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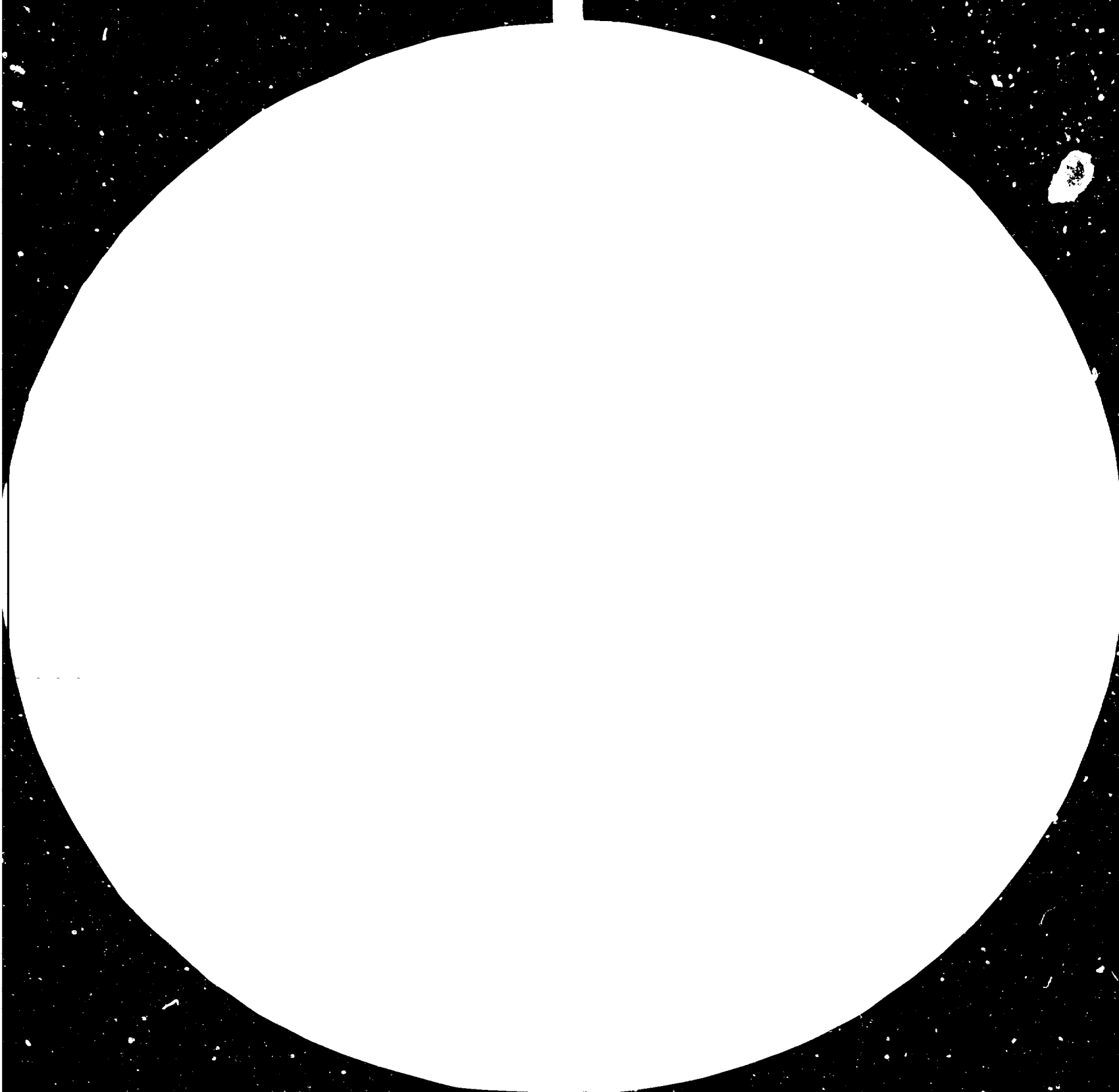

