FINAL REPORT

SURVEY OF IDRC COMPLETED PROJECTS IN SOUTHERN AFRICA

COMMERCIALIZATION CASE STUDY

AGRICULTURE AND AGROFORESTRY

K J Billing
October 1997
Harare, Zimbabwe

TABLE OF CONTENTS

TABLES

TABLES **Continued**

ANNEXES

LIST OF ABBREVIATIONS

AI	Artificial Insemination
ALDEP	Arable Lands Development Programme
APRU	Animal Production Research Unit
ARAP	Arable Areas Programme
ARNAB	African Network of Agricultural By-Products
ART	Africa Resources Trust
BCA	Botswana College of Agriculture
BDF	Botswana Defence Force
BWP	Botswana Pula
CA	CAMPFIRE Association
CAD$	Canadian Dollar
CAMPFIRE	Communal Areas Management Programme for Indigenous Resources
CASS	Centre for Applied Social Sciences
CBRM	Community Based Resource Management
CFDA	Community First Development Areas
CITES	Convention on Trade in Endangered Species
CL	Communal Lands
CSIRO	Commonwealth Scientific and Industrial Research Organization
DAR	Department of Agricultural Research
DNPWLM	Department of National parks and Wildlife Management
FAB	Forestry Association of Botswana
GoB	Government of Botswana
GTZ	German Technical Co-operation
IDRC	International Development Research Centre
IIED	International Institute for Environment and Development
ILCA	International Livestock Centre for Africa
MoA	Ministry of Agriculture
NGO	Non-Governmental Organization
NORAD	Norwegian Development Association
NRMCL	Natural Resources Management in Communal Lands
ODA	Overseas Development Authority
PANESA	Pastures Network for Eastern and Southern Africa
RSA	Republic of South Africa
RSC	Regional Seed Centre
SADCC	Southern African Development Co-ordination Conference
UB	University of Botswana
UHT	Ultra High Temperature
USAID	United States Agency for International Development
UZ	University of Zimbabwe
VIDCO	Village Development Committee
WADCO	Ward Development Committee
4WD	Four Wheel Drive
WWF	World Wildlife Fund
YWCA	Young Women's Christian Association
ZimTrust	Zimbabwe Trust
ZOPP	Objective Oriented Planning

HIGHLIGHTS

The first case study on the impact of IDRC-funded projects in the field of commercialisation evaluated three projects - two in Botswana and one in Zimbabwe. Two of these projects had received funding over two phases. The overall goal of the evaluation was to provide IDRC with information on the projects and their implementation so that the organisation could engage in a process of self-evaluation to improve its management and increase the impact of its work. This specific case study focuses on commercialisation in the context of outcomes which could be used to create wealth by increased profits or income generation.

Dairy / Beef Production Systems (Botswana) - Phase II.

This project which has focused on the introduction of exotic / local cross breeds, the use of crop residues and grown fodder crops for winter supplementary feeding has had very limited impact in terms of increasing income among small-scale dairy producers in the target area. Only 46 farmers eventually participated in the scheme and a number left the scheme once the free inputs (cross-bred cattle, fodder legume seed, and fertilizer) were suspended. The technical aspects of the project used by the Animal Production Research Unit of the Department of Agricultural Research are sound (cross-breeds produce more milk than indigenous cattle, and supplementary feeding especially in winter significantly increases milk yields) but clearly the increased financial inputs and highly increased labour requirements do not justify the increased output, this has consequently affected the extension of the programme to other farmers.

The biggest problem facing the farmers is the marketing of the milk (and milk products) and even with the introduction of Government subsidised village milk collection centres this still remains a problem. The necessary financial analysis was not undertaken and early indications on financial viability were not incorporated into project design. External factors mitigating against the project included the severe drought of 1991/92, and the strong competition local milk producers experience due to the market strength of imported dairy products.

The other objective of the project was to increase the national capacity to carry out animal production systems research and in this respect the project has had a significant impact and reasonable output. The project has funded a B.Sc., M.Sc. and a PhD as well as a number of short courses. Phase I and II has significantly increased the profile of dairy research in Botswana and consequently the funding commitment from GoB has increased and is being sustained.

Fuelwood Plantations (Botswana) - Phase I and II

This project set out to identify suitable fuelwood species for small-scale plantation production in the semi-arid areas of the country. The research was undertaken by the Forestry Association of Botswana which carried out a multi-species evaluation trial at some 9 diverse sites. Impact of this phase was significant as it was the first systematic research on tree species suitability. However, its importance, as something which could be extended to rural communities, was reduced by the fact that the initial selection of trees included too many single purpose exotics when clearly the socio-economic preference is for multi-purpose (fencing, wind-break and fodder) tree species. In the second phase assistance was provided to three communities to establish fuelwood plantations and vegetable gardens. The impact of these projects on income for the participating farmers has been negligible, in fact the plantations have not even made much contribution to their use of firewood. The slow growth of trees in Botswana especially during the series of dry years and droughts experienced during the project life means that some of the communities have been waiting some 5 - 6 years for the Eucalyptus to mature and they now hope to sell them as poles. The problem they will experience is the lack of a ready market for untreated gum-poles in the rural areas, the very real reluctance of locals to purchase the fast burning wood, and the impracticality of transporting the poles to either a processing centre or the cut wood to an area of urban consumption. External factors mitigating against the project include the fact that the "fuelwood crisis" appears to be a conceptual problem not yet appreciated by the majority of Batswana and the strong competition faced in the treated pole market from imports from neighbouring countries. The major problem with the project was its failure to adopt a more social forestry approach which worked with the community to identify their needs.

Natural Resources Management in Communal Lands (Zimbabwe) - Phase I and II.

This project provides extended socio-economic and socio-cultural research by the University of Zimbabwe-based institution - Centre for Applied Social Sciences (CASS) on aspects of natural resource management in the

Communal Areas. The commercial use of wildlife for the direct benefit of the communities bordering on the National Parks and Wildlife Areas is the basis of the successful CAMPFIRE project. CASS provides this national level project with an independent and unbiased research input to undertake baseline studies and project monitoring. This core CAMPFIRE programme now receives substantial funding from major donors and the provision of the CASS component of NRMCL research is jointly funded by IDRC and Ford Foundation., the research is still receiving funds for its current and third phase.

While CAMPFIRE has obvious commercialisation success (some 250,000 rural households have received +/- Z$34 million) the impact of CASSs research role in the programme is more obscure. The programme has made a significant impact in the collection of relevant information which has been used to develop the various implementation procedures and contribute to the debate on appropriate policy. The research has also provided an articulated voice to the views, aspirations and concerns of the communities involved but CASSs role in this form of advocacy has been questioned. In terms of mobilising community awareness of their "rights" and engendering transparency into the CAMPFIRE process, the NRMCL research has possibly made a greater impact in terms of public good and policy than in commercialisation.

The most significant impact of the project has been in the building of individual and institutional capacity at both CASS and other regional institutions. The IDRC funded research has produced 4 PhD's and 1 M.Phil and most graduates continue to work in the region. Through its collaborative efforts with the Department of Biological Sciences the programme has also been responsible for the production of a number of graduates with a M.Sc. in Tropical Resource or Terrestrial Ecology who not only have a scientific qualification but who are correctly orientated towards a social economic approach which is based on community participation. CASSs role as a centre of academic excellence has enabled it to attract top international personalities and make natural resource management in Zimbabwe and the region a well researched and well documented subject.

Summary of lessons learnt

In terms of commercialisation there is clearly a critical need for IDRC to be more analytical about possible and projected income effects of projects and be more rigid in ensuring that research components which identify, investigate and confirm the economics of a project are carried out. The assessment of the financial and economic benefits of a project must include a realistic assessment of the market and the feasibility and sustainablity of any marketing proposals. Given the growing increase in globalization of developing economies, because of structural adjustment and liberalisation, careful consideration must be given to cross border competition of substitute products.

- The leadership of programmes is possibly one of the biggest contributing factors to the successful and dynamic implementation of the project.

- The time horizon of IDRC input needs to be better defined at the beginning of the programme so that expectations of continuing funding can be incorporated into the institutions' planning

1.0 BACKGROUND

Over the past quarter of a century IDRC has supported research projects throughout the developing world and in the South and Central African Region in particular. IDRC is now engaged in an evaluation of its research projects in order to determine the impact of these endeavours, as a process of self-evaluation to fulfil its ongoing and future role in a more efficient manner.

The overall goal is to "deepen understanding of how development research contributes to social and economic development in the Third World" and how "IDRC's own work has had an impact and perhaps failed to have an impact, on this process." (Concept Paper - A.Bernard and C.Saunder 1996)

More specifically the objectives of this survey and assessment of completed projects are "to identify research outputs which have led to, or could have led to an impact" and further "to identify factors that have either facilitated or hindered the application of results".

This focus on "impact" is part of an ongoing refining of IDRC's institutional rationale and overall mandate. IDRC has always remained committed to its general development goal of "improving the lives of people who are marginalised and living in poverty" more recently it has been more concerned with issues related to the identification of the most appropriate target group, determination of how their "problems" can best be addressed or alleviated and who eventually defines and measures improvement in their condition.

The changes in emphasis, over the years, in IDRC's approach to development provides a good background to this evaluation of completed projects. There has been a change in thinking on the interaction between development activities and research and the subsequent interaction between research and application which forms the core of this study. IDRC has always had a realistic attitude as to how effective research could be at significantly altering development initiatives.

In its early years, IDRC was insufficiently concerned about the wider and longer-term impact of its activities, and very few follow-up studies were undertaken. During the early 1980's IDRC adopted a more specific role in "support to research and on strengthening less-developed countries' capacity to do and use research" rather than a direct involvement in development activities. This orientation evolved into a deeper concern on the utilisation of research and its results, this further refined the organisation's focus towards identifying the skills and training required to carry out effective research, to disseminate and share research experience. This component of institutional strengthening and capacity building is a key aspect of many of the projects evaluated in this case study.

The later half of the 1980's saw a further adjustment of focus and an orientation of development research towards broader appreciation of multiple stakeholders and beneficiaries, involvement of users in research priority setting and in the ability of research to both create awareness and possibly influence policy. Most of the projects evaluated in this case study come from this era and the role of research in the creation of public awareness and its influence on policy is an important focus in some of the projects.

The most recent shift in focus - "Empowerment Through Knowledge" in 1991 - has seen IDRC becoming more concerned about the possibility of a greater involvement in the management of possible application of research results. In addition, the ability to "sell" research findings which have produced impacts and which could have economically beneficial applications has become a consideration. This new orientation is reflected in the fact that this case study specifically focuses on Commercialisation.

This changing focus in IDRC has contributed to the institution's desire to gain a deeper understanding of the "success" and "failures" of previous research project initiatives and to use this information to adjust and hopefully improve its institutional management. One of the restated components of IDRC's basic operating style is "learning from the past to improve performance in the future". In this respect, it is hoped that the critical review of the three projects covered by this case study will contribute to this process.

2.0 METHODOLOGY

This evaluation takes full cognisance of the fact that the involvement of research in development initiatives can be intangible and that it is hard to define and measure impact. It is also appreciated that research is a process and that the effects/impacts vary with the course of the project. This Case Study specifically concentrates on Commercialisation, which by IDRC definition refers to wealth creation either in the form of increased profits or income generation. The projects covered by this case study are detailed in Table 2.1. The overall evaluation (the Survey of Completed Projects) also focuses on impact in three additional areas:

Public good
Policy
Information and communication links

As the basis of this evaluation, the following components were considered and they are defined below. A fuller, more detailed description of the general methodology and the specific components is contained in the overall Synthesis Report.

Outcomes	a project overall influences (positive or negative) categorised into four areas: - institutional capacity - individual capacity - knowledge - practice and knowledge
Outputs	products or processes which result from the objectives and inputs of a project
Reach	groups touched by the project including users and beneficiaries
Impact	when a person, persons or group is influenced by an outcome or result.

As secondary aspects to the main evaluation of impact, the assessment will attempt to identify:

- cases where further IDRC support could improve application/commercialisation of research results
- identify projects which have used information and communication technologies in an innovative manner.

The evaluation of the three projects in the Commercialisation Case Study - Agriculture and Agroforestry is based on the following general principles and methodology:

- The stated objectives of each project, given in the Project Summary, are compared to the actual and final activities and outcomes of the project.
- Wherever possible, the persons involved in the original project were interviewed and their interpretation of events and their recollections of the project sought. A full list of the people interviewed is contained in Annex I.
- Wherever possible, an attempt was made to meet the planned beneficiaries and participants of the projects in the form of farmers and villagers.
- In all interviews with respondents, the specific components of the evaluation, as described above, formed the basis of the discussions, i.e. inputs, outputs, context/environment, reach and impact.
- Wherever possible, relevant project documents were sought and studied to ascertain information relevant to the project evaluation. Specifically relevant documents were collected. Details of all documents reviewed are given in Annex II.
- All respondents were asked to identify other persons who could significantly contribute to the overall evaluation of the project or a specific aspect of it.

- More senior respondents who have been directly involved in the project were asked to specifically comment on their interaction with IDRC and the relevant Project Officers. These respondents were asked for suggestions as to how the involvement of IDRC could have been made more effective and useful.

- Background information which may have affected the project's overall implementation and the success or failure of the individual objectives was sought from relevant organisations and individuals who may have had nothing to do with the actual project. In these cases, only the more general aspects were covered.

This specific case study concentrates on a series of projects selected to represent the impact area of commercialisation and looks at the outcomes (products, processes or services) which either were or could be commercialised. In this respect the evaluation carried out on the three projects is not a full evaluation of the projects but rather on one very narrow aspect - commercialisation. This fact should be remembered when the evaluation of the project is read by the staff of the research institute or organisation that carried out the research. The evaluation is not passing judgement on the quality of the research work, nor is it judging the manner in which the IDRC funds were administered and used - it focuses specifically on the commercialisation aspects of the research. In many cases the research undertaken is of a high technical standard and the quality of the actual research is beyond reproach. None of the projects evaluated were intentionally directed at the commercialisation aspects or consequences of the research. However, where this research has failed to consider the financial viability of the innovations in relation to the market environment in which it must be adopted by farmers or implemented by an organisation - it has been criticised. Projects contributing to the general body of scientific knowledge (at times an important aspect of research) but with no market potential have not been classified as "successful" in terms of this very focused evaluation.

It must be recalled that the main beneficiary of this evaluation is IDRC, the objective is to critically evaluate IDRC's performance not that of the implementing institute. It would be presumptive for the consultant to attempt a full evaluation of a research project which in some cases has spanned 6 or more years with such a short field visit. Equally it would be grossly unfair to carry out a full project evaluation where, because of timing, all project staff could not make a more prepared and formal presentation of the project as was the case with this evaluation.

TABLE 2.1 DETAILS OF PROJECTS INCLUDED IN COMMERCIALISATION CASE STUDY - AGRICULTUTRE AND AGROFORESTRY FOR IDRC'S SURVEY OF COMPLETED PROJECTS IN SOUTHERN AFRICA

PROJECT NO.	TITLE	COUNTRY	RECIPIENT	SECTOR	PLANNED DATES	ACTUAL DATES	AMOUNT CAD $
87-0225	Dairy Beef Production Systems Phase II	Botswana	Ministry of Agriculture, Botswana	Agriculture	1988 - 91	1988 - 92	395 300
85-0118	Fuelwood Plantations Phase I	Botswana	Forestry Association of Botswana	Agroforestry	1985 - 89	1986 - 88	333 100
89-0068	Fuelwood Plantations Phase II	Botswana	Forestry Association of Botswana	Agroforestry	1989 - 92	1989 - 91	334 100
88-0026	Natural Resource Management in Communal Lands	Zimbabwe	Centre of Applied Social Studies, University of Zimbabwe	Natural Resource Management	1988 - 90	1988 - 90	303 740
91-0040	Natural Resource Management in Communal Lands Phase II	Zimbabwe	Centre of Applied Social Studies, University of Zimbabwe	Natural Resource Management	1992 - 95	1992 - 95	312 332

3.0 PROJECT # 87-0225 - DAIRY/BEEF PRODUCTION SYSTEMS (BOTSWANA) - PHASE II

3.1 Description of the Project

3.1.1 General comments and background

The project attempted to increase milk production and consequently family income among small-scale peri-urban livestock owners in the area close to the capital, Gaborone. This was the second phase of a project which had started in 1985 and ran until 1988 with IDRC funding (Project # 83-0281) but which is not part of this current evaluation. In the belief that this evaluation can be used to help IDRC in its planned evaluation of other projects it is worth making a specific comment on the exclusion of Phase I. In this project the second phase is very much an extension of the first and it would be more complete to have evaluated both phases, a contributing aspect maybe that livestock research is often long-term and therefore it can be expected that both phases would be similar. In cases where the two phases of a project are very different there could be a case for them to be evaluated separately but where the two (or three) phases are similar it would be better if all the phases are evaluated.

The project was based on the introduction of improved local/exotic cross breeds, coupled with the collection and storage of crop residues, the production of fodder and the introduction of winter feeding. A socio-economic baseline survey undertaken during Phase I had identified the following:

- genetic potential of local animals for milk production was low;
- inadequate feed in the dry season (poor grazing and no additional feeding) led to negligible milk production; and
- grain and stover production was low due to low rainfall and the utilisation of crop residues as a feed source was hampered by poor management practices, unfenced fields (uncontrolled and non-specific grazing) and an absence of any stover and forage storage strategies.

Source : Project Summary for Phase I and II

Detailed research station and on-farm research during Phase I had also identified that by using Tswana/Simmentaler crosses, milk yields could be increased by up to 200%. The feed value of various farm-grown fodder was evaluated and their positive effects on milk yields determined. A suitable leguminous fodder crop had also been identified (a Dolichos legume, *Lablab purpureus*). In fact by the start of Phase II, there were already 40 participating farmers (30 from 1985-86 and 10 additional in 1987-88). Phase II involved a direct extension and continuation of Phase I and was operational from 1988 to 1992. It did not differ significantly from the first phase other than that some of the on-station screening of other technologies etc. was dropped because it was deemed that a suitable package had been developed.
Source : Project Summary and interview with Head of APRU

The evaluation of this project will focus on the commercialisation aspects and will attempt to identify how profitable the various activities are and how the individual practices are viewed by participating farmers, in terms of the return to the additional labour input. The expansion and spread of the project in the target community will be taken as a proxy indicator of economic advantage. In addition, the sustainability of the project in the absence of subsidised inputs will also be considered. It must be clearly stated that this evaluation of the Dairy / Beef Project does not attempt in any way an evaluation of the technical merits of the research carried out during the project, it has focused on a very narrow aspect - that of the commercialisation component.

The project has been extended into a Phase III, from 1992, using Government of Botswana (GoB) funding and is still running today.
Source : Interview with Director DAR

3.1.2 Context

Botswana has, for many years, had a large and viable beef industry based on extensive exports. The droughts which persisted throughout most of the late 1980's and early 1990's adversely affected stock numbers and nearly one-third of the total herd of 3 million cattle perished. The cattle industry in Botswana has generally been based

on extensive ranching activities and the large-scale seasonal movement of cattle between different areas of grazing depending on rainfall pattern (transhumance).

The traditional sector has in the past produced and self-consumed a substantial amount of milk but this production has never been quantified and is considered to be low because of the inherent low milk production capacity of the indigenous breeds. The commercial production of dairy products has generally been low and local production has generally only produced 20-25% of total recorded consumption. This consumption is expanding at a rate of 15% per annum due to increasing urbanisation and an improvement in levels of income.

The GoB is committed to decreasing wherever possible the high dependency the country has on imported foodstuffs. Equally, Government policy encourages income generating activities in the rural areas so that food deficient households can buy in food. For these reasons, GoB has been encouraging dairy production via financial assistance to dairy producers and promoting research and extension on the subject.
Source : Project Summary and Report by Dairy Section of Dept of Animal Health and Production. MoA

The GoB has, in addition to its long-term commitment to development, a strong belief in the free-market and an avoidance of market distortions caused by subsidies. There is a belief that protectionism promotes inefficiencies and leads to increases in local food prices. Accordingly, the authorities consistently refused to "protect" the local dairy industry from competitive imports from South Africa and Zimbabwe.

This positive free market stance has made the development of a local dairy industry difficult because the reality is that local producers were, and are, having to compete with subsidised and supported producers. South African dairy producers have, for example, benefited from price support subsidies from their Milk Marketing Board, export incentives, subsidised electricity and feeds, below economic value water charges etc.
Source : Barclays Bank Economic Review and interviews with DAR and MoA

3.1.3 Project objectives

General objectives

To increase milk production among small-scale peri-urban livestock owners and to strengthen the national capacity to carry out animal production systems research in Botswana.

Specific objectives

1. To continue to introduce and evaluate fodder crops and dual purpose cross-bred cattle on small-scale farms.

2. To evaluate the economic performance and social acceptance of the introduced technologies.

3. To identify marketing alternatives and to plan a local marketing strategy.

4. To strengthen linkages with extension staff and transfer technology to the extension staff and farmers.

5. To train research technicians and scientists.

Source : Project Summary

The project period (1988-1992) was unfortunately characterised by a series of fairly severe droughts in the project area, which affected stover and fodder production and the overall performance of the cattle because of pasture and water shortages. The project received a major set-back due to accidental poisoning of cattle. This severely affected the expansion of the programme and after this point in time no new participating farmers were added.
Source : Interviews with head of Section and review of Annual reports.

The production economics of the project were analysed and a full report published in the 1989 Annual Report of the Animal Production and Range Research Unit of the Ministry (dated 1989 but only published in 1990). Three years of economic data from participating farmers was analysed by a staff member as part of a M.Sc. dissertation (produced in 1992).

Some useful multi-institutional and ground breaking research was conducted on the various methods of production (involved assessment of local preparation techniques) for a local dairy product "madila" including assessment of consumer preferences (testing taste preferences with local respondents) and published in the annual report.
Source : Annual Reports

Improvement of linkages with extension were not fully achieved but there was increased interest in Lablab as a fodder crop by neighbouring farmers but more as a general survival ration than as a feed supplement for lactating animals.
Source : Interview with researchers

3.1.4 Strategy / Activities

From the details in the Project Summary the strategies (methodologies) used to achieve the objectives were (the numbers and sub-sections below relate to specific objectives listed above):

1. Participating farmers were allowed to exchange two local cows (of any age) for a Tswana/Simmentaler cross produced on GoB ranches and in calf (pregnant) after being artificially inseminated with Simmentaler sperm. They were advised on appropriate production techniques for the establishment of 1 ha of lablab including: land preparation, fertilisation, planting and weeding. Information on harvesting and storage of lablab hay, sorghum stover and cowpea haulms was also supplied. The project felt that the "risk" associated with the adoption of the package required that a significant portion of the inputs were provided free of charge including the Lablab seed, phosphate fertiliser, hay if their Lablab crop failed, mineral supplements, sorghum bran, a knapsack sprayer, chemicals, veterinary support, milking equipment, etc. Much of the research was conducted on-farm and participant farmers were expected to keep detailed records. This farm level data was supplemented by on-station research.

2. Production data (milk yields to cash flow) collected under Phases I and II were to be fully analysed to assess economic performance. This was to be done by an agricultural economist. In addition, the attitude of farmers to the various components of the package and social aspects such as communal grazing and possible commercial rights to stover were to be evaluated.

3. Marketing of milk/milk products and home consumption was to be surveyed by the research team (with economists) so that alternative and optimal marketing strategies could be identified.

4. Regular meetings with the Dairy Section of the Animal Production Division (the extension agency for dairy) and joint activities such as farm visits, production of posters and pamphlets, monitoring and review workshops were planned. It was envisaged that extension would take over the project at the end of Phase II as a development activity.

5. Provision was made to fund three fellowships for a B.Sc., a M.Sc. and a Ph.D. In addition, technicians from research and extension were to attend regional courses on dairy production and extension.

In the detailed strategies, an additional and more comprehensive sixth objective was detailed.

6. To evaluate the project. It was proposed that the research team (and economists from DAR) would conduct an impact study based on interviews with GoB officials, farmers, members of the cattle and dairy industry, etc. to determine not only successes and failures, but attitudes as well.

Source : Project Summary

3.1.5 Inputs

The total IDRC budget was CAD$ 395 310 and it was foreseen that GoB would contribute an additional CAD$294 030 (IDRC contribution = 57,3% of total budget). The full extent of the GoB's financial contribution was not assessed as inputs such as the cattle from their ranches were not costed in.

The breakdown of the budget is given in Table 3.1 and this shows the allocation between the various project components.

