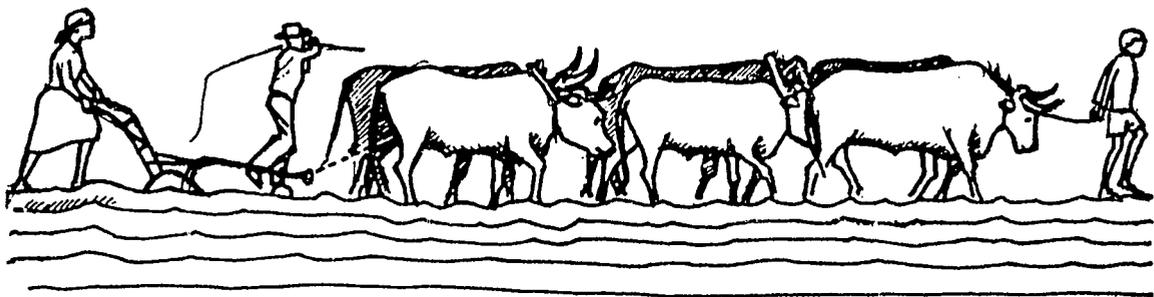


**AGRICULTURAL TECHNOLOGY
IMPROVEMENT PROJECT (ATIP)
CLOSE-DOWN REPORT
OF ATIP, SEPTEMBER 1990
Annual Report Number 8
Reporting Document: RD 90-1**



Agricultural Technology Improvement Project
Department of Agricultural Research
Ministry of Agriculture
P/B 0033
Gaborone
Botswana

Telephone 352381 Ext. 260
A GOB / MIAC / USAID Project

PD-ABC-087

15N 69182

AGRICULTURAL TECHNOLOGY IMPROVEMENT PROJECT

ATIP

CLOSE-DOWN REPORT OF ATIP, SEPTEMBER 1990

ANNUAL REPORT NUMBER 8

REPORTING DOCUMENT: RD 90-1

PRINTED: SEPTEMBER 1990

**DEPARTMENT OF AGRIC. RESEARCH
MINISTRY OF AGRICULTURE
BOTSWANA**

**MID-AMERICA INTERNATIONAL
AGRICULTURAL CONSORTIUM
(MIAC)**

ADDRESSES:

**P/BAG 0033
GABORONE**

**P.C. BOX 10
MAHALAPYE**

**P.O. BOX 10275
TATITOWN (FRANCISTOWN)**

LIST OF CONTENTS

CHAPTER 1: BACKGROUND	1
1.1 PREAMBLE	1
1.2 COMPREHENSIVE REPORTS.	1
1.3 CONTENT OF THIS REPORT	2
1.4 ACKNOWLEDGEMENTS	3
CHAPTER 2: PERSONNEL.	4
2.1 PROFESSIONAL STAFF	4
2.1.1 STAFF CHANGES	4
2.1.2 CONTINUITY OF USAID FUNDED PERSONNEL	4
2.1.3 CONTINUITY OF BATSWANA STAFF	7
2.2 SUPPORT STAFF	7
2.3 CONSULTANTS AND EXECUTIVE VISITS	8
2.4 VISITORS	8
CHAPTER 3: TRAINING.	10
3.1 LONG-TERM TRAINING.	10
3.2 SHORT-TERM TRAINING AND IN-SERVICE TRAINING.	12
3.3 ON-THE-JOB-TRAINING.	14
CHAPTER 4: EQUIPMENT.	15
4.1 PURCHASES OF EQUIPMENT.	15
4.2 HANDING OVER OF EQUIPMENT PURCHASED WITH USAID FUNDS	15
CHAPTER 5: STATUS WITH REFERENCE TO THE LOG FRAME	16
5.1 FARMING SYSTEMS APPROACH DEVELOPED AND TESTED.	16
5.1.1 PROGRESS MADE TOWARDS LOCALIZATION OF FARMING SYSTEMS WORK	16
5.1.2 HANDBOOK FOR FARMING SYSTEMS WORK IN BOTSWANA PREPARED	20
5.1.3 ALTERNATIVE CROP AND LIVESTOCK TECHNOLOGIES TESTED ON FARMERS' FARMS AT ATIP LOCATIONS	20
5.1.4 HELPED DAR IN IMPLEMENTING A SYSTEM FOR APPROVING RECOMMENDATIONS FOR ONWARD TRANSMISSION TO DAFS	21
5.2 INSTITUTIONAL CAPABILITIES DEVELOPED IN MOA.	22
5.2.1 QUALIFIED STAFF DEVELOPED IN NEEDED SPECIALTY AREAS.	22
5.2.2 HELPED DAR, AS REQUESTED, IN EVALUATING FARMING SYSTEMS WORK	22
5.2.3 HELPED DAR, AS REQUESTED, IN ESTABLISHING SYSTEMS FOR INTEGRATING RESEARCH, EXTENSION AND PLANNING TO MAXIMIZE THE BENEFITS OF FSR	23
5.3 NECESSARY FSW SUPPORT ACTIVITIES STRENGTHENED	24
5.3.1 SEED MULTIPLICATION UNIT STRENGTHENED AND PROGRESS MADE ON LOCALIZATION OF ALL POSITIONS	24
5.3.2 TRAINING PLAN IMPLEMENTED FOR AT LEAST SIX SUBJECT MATTER SPECIALISTS.	25
5.3.3 ON-STATION AGRONOMIC RESEARCH PROGRAMS ON SORGHUM, MILLET AND COWPEAS STRENGTHENED	25
5.4 RESEARCH AND INFORMATION.	25
5.4.1 ATIP DATA ENTERED ON MICROCOMPUTER TO FACILITATE FUTURE DATA COLLECTION AND ACCESSIBILITY	25
5.4.2 ATIP DATA MADE AVAILABLE TO AND USED BY OTHER GOB PERSONNEL	25
CHAPTER 6: CONCLUDING COMMENT	27
ATIP REFERENCES	28
OTHER REFERENCE	28

LIST OF TABLES

TABLE 2.1: PERSONNEL ASSOCIATED WITH ATIP SINCE ITS INCEPTION.	5
TABLE 3.1: LONG-TERM PARTICIPANT TRAINING SINCE INCEPTION OF PROJECT.	11
TABLE 3.2: LONG-TERM TRAINING DONE UNDER ATIP AUSPICES.	12
TABLE 3.3: SHORT-TERM AND IN-SERVICE PARTICIPANT TRAINING SINCE INCEPTION OF PROJECT.	13
TABLE 5.1: LATEST ATIP LOGICAL FRAMEWORK, JULY 1989.	17

GLOSSARY

ALDEP	Arable Lands Development Program
ANDP	Agricultural Development for Ngamiland Project
APRU	Animal Production Research Unit
ATIP	Agricultural Technology Improvement Project
BAC	Botswana Agricultural College
BAMB	Botswana Agricultural Marketing Board
CAPRO	Chief Animal Production Research Officer
CIMMYT	International Maize and Wheat Center
COP	Chief of Party
CPO	Crop Production Officer
CRSP	Collaborative Research Support Program
DAFS	Department of Agricultural Field Services
DAO	District Agricultural Officer
DAR	Department of Agricultural Research
DPS	Division of Planning and Statistics
FAO	Food and Agricultural Organization
FSSR	Farming Systems Southern Region
FSR	Farming Systems Research
FSW	Farming Systems Work
GIS	Geographical Information System
GOB	Government of Botswana
IBSNAT	International Benchmark Sites Network for Agrotechnology Transfer
IITA	International Institute of Tropical Agriculture
INTSORMIL	International Sorghum and Millet CRSP
ISNAR	International Service for National Agricultural Research
KSU	Kansas State University
LUO	Land Utilization Officer
MDP	Molapo Development Project
MOA	Ministry of Agriculture
MIAC	Mid-American International Agricultural Consortium
NORAD	Norwegian Aid Agency
OPEX	Operational Expert
RAO	Regional Agricultural Officer
RELO	Research Extension Liaison Officer
RSU	Rural Sociology Unit
SIDA	Swedish International Development Agency
SMS	Subject Matter Specialist
SMU	Seed Multiplication Unit
USAID	United States Agency for International Development
USAID/B	United States Agency for International Development in Botswana
USDA	United States Department of Agriculture

CHAPTER 1: BACKGROUND

1.1 PREAMBLE

The Log Frame indicates the major purpose of the Agricultural Technology Improvement Project (ATIP), which commenced in 1982, has been to improve the capacity of the Ministry of Agriculture's (MOA) research and extension programs to develop and extend of farming systems recommendations, relevant to the needs of the small (limited resource) farmer. To ensure sustainability of this approach two essential components of this effort have been to:

- (a). Develop a farming systems research (FSR) methodology suitable for the harsh climatic regime of Botswana and help in institutionalizing the approach in the MOA.
- (b). Develop links with farmers, with research in the Department of Agricultural Research (DAR) and with extension staff in the Department of Agricultural Field Services (DAFS).¹

Major components of the ATIP program have been the Mahalapye and Francistown farming systems teams, and liaison activities between research and extension. The actual steps and attributes of FSR can be found in previous Annual Reports.²

During the existence of ATIP there have been two External Mid-Term Reviews supplemented by an Internal Review, and one official Audit. These have been favorable, and an attempt has been made to follow-up on the recommendations that were made.

