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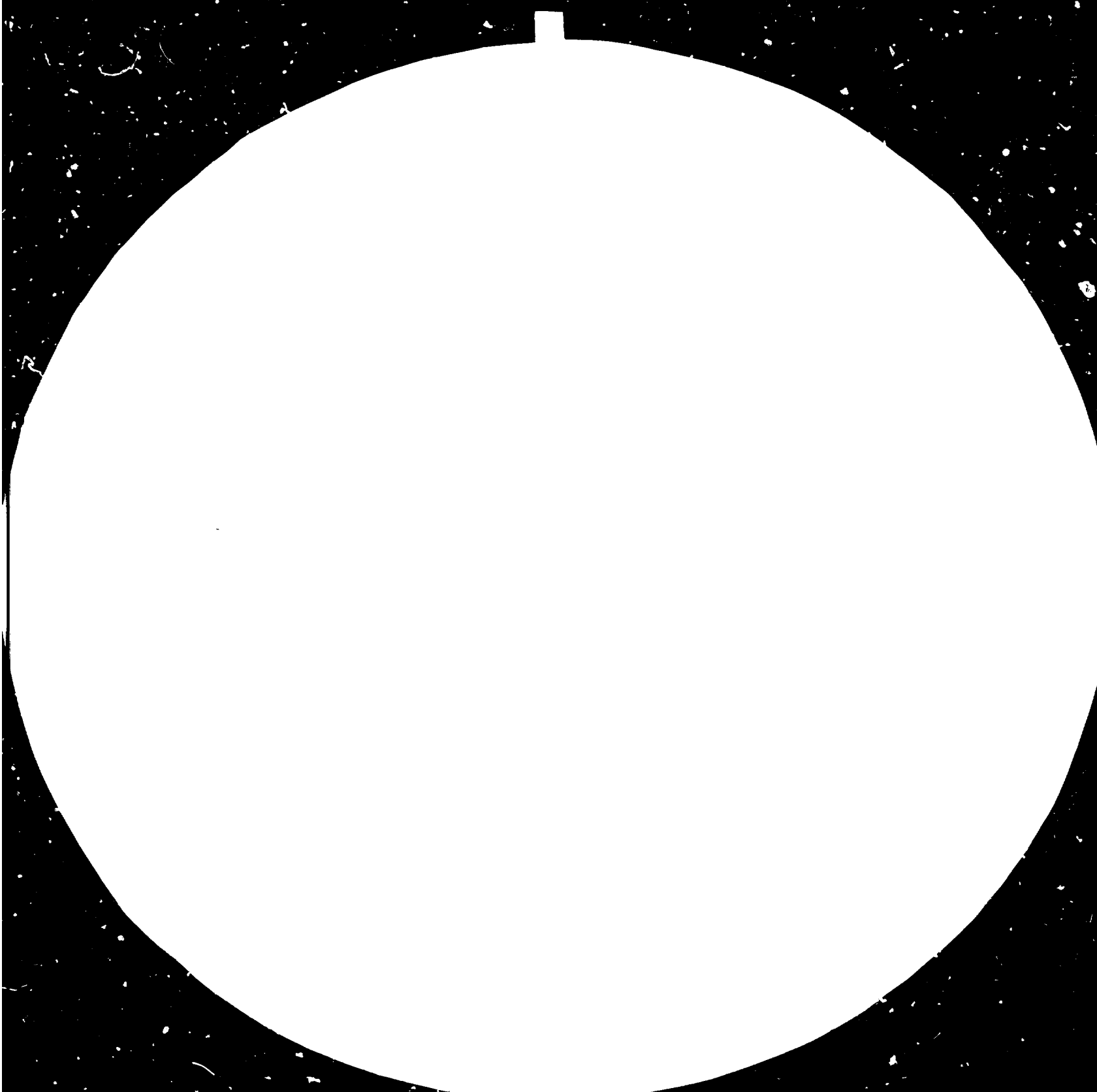

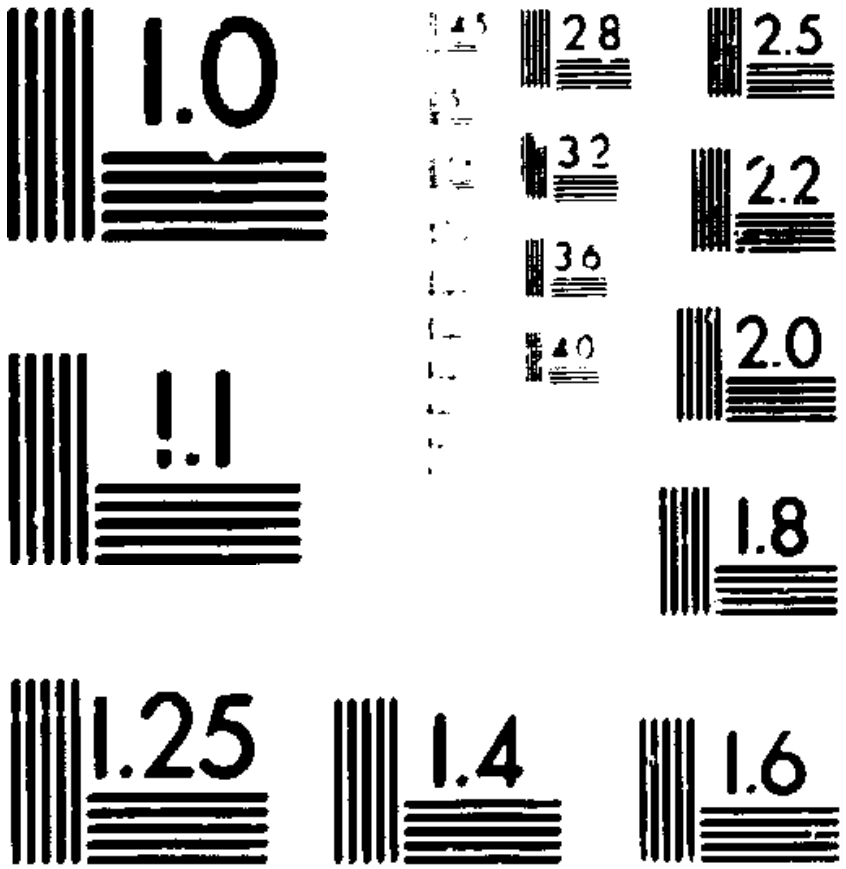

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DP/ID/SER.A/521
29 June 1984
ENGLISH

JUTE PRODUCTS RESEARCH,
DP/BGD/75/013
BANGLADESH

Evaluation report*

Prepared for the Government of Bangladesh
by the United Nations Industrial Development Organization,
acting as executing agency for the United Nations Development Programme

Based on the work of J.J. Willard
Consultant

United Nations Industrial Development Organization
Vienna

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TABLE OF CONTENTS

ABSTRACT

Project DP/BGD/75/013 Jute Products Research is nearing completion of fulfillment of all the project objectives and outputs. Certain essential inputs included in the budget have yet to be completed, and an extension from September 1984 until June 1985, already agreed upon in principle, is recommended in the Evaluation Report.

