactures and projection of production for the terminal year of the Fifth Plan are presented in Table 14.14.

Table 14.14
Projected Production of Major Industrial Output During
Fifth Plan Period

Items	Unit	1996/97 (Base Year)	2001/2002 (Terminal Year)
Urea	000 M.T.	2,049.81	2,363.00
T.S.P/S.S.P	000 M.T.	104.18	220.00
Paper, Pulp and Newsprint	000 M.T.	70.00	124.20
Cement	000 M.T.	107.30	233.00
Yarn Production	Million KG	113.00	522.00
Cotton Yarn	Million KG	75.71	349.74
T.C.& Others	Million KG	37.29	172.26
Fabrics Production	Million Metre	1,163.00	3,651.00
Cotton Cloth	Million Metre	779.21	2,446.17
T.C. & Others	Million Metre	383.79	1,204.83
Fabrics for Garments	Million Metre	210.00	1,614.00
Cotton Fabrics	Million Metre	140.70	1,081.38
T.C. & Others	Million Metre	69.30	538.62
Jute Textiles	000 M.T.	435.00	500.00
Hessian	000 M.T.	139.20	160.00
Sacking	000 M.T.	252.30	290.00
C.B.C.	000 M.T.	43.50	50.00
Sugar	Million M.T.	0.14	0.23
Spirit	000 Litre	2,500.00	4,000.00
Bus, Truck & Car	Nos.	1200	1350
Motor Cycle	Nos.	7000	8000
Diesel Engine	Nos.	750	4000
Steel Ingot	000 M.T.	21.90	75.00

14.10 Manufacturing Sector Outlay During Fifth Plan

14.10.1 The Fifth Plan provides an outlay of Tk.310,569.86 million for investment in the manufacturing sector. About 96 per cent of this outlay (i.e.Tk.298,776.16 million) is expected to be in the private sector and the residual 4 per cent is earmarked for the public sector. Outlay for the public sector will be utilised mainly for promotional and support services for the private sector, providing the equity share in case of joint ventures between the public and private sectors as well as in establishing industrial undertakings in those areas where the private sector will not be forthcoming. During the execution of the Plan if the private sectors response is inadequate investment in the public sector may have to be made in critical areas such as chemical fertiliser, chemicals etc.

14.10.2 The tables 14.15 and 14.16 show agency wise tentative public sector investment outlay and sub-sector wise private sector investment outlay respectively during the Fifth Plan period.

Table 14.15
Public Sector Investment Outlay for Fifth Plan
(at 1996/97 prices)

(in million Taka)

Agency/sub-sector		Spill-over projects	New Projects	Total Investment	
A.	Investment	Amount	Amount	Amount	%
	Bangladesh Chemical Ind. Corpn.	1,040.00	3,883.37	4,923.37	41.75
	Bangladesh Steel & Engg. Ind. Corpn.	150.00	212.00	362.00	3.07
	Patent, Design & Trademark	-	4.00	4.00	0.03
	National Productivity Organisation (NPO)	-	6.70	6.70	0.06
	Bangladesh Sugar & Food Ind. Corpn.	-	297.00	297.00	2.52
	BEPZA	500.00	560.48	1,060.48	8.99
	BFIDC	-	6.26	6.26	0.05
	Bangladesh Small & Cottage Ind. Corp.	1,000.00	89.89	1,089.89	9.24
	BITAC	-	31.79	31.79	0.27
	BFDC (Bangladesh Film Dev. Corpn.)	-	6.26	6.26	0.05
	BIM	10.00	4.85	14.85	0.13
	Department of Printing & Stationery	20.00	15.67	35.67	0.30
	BJMC	30.00	121.20	151.20	1.28
	Department of Jute	150.00	31.30	181.30	1.54
	Bangladesh Jute Research Institute	-	40.58	40.58	0.34
	BTMC	150.00	138.76	288.76	2.45
	BHB (Bangladesh Handloom Board)	500.00	34.85	534.85	4.54
	Bangladesh Sericulture Board	27.00	58.10	85.10	0.72
	Department of Textiles	1,060.00	255.00	1,315.00	11.15
	Sub-total (A) :	4,637.00	5,798.06	10,435.06	88.48
B.	Other Outlay:	115.80	1,242.84	1,358.64	11.52
	Total (A+B)	4,752.80	7,040.90	11,793.70	100

Table 14.16
Private Sector Investment Outlay During Fifth Plan Period
(at 1996/97 prices)

(in million Taka)

Sl. No.	Sub-sector/Group	Outlay							
		Large & Med.		Small		Cottage		Total	
		Allocation	%	Allocation	%	Allocation	%	Allocation	%
1.	Food & Allied Industries.	11,544.07	6.65	16,461.44	14.12	1,274.55	14.71	29,280.06	9.80
2.	Textile Products.	51,199.23	29.50	40,302.55	34.57	2,463.32	28.43	93,965.10	31.45
3.	Jute Products and Allied Industries.	1,903.11	1.10	641.20	0.55	84.92	0.98	2,629.23	0.88
4.	Forest Products and other Agro-based Industries.	3,804.97	2.19	2,867.93	2.46	1,274.55	14.71	7,947.45	2.66
5.	Paper, Board, Printing & Publishing and Paper Converting & Packaging.	7,673.89	4.42	4,196.97	3.60	169.82	1.96	12,040.68	4.03
6.	Tannery, Leather and Rubber Products	9,502.85	5.53	3,427.52	2.94	424.56	4.90	13,444.93	4.50
7.	Chemical, Pharmaceutical & Allied Industries.	40,332.93	23.24	13,162.16	11.29	254.74	2.94	53,749.83	17.99
8.	Glass, Ceramic & other Non-metallic Mineral Products.	5,129.52	2.96	1,014.27	0.87	339.65	3.92	6,483.44	2.17
9.	Engineering, Electrical & Electronics Industries.	14,403.36	8.30	15,890.19	13.63	2,123.67	24.51	32,417.22	10.85
10.	Service Industries (Warehousing, Transportation, Construction, etc.)	15,354.75	8.85	11,564.98	9.92	-	-	26,919.73	9.01
11.	Trade & Industries Promotion:	209.14	0.12	-	-	-	-	209.14	0.07
12.	Misc. Industries	12,381.37	7.14	7,053.24	6.05	254.74	2.94	19,689.35	6.59
	Total	173,529.19	100	116,582.45	100	8,664.52	100	298,776.16	100

14.11 Sub-sectoral Investment Outlay

14.11.1 Projected Investment Outlay for the Private Sector Textile Industry: The estimated investment requirement for creation of new capacity in spinning, weaving, dyeing

and finishing, export-oriented RMG sub-sector and other textile industry is estimated at Tk.93,965.10 million and shown in the Table 14.17.

Table 14.17
Projected Investment in Private Sector Textile Industry During Fifth Plan Period

(in million Taka)

Textile Sub-sector	1997/98	1998/99	1999/2000	2000/2001	2001/2002	1997-02
A. New Capacity Creation						
Spinning	9,105.55	9,195.25	9,305.10	9,129.80	8,913.57	45,649.27
Weaving	5,625.10	5,205.35	4,923.20	4,712.20	4,410.52	24,876.37
Dyeing & Finishing	2,712.85	2,203.15	2,512.85	2,610.15	3,056.03	13,695.03
RMG	776.33	785.25	809.25	710.40	623.00	3,704.23
Others *	717.35	718.55	683.85	732.10	588.35	3,440.20
Total (A)	18,937.18	18,707.55	18,234.25	17,894.65	17,591.47	91,365.10
B. BMRE						
10 Textile Mills	200.00	150.00	-	-	-	350.00
Specialised Textiles	350.00	325.00	325.00	325.00	325.00	1,650.00
Total (B) :	550.00	475.00	325.00	325.00	325.00	2,000.00
C. Handloom & Sericulture						
Handloom	120.00	120.00	120.00	120.00	120.00	600.00
Total (C) :	120.00	120.00	120.00	120.00	120.00	600.00
Total (A+B+C)	19,607.18	19,302.55	18,679.25	18,339.65	18,036.47	93,965.10

* New capacity creation in other textile industry.

14.11.2 Investment Outlay in Public Sector Textile: The present policy of the government is to privatise public sector textile mills in phases. In pursuance of this policy, 10 textile mills under BTMC were laid off. Among these laid off mills, 7 were sold to private entrepreneurs and 6 of these were handed over to them. The remaining 3 laid off mills are in the process of sale through tenders. Another 11 textile mills from the remaining 30 mills and one engineering workshop under BTMC will be privatised immediately. Until all the mills are privatised BTMC will operate the profitable mills. In view of this, new spindles are being added to 10 BTMC mills under BMRE projects. Another 4 mills will be brought under BMRE programme during the Fifth Five Year Plan period. Besides, Ministry of Textiles (MOT), Bangladesh Handloom Board (BHB), Bangladesh Sericulture Board (BSB), and Department of Textiles (DOT) will carry out promotional activities by implementing several development projects. The proposed outlay for public sector agencies under the Ministry of Textiles is shown in Table 14.18.

Table 14.18
Projected Investment in Public Sector Textile Industry During Fifth Plan Period

(in million Taka)

Public sector	1997/98	1998/99	1999/2000	2000/2001	2001/2002	1997-2002
BTMC	40.20	62.00	66.00	75.36	45.20	288.76
BHB	76.60	102.60	157.40	137.10	61.15	534.85
BSB	19.20	16.20	15.90	16.30	17.50	85.10
DOT	398.65	335.10	326.25	152.25	102.75	1,315.00
MOT	35.60	32.80	4.84	5.25	4.75	83.24
Total	570.25	548.70	570.39	386.26	231.35	2,306.95

14.11.3 At present there are 31 textile mills in the public sector. Most of them are very old and technically out-dated to produce good quality yarn and grey fabrics. All the public sector textile mills are running at loss due to some inherent problems like low capacity utilisation, irregular repair and maintenance, lack of managerial efficiency, excess manpower, high cost of production, etc. Thus replacement of machinery to increase production and meet needs for the export quality fabrics is essential for increased value addition and employment generation for RMG.

14.11.4 Investment Outlay for Jute Industry: In order to achieve the objectives and goals of the Fifth Five Year Plan for jute manufacturing industries under the purview of the Ministry of Jute, an investment outlay of Tk.3,064.57 million at 1996/97 prices has been provided for; of this Tk.435.34 million has been projected for the public sector and Tk.2,629.23 million for the private sector. Agency wise financial outlay for public and private sectors in jute industry including spill-over and new programmes has been shown in Table 14.19.

Table 14.19
Projected Outlay of Jute Industry During Fifth Plan Period

Agency	On-going Projects	New Projects/Programmes	Total Jute Industry
	Amount	Amount	Amount
(in million Taka)			
A. Public Sector			
1. Ministry of Jute	56.00	6.26	62.26
2. Bangladesh Jute Mills Corporation	30.00	121.20	151.20
3. Department of Jute	150.00	31.30	181.30
4. Bangladesh Jute Research Institute	-	40.58	40.58
Sub-Total (A)	236.00	199.34	435.34
B. PRIVATE SECTOR			
1. Bangladesh Jute Mills Association	-	1,200.00	1,200.00
2. Bangladesh Jute Spinners Association	-	717.77	717.77
Sub-total (B)	-	1,917.77	1,917.77
C. Small & Cottage Industries.	-	711.46	711.46
Total (A+B+C)	236.00	2,828.57	3,064.57

14.12 Total Investment Outlay Under Ministry of Industries: An outlay of Tk.6729.60 million including Tk.2,200.00 million for spill-over projects and Tk.4,529.60 million for new projects has been made in the public sector under the Ministry of Industries. Agency wise outlay is mentioned in Table 14.20.

Table 14.20
Public Sector Investment Outlay of Agencies under Ministry of Industries
(1997-2002)

Name of Corporation/ Agency	Outlay for Spill-over Projects	Outlay for New Projects	Total Outlay
	(in million Taka)		
Public Sector Agencies			
BCIC	1,040.00	3,883.37	4,923.37
BSEC	150.00	212.00	362.00
BSFIC	-	297.00	297.00
BSCIC	1,000.00	89.89	1,089.89
BITAC	-	31.79	31.79
BIM	10.00	4.85	14.85
NPO	-	6.70	6.70
Patent Office	-	4.00	4.00
Total	2,200.00	4,529.60	6,729.60

14.13 Investment and Employment Target of EPZs: During the Fifth Plan implementation of the policy packages will be closely reviewed and monitored and necessary support services will be provided to attract investors with the ultimate objective of generating more employment opportunities in EPZ areas and also to boost up export. The projections that have been made for the Fifth Plan, with this end in view, are shown in Table 14.21.

Table 14.21
Expected Investment and Employment in EPZs by 2001/2002

Zones	No. of Industries	Investment (million US dollar)	Employment (nos.)	Yearly Export (million US dollar)
Chittagong EPZ	110	350	50,000	600
Dhaka EPZ	90	300	40,000	500
Gazipur EPZ	150	400	60,000	700
Mongla EPZ	100	300	40,000	500
North Bengal EPZ	90	300	40,000	700
Total	540	1,650	230,000	3,000

Source : Bangladesh Export Promotion Zone Authority (BEPZA)

14.13.1 At the end of Fifth Plan 540 industrial units with a total investment of \$ 1,650 million are expected to be established and 230,000 jobs are expected to be created. The yearly expected export at the terminal year of the Plan is estimated to be \$ 3 billion.

14.14 Investment Outlay: An outlay of Tk. 1060.48 million including Tk. 500.00 million for spill over projects and Tk. 560.48 million for new projects has been provided in the Fifth Plan for the EPZ sub-sector.