The contract with the Mid-America Agricultural Consortium (MIAC) will finish on September 28th, 1990, and therefore this constitutes the Close-Down Report of ATIP as far as the Kansas State University/Mid-America International Agricultural Consortium (KSU/MIAC) contract is concerned. However, in order to encourage sustainability of the approach, USAID/B will continue some funding for FSR by supporting an Operational Expert (OPEX) position, and post-ATIP linkages between MIAC and Botswana. The Sorghum and Millet Collaborative Research Support Program (INTSORMIL) and USAID/B will also continue supporting one agronomist position in soil management at the main research station at Sebele.

1.2 COMPREHENSIVE REPORTS

Unlike the earlier Annual Reports for the project, this report contains little technical or professional material. The reason for this is that USAID/B suggested that the technical part of ATIP's work over the years would benefit from comprehensive summaries that could be widely distributed. This technology improvement work is presented in three comprehensive

¹. Recently this department was split into two: the Department of Crop Production and Forestry and the Department of Animal Health and Production.

². The terms FSR and farming systems work (FSW) are used interchangeably in this report. The reason for mentioning the term FSW is that it is used in the Log Frame. In fact, as is described elsewhere, the two terms are not completely substitutable [ATIP RP 5, p. 6].

documents. These are as follows:

- (a). Technical Summary of ATIP Activities, 1982-1990: Research Results [ATIP RP 5].
- (b). Technical Summary of ATIP Activities, 1982-1990: Promising Guidelines [ATIP RP 6].
- (c). Technical Summary of ATIP Activities, 1982-1990: Research Extension Liaison Office Achievements [ATIP RP 7].

It is anticipated that report (a) is of most relevance to those interested in research, while report (b) is more relevant to extension staff interested in undertaking widespread testing of promising technologies and approaches. Report (c) is of interest to those concerned about fostering linkages between research and extension by means of a Research Extension Liaison Office (RELO).

While the above documents concentrate on results, ATIP has also -- over the last few months -- produced a two volume report concerning suggestions on how to undertake FSR in the harsh climatic zone of Botswana. Production of such a report was recommended in two reviews of the project. The volumes in the report are as follows:

- (a). Farming Systems Research Handbook for Botswana [ATIP RP 3].
- (b). Farming Systems Research Handbook for Botswana. Annex Volume: Examples of Forms and Surveys [ATIP RP 4].

The handbook is not designed to be a comprehensive document but rather outlines the methodology and implementation strategies necessary to deal with the many unique features which make up Botswana. It is anticipated that improvements in the various techniques that are discussed in the handbook, will develop as a result of additional experience gained by FSR practitioners in the country. However, the current availability of the handbook will undoubtedly help further the sustainability and the institutionalization of FSR in Botswana.

1.3. CONTENT OF THIS REPORT

Because of the production of the above technical documents, all of which have been distributed to USAID/B, this Close-Down Report contains little technical material. The contents are confined to the presentation of material not given in the above reports. The following areas are considered briefly in this document:

- (a). Personnel who have been associated with the project are presented in Chapter 2.
- (b). A summary of the training achievements associated with the project are given in Chapter 3.
- (c). Issues with respect to equipment purchased with project funds are briefly considered in Chapter 4.
- (d). An evaluation of how well the achievements of the project correspond to those detailed in the Log Frame is provided in Chapter 5.

Any detailed changes occurring since the last annual report [ATIP RD 89-1] was produced (i.e., end of 1990) are mentioned, and supplemented with more general statements concerning changes and progress over the life of the project.

1.4 ACKNOWLEDGEMENTS

The staff of ATIP would like to express their sincere appreciation for the support given by USAID/B personnel, by the leadership in the Ministry of Agriculture, and by MIAC/KSU staff. Without this, little would have accomplished. Finally, perhaps the biggest debt of gratitude is due to the many farmers who have enthusiastically participated in the multiple trials, studies, surveys and training courses undertaken by ATIP, often in association with other agencies in the Ministry of Agriculture (MOA). Because of the constructive cooperation of so many agencies and individuals associated with ATIP over the years, most staff in ATIP have had a truly rewarding and fulfilling experience.

CHAPTER 2: PERSONNEL

2.1 PROFESSIONAL STAFF

2.1.1 STAFF CHANGES

There have been no changes in Botswana or USAID funded professional staff since the beginning of 1990. However, with the approaching end of ATIP, the externally funded personnel are in the process of leaving. Drs. T. Thedford and F. Worman left in August, and Drs. Siebert and Norman are due to leave in September. Dr. G. Heinrich will, however, be returning to Botswana in the OPEX position mentioned earlier (Section 1.1). He will continue to be stationed at Francistown. Dr. N. Persaud will continue as the agronomist/scil management specialist being funded under the INTSORMIL and USAID/B program.

A list of professional staff associated with the project since its inception is given in Table 2.1.

2.1.2 CONTINUITY OF USAID FUNDED PERSONNEL

There has been excellent continuity of USAID funded personnel in the field. The seven person team have contributed 49.5 person years during the eight year project. A total of 12 long-term staff have been involved, with a breakdown, in terms of length of service in Botswana, as follows:

2 persons -- stayed 8 years each
1 person -- stayed 7 years
1 person -- stayed 6 years
1 person -- stayed 5 years
1 person -- stayed 3 years
1 person -- stayed 2.5 years
5 persons -- stayed 2 years each

The greatest turnover of USAID funded staff has occurred in two of the most difficult positions: research-extension (3 staff), and animal science (3 staff).

Continuity in terms of USAID funded staffing has been an important factor in contributing to the accomplishments of the project. Two major reasons why such continuity has been possible are:

- (a). The pleasant working and living environment provided for staff while working in Botswana.
- (b). The selection of suitable personnel has been the joint responsibility of the home campus and the ATIP Chief of Party (COP). Following this, approval of proposed appointments has been obtained from GOB and USAID/B.

Other reasons which have come into play more recently may have been:

- (a). In the most recent contract extension, provision was made to allow each MIAC

TABLE 2.1: PERSONNEL ASSOCIATED WITH ATIP SINCE ITS INCEPTION^a

(A). CURRENT

Name	Position	Level	Rank	Station	Started
USAID TECHNICIANS:^b					
Norman, D.W.	Ag. Econ.	Ph.D	-	Sebele	Aug. 1982
Siebert, J.C.	Agronomist	Ph.D	-	Mahalapye	Sep. 1982
Heinrich, G.	Agronomist	Ph.D	-	Francistown	Aug. 1983
COUNTERPARTS:					
Modiakgotla, E.	Agronomist	MS	C2	Sebele	Aug. 1982
Ramolemana, G.	Agronomist	MS	C2	Gaborone	Sep. 1983
Koketso (Tibone), C. (Mrs)	Ag. Econ.	BS	C3	Francistown	Sep. 1983
Luzani, J.	Agronomist	BS	C3	Mahalapye	Jan. 1984
Makhwaje, E.	Ag. Econ.	B.Sc	C3	Mahalapye	July 1988
TECHNICAL STAFF:					
Masikara, S.	Agronomist	CA	C4	Francistown	Sep. 1983
Kelemogile	Animal Health	DA	C4/C3	Francistown	Jan. 1989
ADMINISTRATIVE ASSISTANT:					
Selelo, L. (Ms) ^b	-	-	-	Sebele	Mar. 1983
Snyder, J. (Mrs)	-	-	-	Sebele	Sep. 1988
OTHERS:					
Mahilo, C.	Enumerator	-	B3/B2	Shoshong	Sep. 1982
Okaile, K.	Enumerator	-	B3/B2	Makoro	Sep. 1982
Dira, D.	Extension	-	B1	Mahalapye	Oct. 1982
Monyane, P. (Ms) ^b	Computing	-	-	Sebele	Feb. 1983
Monyadzwe, M.	Enumerator	-	B5	Mathangwane	Oct. 1983
Sibanda, C.	Extension	-	B1	Mathangwane	June 1984
Letswetla, T.	Enumerator	-	Ind. CI	Mahalapye	Jun. 1984
Bagai, B.	Extension	-	B1	Matobo	Oct. 1984
Nkhetlang, R.	Enumerator	-	B5	Matobo	Oct. 1984
Tsabadira, R.	Driver	-	Ind. CI	Francistown	Oct. 1984
Gaobone, K. (Ms)	Messenger	-	Ind. CI	Francistown	July 1986
Molapisi, M.	Typist	-	B4/B3	Francistown	July 1986
Bani, I.	Enumerator	-	B5	Shoshong	Sep. 1986
Motsokono, O.	Driver	-	Ind. CI	Francistown	Oct. 1986
Batshani, P. (Ms)	Enumerator	-	B5	Marapong	Oct. 1986
Mpaesele, B.	Driver	-	Ind. CI	Mahalapye	June 1988
Talibona, K.	Enumerator	-	B5	Matobo	Oct. 1988
Kooneeng, K.	Extension	-	B3/B2	Makwate	Nov. 1988
Aleseng, B.	Driver	-	Ind. CI	Mahalapye	May 1988
Kemotso, R.	Enumerator	-	B5	Makwate	Aug. 1989
Molefhe, S. (Ms)	Typist	-	B4/B3	Mahalapye	Sep. 1989
Otsogile, M.	Enumerator	-	B5	Mathangwane	Feb. 1989
Dinitho, O.	Extension	-	B3/B2	Shoshong	Nov. 1989
Mookodi, L.	Enumerator	-	B5	Shoshong	Apr. 1990
Bonolo, T.	Enumerator	-	B5	Makoro	Apr. 1990
Sibozi, P.	Extension	-	B2	Marapong	Aug. 1990

a. The table does not include those who were employed as casual labor or as contract workers under Industrial Class. Also, it does not include the students who worked with the project for short periods.

b. All the USAID technicians will have left by the end of September 1990, apart from G. Heinrich who will be returning under an OPEX arrangement. Also others marked with this superscript will leave because they are funded from USAID sources.