With the completion of the project extension in June 1985, the project objectives will have been fully met, and this project phase should be terminated.

Project outputs in this evaluation have been reviewed in terms of the five major project areas:

1. annual program of research
2. production of research reports
3. training and study tours
4. technical communications with industry
5. provision of laboratory and production equipment.

The BJRI is now in an excellent position to undertake research and development work in jute materials and has the potential to provide new technology to the jute industry. However, technical capabilities are limited to those based on jute processing technology, and emerging interests are related to fiber blending and processing on textile manufacturing equipment. Such capability would dramatically enhance the overall strengths of BJRI.

The Evaluation Committee recommends the continuation of technical assistance to BJRI as Phase II and a Preparatory Assistance to Bangladesh may be invited at the earliest possible time to study the best means of providing combined jute/textile capabilities to BJRI, and to prepare a new Project Document for a Phase II project.

ACRONYMS USED

BJRI	-	Bangladesh Jute Research Institute
BJMC	-	Bangladesh Jute Mills Corporation
UNIDO	-	United Nations Industrial Development Organization
UNDP	-	United Nations Development Programme
BJRI (Tech)	-	BJRI - Technological Research Wing
BJMA	-	Bangladesh Jute Mills Association
BARC	-	Bangladesh Agricultural Research Council

I. INTRODUCTION

The project "Jute Products Research", DP/BGD/75/013, was initiated in October 1978 for strengthening the research capabilities of the Technological Research Wing (Tech) of the Bangladesh Jute Research Institute (BJRI). The Immediate Objective was "to develop the capability of BJRI (Tech) to carry out technological research and development work for the benefit of the Bangladesh Jute Industry on a scale appropriate to the size and economic importance of the Industry".

Research on jute had been initiated at BJRI at the end of 1963 for carrying out scientific and technological research and Pilot Plant studies on new jute products.

The Project Document was prepared with the advise of Dr. Harry P. Stout, Jute Technologist, who was present at BJRI during four months in late 1977. Dr. Stout has continued to serve as the principal Expert on the project and has spent a total of twenty months at BJRI.

A Project Administrator/Textile Chemist, Mr. Conrado I. Diala, was assigned to the project in March 1979 and continues in that function. This position has made possible a smooth flow of all project inputs and smooth flow of communications.

The project entered a first revision stage in September 1982 and a second revision in September 1984. This third phase which will extend the project for nine months from September 1984 until June 1985 is awaiting final approval by the Government. The relevant draft project revision "Q", prepared during the Tripartite Review Meeting in Dhaka in November 1983, contains an additional UNDP input of $ 120,582 bringing the total UNDP project input to $ 3,045,311.

This project has been the object of two previous evaluation missions. The first, which occurred during 30 March to 8 April 1982, was carried out by the UNIDO Senior Industrial Development Officer. A follow-up mission from 2 November to 19 November 1982 by representatives from UNIDO and UNDP resulted in the first project extension for two years until September 1984.

This evaluation mission is a result of a request by Mr. D. Mondal, Deputy Secretary, External Resources Division, Ministry of Finance and Planning during the 17 November 1983 Tripartite Review Meeting. This followed discussions in which BJRI requested substantial further UNDP/UNIDO inputs in a Phase II project. The full committee agreed with the request and the mission was requested by the Government in the Terms of Reference to

a) assess utilization of project resources, and
b) recommend follow-up action ..... for improving the competitive position of jute and jute products.

The full Terms of Reference are provided as ANNEX I and the associated Job Description for the UNIDO Consultant as ANNEX II.

The evaluation on the part of UNIDO took place during the week May 21-25, 1984 and was carried out by Dr. John J. Willard, Consultant to UNIDO. It was the spontaneous reaction of all persons in Dhaka involved with the project evaluation that four working days (Friday is a weekly holiday) in Dhaka allows insufficient time to complete the necessary meetings, tasks at hand, and report preparation. An exhaustive evaluation would require a minimum of two weeks at BJRI, preferably four weeks total time including travel for briefing/debriefing in Vienna.

The author met Dr. Stout in Edinburgh enroute to Vienna/Dhaka for in-depth discussions about the past and present status of the project.

The evaluation mission commenced with an in-depth review meeting of key personnel involved with the "Jute Products Research". The individuals present are identified in ANNEX III.

Senior staff of BJRI (Tech) were most helpful in providing information for this evaluation. The members and their specific Institute functions are shown in the organizational chart in ANNEX IV.

Special acknowledgement is extended to Dr. Ayubur Rahman, Member-Director, BARC and Convenor of the Evaluation Committee, for continuing valuable contributions which made this evaluation worthwhile and fruitful.

II. BACKGROUND AND JUSTIFICATION

The historical importance of jute in the economic affairs of Bangladesh is well documented. Bangladesh is the major jute growing country in the world. Background information contained in the Job Description in ANNEX II provides a concise history of jute utilization and the importance of the role of research at BJRI given by the Government.

Since the denationalization of the jute mills in 1983, 33 of 77 mills have entered the private sector joining an additional 30 spinning or twine mills. Also 4 carpet mills out of 6 are now privately held.

In Bangladesh, the only foreign assistance provided to the jute sector is by UNIDO/UNDP. This major industry is heavily dependent upon this assistance to increase its jute production for domestic and especially the export markets.

The price of raw jute is currently ranging around 0.18 US dollars per pound. Since this is only about one-fifth of the price of other natural and synthetic fibres, the opportunities to increase the industrial utilization through blending with other fibres to generate new spectrums of commercial products provide most important challenges with strong price incentives.