The major component of the IDRC budget was for salaries and allowances (41,7%). The single item comprising this expenditure was the remuneration and living costs of the IDRC Project Advisor, Dr B Kiflewahid. This person was meant to provide leadership for the programme until the Motswanan senior staff returned from their studies. He had been in effective charge of the project during most of Phase I and it was envisaged, and budgeted, that he would remain on the project during Years 1 and 2. In fact, on the completion of his IDRC contract in 1990, he returned to Botswana, in his individual capacity, and took up a 3 year GoB contract as Head of Livestock Research (1992-1995).
Source : Interview with Head of Unit

Table 3.1 : Breakdown and analysis by item of IDRC contribution to APRU for Phase II of the Dairy / Beef Production Systems Project - in CAD$

ITEM	IDRC CAD$	as % of Total	GoB CAD$	as % of Total	IDRC as % of Total
Salaries and Allowances	164700	41.7%	132051	44.9%	55.5%
Research expenses	14877	3.8%	54546	18.6%	21.4%
Travel - Field research	12396	3.1%	74379	25.3%	14.3%
Travel - Regional/International	16000	4.0%			100.0%
Extension material	4959	1.3%			100.0%
Publications / Reports	2478	0.6%			100.0%
Equipment	11900	3.0%	33058	11.2%	26.5%
Training	147000	37.2%			100.0%
Seminars & workshops					
Contingencies	21000	5.3%			100.0%
TOTAL	395310	100.0%	294034	100.0%	57.3%

Source : Project Summary

The next most significant IDRC budget component was for training at 37,2% of total. The actual use of these funds and exactly who benefited from the training, under this budget item, is a little hard to ascertain. It could not be determined, during the evaluation interviews or by studying project documents, who was funded under Phase I or Phase II, who received other donor funded scholarships and who received direct GoB funding. Key persons involved in these decisions (Dr L Setshwaelo, the Project Co-ordinator) are no longer working on the programme and some of the other senior staff were actually away on training themselves.

Other cost components were small - travel at 7,2% of total actually included funds allocated to cover the cost of international travel by students and Other (6,6%) includes a small amount for extension and the amount allocated to contingencies. The GoB contribution was focused heavily on salaries and allowances (44,9%), field research expenses (travel and related allowances - 25,3%), actual research expenditure (18,6%) and the purchase of vehicles (11,2%). Generally all inputs were received in a timeous and efficient manner.
Source : Project Summary and Interview with Senior researchers.

The actual involvement of IDRC regional staff including the Programme Officer (Hugo Li-Pin) from Nairobi and the contribution they made cannot be ascertained because the APRU staff involved were away on training at the time of the evaluation. The Head of the Unit specifically states that Bruce Scott from the Nairobi office has consistently provided thoughtful and useful advice on matters of livestock research
Source : Interview with researchers.

The breakdown of the IDRC budget contribution meant that only a small proportion (12%) was actually administered by GoB. This represented at the time a total of BWP 56 400. The report on Phase II recently produced by GoB for IDRC details expenditure which totals over BWP52 000 but claims that payments received from IDRC total BWP94 500 meaning that some BWP42 000 has not been spent. These figures are confusing and further investigation should be carried out. This consultancy did not allocate time to investigate because the financial aspects are not considered critical to this evaluation. No IDRC funding was made available for Phase III which is exclusively funded by GoB.
Source : Draft of Final Project Report (APRU)

From experience on Af.D.B. project evaluation in Botswana, the period of the project has been characterised by a substantial devaluation of the local currency (the Botswana Pula (BWP)) against major currencies and the

GoB Treasury has not allowed departments to benefit from these currency movements. Generally, recipient Ministries are held to the Pula value in the original budget, making it impossible for projects to spend their total allocation in foreign exchange; this could be the case in the figures presented above.

It is generally accepted by most donors in Botswana that financial control is good but the Ministry of Finance tends to delay claiming reimbursements of project funds from the donors.
Source : Previous project evaluations in Botswana

Information provided by IDRC Head Quarters indicates that some CAD$60 700 remains unspent on the project. The greatest variance is on the Project Advisor Salary where only CAD$66 820 was spent. However, this is compensated for by an equivalent amount on Overseas Allowance, Employee Benefits and Other Allowances (CAD$36 700) which is considered by IDRC under salaries and allowances.

The budget allocation for training was underspent and some CAD$25 670 was unused. This is sufficient for at least two additional B.Sc. students (actual expenditure of CAD$856 on B.Sc. course in Swaziland). The amount allocated for contingencies was never touched.
Source : Project Variance Report

3.2 Project Outcomes

3.2.1 Outputs

1a. Introduction of cross-bred cattle

The increase of cross-bred cattle, among the participating farmers, has been based on the direct exchange of local for cross-bred cattle and the provision of artificial insemination (AI) services for the farmers' cows both on-farm and by sending them to a Government AI centre. The policy in the project has been to replace any project cattle which die. For example in 1986, 5 of the 30 cross-breeds in the programme died and were replaced, in 1987, 8 died due to food poisoning. In 1988/89 animal health improved and only calves died. In 1989/90 an additional 6 farmers joined to increase the number to 46 (2 cows died in that year).

During the drought of 1991/92, one of the most severe for many years, 36 of the participating farmers lost a total of 341 animals - 69 of them cross-breeds. In addition to drought losses, the project received a severe set back in late 1992 when a large number of the farmers' cattle, which were at the GoB AI centre, were poisoned by a noxious plant Dicapitelium, a tuber which produces an above-ground portion after a drought. All the cross-breeds produced in the last two years of the programme (1992 and 1993) were diverted to replace cattle lost through this accidental poisoning.
Source : Annual Reports and Interviews with Researchers.

The various on-farm and on-station research work undertaken during both Phases I and II clearly shows that the introduced cross is both hardy and a much better milk producer than the indigenous Tswana (it produces 2,5 to 2,7 times more milk). However, subsequent research work on other crosses and on other strains of Simmentaler clearly show that there are much better dairy strains. Some researchers argue that the early work concentrated on a Simmentaler line which was both a dairy and a beef animal (the actual title of the project) but that better selection of breeding stock would have produced a better, more efficient dairy strain. Future activities in small-scale dairy will concentrate on using crosses with classic dairy cows (Friesian, Brown Swiss, Jersey and dairy Simmentaler).
Source : Head of Unit and Director DAR

The cut-back in free inputs has seen the original participating farmers reduce to 30 (at the time of the evaluation in May 1997). Participation is classified as those farmers still submitting their records. Some farmers still participate in the milk marketing project but no longer provide dairy records.
Source : Interview with Researchers

Breed performance (on-farm and on-station) has been monitored and reported regularly in the annual report but this document is not widely distributed. For example, only a limited number are produced (during the evaluation visit the Department had no more copies in stock) and generally they are sent to related GoB departments. Like many of the reports produced by research stations it is not intended for popular consumption and makes for rather dry reading. Even if distribution were widened it is doubtful that the intended audience (a

farmer deciding on the suitability of a particular cross) may be able to determine which the best breed was, from the way the results are presented. A more concise publication such as a fact sheet or bulletin maybe received and used by a wider audience.
Source : Discussions with senior Researchers, Annual Report and opinion of consultant based on previous research station evaluations.

Despite a number of papers presented in regional and international workshops including the World Conference on Animal Production in 1987 and 1988, there appears to have been very little scientific publication in the period 1989 to 1992. Some researchers put this down to the unsettled nature of staff, due to overseas training, and the movement of the former Project Advisor into a post burdened with administrative duties. As is typical of many government funded and on-station livestock research programmes, the dairy research programme has been established, data collection has become routine and the technicians continue to generate a mass of results which are not fully analysed or reported. This is partly a result of the long-term nature of livestock research and the fact that often senior researchers become involved with their own research programmes leaving the more routine and basic (but also important research like breed performance) to junior staff.
Source : review of literature, interviews with Senior researchers.

1b. Introduction of fodder crops and use of stover

Some of the earlier annual reports claim that the introduction of Lablab fodder had been reasonably successful and that production per ha was adequate for supplementary feeding of lactating cattle, when there was adequate rain. The problem is that the crop must be sown every year, at a rate of 20 kg per ha. In addition, the seed for the fodder crop must be imported and is expensive.

Sorghum stover was collected by farmers but not all that available was collected due to labour constraints. Four different diets involving sorghum stover, sorghum bran and lablab were tested but produced no significant differences in mean milk yield and lactation length.
Source : Annual Reports and interviews with Researchers.

2. Evaluation of economic performance

A good report on production economics was produced by I. Daniels and published in the 1989 Annual Report. This paper makes a financial analysis of the benefits of the complete package, from the point of view that the farmer would have to cover all costs. The analysis assumes a number of values for various inputs (including stover and hay) and calculates total input cost, not on the actual inputs recorded by the project, but on the basis of average diets and average milk yields. These calculations assume that additional stover would have to be bought in and that farmers would have surplus lablab hay to feed to other animals. (This is a reasonable assumption as very few farmers produce and collect sufficient stover and this represents one way in which to cost stover - a second way could have been to cost its collection and local transport). The cost of the cross-bred animals is costed in, with interest, as a 3 year loan from the National Bank. The production model projects a surplus of 2 to 5 litres per day and envisages a marketing group of 15 farmers producing "madila" and milk for the Gaborone market.

The analysis finds that, although income is almost double in the case of the project, the net benefit is lower than in the "without project" case. The report states "the project proposal, as it stands, must be rejected as financially unattractive to the farmer".
Source : Annual report

The data collected by the project from 1986 to 1990 was used by one of the staff as partial fulfilment for a M.Sc. at University of Guelph in 1992. This wealth of data was used to create a single period linear programming model which was then used to determine optimal farm plans for each of the farmers in the project (38 of the 40 included). Linear programming, by necessity, has to make a series of assumptions about production patterns (the basis being the belief in linearity) so as to model production decisions and alternatives. In the case of this research, very little meaningful analysis was ever made of how the Botswana farmers saw production alternatives and therefore the assumptions are very first world ethno-centric and follow the pattern of dairymen in Canada. For example, one part of the model optimises culling and replacement decisions and a major component of the income flows then become sales of steer and heifer calves and culled cow sales. There is no evidence that the selection and purposeful replacement of cows takes place. Farmers who deem a cross-

bred animal unsuitable for dairy would more likely move the animal into their beef herd at their cattle post than to cull or sell it.

A second example of unrealistic modelling decisions is given by the assumptions made about labour. It is assumed that it can be hired whenever necessary and that the local wage rate will be equivalent to the GoB's minimum wage rate for daily paid industrial class workers. It further assumes that non-agricultural household activities will occupy 50% of available labour. There are severe local labour shortages at key points in the agricultural calendar but generally there is considerable unemployment and underemployment in most of the populated areas of Botswana. Local labour costs are considerable lower than the industrial minimum wage.

Despite the limitations of the model, detailed reading of the dissertation provides some clear clues to the economics of the system: "In case of farm resources, ... animal feed resources and labour were found to be most limiting." p.94. "At present farmers are being subsidised in terms of animal feed. It is now clear that once the subsidy is withdrawn, some farmers will not find the new production system to be economically sustainable and therefore will not continue with the proposed production system." p.96.
Source : M.Sc. Dissertation

The failure to feed these academic findings into the research programme is discussed elsewhere but other attempts to evaluate the economic aspects appear to have failed. The first Annual Report 1989-90 states: "Six additional farmers were monitored as control farmers in order to assess the economic advantages of the technical and management interventions. This group was again monitored during 1989/90 period and the data will be ready for analysis to be included in the next report."

The 1990 Annual Report states: "A milk and milk products consumption patterns and marketing survey involving both dairy project and non-project farmers was completed."
Source : Annual Report

Neither of these two studies appear to have been written and information on them could not be found at APRU during the evaluation visit.

3. Identify marketing alternatives and produce marketing strategy

This output had already been part of Phase I of the project but had not been realised and it was re-included in this second phase. The Project Summary for Phase II even states: "the development of a strategy for marketing surplus milk ... has not been fully addressed".

Research on the conversion of milk into "madila" (a soured milk product) showed that some 2,6 - 3,0 litres of fresh milk was used to produce 1 litre of the product. When this was compared to the local selling prices for whole milk, it became apparent that "madila" was being sold at only 40-60% of the equivalent milk price. This should have indicated to researchers that the production of "madila" was not a means of adding value to milk but rather a technique of disposing of surplus spoiled milk. This simple financial realisation that there was no increase in value for the additional effort required to produce "madila" should have been used to cost out the effect of spoilage of milk. There had always been a strong belief among researchers that making "madila" actually profited farmers, these beliefs persist despite the reported research and was actually noted during the interviews with local staff involved in the project. The failure of this research finding to influence the general course of the project is thought to be a result of the compartmentalisation of research workers in different disciplines, coupled with the failure by "scientific" researchers to see economic considerations as critical. This research was carried out in conjunction with both the Botswana Food laboratory and the University but the results were not presented to the team at Sebele, the same could be said of the research undertaken as part of an overseas M.Sc. - returning staff do not make seminar presentations to their colleagues. This lack of "team" meetings where different research projects could influence and interact with each other has already been noted by the Head of the section as a deficiency which should be rectified.
Source : Annual report, interviews with researchers and analysis by consultant

By the time of the first Annual Report, the marketing strategy had already been proposed and it involved the "establishment of village milk collection centres equipped with filtering, cool storage, recording and sale facilities. When surplus production exceeds local demand, then this would be collected to the Gaborone Dairy Marketing Co-operative for processing and distribution in urban areas". Preliminary discussions with farmers and village authorities (for allocation of a site) had already been undertaken. In the 1990 Report, it was stated

that construction would commence once plans were finalised. By the 1992 Report, it was reported that the building was complete at Kumakwane but there had been little progress at Oodi (only fence erected). In fact the first centre only operated in 1994 and 1995 while the other two only became operational early in 1997, some time after the completion of Phase II. As at May 1997 all three centres were operational.

4. Strengthen linkages with extension staff and farmers

Apart from occasional field days at Sebele for extension staff and two short training courses for participating farmers, there has been very little extension of small-scale dairy technology.

Although the use of lablab hay as a supplementary feed is appreciated by many farmers and their neighbours, the seed has never been freely available. Without cross-bred cattle and critical inputs (like seed), the potential for extension activities are limited.

There is no evidence that any extension materials (a specific item in the budget) were ever produced to extend dairy production.
Source : Interviews with Researchers and Dairy Specialist

5. Staff training

The attenuated nature of some of the postgraduate training makes it difficult to separate which course was funded from Phase I, which from Phase II funds and which staff received support from other financial sources. No official information on exactly which trainee was funded, where and when, could be found and therefore this matter could not be fully resolved in the time available. In terms of output, this is the most successful component. The technical innovations produced by the research have had little financial impact, but the impact of individual capacity building is long-term and sustainable.
Source : Opinion of Consultant.

Mr W Boitumelo completed his M.Sc. in Dairy Science at University of Guelph, Ontario, in 1989 and returned to Botswana in 1990. Subsequently he started a Ph.D. course at the same university in 1992, taking up a position which was to be used by Mrs Mahabile and funded by IDRC (it is not known if Phase II funding was used).

Dr Bernard Mosimanyana attended Guelph as a Ph.D. Animal Science postgraduate from 1987 (? funded by Phase I) and was due to complete his doctorate in 1991 but extended and only completed in 1992 (? extension funded by IDRC Phase II). He is currently Head of the Unit.

Ms K Palaelo went to start a B.Sc. Dairy Science at the University of Saskatchewan but was forced to return for health reasons. She completed her B.Sc. Agriculture degree at Botswana College of Agriculture (BCA) from 1991-93.

Mr Ramaphane obtained his B.Sc. Agriculture from the University of Swaziland studying from 1991-95. It is assumed that the special permission to fund a Bachelor level degree, granted by IDRC for Ms Palaelo was used in this case.

Some technical staff went for short-term training at ILCA in Addis Ababa (2 x) and in Harare.
Source : Draft of Final Project Report (APRU) and interviews with Head of Unit.

6. Evaluation of the project

One of the planned outputs which was not achieved was the planned multi-discipline evaluation of the project. If this had been done a number of the problems noted could have been identified and adjustment made to the project at an earlier stage. Even though the project has been over for some time an evaluation which focused on measuring impact from the point of view of the farmers would be extremely useful in the design of future research projects.

7. General observations on output

The economics of the project were not sufficiently thought out. Especially the unsustainable and subsidised production of cross-breeds, and the need to make annual purchases of Lablab seed. The project in Phase III is concentrating on on-farm AI as a means of increasing the number of cross-breeds as they now realise that production of animals by the project and exchange with farmers is not a viable option. In the field of pasture improvement and the production of feed material the project has moved away from the growth of Lablab hay and is now concentrating its research effort on Buffel grass with a pasture legume as a permanent (self-seeding) pasture. Both these adjustments indicate that the project has accepted that it must move away from subsidised inputs (cross-breeds and annual seed distribution) and take more cognisance of the labour demands that technical innovations demand. However, the fact that the project still has as one of its major constraints, the marketing of milk indicates that the importance of economic issues have still not been taken fully on-board.
Source : Interviews with Senior Researchers and opinion of Consultant.

Insufficient consideration is given to local demand for milk and costs of transporting surplus milk to the market even from a collection point. Gaborone Dairy Marketing Co-operative has recently collapsed due to mismanagement and the fact that transport problems (vehicle breakdowns) and costs were unsustainable.
Source : Interviews with commercial sources in Gaborone milk market.

3.2.2 Institutional environment

The Project has been attached to a research unit in the Department of Agricultural Research at the Ministry of Agriculture. The Animal Production Research Unit at Sebele Research Station has a competent and qualified staff equivalent to any in the region.

The research undertaken in the field of breeding, fodder establishment and stover collection/storage, feed production, the nutritive value of the various diets, dairy cattle performance, animal health and management have all been well implemented and generally are technically excellent. There are instances where even the staff involved would, with the ability of hindsight, maybe have adjusted the focus - for example the use of multi-purpose cross instead of a pure dairy animal. The staff development programme (partially funded by IDRC) has been well thought out and promising technicians have been able to move from a diploma, to B.Sc. and eventually to a M.Sc. This has seen them upgrade from a lab/field technician to a technical officer, then to a research officer and beyond.
Source : Interviews with Senior Researchers, dairy specialist and opinion of Consultant.

The need for a full time agricultural economist in APRU was realised early on. Economic support was normally attached to the programme from the Department of Agricultural Research (DAR) with a generalist economist provided. This support may have been better obtained from the Dairy Section of the Department of Animal Health and Production where the agricultural economist would have had some dairy experience. The specific training of a APRU staff member, Ms. K. Mokgotle (now Mrs Laletsang) was a logical step but the Department lost access to her input when, after her marriage, her husband was posted to an important post with the European Union in Luxembourg.
Source : Interview with Head of Unit

The weakness of the economic input and the failure to more closely integrate with the extension and dairy production section must be classed as factors which did not contribute to overall success. An important aspect in the performance of the Unit was the continuity provided by the IDRC funded Project Advisor, Dr. B. Kiflewahid, during most of Phase I (1985-88), part of Phase II (1989-1990) and his subsequent return (1992-95). His level of commitment and thoroughness is reflected in the annual reports that he was responsible for.
Source : Interview with head of Unit and Director DAR.

There was very good co-operation between APRU, the Botswana Food Laboratory and the Biology Department of the University of Botswana on the research into "Microbiological, Chemical and Organoleptic Study of Milk and Fermented Milk Products" - the research on the rural production of "madila".

The Project Summary details an important relationship between APRU and the Pastures Network for Eastern and Southern Africa (PANESA) - a collaborative research project on pasture agronomy and the African Network of Agricultural By-Products (ARNAB) - a research network studying the use of crop residues as animal feed. Team members have attended workshops and presented papers related to these bodies in 1996

(Blantyre, Malawi) and 1987 (Bamenda, Cameroon) but very little appears to have happened since then. APRU has maintained useful contacts with ILCA in Addis Ababa, and the Small Scale Dairy Improvement Programme in Zimbabwe.
Source : Interview with Senior researchers

3.2.3 Project Reach

The project was initially planned to benefit small-scale farmers in the Gaborone area and in other urban areas of Botswana, by facilitating their entry into dairy activities. A summary of the project reach is presented (with impact) in Table 3.2

The expanded reach of the programme was dependent on the incorporation of the dairy technologies developed into the extension programme and the recruitment of participants by the extension service, not the research programme.

This did not happen because of three reasons:

- the extension service was never brought on board;
- the technologies developed were never translated into concrete and adoptable recommendations; and
- the prerequisites for the programme, cross-bred animals, Lablab seed, etc. were not readily available to prospective adopters.

Source : Interviews with Senior researchers and analysis by Consultant.

Accordingly, the total reach of the full package of the programme only covered the 46 participating farmers. The initial objective was to target farmers with four to six cattle and a grazing shortage. Much of the modelling undertaken in the various production economic evaluation assumes this size of herd. However, surveys of the participating farmers indicate that their average herd size is 20. The participating farmers and the main beneficiaries are therefore relatively well-off farmers, typical of projects involving new and unique technologies -richer farmers can and do take greater risks than resource-poor farmers.
Source : Annual report and interviews with Senior researchers

Reports of interest in the establishment of Lablab pastures by non-participating farmers is not supported in discussions with farmers at the project site in Oodi.

More convincing evidence of an expanded project reach comes from changes in the attitude towards stover. The traditional method has been to leave stover in the fields for common grazing use. The importance of winter feeding as a survival mechanism is becoming more apparent to many farmers in Botswana, especially in the crowded eastern portions where grazing resources have been stretched during the droughts. Collection of crop residues, their storage and winter supplementary feeding in pens is already part of the extension message. The lack of extensive adoption of the use of stover is clearly related to a number of factors:

- crop plantings are fairly extensive and crop residues not substantial in volume, making their collection extremely labour intensive;

- only a few farmers have ox-drawn or donkey carts and animals to ease the burden of transporting the stover from their fields to their homesteads of cattle kraal (pen) sites; and

- both the above factors are influenced by the common belief that cattle herding activities (and consequently prevention of grazing in fields) end once harvest has occurred. This means that useful stover must be collected immediately after harvest, aggravating the labour and local transport bottleneck.

Source : Discussions with Senior researchers, Dairy Specialist and experience of Farming system in Botswana

A partial solution to the above problems can be found by fencing the fields. Finance for fencing is now available under two GoB rural development assistance programmes, ARAP and ALDEP. This enables farmers to preserve their stover for their exclusive use and they can let their animals into the field if and when available communal grazing starts to deteriorated.

The collection and storage of stover is an important animal feed strategy especially in the countries of South and Central Africa where an extended dry season reduces the quality of grazing. However, the use of preserved crop residues for the selective feeding of specific animals, such as pregnant / lactating cows, represents an additional innovation. The fact that selective feeding has occurred in Botswana supports what one of the researchers describes as a commonality of purpose between traditional feeding practices and the dairy programme. At times of feed shortage, pregnant animals and those with young calves would traditionally be favoured. Equally others argue that the reason why the impact of winter feeding has not been significant on milk production is because the crop residues and lablab hay have been feed to all animals in the herd. This phenomenon indicates that farmers have a strong commitment to the survival of their whole herd, a multiple function strategy where minimal provision is also given to draft animals, bulls and other cows. The farmers are not simply and solely committed to dairy because of the risks involved in single function enterprises.
Source : Interview with Senior Researchers and farmers, and previous experience of Botswana

The adoption of dairy activities is very dependent on the production economics and the failure of the project to fully appreciate this is discussed extensively under the following section on Impact. Clearly the reach of the project is critically dependent on the fact that the problems of marketing milk and related pricing issues represents a major constraint to its expansion.

One of the more important aspects of reach of the project has been the staff improvement via the training they received and the overall improvement in terms of the institutional strengthening of APRU to carry-out dairy research both on-station and on-farm.
Source : Interview with Senior staff and opinion of Consultant.

3.2.4 Project Impact

The project has not had a major impact in terms of its overall objective of increasing smallholder milk production. It failed to make an impact in terms of the extension of new dairy technologies and to substantially increase small-scale farmer incomes. However, the programme has had a major impact on the elevated status and prominence of dairy research and has significantly contributed to the national capacity to carry out animal production research. The commitment of an organisation as influential as IDRC to dairy research has contributed to this improved status as did the availability of training in this field. A summary of reach and impact is presented in Table 3.2.
Source : Analysis and Synthesis of Information gathered

Limited Impact

The limited impact at the farmer level is reflected by the fact that the total number of beneficiary families is still under 50 after two phases, involving something of the order of CAD$1 million and ten years' work.