TABLE 2.1: PERSONNEL ASSOCIATED WITH ATIP SINCE ITS INCEPTION (CONTINUED)^a

(B). PAST

Name	Position	Level	Rank	Station	Started	Ended
USAID TECHNICIANS:						
Hobbs, A.	Agronomist	Ph.D	-	Gaborone	Aug. 1982	Aug. 1985
Koch, B.	Animal Sc.	Ph.D	-	Francistown	Aug. 1983	Aug. 1985
Miller, W.	Ag. Econ.	Ph.D	-	Francistown	Aug. 1983	Aug. 1985
Trent, C.	Extension	Ph.D	-	Gaborone	July 1985	Nov. 1987
Gray, R.	Animal Sc.	Ph.D	-	Francistown	July 1985	Feb. 1988
Baker, D.C	Ag. Econ.	Ph.D	-	Mahalapye	Oct. 1982	Aug. 1988
Hill, B.	RELO Adviser	Ph.D	-	Gaborone	Nov. 1987	Nov. 1989
Worman, F.	Ag. Econ.	Ph.D	-	Francistown	July 1985	Aug. 1990
Theford, T.	An. Scient.	DVM	-	Francistown	July 1988	Aug. 1990
COUNTERPARTS:						
Monyatsi, T.	Ag. Eco.	MS	-	Mahalapye	Aug. 1982	Dec. 1984
Moremedi, G.	Agronomist	BS	-	Gaborone	Dec. 1982	July 1986
Mahabile, W.	Animal Sc.	MS	-	Francistown	Sep. 1983	July 1988
Tjirongo, M.	Ag. Econ.	MS	-	Mahalapye	Sep. 1982	July 1988
Mabongo, B.	Ag. Econ.	BS	-	Francistown	Jan. 1986	July 1988
Seleka, T.	Ag. Econ.	BS	-	Francistown	Sep. 1983	Aug. 1988
Lesotlho, J.	Rural Soc.	DA	-	Mahalapye	Sep. 1984	Dec. 1985
Jonas, C. (Ms)	Rural Soc.	Camb.	-	Mahalapye	Jan. 1986	July 1987
PEACE CORPS VOLUNTEER:						
Bock, S. (Ms)	Ag. Econ.	BS	-	Francistown	Sep. 1986	Aug. 1988
Caplan, A.	Ag. Econ.	MS	-	Mahalapye	Sep. 1986	Sep. 1989
ADMINISTRATIVE ASSISTANT:						
Mophuting, N. (Ms)	-	-	-	Sebele	Sep. 1982	Jan. 1983
OTHERS:						
Mothokodise, B.	Enumerator	-	Trainee	Shoshong	Sep. 1982	Mar. 1984
Keipele, W.	Extension	-	T4	Shoshong	Oct. 1982	July 1985
Mmopi, M.	Driver	-	Ind. C1	Francistown	Sep. 1982	July 1985
Moile, P.	Driver	-	Ind. C1	Francistown	July 1985	Sep. 1986
Sibanda, B. (Ms.)	Enumerator	-	GA6	Marapong	Oct. 1983	Dec. 1985
Clifford, J. (Ms.)	Typist	-	S3	Francistown	Sep. 1983	July 1986
Serumola, R.	Enumerator	-	GA6	Makwate	Oct. 1984	Mar. 1987
Mosojane, R.	Extension	-	T4	Mahalapye	Oct. 1984	May 1987
Temba, M.	Enumerator	-	GA6	Matobo	Oct. 1984	Aug. 1988
Mapena, L. (Ms)	Extension	-	B3/B2	Makwate	Jan. 1986	Dec. 1988
Mogotsi, G.	Driver	-	Ind. C1	Mahalapye	Oct. 1982	June 1988
Alakanani, N. (Ms)	Enumerator	-	B5	Marapong	Dec. 1988	June 1989
Moabi, D. (Ms)	Extension	-	B3/B2	Marapong	Jan. 1987	Sep. 1989
Seleke, K. (Ms)	Typist	-	S4	Mahalapye	Dec. 1983	Sep. 1989
Baathodi, J.	Enumerator	-	B5	Marapong	Oct. 1984	
Keutele, L.	Extension	-	B3	Francistown	Dec. 1988	
Lebese, D.	Extension	-	B3/B2	Marapong	Sep. 1989	

a. The table does not include those who were employed as casual labor or as contract workers under Industrial Class. Also, it does not include the students who worked with the project for short periods.

b. She is currently away on long-term training.

technician to have one professional trip outside the country during a two-year tour.

- (b). Three of the current MIAC technicians employed under the contract had no assignments after the project was finished. All have spent at least five years on the project, and each of them was offered employment at KSU for at least six months after the end of the project in September, 1990, to give them time to identify other employment.

2.1.3 CONTINUITY OF BATSWANA STAFF

Of more concern, with the current interest in the institutionalization of FSR, is the issue of continuity in terms of the Botswana staff at a time when preparations are being made for the localization of FSR. The numbers, quality and experience of the individuals in FSR work will be critically important in determining its sustainability in the future. Apart from those specifically indicated in Table 2.1, those likely to be involved in FSR activities in the two ATIP areas after the end of September, are those listed in the table.

Four of the eleven professional level individuals, who worked directly with ATIP prior to their departure on training, and have completed their training, currently work with ATIP, although another three have close working relationships. This situation complicates the task of localizing FSR. However, it does not indicate a lack of support for FSR on the part of GOB. Rather, it reflects the current shortage of trained personnel in GOB, and that many individuals in government service are away on long-term training. It should also be noted that three other staff (1 certificate, 1 diploma and 1 BS degree holder) also work directly in ATIP, and received no long-term training under ATIP auspices.

In terms of training and expertise of the Botswana ATIP staff, two of the individuals have MS degrees. It seems that for some time to come, much of the FSR work will continue to be undertaken by individuals at the BS and diploma level. Many of these have a number of years field experience but with the departure of contract personnel, will continue to need some guidance. The handbook mentioned earlier (see Section 1.2), the presence of the OPEX funded individual (Section 1.1) and the proposed continuing linkage with KSU/MIAC will help to some extent.

There is now considerable MOA support for FSR work. For example, the draft of the new development plan (i.e., NDP VII) indicates strong support for FSR activities. However, one of the main question marks remaining about the sustainability of FSR work, in Botswana, is the identification and retention of well-qualified, satisfied, staff. Because the personnel are stationed away from the headquarters at Sebele, support in terms of housing, incentives, recognition etc., becomes important in determining the continuity and retention of staff in FSR work.

2.2 SUPPORT STAFF

Details on staff changes are given in Table 2.1. Relatively few changes have occurred since the beginning of 1990. Two enumerators were appointed in Mahalapye. At the same time in the Francistown area, two persons left on long-term training and another person was fired. The latter person has been replaced, and one of the other two is likely to be replaced in the near future.

With the recent relocation of all the FSR staff under the umbrella of the Department of Agricultural Research (DAR), there will no longer continue to be seconded support staff.

Those currently seconded from the Department of Crop Production and Forestry are in the process of being transferred to the DAR. It is difficult to evaluate this change in strategy. On the one hand, secondment -- that is, working on a temporary basis for another agency -- reputedly tends to inhibit the promotion prospects of those working under such an arrangement. On the other hand, day-to-day contact between different agencies is likely to be reduced when secondment no longer occurs, because an obvious point of contact has been eliminated.

2.3 CONSULTANTS AND EXECUTIVE VISITS

With the conclusion of ATIP, few consultancies were scheduled in the last year. The ones that took place were as follows:

- (a). Dr. Jorns, KSU Campus Coordinator of ATIP, visited Botswana to settle administrative details with reference to ensuring an orderly close out of the ATIP contract.
- (b). Dr. U. Singh visited on behalf of the International Benchmark Sites Network for Agrotechnology Transfer (IBSNAT) to discuss potential future cooperation.
- (c). Drs D. Nellis and C. Bussing (Department of Geography, KSU) and Dr. T. Coleman (Department of Soil Science, Alabama A and M), were funded under a USAID Strengthening Grant, and a Memorandum of Understanding between KSU and Alabama A and M, to investigate possible cooperation with the University of Botswana in the areas of short-term training and research in the use of the Geographical Information Service (GIS) system.

Over the project life many short-term consultants have been used. Records on these can be found through referring to earlier annual reports.

2.4: VISITORS

The following is a partial list of visitors to ATIP during 1990. Often they came for purposes other than simply visiting ATIP. It is also not a complete record since, for some, a record was not kept.