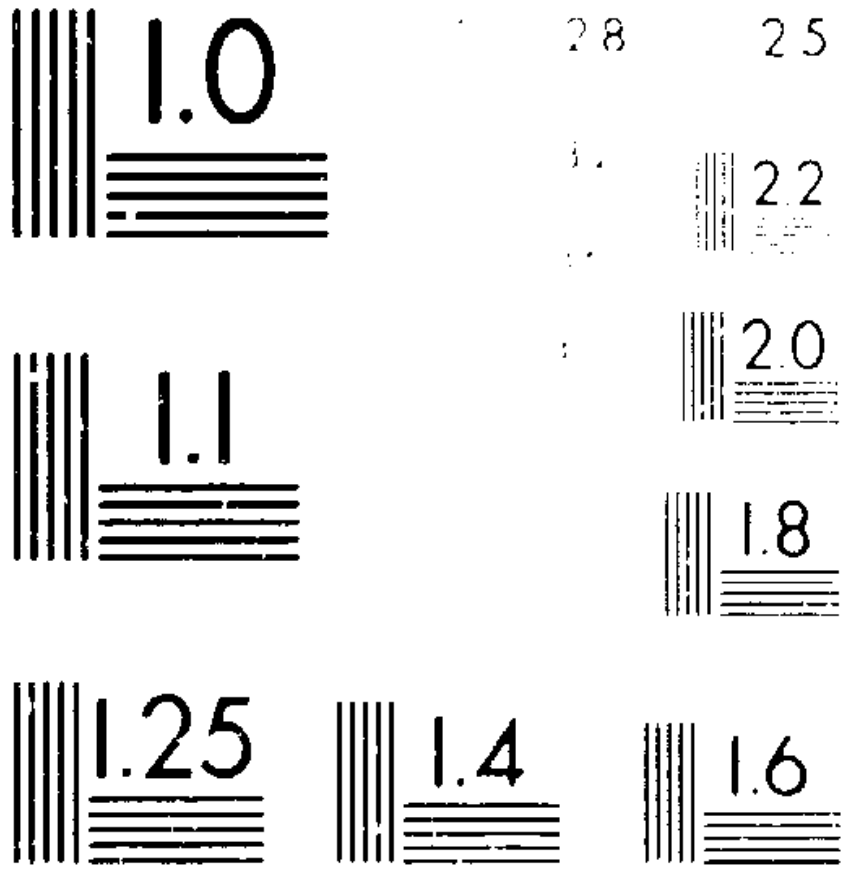

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DP/ID/SER.A/494
7 February 1984
English

JUTE PRODUCTS RESEARCH

DP/BGD/75/013

BANGLADESH

# Technical report: Asssistance to the Bangladesh Jute Research Institute Technological Wing Bangladesh*

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 H. P. Stout, UNIDO expert

United Nations Industrial Development Organization
Vienna

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Section 13 — The Outputs expected of the Project have all been achieved to an acceptable degree, except that of close collaboration with manufacturing industry. To achieve this is now the major challenge facing the BJRI management.

## 1. INTRODUCTION

This Project at the Technological Wing of the Bangladesh Jute Research Institute (BJRI), which comes within the United Nations Development Programme for Bangladesh, has the aim of providing assistance to develop the capability of BJRI for technological research and development work related to the products of the jute manufacturing industry.

The Project was established in 1978, following a Preparatory Mission in 1977, and the details are set out in UNDP Project Document Number BGD/75/013/D/01/37, titled Jute Products Research. The background is set out in this document, and in the terminal report of the Preparatory Mission, and requires no further discussion.

Five previous Technical Reports have been submitted, dated December 1978, 1979, 1980, 1981 and 1982 respectively. The present report describes the activities of the project during 1983, and goes on to consider the status of the Project in detail, having especial regard to the forthcoming termination date at present scheduled for September 1984, but under review.

