

Evaluation Case Competition, 1997

CASE FILE

This case is based on an evaluation report that has been edited for use as educational material. It is for discussion purposes only.

The National Capital Chapter of the Canadian Evaluation Society gratefully acknowledges assistance in the preparation of this case provided by the International Development Research Centre, the Canadian International Development Agency, the authors of the original report and officers of the Bharatiya Agro Industries Foundation.

MESSAGE

To: India Programs Liaison Team

From: Blair McNancy, Evaluations Coordinator

Date: March 28, 1992

Re: **BAIF Project**

Thanks for agreeing to help with our analysis of the evaluation of the IDRC-BAIF program. A draft of the consultants' report on the evaluation is enclosed for consideration. Recommendations are not included but should be delivered to us by April 7, by fax from Senegal where the lead consultant is engaged in another project.

It is essential that we have a clear position on the evaluation by April 9 when the CIDA-IDRC Liaison Committee next meets. By April 7 we should be completely familiar with the evaluation so that when we receive the lead consultant's recommendations we can quickly integrate them with our own. Note that CIDA is likewise preparing a position on the evaluation report.

As a first step, please prepare a 20-minute briefing on the program evaluation for presentation to senior management on Saturday March 29 in the afternoon, in room C 164. I expect that Benoit Gauthier, Nadia Laham and Robert Letellier will be there. They will have received the report but may not have had time to read it thoroughly. You should briefly outline the program, the issues as you see them, the consultants' findings and your preliminary recommendations. The managers will be especially interested in findings and recommendations on the program as a whole because they must convey an overview to the IDRC Program Development Committee on Monday March 31. However, you should also let them know your recommendations with respect to the individual research projects that CIDA and IDRC are supporting and any ideas you may have for a general framework for planning a portfolio of projects.

I understand that all of your group will be attending the Bombay Conference next week and, as discussed, will meet afterwards with the Indian members of the evaluation team to obtain their views on the report. By way of introduction to them I have enclosed photocopies of some snapshots taken while the Canadian consultants were in India. Our travel bureau has booked rooms for you at the Hotel Gandhi in Pune for Thursday night (April 3) guaranteed against late arrival. They have also booked a meeting room in the hotel (Bagheera Room) for 10:00 am to 4:00 pm on Friday. Please make your own arrangements for travel from Bombay to Pune and back.

Thanks very much for agreeing to examine the evaluation report on such short notice. I look forward to seeing you after your presentation, before you leave for India.

International Development Research Centre

D R A F T

**REPORT
OF THE
FOURTH YEAR EVALUATION
OF THE
IDRC / CIDA CO-FINANCED
BAIF RESEARCH FOUNDATION RURAL RESEARCH PROJECT**

PROJECT NO. 468/15018

PREPARED BY JAMES BUCKNALL AND MARCEL ZOLLINGER

FOR CIDA, IDRC AND BAIF

BASED ON MATERIALS PREPARED BY

MRS SRINIVASAN, DR SONI, DR TAKWALE, AND MR SINHA

March 26,1992

ACRONYMS AND ABBREVIATIONS

| | |
|------|---|
| AI | Artificial Insemination |
| BAIF | Bharatiya Agro Industries Foundation |
| BAM | Bamboo |
| BIRC | BAIF Information Resource Centre |
| BIS | BAIF Institutional Support Program |
| BMTC | BAIF Management Training Centre |
| CBR | Community Based Research |
| CC | Communication Cell |
| CCF | Cheap Cattle Feed |
| CIDA | Canadian International Development Agency |
| EDP | Electronic Data Processing |
| FST | Frozen Semen Technology |
| GIS | Geographic Information Systems |
| IDRC | International Development Research Centre |
| IPL | Indian Potash Limited |
| IRC | Information Resource Centre |
| LAN | Local Area Network |
| LIS | Library & Information Services |
| MRK | Marek's Disease |
| MP | Management Plan |
| MUSH | Mushrooms |
| MYCO | Mycorrhizza |
| PAM | Project Approval Memorandum |
| PIM | Project Identification Memorandum |
| PPS | Post Production Systems |
| RPI | Rural Polytechnic Institute |
| RS | Rupees |
| SERI | Sericulture |
| SSC | Social Science Cell |

1.0 INTRODUCTION

1.1 PURPOSE OF EVALUATION

Under the agreements between CIDA, IDRC and BAIF, an independent evaluation of the activities financed under these agreements would be carried out during the fourth year of the project. For BAIF, the evaluation will build on, and extend, its own project monitoring and evaluation activities, drawing on research and other available data, and provide guidance in documenting and refining its programs. For CIDA and IDRC, the evaluation will indicate what effects their support has had on BAIF, if and how the delivery of the support could be improved, and the anticipated benefits of further phases of funding.

The scope of the evaluation is based on the overall goal of the project, to strengthen BAIF's capacity to improve the standard of living and the quality of life of rural communities, focusing on scheduled tribes, scheduled castes, women and other underprivileged groups. The project seeks to do this by reinforcing BAIF's program for development research, thereby strengthening its field programs for integrated rural development.

1.2 METHODOLOGY

The evaluation was divided into three distinct Phases: Phase 1 was the preparatory work in Ottawa prior to going to India (October 21 - November 8); Phase 2 was the mission to BAIF to conduct the field work (November 11 - November 30); and Phase 3 was the analysis of data and information collected in phases 1 and 2, and the preparation of the report back in Ottawa.

The evaluation process began in Ottawa with interviews of persons in IDRC, CIDA and BAIF, and the reading of the documentation made available by CIDA and IDRC. This stage culminated in the preparation and approval of the evaluation workplan

In order to generate the desired evaluation results, the terms of reference foresaw two distinct levels of involvement by the evaluators. On one hand there was the Team Leader and the Rural Development Specialist, who were to take a general view of the

overall project. To assist them, four Indian members were to join the team, who were charged with an in-depth look at particular projects or aspects.

Phase 2 of the evaluation may also be divided into three distinct parts. First, the evaluation team as a group was provided with a six-day tour by BAIF. The tour route is shown in the following map. During the second week, the six individual evaluation team members conducted the data gathering for their individual mission reports. The third and final week in India was spent preparing mission reports and conducting a series of debriefings of BAIF, IDRC and CIDA in Pune and New Delhi. This series of debriefings of the three principal partners in the project in three different venues was an invaluable process of testing the preliminary evaluation findings, and generating important feedback to the evaluation team before the main evaluation report was drafted.

In the field, the six person team was in a sense divided up into two groups. The Rural Development Group consisted of the Rural Development Specialist, the WID Specialist and the Livestock Expert. The Management group then was composed of the Team Leader, the Information Expert and the Training Specialist.

1.3 BACKGROUND AND PHILOSOPHY OF BAIF

The BAIF Development Research Foundation is a large, non-governmental rural development agency in India. It generates applied research and agricultural technologies, and transfers them to poor rural communities. The organization was founded in 1967, has grown steadily over the years, and now operates four major programs:

1. cattle development;
2. animal health;
3. socio-economic rehabilitation of tribal people; and
4. afforestation and wasteland development.

map

BAIF has a distinct operational philosophy, as is shown from the following two quotes from BAIF materials.

DEVELOPMENT WITHOUT RESEARCH IS OUTDATED

RESEARCH WITHOUT DEVELOPMENT IS IRRELEVANT

(BAIF Principle as stated in one of the Briefing Presentations)

Mission Statement of BAIF

BAIF is committed to provide instruments of gainful self-employment to the deprived strata of the rural population, through the intervention of relevant scientific and technological advances.

This objective is achieved through the selection, optimal use and adaptation of appropriate technologies to local needs, through extension (delivery) to operational areas, through innovative

management practices, and a blend of Social Leadership with Technical and Managerial Expertise.

2.0 MANAGEMENT, ADMINISTRATION AND MONITORING

2.1 ORGANIZATION

2.1.1 IDRC-BIS Program Organization Chart

The organization chart shows that there are 113 people in BAIF, who are directly associated with the IDRC-BIS Program: 105 are paid directly through the program and eight through other sources of funding. Mr. Sohani is the Research Program Organiser. He reports to, and is a member of, the President's Council, which is the senior decision making body of BAIF. The senior researcher or project team leader of each of the twelve programs report directly to Mr. Sohani, although six of the senior researchers report administratively to their respective research station managers. Of the 105 personnel financed directly through the IDRC-BIS Program, 38 are classified by BAIF as researchers, 39 as technicians, and the remaining 28 are classified by BAIF as support staff.

2.1.2 IDRC-BIS Program Personnel

A second important ingredient to the efficient and effective running of an organization is the quality of the staff and their morale. We felt that it was especially important to evaluate this aspect of the program because staff hiring for the program seems to have been an issue between IDRC and BAIF in the early phases of the program. Table 2.1 was developed by Mr. Sohani and Dr. Bucknall by taking a list of personnel in the program, reviewing their level of education, assigning each person's level to the equivalent of a western Ph.D, Masters or Bachelors degree, and then tabulating the results.

Table 2.1 shows the number of staff in each project and their level of education. Of the 113 people associated with the IDRC-BIS Program, 11 have Ph.Ds or equivalent, 22 have a Masters degree or equivalent, and 44 have a Bachelors degree.

We would like to point out that the symmetry of the ratio of Ph.Ds, Masters and Bachelors of 1:2:4 is quite striking to a layman in scientific research, but appears to have considerable logic to it.

ORG CHART

TABLE 2.1 IDRC-BIS PROGRAM PERSONNEL EDUCATION LEVELS

| Project | Ph.D or Equivalent | M.Sc or Equivalent | B.Sc or Equivalent | Diploma | Other | Total |
|------------------|--------------------|--------------------|--------------------|-----------|-----------|------------|
| IRC | 2 | 4 | 8 | 0 | 1 | 15 |
| CBR | 2 | 6 | 14 | 10 | 3 | 35 |
| FST | 0 | 0 | 1 | 0 | 3 | 4 |
| RPI | 0 | 2 | 2 | 0 | 0 | 4 |
| MYCO | 1 | 1 | 0 | 0 | 1 | 3 |
| MUSH | 1 | 1 | 0 | 0 | 0 | 2 |
| CCF | 0 | 1 | 4 | 0 | 5 | 10 |
| SERI | 0 | 0 | 1 | 0 | 3 | 4 |
| PPS | 0 | 0 | 1 | 0 | 0 | 1 |
| BAM | 0 | 2 | 8 | 2 | 5 | 17 |
| BMTC | 0 | 0 | 0 | 0 | 0 | 0 |
| MRK | 0 | 0 | 0 | 0 | 0 | 0 |
| ADMIN | 0 | 3 | 4 | 0 | 3 | 10 |
| Associated Staff | 5 | 2 | 1 | 0 | 0 | 8 |
| TOTAL | 11 | 22 | 44 | 12 | 24 | 113 |

One area we can comment on with confidence is the level of morale in the program. Between the six evaluation team members, we spoke to a large proportion of the personnel in the IDRC-BAIF program. We have concluded unanimously, based on these interviews and general observations, that the morale in the program is high and that this is a significant factor in the smooth running of the program.

2.3 DEVELOPMENT AND APPROVAL OF ANNUAL WORKPLAN

The process for developing the annual workplan and budget starts in October when a memo is sent from the central office in Pune to each of the individual project team leaders, requesting a draft workplan and budget. Each project team leader then prepares a draft workplan and budget for their project which is sent to Mr. Sohani in the central office.

Around the middle of November, Mr. Sohani meets with each of the project team leaders on an individual basis. The project team leaders then re-work the draft workplan

and budget and re-submit it to central office where the draft is finalized. Annual technical reports are produced for each of the projects as a parallel exercise. The draft workplan and budget, plus the technical report, are then forwarded to IDRC, New Delhi, which is responsible for the physical production of the workplan, and its distribution to each of the IDRC Program Officers.

The draft workplan and budget, plus the technical reports, are reviewed at the annual Liaison Committee meeting held each January in Pune. Attendees at the Liaison Committee meetings include the BAIF project team leaders, IDRC program officers and staff of the IDRC, New Delhi office. CIDA does not seem to have participated in these meetings.

Following the Liaison Committee meeting, BAIF modifies the workplan and budget, if necessary, and once again forwards it to IDRC, New Delhi. IDRC, New Delhi in turn forwards it to IDRC, Ottawa. The IDRC Interdivisional Director's Committee reviews the draft workplan and budget in Ottawa. Once reviewed and approved, the draft workplan and budget becomes the official workplan and budget for the coming year. CIDA does not participate in the Interdivisional Director's Committee.

In addition to reviewing the **process** for developing the annual workplan and budget, we also reviewed the last two annual workplans and budgets. With minor exceptions, such as individual work activities in one section of an individual project workplan not corresponding to the schedule of activities in the same project, these are professional documents and provide a valuable tool for managing the individual projects.

2.4 ADMINISTRATION AND MANAGEMENT IN BAIF

The IDRC-BAIF program does not operate in isolation. It is an integral part of BAIF and draws heavily on common services provided by BAIF. It follows, therefore, that if these central services are provided efficiently and effectively, they will reflect positively of the efficiency and effectiveness of the IDRC-BAIF program.