The actual income accruing to participating farmers has never been fully evaluated and even if raw income figures could be surveyed or calculated, it would have to be related to the large subsidised inputs fed into the programme and distributed free of charge to participants. Despite the limited quality and depth of the production economic work, it is clear that the package, as devised, is not financially viable. This in itself is clearly the largest reason why the project has had limited impact.
Source :Analysis and Synthesis of Information gathered

During 1988/89, total milk production by all the farmers was approximately 66,4 t (19,8 t coming from project introduced cross-breeds). The following year this increased to 118,9 t (31,4 t from the cross-breeds) only to crash to just 37,2 t during the 1991/92 drought (8,1 t from the introduced cattle). This level of production must have had an impact on the income of participating farmers, considering that a family is expected to consume 3,75 litres of milk per day, meaning that in the peak year, the average family would have some 1,6 t of surplus milk, on average about 4,4 litres of whole milk a day. There must have been local sales to neighbours in the project areas and "madila" must have been produced and sold.
Source : Annual Report, information provided by researchers and opinion of consultant.

Where there were marketing constraints, family members must have consumed more milk and this should have had an impact on nutritional status - this was not measured, recorded or reported.

Table 3.2 : Summary of Impact and Reach - Project Number 87 - 0225 - Dairy / Beef Production Systems (Botswana) - Phase II

Potential Beneficiary /User	How Benefit	Mechanism	Actual Extent benefited /affected	Potential for future benefit
Farmers in Target Areas	Increase in income.	-Introduction of cross-breeds, with pen feeding of grown fodder crops and stover	-Only 46 farmers involved in programme over period '85 to '93 -Innovations required too much labour -Income not significantly increased due to milk marketing problems -Families must have had improved diet due to increased milk / milk products	-Cross-breeds and supplementary feeding can increase yields but must be more economic to be sustainable -Concept of selective supplementary feeding (stover/fodder) is important innovation -Marketing must be reviewed
Researchers	Increased capability for research	-Formal Postgraduate and Undergraduate Training -Regional courses	-One researcher obtained Ph.D. another a M.Sc. (now on Ph.D.) in Canada and two obtained regional B.Sc.'s -Technical Staff on short-term training at ILCA	-Researchers are well trained and capable and will make significant contribution to any livestock research programme -Dairy research has increased status
Department of Agricultural Research	Institutional Capacity Building	-APRU staffed by senior researcher who established dairy program (Phase I&II) -Staff received formal training	-Dairy research programme introduced into Department previously only focused on Beef Production	-Successful dairy in Botswana will involve commercial production and basis for good research support to this enterprise is now established -Dairy research has provided useful skills in animal nutrition and feed science
Extension Service Ministry of Agriculture	Improved Extension Intended	-Interaction with Extension Service poor	-Majority of innovations developed could not be easily extended because project was based on subsidised inputs - cattle and seed	-Use of crop residues and production of cut fodder will eventually become important aspects of livestock production

Even though the establishment of the Dairy Collection Centres occurred outside Phase II, their early performance is worth reporting. During 1994 and 1995, the total intake at one of these centres was 4 756 litres and 2 732 litres. Considering that the differential between buying and selling price was BWP0,10 per litre, total centre income was only BWP23-40 per month. This level of income does not even cover the cost of the gas used to run the cooling facilities. There is certainly insufficient money to cover the development costs of the centres. (Some BWP 45 000 - 60 000 for building and equipment BWP 8000 - 10000.)
Source : Report on Milk Collection Centres

Table 3.3 **Milk deliveries in March 1997 to the Milk Collection Centres, buying and selling prices in BWP per litre**

Centre	Total milk delivery in March 1997	No. of farmers delivering	Buying price BWP per litre	Selling price BWP per litre
Kumakwane	392 litres	3	1,00	1,10
Oodi	131 litres	4	1,30**	1,50**
Bokaa *	82 litres	1	1,00	1,25
Total	605 litres			

* Only operated in April
** Price reduced in May to BWP1,15 and BWP1,25 per litre

The major problem has been the low demand for milk in the villages and the fact that considerable amounts of sour milk had to be turned into "madila" which results in even lower actual milk prices. Of the 131 litres delivered in March at Oodi, 50 litres had to be turned into "madila".

The other problem has been the staffing of the centres - milk is produced every day and attempts to use group members to keep the collection centre open seven days a week have been very unsuccessful. APRU has recently appointed three milk attendants to staff the centres for six days a week. (The Sunday opening will be handled by the committee members on rotation.) The economics of this further illustrate the non-viability of the enterprise. Even at the centre with the greatest margin, the salary alone means that 2 700 litres of milk would have to be sold to break even.

The centre at Oodi has been restricting the deliveries of milk to a maximum of 5 litres per member per day because of its failure to sell milk in any volume. It is clear that a major marketing problem exists when fresh milk cannot be sold in a village for between BWP1,10 and BWP1,25 per litre, when the Gaborone wholesale price of milk is BWP1,80 per litre and fresh milk it is on sale in the area for BWP2,30 to 2,80 per litre.
Source : Interviews with Researchers and members of milk marketing group.

The minimum cost to hire transport to make the one-way journey from Oodi to the main dairy in Gaborone would be about BWP27 per journey (BWP 0,60 per km by +/-45 km). The city dairies are currently paying BWP 0,95 per litre and to achieve a farm-gate price of BWP 0,80 per litre, the group would have to transport a minimum of 180 litres per trip. The figures available from the programme indicate that a surplus of 5 litres per farmer per day is available for only one month of the year and thus even at the time of maximum surplus, the group would have to have a minimum of 36 members(12 times more than present to generate the 180 litres which are required to cover the transport cost. Logistically, this makes for a very difficult marketing problem.
Source: Discussions with Dairy Industry sources and calculations by Consultant.

Positive Impact

A number of respondents highlighted the impact that the IDRC project has had on dairy research in Botswana. The involvement of IDRC on Phases I and II of the project has created an important research focus and established a specific niche in livestock research which previously was dominated by beef production research.

The availability of postgraduate research and training opportunities in the field of dairy has created another career path for livestock scientists and established opportunity in broader aspects of animal nutrition. As one

researcher detailed, dairy investigations provided opportunities for short duration research as nutritional impacts are immediately monitored in daily lactation data whereas beef nutrition research was related to growth rates and increases in body weight measured over the year. Prior to the dairy research programme, there had been very little work on feeds, diet mixtures, etc. The dairy research programme had also indirectly stimulated nutritional work in small ruminants, other small stock and poultry. The cross fertilisation between dairy and other stock research is partially explained by the movement of staff after training.
Source : Interviews with researchers

The other significant impact of both phases of the Dairy Production System has been the fact that it firmly established a tradition of on-farm research among the work carried out at Sebele. Before the mid-1980's, there was a strong reluctance of researchers to move off-station. The early work on the dairy programme convinced the sceptics that farmers could be taught and be trusted to maintain reasonably competent records and that often results on-farm were slightly better than those on-station because the farmers were more committed to the livestock than the farm workers on the research station.
Source : Interviews with Senior Researchers

The most important impact of the project was on the development of local research capacity. Anyone who has had the pleasure of discussing the effect of micro-nutrient problems in grazing cattle in Ngamiland with the Head of the Unit or spent some time at the Unit asking for difficult-to-find information cannot fail to be impressed by the general level of competency, commitment and professionalism which characterises the Unit in particular and the Sebele Research Station in general.
Source : Interview with Head of Unit and other senior researchers.

The most useful part of this component is that all levels have been catered for, Ph.D. and Masters level by IDRC and ODA, and B.Sc. both regionally and locally. This gives a well balanced Research Unit and avoids the problems found in other institutions where they are top-heavy with doctorates. The commitment to all levels of training from regional based B.Sc. through to taught M.Sc. and finally Ph.D. is an aspect worth replicating because, apart from the balance it provides to the recipient institution, it also fosters the spirit of career development and advancement through education. If a junior technician knows that if he/she performs well they will be able to do a B.Sc. degree and eventually if their output continues to improve a masters or Doctorate this improves the general commitment to scientific research and academic excellence, this ensures both good and competent research as well as motivated staff.
Source : Interview with Senior Researchers

Some of the staff trained for the project have moved laterally into the Nutrition Feeds Programme which now concentrates on aspects of commercial dairy production, working now on a pure Friesian herd looking at the efficacy of imported feed concentrates. Mr O. Madibela and Ms. Palaelo have moved to this section. Mr M. Ramaphane has moved to work on small stock. In this respect the staff involved on the original Dairy Project now make a wider contribution to research in animal nutrition.
Source : Interview with Head of Unit

Senior staff of DAR admit that the lack of spectacular success on this smallholder based project has led to more emphasis being placed on large-scale commercial production as a way of increasing dairy production in Botswana. The requirements for successful dairy which includes access to water (stock watering and dairy hygiene), regular supply of stock feed (stover production is too unreliable and labour intensive) and consistent milk production to justify any marketing / transport arrangement precludes small-scale farmers.

3.3 Enhancement of Outcome

A Summary of factors enhancing and hindering the outcome of this project is given in Table 3.4.

The basic flaw with the project was that it was not economically sustainable (because of free inputs) and therefore not replicable and, even in terms of the subsidised inputs, the actual financial advantages of increased milk production (limited by market potential) were insufficient to justify the additional labour inputs in terms of the production, collection, storage and feeding of stover and hay.

There was no easy way in which the outcome could be enhanced because essentially it was not positive. The only additional input or orientation that could have been made by IDRC which may have assisted the programme would have been to insist, at an earlier stage, that the actual economics of the complete package

were analysed in a clearer and more rigid way. This would have required detailed information on:

- actual production cost to GoB of cross-bred heifers;
- actual cost of providing on-farm and on-station AI;
- other costs associated with the animal replacement and AI programmes: transport, labour, supervision, cost of replacing lost animals, etc.;
- actual labour input into: planting Lablab, harvesting hay and stover, storage, and feeding it to cattle;
- the labour involved in herding, selectively feeding lactating cows, milking and delivering milk to the market.

Detailed labour studies would have clearly shown the enormous labour demand involved.

- more detailed work on the decision-making process used by small-scale farmers in managing their herds. The feeling that some observers have is that the research programme (increasing milk production by cross-breeds) was running at a complete variance to the farmers' objective of maximising their returns in terms of the sale of beef animals such as 3 year steers and ensuring that his/her herd survived the drought;

Source : Dairy Specialist

- more work earlier on a practical marketing solution. This should have concentrated more on aspects such as:
  - . disposable incomes at village level for purchase of milk and milk products;
  - . role of small volume extraction of milk in current herd. Indigenous cattle may only produce small amounts but maybe that satisfies the need for milk for granny's porridge and the visitor's tea without causing problems of storing a perishable product;
  - . role of competitors' products - powdered, condensed, UHT and long-life milk;
  - . macro-economic aspects of competition of RSA and Zimbabwean milk products on local production and the strategy of dairies.

Source : Discussions with Senior researchers, Industry Sources and opinion of Consultant.

Table 3.4 Summary of Factors that Inhibited or Enhanced the Outcome of Project Dairy Beef Production Systems (Botswana) - Phase II

FACTORS THAT INHIBITED OUTCOME	FACTORS THAT ENHANCED OUTCOME
Previous research The economic indications on the technologies, especially the required labour input was not considered	Initial research (Phase I) had identified technologies which significantly increased yields.
Objectives Very general and broad , not project specific or focused	Project objectives were comprehensive in that they included specific economics and marketing aspects.
Project Objectives were not all pursued with the same vigour. Technical aspects were well researched but economic and marketing aspects were ignored.	
Context Botswana experienced severe droughts during course of project. Massive cattle deaths were experienced due to drought and poisoning by a drought related noxious weed.	Botswana has well funded research Programme with good facilities and adequate budget provision.
Open Border with South Africa allows direct competition between large-scale producers in that country and milk producers in Botswana.	

Strategies and Activities	Research based on On-farm principles which involved farmers in the collection of data .
Inputs Not all IDRC funds allocated were spent - More could have been done.	Project was adequately funded, the GoB contribution was significant and more than originally costed out in Project Proposal.
Some project inputs (lablab seed etc.) were not freely available to other farmers in the project area and this prevented them adopting the innovations.	
Inputs were heavily subsidised or free and this was not sustainable.	Participating farmers were active and enthusiastic (because of "free" inputs).
Outcomes Linkages to extension service not established and technologies were only extended to participating farmers.	
Many senior Staff were away on post-graduate training for extended periods.	Project had benefit of researchers who were motivated by having just returned from overseas training.
Research implemented by junior researchers because of senior staff absence.	IDRC Project Advisor from Phase I and part of Phase II stayed on in a APRU staff position at the end of his contract.
Few Scientific papers published.	Useful research on soured milk product "madila" was carried out by APRU, Botswana food Lab. And Biology Dept. of University. Published in Annual report.
Annual report the main method of distributing research results were not widely distributed.	
Selected cross-breeds could have been better dairy animals and given a higher milk yield.	Cross-breeds gave a good improvement to the farmers herd because they were also improved beef animals. Small-scale farmers in Botswana have multiple strategy approach to cattle.
Insufficient stover was produced because of the droughts and the farmers have difficulty in collecting it because most of them lack transport to move it from field to homestead (ox-carts).	Produced fodder and collected stover was appreciated as a food source for all cattle.
No critical analysis and evaluation of economic data generated by the programme. Thesis was not distributed or discussed by staff on return.	Economic analysis of data part of M.Sc. dissertation.
Marketing of milk and milk products not dealt with effectively.	
Establishment of milk collection centres was delayed	Milk collection centres established at end of Phase II
Viability of Milk Collection centres uncertain because of the low volume of milk deliveries.	

4.0 PROJECT # 85-0118 FUELWOOD PLANTATIONS (BOTSWANA)-PHASE I

PROJECT # 89-0068 FUELWOOD PLANTATIONS (BOTSWANA) - PHASE II

4.1 Description of the project

4.1.1 General comments and background

The project set out to identify suitable fuelwood species for small-scale plantation production in the semi-arid areas of Botswana.

The first phase of the programme ran from January 1986 to 1988 and focused on the identification of the most suitable fuelwood species by testing a large number of candidate trees. The project was based on the firm belief that the target communities in the eastern portion of the country were experiencing severe deforestation and that "the lower socio-economic orders face a real energy crisis".
Source : Project Summary - Phase I

The project was carried out by the Forestry Association of Botswana (FAB) which was, at the time, then considered to be the only national organisation capable of handling the project. This organisation is a NGO which had had extensive experience with the Brigade Movement. This movement consisted of non-military, rural community organisations which were active in developing small industries and providing vocational training for members of the community. It was envisaged that the brigades and rural development associations would form the backbone of the eventual extension of the fuelwood plantation concept as a means of income generation from selling wood to surrounding communities.

This first phase was analysed and deemed to be a success and a second phase was funded from 1989 to 1991. A six month extension of Phase I with financial supplement was granted to tide the programme over during the two phases.

The second phase did not significantly alter in terms of its project summary but the scope of the project appears to have widened into a broader consideration of tree benefits (in addition to fuelwood).
Source : Project Documents

The evaluation of this project will focus, in keeping with the case study, on the commercialisation aspects which were originally envisaged as the sale of fuelwood. There is a concern that the switch to a projects which focuses on the wider benefits of tree production makes the evaluation more difficult as benefits, other than the production and sale of firewood, are difficult to quantify in commercial terms. The numerous other benefits of trees such as windbreaks and soil conservation have only long-term non-monetary benefits. Other aspects of multiple tree use like pole production and the production of fruit are easier to quantify and evaluate in terms of commercialisation.
NOTE : The narrow focus on the purely commercialisation aspects of this evaluation have already been queried by IDRC staff involved in the evaluation of the preliminary report. While it is accepted that ideally the evaluation should be broadened it is difficult to widen the focus after the interviews and field visits have been completed. The specific and narrow focus on the main evaluation component is a result of the very limited time available to carry out the study. For researchers and workers only reading the evaluation of their project the comments made on page 3 are again highlighted.

4.1.2 Context

In Botswana, 90% of the total population (1,35 million) lives within 40-50 km of the main transport route (rail and road) running through the eastern portion of the country. This skewed population distribution is basically a result of the agroclimatic conditions as the majority of the western portion of the country is covered by the sands of the Kalahari Desert. The soils of the eastern shield are relatively fertile and the rainfall in Botswana increases as one moves east and north. The far north-east of the country is characterised by considerably better rain and the area is generally relatively well-wooded. The south eastern portions of Botswana may be well populated but they are essentially semi-arid areas receiving less than 600 mm per annum. It is in these areas where clearing of land for agriculture, overgrazing by cattle and general population pressure have placed the greatest strain on the ecologically sensitive scrub and Acacia savannah.
Source : Project Summary and other general publications on the country.

The Motswanan people have a tradition of living in large villages. In some cases, these villages have become quite large and all the major settlements, towns and cities, Francistown, Palapye, Mhalapye, Molepolole and Gaborone, have grown from traditional villages. The concentration of people in villages results in acute to severe fuelwood shortages which are localised around the villages and where fuelwood has become a major constraint for the women, who generally collect wood as part of their household chores.

Botswana has experienced spectacular economic growth over the last 20-25 years. Initially, this was driven by the development of beef exports to the lucrative European market but the discovery of substantial diamond deposits at Jwaneng and Orapa further fuelled an economic boom which has seen it become of the richest non-oil producing countries in Africa. The GoB has administered it's wealth in a sustainable fashion (interest on accumulated capital invested in Eurobonds and other foreign deposits and financial instruments, is now an important source of Government revenue) and invested in infrastructural projects which has seen the construction of a network of surfaced roads, the development of water resources via dams and pipelines and the development of urban housing projects in all major towns. The economic growth of Botswana has been reflected in the fastest growing vehicular fleet in the region, 9-13% per annum growth.
Source : Barclays Bank Economic Review.

Against this background of economic growth, there are a number of families who lack access to land and are not cattle owners and who are generally very poor.

4.1.3 Project objectives

General objectives - Phase I

To identify suitable species and reliable establishment and management practices for fuelwood production in the semi-arid areas of eastern Botswana.

Specific Objectives - Phase I

1. To investigate nursery procedures for the germination, early growth and successful out-planting of indigenous and introduced tree and shrub species.

2. To determine cost effective establishment methods to improve species survival and productivity and test the performance of the above species in field trials.

Source : Project Summary - Phase I

Phase I, which ran from 1985 to 1988, successfully established both a central nursery, developed germination and planting out procedures and a series of sites throughout the country where the more promising tree species were planted out for evaluation.
Source : Project interviews

The Fuelwood Project in Botswana represents in itself the major changes in thinking and methodology that have characterised forestry and fuelwood research over the last decade and a half. These are:

- a switch from a reliance on imported exotic species to a belief that indigenous trees are better;

- the realisation that the end users (beneficiaries, farmers) should be consulted and be involved in the selection of tree species and that their needs should be of paramount importance - the growing popularity of the social-forestry concept; and

- the realisation that trees, and their use, form part of a complex system of multi-purpose use which only includes fuelwood but is not totally dominated by it.

This debate on the style of forestry projects had been going on for a number of years and clearly the different and opposing opinions were represented in FAB. This affected the style of implementation of the programme and were partially reflected in the altered objectives of Phase II. However, the fact that the programme did not radically alter at this stage but continued with three extension projects that based their technical inputs on single

purpose fuelwood species, is a clear reflection that the more conservative view of fuelwood promotion prevailed
Source : Consultants opinion, communication with IDRC Project Officer, interviews with senior FAB officials and articles in FAB journal.

General Objectives - Phase II

To identify suitable tree species and reliable establishment of management practices *for the provision* of fuelwood *and other benefit*, for rural communities and individuals in the semi-arid areas of eastern Botswana.

Specific Objectives - Phase II

1. To continue to determine appropriate tree species and technologies for application in *social forestry* programs.

2. To promote the application of the technologies generated by the development of an *active dissemination and extension program.*

Source : Project Summary - Phase II

The shift towards social forestry and the importance of extension *(highlighted above)* represents the major thrust of Phase II. The programme identified communities in which forestry projects could be established and three projects were set up using Phase II funds. The closer liaison between the extension objectives of the Association and their research activities was achieved but this meant that some of the ongoing basic research, started in Phase I, was neglected.
Source : Interviews with senior persons in FAB.

4.1.4 Strategies / Activities

The strategies (methodologies) used to achieve the various objectives are detailed below. The nomenclature I for Phase I and II for the second Phase is used in this section and the numbering refers directly to the stated objectives given in section 4.1.3 above.

1.1. Nursery Procedures and Initial Screening

A new FAB nursery was to be established at Kumakwane some 35 km from Gaborone

Initially 28 species and provenances were to be screened at the project nursery. Seed for indigenous species was obtained from the University of Botswana (UB), seed of related arid zone species was obtained from the Regional Seed Centre (RSC) in Zimbabwe (an IDRC funded project - 83-0300 and 88-0092) while exotic species with drought and frost tolerance were obtained from the Commonwealth Scientific and Industrial Research Organisation (CSIRO) in Australia.
Source : Project Summary - Phase I

The positive role of the other IDRC funded regional project is worth mentioning as it enabled the programme to rapidly obtain good quality and diverse planting material. Better interaction between the programmes may have provided some synergy in terms of better species selection for the trials but the liaison and inter staff communication was minimal.
Source : Project Interviews and opinion of consultant.

Various simple germination techniques to break the hard seed coat of Leguminose seeds and suitable for low technology nurseries, were to be tested.

Various methods of germinating and transplanting eucalyptus seed into plastic sleeves were to be evaluated.

Research on hardening-up species, pruning and selection procedure for nursery material was also to be undertaken.
Source : Project Summary - Phase I

I.2. Species Survival and Field Trials
The most promising species from the nursery trials were to be planted out and further screened for three years

on a 20 ha site at Molepolole. Survival, height, growth and vigour were to be assessed annually.

Six 4 ha sites were to be used to further evaluate tree species and to test various establishment techniques including general disc harrowing, selective deep ploughing and the formation of ridges (five different treatments). Plant spacing trials were also to be tested.
Source Project Summary - Phase I

II.1. Identification of Suitable Trees
The experiments established under Phase I were maintained and further evaluated. An additional site was established but generally by subdivision of existing sites at Selebi Phikwe and Sunnyside. Finally nine different sites

were included. Termite trials, introduced as a follow-up evaluation of National Tree Planting Day, revealed these to be a major pest.

Some additional species were to be evaluated including nitrogen-fixing fodder species and experiments/trials on live fencing were to be established. The most successful methods of land preparation for tree establishment identified in Phase I (deep rip ploughing and ridging) were to be attempted with local ox-drawn equipment.
Source : Project Summary - Phase II

II.2. Extension Program
During Phase I, FAB had obtained some experience in on-farm participatory research and it was decided to concentrate on this with rural institutions such as Community First Development Areas (CFDAs) and local Farmers Associations. The methodology was to assist "farmers with the potential to increase their agricultural output through the introduction of suitable tree species into their traditional farming system". It was hoped that these extension activities with groups of farmers could be funded under the GoB's Arable Lands Development Programme (ALDEP).
Source : Project Summary - Phase II

In terms of the strategies and actual research methodologies used, the following comments on how they could have been improved have been obtained from respondents.

Generally, the composition of the species evaluated is a major criticism but as the President of the organisation states that it is only in hindsight that the species selection looks wrong. In the early 1980's, there was a firm belief that the fuelwood crisis could only be solved by fast growing exotic species.
Source : Interviews with senior FAB personnel and communication from IDRC Project Officer

The site field testing of tree species could have been improved by:

- better pre-screening of species and more thorough research of existing information on the tree species from regional and international sources. For example, some species were planted outside their known range of tolerance for physical conditions;

- better plot lay-out and design. The depth of statistical analysis possible is limited by the lack of plot duplication; and

- more consistent establishment procedures. Too many variables were introduced into the trial, e.g. 5 establishment procedures x numerous species x site characteristic variation (soil type, depth, rainfall).

Much of the information was available but apparently insufficient desk research was carried out before hand. Some sources argue that typically the time demands of getting the material ready in the nursery for the very narrow window that the rainy season offers in Botswana put critical time demands on researchers. An IDRC source argues that all the relevant information should have been available from the National Institute of Research at the University of Botswana - but it was obviously not used. The more critical former members of staff claim it reflects the arrogance of the research manager.
Source : Project interviews, analysis of reported results, and communication form IDRC .

The use of tree height provided an erroneous measurement of biomass production. Work by the National Institute of Research in the early 1980's had provided the necessary research information to relate tree height

and stem diameter to total tree weight. This research had been carried out by cutting and weighing whole trees. Source : Published papers in FAB journal and Project interviews.