14.15 Trade and Export Promotion: Within the broad framework of the export development strategy, the main objectives of the export sub-sector are as follows :

- a. to develop marketability of exportables through product diversification and quality improvement;
- b. to establish backward linkage with export oriented industries and service sectors towards utilisation of more local materials;
- c. to attract increased number of entrepreneurs for setting up of export oriented industries and encourage them through incentive packages;
- d. to expand and consolidate existing markets and also create new markets for Bangladeshi exportables; and
- e. to further narrow down the gap between export earning and import expenditure through achievement of export targets.

14.15.1 In order to achieve the aforementioned objectives, the following strategies will be pursued:

- a. remove procedural and regulatory bottlenecks incompatible with the promotion of exports;
- b. provide progressive policy support comparable with those in other competing countries to enable Bangladeshi exporters to be on a sound footing in international trade;
- c. strengthen and improve institutional framework for providing better services to the exporters and the export oriented industries;
- d. improve supportive infrastructure services to improve efficiency and for smooth functioning of export related activities;

- e. adopt appropriate human resource development programme to improve entrepreneurial and managerial capabilities to boost production and marketing; and
- f. formulate and implement programmes to broaden and diversify the range of exportables.

14.16 Allocation for Trade and Export Promotion and Privatisation Programme: In order to achieve the objectives and to implement the programmes of the sub-sector during the Fifth Plan (1997-2002) an outlay of Tk.1,358.64 million has been made. Agency wise investment projection is shown in Table 14.22.

Table 14.22
Other Outlay for Trade Promotion Services

Name of Agencies	Total (in million Taka)
Export Promotion Bureau	1,087.86
Tariff Commission	1.44
Board of Investment	10.00
Ministry of Commerce	3.13
Privatisation Board (Cabinet Affairs Division)	41.25
Industries Division, Planning Commission.	12.25
Ministry of Jute	62.26
Ministry of Textiles	83.24
Ministry of Industries	3.13
Sadharan Bima Corporation	1.58
Statistics Division	12.50
Bangladesh Standard Testing Institute	40.00
Grand Total	1,358.64

14.16.1 Development of industries in the Fifth Plan will be a challenge for the private sector. If this challenge is successfully met, in the Fifth Plan period, the private enterprise will be the trail blazer in lifting the economy from the syndrome of poverty and unemployment in the next two plan periods.

CHAPTER XV

ENERGY

15.1 Introduction

15.1.1 Energy is essential for promoting living standards. It is a pre-requisite for economic growth and technological progress. In Bangladesh, per capita generation of electricity in 1995 was only 92 kwh which is lower in comparison to that in neighbouring countries. In view of the prevailing low generation and consumption of energy, efforts should be made to develop this sector in such a way that the needs of all sectors can be met adequately, efficiently and economically.

15.1.2 Electricity demand grew at an average rate of 11 per cent per annum during 1972-94; per capita generation increased from 15.6 kwh in 1973 to 92 kwh in 1995. Notwithstanding, the progress made to date, only about 15 per cent population have access to electricity.

15.2 Review of Past Development

15.2.1 During the War of Liberation, power installations suffered extensive damage. As a result, at the worst case, peak demand dropped to 30 MW from the pre-liberation level of 225 MW (1970). So, after independence the immediate problem was rehabilitation of power supply. By the end of 1972-73, a rehabilitation and development programme was undertaken in the First Five Year Plan (1973-78). However, because of the shortage of fund the programme was carried over to the Two Year Plan (1978-80). Several projects, initiated before the Liberation War were completed and a number of new projects were undertaken during the periods. As a result, installed generation capacity increased to 822 MW from 545 MW, while the peak demand rose to 462 MW from 222 MW.

Table 15.1
Power Development During 1972-96

Items	1972	1973	1975	1980	1985	1990	1995	1996
Installed Capacity (MW)	550	608	752	822	1,141	2,352	2,908	2,908
Effective Generation (MW)	469	455	557	625	1,018	1,834	2,133	2,105
Maximum Demand (MW)	183	222	396	462	887	1,509	1,970	2,087
230 kV Transmission Line (Km)	-	-	-	-	179	250	419	419
132 kV Transmission Line (Km)	828	828	1,395	1596	1,971	2,235	2,469	3,017
66 kV Transmission Line (Km)	167	167	167	167	167	167	167	167
Distribution Line(Km) (33 kv & below)	9,010	9,686	17,003	20,256	34,796	69,731	103,540	121,817
No. of Consumers	254,584	277,884	403,518	529,660	848,152	1,670,137	2,766,765	3,090,829
Per Capita Generation (kwh)		15.6	22.9	27	46	70	92	95

15.2.2 To reduce the gap between demand and generation capacity, the Second Plan (1980-85) undertook a rapid expansion programme. The most important achievement during this period was the construction of the East-West electrical inter-connector which enabled the transfer of gas-based low cost power from the east to the west. Five power generation plants having a total installed capacity of 330 MW were completed during this period. But generation capacity still lagged behind the demand. The main constraint to the expansion of power supply was shortfall of resources coupled with a huge system loss and a slow response to tariff adjustment against rising fuel cost. By the end of the Second Plan, the system loss stood at 37.5 per cent. An investment programme of Tk. 14,370 million at 1979/80 prices was undertaken. The actual investment was Tk. 20,970 million at current prices. The Second Plan also pursued a policy of substituting imported fuel by natural gas. A significant progress was made in this direction. By the end of 1984/85, total number of electricity consumers stood at about 964,000 compared with 522,000 in 1979/80. Table 15.1 shows the progress of power development in the country during 1972-96.

15.3 Overview of Fourth Plan

15.3.1 Ensuring supply ahead of demand is the ideal situation in case of electricity for meeting manufacturing, irrigation, commercial and domestic needs of any economy. However, it was not possible to do so in Bangladesh. Against a peak demand of 1640 MW in 1990/91 and 1970 MW in 1994/95, the installed capacity was only 2352 MW and 2908 MW respectively. The operational capacity (2133 MW) was again interrupted by occasional power outages owing to fluctuations in gas pressure, transmission and distribution faults. These caused enormous losses to industrial production and commercial activities. Irrigation suffered relatively less due to its use of diesel power and electricity supplied by REB in off-peak hours.

15.3.2 Electricity generation, transmission and distribution require large financial investment. Although Bangladesh has considerable gas reserve and promising potentials, due to high system loss, large account receivables, poor management and inability to rationalise tariff rate and introduce other reforms, concessional loan for the power sector from the multilateral development partners was not available in the Fourth Plan period. Consequently, needed investments for generation, transmission and distribution of electricity could not be made during 1990-95. Hard term suppliers' credit and inadequate government resources made it possible to add only about 581 MW of generation capacity in the following power plants during the Fourth Plan Period:

a.	Raozan (Chittagong) Power Plant (1st unit)	210 MW
b.	Sylhet Combined Cycle Power Plant	90 MW
c.	Baghabari Power Plant	71 MW
d.	Ghorashal Power Plant (5th unit)	210 MW

15.3.3 However, due to non-completion of scheduled rehabilitation of some power stations, generation capability decreased by 271 MW and about 11 MW capability was retired during the period. The net capacity increase was thus 299 MW. In addition, reduced gas supply caused shut-down of some power stations resulting in lower operational supply of electricity.

15.3.4 Organisational changes were made in the area of transmission and distribution of power in the country with BPDB entrusted with generation, transmission and distribution in urban areas, DESA with distribution of electricity in the greater Dhaka area and REB with distribution in the rural areas. Power generation and distribution was opened to both local and foreign private investments. To this end, a Power Cell was created to facilitate private sector investment in electricity production and distribution. A Rural Power Company (RPC) was set up for generation and supply of power exclusively to the REB. Concrete results of these measures are expected during the Fifth Plan period.

15.4 Fourth Plan Targets and Achievements

15.4.1 The Fourth Plan was formulated with a public sector allocation of Tk. 64,500 million at 1989/90 prices for the power sector. This allocation was inadequate in relation to the physical targets set in the Plan document. Due to shortage of both local and external resources, the Plan allocation as well as Plan targets had to be revised. The revised allocation was Tk. 45,360 million at 1989/90 constant prices against which Tk. 67,480 million was spent at current prices. Major targets as well as the achievements during the Plan period are shown in Table 15.2.

Table 15.2
Targets and Achievements of Power Sector During Fourth Plan

Agency	Particulars	Actual Position in 1989/90	Fourth Plan Target	Achievement	
				New Addition during Fourth Plan (1990-95)	Cumulative Position in (1994-95)
BPDB	Installed Capacity (MW)	2,352	2,878	581	*2,908
	Capability (MW)	1,834	2,743	581	**2,133
	Transmission line (km) 230kv, 132 kv, & 66 kv	2,503	3,151	552	3,055
	Grid Substation capacity (MVA) 230kv, 132kv & 66kv	4,150	2,621	2,369	6,519
	Distribution line km (33 kv & below)	30,256 (Excluding DESA)	36,734	4,437	34,693
	Consumer connection (No.)	850,438	1,050,000	225,296	1,075,734
REB	Distribution line km	35,333	61,188	29,853	65,186
	Electrified village (Number)	8,545	14,530	7,939	16,484
	Consumer connection (No.)	495,565	962,962	679,006	1,174,571
DESA	Transmission line (km) 132kv	221	-	104	325
	Grid Substation Capacity (MVA)	433	-	874	1,307
	Distribution line km	5,511	6,765	1,995	7,506
	Consumer connection (No.)	324,134	570,000	192,326	516,460

* 2352 MW+581 MW new - 25 MW retired/standby = 2908 MW

** 1834 MW+581 MW new - 11 MW retired - 271 MW derated/decrease for maintenance & rehabilitation = 2133 MW

15.5 Operational Performance During Fourth Plan

15.5.1 Load demand : The forecast peak demand of 2,485 MW for the terminal year of the Fourth Plan could not be met due to shortage of available generation capacity. The peak demand served by the end of the Plan period was 1970 MW. This gave an annual growth rate of 4.8 per cent.

15.5.2 Energy generation : Energy generation could not reach its target. The targeted generation in the Plan period (1990-95) was 55,735 GWh and the achievement was 46,962 GWh (84 per cent). The achievement in the final year of the Plan period was 10,806 GWh against a target of 13,577 GWh. Because of shortage of available generation capacity as stated earlier actual demand could not be met.

15.5.3 Energy sale : Electricity sales also remained at a low level due to high system loss and for want of adequate generation throughout the period. The energy sale in the final year (1994/95) of the Fourth Plan was 8,371 GWh (82 per cent of target) against a target of 10,183 GWh.

15.5.4 System loss : The system loss in BPDB (including DESA) and REB was 41.11 per cent and 16.27 per cent respectively in the first year (1990/91) of the Fourth Plan. The system loss of DESA in 1991/92 was 35.55 per cent. The combined system loss envisaged in the Fourth Plan was 25 per cent. To reduce the system loss some measures such as creation of Dhaka Electric Supply Authority, introduction of incentive/punishment scheme to improve overall performance and introduction of new commercial operation system were taken. These

measures brought some improvement, but not up to the expectation. The system loss of BPDB, REB and DESA came down to 22.54 per cent, 15.04 per cent and 30.00 per cent respectively in June 1995. These figures are based on generation/purchase and sale of energy by individual entities. In June 1995, BPDB's gross generation was 10,806 million units and sale was 8,371 million units. Purchase and sale by DESA in the same period were 4,162 and 2,913 million units respectively, and by REB 1,199 and 1,018 million units respectively. This warrants considerable improvement in this area.

15.5.5 System imbalance : System balance could not be ensured during the Fourth Plan. Because of non-availability of loan from development partners, the on-going projects suffered. No new power projects (except those under suppliers' credit) could also be started and the scheduled rehabilitation programme of some existing power stations could not be undertaken. The expansion and distribution system as envisaged in the original Plan document also slowed down. Some surplus generation capacity could not be utilised fruitfully due to bottlenecks in the grid-stations/sub-stations and shortage of gas supply.

15.5.6 System reliability : Five Power stations with a total generation capacity of 581 MW were put into operation during the Plan period. A few units were also put into operation after rehabilitation in the terminal year. Still there was shortage of generation capacity. Consequently, load-shedding was resorted to. The annual load-shedding duration ranged from 113 hours in 1991 to 763 hours in 1995. The total load-shedding over the Plan period was 2,844 hours (6.49 per cent of total duration of the Plan period), i.e., on an average about 24 days per year. The reason for load shed of DESA was tremendous load growth in the industrial and commercial sectors. As a result, the system reliability during the Plan period was not satisfactory.

15.6 Power Sector Reforms

15.6.1 An inter-ministerial working group was constituted on the 3rd February, 1993 to review the necessity and feasibility of private investment (along with public sector) in the power sector. It transpired to the working group that mere private investment in power generation is not the solution for the power sector to come out of the whole gamut of problems and deficiencies in the sector. Given the magnitude of the inefficiencies and the sector's large capital requirement, the working group felt that there was a need to undertake basic reforms to address fundamental problems in the sector. The working group reviewed operational, structural and other deficiencies of the sector, examined various options with regard to reforms and emphasised the necessity for private investment and participation on an equal footing in the power sector and finally recommended the reform programme to be undertaken.

15.6.2 Institutional issues : Power generation and its supply have remained a state monopoly. The government owns, operates and regulates the power sector entities. This has sometimes resulted in overlapping and undemarcated responsibilities with lack of accountability in terms of sector entities, operational performance and service standards. As a result, the performance of the utilities remained far from satisfactory.

15.6.3 The responsibilities for generation, transmission and a large part of distribution of electricity are integrated and vested in the same authority. This makes it difficult to identify the areas of poor performance. All policy decisions/approvals involving planning and installation of additional plants, recruitment of personnel, pay and allowances, major procurement and rehabilitation are taken by the administrative ministry. Both BPDB and

DESA carryout execution. Opening up generation for the private sector, keeping transmission and distribution facilities in the public sector does not really attract private investment.