### Official Arrangements

The administrative details of the Project are as follows:

| | |
|---|---|
| Title: | Jute Products Research |
| Number: | BGD/75/013/D/01/37 |
| Date of Approval: | 19th September 1978 |
| Starting Date: | |
| Estimated: | May 1978 |
| Actual: | October 1978 |
| Duration of Project: | 2 years and 6 months |
| First Revision: | 4 years |
| Second Revision: | 6 years |
| Third Revision: | 6 years and 9 months (to be ratified) |
| Termination Date: | March 1981 |
| First Revision: | September 1982 |
| Second Revision: | September 1984 |
| Third Revision: | June 1985 (to be ratified) |
| UNDP Input: | 1,435,025 dollars |
| Revision P: | 2,927,212 dollars |
| Revision Q: | 3,045,311 dollars (to be ratified) |
| Executing Agency: | UNIDO |

## 2. PROJECT PERSONNEL

The Project Personnel have remained unchanged. The Project Administrator has resided in Dhaka since taking up post in March 1979, and will continue to do so for the duration of the Project. He has assisted the Director of the Technological Wing of BJRI to implement the activities of the Project, and has presented progress reports at six-monthly intervals, the latest report being dated October 1983.

The Jute Technologist has made one visit during 1983, commencing on 01 November and ending on 06 December. Including Preparatory Assistance, his visits to BJRI now total 20 months.

## 3. TRAINING FELLOWSHIPS

During 1983, 8 members of staff of BJRI have completed Training Fellowships abroad, and another member, whose Fellowship has already been extended from 6 to 18 months at the suggestion of his supervisor, has been recommended for a further extension of 18 months.

Three Fellows, who completed their training in June/July 1983, have not as yet (December 1983) returned to continue their work at BJRI.

Special mention must be made of one Fellowship, in which a member of staff has spent 12 months at Napier College of Commerce and Technology, Edinburgh, to be trained in the construction and use of an electronic irregularity measuring instrument for jute yarn. The design of the instrument is based on that of an earlier model containing thermionic valves, and the Fellow has been trained in the replacement of valve circuits by transistorised circuits, and in the maintenance of electronic instruments of this type. A prototype instrument is expected to arrive shortly in Dhaka for use at BJRI.

Although Napier College offers a variety of courses in electronics, these are intended for full time students studying for a degree, and none were suited to the needs of the Fellow. Accordingly, a special course was devised, providing in-depth theory and practical work necessary for an understanding of the instrument, but restricted to this. The arrangement has proved satisfactory, and could well serve as a model for future Training Fellowships.

The essential feature is to have an objective around which the training course can be built, taking account of the time available. The objective must be clearly defined, and if group training is required, the members of the group should all have similar backgrounds and be engaged in related work.

This method of "Training for Objectives" is particularly relevant at the present time as a further 42 man-months of Fellowships were allocated during 1983 and Government approval of the proposed Fellows put forward by BJRI is now awaited. A part of this allocation will be used to provide opportunity for specialised study of problem areas requiring the use of equipment not available in Bangladesh.

## 4. STUDY TOURS

Three Study Tours have been completed during 1983, and the project allocation of 15 man-months has now been fully taken up.

A Principal Scientific Officer from the Microbiology Department whose basic objective was to study the latest research developments in the fields of microbial degradation of lignin and pectin, visited appropriate institutions in Sweden and U.K. A detailed report of his activities during the 2-month tour, and including suggestions for promoting microbial activities within BJRI, was circulated in January 1983.

The Chief of the Chemistry, Biochemistry, and Microbiology Division visited U.S.A., U.K., Sweden, and India during a 2-month tour, accompanied by the Chief of the Physics and Testing Division. The tour was completed in June 1983, and a report has been submitted giving an account of institutions visited and persons met for discussion. Although it is evident that a wide variety of topics were discussed, it is not yet clear how the information obtained will be utilised at BJRI. The Chief, Physics and Testing, has not submitted a separate report.