4.1.5 Inputs

The total IDRC budget for Phase I was CAD$333 085 while FAB's own contribution was CAD$54 990. (IDRC contribution = 85,8% of total budget.) The breakdown of the Phase I budget and the allocation between the various project components is given in Table 4.1 .

The main source of information for the sections below comes from an analysis of the budget presented in the Project Summary for both phases.

The major component of the IDRC budget (39,4%) was for salaries and allowances and the major portion of this was for the expatriate salary and benefits of the Research Co-ordinator (Mr R. Nickersen).

Research expenditure (including the establishment of the nursery, labour, tools and tractor hire for the field trials) accounted for 14,2% of the budget which, with the 13,2% allocated for travel and allowances on the field research, meant that 27,4% was spent on these combined items.

Table 4.1 : **Breakdown and analysis by item of IDRC contribution to FAB for Phase I of the Fuelwood plantation Project - in CAD$**

ITEM	IDRC CAD$	as % of Total	FAB CAD$	as % of Total	IDRC as % of Total
Salaries and Allowances	131400	39.4%	32670	59.4%	80.1%
Research expenses	47430	14.2%	6210	11.3%	88.4%
Travel – Field research	43920	13.2%	11160	20.3%	79.7%
Travel – Regional/International	5000	1.5%			100.0%
Supplies and Communication	7650	2.3%	1575	2.9%	82.9%
Publications / Reports	4500	1.4%			100.0%
Equipment	38385	11.5%			100.0%
Training	24400	7.3%			100.0%
Seminars & workshops					
Support Services			3375	6.1%	0.0%
Institutional Support					
Contingencies	30400	9.1%			100.0%
TOTAL	333085	100.0%	54990	100.0%	85.8%

Source : Project Summary

Equipment purchases in the form of a 4WD vehicle made up 11,5% of the budget. Training took 7,3% of the budget and it was intended to fund two students on undergraduate degrees in Tanzania.

A comparison of the Phase I and Phase II budgets is given in Table 4.2, the main change being the introduction of direct institutional support for FAB in the budget.

Table 4.2 : Breakdown and analysis by item of IDRC contribution to FAB for Phase I & II of the Fuelwood Plantation Project - in CAD$

ITEM	Phase I CAD$	as % of Total	Phase II CAD$	as % of Total
Salaries and Allowances	131400	39.4%	71990	21.5%
Research expenses	47430	14.2%	62520	18.7%
Travel – Field research	43920	13.2%	64590	19.3%
Travel – Regional/International	5000	1.5%		
Supplies and Communication	7650	2.3%	14610	4.4%
Publications / Reports	4500	1.4%	9160	2.7%
Equipment	38385	11.5%	30770	9.2%
Training	24400	7.3%		
Seminars & workshops			16460	4.9%
Support Services				
Institutional Support			64000	19.2%
Contingencies	30400	9.1%		
TOTAL	333085	100.0%	334100	100.0%

Source : Project Summary

The total IDRC budget for Phase II was CAD$334 100 and FAB was to contribute CAD$177 450 in the form of salaries and support services. (IDRC contribution = 65,3% of total budget.) The breakdown of the Phase II budget and the allocation between the various project components is given in Table 4.3.

With the departure of the senior expatriate as Research Manager, the total salary budget dropped despite the inclusion of a new extension officer post (locally recruited) - 21,5% of budget. Research expenditure (18,7%) and field travel expenses (19,3%) were the next largest items with a combined total of 38%.

The provision of direct institutional support to cover recurrent expenditure (rent, electricity, telephone) at FAB (unusual in terms of general IDRC funding) at 19,2% of budget significantly increases the "Other" category in the graphic analysis. This assistance was designed to give a degree of stability to the organisation and allowed FAB to plan its expansion in a better fashion.

Table 4.3 : Breakdown and analysis by item of IDRC contribution to FAB for Phase II of the Fuelwood Plantation Project - in CAD$

ITEM	IDRC CAD$	as % of Total	FAB CAD$	as % of Total	IDRC as % of Total
Salaries and Allowances	71990	21.5%	75210	42.4%	48.9%
Research expenses	62520	18.7%			100.0%
Travel – Field research	64590	19.3%			100.0%
Travel – Regional/International					
Supplies and Communication	14610	4.4%			100.0%
Publications / Reports	9160	2.7%			100.0%
Equipment	30770	9.2%			100.0%
Training					
Seminars & workshops	16460	4.9%			100.0%
Support Services			102240	57.6%	0.0%
Institutional Support	64000	19.2%			100.0%
Contingencies					
TOTAL	334100	100.0%	177450	100.0%	65.3%

Source : Project Summary

The replacement cost of the vehicle (equipment) represented 9,2% of the budget and in Phase II there was a specific allocation for seminars and workshops (4,9%).
Source : Analysis of Budgets in Project Summary for Phase I and II

There were funds allocated for a bridging period from September 1989 to December 1989 between the two

phases but the amount appears to have been moderate (BWP 31 000).
Source : Correspondence in FAB files.

As stated elsewhere, a full analysis of how the funds were spent by FAB has not been undertaken as part of this evaluation.

Towards the end of Phase II, there were clear and obvious indications given to FAB by the Regional Officer in Nairobi that IDRC funding would be extended into Phase III. FAB drew up a budget proposal and assumed, because of the good response it had received from IDRC on its research, the fact that the extension effort was expanding and the growing public awareness of the importance of tree planting (by GoB officials and opinion leaders), that additional funding would be provided.
Source : Interview with former FAB Chairman

It therefore came as a bit of a shock when funding was not forthcoming. Despite the long and happy association, FAB felt the way they were informed via a letter was a bit abrupt and impersonal. The communication from Dr. Ayling briefly explained the new IDRC orientation "Empowerment through Knowledge" and the reduction in Canadian Government funding and stated: "These changes in focus and emphasis along with a greatly reduced professional and administrative Centre staff have required gradual closure or "winding down" of research projects with numerous recipients world-wide, particularly those projects which were commodity based and/or biologically oriented. Unfortunately given the nature of the research programme the Centre has been supporting with the Forestry Association of Botswana, the Fuelwood Plantation project is one of the casualties. It will therefore not be possible to continue financial support for the FAB project beyond the present phase."
Source : Letters in FAB correspondence files

The FAB senior staff at the time argued that this notification came so late that the sudden and unexpected loss of funds (it must be remembered that FAB was also receiving recurrent cost support) caused extreme hardship at the Association. A FAB letter to IDRC uses the term "left out in the cold by your rather brief letter" to describe the relationship. The IDRC Programme Officer reports that at no point did funds get terminated suddenly. The shift from development project funding to targeted funding for research was a justifiable switch in terms of IDRC's strategy and the cutback in funds were beyond IDRC control. The planned expansion of the FAB programme, given the difficulties experienced with Eucalyptus plantations was possibly, with hindsight, not a viable project. Internal divisions in the organisation did not bode well for any major expansion.
Source : Project interviews, communication from IDRC and Consultants opinion.

Staff and field activities had to be suddenly cut back while other funding sources were sought. The lag period in securing finance made 1993 a particularly difficult year. There is some correspondence extending the project to 30 June 1993 but this was to allow additional claims not necessarily extra monies for ongoing activities.
Source : Project interview and correspondence in FAB files.

In addition to the cut-off of extension financing, there appears to have been a problem with the final payment from IDRC for expenditure already undertaken by FAB. The issue was not fully explored by the consultant due to lack of time. A FAB staff member claimed that something like BWP100 000 was not reimbursed but a cursory examination of correspondence (an incomplete record ?) suggests that additional expenditure incurred for the recruitment of a consultant to help prepare recommendations for vegetable production and a manual were not paid despite the assurance by IDRC that the expenditure was covered. This partial investigation indicates that some BWP45 000 less than what was spent was reimbursed. This has further added to the tension between FAB and IDRC and it is unfortunate that this issue cannot have been amicably resolved.
Source : Correspondence in FAB files

Information provided by IDRC Head Office indicates that Phase I of the project was overspent by CAD$33 017 but this is based on a budget allocation of CAD$299 860. The amount actually spent coincides with the original budget detailed above. Recorded expenditure on Phase II indicates that only some CAD$1 680 was unspent. Clearly the complaints from FAB are based on a misunderstanding that budget allocations had been increased when, in fact, they had not. Part of the problem was caused by the fact that the Director of FAB was away completing her M.Sc. and the person effectively in charge at FAB was a relatively inexperienced expatriate. (The absence of senior staff on training programmes is one of the negative affects of staff development projects involving overseas post-graduate training.)
Source : Project Variance Report

Apart from the mis-understandings at the end of the project, there is generally positive experiences about IDRC staff involvement in the project. The project officer, Dr. Ron Ayling, provided useful advice and assistance especially on the regional training workshop held by FAB.
Source : Interviews with Senior FAB staff

There was obviously some tension within FAB between the Research Manager and the Extension staff over the large number of "foreign" trees in the species trial and some of these members feel that the IDRC staff sided with Nickersen and prevented an earlier shift towards a more social forestry orientation. The IDRC staff involved justify this on the basis that at the time fast growing exotics were generally supported. As one of the communications from IDRC headquraters points out consultants on the Evaluation of Completed Projects should remember that often projects are very different in the light of hind sight and this clearly represents a very clear case of this phenomenon.
Source : interview with former FAB staff and communications from IDRC staff.

4.2 Project outcomes

4.2.1 Outputs

(The numbered subsections below relate to specific objectives of the two phases listed in Section 4.1.3.)

I.1. Nursery Procedures and Initial Screening
The FAB nursery was established at Kumakwane and this well-run nursery still represents a major resource in forestry, producing some 30 000 seedlings annually. The nursery has produced all the planting material for the field trials, the material for FAB ongoing extension activities, tree seedlings for the National Tree Planting Day and the Around the Home Tree Planting Programme.
Source : Project interviews and Project Summary for Phase II

Simple and efficient seed collection, pre-treatment, germination, pricking out, pruning and plastic bagging techniques have been developed for all important species.

The initial screening of species was increased from 28 to 80.
Source : Project Summary - Phase II and Annual report of FAB chairman

I.2. Species Survival and Field Trials
The programmes established over 40 ha of trials at 8 different sites and field tested a very large number of suitable species. The research showed that row-ripping with a plough with ridging significantly increased plant survival and initial growth because it breaks up the impermeable layer in the soil, ensuring better water penetration, and the ridges assist in the collection of run-off water.

Ten exotic species (including 5 Eucalyptus species) and five indigenous species were shown to be suitable for the soils and rainfall of the eastern hardveld area.
Source : Project Summary - Phase II

General - Phase I

The initial budget for training was insufficient to fund the intended placement of two staff on the Forestry degree course at the Sokione University of Agriculture in Tanzania and eventually only one FAB staff person was sent on a Forestry Course at the Forestry College in Mutare, Zimbabwe.
Source : project interview.

II.1. Identification of Suitable Trees
The results of all the species field trials have been analysed and published in 1992 as one of FAB's Technical Series "Tree Species Elimination Trials in Botswana" by Andre Kooiman. The assessment of the trees was made on the basis of survival and height. All the sites had been assessed one season after planting and then again four years later. All the details of the sites, location, lay-out, management, soil type, chemical analysis, rainfall, temperature, etc. are included in the report and it represents an useful document which provides the results of the whole Species elimination trial.

The results clearly show the advantages of indigenous trees where 75% of the treatments experienced survival

rates of at least 75%. For all exotics, only 35% of the plants had survival rates of greater than 75%. 42% of the exotic species were eliminated because more than 50% of the plants died while only 11% of the indigenous species had a survival rate below 50%.

Despite the use of height as a proxy for biomass which tends to disadvantage indigenous trees and favour the fast straight growing eucalyptus, indigenous trees generally performed well. The regrowth potential of indigenous trees in the experimental plots after being slashed was noted and the report stated: "This indicates the potential of these naturally established trees to thrive under no management conditions (except for protection from browsing). Natural woodland management may be a cost effective alternative to the expensive establishment of plantations." p.33.
Source : A. Kooiman (1992)

Apart from the above publication, much of the field work undertaken during Phase II appears not to have been analysed or reported. The reason for this is that the major portion of this work involving the monitoring of tree species now considered to be inappropriate by the remaining staff at FAB.
Source : Interviews with senior FAB staff.

In addition to the annual report, FAB produces a short and informative newsletter which is distributed widely. From the start of Phase I, FAB has selectively targeted influential leaders in Botswana. The Association holds regular presentations for Ministers, members of the House of Chiefs and the House of Assembly and also holds meetings at rural centres in as many districts as possible.

The presentations involve films, slides and are always followed by discussions where the views (and at times misconceptions) of the audience are sought.
Sources : Project Interviews.

In 1988 the IDRC's Communications Division assisted FAB in the production of a film entitled "Social Forestry in Botswana". this film had a major impact on the Association's public awareness campaign as it clearly depicted rural communities in Botswana and had ethnic music which identified it as locally made. The film is not used extensively any more because some feel it presents a message that Eucalyptus is one of the salvations of the fuelwood crisis.
Source : IDRC / FAB correspondence and interview with FAB staff.

II.2. Extension Programme

A series of agro-forestry workshops were held in the Southern District in 1990 to identify the needs and expectations of farmers in the design of agro-forestry plots. These workshops held at the community level identified three projects where farmers' groups were keen to implement a project involving the use of trees. The realisation that groups needed some immediate income from the project while the longer-term income potential of the trees was allowed to develop, resulted in each of the three projects having a small vegetable production facility.
Source : Annual Report in FAB Journal

Phihetshane - This project had already been started by the Young Women's Christian Association (YWCA) and involved some 30 women. The project was attempting to carry out arable farming on a 3-4 ha plot. Funds had been obtained from the US Embassy Microproject Fund to erect a fence and to connect the area via a pipe to the village water supply (permission granted by village authorities). FAB's input was to provide tree species as a live fence around the perimeter. About 300 Eucalyptus trees were also planted, Leuceana was planted across the arable blocks to provide windbreaks and start a pilot alley cropping project. A small tree nursery was established at the local primary school and two teachers trained to run it. Trees were produced for the women's project, a multi-species school woodlot and for sale to the neighbouring community as a means of raising funds for the YWCA. A year after establishment of the project, some 40 fruit trees were also planted.
Source : Project Summary - Phase II and interviews with FAB staff

Malokaganyane - This project was established on a 5 ha site granted to the group of ten persons by the village authorities. The Project paid for the erection of a perimeter fence and provided a pipe and water tank to connect the site to the reservoir attached to the village borehole (diesel pump). The CFDA project paid FAB for 1000 Eucalyptus species which were planted around the perimeter. Half the site was ploughed. Leucaena was planted on an area of 40 m x 120 m and 40 fruit trees were also planted. An area of 100 m x 50 m was

established as a vegetable garden. Part of the remaining area was planted to maize using the group's own resources.
Source : Project Summary - Phase II and interviews with FAB staff

Tlhareseleele - This project had originally started as a forestry demonstration plot established by the Ministry of Agriculture. The site, which already had been planted with 4 ha of trees, Eucalyptus, Pine and some fruit trees, had also been fenced. The project then included ten persons who were all classed as "poor" by village elders because they were either landless or had very few cattle. The area near Pitsane is characterised by a large number of private farms acquired by prominent politicians and the Botswana Defence Force (BDF).

The FAB project became involved in 1988 and extended the site by an extra 1,5 ha. Leucaena, some promising indigenous trees and indigenous fruit trees were planted. The project also provided the extra fencing and two water tanks so that water from the village borehole could be diverted into storage at night so that normal water drawings for the village and livestock were not affected during the day. A vegetable project was started.

In the winter of 1990, a number of fruit trees, oranges and papaya, were killed by frost and these were replanted with the assistance of FAB. A FAB consultant carried out a study on the site and ran a training course for the members on how best to look after fruit trees.
Source : Project Summary - Phase II and interviews with FAB staff

The main publishing outlet for FAB information has been the FAB Annual Report. This publication, generally a 74 page B5 size booklet, is packed with an excellent mix of papers and articles, which range from strictly academic papers giving project results to articles of general interest (normally of a forestry nature) to useful tips on pruning or propagation to amazing reprints from material in the archives to poems.

The Annual Report has been published in 1984, 1985, jointly in 1986 and 1987, then a break and revived in 1991.
Source : Review of FAB publications

The extension programme for schools has been taken over by NORAD funding and an extremely useful manual on school nurseries and school woodlots has been produced.
Source : Interview with Project Staff and review of manual produced

General - Phase II

IDRC provided a small grant of BWP15 000 to partially cover the cost of study of Mrs Patricia Walker who undertook her M.Sc. at the University of Aberdeen from 1990 to 1992. The funds were used to fund fieldwork and some follow-up research in Botswana.
Source : Project Interview and correspondence.

4.2.2 Institutional environment

The Forestry Association of Botswana is unique in that it is an NGO involved as the only nation-wide organisation with sufficient credibility to carry out forestry research. In the regional context, the situation is unique in Botswana as there is no Forestry Commission or any similar body to carry out research. There is a Department in the Ministry of Agriculture but it has no capacity to carry out research.
Source : interview with FAB and GoB staff

FAB is a non-profit Trust registered with the Registrar of Deeds and is responsible to its Board of Trustees and to its members.

During Phase I, there was very good co-operation with the National Institute for Research (NIR) at the University of Botswana and the charismatic head, Tabe Tietema, with his incredible enthusiasm, was partially responsible. His departure has lessened contact and there has been considerable criticism of the way in which he took massive amounts of data with him, leaving an enormous information gap at the University of Botswana.
Source : Project Interview

One of the advantages the project had in terms of staff was the involvement of Mr David Inger as chairman of FAB. His long experience in Botswana with various rural development projects meant that he could make a

significant contribution to the work being undertaken. He provided the project and FAB with excellent guidance and continuity. He was instrumental in getting the FAB Annual Report out and helped smooth over some of the staff conflicts which arose.
Source : Project Interviews and opinion of consultant.

The other (unfortunate) characteristic of the organisation was the tension which existed between the "old guard colonists" and the newly empowered Botswana scientists. Conservative and experienced versus radical, innovative and unexperienced. Old versus young, expatriate versus local. One of the locals researchers pointed out that the IDRC project had in fact been a development ground for too many expatriates and insufficient locals. Tensions like this are common in developing countries and some argue that they are a prerequisite for development of local capacity as they indicate the local citizens' commitment to indigenisation.
Source : Project Interviews and opinion of consultant.

4.2.3 Project Reach

The project was meant, especially through its extension programme, to lead to extensive plantings of fuelwood plantations by the peasant sector who, according to all documents, were facing a massive fuelwood crisis. This did not happen and the reason can be partially explained by the fact that the perceived fuelwood crisis is in fact a "perception" problem. The shortage of fuelwood in close proximity to the major villages has caused a number of social adjustments. Less preferred tree species and small shrubs are being used. There is growing evidence that the pressure of grazing, also in the environs of major villages, has been leading to bush encroachment. The phenomenon of bush encroachment in overgrazed pastures, due to the growth of thorny shrubs, is a major threat to grazing resources but it is partially compensating for the increased use of fuelwood.
Source : Project Interview and review of literature.

A summary of the project reach is presented (with impact) in Table 4.4.

The increasing distance to fuelwood has resulted in the collection of firewood becoming a male dominated activity and the wheelbarrow, donkey cart and pick-up is replacing the female head load.
Source : Project Interview

Clearly at a certain point, the fuelwood situation in Botswana will become critical but, with areas of the country still basically untouched, it will be difficult to convince people that the country is so short of wood that it must now be planted in expensive fenced areas.

The rapid increase in rural income, fuelled by the excellent (and preferential) beef prices offered by the EU and GoB's use of diamond revenue to promote and develop the beef industry (maintenance of foot and mouth control fences, construction of abattoirs, etc.), has facilitated increased expenditure on energy. Some of this has been used to pay for fuelwood and there is a thriving rural industry in the provision of wood. Other families have invested in solar heating and lighting, coal sales are expanding (these are currently subsidised), paraffin, kerosene and butane gas is widely available in rural areas (sales of paraffin fridges have increased) and, in some of the more central villages, connections to the national electricity grid are increasing.
Source : Project interviews and opinion of consultant based on experience in Botswana

There is growing scientific evidence that the statements attached to the Phase I Project Summary and which predicted major disaster are not factual. The study on fuelwood availability carried out by FAB and the Department of Environmental Sciences, University of Botswana, in 1991 (funded by NORAD) concludes:

"It does not appear that there is a major wood deficit in south eastern Botswana as a whole. Only 7 settlements (of which 5 have a population of over 10 000) out of 38 were classified as "insufficiently available biomass". This does not agree with general observations that in general the people in this area face serious constraints in the availability of firewood." (van Heist and Kooiman, 1991)

The fieldwork of Ms Keitwele Walker in the southern district of Baroleng added significantly to the general body of knowledge on social forestry. There is, however, some evidence that the swing towards community-based natural resource management beliefs has been a bit too strong. The following statement taken from her M.Sc. dissertation may give a true reflection of the situation but the consultant feels that it fails to understand the effect of modernisation on traditional society and beliefs plus the destabilising effect when populations (men and animal) exceed carrying capacity.

"In spite of reported shortages, no interest is shown in tree planting for fuelwood. Of significant importance is that local people not only have a wide knowledge of trees but also have enjoyed a traditional management practice with which the Baroleng identify and upon which sustainable agriculture could be built."

"In light of these findings, the discussion casts doubts on the need to introduce a new policy aiming at sustainable agriculture or whether sustainable agriculture could be founded on existing traditional practices."
Source : Dissertation Summary - University of Aberdeen, 1992.

Despite some reservation about the current belief in the sustainability of the traditional system, it is abundantly clear that the average farmer in Botswana has a multi-purpose view of forestry where fuelwood considerations are clearly balanced by as strong a concern about live hedges to protect fields from livestock (and to free labour from the arduous task of herding), about the availability of nutritious and palatable browse, about the provision of windbreaks near fields, the provision of shade at the homestead and the use of indigenous fruit or planted fruit trees to supplement the diet.

Even clearer, the provision of Eucalyptus species as a fuelwood source is not a strategy which will significantly improve the rate of adoption of fuelwood plantations as it represents the ultimate in single (double if it is used in construction) use fuelwood species and it has very little commercial value as firewood because if users are to pay for wood, they want wood which satisfies their needs.
Source : Project Interviews and opinions of consultant

The reach of the project has been confined to the shrinking number of participants on the three schemes established under the programme. The lack of significant income generation means that the plots have hardly represented a successful advertisement and extension tool for the commercialisation aspects of fuelwood production. They do, however, illustrate that trees can be grown in small community woodlots.

The major factor affecting the Project Research during Phase II is that the head of FAB for most of this period was Ms Walker whose strong opinions influenced the organisation and who had no belief at all in the extension of single purpose fuelwood plantations. Her attitude to the research undertaken on the species elimination trails is that, by sheer accident, some useful multi-purpose species suitable for fixing nitrogen and providing fodder were included.
Source : Project Interview

4.2.4 Project Impact

The first phase of the project had a major impact in that the research undertaken represented the first systematic forestry research ever undertaken in Botswana. A large number of tree species were tested under a variety of conditions over a wide area of eastern Botswana. The field trials themselves created a visible presence for FAB in many parts of the country and they became a focal point in the local debate on the suitability of indigenous and exotic trees. The controversial nature of the debate and the strong feelings it generated clearly contributed to the growing awareness that the rapid depletion of forest resources had to be arrested and, if possible, reversed.
A summary of reach and impact is presented in table 4.4.