2.4.1 Procurement

The standard operating procedure for purchasing equipment in BAIF and in the IDRC-BIS Program is to complete and have approved a form entitled **Proposal for Approval of Capital/Major Expenditure**. This form identifies the project, the cost, details of

expenditure, justification, recurring costs and alternatives. The form is submitted by the project team leader, certified that it is within budget by the Finance Coordinator, recommended by the Research Program Organiser, and approved by the President's Council. Purchasing in India follows normal BAIF purchasing procedures, i.e., a purchase order is written up, quotes sought etc. Copies of all documents are forwarded to the finance division and the responsible project team leader. Purchasing through IDRC involves forwarding the internally approved request to IDRC which then follows its normal purchasing procedures.

2.4.2 Finance Reporting, Accounting and Auditing

The BAIF-administered portion of the IDRC-BAIF program is over \$4 million dollars. It is imperative that these expenditures be tracked properly both for accounting purposes and for management information systems. Timely and accurate financial reporting is essential to the efficient and effective management of any project. The accounting for the IDRC-BAIF program is done by BAIF's centralized accounting cell. There is no separate accounting department for the IDRC-BAIF project. Financial reporting to IDRC is provided through the central accounting department.

The IDRC-BIS program set of accounts in Pune were reviewed. They meet professional standards. Several tests were conducted to confirm the financial data upon which the quarterly financial reports to IDRC are based. The Finance Coordinator was able to answer all questions in a completely satisfactory manner.

2.5 MANAGEMENT AND MONITORING OF IDRC-BIS PROGRAM

The IDRC-BAIF program consists of a cooperative partnership of three institutions: BAIF, IDRC and CIDA. Each of these three institutions have different roles in the management and monitoring of the IDRC-BAIF program. The role of each of the three institutions is reviewed and assessed in this section.

2.5.1 BAIF

BAIF is responsible for the management of the BAIF-administered funds. The process for deciding how these funds will be spent is through the annual workplan and budget described in Section 2.3. The workplan and financial reporting will be evaluated separately.

The annual workplan and budget provides a good statement of what each individual project will do in the coming year, the schedule for completing each of the various tasks, and the budget available for each individual project. The annual workplan and budget is thus a good management tool.

In addition to progress reports coming from the project team leaders to the central office on a monthly or quarterly basis, the central office provides each of the project team leaders with a monthly financial statement about 21 days after the end of each month. A facsimile of one of these financial reports is reproduced below.

TABLE 2.2
IRC - COMPARATIVE STATEMENT OF EXPENDITURE AND BUDGET FOR JULY 1990 (IN RUPEES)

| Account Head | Expense for July-1990 | Total Exp. for 90-91 | Sanction for 90-91 | Unspent for 90-91 |
|-----------------------|-----------------------|----------------------|--------------------|-------------------|
| Salaries | 30,921 | 129,654 | 424,800 | 295,146 |
| Travel | 4,222 | 15,627 | 53,000 | 37,373 |
| Capital Equipment | 93,466 | 285,045 | 333,000 | 47,955 |
| Training | 400 | 8,260 | 51,000 | 42,739 |
| Research Expenses | 8,029 | 58,962 | 367,200 | 308,238 |
| Consultancy | 247 | 247 | 26,000 | 25,753 |
| Reports/Documents | 0 | 1,992 | 69,000 | 67,008 |
| Infrastructure | 1,815 | 6,073 | 25,000 | 18,927 |
| Books and Periodicals | 57,317 | 61,635 | 102,000 | 40,364 |
| Admin. Overhead | 0 | 0 | 109,300 | 109,300 |
| Total | 196,419 | 567,496 | 1,560,300 | 992,803 |

It is a credit to the progress made in the IDRC-BIS Program in general, and the EDP group in particular, that these financial reports can be produced in such a timely fashion.

2.5.2 IDRC

The role of IDRC in the monitoring of this program can be divided into two components: (a) technical monitoring and (b) financial monitoring.

2.5.2.1 Technical Monitoring

Technical monitoring of the twelve individual projects by IDRC is done by the Program Officers, usually through a visit to Pune at the time of the annual Liaison Committee meeting. We had hoped that the field reports of the Program Officers would provide us with source of information of the impact of the program on institution building. However, a careful review of the files in Ottawa and New Delhi produced a combined list of Program Officer visits to BAIF since project inception, which was a sub-set of the list kept by BAIF of IDRC visits. Furthermore, we were unable to locate mission reports for some Program Officers who had visited BAIF over the years. We tried to overcome this lack of information by sending a telex to each of the Program Officers, but we did not get a positive response to this request. Thus a potential source of information for this external evaluation plus periodic IDRC internal evaluations that should be conducted on big programs such as this is not as useful as it might have been.

The Program Officers each monitor their individual projects and their role is briefly discussed in Chapter 6. However, to the best of our knowledge, no one does a technical monitoring of the **program** as a whole. Such **program** technical monitoring could detect trends, extract lessons learned, determine the extent and under what conditions the IDRC-BAIF program might be replicable elsewhere in the world, etc..

2.5.2.2 Financial Monitoring

Financial monitoring will be reviewed and assessed at two levels: (a) at the **project** level and (b) at the **program** level.

At the individual **project** level, the process of monitoring starts with the preparation of the annual budget. BAIF monitors monthly expenditures against annual budgets, and produces a quarterly financial report which is sent to IDRC, New Delhi. This quarterly financial report consists of a report on actual expenses, committed expenses, and actual and committed expenses by individual contribution agreement line item and by BAIF project. At the end of the year, BAIF produces an overall financial statement in

Rupees with variance calculations, again by program line item and by individual project. These reports are forwarded to IDRC, Ottawa, which inputs the data into its computer and produces its own financial reports, largely in the form of detailed computer printouts, entitled BAIF-Institutional Support, Project Financial Analysis.

In summary, what IDRC senior officers have available to them for financial monitoring is a detailed accounting of BAIF-administered funds by project and expenditure category in Rupees, a detailed accounting of all IDRC-administered funds, and a summary of total program expenditures. What is missing is an integration of the BAIF-administered funds with the IDRC-administered funds in Dollars on a multi-year basis, with an analysis for management.

Proper financial monitoring and reporting by IDRC is extremely important to CIDA. CIDA must have a clear picture of the financial status of the program in order to (a) perform its own financial monitoring, (b) be able to respond knowledgeably to requests from IDRC for major shifts in expenditures of funds from one budget line item to another, and (c) know expected annual and total cash flow of the program so that it can manage the finances of its overall program in India.

2.5.3 CIDA

CIDA's role in the management and monitoring of this project has been as prescribed in the CIDA management plan with the exception that it does not attend the annual Liaison Committee meeting in Pune where the first round of decisions are made regarding the forthcoming year's workplan and budget. CIDA also does not attend the annual IDRC Interdivisional Director's Committee meeting in Ottawa, where the annual workplan and budget is approved, and no provision for its attendance was included in the original planning documents and agreements.

3.0 FINANCIAL MANAGEMENT AND ANALYSIS

3.1 INTRODUCTION

We saw in Chapter 2 that financial information on the program was not in a form that would have helped IDRC and CIDA consider what might be done with surplus funds that were emerging by the end of year 2 of the program. Nor was this information immediately available in an easily understandable form when the decision was taken to fund the BAIF Management Training Centre. This information was still not available at the beginning of this evaluation. We therefore had to undertake this analysis ourselves: partly so that we could understand what money had been spent on what projects, on what budget line items and when, partly to provide CIDA with a clear financial picture, and partly to suggest how program financial data might be presented in future, especially if there is a phase 2.

3.2 SOURCES OF FUNDING AND ORIGINAL BUDGET

TABLE A: BUDGET SUMMARY

| Item | CIDA Contribution | IDRC Contribution | Total Budget |
|---------------------------------|-------------------|-------------------|--------------|
| BAIF Administered Funds | | | |
| Development Research Activities | \$1,459,700 | \$785,900 | \$2,245,600 |
| Infrastructure | 589,600 | 317,400 | 907,000 |
| Capital Equipment | 900,200 | 484,600 | 1,384,800 |
| IDRC Administered Funds | | | |
| Technical Assistance | 227,100 | 122,300 | 349,400 |
| Capital Equipment | 199,700 | 90,300 | 290,000 |
| Inflation | 457,600 | 0 | 457,600 |
| Contingency | 230,000 | 54,500 | 284,500 |
| Total | \$4,063,900 | \$1,855,000 | \$5,918,900 |

There are three sources of funding for the IDRC-BAIF project: CIDA, IDRC and BAIF. The contributions of CIDA and IDRC are shown in Table A. CIDA is contributing up to a maximum of \$4,603,900, and IDRC is contributing up to a maximum of \$1,855,000, i.e., CIDA is providing 69% of the Canadian contribution.

Table 1 shows the original budget of the IDRC-BIS Program as per the BAIF/IDRC Memorandum of Grant Conditions. The budget was divided into those funds which would be administered by BAIF and those which would be administered by IDRC. The budget for BAIF was \$4,537,378 and the budget for IDRC was \$366,600. The total budget was \$4,903,978. We are told by IDRC's financial group that, while not shown in the agreement signed by BAIF and IDRC, a sum of \$272,800 had been reserved for IDRC project monitoring. If this sum is added to the budget, as it is in Table 1, the IDRC administered funds increase to \$639,400, and the total budget increases to \$5,176,778.

The original budget forecast that annual expenditures would be higher in the early years of the program than in the later years. This was primarily because investment items such as infrastructure and capital equipment were expected to be much higher in the first two years than in the last two years of the program. As will be shown, actual annual expenses in the last two years of the program are expected to be much higher than actual annual expenditures in the first three years of the program. This is almost entirely explained by large new infrastructure expenses in year four and five, which were not in the original budget.

TABLE 1: CANADIAN CONTRIBUTION TO IDRC-BIS PROGRAM - ORIGINAL BUDGET

| Item | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Total |
|--------------------------------|--------------------|--------------------|--------------------|------------------|------------------|--------------------|
| BAIF Administered Funds | | | | | | |
| Salaries | \$117,030 | \$182,790 | \$215,171 | \$213,272 | \$223,166 | \$951,429 |
| Research Supplies | \$88,147 | \$208,675 | \$233,260 | \$173,596 | \$179,192 | \$882,870 |
| Consultants | \$9,994 | \$4,997 | \$2,499 | \$0 | \$0 | \$17,490 |
| Report Preparation | \$4,697 | \$2,099 | \$13,092 | \$6,596 | \$16,790 | \$43,274 |
| Support Services | \$0 | \$0 | \$0 | \$9,994 | \$0 | \$9,994 |
| Training | \$5,497 | \$8,995 | \$19,188 | \$18,389 | \$18,489 | \$70,558 |
| Travel | \$18,789 | \$19,788 | \$18,789 | \$14,491 | \$12,493 | \$84,349 |
| Books & Periodicals | \$10,993 | \$31,981 | \$8,995 | \$9,694 | \$8,495 | \$70,158 |
| Administrative Overhead | \$0 | \$0 | \$0 | \$0 | \$0 | \$0 |
| Infrastructure | \$572,656 | \$183,890 | \$111,933 | \$35,479 | \$2,998 | \$906,956 |
| Capital Equipment | \$364,981 | \$429,742 | \$315,811 | \$254,347 | \$19,988 | \$1,384,869 |
| Unallocated Reserve | \$23,086 | \$23,086 | \$23,086 | \$23,086 | \$23,086 | \$115,431 |
| Sub Total | \$1,215,870 | \$1,096,042 | \$961,823 | \$758,945 | \$504,697 | \$4,537,377 |
| IDRC Administered Funds | | | | | | |
| IDRC Project Monitoring | \$60,000 | \$51,100 | \$52,300 | \$53,700 | \$55,700 | \$272,800 |
| Capital Equipment | \$0 | \$130,000 | \$100,000 | \$0 | \$50,000 | \$280,000 |
| International Travel | \$3,700 | \$0 | \$3,700 | \$0 | \$0 | \$7,400 |
| Workshops & Training | \$13,400 | \$4,900 | \$0 | \$0 | \$0 | \$18,300 |
| Consultants | \$22,900 | \$9,000 | \$29,000 | \$0 | \$0 | \$60,900 |
| Sub Total | \$100,000 | \$195,000 | \$185,000 | \$53,700 | \$105,700 | \$639,400 |
| Total | \$1,315,870 | \$1,291,042 | \$1,146,823 | \$812,645 | \$610,397 | \$5,176,778 |