Drs. R. Ammabel and P. Nyack, IITA, Mozambique
Mr. D. Andrews, University of Nebraska
Dr. Coulter, World Bank
Dr. Croon, SIDA, Sweden
Dr. H. Diallo, Mr. H. Sallah and Mr. T. Senghore, MOA, The Gambia
Dr. A. Doto and Mr. C. Honwana, Mozambique
Dr. C. Eicher, Michigan State University
Dr. K. Friedrich, FAO, Italy
Drs. Hansen and Bright, South Dakota University
Ms. H. Henderson and Ms. B. Hutchinson, University of Arizona
Mr. P. Herthelius, SIDA, Sweden
Ms. B. Holden, Overseas Development Administration, United Kingdom
Drs. J. Jansen and L. Kahre, Swedish University of Agricultural Science, Sweden
Mr. Kahuure and Mr. Unino, Namibia
Mr. I. Kaliangile and Mr. L. Singogo, MOA, Zambia
Mr. T. Kirway, Ministry of Agriculture and Livestock Development, Tanzania

Drs. J. Matata and J. Mavua, MOA, Kenya
Dr. R. Otsynina, Consultant
Dr. J. Parr, USDA
Mr. R. Purcell, Consultant
Dr. L. Stiffel, Director General IITA, Nigeria

A more extensive list of visitors over the life of the project can be obtained through looking at the earlier annual reports.

CHAPTER 3: TRAINING

Four types of training for have been provided through ATIP: long-term and short-term formal training, in-service training, and on-the-job-training.

3.1 LONG-TERM TRAINING

Long-term training has always been an important component of the ATIP program.

Since the beginning of 1990 four persons have returned from long-term training. Mr. B. Moji obtained an MS degree in Extension Education, Mrs. P. Ntseane obtained an MS degree in Rural Sociology while Mr. E. Senyatso and Mr. D. Nkane completed MS degrees in Animal Science (Table 3.1). Another individual, Mr. B. Masilo, will also very shortly be completing an MS in Animal Science. Mr. B. Mogwera is also due back shortly in Botswana after completing a Certificate in Video Production.

A complete list of long-term participants is given in Table 3.1. A total of 23 individuals (25 degrees) have, or are receiving training, directly supported by ATIP (19 degrees), and with GOB matching funds (6 degrees). As the results in Table 3.2 indicate, the project has been fairly equitable in training individuals from the Department of Agricultural Research (8 degrees), the former Department of Agricultural Field Services (9 degrees), and the Division of Planning and Statistics (8 degrees), while the distribution has also been equally divided between BS (13) and MS (12) degrees.

In terms of institutional affiliation, 20 of the 21 individuals who have completed long-term training have returned to Botswana,³ and only two have left GOB service -- each joining organizations which have close relationships with GOB. In terms of affiliation with ATIP, before and after training, the picture is less satisfactory. Eleven individuals, who have completed training, worked directly with ATIP prior to their departure on training. Only four of those individuals now work with ATIP, while another two have close working relationships. This situation, of course, complicates the task of localizing farming systems research. However, it does not suggest a lack of support for farming systems research on the part of GOB. Rather, it reflects the current shortage of trained personnel in GOB, and that many individuals in government service are away on long-term training. Also, this situation has resulted in the development of an understanding and support for FSR among many individuals in the Ministry of Agriculture.

One important issue is what happens to the individuals still away on training after the end of September in 1990. With respect to this the following points are relevant:

- (a). Those being trained with GOB matching funds can continue to be funded after the end of September, and therefore should be able to complete their studies satisfactorily. Individuals under this arrangement are Ms. Jonas, Mr. L. Tabona, Mr. E. Ngakane and Mr. P. Mosupi.

³. One individual with strong Namibian connections has recently joined the Civil Service there.

TABLE 3.1: LONG-TERM PARTICIPANT TRAINING SINCE INCEPTION OF PROJECT

Participant	Local Affiliation		Before	Objective	Training Details		Dates
	Before Training	After Training			Place		
ATTIP Sponsored:							
Gaosegelwe, P.	ADNP, DAR	ADNP, DAR	DA 1975	BS (Agronomy)	Kansas SU	1/83- 7/85	
Mchive, F.	DAO, DAFS	DAFS	BS 1985	MS (Agronomy)	Kansas SU	8/85- 3/88	
Monyasi, T.	ATTIP, DPS	Left GOB (National Dev. Bank)	DA 1979	BS (Agronomy)	Kansas SU	1/83- 1/86	
Mochakgolla, E.	ATTIP, DAR	ATTIP, DAR	BS 1981	MS (Ag. Econ.)	Kansas SU	1/83- 1/85	
Moremedi, G.	ATTIP, DAFS	RAO, DAFS	BS 1981	MS (Agronomy)	Kansas SU	8/83- 8/85	
Tjirongo, M.	ATTIP, DPS	Left GOB (Central Bank)	DA 1980	BS (Agronomy)	New Mexico SU	8/83- 7/86	
Lesotho, J.	ATTIP, DPS	RSU, DPS	DA 1982	BS (Ag. Econ.)	Iowa SU	8/83-12/85	
Luzani, J.	ATTIP, DAR	ATTIP, DAR	BS 1985	MS (Ag. Econ.)	New Mexico SU	1/86- 3/87	
Mahabile, W.	ATTIP, DAR	ATTIP, DAR	DA 1983	BS (Rural Soc.)	Ohio SU	1/86- 1/89	
Motswasele, P.	ATTIP, DAR	APRU, DAR	BS 1984	MS (Agronomy)	Kansas SU	1/86- 6/89	
Seleka, T.	ATTIP, DAR	Left GOB (Botswana Dev. Corp)	DA 1985	MS (Antimal Sc.)	Kansas SU	1/86- 3/87	
Tibone, C.	ATTIP, DPS	DPS	DA 1983	BS (Seed Tech)	Mississippi SU	1/86- 7/88	
Rantolemana, G.	ATTIP, DAFS	ATTIP, DAR	DA 1985	BS (Ag. Econ.)	Oklahoma SU	1/86- 7/88	
Sebinyane, A.	LUO, DAFS	ATTIP, DAFS	DA 1983	MS (Agronomy)	Oklahoma SU	1/86- 7/88	
Nisane, P.	RSU, MOA	RSU, MOA	BS 1985	MS (Cartography)	New Mexico SU	8/86- 7/88	
Masilo, B.	APRU, DAR	APRU, DAR	BS 1984	MS (Rural Soc.)	SW Missouri U	8/87- 8/90	
Moji, B.	RAO, DAFS	RAO, DAFS	BS 1983	MS (Antimal Sc.)	Kansas SU	8/88- 8/90	
Moroke, T.	DAR	DAR	BS 1983	MS (Ext. Educ.)	Kansas SU	8/88-10/90	
Manhe, M.	DAR	DAR	BSc 1987	MS (Soils)	U of Missouri	1/89- 8/90	
Mogwera, B.	DAFS	DAFS	MS 1986	PhD (Agronomy)	S Illinois U	8/89- 8/91	
			Cert	Non-degree (Video)	Michigan SU	9/89- 8/93	
					Ohio Inst. Photog.	9/89- 8/90	
GOB Sponsored:							
Jonas, C.	ATTIP, DPS		Camb.	BS (Rur. Soc.)	U of Florida	8/87- 8/91	
Nkane, D.	DAFS		BS	MS (An. Sci.)	Prairie View U	1/87-12/89	
Tabona, L.	DAFS		DA	BS (Agronomy)	Utah SU	1/88- 1/91	
Sentyaso, E.	APRU, DAR		BS	MS (An. Sci.)	Iowa SU	8/88- 8/90	
Ngakane, S.	DAFS		DA	BS (Range Man)	Michigan SU	8/88- 8/91	
Mosupi, P.	DAFS		BSc	MS (An. Sci.)	U of Arizona	8/88-12/90	

- (b). DAR has located alternative funding for Mr. T. Moroke (INTSORMIL) and Ms. M. Manthe (Norwegian Aid) after the end of ATIP.
- (c). GOB has identified alternative funding for Mr. A. Sebinyane after the end of the ATIP contract.

A total of 66 person years of long-term training have been associated with the project -- 51 person years funded directly under the project and another 15 person years with GOB matching funds.

TABLE 3.2: LONG-TERM TRAINING DONE UNDER ATIP AUSPICES*

Department	----- USAID -----				----- GOB Matching -----				Total
	Finished		Still Away		Finished		Still Away		
	BS	MS	BS	MS	BS	MS	BS	MS	
DAR	3	4	--	--	--	1	--	--	8
DPS	4	3	--	--	--	--	1	--	8
DAFS	2	2	1	--	--	1	2	1	9
Total	9	9	1	--	--	2	3	1	25

a. Included in the table as having returned is one person shortly due to return (B. Masilo), while not included is partial support given for two individuals who recently departed (MS and PhD) from DAR (Mr. T. Moroke and Ms. M. Manthe). It also does not include a person from DAFS who went on a one year non-degree course (Mr. B. Mogwera).

3.2 SHORT-TERM AND IN-SERVICE TRAINING

The term, short-term training, in addition to formal courses, has also included funding attendance at conferences and workshops outside the country that contribute to the professional development of the participants. The reason for combining these is because of the way the budget is broken down for the project. In some cases the sponsors of the training courses, such as CIMMYT, shared the costs of the training with ATIP.

The only short-term training supported since the beginning of 1990 has been for Mr. J. Luzani to attend the CIMMYT Workshop in Harare on FSR.