The Bangladesh Council for Scientific and Industrial Research in Dhaka has a parallel program for blending jute products, but the limited effort is restricted to blends of cotton and jute (Jutton) processed on the cotton system.

III. PROJECT FORMULATION AND RESULTS

The Immediate Objective, cited in Section I above, primarily involves equipment acquisition, staff training abroad, and visits of several experts. While equipment procurement and training abroad have been substantially completed, the benefits from visits of most of the Experts are only now being realized in 1984. This latter fact, together with major changes in Government policies including recent denationalization of the jute mills, has imparted a new impetus to BJRI programmes and activities.

When DP/BGD/75/013 was formulated in 1977 it was documented as an institution building project which would establish an effective research capability at the BJRI, Technological Research Wing. The Immediate Objectives of the Project Document have remained unchanged throughout the project.

Those Immediate Objectives were expressed in general terms, and this has made it difficult to measure the results of the project and its effectiveness. This has been the case generally with research institutes as opposed to technical service organizations. As a broad statement, it can be said that the institution-building components provided by UNDP/UNIDO have far exceeded those originally envisaged and that a research institution of substantial potential, by world standards, now resides within BJRI (Tech).

A. Project Document Parameters

The project's Development Objectives are "primarily to improve the competitive position of the Bangladesh Jute Industry in world markets and sustain the export demand for jute manufacturers. A secondary objective is to extend the use of jute in internal markets to substitute imports".

These objectives are certainly desirable and remain today in the best interests of Bangladesh business economy. However, in view of the myriad of factors, business, political, economic and technical, that impinge on jute utilization, there is no way to isolate the effect of a given factor in any specific area on the commercial fate of jute.

We must be exceedingly careful in the present instance to distinguish UNDP/UNIDO project inputs, activities and outputs from the same parameters governing overall BJRI affairs. Thus, many external factors have influenced Institute growth and direction which could not reasonably have been expected to be a part of the Project. Administrative changes and major shifts in the technoeconomic base of supply/demand factors regulating the production of jute fibre versus synthetics are a case in point. It is not possible to formulate projects with major imponderables in mind, because they cannot be known in advance.

The project's five Immediate Objectives as cited in the Project Document are:

1) To develop a research programme for BJRI (Tech) which is appropriate to the needs of the Bangladesh Jute Industry.

2) To improve the technical expertise of BJRI (Tech) research staff in order to enable them to carry out an expanded research programme.

3) To increase the technical facilities of BJRI (Tech) in order to enable an expanded research programme to be implemented.

4) To demonstrate the technical feasibility of the manufacture of new or improved jute products.

5) To develop mutual relationship between BJRI (Tech) and the Bangladesh Jute Industry which will ensure a rapid dissemination of research findings throughout the industry.

The project inputs by UNDP/UNIDO are almost entirely in three areas: staff training abroad, visits of experts, and acquisition of laboratory and pilot plant equipment. In most cases, it is not possible to correlate a given project input with a specific project objective, as there is considerable overlap among them.

On the other hand, the Activities and Outputs were specified in the Project Document in five directly inter-related areas. In essence, the five areas were concerned with:

1) an appropriate annual programme of research;
2) production of meaningful research reports;
3) training and study tours of research staff;
4) effective technical communications with the industry;
5) provision of laboratory and production equipment.

For the purpose of this evaluation as specified in the Terms of Reference (ANNEX I), it is most meaningful to assess the present level of capabilities and activities at BJRI (Tech), as these meet expectations of the Government and UNDP/UNIDO, under the above five areas.

B. Project Results

No end-of-project indicators were cited in the Project Document which can be used to measure the extent to which the project has met its objectives. To re-emphasize, this is not unexpected, because there are no concrete yardsticks by which to measure a "research capability". The quantitative units of activities such as "staff members trained" or "reports issued" have no real significance in the absence of thorough knowledge of the quality of the product in question. Value judgements in such instances require considerable first-hand exposure to the broad situation at hand.

The current apparent status at BJRI (Tech) will be assessed under the five areas identified under Project Outputs in the Project Document which were noted above.

1. Appropriate Annual Program of Research

It is common with many research organizations to take on too many projects such that the total effort becomes too diluted for effective impact in given specific technologies. This way possibly the case at BJRI (Tech) during the late 1970's. Fortunately, due in part to the UNDP/UNIDO assistance, the objectives of the BJRI research programmes have been confined to ten main areas.

The ten research areas are shown as follows and can be seen to be oriented, in large part, toward the practical needs of the jute industry.

1) To improve the technical quality of long jute.
2) To reduce the manufacturing costs of jute products.
3) To reduce the manufacturing costs of jute products by optimising the machine factors which affect the efficiency of spinning and weaving.
4) To measure the spinning quality of raw jute and relate this to the strength characteristics of different counts of yarns.
5) To measure the physical characteristics of jute fabrics having different warp and weft constructions and to relate these to the characteristics of the yarns used.
6) To develop methods of bleaching, dyeing, and printing.
7) To change the chemical and physical characteristics of jute by chemical means.
8) To improve the market potential of jute products.
9) Trial production and technical services.
10) Miscellaneous.

With an institute the size of BJRI (Tech), which now numbers 52 technical staff, it is essential to have some form of inter-departmental collaboration and spontaneous communication as befits progress on principal industry-oriented projects. This can provide results-oriented team work which must be under the direction of a project leader. This situation has been inculcated by performing and logging each scientist's work under the appropriate objectives just noted. External reporting can accordingly be simplified, and internal communications are rendered natural and easier.

The biggest single factor which has added to the research programme of BJRI under the project is probably the visits of experts. This area has seen very important new additions during recent months. The enthusiasm afforded to the relevant staff, and the practical orientation of new projects engendered are notable.

Consultants selected for the project can be considered to be of a singularly outstanding calibre. While the assignment periods have come quite late as it suits the best overall project design, the reasons for this can be rationalized on the basis of:

1) unavoidable delay in receipt of equipment required for use by the consultant, or
2) difficulty in identifying individuals new to the UN system and/or qualified for the demanding tasks at hand involving jute research.

Reports submitted to date by these expert specialists are tabulated in ANNEX V.