TABLE 2 CANADIAN CONTRIBUTION TO IDRC-BIS PROGRAM - BUDGET LINE

| Item | Project Budget | Expense Year 1 | Expense Year 2 | Expense Year 3 | Expense Year 1-3 | Unspent |
|--------------------------------|----------------|----------------|----------------|----------------|------------------|-----------|
| BAIF Administered Funds | | | | | | |
| Salaries | \$1,002,092 | \$114,916 | \$167,672 | \$212,733 | \$495,321 | \$506,771 |
| Research Supplies | \$754,392 | \$60,682 | \$120,846 | \$159,975 | \$341,503 | \$412,889 |
| Consultants | \$13,441 | \$471 | \$1,785 | \$1,743 | \$3,999 | \$9,442 |

| | | | | | | |
|--------------------------------|--------------------|------------------|------------------|------------------|--------------------|--------------------|
| Report Preparation | \$48,995 | \$2,922 | \$4,678 | \$4,936 | \$12,536 | \$36,459 |
| Training | \$92,888 | \$8,995 | \$6,547 | \$12,329 | \$27,871 | \$65,017 |
| Travel | \$87,332 | \$10,693 | \$20,379 | \$28,509 | \$59,581 | \$27,751 |
| Books & Periodicals | \$69,979 | \$13,171 | \$16,199 | \$12,379 | \$41,749 | \$28,230 |
| Administrative Overhead | \$90,759 | \$21,185 | \$33,811 | \$43,261 | \$98,257 | (\$7,498) |
| Infrastructure | \$1,073,929 | \$485,779 | \$159,513 | \$69,519 | \$714,811 | \$359,118 |
| Capital Equipment | \$1,103,068 | \$207,659 | \$159,041 | \$109,402 | \$476,102 | \$626,966 |
| Unallocated Reserve | \$105,634 | \$0 | \$0 | \$0 | \$0 | \$105,634 |
| Sub Total | \$4,442,509 | \$926,473 | \$690,471 | \$654,786 | \$2,271,730 | \$2,170,779 |
| IDRC Administered Funds | | | | | | |
| IDRC Project Monitoring | \$272,800 | \$0 | \$19,442 | \$28,326 | \$47,768 | \$225,032 |
| Capital Equipment | \$377,817 | \$33,875 | \$151,720 | \$2,291 | \$187,886 | \$189,931 |
| International Travel | \$36,265 | \$0 | \$8,042 | \$1,980 | \$10,022 | \$26,243 |
| Workshops & Training | \$24,716 | \$169 | \$7,103 | \$11,066 | \$18,338 | \$6,378 |
| Consultants | \$22,693 | \$0 | \$38,520 | \$11,186 | \$49,706 | (\$27,013) |
| Sub Total | \$734,291 | \$34,044 | \$224,827 | \$54,849 | \$313,720 | \$420,571 |
| Total | \$5,176,800 | \$960,517 | \$915,298 | \$709,635 | \$2,585,450 | \$2,591,350 |

3.3 EXPENDITURE BY BUDGET ITEM AND BY YEAR

Table 2 (preceding page) shows the total Canadian contribution to the IDRC-BIS Program over the first three years of program activities. An analysis of Table 1 and a comparison of Table 1 and Table 2 leads to a number of conclusions.

The column *Project Budget* in Table 2 is derived from IDRC's computer printouts, entitled BAIF-Institutional Support, Project Financial Analysis. There are a number of differences between this project budget and the original project budget contained in the BAIF / IDRC Memorandum of Grant Conditions (see Total column, Table 1) . These differences are highlighted in Table 3. For example, the total BAIF administered funds are reduced by \$94,469 whereas the IDRC administered funds are increased by \$94,891. Furthermore, BAIF administered research supplies and capital equipment were reduced by \$128,478 and \$281,801 respectively, whereas the sum for infrastructure was increased by \$166,973.

Actual annual expenditures were between \$300,000 and \$450,000 below budgeted expenditures in each of the first three years of the program. At the end of the first three years actual expenses were \$1,168,285 under budget: budgeted expenditures were \$3,753,735, whereas actual expenditures were \$2,585,450. As will be shown later, under budget expenditures in years 1-3 are counterbalanced by forecast over budget expenditures in years 4 and 5. If the data presented in Tables 1 and 2, with a proper analysis of variance, had been available to people responsible for the program at the end of year 2, a study could have been initiated to determine the most appropriate use of the "excess" funds in years 4 and 5.

Table 4 shows that BAIF's financial contribution to the IDRC-BIS Program was the equivalent of \$465,999 during the first three years of the program. This contribution was towards salaries, training, research, equipment, reports, travel and infrastructure.

Based on evidence presented in Chapter 2 and this section, we conclude that financial monitoring of individual **projects** by BAIF and IDRC was satisfactory, but that financial data and analysis for the **program** as a whole was not available in a usable form.

TABLE 3: COMPARISON OF ORIGINAL AND REVISED BUDGET

| Item | Original Project Budget | IDRC Project Budget | Difference Between Budgets |
|--------------------------------|-------------------------|---------------------|----------------------------|
| BAIF Administered Funds | | | |
| Salaries | \$951,429 | \$1,002,092 | \$50,663 |
| Research Supplies | \$882,870 | \$754,392 | (\$128,478) |
| Consultants | \$17,490 | \$13,441 | (\$4,049) |
| Report Preparation | \$43,274 | \$48,995 | \$5,721 |
| Training | \$70,558 | \$92,888 | \$22,330 |
| Travel | \$84,349 | \$87,332 | \$2,983 |
| Books & Periodicals | \$70,158 | \$69,979 | (\$179) |
| Administrative Overhead | \$0 | \$90,759 | \$90,759 |
| Infrastructure | \$906,956 | \$1,073,929 | \$166,973 |
| Capital Equipment | \$1,384,869 | \$1,103,068 | (\$281,801) |
| Unallocated Reserve | \$125,425 | \$105,634 | (\$19,791) |
| Sub Total | \$4,537,378 | \$4,442,509 | (\$94,869) |
| IDRC Administered Funds | | | |
| IDRC Project Monitoring | \$272,800 | \$272,800 | \$0 |
| Capital Equipment | \$280,000 | \$377,817 | \$97,817 |
| International Travel | \$7,400 | \$36,265 | \$28,865 |
| Workshops & Training | \$18,300 | \$24,716 | \$6,416 |
| Consultants | \$60,900 | \$22,693 | (\$38,207) |
| Sub Total | \$639,400 | \$734,291 | \$94,891 |
| Total | \$5,176,778 | \$5,176,800 | \$22 |

TABLE 4: BAIF CONTRIBUTION TO IDRC-BIS PROGRAM

| Item | Year 1 1988/89 | Year 2 1989/90 | Year 3 1990/91 | Total Year 1-3 |
|----------------|-------------------|-------------------|-------------------|-------------------|
| Salaries | \$36,790 | \$25,196 | \$30,298 | \$92,284 |
| Training | \$11,620 | \$6,829 | \$25,630 | \$44,080 |
| Research | \$45,549 | \$31,593 | \$54,738 | \$131,880 |
| Equipment | \$50,138 | \$8,895 | \$97,137 | \$156,170 |
| Reports | \$0 | \$0 | \$925 | \$925 |
| Travel | \$2,046 | \$1,751 | \$380 | \$4,177 |
| Infrastructure | \$0 | \$33,883 | \$2,599 | \$36,483 |

| | | | | |
|-------|-----------|-----------|-----------|-----------|
| Total | \$146,143 | \$108,148 | \$211,708 | \$465,999 |
|-------|-----------|-----------|-----------|-----------|

3.4 EXPENDITURE BY PROJECT BY YEAR

Table 5 shows the expenditures on each of the twelve projects in the IDRC-BIS Program for each of the first three years of the program. The Information Resource Centre and the Community Based Research were by far the largest projects during the first three years. They accounted for expenditures of \$729,356 and \$699,542 respectively, out of a total expenditure of \$2,271,732 during the first three years of the program. The principal reason for these large proportions were the purchase of the Pradeep Chambers building in the case of the IRC and expenditures on salary and research supplies in the case of CBR. While both of these projects will continue to incur large expenses in the fourth year, by far the largest project in the fourth year will be the BAIF Management Training Centre, because of the large investment in building the Centre. This expense will continue into year five.

**TABLE 5: CANADIAN
CONTRIBUTION TO
IDRC-BIS PROGRAM -
BY PROJECT**

| Project | Year 1 | Year 2 | Year 3 | Total Year 1-3 | Budget Year 4 | Total |
|---------------------|------------------|------------------|------------------|--------------------|------------------|--------------------|
| Resource Centre | \$498,295 | \$107,603 | \$123,458 | \$729,356 | \$105,142 | \$834,498 |
| Community Research | \$213,481 | \$270,457 | \$215,604 | \$699,542 | \$139,109 | \$838,651 |
| Frozen Semen | \$13,162 | \$25,588 | \$41,804 | \$80,554 | \$26,246 | \$106,800 |
| Rural Polytechnic | \$0 | \$28,379 | \$17,942 | \$46,321 | \$84,076 | \$130,397 |
| Mycorrhiza | \$113,834 | \$94,228 | \$36,969 | \$245,031 | \$18,738 | \$263,769 |
| Micro-carrier | \$0 | \$14,193 | \$15,666 | \$29,859 | \$8,729 | \$38,588 |
| Mushrooms | \$0 | \$0 | \$4,464 | \$4,464 | \$13,471 | \$17,935 |
| Cattle Feeding | \$82,527 | \$66,441 | \$35,223 | \$184,191 | \$19,702 | \$203,893 |
| Sericulture | \$0 | \$26,443 | \$72,576 | \$99,019 | \$40,388 | \$139,407 |
| Post-production | \$5,175 | \$57,139 | \$39,127 | \$101,441 | \$21,835 | \$123,276 |
| Bamboo | \$0 | \$0 | \$51,954 | \$51,954 | \$48,828 | \$100,782 |
| Management Training | \$0 | \$0 | \$0 | \$0 | \$405,574 | \$405,574 |
| Total | \$926,474 | \$690,471 | \$654,787 | \$2,271,732 | \$931,838 | \$3,203,570 |

4.0 OVERVIEW OF THE IDRC-FUNDED PROJECTS

4.1 THE EVALUATION MANDATE

The Livestock Expert on the evaluation team was specifically charged to give a detailed opinion on the scientific aspects of three distinct projects in his area of expertise. These three projects are therefore covered by him in considerable detail, and act as sampling of the scientific achievements of the overall capability of BAIF. All the remaining projects were covered by the Rural Development Specialist. Given his generalist background and interest, the same level of scientific evaluation was neither possible nor desired. Instead the approach taken on the basis of the Terms of Reference was to cover only the broader aspects. Thus each of the remaining projects was evaluated with particular emphasis on the present or potential impact on the recipient population. Any judgements made are therefore based on these considerations, and not on the learned judgement by an expert in that specific field.

4.2 THE INDIVIDUAL PROJECTS

The individual projects are here described as to their goal, their achievements, their problems, and their fit into the activities of BAIF.

4.2.1 Frozen Semen Technology for Buffaloes

BAIF has been associated with crossbreeding cattle for the last twenty years, and has been able to create substantial income for a large number of farmers through this technology. But until recently it had not been involved in any buffalo development work. A large number of small farmers and landless labourers raise one or two buffaloes for milk production, and are able to supplement their income by the sale of this milk. These farmers had to depend on local non-descript bulls of low genetic potential for the service of their female buffaloes. BAIF was thus frequently approached by farmers with the request to also provide an artificial insemination service for their buffaloes. It was therefore decided that in order to meet the needs of the rural poor, buffaloes could not be left out. BAIF scientists

however knew that the freezing and preservation of buffalo semen was much more difficult than that process is for cattle, and made a request for IDRC support in order to establish a functional frozen semen technology.

The project has made excellent progress during the period from 1988 to 1991. The technology of freezing buffalo semen has been upgraded to a level that it now can be used in field testing, and with limited further work can soon be made available by BAIF on a larger scale for the development of buffaloes. The scientists have made excellent progress in evolving a technology for deep freezing of buffalo semen showing significantly improved conception rates. A two-step dilution at 5 degrees celsius produced superior frozen semen, compared to the conventional single step dilution. It was also found that the 3 hour equilibration period was significantly superior to 6 hours, in terms of post thaw motility, intact acrosome maintenance, live count and aspartate amino transferase (AAT) leakage.

1,560 doses of frozen semen of Murrah bulls with different packagings (French medium, French mini, and German mini tubes) have now been distributed to eight centers in South Maharashtra for buffalo artificial insemination. Records show that 609 doses had been utilized by the end of October 1991. 2,805 semen doses of Surti bulls have also been distributed to 10 centers in Karnataka State during September 1991. The reports on conception rates achieved with the use of these different packaging systems is likely to be available by the end of December 1991. After the analysis of the results on conception rates, the frozen semen technology will be standardized by the end of March, and large scale production and distribution for wider use will start in mid-1992.

The establishment of a functional frozen semen technology will improve the rate of success for artificial insemination in buffaloes. This new technology is expected to be in considerable demand among buffalo owners, who will be able to get over 60% higher milk production from the female offspring produced by AI. Higher milk production from buffaloes will earn their owners more money, and as buffaloes are generally managed by woman, who can retain the money they receive from the milk sale, the socio-economic condition of these women is likely to improve as well.

The project team is now starting to look at artificial insemination for Buffaloes in a more holistic way, and has identified a second serious limiting factor. In order to make the system of AI function, proper heat detection will become essential. This is much easier in cattle than in buffalo, which exhibit a marked seasonality in their breeding behaviour. A missed heat here can thus delay conception and milk production for up to six months. To make artificial insemination work in buffaloes, and to actually cash in on the completed semen production research, an additional and new research direction will be essential to undertake. The technology of heat synchronization is well established in developed countries, and the project leader feels that the adaptation of this technology for buffaloes has substantial potential. Under these conditions it will not be so much a synchronization of heat that is needed, it is rather heat induction and heat predictability, which has now been identified as the main limiting factor to using AI for Buffaloes.

This project has thus been an outstanding success in achieving its set goals, but will need to continue for several more years to cash in on the first step of developing artificial insemination in buffalo.