During the project, a total of 39 persons have benefited from professional trips or short-term training outside the country (Table 3.3). In addition, approximately 250 individuals have benefited from short-term training courses associated with ATIP within Botswana -- otherwise known as in-service training courses. Assuming overseas trips average two weeks in length, and courses within country average one week, a conservative estimate of 325 weeks of short-term and in-service training has been partially or completely sponsored by ATIP during the life of the project.

A limiting factor that has arisen during the project with respect short-term training, has been that ATIP has provided per diem and registration fees while GOB has provided airfares. Airfares are generally more expensive than the per diem and registration fees. Thus, the burden of short-term training is usually greater for GOB than for ATIP funds provided through USAID. Often the expense and the definition of short-term training as used by GOB, has created problems in obtaining GOB approval. For example, attendance at the annual US-based Farming Systems Symposium was not considered to be short-term training as far as GOB financial support for airfares, was concerned. Consequently, there have been constraints on the amount of short-term training ATIP has been able to support.

TABLE 3.3: SHORT-TERM AND IN-SERVICE PARTICIPANT TRAINING SINCE INCEPTION OF PROJECT^a

Participant	Local Affiliation	Training Details			
		Current	Objective	Place	Dates
Outside Country:					
Professional Trips:					
Tlale, B.	Dir., DAFS	BS	Visit US Institutions		7/83-8/83
Mmopi, K.K.	DAFS	BSc	Int. FS Tour	CIMMYT	July 1988
Moji, B.	RAO, DAFS	BS	Int. FS Tour	CIMMYT	June 1988
Moremedi, G.	RAO, DAFS	BS	Int. FS Tour	CIMMYT	June 1988
Setshwaelo, L.	CAPRO, DAR	PhD	Int. FS Tour	CIMMYT	June 1988
Modiakgotla, E.	ATIP, DAR	MS	Int. FS Tour	CIMMYT	June 1988
Hill, B.	RELO, DAFS	PhD	Int. FS Tour	CIMMYT	June 1988
Merafe, Y. (Mrs)	RSU, DPS	MS	FSR Workshop	Philippines	June 1988
Gakale, L.	Dir., DAR	PhD	Dryland Conf.	USA	15/8-19/8
Short-Term Training:					
Sigwele, H.	ADNP, DPS	MS	FSR Workshop	U. Zimbabwe	Mar. 1983
Tjirongo, M.	ATIP, DPS	DA	FSR Workshop	U. Zimbabwe	Mar. 1983
Masikara, S.	ATIP, DAR	CA	CIMMYT Workshop	Malawi	May 1984
Monyamane, P.K.	Hort., DAR	BS	Vegetable Course	USDA	1/84- 2/84
Modise, M.	DAFS	BS	Grain Storage	Kansas SU	6/84- 7/84
Lesothlo, J.	ATIP, DPS	DA	CIMMYT Workshop	Zambia	Nov. 1984
Ramolemana, G.	ATIP, DAFS	BS	FSR Workshop	U. Zimbabwe	3/85- 9/85
Masikara, S.	ATIP, DAR	CA	Agronomy Course	ICRISAT	9/85- 3/86
Luzani, J.	ATIP, DAR	DA	MSTAT Workshop	Swaziland	June 1985
Jonas, C.	ATIP, DPS	Camb.	FSR Workshop	Gambia	Apr. 1986
Otisitswe, G.	CPO, DAFS	DA	FSR Workshop	U. Zimbabwe	Feb. 1987
Ramaribana, K.	DAO, DAFS	DA	FSR Workshop	U. Zimbabwe	2/87 & 9/87
Jonas, C.	ATIP, DPS	Camb.	CIMMYT	Lusaka	May 1987
Mosupi, P.	CPO, DAFS	BS	Quelea Control	Colorado SU	July 1987
Mosarwe, D.	CPO, DAFS	DA	Quelea Control	Colorado SU	July 1987
Masikara, S.	ATIP, DAR	CA	CIMMYT	Harare	July 1987
Modiakgotla, E.	ATIP, DAR	MS	CIMMYT	Harare	July 1987
Mabongo, B.	ATIP, DPS	BS	ILCA	Addis Ababa	Nov. 1987
Mazebedi, M.	Hort., DAFS	DA	Irrigation Training	MAMC, Swaziland	3/88- 4/88
Mpathi, T.	SMU, DAR	DA	Seed Technology	Sweden	8/88-10/88
Masikara, S.	ATIP, DAR	CA	US Workshops and Institutions		9/88-10/88
Alidi, F.S.	DAFS	MS	MSU Seminar	USA	9/89-10/89
Tibone, C.	ATIP, DPS	BS	FSR Workshop	U. Zimbabwe	2/89 & 8/89
Ketsilile, T.	FSSR, DAFS	DA	FSR Workshop	U. Zimbabwe	2/89 & 8/89
Pilane, D.	FSSR, DAFS	DA	FSR Workshop	U. Zimbabwe	2/89 & 8/89
Otisitswe, G.	CPO, DAFS	DA	FSR Workshop	U. Zimbabwe	2/89 & 8/89
Makhwaje, E.	ATIP, DAR	BSc	ILCA Data Analysis	Ethiopia	Feb. 1989
Lele, E.	DAR	BS	IFDC Workshop	Togo	Apr. 1989
Makhwaje, E.	ATIP, DAR	BSc	CIMMYT Data Analysis	Kenya	June 1989
Luzani, J.	ATIP, DAR	BSc	FSR Workshop	U. Zimbabwe	Mar. 1990
In Botswana:					
4 Clerical staff	ATIP, DAR		Applewriter IIc	F'town	May 1984
5 Counterparts	ATIP		Daisy Statistics	F'town	May 1984
2 Staff	DAR		Daisy Statistics	F'town	May 1984
18 Staff	DAFS, BAMB		Grain Storage	Sebele	Sep. 1984
25 Enumerators	DPS		Enumerator Workshop	Gaborone	July 1987
25 Enumerators	Farming Systems		Enumerator Workshop	Mahalapye	July 1987
38 Specialists	DAR, DAFS		Writing Workshop	Sebele	July 1987
60 Senior staff	DAR, DAFS		Training Trainers	Sebele	July 1987
5 Ag. Info staff	DAFS		Computer Workshop	Gaborone	Jan. 1988
50 Specialists	DAR, DAFS		Writing Workshop	Gaborone	June 1988
15 Staff	DAFS, Vet Serv, ATIP		Writing Seminar	F'town	July 1988
5 Ag. Inform. staff	DAFS		Computer Workshop	Gaborone	July 1988
3 Clerical staff	ATIP, DAR		Word Perfect	Gaborone	July 1988
1 Clerical staff	DAR		Word Perfect	Gaborone	July 1989

a. The table includes professional visits by more senior level officers in GOB.

3.3 ON-THE-JOB TRAINING

On-the-job training in ATIP has had three dimensions over the life of the project. These are as follows:

- (a). **Training ATIP Staff.** This training is a continuous process, and has been on-going throughout the project. The recent completion of the "Farming Systems Handbook for Botswana" [ATIP RP 3; ATIP RP 4] referred to earlier, will undoubtedly be useful in encouraging future on-the-job training in FSR in Botswana.
- (b). **Other MOA Training.** When called upon to do so, ATIP personnel have also help in implementing other training activities, such as talks to DAFS staff, and Botswana Agricultural College and University of Botswana students. Talks during the last few months have been given by ATIP staff to both these groups.
- (c). **Farmer Training.** In more recent years ATIP staff, in conjunction with other staff in MOA, have been involved in activities relating to the training of farmers. These have included the following:
 - i. **Farmer Groups and Training Workshops.** In the past few years ATIP personnel have been involved in training farmers either directly through groups or via workshops, held in conjunction with DAFS and other agencies. These activities have continued during 1990 with three research-oriented, and two extension-oriented, farmer groups.
 - ii. **Farmer Field Days.** As in previous years, farmer field days have continued during 1990. The nature of the cropping season partially determines how many are held.

CHAPTER 4: EQUIPMENT

4.1 PURCHASE OF EQUIPMENT

Funds originating from both GOB and USAID have been used to purchase equipment used by ATIP. In general, purchases can be classified into the following major groups:

- (a). Vehicles -- mostly from GOB sources.
- (b). Microcomputer (earlier Apple and later IBM compatible) and related equipment -- mostly from USAID sources.
- (c). Desktop publishing system and printing press, plus related equipment -- predominately from USAID sources.
- (d). Agricultural equipment -- from both GOB and USAID sources.

4.2 HANDING OVER OF EQUIPMENT PURCHASED WITH USAID FUNDS

There have been three ways in which equipment has been purchased using funds originating from USAID sources. These have been as follows:

- (a). Equipment purchased through the Research and Operation Support line item for which GOB purchasing procedures have been used.
- (b). Equipment purchased under the KSU/MIAC contract.
- (c). Equipment purchased directly with funds allocated to USAID/B.

Equipment from all these sources has been handed over to GOB, and now appears on the inventory of GOB.

CHAPTER 5: STATUS WITH REFERENCE TO THE LOG FRAME

The following discussion is structured according to the anticipated Project Outcomes listed in the most recently approved Log Frame, which is given in Table 5.1 (Sections C-1 (a) to C-1 (d)).