One of the adverse impacts is that, as FAB has been so successful at carrying out basic forestry research, GoB has not developed an own capacity for research. This has been left in deference to FAB. The fact that FAB is an NGO without a secure line of budget finance makes forestry research very vulnerable and subject to poor continuity, something which adversely affects the long-term nature of the research into trees.
Source : Interview with senior FAB official and GoB staff

FAB, with the assistance of IDRC and other donors (NORAD), has had a significant impact on public opinion about tree planting and preservation of forest resources. The National Tree Planting Day has become a significant event which involves all senior politicians from the President to Village Chairmen, Chiefs and Headmasters. Up to 100 000 trees are planted each year on this day.
Source : Project Interviews

Table 4.4 : Summary of Impact and Reach - Project Numbers 85 - 0118 & 89- 0068 - Fuelwood Plantations (Botswana) - Phase I & II

Potential Beneficiary	How Benefit	Mechanism	Actual Extent benefited /affected	Potential for future benefit
Farmers Groups	Increase in income.	-Establishment of fuelwood plantations, fruit trees and vegetable projects	-Three groups assisted in establishment of fenced plot with fuelwood and fruit trees plus vegetable project (Initially 50 participants - has fallen to 33) -No marketing of fuelwood or wood products has occurred -Income from vegetable production not significant due to marketing problems	-Standing trees could be sold if interested buyer could be found -Marketing concept must be reviewed, sustainable harvesting of trees would be better.
Researchers	Increased capability for research	-Formal training of Foresters (2) to under-graduate level in Tanzania -Support in terms of grant for fieldwork of Postgraduate student	-Only one Forester trained at Forestry Institute in Zimbabwe but has subsequently left FAB to work in Tanzania -then Director of FAB obtained M.Sc. sub-sequentially left association.	-Former Director still making significant contribution to Agro-forestry and Social Forestry with on-going NORAD funded research programme
Forestry Association of Botswana	Increased Knowledge	-Improved Nursery technique for indigenous and introduced trees	-FAB nursery established at Kumakwane and good procedures introduced -Germination and propagation techniques for indigenous trees developed - +/- 30 000 seedlings produced annually and distributed	-Nursery will continue to produce seedlings for distribution - Could be used as training facility for other nurseries
Forestry Association of Botswana	Increased Knowledge	-Suitable tree species identified via multi-site species trial	-Majority of species screened were single purpose exotics not suitable to multi-purpose wood strategy of local farmers	-Established field sites enable long term monitoring of species performance -Some trees included may be useful especially some local and regional species suitable for Nitrogen fixing
Government of Botswana	Policy Formulation	-FAB raising awareness of fuel-wood situation and need for something to be done via public opinion	-National tree planting day and the "Around - the - Home " tree planting have become well known and prominent politicians participate -GoB funding for Forestry increased, Department status improved	-FAB as NGO may be replaced by fully funded Forestry Commission or new GoB department.

An informal evaluation of the survival rate of the trees planted on National Tree Planting Day indicated that where trees were the responsibility of individual families they generally survived. This is thought to be a result of the trees being watered at critical periods during establishment and them being protected against livestock damage. In addition, rural inhabitants indicated a preference for trees at their individual homesteads. On the basis of this information FAB devised the "Around the Home" Tree Planting Project which provides tree seedlings for planting at the homestead (fruit trees and fast growing shade species) This project has been very successful and FAB is now strongly convinced that individual home site plantings are the way to proceed with improving the availability of trees and tree products. This belief in individual family based tree planting strategies is strengthened by the lack of significant success with group projects like those funded under the IDRC funded project. Some households have chosen to plant Eucalyptus because they feel it would rapidly provide them with fuelwood, but these species are not actively promoted, jacaranda for example is very popular. Source :Interview with FAB staff.

None of the trees planted on the scheme have been harvested and one of the ongoing disputes involves the use of cut poles from the Eucalyptus plantation by a member who has left the group and refuses to pay for them. Source : Interview with senior FAB staff

Malokaganyane - Is still operational and the original 10 members increased to 13 in the early part of the 1990's (4 males and 9 females). The perimeter of Eucalyptus has grown extremely well and some are 5-6 metres in height. A forester from the Ministry told them that they should wait ten years before harvesting the trees and, as a result, they have sold no trees. Discussions with them indicate that no attempt has been made to market the trees. A veterinary facility has recently been constructed in the area and all the poles and droppers used in the fencing were brought from Gaborone. The concept that they should be marketing their poles locally and in stages so that they could test the market, establish a clientele, smooth out their income flow, etc., were all clearly very foreign concepts. They still believe that FAB or the MoA official will be able to arrange a buyer for the whole 1000 trees and that this will represent a major "windfall". Equally, they have no idea what they are worth.

The Leucaena has been cut twice and the branches used by the committee as firewood. They also believe that they can sell the leaves as a fodder crop and they are looking for a buyer from among cattle owners in the area. The good rains and abundant grazing make this unlikely this year. They have never been told that Leucaena; can be used to incorporate leaves in the soil and were unaware that if they cut them back heavily, the area could be used for maize because of the nitrogen-fixing ability of the plants.

The role of Acacia albida as an agro-forestry species was also unknown. The fruit trees were all in a very bad state - peaches rotten with fruit fly, grapes afflicted with mildew. The only additional tree plantings made by them were of some guavas (also severely infected with fruit fly).

The vegetable production had been suspended because the stopcock valve linking the site to the village borehole had broken and then the storage tank had fallen down. Vegetable production, always best in winter, has just been restarted (May 1997) with carrots and cabbage being planted. Water is being carried from the borehole some 1,5 km away. The 13 members all work from 7.30 to 13.30 each day of the week (5 days). The only income they have ever received from the scheme is about BWP80 each from the sale of vegetables in 1993 and 1994. They were asked by the village to contribute to the cost of diesel for the borehole. They have a major problem marketing their vegetables in the area even though the village has +/- 500 persons because income levels are low and there are also a BDF farm and a commercial producer in the area.

The project was declared as a possible community project by the drought relief programme in their area and, as a result in 1994, they were all "employed" at BWP120 per month for four months. In addition, the Drought Relief Programme erected a storeroom 10 m x 5 m providing all the materials: bricks, cement, door frames, doors and roofing (imported sawn timbers and asbestos). It also provided the builders, the members collected sand as one of their duties.
Source : Discussions with members of the group, observations on field visit and interview with responsible FAB staff.

Tlhareseleele - This project represents one of the most amazing "oasis" of trees in the midst of a fairly treeless area. Recently MoA have established an apiary in the project and fenced it. The project also received support from the Drought Relief Programme and a 10 m x 5 m storeroom was constructed. At the end of the five month employment project, 7 of the 10 members chose to move with the project to another building site. A further

member left in 1996 and currently only 2 persons, the secretary and the chairman, remain members. There is now a very big dispute between the former and current members: those who left want to sell the whole project - an offer has been received from a local business person.

The greatest income achieved was BWP160 in one year from the sale of fruit and vegetables locally. Currently there are no vegetable growing activities because the two members (both fairly old) find the work too demanding. When they tried to recruit some new members, they demanded that they be paid BWP120 per month.

The project is unique in that it did once produce some forestry products. Eucalyptus was cut and 21 fencing poles of 4 m each and 14 droppers of 3 m each were produced and moved to the MoA office at Good Hope. Total sales yielded BWP20,40 (3 poles x BWP6 and 8 droppers x P0,30). The remaining poles are still lying at the MoA office. Clearly this does not represent a major impact in terms of increased local incomes.
Source : Discussions with secretary of the group, observations on field visit and interview with responsible FAB staff.

4.3 Enhancement of Outcome

A summary of factors enhancing and hindering the outcome of this project is given in table 4.5

As expressed earlier, with hindsight the selected tree species were not well chosen. An appreciation, early in the research programme, that simple single purpose wood species would not satisfy the actual perceived needs of the rural population could have been used to focus more on multi-purpose species. A narrower focus on useful indigenous trees would have enabled more replication to be done and this would have improved the scientific validity of the species elimination trial.

The inapplicability of some of the species included is often highlighted by Motswanas and the fact that one of the species was selected because of its ability to produce twigs. The mass of small twigs growing on the shrubs found throughout Botswana clearly shows the lack of consultation between researchers and the intended end users.

The comments above about the inclusion of unacceptable tree species are related to the failure to involve the intended beneficiaries in a participatory fashion. Again in hindsight, the outcome could have been enhanced by better consultation with the farmers in the target area and a deeper more comprehensive understanding of their farming system. If the complex interaction which occurs between the need for live hedges to separate crops from grazing areas, the desire to have fodder species trees as a supplementary feed for cattle when droughts occur plus the preference for slow burning, non-smoke wood, then the heavy reliance on fast growing exotic Eucalyptus would have been avoided.

The project attempted to implement three extension projects involving communities in the production of fuelwood, the establishment of fruit trees and, as an interim income generating activity, the production of vegetables. The related activities could all have had a much greater impact if they could have been adjusted to the market realities of the local and regional area. For example:

- A review of existing literature on the firewood market and some rudimentary economic studies would have provided information of the market preference of urban dwellers and rural residents.

Some very useful work on the firewood trade between Kweneng and Gaborone was undertaken by D. Kgathi in 1984 and published in the FAB Annual Journal for that year. Preferences for firewood include the following factors:

- have long lasting embers;
- produce reasonably hot fires; and
- fires do not emit a lot of smoke.

This gives the Combretum species a high preference, following by some of the Acacias and Dichrostachya. The wood traders all indicated that Eucalyptus was an extremely unsuitable firewood because it burnt too fast and only produced ash. There is a major price discrepancy between the various firewoods available. The market

reality and the difficulty of selling wood produced from fast growing exotics should have influenced the selection of the species to be planted by the groups.

- Review expenditure patterns of rural households and study the interaction, at the family level, between the need for firewood, the difficulty of collecting it, the valuation of family labour, the collection time of wood and the ability of the family to buy it.

Clearly in households with surplus labour or seasonal unemployment,, the shortage of cash prevents the purchase of wood as its "free" collection and uncosted family labour input means that to buy it is a "waste" of money.

- If the fuelwood market is most viable in the urban centres (rather than local rural areas), then the possible transport mechanisms from site of production to markets should be investigated.

Clearly there will be areas where production of fuelwood for the urban market will no longer be viable because of the transport costs. This sort of market analysis should have helped in the selection of project sites for the extension activities. Transport availability and transport costs should have been an integral part of an analysis of financial viability.

- Alternative use of the plantations as, for example, poles should also be subjected to a full market analysis.

The sale of untreated poles in the rural areas needs to be investigated in relation to the quality of local poles, the ability for local industry to treat poles in Gaborone, the transport cost to move trees to the plant and the competitive price of imported poles from Zimbabwe and South Africa.

As with the proposed analysis of market opportunities for fuelwood and poles, recommended activities such as fruit production and vegetable growing should also be subjected to market analysis. This analysis also needs to take into consideration the total size of the local market, disposable incomes and competitor analysis - it is difficult to sell a small, slightly green orange when imported or commercially produced estate oranges are available. The very small local vegetable market, the ease with which one producer can flood the market, the perishable nature of the produce and transport problems moving supplies to the urban market are all aspects which make vegetable production a marketing problem, not a production problem.

Table 4.5 Summary of Factors that Inhibited or Enhanced the Outcome of Project Fuelwood Plantations (Botswana) - Phase I and II

FACTORS THAT INHIBITED OUTCOME	FACTORS THAT ENHANCED OUTCOME
Previous research The existing information on attributes of trees and their suitability was not used to design species elimination trial	Previous projects in Zimbabwe meant that seed of suitable tree species seed could be easily obtained.
Objectives Project Objectives for Phase II were too broad and unattainable because in essence the species elimination trial had not changed from Phase I but now objectives envisaged identification of trees suitable for Social Forestry.	Project objectives for Phase I were focused and attainable.
Project Objectives were simply re-written to reflect "new orientation " but species used in project were not altered. Extension component proposed trees which were not multi-purpose (what people wanted according to the social investigations) but just fuelwood trees.	

FACTORS THAT INHIBITED OUTCOME	FACTORS THAT ENHANCED OUTCOME
Open Border with South Africa allows direct competition in production of poles by large-scale cheap producers in that country.	
Strategies and Activities Research did not in any way involve communities	Species elimination trial was carried out at 9 different sites around the country giving very good coverage of major agro-climatic zones.
	Project established very good and efficient nursery which established germination and planting procedures for many different tree species.
Inputs Expected IDRC funds for continuation of project into third phase were not forth coming. Project received set-back with loss of funds.	
Too many exotic single purpose fuelwood tree species included in the trial.	Some of the local and regional species were suitable multi-purpose trees.
Outcomes There is no extension service pushing the use of trees and tree planting technologies were not extended to other farmer groups.	FAB is only institution doing research on suitability of various tree species in Botswana.
Training budget was insufficient and only one staff member went for training.	
Trained staff member left soon after return.	
Research and extension implemented by junior staff because senior staff was away on training.	FAB Chairman and then president (with a lot of practical, useful and local experience) provided useful motivation, direction and leadership.
Few Scientific papers published.	Results of Species Elimination Trial published
Not all data collected on the Multi-Species Survival Trial has be analysed.	FAB publishes very useful series of technical papers covering its own and other institutions research results. This is in collaboration with other donors eg. NORAD
FAB journal the main method of distributing information was not widely enough distributed.	Useful research and information published in Annual Journal. Good mechanism to create awareness as to what is being done by various bodies in Botswana.
	FAB as an NGO can be flexible and unbiased in it's approach and activities.
	Good working relationship established with related research programme at National Institute for Research at University
Market potential and local demand for fuelwood and poles not well researched. Viability of market was simply assumed and not investigated.	
Shortage of fuelwood is not seen in the same light by farmers as the concerns of western researchers.	

5.0 PROJECT # 88-0026 NATURAL RESOURCE MANAGEMENT IN COMMUNAL LANDS (ZIMBABWE) - PHASE I

91 0040

PROJECT # 91-0408 NATURAL RESOURCE MANAGEMENT IN COMMUNAL LANDS (ZIMBABWE) - PHASE II

5.1 *Description of the project*

5.1.1 General comments and background

This project had, from the outset, a commitment to the extended research on the subject of socio-economic and socio-cultural aspects of natural resource management under communal tenure conditions in Zimbabwe. The concept of improved wildlife management by involving the communities bordering on the National Parks and Wildlife Areas had been developed earlier in 1985 under a National Programme known as Communal Areas Management Programme for Indigenous Resources (CAMPFIRE). The University of Zimbabwe-based institution, the Centre for Applied Social Sciences (CASS) had accepted the role of providing the social research component to the project which also involved the development of local government structures and the more specific aspects of terrestrial ecology, wildlife management and utilization.

The research programme at CASS had already been receiving funding from IDRC and the Ford Foundation since the early 1980's, and the programme saw itself making an important contribution in the provision of policy relevant analyses of issues.

Phase I of the project, which ran from 1988 to 1990, was seen as the initial phase of an extended research programme. It was again co-funded by IDRC and the Ford Foundation. The need for the long-term nature of the programme was related to the significant changes which were occurring as a result of the eradication of the tsetse fly across a broad swath of the Zambezi Valley, thereby opening an area the size of central Europe to the potential of large-scale immigration and numerous development schemes. The area was also home to one of the largest populations of wildlife, especially elephant, rhino, buffalo and antelope, in the world and included some major protected areas.
Source : Project Documentation

Key components of both phases involved the development of individual and institutional capacity for research via staff development (training) and academic supervised research.

Phase II (also IDRC/Ford Foundation) ran from 1992 to 1995 and envisaged a five year programme involving a number of units. Some of these individual units were also funded by separate projects and one of them, Communal Cattle Management (Project # 86-0188) is included in the evaluation of completed projects under Public Good Case Study #1.

The project has also received further IDRC/Ford Foundation funding for Phase III which started in 1995 and runs until 1998.
Source : Project Interview

In the evaluation of the IDRC funded research at CASS, consideration must be given to the fact that the programme has always received co-funding from Ford Foundation and more recently assistance from USAID. The one issue which will receive specific attention is the impact of staff development and capacity building.

The evaluation of this project will focus, where relevant, on the commercialization aspects of the project which has seen funds raised from Sport Hunting fees, culling and the sale of safari rights and their distribution to border/producer communities. This aspect of the CAMPFIRE programme represents only one component of a much larger programme which has made a massive impact in Zimbabwe in terms of policy and public good.

The real disadvantage of the evaluation is the absolute mass of information which is available and which creates very real problems in terms of selecting and isolating key components of the programme for presentation in this report.

5.1.2 Context

Since 1975, the authorities in the country have allowed private property holders to claim ownership of the wildlife on their land and to benefit from its exploitation. Since Independence in Zimbabwe, a growing number of persons argued that the rights given to these private land owners should be extended to cover the communal lands where the major portion of the rural population live and had tribal or customary rights to the land (often usufructuary). This desire to equalize rights in terms of land tenure coalesced with a growing belief among wildlife experts and ecologists that, as long as the people in the border areas of National Parks saw that wildlife remained the property of some distant bureaucracy, they would never invest in it as a resource. In 1982, the Government of Zimbabwe gave the same rights over wildlife in the communal areas when they allowed the District Councils to be granted status as "appropriate authority" for the resources in their areas.
Source : Project Literature

In 1989, the Communal Areas Management Programme for Indigenous Resources (CAMPFIRE) was formally launched to give people alternative ways of using their natural resources. In the more arid areas, where cropping activities were marginal, the exploitation of wildlife in a sustainable fashion presented a very real possibility for improving rural incomes in areas where they were particularly low and where there was very limited social infrastructure in the form of tertiary access roads, clinics and schools. IDRC and CASS were there at the birth and agreed to provide a socio-economic perspective to this bold new direction.

Since the initial introduction of the CAMPFIRE programme in two areas in the districts of Hurungwe and Guruve, some 26 Rural District councils have become involved. They are now formed into a CAMPFIRE Association. The very success of this programme and the enormous donor resources pouring into it may eventually be one of the reasons it becomes unsustainable.
Source : Interview with CAMPFIRE Association

The use of wildlife resources by the communities in which they are found has become enmeshed in the ongoing debate between hunters (read the gun lobby) and strict conservationalists (read bunny-huggers). CAMPFIRE, its pros and cons, has now become part of the heated debate about whether elephants should be on Appendix 1 or 2 of CITES.

5.1.3 Project Objectives

General Objectives - Phase I

a) To put in place a more comprehensive and integrated programme responsive to current and anticipated social science research requirements in natural resource management/common property issues in Zimbabwe as a result of the large-scale social, economic and environmental changes taking place.

b) To initiate a programme which will act as a catalyst for the development of concomitant and co-ordinated research programmes in the agricultural and biological sciences which will foster a network of collaboration between the University, Government agencies, NGO's and local-level bodies.

c) To build individual and institutional capacity for scientific research (especially social science) in Zimbabwe.

Source : Project Summary - Phase I

Specific Objectives - Phase I

1. Data collection and analysis of in-place and anticipated development schemes.

2. Make policy recommendations relevant to "evolving realities" as these schemes mutate and develop.

3. Make a contribution to implementation, where appropriate, through the development of informational, educational materials and techniques.

4. Augment the capacity of communities and districts to undertake research, plan and implement programmes of resource management.

Source : Project Summary - Phase I

General Objectives of Phase II
These are not very different from those given in Phase I (although the order was different) and rather than fully repeat them, only the adjustments made are given.

a) This was expanded to include social science research requirements in "local governance" and "local empowerment".

b) This was refined to specify that CASS should have a more regional role in the development of collaborative research with priority given to Zambia and Mozambique.

The importance of "local empowerment" was further reflected by the inclusion of specific objective 4 above as a new general objective.
Source : Project Summary - Phase II

As a result of the Phase I evaluation, the Specific Objectives were refined somewhat and they are presented below.

Specific Objectives - Pbase II

1. To generate policy relevant analyses and recommendations, providing the monitoring and evaluation feedback channel to a programme of adaptive natural resource management.
   To focus on:

   - institutional structures
   - processes in common property.

2. Provide baseline socio-economic survey data and initiatory social science inputs for planning to communities and councils.

3. Provide high-level professional training in the social science dimensions of natural resource management.

Source : Project Summary - Phase II

Note that some of the original specific objectives have been moved to other organizations, eg. I.3. (informational and educational materials) was now the full responsibility of the Zimbabwe Trust.

Given that one of the criticisms of the Phase I evaluation was that CASS had difficulty in setting clear objectives against which the project could be evaluated, it is worth noting that they did not learn anything from that criticism. There are fewer examples of putting too much information in a simply stated objective than specific objective #1 of Phase II. It defines the focus as "institutional structures and processes in common property context" but then adds "including consideration of: tenure, land-use, land-use planning, gender, and integration of agricultural and non-agricultural resources in locally based and locally managed systems of economic productivity and self-sufficiency."
Source : Project review - Phase I and project summary - Phase II

It further goes on to explain that the feedback mechanism will consist of "assessment of available options," "to be presented in a variety of forms (verbal reports and presentation to communities and councils, quasi-confidential reports and research reports)". This is not a clear, easily stated objective which helps evaluation.
Source : Project Summary - Phase II and opinion of consultant.

5.1.4 Strategies and Activities

The strategies (methodologies) and related activities used to achieve the various options are discussed in this section.

One of the criticisms of Phase I made at the evaluation was that the various strategies and methodologies to be used had not been spelt out clearly. It is accepted that social science experimental methodologies are particularly difficult to define but some of the sections in the project summary represent more an exercise in semantics than a description of methodology. "The result is that most of what we have been doing under the

rubric of "social science" (and this is true whether the focus has been quantitative or qualitative) has been descriptive and inferential, at best demonstrating correlation rather than causation." ... "This will permit research methodologies incorporating longitudinal quasi-experimental designs."
Source : Project Summary - Phase II

The proposal details that one of the most important initial methods to be used in the research is the "acquisition of baseline data sets carefully structured to ensure the presence of all relevant information across a spectrum of contexts representing the main heterogenities". The next methodological stage is seen as monitoring, where change in dependent variables can be measured and evaluated under various management regimes (impact assessment).

For longer term analysis, comparative data is required in a way which enables different variables to be compared. The proposal was to start with different management regimes - regional projects, council control, ward or vidco control. The methodology proposed a two-year period of field work in each site so that "extensive observational and interrogative techniques" could be used. Involvement in areas where a series of steps - part of the CAMPFIRE philosophy - were being implemented, provided CASS with the ability to engage in a "natural successional experiment".

A clear component of the methodology/strategies was to have multidisciplinary research going on in common areas involving the Department of Biological Sciences and the World Wildlife Fund (WWF). By Phase II, the usefulness of this approach was so well established that CASS hoped to be able to extend this to ecologists of National Parks and Wildlife.
Source : Interview with Senior CASS Staff

The generation of research findings and the development of M.Phil. and D.Phil. field work was another clear strategy pursued by CASS.

By Phase II, the initial focus on natural resources - mainly wildlife - had been widened to cover other aspects of economic significance, eg. woodlands, fisheries, grazing and areas of tourist attraction.
Source : Interview with Senior CASS Staff

5.1.5 Inputs

In the following discussions, it must be understood that the budget allocation to CASS in terms of IDRC/Ford Foundation grants has always been considered as very flexible. The IDRC had negotiated a bilateral agreement with GoZ which gave them duty-free status - with IDRC supplying the vehicles, CASS could avoid the massive 100% import duty. Thus, for financial purposes, the two grants were seen as separate but, for practical purposes, they were administered as one programme.
Source : Interview with Senior CASS Staff

The total IDRC budget for Phase I was CAD303 740; Ford Foundation was to contribute CAD$306 440 (38,7%), University of Zimbabwe CAD$101 710 (10,2%) and the NGO ZimTrust CAD$101 710. (IDRC contribution = 38,3% of total budget.) The breakdown of the budget and the allocation between the various project components is given in Table 5.1 .

Due to the loading of the IDRC budget with equipment, it represents the major portion of the budget (41,6%) followed by salaries and allowances (34%). Other significant components include the allocation for publications and reports (10,5%). It should be noted that under IDRC Phase I, no funds were allocated for Training as all this was covered by the Ford Foundation funds. Equally, this shows the clear interaction between the two programmes because none of the research field work could have been undertaken without the use of vehicles.
Source : Project Summary - Phase I, calculation by consultant and comments by Director of CASS

Information provided by IDRC Head Quarters on the budget indicates that some CAD$178 800 of the Phase I allocation was unspent. This represents about 46% of total allocated budget and this level of under-expenditure is totally inexplicable.
Source : Project Variance Report

Table 5.1 : Breakdown and analysis by item of IDRC / Ford / UofZ / ZimTrust contribution to CASS for Phase I of the NRMCL Project - in CAD$

ITEM	IDRC CAD$	Ford CAD$	U of Z CAD$	ZimTrust CAD$	IDRC as % of Total
Salaries and Allowancees	103180	103180	55220	72650	30.9%
Consultants	7990				100.0%
Travel - Fieid research		75550		23250	0.0%
Travel - Regional/International		6540			0.0%
Supplies and Communication		24550		5810	0.0%
Publications / Reports	31960	24700			56.4%
Equipment	126470		18160		87.4%
Training		65380			0.0%
Seminars & workshops	6420	6540			50.0%
Contingencies / Data Analysis	27600		7260		79.2%
TOTAL	303740	306440	80640	101710	38.3%
		38.7%	10.2%	12.8%	

Source : Project Summary

The total IDRC budget for Phase II was CAD$312 332; Ford Foundation contributed CAD$340 532 (40,7%), and the University of Zimbabwe CAD$184 000 (22%). (IDRC contribution = 37,3% of total budget.) The breakdown of the budget and the allocation between the various project components is given in Table 5.2 .