In summary, it can be said that the current research programme at BJRI (Tech) is reflecting a trend toward practical orientation and industry utilization of results. The specific details are far too involved to elaborate as they might reflect trends. Suffice it to conclude for the purposes of this evaluation that all factors combined which result from UNDP/UNIDO project inputs have provided a marked improvement in the ability of the BJRI to recognize and adapt to industrially useful research projects.

2. Production of Meaningful Research Reports

The production of meaningful research reports was a noted output of the project, and, while not requiring any specific inputs, material progress has been made. There is undoubtedly still room for improvement as this relates to communications with industry, the subject of Output 4.

Reporting by BJRI is now carried out in three basic ways reflecting the influence of Dr. Stout in large part. These are considered further under Section 4 below relating to communications with industry.

3. Training and Study Tours of Research Staff

Training abroad for BJRI research staff was carried out in a most impressive organizational manner and with exceptionally good results. The return rate of trained staff to BJRI has been exceedingly high with no serious detractions. Thus, the trained staff, which will number about thirty-three by the end of the project, are predominantly resident at BJRI. In one case, an official extension has been recommended, and in two other cases, unofficial extensions have been acknowledged, with expectations that all these three cases will return to BJRI following fulfillment of the receipt of advanced degrees in outstanding universities abroad.

A list of the staff members trained abroad is shown in ANNEX VI including the period of training and the location.

Only with knowledge of the results of research work deriving from the trained staff will it be possible to judge the results of such a high level of staff training in a project of this nature.

Eight study tours of Senior staff at BJRI have been completed. The travel schedules, duration, and purposes of these tours are shown in ANNEX VII.

Because these individuals operate at the managerial level in BJRI, it will never be possible to judge the impacts that their tours might have on their own professional performance or the improved manners in which they might motivate their staffs. In the very process of such tours, the knowledge gained, the new contacts made, and personal motivation factors are so subjective that objective assessment of value is beyond calculation. For the proportionately small costs involved, however, it is difficult to imagine that these tours could be less than advantageous to overall project accomplishments.

4. Communication with the Industry

Communication with the jute and/or textile industries is the single biggest factor upon which success of the BJRI (Tech) depends. This includes not only dissemination of research results to the industries, but includes two-way communication by which feed-back information is obtained in effective manners which can help senior staff to monitor research programmes toward the most practical ends.

One of the Prior Obligations and Prerequisites of the Project Document required that "for efficient and effective project implementation that the Bangladesh Jute Mills Corporation (BJMC) appoint a counterpart to the Director BJRI (Tech) to coordinate Institute and Industry".

During the early part of the project, this means of direct contact with the jute mills did not come up to expectations. More recently, there is every indication that a growing and effective contact with the BJMC has been realized. This status has been supported by the very enthusiastic participation in the evaluation committee by Mr. M.A.R. Talukder, Director (Technical), BJMC.

Communication with industry now has a double requirement in that special concerted efforts must be made independently with both the BJMC and associations of the private sector mills. Continuing contacts with the latter group can be maintained through the Bangladesh Jute Spinners Association and the Bangladesh Jute Mills Association.

The BJRI now has three official forms of continuing communication and report/data compilation and retention.

An Annual Technical Report is prepared at the close of each calender year. These are detailed technical reports grouped by subject matters rather than by Department. A summary of highlights for each subject is provided by the Director. Research results are also presented semi-annually on each research project.

A new format for publication is underway in which the present summary of achievements on each research topic will be expanded while still maintaining the clear, readable style. This should form the basis for an Annual Report which would be of particular value to mill personnel.

Finally, a new form of communication will be initiated based on periodic reports under the ten research areas noted above. These will be issued on a monthly or quarterly basis as fits the research status of the individual projects.

Participation of the mills in on-going BJRI technical affairs is of the utmost importance. The author had an opportunity for lengthy discussions with Mr. J.R. Khan, Secretary of the Bangladesh Jute Mills Association. (private mills). This Association has been re-activated following denationalization of the jute mills which commenced in late 1982. Mr. Khan had been Secretary of the BJMA prior to nationalization in 1972. The Association is regaining its original esteemed posture. The BJMA is eager to establish working contacts with BJRI. This includes the mill members serving on Advisory Boards of the BJRI and on working committees. The BJMA will disseminate noteworthy BJRI information to its mill members in their regular meetings. Considerable benefit to both organizations can accrue from this new status.

BJRI has already introduced another form of activity to increase familiarization with jute mills and their needs in both the public and private sectors. This involves visits to the mills by BJRI staff and the initial response has been very positive. Thirty four mills have been visited recently.

In yet another function, the BJRI has begun a training programme. Already one 3-months training course for mill personnel has been carried out which covered all processing areas from spinning to finishing. This activity should be encouraged and expanded.

The UNDP/UNIDO project has made a very important contribution to the jute industry through its project inputs at BJRI.

5. Provision of Laboratory and Production Equipment

Substantial inputs of machinery providing trial production facilities in spinning, weaving, dyeing, and chemical finishing have already been delivered to the Institute, and a final delivery is contracted for 1984. In total, when all commitments have been honoured, 17 items of machinery will have been installed at a cost of about 1.2 million U.S. dollars.

Firm orders have been placed for 46 items of laboratory equipment, at a cost in the region of 84,000 U.S. dollars, and delivery is outstanding for one item only. Additional items costing about 20,000 U.S. dollars are also projected for delivery in 1984.

With this input of laboratory equipment and machinery, at a total cost of around 1.3 million U.S. dollars, the technical facilities available at BJRI are now adequate to support the wide-ranging programme of research in operation. Many of the machines installed are of commercial size, so no difficulty should arise in demonstrating to potential users in the industry the commercial feasibility of any innovations in new or improved jute products.

Summary

In summary, the five project output areas have been highlighted above. There are many project details that have been omitted of necessity. For additional specific information relating to the subject matters, the reader is referred to the latest Technical Report by the principal UNIDO Expert, Dr. H.P. Stout DP/ID/SER.a/494, 7 February 1984.

IV. CONCLUSIONS

The following conclusions have been drawn as a result of this in-depth evaluation of project DP/BGD/75/013 and derive from the foregoing discussions.

1. Upon completion of project extension "Q" in June 1985, UNDP/UNIDO project ~~inputs~~ will have been completed to fundamentally satisfy the requirements of the Project Document.