It is interesting that whilst visiting the Southern Regional Research Centre, New Orleans, a study was made of the pore sizes and void volumes of jute fibre, using methods developed at the Centre, and a paper has been published comparing these values with those obtained for cotton.

## 5. TRIAL PRODUCTION FACILITIES

During 1983 a number of production machines, already budgeted for, have been delivered. A fabric mercerising machine and a 3-bowl calender await erection, to complete essential dyeing and finishing facilities. A sectional warping machine for making up special weavers' beams has been commissioned, as has a centrifugal spinning frame for the study of fine yarns which cannot be produced on the spinning systems commonly used in Bangladesh.

A further commitment for fine spinning, already budgeted for, is the provision of two drawing frames, one incorporating an auto-leveller. A contract has been placed for these machines, but delivery is not expected until mid-1984.

## 6. LABORATORY EQUIPMENT

The second phase in the provision of laboratory equipment, dealing with items which were less readily identified in the early stages of the Project, but the need for which has become apparent, is now well on the way to completion. Some 46 items were put out to contract in 1982, and of these only one item still remains to be delivered. Details will be found in the Project Administrator's Reports.

Certain items of equipment are now receiving such extensive use that they require to be duplicated if delays are to be avoided. For example, the dyeing and chemical finishing research work generates many samples for light fastness tests, and for strength retention assessment. These samples are passed to Physics and Testing for measurement, and have to await their turn for expert examination. It often happens, however, that a quick, preliminary assessment is all that is required, to show whether the sample has potential, or could be discarded, and in such cases it would be advantageous to have appropriate instruments duplicated and placed in the Dyeing and Finishing Division Laboratories.

A problem of a different kind has arisen in regard to measuring the breaking load of jute fabrics. Traditionally, this measurement has been made on constant-rate-of-traverse (C.R.T.) machines operating at 18 inches/minute, and this method is still used in the majority of jute mills. International standards for breaking loads of fabrics have, however, turned towards constant-rate-of-extension (C.R.E.) machines, and, in fact, the Central Testing Laboratories now being set up with UNDP/UNIDO assistance, have installed Instron C.R.E. equipment for this purpose.

BJRI does not have its own C.R.E. machine, although it has an Instron on loan from BJMC in connection with the certification programme for Australian wool-packs. For internal purposes, the BJRI C.R.T. machine is adequate, but it would be useful to provide the same C.R.E. facility as available at the Central Testing Laboratories. For jute fabrics, a basic C.R.E. machine is all that is required, and the various routines for application of load which are required for more extensible materials are not necessary. It may be noted that a C.R.T. machine operating at the reduced rate of traverse of 4½ inches/minute (a 4 to 1 reduction) gives results more similar to the standard C.R.E. values, and also reduces variability.

## 7. CONSULTANTS

No consultants were engaged for work at BJRI during 1983, but early 1984 should see considerable activity in several areas. Thus it is expected that consultants in chemical finishing and dyeing, in jute technology, in lignin chemistry, and in fabric design for export markets, will all visit the Institute, whilst a microbiologist experienced in large scale microbial technology is currently being recruited.

## 8. LIAISON WITH INDUSTRY

Relations between the manufacturers and BJRI have shown some improvement during 1983, largely as a result of the emergence of a private sector following the initial de-nationalisation of the Bangladesh Jute Manufacturing Corporation.

To further liaison with the industry, BJRI plans to set up co-ordinating committees with the private company Associations, in addition to that already operating with the BJMC, to discuss the type of assistance needed and how this can be provided by the Institute.

The Central Testing Laboratories now being established will also have to liaise with the manufacturing companies whose products are tested for export approval. It is most important that C.T.L. and BJRI coordinate their approach to the industry, so that maximum benefit will result.