4.2.2 Economic Feeding Systems for Ruminants

A detailed survey of farmers with regard to feeding practices, and the seasonal availability of feed resources has been completed in two cattle development areas of Rajasthan State. Very useful information regarding land use patterns, the principal crops cultivated, and the feeding practices used have been collected for different categories of farmers, and the availability of nutrients has been assessed in comparison to the nutritional requirements of animals. This information has been put in the central data bank, and will form the basis for the development of feeding strategies in similar conditions.

The analysis of feed/fodder samples collected during the survey, consisting mainly of crop residues and locally available by-products, has been done, and their nutritive value assessed by *in-vitro* techniques. The evaluation of pearl millet straw and pigeon pea residue was also undertaken through feeding trials. Differences in the nutritive value of straw from different varieties of pearl millet were observed in the initial feeding trials, which indicate that more work needs to be done on this problem. The results also revealed differences in feed intake and digestibility, related to the nutritive value differences in pearl millet. The pigeon pea crop residue studies indicated that it could be considered as a medium quality forage with moderate protein content, useful as a supplement to straw diets.

Studies have been completed to measure the effect of urea treatment on digestibility, intake and nutritive value of maize straw. For a proper evaluation of this technology, a long term study with growing animals is now in progress. The information collected during the feeding practices survey has been used to identify the limiting nutrients and seasonal variations in their supply in relation to the nutritive requirements of the animals. This information will be used to devise suitable interventions in developing improved feeding systems. This program was initiated by providing 1500 kg of crop systems residue treated with urea to five farmers for field trials. Results of acceptance are awaited.

In terms of impact, it is too early to assess the benefits which this project has the potential to create. At this time the project has not reached a point where a new technology is ready to be taken to the farm. The project has furthermore not been convincing in showing that the potential technologies will generate a substantial tangible benefit to the farmers.

4.2.3 Microcarrier Culture Technique

The project was started in 1988 with the title "Development of Improved Marek's Disease Vaccine." The main objective was to establish conditions for the large-scale production of Marek's Disease Vaccine, using Roller bottles and Microcarrier cell culture (Cytodex) systems. At the third Liaison Committee meeting of IDRC-BAIF in January 1990, the title, the work plan and objectives were modified, in order to incorporate work on other viruses such as Foot and Mouth disease, Rinderpest, and several poultry diseases.

[Vaccine is made from virus which is grown in cell cultures.] For cell culture work, a Pathogen Free Poultry flock was necessary, and has been established. Proper monitoring of the status of this poultry flock is being done.

It has been observed that in roller bottles, higher cell densities can be achieved, and in microcarrier systems, using Cytodex I, the cell densities and cell yields are significantly higher than even with roller bottles.

The HVT FC-126 [Marek's Disease] virus has been adopted on [grown in] Chicken Embryo of Fibroblast (CEF) cultures, and the growth kinetics of the virus cell have been investigated for further improvements in virus yields.

[The quality of vaccine produced from the virus must be determined.] Techniques for quality assay procedures for Marek's Disease Vaccine, as per British Pharmacopoeia (Veterinary), have been standardized. The quality of the vaccine is judged in terms of plaque forming units (PFU) of HVT virus present. Higher pfu/ml are produced in microcarrier system (0.30 mio pfu/ml) compared to in the conventional monolayer system (0.16 mio. pfu/ml). Work is now in progress for scaling up the production of the virus in cell cultures from 250 ml to 500 ml.

The microcarrier technique was also tried for the cultivation of BHK cells, Vero cells, the Newcastle Disease virus, the Bursal Disease Virus, and the FMD virus, as well as other infectious diseases in livestock and poultry. A two-fold increase in cell and virus yields was achieved through the use of the microcarrier technique in these cell and virus cultures, at quantities of up to 250 ml.

The cost accounting section of BAIF Laboratory was asked to undertake a comparative cost analysis of the conventional and the new microcarrier technology. The material consumption and resulting cost of producing 1 million doses of Marek's Disease Vaccine are as follows :

| Particular | Conventional Technology | Microcarrier Technology |
|--|-------------------------|-------------------------|
| Material Consumption | | |
| Media and stabilizers (in litres) | 70 | 47 |
| Cytodex 1 (in g) | 0 | 141 |
| Cost of material consumed * | | |
| Media and stabilizer (in Rs.) | 9,923.80 | 7,049.20 |
| Cytodex 1 (in Rs.) | 0.00 | 13,874.40 |
| Total cost | 9,923.80 | 20,923.60 |
| Additional cost for microcarrier technology | 10,999.80 | |

* Cytodex 1 in 5 kg packing costs Rs. 98.4 per g as on 18. Nov. 1991.

The cost of labour, energy, packaging and transportation are the same in the two technologies, and hence are not included in this analysis. Using microcarriers for more than one culture/harvest cycle [i.e. re-using the Cytodex] is NOT recommended. At the current scale of microcarrier technology available to BAIF, and based on the cost of the microcarrier (Cytodex I), this technology is not economical. If the scale of production is increased, costs may be reduced to a level where it may become viable.

The constraints to large-scale cultivation of cells however include the pH change and accumulation of metabolic by-products, the sensitivity of cells to physical and physiological constraints to growth, as well as maintaining cultures at an optimum cell density and productivity by limiting excessive cell growth. These constraints could however be overcome with additional equipment and know-how.

Despite these problem areas, the microcarrier technology, even at the present scale of production, can be used for developing diagnostic kits by producing monoclonal antibodies by in-vitro cell culture systems. These antibodies are at present produced in vivo, by growing hybridoma cells in the peritoneal cavity of mice. For the production of only 100 mg of antibodies, one mouse on average has to be sacrificed. The microcarrier technique can produce large quantities of antibodies without destroying laboratory animals. This will support the IDRC policy and philosophy regarding care and use of laboratory animals for biological studies.

The project has made excellent progress in developing and standardizing cell culture technology at a small scale of production, using the microcarrier culture system. The technology at this scale however is not cost effective, and the scaling-up of the process will require additional equipment and knowhow. Diagnostic kits developed from monoclonal antibodies produced by microcarrier technology, will meet a need of animal health personnel, and thus support the cattle development programs.

The question remains to be answered if at a larger scale the new technology would become cost effective. In that case considerable outside funding might be needed to provide the equipment necessary for such a larger scale production.

4.2.4 Sericulture Technology

The production of silk has been a successful industry in India for centuries, but has been limited to specific areas of the country, which had specialized in this activity, such as West Bengal and Kashmir. The opinion was that these areas have particular advantages for the growth of mulberry trees, as well as for the rearing of silk worms. This view was reinforced by the poor results from attempts to establish silk industries in new areas. However, more recently the prevailing view that specific environmental and climatic conditions are necessary for silkworm rearing has been challenged. Since 1970 silkworm rearing has been introduced with some success to areas of Gujarat and Andhra Pradesh, and the Indian Government is actively promoting the establishment of a silk industry in new areas. It has by now been established that if careful adaptation studies are carried out, both on the growing of mulberry trees, and on the breeding and rearing of silkworms, it will be possible to develop functioning production systems in new areas.

Silkworm rearing is considered an activity with a high potential for income earning for rural farming families, and is fully consistent with BAIF's overall aim to improve the livelihood of rural poor families through income generation. Undertaking a research program to establish a technological package to be used in Maharashtra state, and potentially elsewhere, was thus a sound decision, with the potential for considerable impact in generating additional income. The establishment of a functioning cottage industry for silk production however has many facets, from research into the growing of mulberry trees, to the genetic potential of different strains of the silkworm moth. In order to establish an integrated package, the research project had to address all these different aspects.

One of the important research topics was the identification of the best suited mulberry varieties for the project area. For this purpose some 15 local and exotic varieties were planted, and are being evaluated. Parameters of performance measured include growth indicators such as leaf yield and the number of shoots and leaves; and leaf quality parameters such as protein, carbohydrate and reducing sugar content. The mulberry research will then conclude with actual feeding trials. This research is well advanced, and the most promising varieties of mulberry trees are now established in on-farm trials. BAIF is anticipating to help a number of farmers to establish tree nurseries in the near future, and will provide them the cuttings of the recommended varieties.

The second important area is the adaptation of silkworm varieties to local conditions. Due to the cottage industry nature of their rearing in rural villages, climatic control of rearing rooms is not possible, and the silkworm varieties and strains therefore need to be selected according to their performance characteristics in natural environments. The pure varieties only perform in controlled environments, and thus a cross breeding program needed to be initiated. Cross bred varieties may have a lower level of performance in some productivity and silk quality aspects, but they will be less sensitive to variations in temperature and humidity. Cross breeding however also means that the eggs (grainage) have to be supplied on a permanent basis by a supplier such as BAIF.

The project has carried out trials by cross-breeding two proven exotic varieties with ten indigenous varieties of silkworm moth, and has measured a number of attributes in their offspring, among them fecundity, survival rates at egg stage, rearing stage and cocoon stage, as well as length, quality and reliability of the cocoon silk. The project has reared twelve generations, and is now in the process of field testing the best performing two cross breeds with selected farmers.

Subsidiary research activities have also established a method of removing the stickiness from eggs, which allows the eggs to be transported in plastic jars, and permits their storage in a cool environment, inducing a dormancy. Trials have also established the treatment of eggs in order to break the diapause common in some strains. And finally the project has designed a number of new mountages for the cocoons, to replace the traditional home made bamboo mountages. These new mountages have a number of significant advantages, which enhance the productivity of the silk production system.

The project has thus been very successful in designing a package of technologies for the rearing of silkworms in the project area under cottage industry conditions. It is now at the stage of field trials, and thus is entering a new phase. Many aspects of rearing, marketing and processing however are not yet clearly understood, and need to be established, in order to maximize the income the activity is expected to generate for rural women, who will carry the main workload. It has in particular been found that the extension system was weak here, and that several crucial social aspects to the introduction of a cottage silk industry have not been properly addressed.

As the new phase moves from the laboratory, into the village, it is essential to have the expertise of a sociologist to design the best fit into the rural family, with special attention given to the workload of women. At the same time the specific support of a rural economist is needed to look at supply costs, production costs, and marketing and processing options, to optimize the returns to the producer. And not least, imaginative engineering support can produce optimal designs for mountages, rearing systems and cottage type reeling processes.

4.2.5 Mushroom Production Technology

The growing of mushrooms was also considered an idea with considerable potential, producing a technology which can be adopted by poor rural families to provide a source of additional income. It was this consideration that attracted BAIF to propose this topic as a research project. In addition to its potential, the technologies used in the Wagholi laboratory could lend themselves well to the reproduction of mushroom spawn. This project was started only in early 1990, much later than most other projects under IDRC funding.

Rather than starting research into mushroom technology from the beginning, the approach chosen was to look only into the usefulness of three mushroom species, which were already utilized for artificial rearing, and thus to adopt existing technology

rather than to establish a new one. There are three main species of mushroom grown in India, the popular Button mushroom, the Straw mushroom and the Oyster mushroom. Each species is particularly identified by the temperature and humidity range it grows best in. For BAIF's purpose, artificial climate control was not appropriate, and thus the selection of mushroom species had to be based on its performance under the prevailing temperatures of a village environment.

The initial research focused on the establishment of master cultures of a variety of edible mushrooms, the standardization of spawn production technologies and techniques for the evaluation of spawns. Based on this work, the different mushroom species were tested, especially as to their temperature and humidity requirements, and the Oyster mushroom was identified as the most suitable. Subsequent research on the various sub-species of this mushroom then identified the most suitable strain, which showed a high growth potential under wide ranges of temperature and humidity. As a result of these activities a spawn producing unit has been set up at Wagholi, to assure the continuous supply of high quality spawn of the Oyster mushroom for producers.

The second area of research was to investigate different cultivation methods, based on agro-wastes as economical substrates for growing mushrooms. A simple system of producing, sterilizing and inoculating the substrate has been developed, suitable for village use. A particular difficulty here was the prevention of contamination, which is problematic under farm conditions. The inoculated substrate then needs to be kept in plastic bags for 21 days, until the spawn has established itself. It is then unwrapped, and within 5 days the first harvest of mushrooms is ready. One straw ball will produce approximately 150 grams of mushrooms, and a reasonable production of 2 to 3 kg can be expected per batch.

The project has also established that the substrate, at the end of mushroom production, can be used as a good animal feed, or can be composted. The project, in a very short time, has established a viable and sound technology for small scale mushroom production suitable as an income generating activity for rural women. It has now undertaken the first field trials in some remote villages, and is confident that the technology can be adopted.

As in the sericulture project, this technology is now on the verge of being introduced into villages. This is an important moment to look seriously at the economics of the project, and in particular at aspects of marketing the produce. Here the involvement of a marketing specialist or economist is essential, to set up marketing channels and outlets, as well as to establish produce quality and packaging standards. As important is the support of a sociologist, to find the optimum way to fit the project activity into the traditional village environment. And, depending on the marketing opportunities and constraints, drying technology may be needed to convert the product into a marketable commodity.

4.2.6 Adaptability Studies for Bamboo Species

BAIF has for a considerable time been active in promoting a number of forestry activities, especially the rehabilitation of wasteland, and as additional income for farmers in the form of agro-forestry. Of particular interest to farmers were those technologies, which could create income from unused land, such as the boundary areas between cultivated fields. Aside from the tree species promoted, it was realized that Bamboo has a particular niche on the farm. It is often grown near the farmstead, or on plots of wasteland. It has a short growing time, and provides a harvest each year. Bamboo seems to be much in demand, the hollow type is used as building material, and the solid one as raw material for basket weaving, and both thus have a ready market.