5.1 FARMING SYSTEMS APPROACH DEVELOPED AND TESTED⁴

5.1.1 PROGRESS MADE TOWARDS LOCALIZATION OF FARMING SYSTEMS WORK

In recent months a number of decisions have been made by GOB in general, and DAR in particular, which are designed to bring about the institutionalization and localization of FSR activities. Some of these are a direct result of the recently completed International Service for National Agricultural Research (ISNAR) review of DAR. Of special importance in this process are the following decisions to:

- (a). Continue FSR-type activities. This is clearly stated in the draft National Development Plan (NDP VII).
- (b). Locate all the FSR teams under one institutional base -- that is, in DAR.⁵
- (c). Fully operationalize the multidisciplinary Program Research Teams⁶ and the Recommendations Committee for approving technological recommendations. This will better integrate FSR activities with work being carried out on the experiment station.
- (d). To continue FSR or on-farm activities at both Mahalapye and Francistown. The proposal is for a Regional Research Station to be built at Francistown, where both FSR and station-based research workers will interact, and for research activities in the Mahalapye area to be strengthened.

Therefore there is no longer the issue as to whether FSR activities will continue in Botswana. The issue is now one of nurturing so that it can be sustained. The plan to retain the services of Dr. G. Heinrich, Agronomist, and Dr. N. Persaud, Soil Management Specialist, for another two years, to help in this nurturing exercise, is particularly welcomed.

⁴. Section C-1 (a) in Table 5.1.

⁵. Thus there is increased budgetary support in DAR not only to support the absorption of these teams -- the Molapo Development Project (MDP) and Farming Systems Southern Region (FSSR) -- but also to support the staff that were earlier seconded to the department (see Section 2.2).

⁶. These may be called Commodity Research Teams, although some of them are expected to be topic rather than commodity based -- for example, the Soil and Water Management Team.

TABLE 5.1: LATEST ATIP LOGICAL FRAMEWORK, JULY 1989

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumptions
<p>A-1. Program or Sector Goal: the Broader Objective to which this Project Contributes:</p>	<p>A-2. The Measure of Goal Achievement:</p>	<p>A-3.</p>	<p>A-4. Assumptions for Achieving Goal Targets:</p>
<p>To assist the GOB in developing an agricultural system that provides relevant technology leading to increased productivity for Botswana farmers.</p>	<p>Organizational changes made within MOA to institutionalize FSW.</p> <p>Increased returns to labor and other inputs demonstrated.</p> <p>Increased crop production under specified rainfall conditions.</p>	<p>MOA official papers.</p> <p>Farm surveys.</p> <p>Farm surveys and meteorological data.</p>	<p>Agricultural research and extension continue to be high priorities of GOB, and that MOA will review the effectiveness of its approaches.</p> <p>The amount and distribution of rainfall is sufficient to enable production to occur.</p>
<p>B-1. Project Purpose:</p>	<p>B-2. Conditions that will Indicate Purpose has been Achieved: End-of-Project Status:</p>	<p>B-3.</p>	<p>B-4. Assumptions for Achieving Purpose:</p>
<p>To improve the capacity of the Ministry of Agriculture's research and extension programs to develop and effectively extend improved technology and practices relevant to the needs of small farmers in selected pilot areas.</p>	<p>The Ministry of Agriculture's DAR will be able to participate effectively in on-going FSW and be responsive to farmers' needs.</p>	<p>DAR's Annual Report and records. Reports of INTSORMIL and Bean/Cowpea CRSP.</p> <p>Records of meetings/workshops held with DAR/DAFS staff.</p>	<p>That potential exists in the agricultural system to improve productivity.</p> <p>That research for small farmers continues to be given high priority.</p> <p>That the extension positions in the pilot area will be staffed and have sufficient time to engage in farming systems related work.</p>
<p>Sub-Purposes:</p>	<p>1. On-station agronomic research at DAR strengthened in sorghum, millet and cowpeas.</p>	<p>DAR's Annual Report and records. Reports of INTSORMIL and Bean/Cowpea CRSP.</p>	<p>That potential exists in the agricultural system to improve productivity.</p>
<p>(a). Improve the capacity of the Ministry of Agriculture's Research (DAR) to develop technologies for small farmer needs.</p>	<p>2. Systems established for DAR to respond to requests from farming systems teams and conduct trials based upon these requests.</p>	<p>Records of meetings/workshops held with DAR/DAFS staff.</p>	<p>That research for small farmers continues to be given high priority.</p>
<p>(b). To improve the capability of the extension service to transfer appropriate technologies and strengthen the linkages between research, extension and farmers.</p>	<p>Improved linkages will have developed between the MOA research, extension and planning, resulting in more relevant adaptive technologies.</p>	<p>MOA staffing pattern and manpower training plans.</p> <p>DAFS and contractor records.</p>	<p>That the extension positions in the pilot area will be staffed and have sufficient time to engage in farming systems related work.</p>
<p></p>	<p>1. The Subject Matter Specialists trained and working effectively.</p>	<p>MOA staffing pattern and manpower training plans.</p>	<p></p>
<p></p>	<p>2. DAFS disseminating tested technologies in the ATIP areas.</p>	<p>DAFS and contractor records.</p>	<p>That improved technologies can be identified, tested and made available for extension.</p>

TABLE 5.1: LATEST ATIP LOGICAL FRAMEWORK, JULY 1989 (CONTINUED)

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumptions
(c). To provide Botswana farmers in selected pilot areas with relevant innovations in agricultural production technology and methods through field trials, demonstration and farmer training.	Technologies identified which improve returns to labor/capital and/or increased production and/or reduce risk of failure.	Project Records.	
C-1. Project Outcomes	C-2. Magnitude of Outputs: C-3.		C-4. Assumptions for Achieving Outputs:
(a). Farming systems designed, developed and tested in two areas.	1. Progress has been made towards localization of farming systems work.	Project Records.	That the GOB will implement its current research strategy.
	2. Handbook for farming systems work in Botswana prepared.	Project Records.	
	3. Alternative crop and livestock technologies tested on farmers' farms at ATIP locations.	Project Records.	That potential exists in system to improve new technologies.
	4. Helped DAR in implementing a system for approving recommendations for onward transmission to DAFs.		That DAR has capacity to test technologies. That DAR is able to respond to FSW requests for on-station trials.
(b). Institutional capability and skills developed within MOA to carry out FSW in selected pilot areas.	1. Qualified staff developed in needed speciality areas, 25 persons trained at the M.S. and B.S. level, 27 in short-term farming system related courses, and 156 in in-service training courses.	MOA Records.	That sufficient numbers of qualified staff can be released for training
	2. Helped DAR, as requested, in evaluating farming systems work.	Project Records and GOB policy/planning documents.	That GOB concludes farming systems work has merit and has the resources to incorporate it.
	3. Helped DAR, as requested, in establishing systems for integrating research, extension and planning to maximize the benefits of FSW.	MOA Records.	That DAFS, DAR and DPS are willing and able to share responsibility for farming systems work.
(c). Necessary FSW support activities strengthened.	1. Seed Multiplication Unit strengthened and progress made on localization of all positions.	MOA Records.	
	2. Training plan implemented for at least 6 Subject Matter Specialists.		
	3. On-station agronomic research programs on sorghum, millet and cowpeas strengthened.		Bean/Cowpea and INTSORMIL Projects will continue to receive the bulk of their training and TA support from centrally funded CRSP projects.

TABLE 5.1: LATEST ATIP LOGICAL FRAMEWORK, JULY 1989 (CONTINUED)

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumptions
(d). Research and information	1. ATIP socio-economic and technological data systematically entered on microcomputers to facilitate future data collection and accessibility by trained Batswana.	Project Records.	That other GOB staff perceive a use for the data and can easily access it.
D-1. Project Inputs:	D-2. Implementation Target	D-3.	D-4. Assumptions for Providing Inputs:
(a). AID: Technical Assistance	56.5 person years long-term. 52 person months of short-term consultancies.	AID Records. AID Records.	That funds are made available from bilateral and supporting centrally funded sources.
Local Staff Training	8 person years. 45 person months of short-term training. 52 person years of long-term training.	AID Records. AID Records. AID Records.	That funds are available.
(b). GOB: Counterparts Other Staff	109 person years. 10 person years PCVs (local support costs). 16 person years secretaries. 24 person years drivers. 176 person years technical staff.	GOB Records. GOB Records. GOB Records. GOB Records. GOB Records.	That funds are available.
Commodities	5 vehicles and replacements. 14 houses for MIAC staff and counterparts.	GOB Records. GOB Records.	That funds are available.
Training	15 person years.	GOB Records.	That funds are available.

As far as the two ATIP areas are concerned there are, as mentioned earlier (Section 1.1), currently five experienced Batswana professional staff -- three at the BS degree level, and one each at the Diploma and Certificate level. In addition there are two Agronomists in the Sebele/Gaborone area both with MS degrees, one of whom is the Research Extension Liaison Officer. In order to maintain an inter-disciplinary approach help is particularly needed in the Economics area as it is likely that the two Agricultural Economists in the field stations will soon go overseas on further long-term training.