15.6.4 Management issues : Major impediments to BPDB's and DESA's efficient operations include lack of management and commercial independence and an unclear definition of the corporate structure and responsibilities.

15.6.5 Lack of accountability and discipline among the employees of BPDB and DESA are major constraints. Rivalry of trade unions affiliated to different political parties makes the environment even more difficult in BPDB and DESA. Incentive/punishment schemes have been introduced in both the entities to improve the situation but the results remain yet to be seen and marked.

15.6.6 The performance of management of PBS(REB) has been better. This can be partly attributed to transparent operating procedures that were designed before the formation of the organisation. There is no labour union in REB/PBSs. There is no incentive for good performance and also no punishment for the poor performers as the PBS is based on cooperatives.

15.6.7 Financial and economic issues : The present tariff level is low in relation to the financial requirements of the operating entities. BPDB's present average tariff is only about 61 per cent of the long run marginal cost (LRMC). Further, both PDB and DESA provide implicit subsidies to the PBSs through a bulk supply tariff which is about 52 per cent of LRMC. All these adversely affect the financial viability of the utilities. Some categories of consumers enjoy low tariff at the cost of those in the productive sector.

15.6.8 Since the power supplying entities have turned to be financially non-profitable because of inadequate tariffs, high system loss and low collections, investment from own resources as well as from the development partners has become insignificant. The fund requirements in the power sector are large but there are competing demands on government resources constraining public investment in this sector. During the Fourth Plan period, the estimated investment need was Tk. 69 billion at 1990 constant prices, against which the allocation was only Tk. 45 billion. The investment requirement in power sector (both public and private) during the Fifth Plan period is estimated at Tk. 117.36 billion at 1996/97 constant prices.

15.6.9 Technical issues : Power supply is constrained by shortage in generation capacity and inadequate transmission and distribution system. The problem has been compounded by the shortage of gas supply. As a result, BPDB has to shed loads during peak hours through out the country.

15.6.10 REB was created to extend distribution of electricity to the rural areas through PBSs. However, in absence of a clear-cut demarcation of service areas, problems have arisen in the transfer of 33/11 kv sub-station lines and consumers from BPDB and DESA to the PBSs. Further, in areas served by PBSs, there are still 'pockets' of urban centres that are still served by BPDB/DESA.

15.7 Operational Performance During 1995/96 and 1996/97

15.7.1 During the period of July '95 to June '97 no new generation capacity was added to the system, that is the installed capacity remained at 2908 MW, the same as of 1994/95. The Barisal- Patuakhali 132 kv line (37 km) was energised during this period. A total of 2366 km distribution line (33 kv, 11 kv & below) was added to the system raising the length of the

distribution line to 37,059 km through implementation of various distribution projects. The consumer number in BPDB system increased to 1,210,132 in June 1997 from 1,075,734 in 1994/95.

15.7.2 Load shedding continued during the period of 1995/96 and 1996/97 due to shortage of available generation capacity. For this, actual peak demand could not be supplied. As per PSMP of 1995 the projected peak demand was 2419 MW in 1996/97. But the peak demand supplied was only 2114 MW (10.07.1996). During this period load shedding varied from a minimum 10 MW to a maximum 674 MW. System loss in BPDB system decreased marginally. During 1995/96 and 1996/97 the ADP allocation and (provisional) expenditures for BPDB were as follows:

Table 15.3
ADP Allocation to and Expenditure of BPDB During 1995/96-1996/97

Fiscal Year	(in million Taka)			
	Revised ADP	Allocation	Expenditure	(provisional)
	Total	Project Aid	Total	Project Aid
1995/96	5,929.5	2,770.2	7,433.0	3,599.4
1996/97	6,201.7	2,000.4	4,790.4	1,597.6

15.8 Need for Major Reforms

15.8.1 BPDB has been trying for the reduction of system loss for the last 10 years which persisted between 41 and 31 per cent. BPDB was reorganised and DESA was created for performance improvements but desirable results have not been achieved because DESA was created without addressing the fundamental institutional deficiencies. Although there have been some improvements, it is not expected that desirable results can be achieved and sustained without major reforms in the power sector.

15.8.2 The objectives of the proposed power sector reform programme will be to:

- a. achieve commercial characteristics and efficiency in the power sector so as to reduce system loss, attain financial viability in order that it no longer requires subsidies;
- b. increase production and distribution of electricity for the vast majority of the population of Bangladesh which is yet unserved and to meet the growing demands of industry, commerce and agriculture;
- c. increase the operating efficiency of the existing public sector entities through greater competition, managerial autonomy and accountability and full commercialisation/corporatisation;
- d. improve the reliability and quality of the existing power supply system; and
- e. create an environment which will attract private capital and entrepreneurs, both domestic and foreign, to supplement public sector investments and initiatives in improving the performance of the sector.

15.9 Options for Reforms

15.9.1 Cost centres : The recent successful experiences in many countries offer a variety of options for reforms starting with the establishment of separate cost and/or profit centres within the existing utilities for commercialisation and corporatisation, and eventually, to complete privatisation. Along with it, it is also possible to contract out specific activities of the utility to private entrepreneurs (e.g. meter reading, billing, collection, routine and periodic maintenance, etc.) or to offer long-term franchises to manage and operate some substantial

portions of the utility's assets (e.g., a generating plant, a portion of the distribution network, etc.). It is essential that regardless of ownership (public or private), the utility has complete, detailed and up-to-date information on the cost of owning and operating the various parts of its business. No reform is possible without the establishment of separate cost centres for all identifiable and separable parts of the utility.

15.9.2 Unbundling : Once a decision is taken on the establishment of the cost centres, the next set of options to look at will be the structure of the utility (also known as unbundling). The utilities can be restructured (or unbundled) along functional lines with generation, transmission and distribution being operated by separate entities. For example, BPDB can be restructured into separate entities - one handling generation, another operating the transmission system, and a separate and independent company responsible only for distribution. This has recently been introduced in the UK. Only in high state of development, this system can work. Alternatively, distribution can be handled by four zones within the BPDB while DESA and REB/PBSs can continue to operate the distribution system in their respective areas. In this event, rationalisation of distribution entities will be needed. PBSs may operate as they are doing now under their area boards. A further alternative will be to separate the generation and transmission functions from distribution and operated by a single company (eg; Thailand). The principal advantage of restructuring along functional lines will be in appraising cost of generation, transmission and distribution separately which can be reflected in contracts between the functional entities. In addition, if the power sector is structured around functional areas, it will attract private capital to one or more of these functions where the expected returns will be high or the risks relatively low. For instance, while the private entrepreneurs may not like to invest in the existing utilities as a whole, they may wish to invest in new generation facilities. It is assumed, however, that an enabling investment environment which includes a detailed and transparent legal and regulatory framework will be in place to encourage and attract private investment. Investments by the private sector will allow the government to divert funds to meet other socially pressing objectives.

15.9.3 Following the decision to establish cost/profit centres and restructuring the entities along functional lines, the logical next step will be to corporatise the new entities. For each new functional entity, a company can be formed as a public limited company with a clear demarcation of the roles and responsibilities of the government (ownership), the board of directors (policy and monitoring), and the management of the company (operations). The board members should be appointed for fixed terms (with a possibility for renewal). Some of the Board members, including the chairman, should be from the private sector and compensated properly in accordance with private sector practices. The board should appoint the senior managers of the company and delegate to them full managerial autonomy for their day-to-day operations. Through performance contracts, the board (and through them the managers) should be held accountable for efficient operations.

15.9.4 Corporatisation is normally a preparatory step for increased private participation. While there are many ways to achieve this, the most common one can be through the sale of shares in the company. The advantage of this, at least from the government's standpoint, is that while the government continues to retain control of the companies, private capital is mobilised to support the government's development objectives for the sector. However, in order to attract private capital in this manner, it is essential that a capital market exists and that these companies are properly managed and earn a reasonable return on their investments. Another frequently used method for increasing private participation is to contract out specific

activities of the utility to private entrepreneurs or to offer long-term franchises to manage and operate some portions of the utility's assets.

15.9.5 With successful corporatisation and gradual increase in private participation, the final step to be considered in the reform process is the full privatisation. For an existing utility, this will mean an outright sale of its assets. For expansion of the system, this can take several forms such as build-own-operate (BOO) scheme, hire/purchase agreements, etc.

15.9.6 An important point to consider, prior to starting the reform process, is the need to create an appropriate and transparent regulatory system. It should preferably be in place prior to the unbundling exercise so that the system grows along with the implementation of the reform process, while facilitating the same.

15.10 Recommended Reform Programme

15.10.1 In order to overcome the constraints encountered in the viable/desirable operation of the power sector and to achieve the objectives enumerated above, various options to reforms can be considered. Options for reform will be concentrated on the following areas:

15.10.2 Restructuring of DESA : The corporatised entity should be endowed with appropriate management and financial autonomy and commercial independence so that accountability and monitoring of performance can be ensured and improved.

15.10.3 The new company should have its own terms and conditions of employment and have the right to select employees. The present employees of DESA who do not get employed in this restructured company should be provided with appropriate severance package.

15.10.4 Restructuring of BPDB : BPDB should be restructured along the functional lines. In the first phase, the functions of generation and transmission should be separated from those of distribution of electricity and two separate corporatised entities, one for carrying out generation and transmission functions and the other for carrying out distribution functions in those areas that are now being served by BPDB, should be established. These two (new) public limited companies should be formed under the existing Company Act and the ownership should remain with the government. These new companies will have the same features as those of the company to be created out of DESA as described above. In the longer term, generation and transmission functions may also be needed to be separated.

15.10.5 Rural electrification : The rural electrification programme through the co-operatives has been fairly successful and, therefore, should continue without changing the structure. However, its area of operation should be rationalised with that of the proposed distribution companies so that duplication of investment can be avoided, services can be improved and the utilities may become viable. The recent government decisions on the demarcation of service areas of BPDB, REB and DESA should be reviewed and the following criteria may be considered for rationalisation of distribution areas:

- a. The supply area should be continuous and one utility should not have pockets of supply areas within another utility, so that optimum utilisation of distribution facilities may be ensured and manpower for operation and maintenance may be reduced.
- b. The supply area should be of sufficient size to facilitate planning of efficient distribution network.
- c. The utilities/distribution units should have a good consumer mix.

15.10.6 Regulatory framework and change of laws : With the present undifferentiated role of the government as owner, operator and regulator, there is a little regulation with respect to sector entities performance standards and service codes. On the other hand, the tariffs are not adequately related to economic and financial requirements. Recommendations have been made to separate the operation on commercial basis and to attract private investment. In order that the consumers are ensured of an adequate supply of electricity at a reasonable cost, the operational safety is ensured and the power utilities remain economically and financially viable, an independent regulatory body should be established. To begin with, the regulatory body may be attached with the Ministry of Energy and Mineral Resources (MEMR). The regulatory tasks should include, among others, the following :

- a. framing of rules and codes of practice for operation and maintenance;
- b. establishment of performance standards and uniform system of accounts;
- c. approval of construction standards for safe installation;
- d. approval of tariffs;
- e. ensuring enforcement of industry standards, public safety, as set forth under (a), (b) and (c) as well as demand management; and
- f. issuing exclusive service franchises to the distribution companies, either public or private, and license to private generators.

This will require the existing laws creating the BPDB and DESA as well as the Electricity Act to be amended.

15.10.7 Tariff regulation : Tariffs are inadequately related to economic and financial criteria. BPDB/DESA are financially burdened with the cost of providing subsidised electricity supply to PBSs, the size of lifeline block is excessive, and their tariff adjustment process is ad hoc and non-transparent.

15.10.8 To support the development of a viable and self-sustaining power industry in Bangladesh, tariff setting needs to be rationalised, which can be achieved by having a regulatory body with the clear terms of reference. This regulatory body (initially attached to MEMR) will set tariffs in accord with explicit economic and financial criteria. Specifically, the following aspects will need to be addressed :

- a. **Tariffs :** In view of the possible formation of separate generation, transmission and distribution companies, a tariff study should be carried out on long run marginal cost basis to find out the cost of supply at different voltage levels, at various geographical locations and consumer classes. The tariff study will also design the structure including retail tariffs considering social aspects but avoiding distortion as much as possible. The size of the present lifeline block is too large. It should be either reduced to restrict its application to poor consumers or totally abolished.
- b. **Transparency :** To improve financial discipline, transparency in financial relations and to measure the true financial relationships between the generation/ transmission/ distribution companies, subsidies between various categories of utility companies should be made more explicit. Eventually, any such subsidy to PBSs or for meeting public service obligations, if justified, should be funded by the government.
- c. **Indexation :** To reduce uncertainty and ensure predictability, the regulatory body may consider indexed rate regulation. One major advantage of indexed regulation is that, after the initial or base prices are established, adjustments occur virtually automatically in accordance with some defined index (e.g., fuel prices, currency values, discounted inflation rate, etc.) that have been approved by the regulatory body.

15.10.9 Private participation : In view of the large capital requirement in the power sector and limitations of government fund, private sector investment will be necessary for rapid development of the power sector. In order to attract private sector participation, actions on the following fronts should be taken:

- a. **Generation :** Specific power generation projects identified at the national level will be offered for private investment. Competitive tenders on the basis of Build-Own-Operate (BOO) or Build, Operate and Transfer (BOT) will be invited. The government may also negotiate with the private parties who will express interest in investing in generation projects.
- b. **Distribution :** The government will invite private parties, including co-operative societies of the utility sector employees, to participate in the distribution of power in one or more localities on an experimental basis. In doing so, careful evaluation of various proven modalities for participation (e.g., franchise, contract, etc.) will have to be made.
- c. **Contracting of services :** The government will consider contracting out some functions currently performed by BPDB and DESA, particularly meter reading, billing and collections.
- d. **Wheeling arrangement :** The electricity generated by private generators may be supplied to the grid system of the Generation and Transmission Company on agreed terms and conditions. The private/public generators may also sell directly to large consumers through the transmission and distribution facilities of other distribution companies provided the facilities are adequate and the commercial terms and conditions of such wheeling arrangements are acceptable to all concerned.