The main problem area identified has been the difficult reproductive system of bamboo, which may not produce seeds for decades. To overcome this limitation, it was therefore essential to establish a technology for the vegetative propagation of bamboo, in order to make its multiplication independent of bamboo seed. At the same time it was necessary to survey the different types of bamboo species available, and to measure their performance under local climatic and soil conditions.

The project started later than other projects, and initiated its work with a germplasm collection of some 18 different species, and the establishment of three arboreta in different agro-climatic zones. The second aspect of the research concentrated on vegetative propagation methods. While some species of bamboo do propagate vegetatively under certain conditions, the majority do not. Thus the treatment of bamboo culm cuttings with plant growth hormones was considered the key to overcoming this problem. The research involved treating bamboo cuttings with five different growth regulators, to establish the best methods for vegetative reproduction. The results of this work will not be available until early 1992. Finally, initial field trials were started to establish the best uses of bamboo on the farm, and bamboo has been planted around homesteads, as field bound plantings, and as independent plots. Preliminary calculations show that even as a field crop bamboo may rival some agricultural crops in the income it can generate, and will certainly provide additional income to farmers if planted on unused land.

The future usefulness of this project will hinge on the identification of the most suitable species for this climatic region, and especially on the success of a simple vegetative reproduction technology. This can then be easily transferred to specific farmers wanting to establish bamboo nurseries, from where the seedlings are to be purchased by farmers. Although some marketing questions remain, the technology is simple, and the demand for bamboo is high, both by the farmers and by the market. There is little doubt that with some further work, a new technology bringing additional income to farmers will be the result of this project.

4.2.7 Production Technology for VA Mycorrhiza

Among the low-cost technologies attractive to Third World countries, few have been so actively pursued as the replacement of chemical fertilizers by bio-fertilizers. Here

especially the nitrogen-fixing Rhizobium bacteria has been widely used with legumes. Similarly VA Mycorrhiza has been identified as having a similar potential for phosphorus substitution. BAIF undertook research into the production of Rhizobium bacteria some years ago at its Wagholi laboratory, and pioneered the freeze-drying of the Rhizobium bacteria to extend its viability, and to facilitate transportation and storage. BAIF continues to produce Rhizobia for the Indian market, but indications are that demand has not been as high as anticipated.

To follow up on its earlier success with Rhizobia, it seemed a natural next step to initiate research into Mycorrhiza, especially since this work linked to one of BAIF's main field interests, agro-forestry. Here it was envisaged that trees could benefit from the inoculation with VA Mycorrhiza in circumstances where soil conditions are extremely poor, and where the use of fertilizers is uneconomical. Mycorrhiza inoculation would not only help young seedlings to cover their phosphorus needs even in the poorest of soils, but there are indications that it will also make micro-nutrients more accessible, and through its own root network will be able to extract more moisture from the soil, making the host plant more drought resistant. In Wagholi, BAIF had all the necessary infrastructure, knowhow and experience to undertake this new venture, and produce successful results.

The project has so far achieved remarkable results. It has been able to standardize techniques for the collection of Mycorrhiza from the soil, to isolate and identify six species of Mycorrhiza, and to standardize laboratory techniques to produce monosporal cultures.

However the main objective of the project, the mass production of VA Mycorrhiza, has proven to be more elusive. The fungus lives in a symbiotic relationship with the host plant, and it is thought that in order to multiply, it needs some unknown substances provided by its host plant. Thus a complex chemical interrelationship seems necessary for the multiplication of the fungus, a process which is not yet well understood. It has therefore not been possible, as was the case with Rhizobium, to mass-produce Mycorrhiza in a standard fermentation process. Even an intermediate step, its mass production through root culture, has not met with success.

The project has nevertheless been successful in inoculum production on a pilot scale. Here the best Mycorrhiza strains, soil substrates and plant hosts have been identified, and the system has allowed the production of considerable quantities of inoculant. The lack of availability of inoculant had been one of the major limiting factors hindering research into different uses of Mycorrhiza. BAIF is now in a position to make inoculant available to a large number of scientists all over Asia. This in itself will result in considerably accelerated research into the subject, and will in time provide valuable information on yield improvement on various agricultural crops and forestry species, as well as the interactions of different hosts and different Mycorrhiza species, and the identification and assessment of different strains within the species now recognized.

An additional feature of this project has been the involvement of a Canadian consultant, who has contributed considerably to the project, and the establishment by IDRC of a

Mycorrhiza network, where much fruitful interaction between scientists of the Asian region has been a major benefit.

Irrespective of the impressive successes achieved by the project, the limitations to mass production remain. And while farm trials can be undertaken, the large scale impact on agriculture and forestry will remain elusive until VA Mycorrhiza can be mass produced. Research into such mass production is carried out extensively worldwide, but to forecast if and when the hoped for breakthrough will occur seems quite impossible. Until then the promise of a major impact of this interesting new technology on the farmer remains unfulfilled. From the point of view of BAIF's main mandate to produce benefits to rural poor farmers, this project is therefore unlikely to fulfil these expectations for a considerable time to come.

4.2.8 Research on Post-Production Technologies

The objectives of this project were initially quite vague, as it was necessary to first identify the traditional post-production systems in the various project areas. Based on these findings, the project was then to formulate specific interventions, either as research, or through the introduction of useful technologies existing elsewhere.

Very soon however the project began to be occupied with what turned out to be a major enterprise. The rural development projects of BAIF had under their agro-forestry program, and in response to farmer's requests, started to initiate the planting of fruit tree orchards. Here the main demand by farmers was for mango trees, and BAIF, through the establishment of tree nurseries and the introduction of grafting technology, had in its Vansda Tribal Rehabilitation project alone planted some 5,500 mango trees. While most of these trees are still immature, the area produced some 90 tonnes of mango fruit in 1990.

This level of increase in the supply of fruit created considerable marketing problems. Bulk fruit purchasers from the north meet at harvest time with producers in a regional market, and in a strict supply - demand controlled system, the producer is generally shortchanged. To circumvent this market, the Post-Production project decided to establish a mango processing plant. Far from being intermediate technology, this plant in 1990 processed 42 tonnes of mangoes, and can at full capacity process up to 400 tonnes. The end product, mango pulp, is purchased both in bottled form by food retailers, and in bulk form for the flavouring of ice cream, and for fruit juices. The mango processing project has thus successfully established processing channels for a raw material, and in doing so both assured a reliable outlet for the fruit, and generated a higher price for the produce, than what the open fruit market was paying. The processing plant pays 50% more than the market rate, and the project over four years has paid out more than 500,000 Rupees (\$ Can. 22,500) to some 159 farmers.

Research is now under way to develop alternative mango products, especially dried pulp as a sweet or candy, and different drying techniques are being tested for this product.

Similar marketing situations as shown for mangoes also exist for other new commodities introduced to increase the income of farmers; among them oilseeds and wood from agro-forestry projects. In all these cases the market is heavily slanted in favour of the buyer, and as a result the farmers are unable to fully benefit from the new technologies introduced by BAIF. In response to this situation the Post-Production project is now looking into possibilities of processing wood and oilseeds locally, to enhance their value, and to improve their marketability. At the same time the project has successfully introduced some pedal threshers as a demonstration project, and is testing a wood gasification plant to reduce fuel consumption of diesel engines used to pump water.

The project has thus achieved much more than it initially set out to do, and has met its challenges with considerable success. There is however an underlying problem: The post-harvest difficulties were largely economical, i.e. in the field of marketing, but because of the Post-Production project's orientation towards technology, it searched (and found) technical solutions. It may be argued that an Economics Project would have found marketing solutions. There is thus a feeling that the present concept of post-harvest technology is too narrow for the needs of BAIF, and that it should encompass at least as much a marketing and economics focus as a technology orientation.

At the same time, many of the other projects under IDRC funding have now reached the stage of moving from the laboratory to the field, and for this important step they will need both technology input, and especially marketing assistance.

4.2.9 Community Based Research

This project was originally intended to become the link between research and the community. One of its aims was to thoroughly study the communities, and to identify relevant development interventions according to the needs of the communities. At the same time the project set out to carry out research on implementation strategies for income generation and health improvement. The initial IDRC program in fact divided this activity into two distinct projects, one in the tribal project areas, and the other for the non-tribal activities, located largely in the general area of Uruli Kanchan (the BAIF headquarters). In a recent revision of the project, the two were amalgamated into the present Community Based Research project.

The evaluation of this project gave the evaluators more problems than any of the other projects. This was in part due to the methodology of the evaluation, where the initial rapid visiting schedule left little time for in-depth work in the Tribal Areas, essential to generate a solid understanding of the project. But even more important, problems arose because the project is involved in so many activities, and covering so many different development aspects. Such a complex project thus demanded a considerable effort by the evaluators to sort out all its facets.

The first confusion arose from the title of the project: Community Based Research. Being led by the structure of all the other projects, it seemed reasonable to the evaluators to expect some rigorous social research activities. This was not found. What was found were several reports based on a number of information gathering activities, such as Population Census, Baseline Studies, Rapid Rural Appraisal Surveys and Health Status surveys. Only one document among these would have been classified as research in the narrow sense. To come to grips with these activities, it was necessary to redefine the concept of research in a much broader sense than as the classical scientific study. The term research is therefore used here in a much wider meaning, denoting the gathering of information useful to the better understanding of any aspect of community life. Under such a wider definition the activities undertaken could be quite acceptable as being most useful to the project.

It became however quite evident that few project staff had an adequate level of social training, and that in this discipline IDRC support has also been lacking. This should be rectified as soon as possible, in order to initiate a more rigorous and sophisticated social research program. Here the present information gathering activities must become more focused, and properly designed, so that the results can become reliable indicators of the present situation, what impact projects have, and what future interventions by BAIF would be of particular benefit to these communities.

The second area of difficulty was the multitude of activities undertaken. This is a typical reaction of development workers at the village level, who see so much need and so many problems, and want to solve them all. However this reaction can imply the danger that such a response by the heart leads to a "band-aid" approach of spreading the effort too thinly, with the result that only superficial remedies are carried out. Examples here can be quoted based on the limited time spent in villages, which may not be fully representative, but which nevertheless give an indication of the problem. One example is the community visited, which was keenly aware of the need for better hygiene. Even the primary school children knew every rule of hygiene, yet there is not a single latrine in the village, to put their knowledge into practice. Or the farmer who received hybrid sorghum, and achieved almost double the normal yield. But he ate all his sorghum, and has no seed for next year, and neither did he sell any to his neighbours. Such incidents show the shortcomings of too wide a spread of activities. It is not appropriate here to pass a value judgement, if such a "shotgun" approach is better or worse than a few targeted and sound interventions, based on priorities. However, this approach does not seem to fit with the rest of the projects BAIF carries out, which are based on the identification of a single and well defined need, followed by the design of a comprehensive package to respond to that need.

The third confusion arose from the fact that based on the project objectives, health seemed to be only one of many activities. Yet in the field every indication was that this was clearly a Health project, with the project leader being a medical doctor, and the IDRC Program officer responsible being from its Health Division. However much of the work in the health sector by the project seems to be a mix of data collection on health status, the teaching of better health practices through preventative health, and curative health activities through clinics. This component of the overall project therefore seems to carry out all the steps in a project cycle on a micro scale, identifying a problem and

solving it. This is quite a different approach from the other projects, and seems to lead to considerable ad-hoc activities. Problems are then not fully documented and understood, they are not necessarily the same for the whole project area, they are not prioritized, and the development solutions are not comprehensive. To give an example: Anaemia was identified as a problem in a morbidity survey. Now the women are taught to grow green vegetables during the dry season, and to go back to use the old iron pots instead of the new ones made from aluminium. These may be sound local solutions, but if Anaemia was considered a serious and widespread problem, then a proper research program could have been undertaken, to fully understand the problem, and to develop a package of interventions that would alleviate the problem, and could be used in any other area where this problem occurs. Similar examples could be mentioned on child mortality, hygiene and nutrition.

And finally, there seemed to be a considerable component of project implementation. Of particular note here are the excellent activities of planting fruit tree orchards on land not usable for arable agriculture, and the activities in agro-forestry, through the planting of fast growing trees on field boundaries and hill sides. Other development activities seemed to include the construction of water pumps, and the building of temporary check dams for irrigation. These are all excellent interventions, helping communities to improve their livelihood, but they are not consistent with the project name "Research".

5.0 ANALYSIS OF THE BAIF-IDRC PROGRAM

5.1 A NEW TYPE OF COOPERATION

The program under evaluation is in many ways unique, and now, towards the end of the initial phase of this collaboration, it is an opportune moment not only to look at the results achieved, but beyond that at the usefulness of the model of this type of cooperation, and the contributions that the two partners have made. From the beginning the partnership was understood by both parties as a new approach to development. Thus IDRC covered new ground by funding multiple projects with one recipient institution, and BAIF also has had to break new ground to collaborate with a research oriented donor. Both parties have from the outset looked at their cooperation as a type of symbiosis, a partnership which would provide substantial benefits to both parties.