2. A substantial research and development capacity including research as well as full-scale jute production equipment together with trained staff now resides within BJRI.

3. Visits by expert specialists,especially during recent months, have provided new expertise and impetus to timely and important research projects.

4. An extensive programme of training fellowships abroad has been very successful, with important emphasis on relevant textile technology, and all the trained staff already have or are expected to return to BJRI.

5. With one-third of national jute production capacity (excepting twine and carpets) recently released to the private industrial sector, a new stimulus has been introduced for the BJRI to demonstrate that it can effectively serve that sector. The BJRI staff are responding to this challenge through mill visits, expanded extension services, and re-introduction of trained programmes for mill personnel. The development of new commercial jute products requires more intensive and results-oriented research, but experts' visits are providing important new stimuli and direction in this regard.

6. The BJRI is an important national technical asset to Bangladesh, made possible largely through UNDP/UNIDO contributions. The BJRI is not yet ready to continue independently to satisfy the

expanding needs of the domestic jute industry, but technical assistance oriented towards new and improved products, with an exact form yet to be defined, is required and is urgently sought by the concerned Government officials.

7. During the balance of this project, increased attention should be given to the acquisition of a more complete technical library on jute-related subjects, on expanding the present maintenance and machine shop, and by means to supply spare parts from abroad for the equipment supplied.

V. RECOMMENDATIONS

This consultant recommends that the Project Revision "Q" which provides for project extension from October 1984 until June 1985 be approved by the Planning Commission of the Government. This will include a nine-months extension of the Project Administrator/Textile Chemist, five visits by Experts, one sub-contract, seven additional fellowships, and delivery of two drawing frames and a digester.

In view of the critical importance of jute production and export to the Bangladesh economy and the need for external assistance in new jute product design, the Consultant recommends that further UNDP/UNIDO assistance be provided to Bangladesh through the BJRI. The optimal form that the assistance should take can only be determined following the thorough evaluation in progress, constituted by the Ministry of Agriculture under the Chairmanship of Dr. Ayubur Rahman (BARC), of the best commercial opportunities for new jute and jute blend products. Completion of this evaluation is expected by mid-June 1984. One obvious major opportunity lies in the area of new jute products comprising intimate fibre blends with other natural and synthetic fibres. The preferred means by which BJRI could acquire capabilities to produce and process fine jute blend yarns should be explored.

The Consultant recommends to UNDP/UNIDO the fielding to Bangladesh of a Preparatory Assistance mission to prepare a Project Document for a Phase II project at BJRI such that it can be included in the 1985-90 Country Programme.

The above recommendations are in general agreement with the desires and expectations of the Government constituted Committee which participated actively in this evaluation (see Terms of Reference, Annex I).

ANNEX I

Government of the People's Republic of Bangladesh
Ministry of Agriculture
Agriculture and Forest Division
PMU (E + R) Section

No. P+E (PMU-E+R)-BJRI-3/83(Part-I/46) Dated the 15 February 1984

Office Memorandum

1. Government have been pleased to constitute a Committee to undertake an in-depth Evaluation of the UNDP Project - Jute Products Research (BGD/75/013) with the following:

Dr. Ayubur Rahman Member-Director, BARC	Convenor
Mr. M.A.R. Talukder Director (Technical), Bangladesh Jute Mills Corporation	Member
Mr. Shamsuzzaman Assistant Chief (Crop), Planning Commission	Member
UNDP/UNIDO Experts	Member

2. The Terms of Reference of the Committee will be as follows:

a) Assess utilization of the project resources in terms of:

i) research programmes of BJRI (Tech.Res. Wing), oriented to the needs of the Bangladesh Jute Industries and new/improved jute products for semi-large scale production.

ii) improvement of technical expertise and facilities of BJRI (Tech.Res. Wing) for expanded research programmes.

iii) Strengthening of the relationship between the BJRI (Tech.Res. Wing) and the jute and Textile Industries for rapid dissemination and utilization of research findings.

b) recommend follow-up action with identification of areas in which further donor assistance is needed in order to fulfill the objectives of TRW of BJRI for improving the competitive position of jute and jute products.

3. The Committee will submit its report in printed form to the Secretary, Agriculture and Forest Division by May 15, 1984.

(Abdul Waheed Khan)
Agricultural Economist

Distribution:

1. Dr. Ayubur Rahman, Member-Director, BARC
2. Mr. M.A.R. Talukder, Director (Technical)
   Bangladesh Jute Mills Corporation, Adamjee Court,
   Motijheel C.A.
3. Mr. Shamsuzzaman, Assistant Chief (Crop)
   Planning Commission
4. Mr. Vicente C. Lavides, UNIDO, Senior Industrial Dev. Field Adviser
   60 Road No. 11A, Dhanmondi R.A., Dhaka

For information:

1. Secretary, Agriculture and Forest Div., Dhaka
2. Executive Vice-Chairman, BARC, Dhaka
3. Chairman, BJMC, Adamjee Court, Motijheel C.A.
4. Joint Chief (Crop), Planning Commission
5. Director (Tech), BJRI, Dhaka

ANNEX II

UNITED NATIONS

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

UNIDO 27 April 1984

PROJECT IN THE PEOPLE'S REPUBLIC OF BANGLADESH

JOB DESCRIPTION

DP/BGD/75/013/11-57/31.7.B.

Post title	Textile consultant
Duration	Two weeks
Date required	May 1984
Duty station	Dhaka
Purpose of project	To strengthen the capability of the Bangladesh Jute Research Institute (Tech.) (BJRI) in carrying out effective research and development work for the jute industry
Duties	The consultant will represent UNIDO in an in-depth evaluation exercise for the above project and will specifically be expected to

a) assess the utilization of the project resources in terms of:

- research programmes for BJRI (Tech. Res. Wing), oriented towards the needs of the Bangladesh jute industries and new/improved jute products for semi-large-scale production;
- improvement of technical expertise and facilities of BJRI (Tech.Res.Wing) for expanded research programmes;
- strengthening of the relationship between the BJRI (Tech.Res.Wing) and the jute and textile industries for rapid dissemination and utilization of research findings;

b) recommend follow-up action with identification of areas in which further donor assistance is needed in order to fulfill the objectives of TRW of BJRI for improving the competitive position of jute and jute products.

..../..