15.10.10 Some of the steps already initiated/implemented towards privatisation and reform programmes are briefly outlined below:

- a. **Implementation of power sector reform :** Power sector reform programmes are being implemented. Some of the proposed reform programmes have already been initiated by the utilities. Power Cell has already prepared the Private Sector Power Generation Policy of Bangladesh which was approved by the government. The Cell has also prepared standard security package document, that is, Implementation Agreement (IA), Power Purchase Agreement (PPA) and Fuel Supply Agreement (FSA) for Independent Power Projects. A study on re-structuring of the power sector has also been completed and a final report with recommendation of reforms proposed to be undertaken has been prepared. A new tariff structure based on long run marginal cost of supply in the restructured electricity industry has been proposed to be implemented.
- b. **Power grid company of Bangladesh :** PGCB, a subsidiary company under BPDB has been set up. Initially, it will build, own and operate the Comilla-Meghnaghat-Rampur and Meghnaghat-Haripur 230 kV transmission line and related grid substations. In course of time, all transmission assets of BPDB will be transferred to PGCB.
- c. **Dhaka electric supply company :** DESC, a new distribution company has been set up under Dhaka Electric Supply Authority. DESC will own and operate assets for the distribution network initially at Mirpur and in course of time all of DESA's distribution assets will be transferred to DESC.

- d. **Meghnaghat power company** : MPC has been formed. Installation of a 300-450 MW Combined Cycle Power Plant by private sector power investors on BOO basis is under process.
- e. **Rural power company** : RPC has been formed under Rural Electrification Board. Initially, a 60 MW Gas Turbine Power Plant will be installed and operated by RPC at Mymensingh.

15.11 Fifth Plan

15.11.1 In order to achieve an annual economic growth rate of 7 per cent, alleviate poverty and realise desirable socio-economic and human development, it is essential that the minimum electricity growth rate is maintained at a factor of 1.5 of GDP growth. Adequate and reliable supply of electricity at a reasonable cost is a pre-requisite to attain this goal. Hence, there is a great need and urgency to expand the electrification programmes. It is recognised that the pace of power development has to be accelerated in order to achieve the overall economic development projections of the country and avoid looming power shortages. Specially, for investment in expansion of industry, power development has become prerequisite.

15.12 Objectives

15.12.1 The development objectives of the power sector in the Fifth Plan period will be to :

- a. facilitate economic development through adequate and reliable supply of electricity at economic cost;
- b. ensure reliable and uninterrupted power supply through maximum utilisation of the existing capacities, adding generation capacities by optimising energy mix and balanced expansion of transmission and distribution network;
- c. reduce the cost of supply through implementation of least cost expansion plan and efficient system operation with a view to making the electricity available to the consumers at a reasonable price;
- d. make the utilities self-reliant through efficient management, reasonable restructuring of electricity tariff and favourable financial arrangement so that reasonable portion of capital expenditure can be financed out of internally generated funds;
- e. improve management and engineering capability of the utilities;
- f. raise resource management efficiency, reduce system loss and improve financial performance of the power sector;
- g. ensure environmentally sound, sustainable power development with minimum damage to environment;
- h. encourage private sector participation in power development;
- i. expand power supply in the rural areas to boost rural economy and thereby alleviate poverty and ensure women's participation in the rural areas; and
- j. give special attention to meet the power shortage in the north-western region and to line up power connection to deep tubewells installed for agricultural use.

15.13 Strategies

15.13.1 These objectives will be achieved through a package of policies, strategies and necessary institutional reforms which, *inter alia*, will include:

- a. generation, transmission and distribution of more electricity at least cost through optimisation of fuel mix; to this end special attention will be given to use coal deposits;

- b. augmentation of the capacities through rehabilitation of power plants, transmission lines and grid substations;
- c. balancing of transmission and distribution networks to match generation capacity and extension of transmission and distribution networks to connect growth centres, both urban and rural, and to meet irrigational needs;
- d. addition of more 230 kv and 132 kv transmission lines for efficient transfer of power from generating stations to the major load centres;
- e. encouraging private investment in power sector, particularly as joint venture or on BOT/BOO principles through various incentive packages; to meet immediate need in 2 or 3 strategic locations public sector generation will be taken up if private investment is found lacking;
- f. generation of nuclear power as an appropriate option for a reliable, economic, safe and long term generation mix in consideration of the inadequacy of indigenous fuels for meeting electricity demand on a medium to long term perspective; Rooppur Nuclear Power Project has been included in the public sector development programme for many years, it has not been possible to implement it mainly due to constraints of financing; though the initial cost of a nuclear plant is high (estimated to be about 40 to 50 billion taka for a 600 MW plant), its low operation and maintenance cost makes the average generation cost comparatively cheap; efforts will be made to start implementation of the project with a 600 MW nuclear power plant during the Fifth Five Year Plan; the private entrepreneurs will also be encouraged to participate in the implementation of the project;
- g. dissemination of various forms of renewable energy technologies like solar, wind and mini-hydro, specially in rural areas and other remote and isolated location of the country;
- h. development of biogas: biogas technology is believed to have good potentials as a source of energy in Bangladesh. BCSIR has developed technologies though their dissemination has been very limited; during the Fifth Plan, efforts will be made to popularise the use of biogas technology in the country;
- i. introduction and dissemination of improved cooking stove: replacement of traditional stoves by an improved version having better energy conversion efficiency will help conserve biomass in the rural areas; moreover, use of the technology in the urban area, will help reduce consumption of fuel wood, thereby reducing deforestation; technologies are available and efforts will be made to popularise them during the Fifth Plan;
- j. application of new and renewable energy technologies; and
- k. making appropriate institutional, fiscal, legal and administrative arrangement for the successful implementation of the above strategies.

15.14 National Energy Policy

15.14.1 The objectives of the National Energy Policy (NEP) are to:

- a. provide energy for sustainable economic growth so that the economic development activities of different sectors are not constrained due to shortage of energy;
- b. meet the energy needs of different zones of the country and socio-economic groups;
- c. ensure optimum development of all the indigenous energy sources;
- d. ensure sustainable operation of the energy utilities;
- e. ensure rational use of total energy sources;

- f. ensure environmentally sound sustainable energy development programmes causing minimum damage to environment; and
- g. encourage public and private sector participation in the development and management of the energy sector.

15.15 New and Renewable Energy Technologies

15.15.1 Biomass : Electricity coverage being only 15 per cent of the population and natural gas reaching only 3 per cent of the households, biomass is the major source of energy in Bangladesh. Over three-fourths of the total population of the country depend on biomass for cooking, crop drying and winter heating. So in terms of population coverage, biomass stands most important of all energy sources. Biomass includes trees, crop wastes, cow dung etc. Unfortunately, Bangladesh does not have adequate supply of biomass due to low forest coverage, a large portion of the country being affected each year by natural calamities like flood, cyclone and river erosion. The present forest coverage is only around 17 per cent. However, using standard tree density criteria, the forest coverage comes down to only 7 per cent compared to 25 per cent which is usually considered to be the average a country should have to maintain energy and environmental balance. As response to this serious problem, social forestry, homestead forestry and linear planting (along roads, embankments and railways) have been given high priority in the public expenditure. The policies, programmes and projects undertaken to augment the supply of biomass have been mentioned in the forestry sub-sector. It can briefly be said here that afforestation on all available land has been a social movement in Bangladesh for over a decade and it can be said that, by and large, it has been successful. If the current trend can be sustained, it will largely offset the deficit in the supply of biomass for the majority of the population who are critically dependent on it. Along with social forestry, popularisation of improved cooking stove, bio-gas plants, and utilisation of solar energy, especially in the offshore islands, will contribute to both conservation of energy through more efficient use of biomass and increasing the supply of energy through solar power. Power sector policies, programmes and projects have, therefore, been aimed at this direction. The dominant role of biomass in the energy supply mix of the country is likely to continue.

Improved bio-mass fuel burning devices have been introduced in order to save bio-mass fuels and to improve the environmental conditions surrounding the energy consuming devices. Projects/programmes for improved stoves for urban cooking, rural cooking and improved devices will be undertaken for bio-mass fuel consuming industries. Necessary support and incentives will be made available to the entrepreneurs from the credit institutions. Action research programme, training programme, extension and dissemination programme will be provided. In addition to that, promotion of awareness about bio-mass fuel conservation and improved devices will be encouraged.

The government has laid emphasis on the development and augmentation of rural and renewable energy during the different Plan periods. Agencies like Rural Electrification Board (REB) and the Local Government Engineering Department (LGED) are involved in dissemination of various types of renewable energy technologies. The Department of Forest and other extension agencies are also involved in planned plantation with a view to not only improving the situation of forest coverage of the country but also in augmenting the supply of biomass on a long term perspective. The Grameen Bank and the NGOs like BRAC, Proshikha and others are involved in deployment of available technologies through their respective networks. REB as well as a number of private sector enterprises are involved in marketing of solar photo voltaic (PV) based technology.

Augmentation of bio-mass supply through intensive afforestation in especially selected locations like reserved forest as well as village and community forestry programmes has gained momentum. These programmes are being implemented by the related extension agencies. If sustained, this will have a significant impact not only on maintaining an acceptable level of forest coverage of the country, but also facilitate sustainable supply of fuel wood. Under energy conversion till date, 417 bio-mass plants including 198 of BCSIR have been set-up by various agencies. An elaborate programme of bio-gas plants technology diffusion was envisaged during the Fourth Plan period. REB and associated agency, under the technical guidance of BCSIR, will undertake the responsibilities for setting up of additional 5000 bio-gas plants in selected areas of the country.

15.15.2 Mini-hydropower : According to the report of the Working Committee on Mini-hydropower Generation of Bangladesh, there is potential for producing 10 GWh of electricity annually. Concrete steps will be undertaken during the Fifth Plan period to realise this potential.

15.15.3 Solar energy : The average daily solar radiation varies from 5.05 kWh/sqm in winter to 8.76 kWh/sqm in summer. At present solar energy is mainly used as a convenient and low cost means of drying crops, fish and salt. Some photo voltaic units have been installed in different parts of the country mainly for demonstration. Capital cost for solar photo voltaic technology for the generation of electricity being costly, its prospects are to be ascertained for specific end uses and locations. One immediate positive step to encourage use of solar energy will be to allow duty free import of photo voltaic cells.

15.15.4 Wind power : Average wind speeds in the country are low (less than 3 m/s). There is a prospect for wind power generation using low speed wind turbines in selected areas and for specific end-uses. In the Fifth Plan period a pilot project will be undertaken to use wind to generate power in a selected local area.

15.15.5 Tidal and wave power : The prospects of tidal and wave power in coastal areas need to be assessed. A feasibility study will be undertaken in the Fifth Plan period to find out ways and means to use tidal and wave power.

15.16 Load Management

15.16.1 The annual load factor of the national electricity grid is about 57 per cent. The characteristics of demand is such that the evening peak is very sharp. In order to improve the performance of the system, reduce investment as well as to rationalise the energy use, there is a need to undertake appropriate measures for the management of loads. Recently, the government has adopted some load management measures to reduce electricity consumption during peak hours such as early closure of commercial shops, prohibition of using irrigation pumps during evening peak hours, etc. These measures, however, are yet to be implemented fully.

15.17 Load Forecast

15.17.1 Power being the basic infrastructure for higher level of economic growth, the high demand forecast of 4051 MW by the terminal year of the Fifth Plan has been envisaged. To meet this demand, public sector investment will not be adequate. Considerable private investment will be needed. However, since other sectors of the economy cannot grow at the projected rate without necessary power supply, the public sector financial outlay may have to be adjusted upwards in the course of Plan implementation should there be inadequate response from the private sector for power generation. On the basis of the High Forecast, the

projected peak demand, generation capability and reserve margin up to FY 2002 are shown in the Table 15.4.

Table 15.4
Projected Maximum Demand for Power During Fifth Plan

Year	Maximum Demand (MW)	Generation Capability (MW)	Firm Capacity (MW)	Reserve Margin (MW)	Reserve Margin as per cent of Max. Demand (%)
1997/1998	2806	2813	2352	7	-
1998/1999	3109	3464	2983	355	11.42
1999/2000	3447	4342	3681	895	25.96
2000/2001	3736	5156	4196	1420	38.00
2001/2002	4051	5739	4779	1688	41.67

15.17.2 This projected maximum demand of 4051 MW will call for total generating capability of 5739 MW including reserve margin of 1688 MW by 2001/2002. A total of 3319 MW generation capacity is planned to be added to the system raising the installed capacity to 5875 MW. This will need an investment of around Tk. 100,000 million which can only be possible if the private sector power investors participate in power generation. Following completion of 8 projects already undertaken by the public sector (SL. 1-5, Table 15.5), capacity addition in the public sector during the Plan period will be 1389 MW only. This will leave a capacity gap of 1930 MW. This gap is expected to be filled up by private sector/ joint venture investments. In case, the private sector does not come forward in time, alternative ways and means will be devised in the shortest possible time to meet the anticipated demand.