5.2 THE SYMBIOSIS BETWEEN IDRC AND BAIF

The outstanding strength of BAIF had long been recognized as being its close links to the village, the farmer and the rural poor. Its leadership had set itself the mandate to take a special new initiative, by developing a number of new technologies, which were to form the basis for projects aimed at improving the life of the rural poor. In this endeavour, BAIF could look back to an excellent record in the development of new technologies, while it also had made considerable progress in carrying out research oriented activities. It is thus recognized as one of very few development oriented organizations, which are able to combine sound knowledge of the recipient and his environment with considerable experience in the development of new technologies. This is even more remarkable since BAIF is a foundation, and thus an NGO with limited permanent funding sources.

The successes of the past, and the resulting growth of the organization, however had caused a lagging behind of certain aspects of administration and support functions. BAIF was therefore looking for a donor who could be of assistance in these areas, as well as help with the initiation of new research programs.

IDRC, with its mandate of promoting and funding development oriented research activities, has a long history of successful development of research-based technologies in developing countries. Indeed both BAIF and other research institutions in India had collaborated with IDRC on previous occasions. IDRC however had from time to time had to struggle with situations where technically sound research results were not adopted by target groups as expected. It had identified one of the potential causes of this problem a lack of a clear understanding of these target groups, and a lack of a system to allow input by these target groups into the research planning, design and execution process. IDRC was therefore keenly interested in finding a partner who had a solid record in working with poor rural communities, had a sound understanding of their needs, and thus provided excellent opportunities for learning how applied research

is designed, executed and implemented in the rural communities, an opportunity for learning, which few other institutions could offer.

When IDRC became interested in a larger funding support package for BAIF, it was thus with the clear understanding that this was an unusual partnership, which had the potential to generate considerable benefits for both BAIF and IDRC. For the latter, the feedback provided from the implementation of projects in villages, and the generation of new technologies through research, growing out of a needs assessment in rural villages, showed promise to become a model of potential use elsewhere. BAIF on the other hand could initiate some new and promising research projects, and at the same time strengthen both its administrative capacity, and its rural development activities.

6.0 INSTITUTION BUILDING

6.1 INTRODUCTION

In most development assistance projects, institution building involves, *inter alia*, the building up of the capacity of an organization to perform its existing functions better and to take on new functions in a self sustaining manner. Institution building includes some or all of: engaging additional staff; training existing and additional staff; providing resources such as money, buildings, vehicles and equipment; and providing outside technical assistance.

The IDRC-BAIF program has provided many of these inputs. The financial contribution has facilitated engaging new staff, training, the purchase and renovation of existing buildings, the renovation of existing BAIF buildings and the construction of new buildings, and the purchasing of new equipment and materials. Furthermore, IDRC has provided considerable technical assistance through the visits of Program Officers and the provision of the services of many consultants.

At one level, the evaluation of the success of the IDRC-BAIF program in building up BAIF's institutional capacity to conduct development research is simple. As a direct result of the BAIF-IDRC program, BAIF has engaged additional staff, they have been provided with training, the stock of buildings has been increased and upgraded, and the stock of research equipment and materials has also been increased and improved. Furthermore, not only has the stock of human and physical capital been increased and improved, but it is being used effectively by BAIF to conduct research and manage research programs. Thus, as a direct result of the IDRC-BAIF program, the institutional capacity of BAIF to conduct and manage research has been significantly increased.

At another level, however, we found the evaluation of institutional building difficult because of the lack of accurate and relevant information. In those areas where an institutional capacity already existed in BAIF, institution building can only be measured by the incremental increase in capacity resulting from the IDRC-BAIF intervention. This, of course, requires that knowledge of the capacity of the institution before the intervention started. Possible sources of such information would include base-line studies, mission reports of Program Officers, and internal reviews, evaluations and monitoring by IDRC. Unfortunately, we were unable to find any useful base-line studies or internal reviews of the **program** as a whole. Nor were the Program Officer reports that we could find particularly helpful in this aspect of the evaluation.

Within the bounds of these constraints of imperfect knowledge, the purpose of this chapter is to evaluate several IDRC-BAIF projects whose primary purpose is institutional building: the Information Resource Centre, training in general, the Rural Polytechnic Institute, and the Management Training Centre.

6.2 BAIF INFORMATION RESOURCE CENTRE (BIRC)

6.2.1

BIRC is made up of three cells: Library and Information Services Cell, Computer Services Cell, and Communication Cell. Each of these three cells will be reviewed and assessed in the following paragraphs.

6.2.2 Library and Information Services Cell (LISC)

LISC's main information base is its library at Pradeep Chambers in Pune. Small reference libraries also exist at Kamdhenu, Uruli Kanchan, Wagholi, Akole and Vandsa campuses of BAIF. There is a steady growth in the library collection. These libraries now contain for 4,780 books, 421 journals, and 832 documents on microfiche. The library acquires documents through purchase, membership and gratis. The growth of documents acquired by the library is shown in Table 6.1.

**TABLE 6.1
GROWTH OF LIBRARY COLLECTION**

| Year | Books | Journals | Microfiche |
|-------|-------|----------|------------|
| 1989 | 1,562 | 108 | 0 |
| 1990 | 1,262 | 135 | 832 |
| 1991 | 1,956 | 178 | 0 |
| Total | 4,780 | 421 | 832 |

LISC has used the computer facilities to develop several databases using software developed by UNESCO. These databases include: (1) CRS database; (2) IRC database; (3) biogas database; and (4) Leucaena database.

BIRC operates information services both for researchers and field staff of BAIF. The services provided to researchers are: (1) monthly information update; (2) article alert service; and (3) journal contents service.

6.2.3 Computer Services Cell (CSC)

The CSC has spent its initial years building up staff, hardware and software. The cell has seven professionals: 1 joint program coordinator, 1 senior programmer, 3 programmers and 2 junior programmers. The cell has 25 different software packages. Many of the professionals in CSC have undergone short-term training in system analysis and design, statistical techniques and the use of special software.

The design and development of application systems were done in conjunction with IDRC and BAIF personnel. Thus far BAIF has ten application systems operating,

including: payroll, financial accounting, project monitoring, personnel, Wadi monitoring, MCH monitoring, dairy cattle, provident fund, and inventory control. All of these applications were found to be operating in a satisfactory manner. The evaluation team was impressed by the competence of the people in the computer cell and the quality of its output.

The CSC has helped BAIF's research and development programs to analyze data from surveys to produce reports. The collected data is usually organized in the form of a Foxbase database. Six studies have been undertaken, including: baseline surveys at Vansda and Uruli Kanchan, nutritional status of mothers and under fives in Akole, data analysis of diagnostic camps, study of Wavli practices amongst tribal women in Vansda, agro-forestry data analysis, and an impact study of health education in school children.

The CSC is also establishing a local area network (LAN) to connect computers located in the offices of BAIF at Pradeep Chambers, Pune. The purpose is to share expensive resources such as laser printers, hard disks and software. A recently acquired AT-386 will act as the file server. CSC will need to develop user-friendly shells before the LAN becomes fully operational. BIRC is also trying to connect other major campuses of BAIF through INET of the P & T Department.

The annual workplans for the last two years have called for the development of a Geographic Information System. This system would be used for watershed development planning, area planning, and reporting and documentation. So far, the principal activity has been the training of one staff member.

Both in the outlying campuses and in the central office, the evaluation team observed that important computer data was not secure. For example, we observed in the field that data on hard disks was not backed up, so that a hard disk crash would have resulted in the total loss of data on that disk. Similarly, and potentially far more damaging, at the central office, back ups were made, but these backups are then stored next to the computers themselves. In the event of a disaster at Pradeep Chambers, such as a fire, all of BAIF's computer records would be destroyed.

6.2.4 Communication Cell (CC)

There are two staff in the Communication Cell and they plan, coordinate, design, pretest, and produce the materials. They also edit articles, books and papers prepared by BAIF staff. The staff of the CC also interact with different programs of BAIF to assess their communication needs, and then develop communication materials for them.

The items produced by the CC include: VHS films; printed materials such as books, reference manuals and booklets; slides; radio programs; and posters and charts. Some of the products of the CC have received national recognition: (1) the film *Golden Earth*

on soil and water conservation won a national award; and (2) the book, *Mother Nature* won a national award in the national prize competition for children's literature.

In spite the high quality of most of the work coming out of the CC, the printed materials do not project a distinct style of their own and considerable variation exists in presentation and organization of text, tables etc.

6.3 TRAINING

6.3.1 Introduction

The purpose of this section is to review general training in BAIF and specific training under the IDRC-BIS program. Training has always been an important component in BAIF's overall activities.

6.3.2 BAIF Staff Training

BAIF staff training is mainly for staff working at headquarters and regional stations and is aimed at strengthening technical, management and professional capacity. During the four-year period 1988-91, 64 training programs were organized mostly in the areas of (a) computer applications and technology, (b) information management, (c) orientation and training in research methodologies, (d) organization and management, and (e) acquisition of expertise in new areas such as ferro-technology, mushroom production, sericulture etc. Out of these 64 programs, 16 programs were related to computer application and information management.

6.3.3 Extension Staff Training

Extension staff training is for field level staff in different programs undertaken in various development areas such as agriculture, agro-technologies, health and social development. Extension staff training is the single most important component of training for the success of projects and programs in BAIF. The training program is carried out under both general BAIF programs and under IDRC-BIS programs. Under BAIF programs, information is only included from those areas in which the IDRC-BIS program operates.

The training is mainly carried out at Uruli Kanchan, Vansda and at communities where projects are implemented. Various training activities are grouped in the following areas: (a) agriculture; (b) health; (c) social sciences and (d) general.

Table 6.2 shows the number of courses and participants trained under general BAIF programs during 1989/91. This table shows that there were 421 training programs, that 14,216 individuals participated and that 20,408 person-days of training were provided.

TABLE 6.2

BAIF TRAINING PROGRAMS

| Type of Participant | Number of Programs | Number of Participants | Number of Participant days |
|---------------------|--------------------|------------------------|----------------------------|
| Extension workers | 15 | 473 | 4,952 |

| | | | |
|----------------------|------------|---------------|---------------|
| Community members | 14 | 254 | 1,006 |
| Project participants | 212 | 13,489 | 14,450 |
| Total | 421 | 14,216 | 20,408 |

Table 6.3 shows the number of training programs conducted under the IDRC-BIS program during the period 1989/91. This table shows that there were 93 training programs, that 2,890 individuals participated in these training programs, and that 16,551 person-days of training were provided.

TABLE 6.3

IDRC-BIS TRAINING

| Type of Participant | Number of Programs | Number of Participants | Number of Participant days |
|---------------------|--------------------|------------------------|----------------------------|
| Extension workers | 19 | 143 | 3,510 |
| Community members | 74 | 2,647 | 13,041 |
| Total | 93 | 2,890 | 16,551 |

While not shown in the two summary tables above, the data in Dr. Takwale's report show that:

- > IDRC-BIS training supports already existing training activities provided by BAIF;
- > the participation of women is equal to that of males in most programs, and is exclusive in the Wavli programs;
- > the number of participants over the last three years has increased considerably.

6.3.4 Project Participant Training

Program participant training for farmers and their families is for specific development activities such as sericulture, dairy, etc.,

Some of the more important results of the training include:

- > tube-well handpumps are well maintained by trained tribal boys and girls;

- > engines are operated and maintained by trained tribal boys;
- > Sixty-three women have earned Rs 60,000 through watermelon production and marketing training and another fifty-three groups of 347 tribal women have demanded participation in this training program;
- > In the Wadi program, 2,794 women under Wavli earned Rs 1,750,000 during three years through fruits and forestry nursery; and
- > In Akole, 100 women raised one million seedlings and earned Rs 250,000 and 25,000 plants were grafted by tribal grafting technicians.

6.3.5 Community Training

The community health program in BAIF is one of the major activities in the development program and is an integral part of improving the quality of life in rural communities. Income generation forms the basis of health care as improved income should lead to improved nutrition and better general health. The community health activities concentrate on health education and the involvement of women and students, and include immunization, improved sanitation, routine anti-natal care, under-five year old check-ups, and growth monitoring of infants.

Community health activities are taken-up in a group of 37 villages in Vansda, 14 villages in Akole, and 12 villages around Uruli Kanchan. The BAIF health program is designed around an holistic approach and is based on participation of the people in order to improve health along with the economic and social quality of life.

A large number of training programs have been organized under community training. Most of these are in the area of community health and include:

- > 2,187 participants were treated for scabies in Vansda;
- > 1,493 participants attended courses at general health camps;
- > 700 children were trained to chlorinate drinking water wells;
- > 180 teachers at Uruli Kanchan and 48 teachers at Akole were trained in primary health care and rural development;
- > 1,000 women were trained in MCH care during 1988/91; and

- > Forty-four tribal boys and girls from Vansda have undergone sericulture training for 45 days, while 16 families have started silk worm rearing and 42 families have started mulberry plantations.

BAIF has also shared its experience and expertise with outside agencies, state governments and Khadi Village Industries Board at Uruli Kanchan. Between 1984 and 1990, six agencies sent 1,044 participants for a total of 7,264 training days.

In addition to all the training programs conducted by BAIF, the IDRC-BAIF program has undertaken two significant training projects: the Rural Polytechnic Institute and the BAIF Management Training Centre. These are discussed in the following two sections.

6.3.6 Rural Polytechnic Institute

Major problems of rural India are unemployment, migration to cities and lack of training facilities in agriculture and agro-technologies. The need for such training for women near their villages is particularly important. To service this training need, a multi-locational and multi-disciplinary polytechnic was established in 1989.