	The expert will also be expected to prepare a final report, setting out the findings of the mission and recommendations to the Government on further action which might be taken.
Qualifications	Ph.D. in chemistry or related subject. R+D experience in the textile industry
Language	English
Background Information	On separate page.

Background information

Juce is the most important national export commodity and also the raw material for the country's most important industry. The country's juce industry was completely nationalized in March 1972 and has been making steady progress since then towards achieving the 1969-1970 production level, which was the highest in its history.

There are currently 77 juce mills in the country, of which 74 are in operation. The estimated production in 1974-75 was 451,000 metric tons of juce fabric in the form of hessian, sacking and small quantities of carpet backing : this represents approximately 50% of actual installed capacity. Approximately 85% of this production goes to the export market earning, 55% of the country's foreign exchange. The industry provides employment to 200,000 people.

In the last ten years, and particularly in the early 70's, juce has been subject to increased competition from synthetics and mainly from polypropylene. The successful market development of polypropylene in direct competition with juce can be attributed to its low price, ready availability and superior technical performance as a result of superior mechanical and physical properties. A typical example of the prevailing situation is in the area of primary carpet backing in the U.S. market, in which the share of juce has fallen from over 80% in 1967 to less than 10% in 1974. The decline in other markets and other traditional juce end-uses has been equally precipitous.

A policy of containment to minimize market losses on the part of the juce-producing countries should necessarily focus on the price imbalance between juce and synthetic products. However, the survival of the juce industry will depend on the increase of its productivity and the development, through research, of better products and new end-uses. This project has been designed with the latter aim in mind.

The Dacca Declaration of January 1973 envisaged the establishment of "Juce International" with a mandate to carry out joint research and development activities. UNDP subsequently fielded a Research and Development Working Group to recommend priority projects to Juce International. The technical centre envisaged to be established under "Juce International" would be fed with results from various national and international research centres for effective translation as and when necessary. The Research and Development Working Group also stressed the need for viable national research centres to carry out their own research projects which will be valuable to their own national industries.

In Bangladesh, the mandate for carrying out technological research has been given to the Bangladesh Juce Research Institute. The Institute consists of an agricultural research wing and a technological research centre. Facilities at the technological research are inadequate to carry out any meaningful research and development project. In addition, the centre is understaffed and lacks expertise in all the important areas of juce technology. According to the report of the research and development working group for "Juce International", assistance in the Bangladesh Juce Research Institute is urgently needed in improving its own facilities for research and development, irrespective of related technical activities planned for "Juce International".

The Government has recognized the significance of technological research on product development, diversification of end-uses for juce fibres and testing quality control services. Through the Ministry of Juce and the Bangladesh Juce Industries Corporation, the Government is proceeding with a reorganization of the Bangladesh Juce Research Institute with the aim of making it a viable research institution.

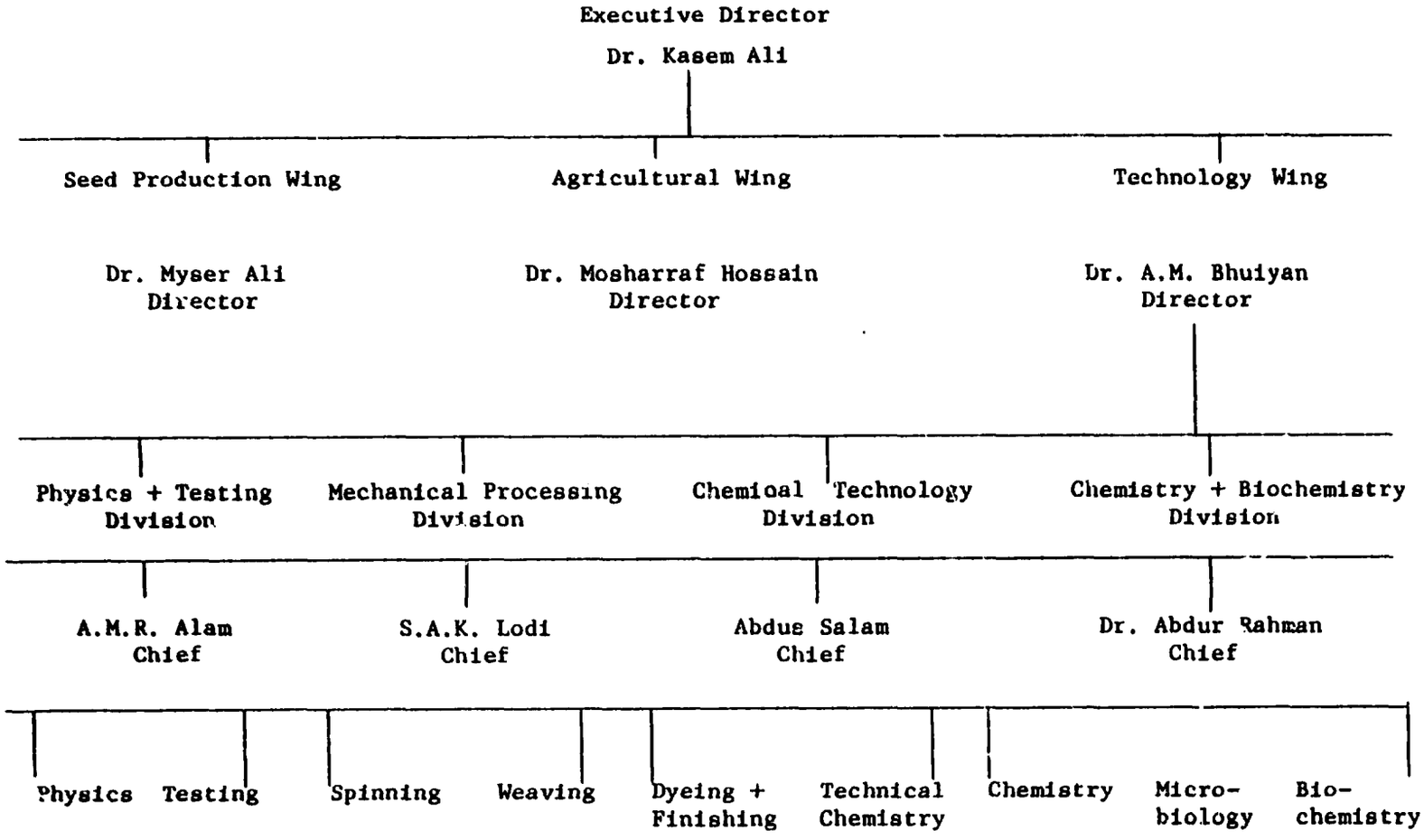
ANNEX III

Members present in the in-depth meeting of the Jute Products Research held on 21 May 1984 at BARC