Table 5.2 : Breakdown and analysis by item of IDRC / Ford / UofZ contribution to CASS for Phase II of the NRMCL Project - in CAD$

ITEM	IDRC CAD$	Ford CAD$	U of Z CAD$	IDRC as % of Total
Salaries and Allowancees	129420	129420	168000	30.3%
Consultants		17560		0.0%
Travel - Fieid research	43572	43572		50.0%
Travel - Regional/International	28080	28080		50.0%
Supplies and Communication	7720	4200		64.8%
Publications / Reports	22000	22000		50.0%
Equipment	21740	26540	16000	33.8%
Training	32780	42140		43.8%
Seminars & workshops	27020	27020		50.0%
Contingencies				
TOTAL	312332	340532	184000	37.3%
		40.7%	22.0%	

Source : Project Summary

The major items represent salaries and allowances (41,4%), travel (33%) and training (10,5%). Significant allocations were again made for publications/reports (7%) and for seminars and workshops (8,7%).
Source : Project Summary - Phase II and calculations by consultant,

Information provided by IDRC Head Quarters indicates that the whole amount allocated bar 82 cents has been spent. (This makes the unspent portion of Phase I even more inexplicable but, as stated elsewhere, a decision was taken not to get bogged down in a financial analysis.)
Source : Project Variance Report

The input by IDRC regional staff is viewed in an extremely beneficial light by senior staff. Hartmut Krugmann provided the critical "light touch" control for which IDRC programmes are known - and which is discussed later as an important management style. Krugmann is also credited as being an excellent listener and a perceptive analyst against whom CASS staff could "bounce" ideas and get a rational response. When asked to define the attributes of a good Project Officer, the incumbent stated "the ability to ask questions" - by all reports, they were also good "questions".
Source : Interviews with senior CASS staff and IDRC Project Officer

During the course of Phases I and II, there has been a large devaluation of the Z$ against CAD$ from CAD$1 = Z$1,37 to CAD$1 = Z$2,50 to CAD$1 = Z$8,36 (to date). This devaluation has coincided closely with the massive wage inflation experienced in staff salaries at the University of Zimbabwe (UZ) as the GoZ responded to a series of strikes by workers and to a Commission of Inquiry which investigated the appalling staff loss being experienced at the University, due to unattractively low salaries and conditions. Thus the increasing local Z$ costs have balanced out the shift in the exchange rate.
Source : Interview with senior CASS staff and Centre records

5.2 Project Outcomes

5.2.1 Outputs

These are related to the general and specific objectives detailed in Section 5.1.3 earlier. The general objectives because they are similar for Phases I and II will be dealt with together.

General objectives

a) More comprehensive programme responsive to social science research requirements.

CASS established a very comprehensive research programme covering four basic research units:

- CAMPFIRE Unit. This unit was to address micro-economic, cultural and organizational community-level issues related to CAMPFIRE. This was to have three posts.

- Grazing Management Unit. To address use of grazing resources under common property regimes. This was to have two posts (funded by IDRC under Project # 86-0188).

- Socio-Legal Unit. To analyze issues in this field and how it affects access, control and proprietorship. This was to have two posts.

- Implementation Unit. The role of this unit was to be taken over by ZimTrust, an NGO working with CAMPFIRE projects.

Source : Project documents and interviews with senior CASS staff

It was hoped that, once funding was obtained, two additional units would be established for forestry and fisheries. This happened with the introduction of the NORAD/SADCC Zambia/Zimbabwe Lake Kariba Fisheries Project.

In these programmes were to be placed four Senior Research Fellows - one a UZ Staff Development Fellow and three Ford Foundation/IDRC persons.

James Murambedzi	worked on micro-political dynamics of CAMPFIRE in Omay, Kariba District
Calvin Nhira	worked on woodland management in Kanyati, Kariba District
Richard Hasler	worked on anthropological study of community resource utilization in Chapoto Ward, Guruve District

Despite extensive advertising, the fourth Research Fellow post could not be filled until late 1991.
Source : Details in Project Documents including Evaluation Report and Interviews with Project Staff.

The CAMPFIRE Programme grew fairly rapidly and CASS, through the Collaborative Group, provided its input on the social science side. This led to a rapid expansion of the area where CASS worked and diluted the possible effort which the IDRC/Ford Foundation Project assumed would be put into the original two Zambezi Valley districts of Guruve and Kariba.

By 1991, the number of districts granted Appropriate Authority Status had increased to 12 and they were found in 7 of the 8 provinces. The geographic spread of projects was now enormous, stretching from the south east - Chipinge - to the extreme north west - Binga. Other donors entered the scene, especially USAID with the

Matabeleland Project.
Source : Interviews with WWF, Zimtrust and CASS Staff.

b) Initiate co-ordinated research programme which would foster collaboration.

CASS developed a very good relationship with the Department of Biological Sciences, UZ, in that they provided all the social science input - teaching and supervision, on the Masters course in Tropical Resource Ecology. They also worked closely with the Department of Rural and Urban Planning because staff like Dr. Jeremy Jackson had previously worked there.
Source : Interviews with Project staff.

In 1989, there was the formal establishment of the Collaborative Group which collected CASS, WWF, ZimTrust and the Department of National Parks and Wildlife Management (DNPWLM) into a co-ordinating body. This group was expanded when the CAMPFIRE Association (CA) joined. By the end of Phase II, the CA was considered the lead organization and the other members, CASS, WWF, ZimTrust and DNPWLM were effectively responsible to CA.
Source : Interviews with WWF, Zimtrust, CAMPFIRE and CASS Staff.

In each district that CASS worked, it established close collaboration with the relevant Local Government organizations, District Councils (later to be Rural District Councils), WADCO's and VIDCO's, plus the District Wildlife Management Committee, the Wildlife Management Committee and staff of the Ministry of Local Government and, at a later stage, specific bodies such as the Nyaminyami Wildlife Trust, etc.

This involvement with local-level bodies helped fulfil the fact that the terms "local governance and empowerment" had been added to the general objectives.
Source : Interview with Senior CASS staff.

c) Build individual and institutional capacity

The recruitment of research fellows, already detailed above, represented the ongoing commitment to this process. In addition to the field work research undertaken by the post-graduate students, a number of placements for specific taught courses at the University of Reading, Michigan State University, etc. were organized.

In addition to student placements, the programme was able to recruit senior researchers on Fullbright Fellowships which saw academic figures of high international reputation come to CASS for a placement. They carried out relevant research, ran student seminars and provided an excellent atmosphere for academic cross-fertilization. Professors Louise Fortman, Peterson and Roland Hawkes are examples of this high calibre input.
Source : Interview with senior CASS staff

CASS was designated a "regional centre of academic excellence" by the UN and this further strengthened its reputation. Over the years of the project, there have been a number of academics who have come to CASS at their own expense or on sabbatical where they are afforded Research Associate status. This has been an extremely beneficial exercise and most staff report that, with few exceptions, most left more than they took although, for many, working on the very real issues in Zimbabwe has produced papers which they could not have produced elsewhere.
Source : Project Interviews, review of project documentation and opinion of consultant

Outputs of specific objectives in Phase I

1. Data collection on development schemes
This was achieved by studying and holding discussions with authorities and donors on the Mid-Zambezi Valley Development Project, the Kanyati Integrated Rural Development Project, the Sengwa Coal Project, the Regional Tsetse Eradication Programme, etc. Some detailed work was undertaken by Prof. Derman (a Research Associate).
Source : Interviews with senior staff and review to project Documants

2. Policy recommendations
This was covered/facilitated by the collection of baseline quantitative data on a number of wards and production

of a series of ward profiles based on detailed case studies. The recommendations were made to the full range of stakeholders from communities and wards to Councils and the Ministry. The Centre ran a series of well attended seminars where staff and visitors presented either their findings or their views. This was an important forum but one of the main beneficiaries, because it was at the University, were other researchers and members of the collaborative group. At the time when policy was being formulated, it was important for this group of intellectuals to sharpen the concept and the possible practice of the programmes. One must remember that the only other projects where community-based resource management was being effectively practised (in the rest of the world) could have been listed on one page. There was a criticism at that time that insufficient academic papers were being produced.
Source : Interviews with WWF, Zimtrust, CAMPFIRE and CASS Staff.

3. Contribute through informational and educational materials
This component was not handled well by CASS. The evaluation of Phase I criticised the organization's failure to pursue this important aspect. The educational needs of the various ward and village groups was not considered. This aspect has now been taken over by ZimTrust and ACTION magazine and the impact of having single subject specialists handling this matter is remarkable. A lesson exists in this: get a media specialist to produce media not an academic researcher.
Source : Interviews with WWF, Zimtrust, CAMPFIRE and Project Evaluation report.

4. Augment capacity of communities to plan and implement
Considering there was very little capacity at the beginning, CASS and the other groups have made an impact but much more is required.
Source : Interviews with other members of Collaborative Group

Outputs of specific objectives in Phase II

1. Policy relevant analysis and monitoring and evaluation feedback
The research work started in Phase I continued and the baseline profile and different case studies started to generate some useful information which could be fed into the project debate. The Phase II focus on institutional structures and the access to common property brought the policy research focus onto:

- conflict on how revenues should be used in terms of ward and district;
- conflict within wards on how funds should be disbursed, either to all families or excluding illegal settlers and recent in-migrants;
- conflict within wards and districts as to what social infrastructure should be built (clinic, school, etc.) and, more importantly, where it should be built;
- conflict as to how much of the wards' proposals for future action should be included in the district development plans.

Here the decision to return revenues to the ward that generated them created some problems. Districts felt that as they had negotiated the contracts, this was their revenue while wards, experiencing animal damage, claimed they alone should be compensated. This created situations where families in wards in part of a district received cash payments of up to $1 000 per family (Hurungwe 1992) when the rest of the District received nothing.
Source : Interviews with senior CASS staff and researchers involved in the work.

In these outputs, there was some criticism about the role of researchers in community level advocacy. The debate about sociologists and anthropologists becoming "too involved" with their research subjects has raged for hundreds of years since the first social scientist got drunk on traditional brew or over-enthusiastic at the tribal fertility ceremony. The fact that CASS researchers took the side of the community in their conflict with districts can be criticised in terms of pure research theory but it has a role in the advocacy and promotion of a community's right to their own resources.
Source : Interview with CAMPFIRE staff and discussions with Senior CASS staff

The information collected by some of the researchers on this aspect of policy was, in a few incidents, presented at a public meting, causing some embarrassment for the responsible councillor. This created a major conflict between CASS and the council, unfortunately one of the key institutions in the "feedback loop". There were a

number of appeals for CASS to be more "sensitive".
Source : Interviews with other members of Collaborative group

Excellent research in the use of "mopane worms", a species of caterpillar collected in the woodland, by P. Hobane and the detailed marketing analysis undertaken should be an example to other studies of this nature.
Source : Review of relevant project documents

2. Baseline socio-economic surveys

A number of large-scale quantitative baseline surveys were actualy conducted by CASS but they have not been extensively used. In discussions with some related organizations, they complained that CASS had failed to carry out this style of data collection. This clearly gives an indication that the failure of use the base-line survey information was due to a lack of communication.
Source : Interviews with other members of Collaborative group and senior CASS staff

The large number of baseline studies - containing more socio-economic and less questionnaire-based information - were produced and these are detailed in two good reports: "Joint Report to Ford Foundation and IDRC" in 1991 and 1992.
Source : Review of relevant documents and opinion of consultant

3. Training

The most significant and project specific output has been in the research graduates produced. Phases I and II have seen doctorates awarded to four CASS staff members, ie. Drs. Cousins, Hasler, Murombedzi and Nhira. In addition, the research work at CASS has resulted in two outside doctorates - Jenny Adams at Cambridge and Mette Maast at Rochilder University, Denmark.

The crop of M.Phils. has not been good with only Mudzoza graduating. Three or four M.Phils. are currently still n the pipeline.

Regionally and in Zimbabwe, CASS's training programme has significantly added to capacity to research and now teach issues of natural resource management.
Source : Interview with Senior CASS staff

In addition to the output of doctorates, staff have also taught on the M.Sc. Terrestrial Ecology and at some undergraduate courses in the Faculty of Sociology. This balance between research and teaching has been possible because the staff of CASS were not over-burdened by teaching commitments. The reduced teaching load was only possible in terms of the University because of the funding provided by the IDRC/Ford Foundation project.
Source : Interview with Senior CASS staff

5.2.2 Institutional environment

CASS, as a largely independent institute in the University of Zimbabwe, has occupied a unique and important position. Ford Foundation or IDRC support has significantly added to its considerable reputation. The Centre has responded admirably to changing circumstances of the whole of CAMPFIRE and related programmes. Its adaptability has been a direct result of the practical flexibility of IDRC funding and the organization's decentralized decision making ability given to Programme Officers to approve changes in the programme and to switch project funding.
Source : Interview with Senior CASS staff

The major impact that CASS has had is related very much to the head of the Centre. Prof. Murphree's input into the Centre, the staff's development, the research programme, the quality of the results, and the use to which they have been put, is so enormous that it would be a major undertaking to even list them and an embarrassing exercise in adulation to describe them all. Sufficient to say that any other organization like IDRC would be very lucky to have someone as good as him for project leader.
Source : Interviews with all respondents and opinion of consultant

The co-ordination between members of the collaborative group has been very good but many comment that it has diminished over the last couple of years as the individual organizations get down to their new separate tasks.
Source : Interviews with other members of Collaborative group

5.2.3 Project Reach

The reach of CAMPFIRE has been fairly enormous - some 250 000 households in Zimbabwe are now included. The distribution of funds up to 1994 was something of the order of Z$34 million . The breakdown of this is given in Table 5.3. A summary of the project reach is presented (with impact) in table 5.4

Table 5.3 Income from Wildlife in CAMPFIRE districts in Zim $

Year	Sport Hunting	Tourism	Cropping	Hides& Ivory	Other	Annual TOTAl
1989	694 773	60	35 910	11 256	1 700	743 699
1990	1 310 187	7 082	75 790	105 917	65 849	1 564 825
1991	2 393 713	59 657		78 242	379 243	2 910 855
1992	5 743 999	96 878	21 666	48 199	153 247	6 063 989
1993	9 101 186	137 730	32 833	97 858	317 971	9 063 989
1994	12 319 070	319 856	11 014		377 554	13 027 494
TOTAL	31 563 558	621 263	177 213	341 472	1 295 564	33 999 070

The actual reach of CASS's research may be more difficult to determine but clearly the fact that CAMPFIRE is well researched means that the principle has been widely accepted. It has become comprehensively incorporated into policy in Zimbabwe. Every Minister and Member of Parliament can talk meaningfully about CAMPFIRE.
Source : Observation by consultants based on government statements.

A number of the persons interviewed claim that the real reach of the CASS work has been outside the borders of Zimbabwe. Namibia, Botswana, Mozambique and Zambia have all benefited from the advice and guidance provided by CASS staff. Someone claimed that the readiness with which advice has been received and implemented is living proof that "prophets are appreciated more outside their homes".
Source : Interviews with WWF and ART staff

The rapid expansion of CAMPFIRE, especially since the Americans threw $20 million at it, has made the programme too big for CASS to handle in terms of providing the required socio-economic back-up. USAID has funded some baseline surveys of new areas but the quality and reliability of research undertaken by a commercial consultancy company cannot be compared to the in-depth information which was available on the original CAMPFIRE communities.
Source : Interviews with senior CASS staff

5.2.4 Project Impact

CAMPFIRE has had a major impact on natural resource management. The question that this evaluation must focus on is: "What has been CASS's contribution to the impact of CAMPFIRE?"

CASS provided an important legitimacy to the whole CAMPFIRE programme. Its high academic reputation and competent research work fed into the process of development of both the concept and the actual programme.

CASS's research work provided other participants with confidence that their gut feelings (that communities were enthusiastic and benefitting) were correct. The feedback from community to council, from council to central Government, which CASS was able to articulate and present in a competent fashion, further strengthened the commitment at all levels. The support that communities showed for the programme, the way CASS's work demonstrated this in a professional and internationally accepted academic way, encouraged the authorities to make further steps to expand and encourage the programme. CASS's ability to take the nameless voices of VIDCO/WADCO members and councillors to fora at both the national and international levels, got people hooked on the idea and committed to it. If CASS claimed, in its cool and competent way, that real and actual empowerment was taking place - that real and genuine distribution of benefits was occurring at the grass-roots level, then their independence and their unbiased assessment had a major impact. This was not a white hunting safari operator claiming that it was a good idea. This was *not* a party official from the ruling party who claimed "his people" supported it. This was an internationally recognized, academically independent institution which was staking its collective and individual reputation on the fact that the information provided was real,

genuine, analyzed and interpreted in an unbiased and competent fashion.
Source : Interviews with other members of Collaborative group

CASS's real impact on CAMPFIRE had another side to it, a side which has been criticised in some publications and in some evaluations. It was with the people. When CASS researchers stood at a village or ward meting and supported an idea, this provided the idea with legitimacy. The research workers were trusted "friends" of the community. If they repeated that fencing would be installed next season, people believed it would happen. The tension of problem animals could be put in its proper perspective. This was the last season the community would have to put up with it because a fence was coming. The person with the message, a government employee or a local government official, would, without the legitimacy of the CASS researcher, have been another empty promise. This is not to say that CASS researchers have been put in a position where communities have a dependency relationship with them but, at a critical time of the programme while communities were still finding their feet and flexing their muscles, the CASS researchers presented an unbiased version of the possibilities and at times a vision of the future. When villagers reported that an uncontrolled influx of illegal settlers was threatening the viability of a project, they knew that CASS would report the matter objectively, especially if their investigations revealed that the local councillor or headman was part of the problem because he was "selling" land to the settlers.
Source : Interviews with CAMPFIRE and CASS researchers.

A Summary of reach and impact is presented in Table 5.4

What impact has the CASS research had on "commercialization" or income generation in the border communities? This connection is somewhat tenuous. The revenues come from the sale of hunting concessions and other fees. This income is determined by the way in which the "deal" between the council and hunter is negotiated. The research undertaken by CASS has provided the following information which has been acceptable as part of the lexicon of CAMPFIRE

- funds from CAMPFIRE must be distributed in the "producer" communities;

- district charges, costs and CA levies etc. should not exceed 50% of total revenue so at least half (if not more) of the income goes to the villagers themselves - "those that make the sacrifice must reap the rewards"; and

- all dealings at council, ward and community levels must be "transparent".

Source : Project Interviews and review of project documents.

Table 5.4 : Summary of Impact and Reach - Project Numbers 89 - 0026 & 91- 0040 Natural Resource Management (Zimbabwe) - Phase I & II

Potential Beneficiary /User	How Benefit	Mechanism	Actual Extent benefited /affected	Potential for future benefit
Farmers Groups	Increase in income. Local Empower-ment	-Distribution of income from the sale of wildlife and safari rights directly to the participating community or via expenditure on projects determined by the community	-Monitoring by research programme, participatory research and advocacy ensures degree of transparency which contributes to money being fairly distributed. - Researchers criticised for becoming too involved in advocacy and local politics. Siding with community against local representatives.	- Community mobilisation and institutional growth should enable local groups to carry-out own advocacy. - CASS research programme will become too politically orientated
Researchers	Increased capability for research	- Postgraduate training of staff and fieldwork on CAMPFIRE to generate original research for doctoral and masters dissertations	- Phase I and II resulted in the award of 4 Ph.D.s and one M.Phil. to CASS staff. - 2 additional Ph.D.s awarded to outside students stationed at CASS	- Graduates of CASS programme represent a significant proportion of the regional skills in Community based Natural Resource Management - Graduates from CASS are having major impact on training capacity in region.
Centre for Applied Social Sciences	Increased Knowledge	-Improve the availability of sound socio-economic and socio-cultural information (baseline data) so that project impact could be monitored , adjusted and planned -Provide a research feed-back loop so that project options could be generated.	- Research formed part of fieldwork for dissertations and thus was not published and made available on a regular basis during the research period - Field work observations were fed to interested parties by the constant involvement of the director of CASS in Collaborative Group - Information not widely distributed in easily "digestible" form. - information on community acceptance and the importance of transparency helped guide programme and assisted GoZ in decisions.	- Baseline data could be used for further time series research - Information available at CASS could form basis of very useful teaching material - The research and information already available can be made more accessible and re-published in a more user friendly way.

Table 5.4 : Summary of Impact and Reach - Project Numbers 89 - 0026 & 91- 0040 Natural Resource Management (Zimbabwe) - Phase I & II

Centre for Applied Social Sciences	Institutional capacity Building	-Improve and strengthen academic connections between overseas Universities and regional institutions. - Provide important social science input to Biological and ecological students.	-Attract visiting academics of high calibre to provide intellectual and academic cross-fertilisation. CASS declared centre of excellence - received a number of Fullbright Fellowships. - Improved inter- Departmental interaction between CASS and other UofZ groups by teaching input on Tropical resource M.Sc.	- CASS reputation as regional centre is well established and this could be maintained and strengthened. - programmes in neighbouring countries of Mozambique, Namibia and Zambia have benefited from advice and assistance from CASS
Government of Zimbabwe	Policy Formulation	- Convinced of the efficacy of allowing communities to manage their own natural resources.	- CAMPFIRE now national policy in terms of wild life - CAMPFIRE Association is now important local government body.	- Government may also grant communities control over natural resources such as forestry - Campfire has become too big (on donor contributions) to be sustainable on member Association contributions alone.

In addition to the CASS research work, their involvement with institutions like the Rural District Councils, the various Wildlife Trusts, Management Committees, and Ward and Village Committees, they have promoted openness and created a firm belief that people and participants have a right to know. This process represents all that IDRC enshrines in its own strategy - this is "empowerment through knowledge". By knowing how much council got, by knowing how much the ward was allocated, they know if they (the community) are being cheated.
Source : Interviews with CAMPFIRE field staff.

In this way, CASS's work in terms of institutional strengthening in the various bodies involved has affected the level of income distributed. Other members of the collaborative group have also made a massive contribution: WWF in educating about the value of various game species and their support in negotiations with hunting concessionaires have helped keep the process sustainable and lucrative. ZimTrust, in its education campaign, has trained community officials and monitors so that they can insist on transparency. ART monitors external policy and ACTION provides educational material for communities and more importantly their children. Communities now jealously "guard" their wildlife and natural assets because they realize it is theirs. CAMPFIRE and the revenue it generates could be sustainable but as population pressure mounts and wildlife diminishes, so incomes will remain stagnant at best and possibly fall. But it is hoped that CASS's ongoing socio-economic work will be able to document the changes at a community level.
Source : Interviews with staff from Zimtrust, WWF, ART and CASS

As stated already, the impact of CAMPFIRE and the role CASS's research has played has more impact in terms of Public Good and Policy than in commercialization, although the latter is one of the reasons why CAMPFIRE has been a successful policy - it is not just an idea or theory but it does generate a series of tangible benefits.

To see the President of Zimbabwe address an international gathering and state unequivocally that the GoZ is committed to sustainable use of natural resources and that the vehicle of this is community-based natural resource management based on the empowerment of communities to control and utilize their own resources in a sustainable way, then clearly CAMPFIRE has made a massive impact.
Source : Observations by and opinions of consultant

The Presidential Commission of Inquiry into Appropriate Agricultural Land Tenure Systems singles out the CAMPFIRE programme as the one approach which has provided a reason for communities to conserve and manage their natural resources. GoZ accepts this report, CAMPFIRE has become policy. The Chairman of that Commission, Prof. Mandivamba Rukuni admits that the well researched and documented background to CAMPFIRE provided by CASS and ZimTrust made it very easy to get consensus among commissioners.
Source : Project interview

In the long term for the Government to accept the principle of community ownership of resources, even though initially it was in terms of wildlife, it can be extended to trees (forestry exploitation), river sand, gravel, etc. Accepting that communities control their resources has deep and long-term consequences. These consequences are in terms of Policy and eventually Public Good.

5.3 Enhancement of Outcome

As with the other projects a summary table of factors enhancing and hindering the outcome of NRMCL is given in Table 5.5

The research undertaken by CASS, and published, has an international reputation and is accepted academically. The publication list is extremely comprehensive and any institution working in the field of community based Natural Resource Management would be required, for the sake of academic completeness, to purchase 50-60% of the papers. The papers are, however, not easily accessible to non-academic users and for many of the potential users, their cost is extremely high. By making them more freely available, there is a possibility that more could have been achieved in spreading the impact.