The accomplishments in the first two years include hiring four full-time personnel, surveying 12 villages around Uruli Kanchan to determine possible employment opportunities and training needs, and identifying 10 courses. Table 6.4 shows the number of courses conducted by RPI during the last two years.

TABLE 6.4

COURSES CONDUCTED AT RURAL POLYTECHNIC INSTITUTE

| Year | Number of Courses | Number of Trainees | Number of Training Days |
|-------|-------------------|--------------------|-------------------------|
| 1990 | 6 | 146 | 1,021 |
| 1991 | 6 | 102 | 4,544 |
| Total | 12 | 248 | 5,565 |

Training modules have been prepared for five courses and materials have been prepared. Multi-media materials in the form of charts, models, audio-visual, and booklets are being prepared but are, at present, on a small scale only.

Internal evaluations of these courses conducted by BAIF at the end of the courses revealed the following:

- > longer courses should be split into a number of short courses with the maximum length not exceeding six to seven days;
- > more emphasis should be placed on hands-on training and practice on the farm;
- > more demonstrations be given before expecting participants to do the task themselves;
- > more individual work rather than team work; and
- > more post-training support for acquiring equipment and materials, and in marketing.

The RPI is expected to establish backward linkages with BAIF's research and development programs as well as forward linkages by setting up a production and marketing centre. A production centre for providing post training support is planned in mangos, carpentry, baking, ferro-cement technology and mushroom technology. The production centre is expected to be self-supporting and will offer (a) facilities for the trainee and practical experience, (b) advise in setting up individual or group production units in rural areas, and (c) help in marketing.

6.3.7 BAIF Management Training Centre

The goals and objectives of the new BMTC will be to:

1. identify the needs of NGO functionaries;
2. develop training modules and materials; and
3. train participants.

6.4 THE ROLE OF IDRC PROGRAM OFFICERS

Based on the normal operation of IDRC, its Program Officers have specific functions to carry out. For the BAIF-IDRC program, these functions largely centred around designing the actual program, and then providing ongoing support, guidance and monitoring, through periodic visits to the individual projects. In order to assess this aspect of the program, it was essential to compile a record of all these visits, their purpose, the tasks carried out, as well as their duration and itinerary. This has been a rather difficult task. The IDRC filing system of trip reports was not conducive to compile this information, and the trip reports themselves are often not indicative of the actual activities, nor the time spent on the project.

Feedback from a wide cross-section of BAIF staff indicates not only an excellent relationship with the respective IDRC Program Officer, but also the usefulness of their advice, and the support they provide, especially through linkages with other scientists, institutions and organizations. Although BAIF project leaders have become more confident, and carried out their research tasks with increasing expertise, the need for close support remains important. The available information shows that most Program Officers visited the project on average less than four times over the last four years. Given the importance of their involvement, this seems rather inadequate, and one visit every six months should be a more useful level of contact, especially where one Program Officer covers several projects.

One exception to this general observation of a close working relationship with IDRC Program Officer contact has been the Community Based Research Project. Here the linkage to IDRC was largely limited to the Health field, and little attention has been given to Social Research, one of the important aspects of the CBR project.

And in line with the proposed new emphasis of the BAIF program on "Packaging" of the technologies, IDRC Social Science Program Officers will also be expected to play a major support role here. At the same time such support will also be essential in the areas of economics and marketing, where IDRC has up to now not made a significant contribution.

The present role of Program Officers in monitoring and planning also needs to be considered. Records show that most of their visits coincide with the Annual Meeting, which they attend. It seems from the trip reports that their time is often too short to both work with project staff on a review of the project, and also to fully participate in the meeting.

6.5 IMPACT ON BAIF'S ABILITY TO MANAGE PROJECTS

As the name of the program implies, IDRC-BAIF Institutional Support Program, one of the primary goals of the program is to build up BAIF's capacity to design and implement research and development projects. Table 6.5 shows the growth of BAIF over the life

of the IDRC-BAIF program. The indicators that we have collected over time are the number of (a) projects in operation, (b) cattle development centres in operation, (c) families in the tribal rehabilitation program, (d) financial outlays and (e) BAIF staff.

TABLE 6.5

GROWTH OF BAIF DURING LAST FOUR YEARS

| Year | Projects | Cattle Centres | Tribal Families | Rupees | Staff |
|------|----------|----------------|-----------------|--------------|-------|
| 1988 | 55 | 401 | 4,850 | 77.7 million | 1,084 |
| 1989 | 66 | 450 | 7,063 | 83.5 million | 1,363 |
| 1990 | 83 | 526 | 9,118 | 96.5 million | 1,542 |
| 1991 | 95 | 545 | - | - | 1,544 |

All five indicators show that BAIF has grown very rapidly over the life of the program. It is difficult to see how this growth could have been managed without the computers supplied by the program and the support of the IDRC-BIS created Information Resource Centre in general and the Electronic Data Processing cell in particular.

7.0 WOMEN IN DEVELOPMENT

This chapter is based on Mrs. Viji Srinivasan's report.

7.1 INTRODUCTION, OBJECTIVES AND METHODOLOGY

The objectives were to assess the involvement of women in the definition and formulation of research projects; the effects of the research on the daily lives of women; to review the 'voice' of women in program planning, delivery and evaluation, and the mechanisms for feedback from women; to assess whether the concerned technologies are consistent with the needs of women; to assess the economic impact on women; women's control over income; the impact on women's role-models and self-esteem; women's participation in extension activities, and the empowerment of women and men.

Thus the methodology consisted of observation, group interviews of grassroots women's groups, and men's groups; interviews of grassroots women; interviews of field-level staff, middle-level staff, scientists, and the top management of BAIF.

7.2 VILLAGE PROFILE 1

Navlakh Umbre, Maval area, Poona district. November 19, 1991.

Visited by: Ms Viji Srinivasan

Accompanied by: Mr. A.V. Karandikar, Mr. I.A. Kamte, Mr. J.K. Belose, Mr. R.R. Pisal

Title of Research: Development and Standardisation of Sericulture Technology

Snuggling against the barren, eroded Sahyadri and Western Ghats, Navlakh Umbre is a poor village. The black cotton soil is here and there interspersed with bright green jowar plants. The hills are full of dark grey rocks, the top soil is gone, the thorny *babul* is the only remaining tree. Its foliage is a delicate trace against the grey, cloudy sky. The dirt track leads to a brightly painted temple of Pandurangan and Rokhamayi in Bhadalwadi (a hamlet of Navlakh Umbre).

We go to one of the houses opposite the temple. The family has a mulberry plantation. The young wife is at home. Her name is Shanta Bai Jaiwant Bhadale. She wears a thin cheap cotton sari, a tiny black bead necklace and dark green glass bangles. "What were you growing before mulberry?" I ask. The men of the village, who are present, chime in: "She won't know, she won't know." Mr. Karandikar says: "This is not an examination, let her answer." "Where is your husband?" I ask. It is translated as *yajman* (meaning master), but I let it pass. "He has taken milk to Talegaon by cycle, and then to Pune by train." They have one hectare of land.

"What work do you do?" I ask. "When rural women are not educated, can't write, can't sign their names, what else to do except agriculture?" "I do weeding, harvesting, transplanting of paddy; same for jowar. Sometimes in peak season I employ labourers. Men are paid 15 Rupees per day, women 10 Rupees. I too work on other people's land for these rates."

"We have four buffaloes, one cow (*des*). My husband does the milking, I don't know milking. When he is away I call someone to do the milking. You won't find any women in this village knowing milking. I do all other work related to dairying - cleaning of shed, cow-dung cakes, feeding, bathing ... etc."

"We get 5 to 6 Rupees per litre of milk. It is given monthly. I don't know how much he gets. He buys everything. If something is needed, I ask him." "In general in this village, you won't find women having any money. Women are only expected to work."

I ask "Why did you take up mulberry?"

She says, pointing to Mr. Belose: "He came, held a meeting, some farmers decided to plant it."

"Your husband didn't ask you?" I ask.

"No! Many (all) rural husbands are like this. They won't ask the wives", she says.

"What operations will you be doing after the mulberry grows?" I ask her.

"I don't know."

"What is mulberry for?" "I don't know."

"Do you do any work in the mulberry field?" "Watering, weeding." "Have you seen a silkworm?" "No, never."

"You already have agriculture, dairying. How can you do sericulture also?" "To survive, we must."

Mr. Pisal says: "In meetings only men gather. The husbands will tell their wives. When we actually begin rearing, women will learn practically."

"What are women's problems?" I ask.

"Drinking water. I have to bring water from two kilometres away. "Fuelwood, in my 'free' time I bring fuelwood from the nearby hills. We had biogas, but it is not working any more. It is 9 years old, and it needs to be cleaned." "Now we burn dung cakes." "We get 10 litres of milk a day, we keep one or two litres." "I have three sets of clothing (saris)", she says. Here all the men who have been watching so far interject: "Tell the truth, you have only two." One says: "You make sure you are writing everything properly, otherwise her husband will return and scold her."

On social issues she says: "There is TV in the temple, but women don't go." "I think that in this village there are no dowry problems, but I have heard of two cases of dowry deaths."

"There is no widow remarriage. Girls are married at 15 years, boys at 17." "The Gram Panchayat has two women members, but from other villages ..."

Mr. Pisal says her husband will go to Uruli Kanchan for training in sericulture. "How many will go?", I ask. "22 all together ..." "How many women?" "None."

As we leave I see another women in the house. A shadow. I ask "Who is she?" The men laugh. She is the second wife.

We then meet with a group of men, including the *sarpanch*, in the temple. The deities are Pandurangan and Rokhamayi ..., dark and beautiful. There is a stone slab floor. There are delicate flower decorations, mostly of bright orange marigolds ... There are huge leather and brass/copper drums ..., called *tashas*, and cymbals hung on the walls. Women pass by, laden with three big pots of brass/copper full of water, mostly in traditional saris and blouses, -the gorgeous 'Poona' handloom.

The *sarpanch*, Mr. Bhadale, tells us about his work. He was elected three years ago. "The main problem of the area is the lack of water, both for irrigation and for drinking." "When Mr. Belose came here and talked of sericulture at a panchayat meeting, we decided to try. Twenty began. Four mulberry plot owners are here. The meeting was held here."

"Did the twenty consult their wives before planting mulberry?" "No." "There is no such *paddhati* (system)." "The meeting was held here, the decision was made here ! Women don't come to meetings!" "Who will do the work of rearing silkworms?" Two men say: "Women." "Both men and women", say two other men. "Overall who does more work?", I ask. "We admit, women do much more work than men."

"What other income-generating activities are suitable for this area?" "Poultry for women, Jersey cows for men."

"Is there a Dairy Cooperative Society in the village?"

"We have just sent the papers"; "all are Maratha, 15 per cent illiterate." "51 men members."

"Why no women?" "Men do the milking." "Land is not in women's names." "What is the use of having women?" "The Government will ask for men only, because of the assets. Loans can be only be given to men members. IRDP loans are given only to men." I say: "30 per cent of IRDP beneficiaries have to be women." The *sarpanch* says, emphatically: "There is no such rule." (Such a rule has been in force for the past 10 years!)

I ask about widow remarriage. "It is somewhat common."

I ask about polygamy. "It is somewhat common too."

We leave. I am troubled.

We next go to the plot of three brothers. There their three wives meet us (Surekha, Meera and Parvati). One is dressed in a pure Varanasi silk sari.

"What is the mulberry for?" I ask. Two blink. One says, tentatively "to prepare silk." I press her: "How?" "We have never seen it, so how can we know?" "Even if our

husbands know, they will not tell us." "It is taken for granted that we will do the work."
"We have never seen a silkworm or a cocoon." "Cuttings were brought from outside.
We did all the work, including the planting. We can only tell you what we have done!"
"The men went to the meeting, not the women."

"We have two Jersey cows, two *desi* cows, two buffaloes. We do most of the work.
Men do the milking. But we also milk."

"Who sells the milk?" "My husband." "How much land does the family have?" "We
don't know. Maybe 15 or 16 acres!" "Who does the work?" "We do! Sometimes we
employ labourers." "How much are the labourers paid?" "15 Rupees for women, 25
Rupees for men." "Why this difference?" "Women actually do all the work, but in the
end she gets recognised through the man only!"

"Would you like to have training in sericulture?" "Yes."

"Can you go to Uruli Kanchan with your husband?" "Yes." "What other work do you
do?" "Collect and make cow dung cakes." "We don't have bio-gas."

The next plot. Two brothers. "Did you consult your wives before planting mulberry?"
"No. Why?" "What if she refuses to do the additional work?" "I have an obedient wife."

The next plot is at some distance. It is a nice tiled house, with a picturesque back-drop
of the Western Ghats. I meet mother and daughter (Thanu and Subhadra). She has
five children. "Who decided to plant mulberry?" "My husband. But he wanted to plant
all of our land (8 acres). I said, let us try on part of the land only, - he agreed to that." "I
don't know what use mulberry is. Whatever work was needed I did, how can women
ask such questions?"

"We have no animals. But we have eight acres of land. We grow paddy, jowar, onion,
garlic; we do all the work! The man only starts the engine and provides water!"

I ask the mother: "How have women's lives changed?"