## 9. PROGRESS REPORTS

Regular reporting of research results is a vital output of BJRI, and two volumes of reports have been issued during 1983. The Annual Technical Reports for the year 1982 were presented in February 1983, and the Half-Yearly Reports in November 1983. Technical comments on the work reported in the Half-Yearly volume have been prepared, and are given in a separate document. It is hoped that this document will have wide circulation amongst the research staff, as there is still room for improvement in the manner of presentation. It does not seem to be appreciated that results presented in a simple manner usually increase the value accorded to a piece of work.

As in previous years, the individual reports have been grouped together under a number of general objectives, rather than under Departments. This arrangement is now generally accepted as being advantageous in showing how much research effort is being applied in different directions, and also how work under the same heading is distributed amongst several departments.

The Annual Technical Reports, presented each January/February consist of three distinct sections. There is first a summary of the technical highlights of the past year, written by the Director in a simple, straightforward style which is easily read by scientist or layman. Second, is a collection of progress reports covering all the research projects, and written by the individual scientists. The inadequate presentation common to such progress reports makes it unlikely that many readers will work through these. Third, is a collection of reports written by project personnel and consultants.

In discussion with the Director and senior members of staff, a new format for publications has been proposed. The present summary of the past year's achievements should be expanded, but still maintaining the present readable style, and this should form the basis of an Annual Report. Reports by project personnel may be appended if desired.

Half-yearly progress reports should continue in their present form, but should be regarded as the inputs to a technical information bank for internal purposes. Over the years, they will form a valuable source of information on all the research projects, but should not be included in the Annual Report. Instead a new publication should be prepared, in which from time to time the progress of different projects should be summarised, and the implications of the work for industry clearly shown. Such a publication might appear monthly, and, for example, one of the 10 Research Objectives might be written up each month. The authors would have to be senior members of staff in a position to oversee work in different departments.

It is felt that the summary Annual Report, together with the monthly publication, would be more relevant to the heads of the manufacturing industry than the present system. Scientific papers would still be published in appropriate journals.

## 10. ANNUAL PROGRAMME OF RESEARCH

The annual production of a Programme of Research setting out the anticipated work of the Institute for the coming year is now well established. Individual research projects are grouped under a number of general objectives, irrespective of the Department in which a project will be carried out, and the range of work carried out within BJRI can be readily assessed.

The Programme is developing year by year, with increasing orientation towards projects leading to the development of improved jute products, and to the technical improvement of the manufacturing processes of jute spinning and weaving. There is still room for further development, however, and greater concentration of effort on fewer projects would be advantageous. But full development of the Programme will require closer collaboration with the manufacturing industry than exists at present.

## 11. TRIPARTITE MEETING

A tripartite meeting was held on 17 November 1983 to review the status of the Project, and to make such revisions of the Budget as may be thought necessary. The meeting was attended by representatives of the Bangladesh Government, UNDP, UNIDO, and BJRI, and after lengthy discussion, the following recommendations were made:

1. That the termination date of the Project be put back from September 1984 to June 1985, to allow sufficient time for the implementation of those inputs which are still outstanding, although budgeted for.

2. That the Project Administrator remain with the Project until the termination date.

3. That, as Government approval has already been obtained, the Training Fellowship of a member of BJRI staff who has been studying abroad for the past 18 months, should be extended for a further 18 months.

4. That an official UNDP/UNIDO Evaluation of the Project be made, and the evaluating team to submit their report not later than May 1984.

The minutes of the meeting have been circulated, and notification of the recommendations and the associated Budget revision is awaited.

It may be noted that as explained during the discussion, BJRI has in mind to make a more positive approach to manufacturing companies than hitherto, in order to render all possible technical assistance. It was pointed out that this is bound to involve a lot of travelling for the staff, so to assist in getting industrial visiting under way, UNDP/UNIDO offered to provide one or two vehicles for this purpose, and to offset outstanding travel expenses, for the time being.