Table 5.5 **Summary of Factors that Inhibited or Enhanced the Outcome of Project Natural Resources Management in Communal lands (Zimbabwe) - Phase I and II**

FACTORS THAT INHIBITED OUTCOME	FACTORS THAT ENHANCED OUTCOME
Previous research	CASS had already established a reputation of competent socio-economic and socio-cultural research
Objectives Project Objectives were not clearly stated and tended to be too broad and unattainable	
Context	CAMPFIRE idea was gaining acceptance and it required a social science research input. Other key players including National Parks, professional hunters etc were already committed. A congruency of motives.
	Government was committed to using Centres of higher learning as contributor to the debate about development.
Strategies and Activities Research methods were not clearly specified.	Research methods were participatory and completely involved the local people and were designed in such a way that the views of local villages could be obtained.
	Carried out detailed base-line surveys in selected communities so that subsequent research was given good basis. Research was multidisciplinary and also involved WWF and Biological Sciences
Inputs	Budget items from Ford and IDRC were balanced in a way which gave CASS maximum advantage. IDRC's financial flexibility assisted CASS
	Increased Zimbabwe $ costs were compensated for by the rapid devaluation of the local currency against CAD $
Outcomes CASS, by attempting to cover many topics (CAMPFIRE, grazing management, fisheries etc.) spread itself a bit thin	Individual workers concentrated on their particular research fields
Research undertaken for dissertations tends to get "buried" until the researcher analyses the data when they start write-up.	CASS constantly held seminars and workshop which ensured that preliminary research results were made available.
	Research workers remained in the country except for short stays away on specific taught courses.
Too many visiting foreign researchers distorted the programme.	Centre, staff and students benefited by the presence of top class academics on short-term fellowships.
	Government was committed to genuine policy debate and remained flexible to suggestions based on research.
	Local empowerment and the involvement of Village Development Committees (VIDCO) fitted in very closely with Government development policy.
Availability of money in Districts generally short of funds creates pressures to divert funds away from producer community to District level projects.	Flow of money from wildlife activities was substantial because of good game resources and good marketing.

6.0 SUMMARY OF IMPACT ASSESSMENT - COMMERCIALIZATION CASE STUDY - AGRICULTURE AND AGROFORESTRY

6.1 Interaction between Research, Development and Project Impact

Before this chapter deals with the evaluation of reach and impact of the 3 projects evaluated in this case study it is worth returning to the issue raised at the beginning of this document - the difficulty of separating out the role of research in development and the interaction between information and knowledge and impact.

IDRC has as its current strategy "Empowerment through Knowledge". Research plays a key part in this development process because it is the means by which the appropriate information (knowledge) is obtained. This knowledge, if it is genuinely appropriate and can be applied in such a way so that it increases production (income), saves labour, eases hardship or improves the quality of life then it can be considered as beneficial to development. Genuine development, either in physical, monetary, institutional or spiritual terms, is a form of empowerment.

When research discovers/invents/perfects a process or product which is immediately beneficial, then the link to development and the impact of research is clear. When the research produces information which must first be adopted, applied or used before it makes a contribution, then secondary factors come into play. The impact of the research becomes filtered by the efficiency by which it is extended. Here the extension of the idea/concept/process/item depends on its own particular attributes and the way it fits into the existing production system or with the existing values/cultural norms. Research/knowledge by itself does not necessarily cause an impact. It is only successful when it is relevant and applicable. The research may produce something of real benefit but it may have no impact because it clashes with existing practices which make the adoption impossible or problematic.

In the three projects studied in this case study, a number of different interactions between research, useful knowledge, use of that knowledge and impact exist. Exploring certain elements of this interaction may help to understand how research has an impact and possibly how it may be enhanced.

The Dairy/Beef Production System research in Botswana identified the following important facts:

- Tswana/Simentaler crossbreeds produce more milk than indigenous cattle.
- Plantings of the Dolichos pasture crop Lablab can produce significant quantities of hay.
- Feeding collected stover and harvested Lablab hay can significantly increase milk production in Tswana/Simentaler crossbred cattle.

The actual impact of this important research was, however, limited by the following factors. Crossbred cattle are not freely available, the alternative of getting indigenous cattle Artificially Inseminated is available but not fully appreciated by farmers. Lablab seed is not freely available and labour/local transport demand of collecting stover and feeding it to cattle is too high. The incentive for the adoption of the various innovations - the potential of increased income from the sale of surplus milk on a market "clamouring" for fresh milk - just does not exist. Market competition (from imported UHT and steri-milk) limits marketing opportunities and low marketing income does not encourage farmers to adopt the package of innovations which, in reality, calls for a massive additional input of labour. The research failed to have an impact because the market and the economics of production were not thoroughly researched.

The Fuelwood Plantation Project research programme screened a number of exotic tree species especially *Eucalyptus* and identified that one of the hardiest of these quick-growing trees was *E. camaldulensis*. This species was then planted at the appropriate spacing (also researched) in community woodlots. Some ten years later, the target groups still have not managed to sell them because, as fencing and building poles, they compete unfavourably with the creosote treated gum poles imported from Zimbabwe and South Africa and as firewood they are, as one of the project participants described them, "not good firewood, they burn like a cigarette leaving only ash". Here the research failed to have an impact because the complex role of trees and fuelwood in the lives of the farmers was not fully understood. The prerequisites for growth were carefully researched but the factors affecting use were barely examined. This research failed to have an impact because the value system of the intended beneficiaries was not incorporated into design of the project.

In the National Resource Management in Communal Lands Project, baseline information on participating communities has been collected. The process by which communities take on board the concept of managing and benefiting from the sustainable use of wildlife resources is clearly understood. The positive interaction between distribution of benefits in the producer community and the adoption of sound wildlife management on the part of the community has been clearly and unequivocally established. Despite this, there is always the tendency for cash strapped Rural District Councils to see CAMPFIRE revenues as a reliable (and presumably inexhaustible) source of funding for the allowances they pay themselves and for "prestige" projects (like new council offices or a beerhall) in the district capital.

Information on communities shows that, in established and settled communities, there is good adoption of the principles and practices of CAMPFIRE. Where communities are coherent wholes, they can adapt to the concepts of community resources management. However, where there has been massive in-migration and where immigrants outnumber the original residents, there is no sense of community and "community based/natural resource management (CBRM)" becomes a useless acronym. Despite this information, the authorities are reluctant to enforce land-use plans drawn up for the area and restrict uncontrolled in-migration of settlers and their cattle. Clear evidence of an impending ecological disaster is ignored.

In this project, the major impact on the lives of people and communities involved is a result of the soundness of the concept and principles of CBNRM. The research assists and reinforces what the originators knew at the beginning - this is a good idea.

The research of what goes wrong with CAMPFIRE programmes only has an impact if the relevant authorities listen to the findings and react accordingly. The research also has an impact on those "doubters" at CITES who cannot believe that communities can effectively manage their wildlife but even all the well written papers in the CASS library will not be able to convert a member of Friends of the Earth who finds the idea of sports hunting abhorrent.

The NRMCL project also illustrates an important aspect of research in real and meaningful development. The participatory role that the community actually plays in much of the research undertaken by CASS has created a situation where the community gains knowledge.

When CAMPFIRE communities know how much the wildlife concession went for, when the researcher with his/her calculator works out how much they, as a ward, should be getting, then they have information with which to confront their ward councillor and accuse him of misappropriation and theft. This is living proof of empowerment through knowledge.

Research has an impact on development when the project or process being investigated has an actual relevance to the communities or individuals who will eventually use it. In a large number of cases, this relevance can be found in the way the knowledge will benefit the user. In the case of commercialisation, the benefit is much easier to measure/quantify than in the case of policy or public good. Here the potential benefit to the intended user can be designated in monetary or near monetary terms. In this case, any research which has as its long-term objective commercialisation or increased income generation, must have as one of its central research components an analysis of the economics of the practice or process being proposed.

The effect of the new innovation on the existing allocation of labour and how it integrates with the most favoured activities or generating the preferred food source or the most important income source must be considered (Farming System Research). If the net output is a product or service, its market potential must be analysed, how it relates to substitutes and a full competitor analysis must be considered. Simply assuming that a local market exists, despite import competition, is naiveté at its height. The days of import substitution and tariff barriers are gone; the new reality is the World Trade Organisation regulations and competitor analysis must now include other regional producers.

6.2 Analysis of impact in relation to individual Project components

This section summarises some of the conclusions drawn about the various project components in the three chapters covering the projects (Chapters 3 to 5). These observation are extracted from the Summary tables detailing factors which inhibited and enhanced the outcome of the project. Table 3.4 for the Dairy Production system, Table 4.5 for the fuelwood project and Table 5.5 for the NRMCL project.

6.2.1 Objectives

It is important to have project objectives as it enables the relevance of the project to be assessed at the project formulation and funding phase. They should be used to direct the project and are critical for any evaluation. There is some evidence in the projects studied that this is an area where considerable improvement could be made.

The objectives in Project Summaries for the NRMCL project for Phase I and II represent the worse examples. The most confusing part of the Phase II objectives is that they keep referring to sections in the Phase I document. In future, project objectives should be presented in full with no reference to other sections in other documents. They should be free-standing entities which clearly define the objective. For example they should not be phrased as such:

"3.1 General Objectives

3.1.1 The general objectives are stated in paragraph 1.I, the core objective being to initiate an applied social science research programme proving policy relevant analyses for issues on natural resource management in Zimbabwe's Communal Lands or raised in paragraphs 2.2 and 2.3 and which furthers the methodological and training objective mentioned in paragraph 2.4."

Source : NRMCL Project Summary - Phase II

The other failure of the objectives in the NRMCL project is the fact that they are rather broad and unattainable (as described earlier) include details of activities as well. The objective should be short, concise, clear and adjusted until they are achievable within both the budget and the time scale of the project.

The objectives of the Dairy Production System -Phase II and the Fuelwood Project Phase I exhibit a clearer focus of objectives. The only criticism is the fact that project scope is often not considered in the objectives, making them too broad For example, the Dairy project involving a few farmers on-farm testing new technologies must clearly be seen as a pilot project. The objective "to increase milk production among small-scale peri-urban livestock owners" does not indicate that the methodology is still being tested. The Phase II objectives of the fuelwood project were adjusted and then unfortunately made too broad by the inclusion of terms such as Social forestry. This change in the objective was not reflected in any way in terms of the project design.

In this respect, the experience of GTZ (the German technical co-operation organisation) with their ZOPP methodology could be useful to IDRC. Carrying out an analysis of the problem, determining a long-term goal and breaking this down into one or two clear concise objectives, and then breaking the objectives down into clear and obtainable activities could help focus projects.

"To strengthen linkages with extension staff" is an objective which clearly should be broken down into concrete steps and planned activities. For example, the extension method and extension message needs to be worked out: who is going to do the extension ?- where and when ?, these are important aspects. How is the technology to be transferred? When will the training take place? etc. This should be planned, if it is not then, like the Dairy Project in Botswana, the linkage to extension will not be maintained, let alone strengthened.

6.2.2 Strategies, methodologies and Activities

Here only general comments can be made, all of which should be clearly known by IDRC:

- methods used should be sustainable in the long term;
- economics of the research need to be carefully monitored;
- where possible, beneficiaries should be involved in formulation of research; and
- social and socio-economic research must clearly rationalise observation and participation issues.
- where ever possible research should be multidisciplinary
- if possible research should be conducted on farmers fields rather than on research stations.

6.2.3 Inputs

The summary of the IDRC budget input in the projects is given in Table 6.1.

The reality of this evaluation must be clearly seen in the figures contained in the table. Total IDRC budget allocation varies from CAD$303 000 - 395 000. These are not large sums and it would be extremely unusual for amounts as small as this to have any major impacts.

IDRC funds have acted like seed money to dairy research in Botswana - GoB is now running with its own baton. IDRC funds to FAB got the NGO on its feet and established an important process of forestry research, even if the selection of tree species could have been better. CASS has benefited and continues to benefit from IDRC support and has used the funds in a sensible fashion so as to firmly establish itself as an important regional research centre.

Table 6.1 : Breakdown of IDRC contribution in CAD$ by main category to the various projects considered for the Commercialisatio Case Study

ITEM	DAIRY *Phase II*	as % of Total	FAB *Phase I*	as % of Total	FAB Phase *II*	as % of Total	NRMCL *Phase I*	as % of Total	NRMCL *Phase I*	as % of Total
Salaries and Allowances	164700	41.7%	131400	39.4%	71990	21.5%	103180	34.0%	129420	41.4%
Travel	28396	7.2%	48920	14.7%	64590	19.3%	0	0.0%	71652	22.9%
Research Expenditure	14877	3.8%	47430	14.2%	62520	18.7%	0	0.0%	0	0.0%
Publications	2478	0.6%	4500	1.4%	9160	2.7%	31960	10.5%	22000	7.0%
Equipment	11900	3.0%	38385	11.5%	30770	9.2%	126470	41.6%	21740	7.0%
Training	147000	37.2%	24400	7.3%	0	0.0%	0	0.0%	32780	10.5%
Seminars & workshops	0	0.0%	0	0.0%	16460	4.9%	6540	2.2%	27020	8.7%
Others	25959	6.6%	38050	11.4%	78610	23.5%	35590	11.7%	7720	2.5%
TOTAL	393310	100.0%	333085	100.0%	334100	100.0%	303740	100.0%	312332	100.0%

The evaluation interviews with staff on the completed projects carried out in this case study all produced positive comments about the beneficial effect of IDRC maintaining a flexible approach to the use of the project budget. By allowing adjustments between various budget lines and by making sure that budget disbursement requests were handled swiftly the projects and the research they supported could continue. The importance of flexibility was particularly relevant for FAB and CASS which are basically autonomous institutions - the first a relatively small NGO which could not have afforded to self-fund its activities and the second an department at a University not renowned for its efficient financial management. For the APRU in Botswana, most of the IDRC funds were filtered through the GoBs normal budgetry process thereby removing any direct advantage. Where the flexibility was noticed was in the payment of fees to Universities in Canada which was handled much more efficiently and easily than could have been achieved by the responsible department in GoB.

One area where there could have been an improvement was with the flow of information from IDRC to the responsible organisation, the provision of regular financial position reports would have helped the organisation manage their budgets. Equally, IDRC would benefit from a more regular report back system, compulsory on recipients, which shows exchange rate fluctuations and how funds are being spent.

No use was made in any of the three projects of useful and interesting information and communication technology.

6.2.4 Communicating Research Output

For two projects, the research outputs (information on dairy production and information on the growth of trees) were used internally to adopt an existing dairy project and start a new fuelwood plantation programme. In these cases, the fact that the output was not readily available to the general public was not critical. In general terms, the fact that research project outputs are not well communicated in a form suitable to the relevant audience is an element affecting the project reach.

Scientists at research stations and academics in universities produce papers which would not be rated highly in terms of their readability by the common man. In many cases, this common man is the person with whom the programmes should be communicating because it is they who ultimately formulate development plans and allocate resources. This conflict between documents which can be accepted and published in academic journals, where they are subjected to peer review, and having an article which a councillor can read is a major problem which very few research programmes manage to bridge.

The Dairy Project produced very "dry" reports which used a standard format perfected some years ago. The staff lack experience in explaining the consequences of their analysis to a lay person or in translating their research into practical recommendations.

The Tree Elimination Trial by FAB is published in a report with a mass of tables which would cause any normal person a major problem if all they wanted to know was what tree to grow.

Some of the CASS publications would require a background knowledge in sociology to fully grasp the subject. There are examples of CASS research reworked and presented in the "Wildlife and Development Series" by the International Institute for Environment and Development (IIED), which are ideal communication tools.

Two of the three projects, because they either had unsustainable economic aspects or were incorrectly formulated, had very limited reach and very little analysis or comment can be made on them.

6.2.5 Reach and Impact

The impact of the various projects were assessed in relation to a number of general categories. The results of this summary are presented in tables 6.2 to 6.4, and they are discussed below.

Dairy Beef Production Systems (Botswana)

The research undertaken under this project has had a medium impact in terms of its contribution to the knowledge pool because the results are not easily replicable through extension in terms of smallholder management practices (Lab-Lab seed not available, collection of stover difficult). However, some research on

the improved nutritional status of cattle due to winter supplementary feeding is important and should have future impact.

Table 6.2 Project number : 87 - 0225 - Dairy/Beef Production Systems - Phase II

Impact Assessment area	High	Medium	Low
Knowledge Pool		✔	
Individual capacity building	✔		
Institutional capacity building	✔		
Building networks and linkages			✔
Policy formulation			✔
Improved Quality of Life			✔
Increased Income			**Negligible**

In terms of both individual and Institutional capacity building this project has had a major impact. Nearly 40% of the budget was allocated to training and together with GOBs contribution this has been money well spent. The impact in terms of building important linkages and networks with other regional research centres has been low, this is partially due to the fact that many of the more senior personnel have been away on training.

Impact in terms of policy formulation has been low but the research was not intended, as such, to contribute in this area. However, a clear and concise evaluation of the problems facing small-scale dairy producers in terms of access to credit, difficulties in marketing, competing with indirectly subsidised large-scale producers in South Africa (e.g. lower electricity costs) etc could be used to influence policy in Botswana on dairy development and the use of some form of leverage to promote local import substitution industries.

Fuel wood Plantations (Botswana)

This project has made a medium level impact in term of the knowledge pool. Some local researchers would have scored this as low or negligible because of the large number of single purpose exotic fuelwood species included. This evaluation is slightly more practical and clearly, at some point, areas of Botswana will be forced to consider fast growing exotics. The FAB trial, if management of the sites continues, will be able to provide species information on long-term survival and growth rates. In addition, if properly managed, the existing plantations could also provide information on copicing and re-growth potential after cutting back.

Table 6.3 Project number : 85 - 0118 - Fuelwood Plantation - Phase I
Project number : 89 - 0068 - Fuelwood Plantation - Phase II

Impact Assessment area	High	Medium	Low
Knowledge Pool		✔	
Individual capacity building			✔
Institutional capacity building		✔	
Building networks and linkages		✔	
Policy formulation			✔
Improved Quality of Life			✔
Increased Income			**Negligible**

The failure to fully use the possibilities of the IDRC grant for staff training means that there has been a low impact in this area. Institutional capacity has been hindered as well as helped by a number of expatriate managers who have worked on the programme. The benefit has been accorded to the project because of the intellectual and academic commitment of some staff and suffered because of the conflict with others who may not have been totally committed to local capacity enhancement.

The project was not meant to make a direct input into policy formation and its impact in this field was scored as low. However, on reflection it could be argued that FAB's unfortunate experience on Phase II with extension of fuel wood plantations and it's on going involvement in social forestry could be having a direct impact on tree planting policy in Botswana. The focus on multi-purpose trees, the reliance on local and regional species and switch from village woodlots to around the homestead tree planting are all policy changes traceable to FAB's activities and research.

This case study focuses on commercialisation and in the categories of improved quality of live and increased income the impact is low and none, respectively.

Nature Resources Management in Communal Lands (Zimbabwe)

The project has had high impact in terms of the knowledge pool individual and institutional capacity building, building networks and linkages and most important policy formulation.

Table 6.4 **Project number : 88 - 0026 - Natural Resource Management in CLs Phase I**
Project number : 91 - 0040 - Natural Resource Management in CLs Phase II

Impact Assessment area	High	Medium	Low
Knowledge Pool	✔		
Individual capacity building	✔		
Institutional capacity building	✔		
Building networks and linkages	✔		
Policy formulation	✔		
Improved Quality of Life		✔	
Increased Income		✔	

The role of a local research organisations where training involves local and expatriate researchers working in country is a most successful element of CASS operations. The role of a dynamic and innovative team leader may be hard to replicate but clearly training "in situ" at centres of regional excellence is clearly loaded with real and genuine impact.

The medium impact income and quality of life is again tempered by the fact that this is a result of the CAMPFIRE programme and could be an area where project research impact is actually low if it could be separated from the effect.

6.3 Specific Results of the Evaluation

The end of Phase I of the NRMCL project was characterized by an absolutely first class project evaluation by Drs. Bell and Munjanjanja. CASS responded to some of the criticism and adjusted its activities in Phase II. This evaluation was built into the project and it represents an aspect of the project which it may be useful to replicate in other IDRC-funded projects. Evaluations by a couple of competent persons with a wealth of experience are not cheap but projects which lose relevance because they lose direction are a complete waste of money. Between-phase evaluations *should be compulsory and costed into the budget. Mid-term evaluation of* any programme running longer than two years would also be useful.

6.3.1 Commercialisation and market analysis

This case study has concentrated on projects categorised under the title of commercialisation. The inclusion of the NRMCL project in this case study has been questioned previously but the other two projects in Botswana had as one of their objectives the increase of rural income - one via the sale of milk and the other via the planned sale of fuelwood and/or alternatively poles. Neither of these projects achieved any major impact in rural incomes in a sustainable fashion especially if the "free" or subsidised inputs are considered.

The reason for the failure of both projects in terms of commercialisation is due to the lack of appreciation of actual market forces prevailing in the area of implementation and the country in general.

Milk and milk products, imported from RSA and Zimbabwe, are generally freely available at reasonable prices in Botswana. The rural market for milk, as a whitener for beverages such as tea and coffee, is now dominated by UHT and Steri-milk type imports which can last five to ten days after opening without any refrigeration. Unsterilized, unpasteurized and unbottled milk does not appear to have a ready and easy market among wage earners in the rural areas where it is considered unsophisticated and unhygienic. The non-salaried income group in Botswana generally has access to some livestock and any member of the family requiring a small amount of milk can easily milk a lactating goat or cow.

The importation of whole unpasteurized milk from South Africa is controlled via a permit system but this procedure is only loosely applied. The dairy industry in Gaborone can buy milk direct from South African producers at P0,88 per litre, delivered in bulk to the dairy. The current producer price paid by the dairies to local producers is P0,95 per litre and this was achieved after an element of pressure on them by both Government and the major milk producer, Botswana Development Corporation. The latter still argues that the current price hardly enables them a reasonable efficient operation using full dairy cows and feed concentrates, to break even.

Clearly a simple competitor analysis of the dairy industry in Botswana where food concentrates must be imported in comparison to Zimbabwe and RSA where seed cake and bran are by-products of their massive agro-industrial complexes which produce cooking oil and refined food products, should demonstrate that the development of the dairy industry in Botswana will face problems.

6.3.2 *Research and staff development*

All the projects evaluated in this study combined detailed research with staff development and all illustrate a common problem - dynamic and perceptive research and the critical analysis which should go with it is not easily achieved by junior research workers engaged in the pursuit of degree courses or undertaking a dissertation (M.Phil/D.Phil/Ph.D.). In this way, the double commitment to both research and staff development represents an anomalous situation for IDRC.

The classic example in this study is the evaluation of the important economic data on the Dairy Improvement Programme in Botswana as part fulfilment of a M.Sc. degree. As described elsewhere, the data was used to establish a linear programming model, no doubt convincing the teaching staff at the Canadian University that the student had fully understood the use and set-up of this important analytical tool. However, the analysis offers absolutely no help to the research programme as it completely fails to address the critical issue of acceptability of the innovations in terms of basic economics such as the return per labour day and how much additional income (based on actual and possible sales of milk) can be generated with the additional effort involved in the production of fodder crops, the collection and storage of stover and the subsequent feeding of them to lactating cows.

Many junior researchers appear to be reluctant to take definite stands on certain issues on the basis of their preliminary research results. In general, awaiting completion and full analysis is a sound research principle but more experienced researchers would be comfortable with presenting preliminary indications especially where they offer important insights to ongoing programmes. Here the example of the forestry research undertaken by Mrs Walker in Botswana is relevant. Clearly from a very early stage, it was obvious that the community did not see a need for fuelwood plantations and were more interested in multi-purpose tree species than in non-indigenous trees such as Eucalyptus. These preliminary indications should have been fed into the Fuelwood Plantation multi-species testing programme at an earlier stage and used to adjust the species composition of the trials. Unfortunately they were not and many of the tree species tested were as a consequence irrelevant to the future needs of forestry in Botswana.

In the case of staff development fellows attached to CASS, the research undertaken required a degree of advocacy plus the ability to communicate this at the national level in important fora. This was particularly difficult for young and inexperienced researchers.

The other disadvantage of using research output as part of the academic advancement of the research workers is the exceptionally long gestation period between actual research and the production of the output in the form of a dissertation. If this were the sole output of the research, it would almost make the research findings irrelevant due to the delay.

Despite the disadvantages noted above, there are examples where they can be avoided. The research programme at CASS benefited by having a Professor like Marshall Murphree who, by constant interaction with his post-graduate students both in formal settings and in the field, was able to distil the information generated by their research and communicate this to the relevant bodies involved in the formulation of the evolving policy on CAMPFIRE. All the research fellows were expected to produce papers on a variety of smaller issues during the course of their research and to make numerous presentations on their research to workshops and seminars.