Table 15.5
Projected Capacity Addition to Power Generation During Fifth Plan

Sl. No.	Name of the Power Plant	Fuel	Capacity MW	Expected date of commissioning
A	PUBLIC SECTOR			
1.	210 MW Ghorasal Thermal Power Station Extension (6th unit)	Gas	210	March, 1998
2.	210 MW Siddhirganj Thermal Power Station	Gas	210	March, 2000
3.	109 MW Haripur Combined Cycle Power Plant	Gas	109	March, 2000
4.	60 MW Shahjibazar Gas Turbine	Gas	60	FY 2000
5.	210MW Chittagong Thermal Power Station (2nd unit)	Gas	210	September 1997
6.	Sylhet 90 MW Combined Cycle Power Plant (2nd unit)	Gas	90	FY 2001
7.	Barapukuria 300 MW Coal Based Thermal Power Station	Coal	300	FY 2001-2002
8.	East Zone 2×100 MW Gas Turbine	Gas	200	FY 2001-2002
	Sub total : A		1389	
B.	PRIVATE SECTOR/ JT. VENTURE			
1.	4×100 MW Barge Mounted Power Plant	Oil/Gas	400	FY 1999
2.	Mymensingh 60 MW Gas Turbine	Gas	60	FY 1999
3.	100 MW Baghabari Gas Turbine	Oil/Gas	100	FY 2000
4.	Meghnaghat 450 MW Combined Cycle Power Station	Gas	450	FY 2001
5.	Haripur 360 MW Combined Cycle Power Station	Gas	360	FY 2000
6.	210 MW Khulna Thermal Power Station	F. Oil/Gas	210	FY 2002
7.	350 MW Power plants in west zone	Gas	350	FY 2000-2002
	Sub total : B		1930	
	Grand total : (A+B)		3319	

15.18 Physical Programme

15.18.1 The physical programme for the Fifth Plan includes 35 on-going projects and 30 new projects (excluding TA projects). The ongoing projects and some of the new projects will be completed and the benefit will be obtained during the Plan period. A 300 MW Barapukuria Coal Based Thermal Power Plant, a 300-450 MW Meghnaghat Combined Cycle Power Plant and four 100 MW Barge Mounted power plants will be taken up for implementation during the Plan period.

15.18.2 With the implementation of these projects, necessary additional facilities for generation, transmission and distribution will be created during the Plan period. Installed generation capacity is expected to go up from 2908 MW (June, 97) to 5875 MW at the end of the Plan period against the projected power demand of 4051 MW. This will have a reserve margin of 1688 MW (41.67 per cent) over the maximum demand. The generation programme includes 10 on-going projects and 5 new projects. Scheduled completion of the public sector projects will add 1389 MW of electricity by the terminal year of the Plan.

15.18.3 In the Fifth Plan, 627 km of 230 kv line and 847 km of 132 kv transmission line including 166 km second circuit stringing have been proposed. The Plan aims at expansion of 230 kv and 132 kv transmission lines and substations to remove bottlenecks in the transmission system. Transmission projects included in the programme have been tested by computer simulation for load flow, voltage drop and stability. The programme includes 3 on-going projects and 9 new projects. All on-going projects and 9 new projects are scheduled to be completed during the Plan period. A list of the Transmission Projects to be implemented during the Fifth Plan is shown in Table 15.6.

Table 15.6
Power Transmission Projects to be Implemented During Fifth Plan

Sl. No.	Name of the Project	Line Length (km)	Expected Year of Completion
1.	Rehabilitation, Renovation & Augmentation of Grid System incl. Ashuganj-Jamalpur 132 kv Second Circuit.	166	1999
2.	Comilla-Chittagong 230 kv Transmission Line Project.	150	1999
3.	Comilla-Meghnaghat-Rampura & Meghnaghat-Haripur 230 kv Transmission Line & National Load Despatch Centre.	110	2000
4.	Khulna-Ishurdi-Bogra-Barapukuria 230 kv trans. line & 132 kv line from Barapukuria to Saidpur & Rangpur.	367	2001
5.	Three Transmission Lines	95	
(a)	Thakurgaon-Panchagarh 132 kv single ckt line.	45	2000
(b)	Naogaon-Joypurhat 132 kv single ckt line.	40	2000
(c)	Chuadanga-Jhenaidha-Magura 132 kv single ckt line	73	2000
6.	Tangail-Madhupur-Jamalpur 132 kv single ckt line.	100	2001
7.	Dohazari-Cox's Bazar 132 kv second ckt stringing.	88	2001
8.	Chandpur-Comilla 132 kv second ckt stringing.	70	2000
9.	Kabirpur-Tangail-Shirajgonj 132 kv tr. line	85	2000
10.	Comilla-Bara Aulia 132 kv transmission line	140	1999
11.	Barisal-Bagerhat-Khulna 132 kv transmission line	110	2000
12.	Bhandaria-Mothbaria-Patharghata 132 kv transmission line	55	2000

15.18.4 Like the transmission sub-sector, thrust has been given to the distribution sub-sector in the Fifth Plan. Importance has been given to town distribution projects as well as the rural electrification projects. The secondary town distribution projects aim at meeting the fast growing demand in the urban areas, improving reliability and quality of supply and reducing system loss. In the distribution programme 7 on-going projects and 3 new projects of BPDB, 11 on-going and 7 new projects of REB, and 5 on-going and 2 new projects of DESA have been included in the Plan period.

15.18.5 The physical programme for the Fifth Plan aims at achieving a transmission line of 1408 km under BPDB and 66 km under DESA, and distribution line of 5,377 km under BPDB, 50,000 km under REB and 3714 km under DESA. The details of physical projections are shown in Table 15.7.

Table 15.7
Summary of Physical Projections for Power Sector During Fifth Plan Period

Agency	Particulars	Bench Mark Position (1996/97)	Projection (Additional)	(1998-2002) Cumulative Position
BPDB	Capability (MW)	2,148	3,319	5,739 *
	Transmission line (km)			
	230 kv	419	627	1,046
	132 kv	2,506	781	3,287
	Substation capacity (MVA)	6,505	1,940	8,445
	Distribution line (kv) 33 kv and below	37,059	5,377	42,436
	Consumer connection (No.)	1,250,000	3,00,000	1,550,000
REB	Distribution line (km)	85,111	50,000	135,111
	Electrified village (No.)	20,520	12,000	32,520
	Consumer connection (No.)	1,712,439	1,000,000	2,712,439
DESA	Transmission line (km)	511	66	577
	Distribution line (km) 33 kv & below	6781	3,714	10,495

* 2,148+3,319 (new) - 531 (net increase through maintenance & rehabilitation.) - 259(rtd.) = 5,739 MW.

15.19 Financial Programme

15.19.1 An investment outlay of Tk. 88,361 million including project aid of Tk. 58,275 million both at 1996/97 prices has been made in the public sector during the Fifth Plan for the implementation of the physical programme for the power sector. Agency wise break up of this allocation is shown in Table 15.8.

Table 15.8
Agency-wise Public Sector Financial Outlay For Power Development
(at 1996/97 prices)

(in million Taka)

	Name of Agency	Local Currency	Project Aid	Total
A:	Spill over projects			
	BPDB	7290	17648	24938
	REB	2891	6505	9396
	DESA	3466	5080	8546
	Sub-total	13647	29233	42880
B:	New projects			
	BPDB	7555	17683	25238
	REB	6731	8410	15141
	DESA	2153	2949	5102
	Sub-total	16439	29042	45481
	Total (A+B)	30086	58275	88361

15.19.2 In addition to ADP financing, resources will be raised through bonds to finance implementation of projects by PDB, DESA and REB.

15.19.3 The private sector is also expected to make substantial investment (to the tune of Tk. 29,000.00 million) both in generation and distribution of power during the Fifth Plan period. Of this amount, about 80 per cent is expected to be in generation and 20 per cent in transmission and distribution.

CHAPTER XVI

OIL GAS AND NATURAL RESOURCES

16.1 Introduction

16.1.1 Indigenous energy resources consist of known reserves of natural gas, limited hydro-electric power and traditional fuels coming from fuelwood, crop residuals and animal dung. About 55 per cent of the country's overall energy supply is in the form of traditional fuels with the balance being met by natural gas (24 per cent), imported oil and coal (19 per cent) and hydro-electricity (2 per cent).

16.1.2 The present per-capita consumption of non-renewable energy resources in Bangladesh is about 64 Kilogram of Oil Equivalent (KGOE) which is one of the lowest in the world. Per-capita energy use in KGOE is 123 in Sri Lanka, 236 in India and 267 in Pakistan. Of the total non-renewable energy consumption, about 60 per cent is derived at present from indigenous resources and the rest is met from imported petroleum and coal. Moreover, the entire reserves of exploitable indigenous primary energy resources are located in the east zone, thereby resulting in a gap in energy supply between the east and west zones. Mining of newly found coal in the west zone is expected to start by the turn of the century which will help reduce the gap partially. Of the various natural resources available, natural gas in particular :

- a. supplies primary commercial energy for electricity generation to accelerate the pace of agricultural and industrial development and reduces the kitchen drudgery at the level of individual households;
- b. helps in narrowing the deficit in the balance of payments by reducing import bill for oil, coal, etc.;
- c. mobilises resources for the national exchequer; and
- d. provides raw materials for the production of urea fertiliser and fuel for electricity generation.

16.1.3 The development of the oil and gas sector is vital for further strengthening of the national economy. Expansion of the energy sector since the 1980's is mainly attributed to increased natural gas production. Currently, natural gas accounts for about 70 per cent of the commercial energy consumption compared to about 35 per cent in 1980. The development of Bangladesh's natural gas resources has also contributed to the reduction in deforestation and to an increase in tax revenue for the government through the levies on gas sales. During 1985-1992, gas production increased at an average annual rate of about 10 per cent. It is estimated that minimum growth rate of about 10 per cent per annum in gas production will be required to meet the average GDP growth target of 7 per cent per annum during the Fifth Plan period. However, the existing gas infrastructure has limited capacity and needs to be expanded as per requirement. Additional investment is, therefore, required to enable Bangladesh to utilise its available gas reserves and to increase exploration activities for new gas and oil fields. For further long-term gas supply commitments, particularly for the planned power plants, the government is encouraging private sector participation in the oil and gas exploration activities through the Production Sharing Contract (PSC) with the International Oil Companies.

16.2 Potentials of Natural Resources

16.2.1. Natural Gas: Natural gas is currently the only indigenous non-renewable energy resource of the country which is being produced and consumed in significant quantities. Gas, the main source of commercial energy, plays an active role towards the growth of the economy. Currently, about 90 per cent of power generation is based on natural gas and the whole of the urea fertiliser requirements of the agricultural sector is met by using gas as feed stock. Natural gas output now accounts for about 70 per cent of the country's commercial energy supply. Current gas reserve (proven) has been estimated at about 22.90 TCF of which 13.60 TCF is considered as recoverable. So far 2.72 TCF has already been consumed and as of September 1996, the recoverable reserve was 10.87 TCF. New discovery in Sangu (offshore), Shahbazpur, Shaldanadi and other blocks may augment the gas reserve to several times the present reserve. This will enable generation of more electricity and setting up of new urea plants against the Bangladesh's share of the PSC's already signed. A brief description of the newly discovered gas fields is given below :

16.2.2 Saldanadi Gas Field : Saldanadi gas field is situated along the India-Bangladesh border under Kashba Thana of Brahmanbaria district. The structure was selected for exploratory/appraisal drilling after evaluation of seismic data collected during 1991/92 field season by BAPEX. Accordingly, drilling was undertaken in 1996 and a prospective gas reserve was discovered at a depth of 2,511 metres. After reviewing the data, a preliminary estimate of gas reserve was given at 0.202 TCF.

16.2.3 Shahbazpur Gas Field : Shahbazpur field is located in the central part of Shahbazpur island of Bhola district. The location was selected for exploratory drilling after evaluation of seismic data collected during 1986/87 field season. Shahbazpur well was spudded in December, 1993 and in 4 months, a depth of 3,631 metres was reached. Due to encountering of over pressure, the well had to be abandoned after flowing gas through coil tubing from interval 3,201-3,210 metres. Subsequently, it was decided to drill a side-track hole. After drilling of side-tracking hole down to 3,342 metres, commercial gas flow was ensured. Analysis of results obtained from vertical and side-track drillings indicated an in-place reserve of 0.5138 TCF.

16.2.4 Shangu Gas Field : In 1994, Bangladesh Government signed a Production Sharing Contract (PSC) with Cairn Energy and Holland Sea Search for oil and gas exploration in Chittagong and its adjacent coastal areas. The international company conducted a comprehensive seismic survey in the Bay of Bengal in 1995 and identified a prospective area of hydrocarbon reserve located 40 km away from Shangu estuary. The first well was drilled down to the depth of 3,500 metres and four gas zones were reached. Examination of two zones indicated the presence of significant amount of gas and Shangu was declared a gas field. Then the second well was drilled to estimate the gas reserve and a reserve of 0.848 TCF was determined and to exploit the gas reserve, development of the field was planned. To make it commercial, plan was prepared to drill additional production wells, construct platform and install pipelines and processing plants. After successful completion of all these activities, it is expected that the production of natural gas from this field will be possible from April, 1998.

16.2.5 Patharia Oil and Gas Exploration Well : Patharia area is located in the north-eastern part of Bangladesh under Baralekha Thana of Moulvibazar district. After evaluation of seismic data and gravity survey, the location was selected for exploratory drilling. Drilling of one exploratory well with Saudi assistance was planned during the Third Plan period.

Patharia well was spudded in 1989. The well was designed to be drilled down to a depth of 5,000 metres. However, due to several changes in casing points and hole deviation, it could reach only down to 3,438 metres. Then the drilling was terminated for deterioration of casing due to frequent reaming, slow drilling rate and risk factor in continuation of drilling.

16.2.6 Oil : Exploration activities carried out so far could not discover any significant oil deposit. The only oil deposit so far discovered in the country is in Haripur which produced a total of about 0.65 million barrels of crude oil till 1994. The oil production has since ceased because of reduction of pressure and influx of water in the oil zone. Comprehensive exploration efforts need to be mounted in this field.