There are also plans for two other farming system teams to continue operating in the Southern and Maun areas.⁷

5.1.2 HANDBOOK FOR FARMING SYSTEMS WORK IN BOTSWANA PREPARED

Some priority has been given to the preparation of the handbook during the last few months (see Section 1.2). The reason for this is that staffing of all the FSR teams, in Botswana, is changing frequently, and such a handbook could help provide continuity in terms of the approach to be used. As indicated earlier (see Section 1.2) it is not intended to be a comprehensive handbook since several are already available. Instead, it has concentrated on the approach being used in Botswana. The handbook also contains references to other manuals where further details on specific methodological issues can be found. Although ATIP has played a major role in developing the handbook, drafts were given to other FSR teams in Botswana to elicit their comments. This, combined with the localization and institutional consolidation of FSR teams under one department (i.e., DAR), will help in the evolution of a common approach to FSR-type activities in the country.

5.1.3 ALTERNATIVE CROP AND LIVESTOCK TECHNOLOGIES TESTED ON FARMERS' FARMS AT ATIP LOCATIONS

Although external funding for ATIP will finish at the end of September, 1990, much of the work that has been undertaken will continue. Therefore work output at this stage of the project is a combination of that which can be considered completed and that which requires more work before it can be considered a farmer recommendation. Therefore the "Technical Summary of ATIP Activities: 1982-90" volumes referred to earlier (Section 1.2) present results in the following manner:

- (a). The **Promising Guidelines** volume [ATIP RP 6] contains information on technologies and approaches that ATIP staff have helped -- often with others -- to develop which would benefit from further field testing in extension-oriented farmer groups before being produced as formal recommendation leaflets or **Agrifacts** (for technologies) or **Extension Bulletins** (for approaches) as they are called. ATIP staff are confident that these **Promising Guidelines** will be valuable in helping to improve the productivity and welfare of farmers.

In terms of **technologies**, a total of nine guidelines have been prepared. These guidelines are classified under a number of themes, namely:

- i. Soil moisture enhancement (early plowing, contour strip tillage, water conservation terraces).

⁷. These teams are called Farming Systems Southern Region (FSSR) and the Molapo Development Project (MDP).

- ii. Planting and weeding (row planting and mechanical weeding, rotary injection planter, Maun cultivator).
- iii. Specific crop activities (cowpeas).
- iv. Specific livestock activities (control of lice on goats and goat kraal construction).

Similarly, in terms of **approaches**, a total of eight guidelines have been prepared. They can also be presented according to a number of themes, namely:

- i. Farmer involvement (extension-oriented farmer groups, farmer training courses, conducting farmer field days, and competitions at Agricultural Shows).
- ii. Encouraging cooperation (between FSR and station-based research and between research and extension).
- iii. Techniques (estimating tswana goat weight with a tape measure, and the use and care of the bloodless castrator, Burdizzo).

In addition to the **Promising Guidelines**, ATIP staff have made substantial contributions to two **Agrifacts**, one on donkey draft power, already published, and the other on double plowing, which will shortly be available for distribution.

- (b). The **Research Results** volume [ATIP RP 5] contains not only the results of research on the technologies and approaches that formed the basis of the **Promising Guidelines** under (a) above, but also presents recommendations for future work on other technologies and approaches that need further development before **Promising Guidelines** can be developed.

Whenever ATIP staff have been involved in the development of **Promising Guidelines** and **Agrifacts**, attempts have been made to include the following types of information:

- (a). **Conditional Information** which indicates what to do if the recommendation cannot be adopted in its entirety, if a particular event occurs, etc.⁸
- (b). **Targeting Information** which indicates under what conditions the recommendation works the best, for example, type of farmers, particular soil, etc.

5.1.4 HELPED DAR IN IMPLEMENTING A SYSTEM FOR APPROVING RECOMMENDATIONS FOR ONWARD TRANSMISSION TO DAFS

A Recommendations Committee in DAR has been approved which will evaluate possible improved technological recommendations for crops and livestock that can be produced as **Agrifacts** and/or **Extension Bulletins**. Terms of reference and operation are still to be clarified.⁹ As mentioned earlier (Section 5.1.1), complementing the Recommendations Committee is the decision to establish livestock and crop related Program Research Teams around commodities and subject areas that will encourage more of a team approach, and hence greater integration of research undertaken by individual researchers. Once again, terms of reference and operational procedures are currently being developed for them. ATIP staff have helped in preparing proposed terms of reference and operational guidelines for both the Recommendations Committee and the Program Research Teams.

⁸. For example, double plowing should not attempted late in the season, top dressing of fertilizer should only be applied if the rains are good, etc.

⁹. ATIP staff, particularly the COP, have been helping in this exercise.

The approval system for developing **Agrifacts** or **Extension Bulletins** is of course only the first step in the process designed to encourage farmers to make changes in their farming systems. In recognition of the importance of involving farmers, ATIP has not only developed **Promising Guidelines** (Section 5.1.3) worthy of further testing with farmers, but has also developed both Research- (for testing technologies) and Extension-Oriented (for disseminating technologies) Farmer Groups for more productive and efficient involvement of farmers. The latter type of group has been adopted as an extension strategy for widespread testing in the second phase of a major development program, the Arable Land Development Program (ALDEP).

5.2 INSTITUTIONAL CAPABILITIES DEVELOPED IN MOA¹⁰

5.2.1 QUALIFIED STAFF DEVELOPED IN NEEDED SPECIALTY AREAS

According to the Log Frame, 25 persons were to benefit from long-term training at the degree level. Complete support has been given for 25 degrees, and co-funding support has been provided for three others. Because of the end of the ATIP contract in September, 1990, GOB has arranged alternative funding after August 1989 for three who will not have completed their studies by that time. In addition four others are currently being trained with GOB matching funds, which can continue to be committed after the end of September, 1990.

Twenty-six individuals have received short-term training in farming systems research or closely related topics. Twenty-five were in fact scheduled in the Log Frame. Thus obligations in this area have been fulfilled. Altogether 39 individuals benefited from professional trips and short-term training in other countries. Some of this training was co-funded with other agencies, particularly CIMMYT.

In terms of in-service training, ATIP has provided some form of support¹¹ for 268 individuals who attended courses of one sort or another. This far exceeds the number scheduled (156) in the Log Frame. Thus, once again, obligations in this area have been fulfilled. Individuals trained included not only staff in MOA but also farmers.

Finally, when requested, several ATIP staff members have given seminars, lectures and courses to extension staff, and to students at BA and the University of Botswana. These have often been related to FSR topics.

5.2.2 HELPED DAR, AS REQUESTED, IN EVALUATING FARMING SYSTEMS WORK

An offer was made for ATIP funds to be used in partially supporting the review of DAR by ISNAR consultants. However, this was not necessary since NORAD agreed to completely fund the visit. The ISNAR consultants reviewed DAR as a whole, but their terms of reference included looking at the relationship between on-station and FSR or on-farm work. The ATIP COP was on the Reference Group that met regularly with the ISNAR group. Although the final report is still not generally available, the presentation given by the

¹⁰. Section C-1 (b) in Table 5.1.

¹¹. For example, funding the participants providing support for the trainers, ATIP staff giving lectures, talks, etc.

ISNAR group before their departure, indicated strong support for a continuation of FSR activities.

Their evaluation therefore supports the MOA in general, and the Director of DAR, in particular, who have decided to continue FSR activities -- that is, an on-farm systems approach -- after ATIP finishes. As indicated earlier (Section 5.1.1), Farming Systems Southern Region (FSSR) and the Molapo Development Project (MDP) are in the process of being absorbed under DAR, thus placing all the farming systems teams within one department. Also in order to better direct and integrate on-farm and on-station research, a number of multidisciplinary Program Research Teams focussed on specific commodities and subject areas are in the process of being formed.

Therefore the recent positive evaluation that FSR has received means that there is strong support for GOB institutionalize the approach in Botswana.¹²

5.2.3 HELPED DAR, AS REQUESTED, IN ESTABLISHING SYSTEMS FOR INTEGRATING RESEARCH, EXTENSION AND PLANNING TO MAXIMIZE THE BENEFITS OF FSW

Emphasis on the further development of linkages has received particular attention during the last few years of the project. The situation is as follows:

- (a). Many joint activities between research and extension have developed in the Mahalapye and Francistown areas where ATIP FSR teams have been operating. Joint activities which are discussed in other documents [ATIP RP 5; ATIP RP 6] have included research and extension-oriented farmer groups, farmer training courses, farmer field days, competitions at Agricultural Shows, etc. Over time these linkage activities within the regions are becoming more formalized, and are supported by the leadership at MOA headquarters.
- (b). The Research Extension Liaison Officer (RELO) was a formalized attempt to establish linkages between research and extension at MOA headquarter level and also between the center and the regions -- including the farmers. A report has been written detailing these activities [ATIP RP 7]. Many activities have been undertaken, some more successful than others. On evaluating the current situation there does seem to be strong support, within the MOA leadership, for a continuation of the RELO position. However, there are a number of issues that are currently under debate and need resolution before this position can be truly effective. The signs are that these will be resolved in the near future. This should be helped as a result of recent organizational changes have taken place in MOA. Also, since the 1989 Agricultural Sector Assessment Study, the 1990 ISNAR consultants and the new National Development Plan (NDP VII) have all addressed the RELO issue in a positive manner, resolution of the outstanding issues should occur in the near future. Three important issues that need resolution are as follows:
 - i. Where should the RELO be located, under the office of the Deputy Permanent Secretary or in DAR? For a number of reasons, the latter location appears to be currently more likely and the more desirable.