Name	Designation	Organization
Dr. Ayubur Rahman	Member-Director, Planning and Economy and Convenor, Evaluation Committee for UNIDO Project - Jute Products Research	Bangladesh Agricultural Research Council (BARC)
Mr. A.R. Talukder	Director, Technical	Bangladesh Jute Mills Corporation (BJMC)
Mr. Vicente C. Lavides	Senior Industrial Development Field Adviser (SIDFA), UNIDO, Dhaka	UNIDO/UNDP, Dhaka
Mr. Conrado I. Diala	Project Administrator/ Textile Chemist	UNIDO Project BGD/75/013 - Jute Products Research BJRI Tech. Wing, Dhaka
Mr. Robert Petri	Programme Officer	UNIDO/UNDP, Dhaka
Dr. A.M. Bhuiyan	Director, Tech.Res. Wing	Bangladesh Jute Research Institute Tech.Res. Wing, Dhaka
Mr. A.T.M. Salehuddin Chowdhury	Principal Scientific Officer	BARC, Dhaka
Mr. M.A. Mumin	Deputy Chief	Agriculture Division, Planning Commission
Dr. John J. Willard	Consultant	UNIDO

ANNEX IV

Bangladesh Jute Research Institute (BJRI)



ANNEX V

Specialist Experts' Reports

Consultant	Tenure	Report
Dr. Harry P. Stout Jute Technologist	Started on September 1978 and visited eight times; last visit started on 1 November 1983 and he left on 6 December 1983.	DP/ID/SER.A/494 (latest) Technical report on "Assistance to the Bangladesh Jute Research Institute, Technical Wing". He presented nine reports altogether.
Ms. Danuta Zyzka Consultant on Dyeing and Finishing	Started on 18 November 1981 and visited thrice. Last visit made on 11 January 1984 and left on 6 March 1984.	DP/ID/SER.A/478 "Chemical Finishing of Jute and Jute Products". She presented three reports.
Dr. L.W.C. Miles Short-term-Consultant on Textile Chemistry	Visited on 20 December 1983 and left on 28 December 1983.	(No Serial Number) "Textile Chemistry"
Ms. Margareta Nettles Textile Designer	She came on 6 January 1984 and left on 31 January 1984.	Investigate the feasibility of developing new jute interior fabrics for export to Europe and the United States
Mr. Boris Iliev Textile Technologist	He arrived on 1 February 1984 and left on 12 April 1984.	DP/ID/SER.A/510 "To develop physical and mechanical research programme with special reference to the technical problems of the jute manufacturing industry".
Mr. Kyoti Sarkanen Organic Chemist	He arrived on 20 March 1984 and left on 29 March 1984.	DP/ID/SER.A/511 "Chemistry of Lignin with special reference to the jute fibre and the photo-chemical yellowing upon exposure to sunlight".

ANNEX VI

Name, Place and Field of Studies	Date Started	Date Completed	Duration
Md. Shabuddin, S.S.O., had a Diploma Course on Weaving Technology at the University of Manchester Institute of Science and Technology, U.K.	2 August 1980	July 1981	12 months
Khondkar Atiar Rahman, S.S.O., pursued a Diploma Course in Bleaching, Dyeing and Printing Technology at the UMIST, U.K.	2 August 1980	July 1981	12 months
Abul Bashar Md. Abdullah, S.S.O., pursued a Diploma Course in Bleaching, Dyeing and Printing Technology at UMIST, U.K.	2 August 1980	-	12 months 24 months** 36 months
Khairul Kabir, S.S.O., had a Diploma Course in Spinning Technology at the University of Leeds, U.K.	3 September 1980	September 1981	13 months
Ismail Chowdhury, S.S.O., undertook a course in Micro-organisms and Enzymes, particularly the biological degradation of cellulosic and lignified materials at the University of Strathclyde, U.K.	1 October 1980	March 1981	6 months
Ataur Rahman, S.S.O., undertook a course in Micro-organisms and Enzymes, particularly the biological degradation of cellulosic and lignified materials at the University of Strathclyde, U.K.	1 October 1980	March 1981	6 months
Habibub Rahman, S.S.O., undertook a course in Micro-organisms and Enzymes with particular reference to the Enzymatic degradation to cellulosic materials at the University of Strathclyde, U.K.	1 October 1980	March 1981	6 months
			91 m/m

** This fellow has been extended for additional 24 m/m to complete his Ph.d.

Name, Place and Field of Studies	Date Started	Date Completed	Duration
			91 (Carry over)
Ms. Rasheda Islam, P.S.O., undertook a course in Micro-organisms and Enzymes with particular reference to the Enzymatic degradation to cellulosic materials at the University of Strathclyde, U.K.	1 October 1980	March 1981	6 months
A.S.M. Serajuddin, P.S.O., to study a course in Cellulose and Lignin Chemistry specially on the studies in the chemistry of Hemicellulose, U.K.	1 October 1980	March 1981	6 months
Aminul Islam, S.O. to study a course in Cellulose and Lignin Chemistry specially the structural chemistry of lignin with particular reference to photochemical colour change at the University of Strathclyde, U.K.	1 October 1980	March 1981	6 months
Mohammed Ali, S.S.O., to study course in Cellulose and Lignin Chemistry, particularly the structure of lignified bast fibre in relation to chemical composition at the University of Strathclyde, U.K.	1 October 1980	March 1981	6 months
Nurul Amin, S.S.O., to study a course in Textile Chemistry, in the area of textile finishing processes other than bleaching and dyeing with particular reference to resin applications at the University of Strathclyde, U.K.	1 October 1980	March 1981	6 months
Abdus Sukur, S.S.O., to study a course in Textile Chemistry specially the Technology of liquid ammonia and allied treatments for textiles at the same University.	1 October 1980	March 1981	6 months
Kazi Karim, S.S.O.. to study a course in Textile Physics particularly the colour measurement and assessment colour changes in textile at the same University.	1 October 1980	March 1981	6 months
Siddiqur Rahman, S.O., to study a course in Textile Physics particularly the structure of textile yarns, with reference to the behaviour of fibres on machinery and limit count spinning, at the same University.	1 October 1980	March 1981	6 months
			139 m/m