16.2.7 Coal : Discovery of coal dates back to late fifties, when an exploratory oil well was drilled through coal beds in Bogra. Subsequent explorations resulted in the discovery of the Jamalgonj coal deposit at a depth of about 1,000 metres from the ground level and having an estimated reserve of more than 1,000 million tons of coal. Feasibility studies have indicated that the development of this deposit is not yet feasible under the prevailing international market price. However, with the increase in gas price, these deposits may become competitive. After evaluation of a detailed geological and geophysical survey, Geological Survey of Bangladesh (GSB) identified 13 locations in the region of greater Rangpur and Dinajpur districts as the prospective basins for coal exploration. Exploratory wells were drilled in 5 basins out of which high quality bituminous coal deposits were found in 3 basins. In addition, BHP, a foreign company, also discovered a coal reserve in one basin. In 1984/85, Geological Survey of Bangladesh located another coal deposit at Khalashpir (Pirgonj) of Rangpur district at a shallower depth (150 metres), with an estimated reserve of 450 million tons of coal. This deposit requires to be appraised in respect of its potential.

16.2.8 Besides, minable coal deposit was also discovered in Barapukuria area of Parbatipur, Dinajpur at a reasonably shallow depth (240 metres) with an estimated reserve of about 300 million tons. Based on this, a project for construction of an underground mine has been undertaken at an estimated investment of Tk. 8,873.60 million to produce an annual output of 1 million tons commencing from 2000/01. Recently, another coal deposit has been discovered by Geological Survey of Bangladesh in Dighirpara area of Dinajpur district covering an area of about 15 sq. km. As only one well has been drilled, the actual deposit of coal could not yet be determined.

16.2.9 The GSB has planned to conduct comprehensive exploration activities by the year 2000 in the following seven basins :

- a. Badargonj-II (Rangpur)
- b. Basudevpur (Rangpur)
- c. Barapukuria-I (Dinajpur)
- d. Barapukuria-II (Dinajpur)
- e. Daudpur (Dinajpur)
- f. Dongapara (Dinajpur)
- g. Shamnagar (Dinajpur).

16.2.10 Peat : Deposits of peat occur at shallow depths in different low lying areas of Bangladesh. According to the Geological Survey of Bangladesh, the reserve of dry peat is about 170 million tons. The major deposits are in greater districts of Faridpur (150 million tons), Khulna (8 million tons) and Sylhet (13 million tons). Peat requires drying before making briquettes for use as fuel. A pilot project for extraction of peat and making briquettes

was implemented by Petrobangla, but the results were not encouraging and extraction was assessed as economically not viable. However, in future, this resource may be viable as and when prices of other fuels rise.

16.2.11 Hardrock and Limestone : Hardrock was discovered by GSB in Madhyapara area of Dinajpur District in 1964 at a depth of 285 metres from surface. An agreement was signed with North Korea in 1993 for the opening of an underground hardrock mine with a target production of 1.6 million tons per annum. The hardrock mine is expected to come into operation by the year 2000/01. Madhyapara hardrock will be used for river training , heavy construction work, railway ballast, highway, etc. The granite slabs excavated from this mine can also be used as polished tiles and pavings. Presently these are imported. Considerable import substitution and increased revenue earning may, therefore, be expected from this rock. Limestone has been found at Joypurhat and some other places of Sylhet district. The production of sub-surface limestone of Joypurhat is yet to materialise.

16.3 Review of Past Performance (1973-1997)

First Five Year Plan and Two Year Plan (1973-1980)

16.3.1 The need for development of natural gas as a source of energy was recognised in the First Plan (1973-78). In this Plan, priority was given on the gas transmission and distribution related works with a view to accelerating the use of natural gas as fuel and industrial raw material. One of the objectives of the Two Year Plan (1978-80) was to accelerate the pace of exploration activities and encourage expanded use of gas, particularly as a substitute of imported petroleum. An allocation of Tk. 2,360.00 million was made during the First Plan and Two Year Plan periods for development of the sector. However, actual expenditure during the period stood at Tk. 2,870 million.

16.3.2 An intensive effort was made during this period to find new hydro-carbon sources, particularly in the off-shore areas, but with limited success. Gas deposits were found in two wells out of eleven exploratory wells drilled, of which 9 were off-shore wells drilled by the international oil companies (IOCs). Nine production wells drilled in 4 fields with an estimated production capacity of 210 MMCFD, produced only 122 MMCFD of natural gas in 1979/80. Total transmission line extended up to 224 km in 1979/80. During this period, the main physical achievement was the connection of Habigonj gas field with the Titas field by the 12" transmission line over a stretch of 56 km and initiation of gas transmission line from the Bakhrabad field to Chittagong. Total distribution line of 1,608 km was constructed and 119,400 gas connections were given upto 1979/80. Crude oil storage tanks with a capacity of 80,000 tons and refined petroleum storage tanks with a capacity of 25,000 tons were installed during 1973-80.

Second Five Year Plan (1980-1985)

16.3.3 Implementation of the Second Plan started with the objective of maximising the utilisation of indigenous natural gas and saving foreign exchange through substitution of imported fuel. The Plan envisaged to raise the supply of gas to 128 BCF in 1984/85 from 44.5 BCF in 1979/80 in order to enhance the share of natural gas in commercial energy consumption from 37 per cent in 1979/80 to 68 per cent in 1984/85. At the same time, exploration activities were geared up in search of oil and gas.

16.3.4 During the Plan period, drilling of 6 exploration wells were completed against the planned target of 9 wells. Out of these, 4 wells were found to have gas reserves. The

important developments during the period were the activation of Bakhrabad gas field to supply gas to Chittagong area and connection of this field with the Titas system by a new transmission line near Dhaka. Transmission system was expanded by 307 km altogether which enabled gas supply to rise from 44.5 BCF in 1979/80 to 94.6 BCF in 1984/85. The share of gas in commercial energy rose from 37 per cent in 1979/80 to 56 per cent in 1984/85. At the end of the Plan period, 240,000 customers were given gas connection against the target of 258,000 customers which raised the total gas connection to 359,400 customers in the year 1984/85.

16.3.5 The country continued to be entirely dependent on imported POL. The total quantum of POL product consumed during the Second Plan was 6.8 million tons at an average rate of about 1.4 million tons per year. Of this, about 70 per cent was derived from imported crude oil refined at the Eastern Refinery Ltd. (ERL) and the rest, the middle distillates like diesel and kerosene were imported. ERL also set up an LPG recovery plant with a designed capacity of 17,000 tons per annum. Production of LPG was 7,000 tons in the year 1984/85. At the end of the period, the economics of ERL were upset by the fall in world oil price. As spot purchases of POL products became cheaper, refining of crude through ERL was reduced to below 1 million tons against its capacity of 1.5 million tons. Moreover, naphtha was exported at a cheap price when some middle distillates were being imported at a higher cost. So a study was undertaken for ascertaining the feasibility of secondary conversion of some of the ERL products into more needed middle distillates. The drop in world prices, however, helped BPC to improve its financial position as the domestic prices of POL products remained unchanged and BPC was able to make up its past losses.

16.3.6 During this period, about 1,025 sq. km of geological mapping, 2,560 sq. km of geological surveys, 1,520 km of drilling and 3,000 geochemical analyses were completed. A new shallow depth coal deposit at Dinajpur was discovered as a result of geological survey during this period.

16.3.7 An amount of Tk.6,150 million (at 1979/80 prices) was allocated to the sector in the Plan while the actual expenditure amounted to Tk. 9,550 million. The excess expenditure was met from Petrobangla's own resources.

Third Five Year Plan (1985-90)

16.3.8 The Third Plan envisaged to maximise the use of natural gas to reduce pressure from fuel import bill, explore the major gas fields to assess the proven reserves, conduct exploration for oil and gas, construct transmission and distribution lines to provide additional gas to various customers, improve product-mix of Eastern Refinery and conduct survey for mineral discoveries. In order to achieve these objectives, the Plan set a target to drill 18 development/appraisal wells and 5 exploration wells for hydrocarbon and construct 3,760 km of transmission and distribution lines. It was planned that the oil consumption would be contained within 1.6 million tons in 1989/90. GSB envisaged to continue extensive geological mapping and survey works including drilling of 6 more boreholes to delineate the Barapukuria coal deposit during the Plan period .

16.3.9 During the Third Plan, 16 out of 18 planned development/appraisal wells were drilled, 2,700 km transmission and distribution lines out of planned 3,760 kms were constructed and only 2 out of 5 exploration wells were completed. During the Plan period, additional gas connections were given to 165,600 customers as against the target of 160,000. Gas supply was raised from 94.6 BCF in 1984/85 to 165 BCF in 1989/90. Oil consumption and hence the

import bill could not be contained on account of underestimation in demand projections and lagging behind of the expected substitution of diesel and kerosene through rural electrification and other programmes. The addition of a secondary conversion plant to Eastern Refinery could not even be initiated. Physical activities of GSB were almost completed which included drilling of 6 boreholes for coal exploration. Training courses to 500 professionals and technicians of BOGMC, GSB etc. were provided by Bangladesh Petroleum Institute under the Plan. The discovery of oil in sylhet gas field in December, 1986 and the discovery of a large coal field at Khalashpir, Rangpur at a depth of 250 meters in April, 1989 were two remarkable achievements during the Plan period.

16.3.10 Out of the total allocation of Tk. 13,150 million, the amount utilised was about Tk. 12,000 million during the Plan period in the public sector. Besides the public sector, Tk. 1,250 million was spent for hydrocarbon exploration by two IOCs.

Fourth Five Year Plan (1990-95)

16.3.11 The Fourth Plan was launched with the objectives of ensuring the supply of increased quantum of commercial energy mainly from indigenous resources and optimising its utilisation. The agency-wise physical targets and actual achievements were as follows :

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16.3.12 Exploration Survey and Drilling for Hydrocarbons : Intensive geophysical and geological survey were to be undertaken over discovered as well as new areas. The target was 7,500 lkm. of survey during the Fourth Plan. In effect, actual seismic survey amounted to only 1,712 lkm. with an additional 1,000 lkm of geological survey.

16.3.13 Drilling of 5 exploration wells was planned to be executed by BAPEX. In practice, no exploration drilling was completed during the Fourth Plan. The main reasons were financial constraint, non-availability of project equipment and lack of expert personnel in BAPEX. PSC partners were expected to drill at least 10 exploration wells during the Plan period. No PSC was actually made operational and no drilling took place .

16.3.14 During FFYP, 45 new production wells were targeted (net no. of wells was to be 41 as four wells were expected to be shut-off). By the end of the Fourth Plan, 42 wells were completed (net 39 wells, 3 wells were shut off). The Plan target was to have 35 wells in operation. Against this target, 33 wells were put into operation upto June, 1995, while two others came on stream shortly thereafter. Peak demand for gas was estimated to increase by 300 MMCFD to 950 MMCFD by 1994/95; in reality, peak demand was registered at 850 MMCFD by 1994/95. Annual production of gas was planned to increase from 165 BCF to 275 BCF by the end of Fourth Plan. Actual production of gas reached to 247 BCF.

16.3.15 Transmission and Distribution Line and Customer Connections : During the Plan period, some major transmission pipe lines were completed and commissioned. These included North-South Pipe Line, Brahmaputra Basin Pipeline and Pipeline to Raozan power plant. In addition, a condensate pipeline of 190 km length was completed. However, the Ashugonj-Bakhrabad pipeline suffered due to delay in financing and other complications. The target was to add 700 km transmission line by the end of the Plan period.

16.3.16 To reach the consumers, the distribution network was planned to be expanded with the addition of 2,500 km pipeline. This would bring the total distribution network to 7,500 km. In effect, distribution network under the three franchise areas increased by 2,950 km so

that the total figured at 7,950 km. Concomitant with the growth of the network, customer connections also grew rapidly. The Plan envisaged an addition of 195,000 new connections to bring the total to 600,000. Actual number of connection to customers reached 631,710 by the end of the Plan period.

16.3.17 Development Projects : During the Plan period, a total of 16 projects were completed, of which 10 were investment projects and 6 were technical assistance projects. These projects together created employment opportunity for about 800 persons during implementation and about 650 persons during operation. The oil and gas sub-sector contributed Tk. 36,000 million to the government in the form of CD/VAT, corporate tax, dividend, etc. during the Plan period.

16.3.18 Plan Allocation : Against a Plan allocation of Tk.23,980 million the actual utilisation was Tk. 15,320 million which was about 64 per cent of the Plan allocation and 80 per cent of RADP allocation.

16.3.19 Bangladesh Petroleum Corporation : BPC undertook five development projects (4 spill-over and 1 new) during the Fourth Plan involving a total investment of Tk. 5,339.90 million with a foreign exchange component of Tk. 3,121.50 million to attain improved operational flexibility and also to ensure easy availability of petroleum products at the door step of the people. During the years under review, RADP allocation was Tk. 3,381.50 million out of which an amount of Tk. 3,056.90 million was utilised. Among the five projects, three were completed as scheduled at a cost of Tk 3,609 million.

16.3.20 With the completion of BMRE of ERL, the refinery attained its original processing capacity of 1.5 million tons of crude oil per annum. Besides, a three MW steam turbine generator, a cooling tower, dolphin type oil jetty and modern fire fighting facilities were also installed to improve power generation and cooling system of the refinery and to facilitate crude reception and naphtha export. After completion of the secondary conversion plant at ERL, excess furnace oil (FO) produced in the Refinery was upgraded to High Speed Diesel (HSD) which saved foreign currency by way of import substitution of HSD.

16.3.21 Geological Survey of Bangladesh : GSB is entrusted with the responsibility of carrying out basic geological studies including geological, geotechnical and geophysical drilling, etc. in the country for the exploration of mineral resources except oil and gas.