¹². Another constructive look at FSR work in Botswana has been provided by Frankenberger and Mitawa [1988].

- ii. How can the RELO position be given more authority to go along with its responsibility? Currently the RELO has little authority which inhibits it being effective.
 - iii. What should be the job description of the RELO position, for example, should it include not only crops but also livestock? Given the significant interaction between crops and livestock in the farming system, and the general importance of livestock, ATIP considered this to be essential.
- (c). Linkages with planners -- particularly with the Division of Planning and Statistics (DPS) -- have occurred, but on a less sustained basis than those with extension. Linkage-type activities have included the following:
- i. Responding to specific study requests from planning and development agencies. Examples include; evaluating the impact of programs designed to alleviate the effect of drought [ATIP EP 88-4], evaluating conditions of farmers' equipment with a view to making recommendations on how to overcome identified problems [ATIP WP 38], estimating costs of running tractors as an input to determine the level of the plowing subsidy [ATIP EP 88-3], etc.
 - ii. Use by planning and development agencies of research results from ATIP's work that have implications concerning support systems and agricultural policy.
 - iii. ATIP staff responding to requests from planning and development agencies for help in providing information to and guiding and evaluating the work of consultants (e.g., destumping, irrigation, development of the Western Region, agro-forestry, draft power subsidies, etc.), and planned development initiatives (e.g., evaluation of ALDEP, preparation of Agricultural Sector Assessment Study, preparation of National Development Plan VII, etc.).

On the related issue of improving communication and information dissemination, a desktop publishing system plus printing press and related equipment were purchased with ATIP funds and set up in the Agricultural Information Services offices in the MOA. This system provides services for all agencies in the MOA. Consequently there has been a great improvement in the timely production and distribution of agriculturally-related materials in the MOA.

5.3 NECESSARY FSW SUPPORT ACTIVITIES STRENGTHENED¹³

5.3.1 SEED MULTIPLICATION UNIT STRENGTHENED AND PROGRESS MADE ON LOCALIZATION OF ALL POSITIONS

With the departure of the Seed Multiplication Advisor in 1989, the Seed Multiplication Unit was completely localized and no further ATIP support has been necessary.

¹³. Section C-1 (c) in Table 5.1.

5.3.2 TRAINING PLAN IMPLEMENTED FOR AT LEAST SIX SUBJECT MATTER SPECIALISTS

These Subject Matter Specialists are extension staff. Three have been trained, and five are currently away on training. They are included in the list in Table 4.1. Two of the returned staff are now Regional Agricultural Officers (RAOs).

5.3.3 ON-STATION AGRONOMIC RESEARCH PROGRAMS ON SORGHUM, MILLET AND COWPEAS STRENGTHENED

In order to strengthen experiment station-based research, some ATIP support has been provided for two Collaborative Research Support Programs (CRSPs) during the life of the project -- the one for sorghum and millet (INTSORMIL) and the other for beans and cowpeas. Both CRSPs have, for at least some of the project, assigned long-term staff in Botswana. ATIP has been responsible for some of the local support costs. In addition, ATIP has supported one year of training for experiment station-based scientists currently undertaking further studies in soil science (MS degree) and legume agronomy (Ph.D).

Finally INTSORMIL, with some support from USAID/B, will continue funding one position in Botswana starting in September, 1990.

5.4 RESEARCH AND INFORMATION¹⁴

5.4.1 ATIP DATA ENTERED ON MICROCOMPUTER TO FACILITATE FUTURE DATA COLLECTION AND ACCESSIBILITY

A format for storing data has been developed and the databases are housed at the various ATIP offices. Unfortunately, an understanding of the design and implementation of the study, survey or trial itself will be necessary for much of the data to be usefully accessed by other individuals.¹⁵ A lack of time, combined with some concern that much of the data have already been fairly completely analyzed, means that progress on documenting the data properly has not always been very satisfactory.

5.4.2 ATIP DATA MADE AVAILABLE TO AND USED BY OTHER GOB PERSONNEL

Substantial amounts of data and results are available for, and have been distributed to other interested agencies and individuals in the MOA. ATIP work has been well documented and summarized in the "Technical Summary Reports" mentioned earlier [ATIP RP 5; ATIP RP 6; ATIP RP 7]. A computerized mailing list was developed for ATIP papers. The total number of papers produced in each series, has been as follows:

- | | | |
|------|---|----------------|
| (a). | Externally Published Papers (EP Series) | -- totalled 36 |
| (b). | Research Papers (RP Series) | -- totalled 7 |
| (c). | Working Papers (WP Series) | -- totalled 37 |

¹⁴. Section C-1 (d) in Table 5:1.

¹⁵. There is the possibility of students using the data for further analysis providing sufficient contacts with staff responsible for collecting the data can be established.

- (d). Miscellaneous Papers (MP Series) -- totalled 91
- (e). Progress Reports (PR Series) -- totalled 62
- (f). Reporting Documents (RD Series) -- totalled 14

CHAPTER 6: CONCLUDING COMMENT

In conclusion, ATIP has had a very positive impact during its existence. Among the positive features which ATIP has helped create have been:

- (a). Increased recognition by MOA staff of the role that farmers can play in the research process, and the development of systems that can improve both their inputs and the efficiency in delivering services to them (e.g., farmer groups).
- (b). Development of a methodology handbook, reviewed by all the FSR teams, for undertaking FSR within the harsh climatic conditions of Botswana.
- (c). The decision by MOA to institutionalize FSR, locate all the FSR teams under one department, and the establishment of the Program Research Teams and a Recommendations Committee designed to improve the efficiency and productiveness of the research process.
- (d). Increasing recognition on the part of MOA of the importance of forging links between farmers, research and extension, both as a result of activities of the RELO and the two FSR teams.
- (e). The development of two Agrifacts and 17 Promising Guidelines on technologies and approaches designed to help farmers improve the productivity and welfare.
- (f). Provision of information to planning on matters relating to policy/support systems, development, etc.
- (g). Provision of substantial amounts of training -- long-term, short-term, in-service and on-the-job -- to substantial numbers of MOA staff, college and university students, and farmers. This will aid in the institutionalization of FSR in Botswana and also help in improving the potential productivity of farmers.
- (h). In spite of the drought prevailing during much of the project, substantial progress was made in developing strategies designed to improve the productivity of limited resource farmers under the difficult farming conditions that prevailed. With the proper support systems present widespread adoption of some of these strategies (e.g., double plowing, row planting and inter-row cultivation, etc.) should be possible.¹⁶

¹⁶. Detailed discussion on the issues of adoption is given elsewhere [ATIP WP 34; ATIP RP 5; ATIP EP 90-4].

ATIP REFERENCES

A complete list of papers produced by ATIP is given elsewhere [ATIP RP 5, Appendix C]. The ones listed here only refer to those cited in this report.

- ATIP EP 88-3.* Ketsitlile, T., Caplan, C., Modidi, L., and P. Bacon. "Estimated Tractor Costs for Ploughing in the Southern Region of Botswana". Kanye: FSSR, DAFS, Botswana.
- ATIP EP 88-4.* ATIP, ADNP and FSSR. "Impact Assessment of the Accelerated Rainfall Arable Production (ARAP) and Drought Relief (DR) Programmes: Executive Summary". Gaborone: DAR and DAFS.
- ATIP EP 90-4.* Norman, D., and E. Modiakgotla. "Ensuring Farmer Input into the Research Process within an Institutional Setting: The Case of Semi-Arid Botswana". *Agricultural Administration Network Paper* No. 16. U.K.: ODI, 1990.
- ATIP RD 89-1.* ATIP. "ATIP Semi-Annual Report Number 6, May 1989".
- ATIP RP 3.* Worman, F., D. Norman, and J. Ware-Snyder (Eds.). "Farming Systems Research Handbook for Botswana". 1990. June 1990.
- ATIP RP 4.* Worman, F., D. Norman, and J. Ware-Snyder (Eds.). "Farming Systems Research Handbook for Botswana. Annex Volume: Examples of Forms and Surveys". June 1990.
- ATIP RP 5.* Heinrich, G., J. Siebert, E. Modiakgotla, D. Norman and J. Ware-Snyder (Eds.). "Technical Summary of ATIP's Activities, 1982-90: Research Results". September 1990.
- ATIP RP 6.* Heinrich, G., J. Siebert, E. Modiakgotla, D. Norman and J. Ware-Snyder (Eds.). "Technical Summary of ATIP's Activities, 1982-90: Promising Guidelines". September 1990.
- ATIP RP 7.* Norman, D. and G. Ramolemana. "Technical Summary of ATIP's Activities, 1982-90: Research-Extension Liaison Office". September 1990.
- ATIP WP 34.* Worman, L. Williams, C. Tibone and G. Heinrich. "1989 Adoption Study: Spontaneous Technology Adoption in Farmer Groups". June 1990.
- ATIP WP 38.* Norman, D., M. Sechele, K. Dira, E. Makhwaje and C. Patrick. "Row Planter Condition Survey". August 1990.

OTHER REFERENCE

- Frankenberger, T., and G. Mitawa. 1988. *Farming Systems Research and Extension Activities in Botswana: A Results Inventory*. Tucson, Arizona: University of Arizona.