ANNEX VI (cont'd)

Name, Place and Field of Studies	Date Started	Date Completed	Duration
			139 (Carry over)
N.G. Saha, S.O., to study a course in Textile Physics specially the evaluation of the physical characteristics of textile fabrics and materials at the same University.	1 October 1980	March 1981	6 months
A.M.R. Alam, P.S.O., to study a course on Textile Physics along the line of Textile Testing and standardization at the same University.	1 October 1980	March 1981	6 months
Md. A. Khaleque, S.S.O., to pursue studies on methods of tests for carpet and assessment of standards required at Harrogate + Leeds, U.K. and Atlanta, Georgia Institute of Technology, U.S.A.	3 September 1982	1 April 1983	6 months
Md. Hurmuz Ali, S.S.O., to pursue studies on methods of tests for furnishing fabrics and performance standards required at Georgia Institute of Technology, U.S.A.	1 January 1983	-	6 months
Md. Serajul Huq Talukdar, S.O., to pursue studies on maintenance of chemical instruments at Bristol Polytechnic, U.K.	4 January 1983	1 July 1983	6 months
Md. Nurul Islam, S.O., to pursue studies on methods of improving wash fastness of textiles and application to lignocellulosic materials at Cologne, West Germany and Base at Switzerland.	31 July 1982	31 December 1982	6 months
Abu Siddique Mia, S.O., to pursue studies on methods of textile printing and knowledge about inks and other at UMIST, U.K.	31 May 1982	- extended for	6 months 12 months 18 months
A.K.M. Mansurul Huq, S.O., to pursue studies on methods of fire proofing and performance standard at Texas Tech University, U.S.A.	28 May 1982	-	6 months
			217 m/m

ANNEX VI (cont'd)

Name, Place and Field of Studies	Date Started	Date Completed	Duration
			217 (Carry over)
Jagabrato Barua, S.O., to pursue studies on Micro-organisms and Enzymes, particularly the biological degradation of cellulosic and lignified materials at Kent University, U.K.	6 September 1983	-	6 months
Mohiuddin Ahmed, S.O., to pursue studies on instrument maintenance at Napier College, Edinburgh, U.K.	28 July 1983	14 June 1983	11 months
		Total m/m	234 man-months

Note: Another 5 fellows have been selected by the Institute for six-months training course for each; their papers are still with the Ministry for approval.

ANNEX VII

Study Tours

Name and Designation	Duration	Field of Study Tour and Country
Mr. S.A.K. Lodi Chief, Mechanical Processing Division, BJRI (Tech)	3 Nov. 1979 to 1 Jan. 1980 (8 weeks) Two months	Visited Italy, Austria, Netherlands, U.K. and U.S.A. During his tour he has gathered ideas and acquired knowledge about the recent development in textile/jute processing machinery and advancement in research and development work on carpet backing, tufted carpet, jute decorative, wall covering and other jute products.
Mr. Abdul Salam Chief, Technology Division, BJRI (Tech)	3 Nov. 1979 to 23 Dec. 1979 (7 weeks) 1 1/2 m/m	Visited Switzerland, Belgium, Netherlands, U.K. and U.S.A. During his tour he was able to acquire knowledge and gather idea about the recent development and advancement in textile chemistry, textile wet/chemical processing, dyeing; the application of auxialiaries and finishing chemical in the field of jute and bast fibre industry and technological advancement in coloured and printed carpet products.
Dr. A. Matin Bhuiyan Director-in-charge, BJRI (Tech)	7 April 1980 to 6 June 1980 (8 weeks) Two m/m	Visited Sweden, U.K., U.S.A. and Japan He studied on researches on cellulose and lignin chemistry, micro-degration of polysoccarides. Researches on coir and other natural fibres and utilization of agricultural wastes. Researches and development on mercerizing techniques, dyeing and finishing treatments for textiles of natural fibres. Researches and development on poly-propylin natural and synthetic fibres.
Mr. M. Mostafa Mechanical Engineer, Mechanical Processing Division, BJRI (Tech)	28 Sept. 1980 to 10 Nov. 1980 (6 weeks) 1 1/2 m/m	Visited Toyoda Tsusho Kaisha Ltd., Japan to have training on operation erection, maintenance of dyeing and finishing and different machineries.

ANNEX VII (cont'd)

Name and Designation	Duration	Field of Study Tour and Country
Mr. M.A. Sobhan Principal Scientific Officer, Mechanical Processing Division, BJRI (Tech)	5 Oct. 1981 to 2 December 1981 Two m/m	Visited Italy and West Germany to find out which machinery would be suitable for jute to process low count jute yarn. Also made a technical evaluation in the performance of machinery in relation to the possible procurement of Fine Yarn Spinning Machinery for processing jute. He had spinning tests of different counts of yarn and theoretical knowledge and knowledge on operation and maintenance of the spinning machinery.
Dr. Ghulam Mohiuddin Principal Scientific Officer, Chemistry and Bio-chemistry Division, BJRI (Tech)	2 Nov. 1982 to 28 Dec. 1982 Two m/m	Visited U.K. and Sweden and studied the different research projects on microbiological degradation of lignin and to gather information suitable for future research work on upgradation of jute cuttings. Did some work on isolation, purification and use of ligninase. Studied the desizing of natural fibre. Gather information on research and development work being carried out in the lignocellulosic fibre like sisal, coir and other natural fibre. Studied the technique for the large scale production of enzymes.
Dr. M. Kabir Chief, Physics and Testing Division, BJRI (Tech)	22 April 1983 to 23 June 1983 Two m/m	Visited U.S.A., U.K., Sweden and India. To enable them to establish contacts with their counterparts in foreign textile research institution and to discuss with the authorities concerned about the subjects of mutual interest. To generate new ideas in research which may be applicable in the field of jute industry and exchange of informations regarding the latest developments in research especially advancement on synthetics which serves as substitutes for jute and natural fibres in the international markets.
Dr. A. Rahman Chief, Chemistry and Bio-chemistry Division, BJRI (Tech)	Same as Dr. Kabir Two m/m	Same as Dr. Kabir (They have travelled together)