ANNEX I

LIST OF PEOPLE INTERVIEWED

List of Persons Contacted

Dairy/Beef production Project - Botswana

Department of Agricultural Research, Ministry of Agriculture, Gaborone:

Dr. Lucas Gakale	Director of Agricultural Research
Dr M B Mosimanyana	Head of Animal Production and Research Unit, Sebele Research Station
Mrs W Mahabile	Senior Dairy Research Officer, APRU
K Moilwa	Agricultural Officer (Dairy Research), APRU
O R Madibela	Agricultural Officer (Research), Nutrition Feeds Programme, APRU
J Kelebetse	Senior Technical Assistant, Beef Research Programme, APRU
Ms B Keakantse	Milk Attendant, Oodi Milk Collection Centre

Other GoB Departments:

S K M Mosielele	Senior Animal Production Officer (Dairy), Department of Animal Health and Production, Ministry of Agriculture

Small Scale Milk Producers:

K Masisi	Chairperson, Oodi Milk Collection Centre and Milk Producers Group, Oodi Village
M P Gabatlale	Farmer, Member of Oodi Milk Producers Group, Oodi Village

Relevant Dairy Industry Contacts:

P Valence	General Manager, Prime Dairies, Gaborone
K Onwell	Production Manager, Prime Dairies, Gaborone
P Sethewaelo	Former Chairperson of now defunct Gaborone Dairy Marketing Co-operative, Gaborone

List of Persons Contacted

Fuelwood Plantation - Botswana

FAB Staff (current and past)

David Inger	Head of Botswana Technology Centre, and former President of Foresiry Association of Botswana
Mrs Patricia KeitireleWalker	Former Extension Manager and Director of FAB. Now Senior Environmental Officer, Aquatec, Mahalapye.
Mrs Betty Moganane	Acting Director of FAB and Extension Manager FAB, Gaborone

Related

Dr D L Kgathi	National Institute of Research, University of Botswana, Gaborone
S K Seopana	Head of Forestry Division, Department of Crops and Forestry, Ministry of Agriculture, Gaborone
Mrs Elen Phushuli	Secretary of Tlhareseleele Agro-Forestry Project, Tlhareseleele Village, Pitsane Area
7 Members of	Malokagonye Project, Malokaganye Village, Pitsane Area

List of Persons Contacted

National Resources Management in Communal Lands - Zimbabwe

Professor M W Murphree	Associate Fellow, CASS, Former Head of CASS, University of Zimbabwe, Harare
Dr Jeremy Jackson	Acting Head of CASS, University of Zimbabwe, Harare
Dr J C Murombedzi	Senior Research Fellow and Lecturer, CASS, University of Zimbabwe, Harare
Dr H Krugmann	Programme Officer, International Development Research Centre, Regional Office Southern Africa, Johannesburg
Dr Russel Taylor	Head of World Wildlife Fund for Nature, Programme Office Zimbabwe, Harare
Ian Bond	Research Manager WWF, Harare
Rob Munroe	Director of Zimbabwe Trust, Harare
Simon Metcalfe	Senior Liaison/Research Officer for Zimbabwe Trust and African Resources Trust
Joseph Makonyere	Senior Field Officer, Zimbabwe Trust, Harare
Stephen Kasere	Deputy Head, CAMPFIRE Association, Msasa, Harare
Maxwell Banda	Wildlife Co-ordinator, Hurungwe Rural District Council, Magunje
Ms Priscila Potera	Assistant Wildlife Co-ordinator, Hurungwe Rural District Council, Magunje
Two Councillors from	Hurungwe Rural District Council, Magunje
Prof M Rukuni	Head of Department of Land Management and Dean of the Faculty of Agriculture, University of Zimbabwe, and Chairperson of the Presidential Commission of Inquiry into Appropriate Agricultural Land Tenure Systems
Dr L E Munjanjanja	Permanent Secretary, Labour, Manpower Planning and Social Welfare. Co-author of CASS Phase I Evaluation.

ANNEX II

LIST OF DOCUMENTS REVIEWED

DAIRY / BEEF PRODUCTION PROJECT - BOTSWANA

Project documents

International Development Research Centre (IDRC), 1988, Project Summary/Resume de Project - Dairy/Beef Production Systems (Botswana) II.

IDRC/Animal Production Research Unit, 1988, Dairy/Beef Production Systems (Botswana 3P-83-0281) Phase I, February 1985 - March 1988, Final Report.

Well produced and comprehensive record of Phase I but no in-depth evaluation or criticism.

IDRC/Animal Production Research Unit, 1990, Dairy/Beef Production Systems Phase II, March 1988 - April 1990, Annual Progress Report.

Contains first paper on study of madila production.

Documents published by Department (APRRU)

Animal Production and Range Research Unit, 1989, Livestock and Range Research Annual Report, 1989, APRRU. Ministry of Agriculture, Gaborone, Botswana.

Covers on-farm and on-station research and Chapter 9 is on Production Economics pp 96-123. Also has good bibliography.

Animal Production and Range Research Unit, 1990, Livestock and Range Research Annual Report, 1989, APRRU. Ministry of Agriculture, Gaborone, Botswana.

Covers all on-farm and on-station dairy research. Contains second paper on madila production.

Animal Production and Range Research Unit, 1991, Livestock and Range Research Annual Report, 1991, APRRU. Ministry of Agriculture, Gaborone, Botswana.

Covers all on-farm and on-station dairy research. A much weaker report than previous years.

Animal Production and Range Research Unit, 1992, Livestock and Range Research Annual Report, 1992, APRRU. Ministry of Agriculture, Gaborone, Botswana.

Covers all on-farm and on-station dairy research. A bit improved on 1991 but maintains constant format with only few words altered.

Animal Production and Range Research Unit, 1993, Livestock and Range Research Annual Report, 1993, APRRU. Ministry of Agriculture, Gaborone, Botswana.

Again a deterioration in standard. Much reduced format and content.

Madibla, O.R., Dailey, J, and Mahabile, W., (no date). A Report on the Visit to Malawi and Zimbabwe Dairy Research Projects and Dairy Industry, APRU, Department of Agricultural Research, Ministry of Agriculture.

Animal Production and Research Unit, 1997. Project Title: Dairy/Beef Production Systems (Botswana), NDP VIII Number : AG104 (51/104), Centre File : 3-P-87-0225. APRU, MoA, Gaborone.

This represents final report for project after request from Regional Office in Nairobi.

Animal Production and Research Unit, 1997. A Brief Report about Milk Collection Centres, (DAR), APRU, MoA, Gaborone.

Documents related to programme

Mokgotle, Kebabope, 1992. The Economics of Small-Scale Dairy Production in Botswana. A thesis presented to the Faculty of Graduate Studies of the University of Guelph, Canada, in partial fulfilment of requirements for the degree of Master of Science, March 1992.

131 page dissertation as described elsewhere contains linear programming model but very short on analysis.

Documents produced by other GoB Departments

Mosielele, S.K.M., 1995. Dairy Section Report 1995, Dairy Section, Department of Animal Health and Production, MoA, Gaborone.

Provides useful information on dairy production and whole milk prices in Botswana.

Mosielele, S.K.M., 1996. Dairy Section Report 1996, Dairy Section, Department of Animal Health and Production, MoA, Gaborone.

FUELWOOD PLANTATIONS (BOTSWANA)

Project Documents

International Development Research Centre (IDRC), 1985. Project Summary/Resume de Project Fuelwood Plantations (Botswana)

International Development Research Centre (IDRC), 1989. Project Summary/Resume de Project Fuelwood Plantations (Botswana) II

Forestry Association of Botswana (FAB), 1990. Technical Report 4 of 1989, Bridging Funds Period, September-December 1989, Research Branch

Forestry Association of Botswana (FAB), 1993. Report December 1, 1989 to June 30, 1993.

Documents produced by FAB

Forestry Association of Botswana (FAB), 1997. Strategic Plan 1998-2002 (Draft).

Forestry Association of Botswana (FAB), 1997. Technical Series.

This is the Association's main publication effort and it provides a route for important technical publications. The relevant papers in the series are reviewed below.

van Heist, M., 1991. Mapping Woody Biomass Classes in South Eastern Botswana, using Landsat MSS data, Technical Series FAB, No. 1 (1991), FAB, Gaborone.

Kooiman, Andre, August 1992. Tree Species Elimination Trials in Botswana, Technical Series, FAB, No. 4 (1992).
This is a 38 page report plus 8 appendices covering 39 pages. Presents methodology, experimental design and detailed results of the research works undertaken by FAB and funded by IDRC.

Van Heist, Miriam, November 1992. Evaluation of Fuelwood Availability using GIS, a case study from South Eastern Botswana - Exercise in the use of ILWIS software, Technical Series, FAB No. 5 (1992), FAB, Gaborone.
This paper reports on experimental use of LANDSAT satellite imagery to relate tree cover to biomass - concludes that this is not feasible. Report is 76 pages plus 3 maps and includes user manual for Integrated Land and Water Information System (ILWIS).

Motoma, Lesego, M, August 1995. Phenology and Ecology of Twenty Indigenous Tree Species found in Botswana, A Literature Review and Plan of Action, Technical Series, FAB No. 7, FAB, Gaborone.
Report of 39 pages provides a full review and biography of all available data on the 20 main (useful) species found in Botswana.

Forestry Association of Botswana Journal.

This is generally an annual publication and useful papers are reviewed below.

1984

Tietema, T., 1984. Firewood Research at the National Institute for Research (NIR). In FAB Journal 1984, pp 8-10.
Contains description of work at NIR and full bibliography of publication and papers produced by staff members.

Shepherd, Gill, 1984. Social Forestry. In FAB Journal 1984, pp 12-19.
If FAB had read this excellent report, it may have adapted its programme because it clearly covers the most important aspects such as "plans must be formulated with villages", "researcher must understand multiple use of trees", "labour availability must be evaluated", in review of forestry projects and found

that many failed because "they failed to spell out **how** fuelwood would be distributed, or **by** or to **whom**".

Kyathi, D.L., 1984. Firewood Trade between Botswana's Rural Kweneng and Urban Gaborone : Employment Creation and Deforestation. In FAB Journal 1984, pp 41-54.

Excellent paper analyzing the market, the role of informal marketeers, pricing structures, wood preferences, etc.

Nickersen, R.A., 1984. The Need for Fuelwood Plantations in Eastern Botswana including a Draft Proposal for Implementation. In FAB Journal 1984, pp 57-64.

Obviously this is the basis for the project funded by IDRC and clearly was written without any reference to other documents in the same issue of the FAB Journal.

1985

von Rudloff, Lex, 1985. A Brief Overview of the Treated Timber Industry in Botswana. In FAB Journal 1985, pp 15-19.

A good and informative paper which clearly defined the problems facing the industry in terms of competition from South Africa and Zimbabwe.

Tietema, I., 1985. The Growth Performance of Indigenous Trees in Botswana. In FAB Journal 1985, pp 22-24.

Nickersen, R.A., 1985. A Tree Nursery Workshop at Molepolole, FAB's First International Venture. In FAB Journal 1985, pp 39-50.

Report on IDRC Regional Workshop plus opening address from the Minister of Agriculture.

Note on p 69 of FAB Journal 1985, is the article "Eucalyptus are not always the answer ..." which reports that in India, farmers are uprooting Eucalyptus because they do not meet farmers' requirements for fodder, timber, fuelwood and green manure - local species more acceptable. It is a pity this did not influence the programme.

1986-87

Millar, C., 1987. Exploitation of Botswana's Forest Reserves : A cause for Concern? In FAB Journal 1986-87, pp 31-42.

Details exploitation of timber in north of country.

Tietema, T. and Eldbjorg Merkesdal, 1987. An Establishment Trial with Acacia tortilis, A. karroo, A. eurbescens and A. erioloba at Morwa Forestry. The situation after one year. In FAB Journal 1986-87, pp 47-54.

Ringrose Susan, Matheson Wilma, and Dube Pauline, 1987. The Use of Remote Sensing Techniques to determine Density of Woody Vegetation Cover in the South-East Botswana Kalahari. In FAB Journal 1986-87, pp 60-72.

Concludes that reflectance from soil affects results as much as vegetation cover, therefore more research needed.

Tietema, T., Merkesdal, E., Kgafela, S. and Masembolwa, J., 1987. The Productivity of Eucalyptus Plantations in Botswana : The Case of the Molepolole Airstrip Plantation. In FAB Journal 1986-87, pp 91-96.

This paper reports that, despite assumed productivity of 9-10 t/ha/year, the actual productivity was only 1,46 t/ha/year, similar to the production of natural woodland. There was also substantial die-off due to droughts. Concludes "Eucalyptus species are probably not suited as a plantation tree in Botswana".

1991

van Heist, M. and Kooiman, E., 1991. The Fuelwood Availability for Settlements in South-Eastern Botswana. In FAB Journal 1991, pp 21-33.

The expected deficits for all settlements do not appear in this work based on GIS satellite imagery and ground assessment. The study was meant to be used to rank settlements for forestry intervention. This study further convinced some FAB staff that this high technology option was a waste of time.

Kooiman, A., 1991. Effects of Soil Cultivation on Tree Species Performance, Molepolole, Botswana. In FAB Journal 1991, pp 34-46.

Other Documents produced by FAB

Community Based Natural Woodland Management Project - Report on Woodland Inventory, compiled and produced by Keitirele Patricia Walker (FAB) and Mulalu Mulalu (RSC, MoA). *Technical Co-operation Project* between FAB and NTC (funded by NORAD).

Documents produced elsewhere but related to project

Walker, Keitirele Patricia, 1992. The Role and Potential of the Growing of Trees on Farms in the Barolong District, Botswana. M.Sc. dissertation, University of Aberdeen.
A very good and readable dissertation.

van Heist, M., and Kooiman, A., 1992. Modelling Fuelwood Availability with GIS, a case study from Botswana, ITC Journal, ITC Enschede, Netherlands.

Other useful background documents

ERI, 1985. Study of Energy Utilization and Requirements in the Rural Sector of Botswana, Consultancy Report, 2 Volumes, London.

N.N., 1980. Report on the National Conservation Strategy, Government of Botswana.

N.N., 1992. Utilization and Management of Indigenous Fruit Trees in Botswana, Final Report. Botswana Energy Masterplan, Energy Affairs Division, Ministry of Mineral Resources and Water Affairs GoB/GTZ.

Nhira, C., 1992. Local Control and Management of Forestry and Environmental Resources in Zimbabwe : Institutional Capacity (Prepared for Forestry Commission and funded by IBRD), CASS Occasional Paper, CASS, University of Zimbabwe, Harare.

A good paper covering issues of woodland/forestry as part of common property and sustainable community use.

Nabane, N., 1994. A Gender Sensitive Analysis of Community Based Wildlife Utilization Initiative in Zimbabwe's Zambezi Valley, CASS Occasional Paper, CASS, University of Zimbabwe, Harare.

A very good example of a local researcher's ability to focus clearly on key gender issues. A good example of staff development and awareness creation by visiting professor (Louise Fortman).

Peterson, J.H. (Jnr), 1991. CAMPFIRE : A Zimbabwean Approach to Sustainable Development and Community Empowerment through Wildlife Utilization, CASS Occasional Paper, CASS, University of Zimbabwe, Harare.

Further example of contribution by visiting professor.

Scoones, I., 1993. A Participatory Model of Agricultural Research and Extension. The case of vleis, trees and Grazing Schemes in the dry South of Zimbabwe. CASS Occasional Paper, CASS, University of Zimbabwe, Harare.

Another example of the clear focus and deep perception brought to the programme by visiting professors.

Documents produced by other institutions but relevant to project

ACTION Magazine

Excellent cartoon based publication for schools and rural communities.

Africa Resources Trust, 1996 (a). Zimbabwe's CAMPFIRE, Empowering Rural Communities for Conservation and Development.

This is an example of the excellent promotional material produced by ART. It presents a short synopsis of CAMPFIRE (what it is, how it works, where it is and its future) in 8 pages with numerous maps, graphs, etc. It also represents one of ART's very useful styles of placing blocks on pages containing short presentations of a specific case study (eg. Fencing in Sinakatenge Village, Crocodile egg poaching in Guruve District). This "magazine" style publication gives a very good balance of broad sweep of the whole programme in the text and specific, well-chosen, complementary examples in the boxes.

Africa Resources Trust, 1996 (b). A Select Bibliography relevant to CAMPFIRE, compiled by M. Taylor, December 1996.

This is the second bibliography produced by ART. It contains 213 references and is available electronically as a data base (with key word analysis) in the format used by many libraries - "Pro-Cite". Many of the CASS publications are contained in this bibliography.

International Institute for Environment and Development (IIED) in association with the CAMPFIRE Collaborative Group - Wildlife and Development Series.

#1 Marshall Murphree, The Lesson from Mahenye : Rural Poverty, Democracy and Wildlife Conservation

#2 Stephen Thomas, Share and share alike? Equity in CAMPFIRE

#3 Nontokozo Nabane, A Gender-sensitive analysis of CAMPFIRE in Masoko village

#4 Stephen Thomas, The legacy of dualism in decision-making within CAMPFIRE

#5 Cherry Bird and Simon Metcalfe, Two views from CAMPFIRE in Zimbabwe's Hurungwe District : Training & motivation. Who benefits & who doesn't?

#6 C Bird, J Clarke, J Moyo, J M Moyo, P Nyakunu and S Thomas, Was Mrs Mutendi only joking? Access to timber in Zimbabwe's communal areas

#7 Richard Hasler, Political ecologies of scale: The multi-tiered co-management of Zimbabwean

NATURAL RESOURCES MANAGEMENT IN COMMUNAL LANDS (ZIMBABWE)

Project Documents

International Development Research Centre (IDRC), 1988, Project Summary/Resume de Project - Natural Resources Management in Communal Lands (Zimbabwe).

International Development Research Centre (IDRC), 1991, Project Summary/Resume de Project - Natural Resources Management in Communal Lands (Zimbabwe) Phase II.

Centre of Applied Social Sciences, March 1991. Research Project in Natural Resource Management in the Communal Lands, Joint Report to the Ford Foundation and the IDRC on Project. Activities for the period October 1989 to March 1991, CASS, University of Zimbabwe, Harare.

Centre of Applied Social Sciences, March 1991. Research Project in Natural Resource Management in the Communal Lands, Joint Report to the Ford Foundation and the IDRC on Project. Final Report and Financial Statements Phase I, Ford Foundation Grant 880-0674 as at the 30 September 1991 and IDRC Grant Project as at 31 December 1991, CASS, University of Zimbabwe, Harare.

Munjanjanja, L.E., and Bell, R.H.V. Project Review, Research Project on Natural Resource Management in Communal Lands. CASS, University of Zimbabwe, Harare.

An excellent Project Review.

Documents produced by CASS

Centre for Applied Social Sciences, CASS - Natural Resource Management Occasional Paper Series (Publications List), February - March, 1997, University of Zimbabwe, Harare.

This publication lists all 84 occasional papers produced and published by CASS.

The following Occasional Papers were reviewed after being recommended as particularly useful material.

Cousins, B., 1993. Property and Power in Zimbabwe's Communal Lands : Implications for Agrarian Reform in the 1990's, CASS Occasional Paper, CASS, University of Zimbabwe, Harare.

Much of Cousins' work is on grazing but some like this paper covers general issues - very good.

Cutshall, C.R., 1989. Masoka/Kanyurira Ward - A Socio-Economic Baseline Survey of Community Households, CASS Occasional Paper, CASS, University of Zimbabwe, Harare.

Other examples of baseline surveys also available by same author and very good if working in the area are:

Kanyemba/Chapoto Wards, 1990, and Angwa/Chisunga Wards, 1991.

Derman, W., 1988. A Study of Common Property and Natural Resource Management with particular emphasis upon the Zambezi River (Basin), CASS Occasional Paper, CASS, University of Zimbabwe, Harare.

A very good overview of an early stage of the programme.

Derman, W., 1990. The Unsettling of the Zambezi Valley - An Examination of the Mid-Zambezi Rural Development Project, CASS Occasional Paper, CASS, University of Zimbabwe, Harare.

A very good critical review of the large project which has been implemented and which has fallen into every "trap" predicted and detailed in this excellent report.

Dix, A., 1996. CAMPFIRE : An Annotated Bibliography (1985-1996), CASS Occasional Paper, CASS, University of Zimbabwe, Harare.

Another good bibliography but not available electronically but useful much early work of CASS. Many of the references are to presentations to workshops or seminars and a bit obscure but most, if not all, are available in CASS Library and Document Centre.

Dzingira, V., 1995. Take back your CAMPFIRE : A Study of Local Level Perception to Electric Fencing in the Framework of Binga's CAMPFIRE Programme, CASS Occasional Paper, CASS, University of Zimbabwe, Harare.

Fortman, L.P., 1991. You've Got to Know who Controls the Land and the Trees People Use : Gender, Tenure and the Environment, CASS Occasional Paper, CASS, University of Zimbabwe, Harare.

A good example of why the input of visiting professors under the Fullbright Programme was so useful.

Hobane, P.A., 1994. The Urbane Marketing of the Mopane Worm - The Case of Harare, CASS Occasional Paper 59/94, University of Zimbabwe, Harare.

Excellent paper; also see Hobane (1994(a)) - Annotated Bibliography.

Hobane, P.A., 1995. Amancimbi : The Gathering, Processing, Consumption and Trade of Edible Caterpillars in Bulamanangwe District, CASS Occasional Paper, CASS, University of Zimbabwe, Harare.

An excellent and comprehensive paper.

Jackson, J.C., 1991. The Artisanal Fishery of Lake Kariba (Eastern Basin). A Socio-Economical Input into Lakeshore Planning and Fisheries Management, CASS Occasional Paper, CASS, University of Zimbabwe, Harare.

An early paper detailing NORAD funded fisheries project - very good.

Jackson, J.C., 1995. Creating Common Pools in a Lake : Planning for the Community-Based Management of the In-Shore Fishery, Lake Kariba Recreational Park, Zimbabwe, CASS Occasional Paper, CASS, University of Zimbabwe, Harare.

Follow-up paper detailing NORAD funded fisheries project - good background.

Murombedzi, J.C., 1990. The Need for Appropriate Local Level Common Property Resource Management Institutions in Communal Tenure Regions - Paper prepared for Workshop on Institutional Dynamics in Communal Areas, CASS Occasional Paper, CASS, University of Zimbabwe, Harare.

Good discussion on existing institutions and their problems.

Murombedzi, J.C., 1992. Decentralization or Recentralization? Implementing CAMPFIRE in the Omay Communal Lands of the Nyaminyami District, CASS Working Paper No. 2, University of Zimbabwe, Harare.

All of Murphree's are worth reading because they are so well written. For those busy professionals with very little time, the following are essential:

Murphree, M.W., 1990. Decentralizing the Proprietorship of Wildlife Resources in Zimbabwe's Communal Lands : An Outline of the Central Issues, 2nd Edition, CASS Occasional Paper, CASS, University of Zimbabwe, Harare.

Murphree, M.W., 1991. Communities as Institutions for Resource Management. Paper Presented to the National Conference on Environment and Development, Maputo, Mozambique, 7-11 October 1991, CASS Occasional Paper, CASS, University of Zimbabwe, Harare.

wildlife resources

#8 Russel Taylor, From liability to asset: Wildlife in the Omay Communal Land of Zimbabwe

This series of short papers, some of them adapted from previously published papers or representing presentations made at various seminars or workshops, represents an easily read collection of the major issues and achievements of CAMPFIRE. None of the series are longer than 24 pages (B5 size) and they are generously laid out (and with good maps), most are only 12-16 pages. This is an ideal series (very comprehensive) for someone wanting a complete overview.

Murphree, M.W. Congruent Objectives, Competing Interests and Strategic Compromise, Concept and Process in the Evolution of Zimbabwe's CAMPFIRE Programme. Paper presented to the Conference on "Representing Communities : Histories and Politics of Community-Based Resource Management", Unicol Lodge, Helen, Georgia, USA. 1-3 June 1997.

This is one of the latest offerings from Murphree. Although it is not published by CASS, it is an excellent paper on the history and evaluation of CAMPFIRE and also has a good section on community.

World Wildlife Fund for Nature, October 1995, List of Publications, Project Papers, Reports and Theses.

Includes 111 publications and reports, some overlap with CAMPFIRE bibliography.

World Wildlife Fund for Nature, December 1996, WWF Programme Office, Zimbabwe, Programme Outline.

World Wildlife Fund for Nature, November 1995, WWF Programme Office, Zimbabwe, Summary outline of current major projects.

Zimbabwe, Government of, 1994. Report of the Commission of Inquiry into Appropriate Agricultural Land Tenure Systems, Harare, Vols I-III. Section on CAMPFIRE : Vol I, p 29 and p 49.