12. STATUS OF THE PROJECT

As designed in 1977/78 the primary aim is "to develop the capability of BJRI, Technological Wing, 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".

The extent to which this aim has been realised may be assessed by considering the expected Outputs of the Project, as stated in Part II E of the Project Document, in relation to the Inputs which have been made.

Thus: Output 1 "An Annual Programme of Research striking a balance between short and long term projects suitably orientated towards industrial development, and within the capabilities of BJRI to implement".

An Annual Programme of Research is now presented each February, for the following 12 months. The individual projects are grouped under 10 broad headings, irrespective of the Departments. Further development of the Programme is still required, and should come about as a result of a joint effort between manufacturing industry and BJRI.

Output 2 "A series of Research Reports and other publications describing the results of the research work, and their implications for industry".

At present Progress Reports are produced Half-Yearly, during July/August, and December/January. Each project in the research programme is discussed, and the Dec/Jan volume is entitled Annual Technical Reports of BJRI and includes a summary of the year's achievements, written by the Director.

It is realised that some change in reporting is required, and in future it is hoped that the Half-Yearly Progress Reports will be filed as the input to a technical information bank, mainly for internal use. The Director's survey of the year's work, suitably expanded, will form the basis of an Annual Report for circulation to interested parties, and a third publication will survey in more detail the work carried out under each general objective in the Programme. This third, and new, publication could be published monthly, and be especially concerned to show the industrial implications of the work.

Output 3 "A nucleus of research staff with overseas training in different aspects of modern textile technology and other specializations". At the present time, 25 Training Fellowships have been completed, and there is a commitment for a further 8 or 9. By the end of the Project, a total of 33/34 members of staff will have received overseas training, extending over an estimated 285 man-months.

An allocation of 15 man-months was made for Study Tours, and this allocation has been fully taken up by 8 senior members of staff. Thus in total, over 40 members of staff have travelled overseas under the auspices of the Project, at a cost approaching 690,000 U.S. dollars. This is a substantial training input, which has generated considerable enthusiasm and a desire to make progress. It is important that this enthusiasm be properly channelled and not allowed to be lost.

In addition to overseas training, an input of short-term consultants for on-the-job training at the Institute is expected early in 1984. An allocation of 22 m/m is available for this purpose, of which 4 m/m has already been utilised.

Output 4 "Appropriate arrangements for technical communication with manufacturing industry, to expedite the transfer of technology from BJRI (Technological Wing) to production units".

It was a pre-requisite of this Project that the BJMC appoint a counterpart to the Director of BJRI (Technological Wing) to co-ordinate Institute and Industry. Although this was done the close collaboration which was expected to develop as a result, has not been achieved.

The situation within the jute industry, however, has changed from what it was at the commencement of the Project, in that a private sector now exists. The Institute has provided assistance to a number of private parties, and there appears to be an increasing interest in collaboration with BJRI.

The importance of this particular Output is now well appreciated by the senior management of BJRI, and plans are being made to develop the collaborative relationship with all sections of the industry, to a high degree. If these plans, which involve technical service, problem solving, lectures and seminars, and the setting up of a Coordinating Committee with representatives of both private and public sectors to discuss technical assistance from the Institute, can be brought into operation successfully during 1984, a big step forward will have been taken.

Output 5 "Laboratory and trial production facilities necessary for the implementation of the research programme".

Substantial inputs of machinery giving 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 15-20,000 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.

## 13. CONCLUSTIONS

It will be clear from the above discussion on Outputs of the Project, that, with the exception of collaboration with the industry, these have all been achieved to a considerable extent. There is no doubt that the Technological Wing of BJRI now has the capability to advance towards the main objective of assisting the manufacturing industry to maintain its competitive position in international markets. How to make full use of this capability is a matter for BJRI management, and, as has been pointed out before, the management of a large research institute presents many problems, but these must be dealt with satisfactorily if the investment made in the Institute is to be productive.