16.3.22 The organisation already completed 3,289 sq.km mapping works including geological, geotechnical, photogeological and geochemical mapping. About 5 km of seismic, 3,312 lkm. of geophysical logging, 50 sq.km. of resistivity and 440 sq.km. of gravity magnetic survey have also been completed within this period. Two drill holes have been drilled in the Dighipara of Dinajpur and Badarganj of Rangpur district respectively and a coal field has been discovered with a good quality bituminous coal at a depth of 1,076 metres below the surface. During the Fourth Plan, GSB spent only Tk. 2.15 million against an allocation of Tk. 2.25 million for implementation of the project - Detailed Geological Exploration in Selected Areas of Bangladesh.

16.3.23 Bangladesh Petroleum Institute : BPI was established in January 1981 as a development project under the Ministry of Energy and Mineral Resources. BPI was mainly assigned to train 250 professionals annually in the petroleum sector. It imparted training over the years to professionals and technicians engaged in the petroleum sector. During the Fourth Plan period, a total of 550 persons were trained through 21 courses, seminars and workshops

on various aspects of exploration, production and development of oil and gas fields, safety and management. BPI also sent abroad 7 of its professionals on short courses and on the job training (4 to 8 weeks) and 3 of its professionals on long term courses including post graduation. It also procured books, a number of training aides and class room tools to facilitate its training activities. BPI was allocated Tk. 154.60 million out of which Tk. 113.90 million (73.69 per cent) was utilised.

16.3.24 Sectoral Allocation and Utilisation During Fourth Plan : A total of Tk. 30,250.00 million at current prices was allocated to the oil, gas and mineral resources sector, out of which Tk. 22,800 million was released through RADP. The actual utilisation was Tk. 18,936.30 million during the Plan period which was 62.6 per cent of the Plan allocation and 83 per cent of RADP allocation.

16.4 Performance During 1995/96 and 1996/97

16.4.1 The OGNR sector is highly important in determining the growth prospect of the economy. Over the two year period, the major objectives in this sector were to ensure a reliable and uninterrupted supply of commercial energy, mostly natural gas. During this period, emphasis was given on the development of the private sector in the oil and gas exploration activities mainly through Production Sharing Contract (PSC). Activities undertaken during this period related to the seismic survey, exploration, expansion of gas transmission and distribution network, development of coal and hardrock mine, etc. During this period, 564 Lkm of seismic survey was conducted and 2 exploration wells were drilled by BAPEX. Both exploration wells (Shahbazpur and Saldanadi) led to discovery of gas. During 1995/96, 15 km transmission pipelines and 575 km distribution and other pipelines were constructed. During 1996/97 fiscal year, 326 km distribution and other pipelines were laid until December, 1996. The Ashugonj-Bakhrabad pipeline (30" dia 59 km) connecting Surma basin production area and Bakhrabad franchise area was completed. Gas production during 1995/96 reached 265 BCF increasing from 247 BCF in 1994/95. Production of the same was 261 BCF in 1996/97. Remarkable achievement of these two years were the discovery of three new gas fields among which two were on-shore and one off-shore. The off-shore field was discovered by one international oil company under PSC and two on-shore fields were discovered by BAPEX.

16.4.2 An allocation of Tk. 4,534.90 million was provided through ADP for 43 projects of the sector in 1995/96. Actual expenditure during the year was Tk.4,080 million. In 1996/97 Tk.4,858.20 million was allocated to 37 development projects of the sector.

16.5 An Overview (1973-1996)

Oil and Gas Exploration

16.5.1 During the period 1973-96, drilling of 24 exploratory wells including 7 off-shore wells was completed. Individual depth of wells varied from 1,560 metre to 4,977 metre. The number of wells drilled by national organisations were 14, while ten wells were drilled by the foreign companies. National organisations discovered 7 gas fields, and one oil field. Foreign companies discovered 2 gas fields including one in the off-shore area. It may be stated that oil and gas exploration activities had been very limited. Only one well per year, on an average, was drilled in the last 23 years.

16.5.2 As far as gas fields are concerned, the exploration/discovery ratio in Bangladesh till now is 3:1 i. e. 17 gas fields were discovered out of 54 exploration wells since 1910, which is

one of the highest in the world. Reserves were estimated at 22.90 TCF of which 13.60 TCF are recoverable. Out of 17 discovered gas fields, 8 were brought into production. It is important to note that almost all the exploration activities were undertaken in the shelf area in the north eastern part of Bangladesh .

16.5.3 To expedite petroleum exploration, a new Model Production Sharing Contract (PSC) was formulated in 1988. In 1989, the area of the country was divided into 23 blocks of which 17 blocks including 6 off-shore blocks were offered to the international oil companies (IOCs) for competitive bidding. In 1993, the government announced a new petroleum policy to seek participation of IOCs in hydrocarbon exploration and production through PSC.

Production of Natural Gas Condensate and Crude Oil

16.5.4 At present gas is being produced from 8 fields, namely, Titas, Bakhrabad, Habiganj, Rashidpur, Kailashtilla, Sylhet, Narsingdi and Feni. Production from two fields, namely, Chatak and Kamta has been suspended owing to various technical reasons. Gas production increased from 23.58 BCF in 1972/73 to 292 BCF in 1996/97, while sales went up from 20 BCF in 1972/73 to 285 BCF in 1996/97. Of the total volume of sales, 46.74 per cent was consumed by the power sector, 35.57 per cent by fertiliser, 9.65 per cent by other industries including tea estates, and the rest 8.04 per cent by commercial and domestic users. Total revenue from sales of gas and gas associated fuel amounted to Tk. 11,618 million in 1993/94.

16.5.5 In 1993/94, production of crude oil from only one oil field at Haripur was 5,395 metric tons. But it decreased steadily during the last few years and was suspended in July, 1994. Current production of gas associated condensate amounts to about 1,000 barrels a day which is expected to rise to about 3,500 barrels a day when the wet gas fields of Kailashtilla and Beanibazar, Jalalabad are commissioned.

16.5.6 The present demand for petroleum products of the country is about 2 million tons of which 50 per cent is for diesel, 25 per cent for kerosene, 8 per cent for motor spirit, 10 per cent for fuel oil and the rest 7 per cent is for other minor products, whereas 1.4 million tons of refined petroleum products are produced by the only refinery of the country of which 20 per cent is diesel, 30 per cent kerosene, 15 per cent LPG and gasoline (motor spirit and naphtha) and 35 per cent fuel oil. This shows that the country has excess gasoline and fuel oil while there is a shortage of diesel and kerosene. The consumption rate of petroleum products is growing slowly but steadily at the rate of 2.5 per cent to 3 per cent per annum. Import of refined petroleum products, therefore, remains, quite essential. To meet the present and future demand for petroleum products of the country, addition to the present refinery capacity will be needed.

Transmission and Distribution of Gas

16.5.7 During the last few years, the operational networks of the transmission and distribution companies have been considerably expanded through the construction of gas pipeline and associated DRS and MRS installations. About 9,600 km of pipelines have been constructed upto June 1996 of which about 1,600 km are high pressure transmission lines.

16.6 Institutional Development

16.6.1 Petrobangla : The gas sector in Bangladesh is dominated by the Petrobangla Group consisting of eight state-owned companies responsible for the exploration, production and delivery of natural gas as well as exploration and development of oil and solid minerals including coal. The Petrobangla Group consists of the holding corporation (Petrobangla), one

exploration and drilling company, two production companies, three distribution companies and one liquid natural gas company. In 1993, the government approved the establishment of the Gas Transmission Company Ltd. (GTCL) to operate the national gas grid.

16.6.2 Bangladesh Petroleum Corporation : BPC was set up in 1976 with the objective of importing, refining and marketing of petroleum oil and lubricant products. It operates through seven subsidiary companies.

16.6.3 Geological Survey of Bangladesh : GSB, the national geoscientific organisation, established in 1962, is responsible for geological, geophysical, geochemical mapping and drilling activities related to finding out solid mineral resources in the country. It evaluates the known mineral resources, conducts studies, renders advisory services and supplies relevant information regarding hydrogeology, engineering geology, urban and environmental geology, etc.

16.6.4 Bangladesh Petroleum Institute : BPI was established in 1992 as a research and training institute with the objective of imparting training to professionals and technicians in the oil and gas sector and carrying out research works.

16.6.5 Hydrocarbon Unit : A hydrocarbon unit was established in 1994 in the Ministry of Energy and Mineral Resources to perform the activities relating to state control over government owned corporations and companies, monitoring exploration/production licences, approval of PSCs, monitoring crude oil refining, petroleum products distribution policy, fixing of price of petroleum products, preparation of budgets, all administrative matters and control of financial matters.

16.7 Major Constraints

16.7.1 The gas sector in Bangladesh is wholly dominated by Petrobangla. The sector has a large potential for increased contribution to the country's economic growth. However, a number of constraints restrict the appropriate development of the sector. The country is dependent on foreign aid. Lack of necessary capital is limiting the development of the sector. Exploration, gas field development, transmission and distribution activities are highly technical and capital intensive activities. The problem of the sector is accentuated by the dependence on expatriate consultants. In spite of providing a large number of short and long-term training, both local and foreign, to a number of technical, professional and administrative personnel in different fields of gas sector activities in the last one decade, substitution of foreign consultants by the local consultants has not been effective in sectoral planning, designing and implementation of programmes/projects. Also, there has been inadequate transfer of technology through technical assistance projects. The deficiency in the development of manpower has also been caused by inappropriate selection of trainee clientele. These have to be overcome through appropriate sectoral manpower planning.

Considerable delays in project implementation occur due to the following :

- a. too many stages of approval at different levels for appointment of consultants/contractors and procuring machinery/equipment/materials both within the government and the development partners;
- b. imposition of too many conditionalities by the donors at different stages of credit negotiation, signing of agreement and effectiveness of credit; and
- c. change in the scope of works and linking the implementation of priority projects with the conditionalities of low priority projects.

16.8 Fifth Five Year Plan (1997-2002)

16.8.1 Objectives : The main objectives for the development of oil, gas and natural resources sector during the Fifth Plan will be to :

- a. substitute imported oil by indigenous fuel, mainly natural gas, to the extent possible and feasible;
- b. meet most of increased demand for commercial energy through the development of indigenous gas;
- c. intensify exploration and appraisal activities for augmenting the hydrocarbon resources base;
- d. make a balanced development of different components of gas activities, namely, exploration, production, transmission and distribution in sync with downstream uses, etc.;
- e. involve private sector in oil and gas development activities particularly in exploration under production sharing contract (PSC), transportation and sale of gas based liquids, LPG, condensate (diesel/motor spirit/kerosene, etc.);
- f. gradually adjust gas price to its economic cost of supply in the interest of its optimal use;
- g. build a national gas grid for equitable regional distribution;
- h. conserve energy resources and help maintain the ecological balance;
- i. extract coal, hardrock and other solid mineral resources;
- j. conduct geological and geophysical surveys in order to explore and discover new sources of indigenous energy resources;
- k. strengthen research and development in the energy sector;
- l. provide cylindered liquid natural gas for the rural people; and
- m. use surplus gas for downstream activities.

16.8.2 Policies and Strategies : The following policies and strategies will be adopted for realisation of the above objectives :

- a. in order to accelerate development activities, efforts will be made to gradually involve the private sector in exploration, production, transportation and sale of oil and gas;
- b. a shift towards better mix will be made so that dependence on a single energy source like natural gas is minimised, and other energy resources are exploited;
- c. natural gas fields rich in condensate and propane/butane will be developed to reduce the import bill for oil; emphasis will be given to supply liquid natural gas to the indigenous rural people by cylinder;
- d. gas pipeline in the west zone through the Bangabandhu Bridge for effective regional balance in energy supply will be laid in;
- e. measures will be taken to use coal discovered in the west zone for electricity generation;
- f. efforts will be made to expand the gas and condensate transmission and distribution networks to the extent possible/feasible;
- g. gas supply to industrial estates will be ensured;
- h. timely maintenance of the gas production wells to avoid supply dislocation caused by sanding/water intrusion as happened in the Bakhrabad well will be ensured;
- i. conservation and economic use of natural gas will be promoted through adoption of appropriate technology and tariff measures; price of natural gas will be rationalised into economic price considering the heating value parity;

- j. extraction of hardrock and other solid minerals including thorium, uranium and beach sand minerals will be geared up;
- k. special incentive package for oil and gas exploration in the west zone will be given;
- l. efforts will be made to encourage establishment of privately owned and managed distribution companies for marketing of natural gas available from transmission pipelines to unserved urban centres;
- m. measures will be taken to establish a regulatory authority which will be manned by competent persons for licensing energy utilities, setting prices and consideration of related issues;
- n. environmental impact assessment will be made mandatory for energy development projects;
- o. dependence on external assistance will be reduced gradually by internal financing to the extent possible;
- p. a comprehensive programme of training linked with career development of professionals will be implemented;
- q. research and development activities will be increased for productivity and cost-effective advances in the energy sector;
- r. geological and geophysical activities will be geared up;
- s. measures will be taken to provide tax incentives to those entrepreneurs who will come forward to set up natural gas based industries; and
- t. international oil companies with whom PSCs have been signed for exploration of oil and gas will be encouraged to invest downstream in power generation activities, fertiliser factories, petro-chemical complex, etc.

16.9 National Programmes

16.9.1 The demand for primary commercial energy is expected to increase from 10 million ton oil equivalent (MTOE) in 1997 to 15 MTOE by 2002 showing an average growth rate of 8.57 per cent. At this growth rate, per capita primary commercial energy consumption will rise from 81 KGOE in 1996/97 to 109 KGOE in 2001/02. This increased demand will mostly be met by indigenous natural gas raising its share to 70 per cent of the total primary commercial energy consumption. The peak demand of natural gas is expected to increase from 1,100 MMCFD in 1996/97 to about 1,700 MMCFD in 2001/02 and average demand from 900 MMCFD in 1996/97 to about 1,360 MMCFD in 2001/02 giving an annual average growth rate of about 10 per cent. Endeavours will be made to put coal to use so that partial energy demand can be met from this alternate indigenous resource. To augment gas supply, both intensive and extensive exploration for hydrocarbon will be carried out aiming at adding new reserves during the period 1997-2002 in both public and private sectors and under PSCs.