"They have not changed for the better. Work has increased. Earlier we did all work
inside the house only. Now women have to do 'outside' work also. Our work load has
increased."

I ask about social issues. The mother says: "There is dowry now. It was not so
earlier." "Widow re-marriage? No! No! ..., how can we say?" "Girls are married at
thirteen or fourteen, boys seventeen or eighteen."

The next plot is completely dried up (all the earlier plots had bright green thriving
mulberry). Changuna Bai - she is so dynamic! She shows us her dried up mulberry
plants. "No water" she repeats in mock anger. "Did your husband consult you before
planting mulberry?" "He was not here, he had gone out of the village. My son went to
the meeting. He come home and told me about it. So we decided to try." "Please help
us with water ..., we'll try again." She is free and happy, even though she is the only
women in the entire group of men. The men laugh at her, she laughs back. Her
husband is also here.

"Our lives are worse now. Men drink constantly. They go to the temple, put on a *tulsi-mala*, and swear to stop. But they return and begin again. Dowry has spread to the village from urban areas. Inflation is a big problem ..., we are much worse off .."

I ask Mr. Kamte: "Why should women be involved in sericulture?" "Sericulture is light work. It is a silkworm nourishing job, which women will do well. She will nourish each worm. She will rear them like her children. Hygiene is very necessary. There is also a need for humidity and temperature control. In all this she will be better. Then the women will get a cash income every two months, and she will gain prominence after some years."

I ask him about the IDRC - supported research on sericulture.

"We are trying out different races of silkworms and different races of mulberry." "We are also trying out different types of mountages."

"What about the impact on women?"

"With the new leaf preservation methods, her labour could decrease. She need not go as often to the field. But with different types of mountages her work may increase, she will have to wash the gunny sacks and store them. With certain races of silkworm her work may also increase. Indigenous races spin cocoons in 22 days; other races in 30 days."

7.3 VILLAGE PROFILE 2

Konegaon, Karad area, Satara district. November 21, 1991

Visited by: Ms. Viji Srinivasan and Dr. Marcel Zollinger

Accompanied by: Dr. B.R. Mangurkar, Dr. Y.P. Phadnis.

Title of Research: Upgrading of Frozen Semen Technology for the Development of Buffaloes

We travel to Karad to see the buffalo breeding program (one of the IDRC supported research projects). Dr. Mangurkar and Dr. Phadnis travel with us. Once more the drive is through barren hill-sides of the Western Ghats, rocky, full of agave and the thorny prosopis, though there are some green plantations here and there.

Our village visit is to Konegaon, where the veterinary Dr. Deshpande meets us. We go to the Panchayat Bhavan. It is an all-male audience. "The village has around 350 buffaloes and 11 cows. The buffalo frozen semen we have developed under the IDRC programme is being tested here. The local non-descript buffaloes are called Pandharpur buffaloes. The heat synchronisation is also being tested. The Cooperative gets around 160 litres of milk a day. All members are men."

In response to a question from me, Dr. Deshpande says: "More than 60 per cent of the work is done by women. We have done training programs for men and women, where 30 out of 80 trainees were women."

At this point, one woman arrives. Her name is Sushila Pawar. She is a *Kotwal* (a functionary). I make her sit next to me.

Then we go to see the buffaloes. Five buffaloes are tied next to each other. Their "owners" arrive (women). "Often I meet only women," says Dr. Deshpande. Slowly more and more women arrive, out of curiosity; the AI cards from BAIF are all in the names of men. I suggest that we sit in one of the houses, and an informal meeting of women takes place.

"What work in buffalo rearing do women do?" "Cleaning, feeding, bathing, grazing, milking." I check up again on the grazing. "Yes, we do it." I check up on the milking: "Yes, we do it." The male link person and Dr. Mangurkar also confirm this.

"What do men do?" I ask. The women laugh. "Bringing sugarcane tops." "How about taking the milk to the cooperatives?" "Oh we women do it." "Who gets the money?" "Men, they are the members."

I suddenly see a man carrying sugarcane tops, and run to take a photo. This creates mirth and merriment for the women. "What else do men do?" "When the buffalo is in heat, if natural service is to be done, he takes it to the bull." "For AI?" "Oh, no, then the doctor comes here, we take care of that." "Which is better?" Only one woman says: "Both should be tried." The others all say: "Doctor!" Even a doddering old lady says: "Now that there is a doctor here, we should use him!"

"This (AI) is easier (for women), we only need to leave a message in the Cattle Development Centre! That we can do ourselves - not like the natural service." I ask if the women present have been there. An overwhelming "Yes."

"Are you all giving the milk to the Dairy Cooperative Society?" "Yes." "Not to the cycle milkman?" "No, No!" "Is the Cooperative better?" "Yes." "Why?" "Lump sum payment (monthly)." "Payment is guaranteed." "But from the cycle milkman it was you who were getting the money, from the Cooperative your husband will get the money." "No, no, our husbands give us the money." "They only collect the money in the Cooperative, but they give it us. Traditionally the milk money has always belonged to women. It is a long tradition." "But why are women not members?" "Women are shy of going to the Panchayat Bhavan, they have never been there!"

The afternoon is spent at the office of the Cattle Development Centre of BAIF. Dr. Mangurkar and Dr. Phadnis tell us about it: "Before BAIF came in, there were a lot of problems regarding AI in the area. It did not reach the doorstep of the farmers. The Sugar Factory approached us, and is now supporting three Cattle Development Centres." "Anyone can come, we do not discriminate. People leave chits here when

their animals come in heat." We are shown some of the chits. "We are now also popularising buffalo insemination."

The veterinaries and the technicians of the three Cattle Development Centres are also here to meet us. We discuss matters with these men in an informal meeting: "Women take more interest in animals than men." "80 per cent of times, the men are not even there." "Women are always with the animals, they take care of them."

"AI work could also be done by women. It is only transport that would be a problem, young women driving motor cycles on their own would be difficult. But the technical skills can certainly be transmitted, and women can do it."

"We in BAIF have to keep aloof from local affairs." But when we were popularising heat synchronisation in buffaloes, women were also there. Four or five women had brought buffaloes. And the women asked us: Why didn't you think of this before? And many couples had come to our training programs." "One lady near town has a milking machine, and a big herd. She manages it all with one labourer." I ask them: "Why involve women?" Dr. Bhide says: "For better results."

7.4 PROJECT FINDINGS

(Based on site visits and interviews)

7.4.1 Integration of Rural Women into Mainstream Development

BAIF is very sincere and committed in its keen interest in integrating rural women into mainstream national development. The women's contribution is warmly and openly acknowledged, and women have a high visibility. This is in spite of the fact that gender issues have not formed part of the initial IDRC-BAIF agreement, and that IDRC has not pushed women-in-development. Therefore, it all the more reflects BAIF's genuine commitment, and the organisation is clearly pro-women; this is not just a superficial phenomenon.

7.4.2 Policy Document

The kernel of a specific BAIF policy document regarding women is already there: "Rural women are at the forefront of development programs", and: "Once we decide on an activity for women, it is kept exclusively for women" are quotes from BAIF documents. There is also a document 'Women In Development', which may be too general, but it can be used as a base. It will however need to clearly differentiate between women's economic, social, political, day-to-day situations.

Nevertheless certain ambiguities remain. For example several BAIF senior staff said: "We don't want to get into areas of social conflict". But then, whether BAIF likes it or not, it has already been involved in "social conflicts". It did so when it decided to make 'drinking', and its abdication, a condition for the WADI programme. (Incidentally, this strategy initially appeared very moralistic; but my later experiences now suggest that this rule should be extended to non-tribal areas). BAIF also got involved when it decided to support Balwadi-cum-field guides, since some of them were getting out of intolerable family situations.

Many other important women's issues have not been articulated as women's issues. One example is bio-gas - women are the main (or only) users of the kitchen, the vessels don't get black, which relieves the drudgery, they don't inhale smoke. The BAIF document on energy does not even mention women.

7.4.3 Initiatives for Integration of Women

On the ground, there are five main initiatives for the integration of women, and for linkages with women:

- there are women health guides (37) in the Community Based Research (CBR) at the Vansda Project,

- CBR near Uruli Kanchan has a group of women Balwadi-cum-Field Guides in 12 villages,
- in Gujarat, Dr. and Mrs. Rangnekar are working with a women's team of wives as Field Guides,
- in all Cattle Development Centres, the staff are informally reaching out to women cattle-keepers,
- in the Vansda Project, an entire women's programme has been based on a traditional concept called wavli, over which women have full control.

7.4.4 IDRC Research Projects Findings

The IDRC Research Projects in general may not be formally and specifically linked to women at the present stage; but certain processes have been set in motion, and these can be easily built upon; and mechanisms put in place wherever needed. Informal linkages exist to a very great extent, which can easily be strengthened. Overall, there is a definite 'hidden' participation of women behind the scenes; there may not be complete decision-making by women; but there is a strong undercurrent of faith and trust in BAIF.

However, in the definition and formulation of research projects, it is doubtful that women were involved in any of them. Most of these seem to have been defined and formulated by the scientists. Only one project seems to have originated in the field, the frozen semen technology for buffaloes. It is also doubtful if data was gathered from women, or if the 'voice' of the ordinary woman has been heard in program planning, delivery and evaluation. However, many projects are not so far ahead yet.

It is clear that technology alone is not the answer. It is important to develop women's membership in producer organisations. The economic impact on women of the research results (or potential results) is likely to be very positive for most of the projects, especially for buffalo frozen semen, bamboo and mushroom production. Such direct benefits are less likely to materialize for women in mycorrhiza inocula, the rural polytechnic, post-production technology, economic feeding systems, and micro-carrier technology.

However in the case of sericulture, the additional work burden has to be carefully studied. And in the Social Science Research the study of the *wavli* practice is dynamic and well documented. But most of the other social science research is rather general, and the focus is not sharp. For example, the study on the status of rural women does not reflect the complexities, nuances and subtleties of women's specific situations.

Women's confidence and self-esteem has certainly been already enhanced by the project, and is certain to be enhanced still further, when the new technologies are developed and introduced. Women are certainly more appreciated in the community

now. Men on the other hand have not yet been encouraged to question their assumptions, but this is a much larger task, will take a long time.

7.4.5 Inside - Outside Dichotomy

An example of the private/public sphere dichotomy is that every single person or group we talked to during this visit said that women do 60 to 70 percent (sometimes 80 percent) of dairying operations. Yet according to 1989-90 statistics, of the members of Dairy Cooperative Societies in Maharashtra 5.6 percent are women. And there was not a single woman member in any of the Dairy Cooperative Societies visited. What is the process causing this anomaly? This needs to be studied.

7.4.6 Self - Reliance

Self-reliance may be difficult in certain projects. There will be a continuing dependence on BAIF, for example in the supply of buffalo semen, mushroom spawn and silkworm eggs, as well as in the marketing of many produce. There also seem to be a number of subsidies in some projects, which are not necessary if the project is actually sound. But given all this, BAIF works wonderfully!

7.4.7 Influencing Detrimental Policies for Women-in-Dairying

BAIF has potential to influence policy in favour of women. As a large cattle development organisation, it is in a unique position to study the dairying operations by rural women, and the barriers to rural women's participation in producer organisations, such as Dairy Cooperative Societies.

As it is, there is a Government Resolution (GR) that 30 per cent of Directors of every cooperative have to be female. BAIF can lobby with the Government to enforce this rule for Dairy Cooperative Societies, if the study shows that this GR is not implemented.

In the villages, BAIF can act as an effective agent of change. For example, IRDP loans for animals don't need security. Land can be held in joint names, and both husband and wife can be regarded as joint heads of the household. The Panchayat Bhavan can be given to exclusive women's meetings, if need be.

7.4.8 Terminology

The reflection of an organization sensitive and progressive in the area of women is by its terminology. This may not be important in itself, but for newcomers it immediately will give a message. Do not use the term "head of the household", and eliminate expressions such as `mankind', `manpower', etc. When talking about `husband', the words *yajman* and *malik* should be avoided, and more neutral term found.

If BAIF in its mandate stresses that the family is the unit, then the obvious consequence is that men and women need to be considered equal. Then the term "head of the household", when applied to men is misleading. Government may use the term "Head of the household" generally for men (or the husband), but BAIF needs to be an example, and consider both husband and wife as heads of their households." This change will have some immediate practical expression, as cards for AI are now in men's names only, and should be changed to the joint names of husband and wife.

7.4.9 Social issues

Again and again in the course of the evaluation, serious social issues were raised as the main problems of women. Social issues have an important role, because BAIF's emphasis on the generation of income is of no use, if its earnings are dissipated because of social problems. For the program to reach its goal of improving the quality of life, it is essential to go beyond simple gainful self-employment. The project has to generate a clear understanding of the negative and destructive "customs" or "habits" prevalent in the villages. BAIF, in order to be true to its mandate, needs to fully address the problems caused by customs such as polygamy, dowry and bride-price, and especially alcohol addiction, and to design appropriate interventions to overcome them.

7.4.10 Energy

Women cook, women collect cow dung, and women make cow dung cakes. Women bring fuelwood from a long distance, which is adversely affecting the environment. Therefore energy should be perceived as a women's issue, and some well designed energy systems should be developed by BAIF specifically for women. Possible interventions would be improved, locale-specific *chulhas*; biogas for small numbers of cattle; fuelwood plantations etc.