16.9.2 To contain the import of oil more or less at the present level, all efforts will be made to substitute this with indigenous natural gas and coal to the extent possible and extract LPG from natural gas to reduce the import of kerosene. The import of diesel and kerosene will be further reduced by expanding rural electrification programme for irrigation and lighting. In spite of all these efforts, the import of POL is estimated to grow at an average rate of 9 per cent annually. It is expected that the consumption of POL in 2001/02 will be about 3.49 million tons compared with the consumption of 2.38 million tons in 1996/97.

16.10 Programmes in Public Sector

16.10.1 Survey/Exploration for Hydrocarbon : The geological and geophysical surveys will be intensified to discover and delineate new hydrocarbon bearing structures and to

determine the extent and potential of existing gas fields. It is expected that a total of 3,000 lkm of seismic survey and about 1,200 lkm of geological survey will be undertaken during this period. At the same time, programme of drilling 7 exploration wells will be implemented during the Plan period in the public sector. For exploration of hydrocarbon, in the private sector, particularly the multinational companies will be encouraged to invest under PSCs.

16.10.2 Production/appraisal wells : Drilling of production wells in Rashidpur/Habiganj gas fields and drilling of appraisal-cum development and workover wells in Titas fields have been planned for 1997-2002. The major work in this respect will include the drilling of appraisal and production wells in Saldanadi and Shahbajpur (2+2=4), Rashidpur (4 wells), Habiganj (4 wells), Titas (3 wells), and workover of about 10 wells together with the drilling and establishment of 480 MMCFD process plant.

16.10.3 Transmission and distribution line : A number of on-going lines will be completed and new ones taken up during 1997-2002. The major ones will include Monohardi-Narshingdi-Shiddhirgonj pipeline (59 km), Rashidpur-Ashugonj loop line (82 km), Beanibazar-Kailashtilla pipeline (23 km) and pipeline over Bangabandhu Bridge and on the west bank (80 km). In total, more than 350 km of transmission line is expected to be completed. Besides, about 2,000 lkm distribution line will be constructed in three franchise areas to supply gas to users.

16.10.4 Coal : At the present rate of growth in energy demand, partial energy demand mostly for thermal power plants beyond 2000 will be met by coal. Development of the Barapukuria coal mine is under implementation projecting a production of 1 million tons of coal per year from 2000 for 65 years. In addition, Khalashpir (Rangpur) coal deposit is being studied for possible extraction. Studies will also be undertaken to extract coal bed methane from the Jamalgonj coal deposit.

16.10.5 Hardrock : The present annual demand of hardrock is 1.5 million tons. The hardrock project is projected to yield of 1.65 million tons per annum.

16.10.6 Development of LPG / NGL : Necessary arrangements will be made for production of LPG/NGL from the wet gas fields of Sylhet region. It is expected that about 125,000 tons of additional LPG/NGL/ condensate will be produced annually by the end of the Plan period.

16.10.7 Major programmes of petrobangla : The following will be the major programmes of Petrobangla in the Fifth Plan period :

Oil and Gas Exploration Drilling	7 wells
Geological and Geophysical Survey	3,000 km
Appraisal/Development Drilling	13-15 wells
Gas Transmission Lines	375 km
Gas Distribution Lines	2,000 km

In addition to these, contingent on negotiations with the relevant oil exploration companies, additional exploration may be undertaken.

16.10.8 Bangladesh petroleum corporation : BPC's main activities will be concentrated on the completion of BMRE of the existing refinery, construction of lighterage and dolphin jetties, second crude oil distribution unit at ERL, Mongla Oil Installation and LPG import, storage, receiving, bottling and distribution facilities. In addition, a second refinery will be set up during the Plan period to meet the rising demand for POL products.

16.10.9 Geological Survey of Bangladesh : Extensive and intensive geological and geophysical surveys supported by drilling for mineral discovery, engineering, water resources and tectonic studies will be undertaken by GSB. It will also conduct research for identifying rocks and minerals and establishing rock sequence in the country. GSB will take up activities relating to the delineation of Khalashpir coal and completing its early feasibility study. A few important proposals of GSB are as follows :

Major Programmes	1997-2002
Detailed geological mapping for minerals	7,000 lkm
Research or stratigraphy	10 sections
Research and exploration for metallic deposits	200 samples
Gravity and magnetic survey	1,000 sq. km
Seismic/Resistivity survey	200 sq. km.
Drilling of exploration wells (15 Nos.)	7,000 metres

16.10.10 Gas Demand Forecast and Other Proposals : Gas demand forecast and other proposals for 1997-2002 period are given in Tables 16.1, 16.2 and 16.3 . Gas demand forecast for power generation and fertiliser production has been made on the basis of already committed projects and future demand estimated from power sector master plan (PSMP). Demand forecast for other sectors has been estimated considering historical trend of consumption (around 10 per cent per annum) by the sectors over the last ten years.

Table 16.1
Gas Demand Forecast During 1997-2002

Items	1996/97 (Benchmark)	1997/98	1998/99	1999/2000	2000/2001	2001/2002
Peak demand (MMCFD)	1100	1240	1380	1470	1550	1700
Average demand (MMCFD)	900	1000	1120	1200	1250	1360
Annual production capacity (BCF)	292	350	495	506	500	500
Annual gas supply (BCF)	285	350	410	438	455	495

Source : Petrobangla.

16.10.11 As stipulated in the energy policy, gas supply will be required to be limited to a maximum of 1,000 MMCFD or 365 BCF/Year provided significant increase in the natural gas reserve does not take place. If remarkable addition to reserve occurs, the situation may significantly improve in the coming years and the production capacity shown above may well be attainable. It is expected that from 1998/99 there will be no supply constraint and gas supply will be based on available demand.

Table 16.2
Customer-wise Average Gas Demand During 1997-2002

Sector	(in MMCFD)				
	1997/98	1998/99	1999/2000	2000/01	2001/02
Power *	540	638	680	712	766
Fertiliser	280	285	305	305	305
Domestic	70	79	84	92	102
Commercial	17	17	18	21	24
Industrial + B.F+ T.E*	95	101	113	120	163
Total	1002 (365 BCF)	1120 (410 BCF)	1200 (438 BCF)	1250 (455 BCF)	1360 (495 BCF)

Source : PSMP/GSMP * Brick Fields + Tea Estates

Table 16.3
Field-wise Appraisal/Production Wells During 1997-2002

Locations	1996/97 (Benchmark)		2001/2002	
	Production wells	Wells under operation	Production Wells	Wells under operation
1. Titas	11	11	14	14
2. Bakhrabad	8	8	8	8
3. Habiganj	6	6	10	10
4. Feni	2	2	2	1
5. Belabo	1	1	1	1
6. Meghna	-	-	1	1
7. Sylhet	1	1	2	2
8. Kailashtilla	4	3	4	4
9. Rashidpur	4	4	8	8
10. Bianibazar	-	-	2	2
11. Fenchugonj	-	-	2	2
12. Jalalabad #	-	-	2	2
13. Semutang #	-	-	1	1
14. Sangu #	-	-	4	4
15. Saldanadi	-	-	2	2
16. Shahbazpur	-	-	2	2

Source : Petrobangla, # Under PSC Investors

16.10.12 Financial Outlay (1997-2002) : A total of Tk 26,039.60 million at 1996/97 prices has been projected under the Plan for development of oil, gas and natural resources in the public sector. In addition, Tk. 8,726.07 million is expected to be invested by the private sector. Agency- wise break-up of the financial outlay is as follows:

Table 16.4
Public Sector Outlay for Development of Oil Gas and Natural Resources in Fifth Plan
(in million Taka)

Agency	Allocation
Petrobangla	19,990.60
BPC	5,978.70
GSB	70.30
Total	26,039.60

Table 16.5
Projected Physical Attainments in Oil Gas and Natural Resources in Fifth Plan

Sl. No.	Description	Base Year 1996/97	Proposed 2001/02	Addition	Remark
1.	Peak Demand for Gas (mmcf/d)	1,100	1,700	--	
2.	Annual Supply of Natural Gas (bcf)	285	365/400	115	Subject to gas reserve
3.	Customer (Nos)	650,000	790,000	140,000	--
4.	Exploration wells for Hydrocarbon	55	77-82	22-27	Subject to new PSC operations
5.	Production wells (Operation)	36	64	28	Both Public & PSC
6.	Transmission lines (km)	1,600	1,975	375	--
7.	Distribution lines (km)	8,000	10,000	2,000	--
8.	Geological & seismic survey (lkm)		7,000	7,000	3000 public sector, 4000 in PSC
9.	Production of Cond/NGL (tons/yr)	50,000	175,000	125,000	Jalalabad, Beanibazar & Kailashtila fields to be commissioned
10.	Production of Coal (100,000 tons)	nil	10	10	--
11.	Production of LPG (tons/yr)	nil	15,000	15,000	NGL plant needed to be commissioned

16.11 Participation of Private Sector

16.11.1 One of the policies of the government is to involve the private sector in the development of hydrocarbon resources of the country through participation of international oil companies (IOC) under production sharing contract. This policy will continue during the Fifth Plan. With the known recoverable reserve of gas, it will not be possible to give additional gas connections beyond 2000 without constraining the supply to the already connected consumers. With the projected demand and known recoverable resources of gas, the country will start facing gas shortage after 2010 if no gas fields are discovered. In order to accelerate exploration efforts, international oil companies will be encouraged to participate in hydrocarbon development. During the last forty years, IOCs/private companies discovered 10 gas fields in the country. On the other hand, the state owned organisation discovered 9 gas fields through implementation of different projects. For exploration of hydrocarbon the whole country has been divided into 23 blocks of which 17 are offered for IOCs for competitive bidding. Three production sharing contracts have been signed for development of discovered gas fields and further exploration and development of new fields. It is envisaged that the supply of gas under PSCs may be available from end- 1998.

16.11.2 In order to regulate the operation of private and public sector entities in the sector, the government is in the process of creating a Gas Regulatory Authority. In line with the policies of privatisation and commercialisation of the sector, the entire gas industry is being segregated into production, transmission and distribution lines. Each operation is entrusted with separate companies to be operated on profit and loss basis. Instead of regulating the price of natural gas, the government is considering to align the domestic price of gas to its international price/long run marginal cost of gas. To this end a committee has already submitted a report on gas pricing, decision on which is awaited.

16.12 Environmental Aspects

16.12.1 Following the decision taken in the Earth Summit held in Rio-de-Janeiro, Brazil in 1992 and in line with the environmental policy of Bangladesh, measures will be taken to assess the environmental impact of the development projects, especially of the new ones. The

Government of Bangladesh has developed an environmental policy which requires assessment of environmental impact of all new industrial projects. In fulfilment of the policy to conduct environmental impact assessment, the government has initiated appropriate action programmes. Over the past decades, the gas sector practically caused no environmental problem since gas produces no hazardous smoke detrimental to environment. Rather, it has been protecting the environment by replacing traditional fuel wood and kerosene.

16.12.2 Recently the government has planned to extract coal and use it in producing electricity in the energy-deficit west zone of the country. Though coal pollutes the environment to some extent, it will also help save the environment by reducing the deforestation process in the west zone. Besides, as this coal is of high quality with low sulphur content, it will cause comparatively low environmental damage. However, to contain possible adverse environmental effects, the government has established an Environment and Safety Division in Petrobangla to assess and monitor the environmental effect of the development projects and suggest mitigation measures. The newly created division will also develop environment and safety management system.

16.12.3 As regards pollution effect of oil refinery, consideration of environment was not taken much into account at the time of construction of oil installations and oil refinery. As a result, the installation does not have adequate environment protection measures and the amount of oily water/sludge going into the surrounding canals, ponds and river and the off-gas pollute the environment around the refinery flare. In order to release minimum carbon-dioxide gas in the atmosphere and to meet the requirement of refinery, adequate measures will be undertaken during the Plan period.

16.13 Linkage With Other Sectors

16.13.1 Since the demand for gas is a derived demand, gas sector development issues, policies and strategies are closely related to and ultimately dependent on the end-user's sectoral objectives and policies, particularly those of power generation and industries (including fertiliser) sub-sectors. In fact demand estimate and investment programme of oil, gas and mineral sector are made on the basis of existing demand and drawn up development plan of the major consuming sectors. Efficient use of gas and commercial energy depend on the operational efficiency of power and fertiliser units, which vary widely from plant to plant due to technological obsolescence and age of the installed plants. Generally keeping this in consideration, the challenge will be to ensure development of downstream production units so as to completely avoid any mismatch of supply and use.

16.14 Internationalisation of Gas Trade

16.14.1 Bangladesh has an estimated gas reserve of 22.90 t.c.f of which 13.6 t.c.f is considered recoverable. With the intensification of oil and gas exploration under the PSCs, this reserve is going to increase significantly in the years to come. With a success ratio of 3:1, it will not be a surprise if we experience a doubling or tripling of the existing reserve very shortly. On the other hand with the current demand scenario and its growth, intensive oil and gas exploration requires a sharp expansion of the gas market even beyond borders. It may be mentioned that due to asymmetric gas reserve vis-à-vis the internal demand in our neighbouring countries, cross border gas trade is a highly promising option for Bangladesh. According to an estimate, by the year 2005, gas demand-supply gap will be 20.8 BCMY in India, 16.1 BCMY in China, 10.6 BCMY in Thailand and 7.5 BCMY in Pakistan. Surrounded by such energy deficit economies, Bangladesh has a great potential for export of gas. The corner stone of a medium to long run strategy of the government may be an internationalisation of gas trade to make the sector economically viable and harness the resources needed for its development. Care will be taken to export gas if so required within the framework of a pragmatic policy of ensuring national interest.