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OBSERVATIONS ON GENDER ISSUES IN BOTSWANA FARMING SYSTEMS RESEARCH

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PREFACE

ATIP Progress Reports are prepared and circulated to make ATIP research findings easily available to GOB personnel and researchers interested in Botswana farming systems. A major objective of the Progress Report series is to make research findings available in a timely manner. These reports are not subject to professional review outside the Mahalapye team. Therefore, data and findings presented in the Progress Report series may be subject to further revision and should not be cited without permission of the authors. Therefore they do not necessarily reflect the official views of ATIP, DAR or MIAC.

OBSERVATIONS ON GENDER ISSUES IN BOTSWANA FARMING SYSTEMS RESEARCH

Doyle Baker

INTRODUCTION

This progress report presents observations on two gender issues in Botswana farming systems research. The observations are based on five years of field experience, as well as data analysis. The objective is to raise issues and stimulate thinking about gender issues, not to present detailed findings.

The first issue is whether the Ministry should pay special attention to the gender of household heads when developing and disseminating technologies. The paper argues that even though female-headed households tend to be poorer and less productive crop farmers than male-headed households, the Ministry might be more effective in helping farming households -- including female-headed households -- if technology development targeting was based on draught access.

The second issue is whether the Ministry should pay increased attention to intra-household gender equity issues. The paper reviews potential paths to increased crop production and argues that each path requires that males assume a greater share of the work burden in Botswana farming systems. The paper therefore concludes that intra-household gender equity should be given more attention by the Ministry.

HOUSEHOLD TARGETING

Several past studies have shown that female-headed households are a particularly vulnerable segment of the population [Bond, 1974; FAO, 1974; CSO, 1976; CSO, 1982]. Such households tend to be poor, and also tend to be among the least successful crop producers. This suggests the possibility that female-headed households should be specially targeted for technology development research and extension activities. In order to assess the value of household-gender targeting, ATIP has studied the relative circumstances of female-headed and male-headed households since 1982.

ATIP also has disaggregated the farming population according to cattle assets and draught access. Cattle asset inequality has been a major planning issue in Botswana since the Rural Income Distribution Study [CSO, 1976]. Draught access has been identified in several studies as a key problem affecting crop production [FAO, 1974; Oland, Alverson, Cummings, 1980; Vierich and Sheppard, 1980].

Five seasons of ATIP research have shown that the alternative ways of classifying households are complementary. Any of the three population divisions [gender of head, traction access, or cattle assets] do equally well in isolating households which have fewer livestock, less equipment, poorer housing, lower incomes, worse cashflow problems, and lower food consumption [Baker, 1987].[1] Which division is most important differs slightly depending on the performance variable but the choice for a single best division is not clear. Therefore, the Ministry needs to determine the relative utility of different population divisions for: [a] programme planning and [b] targeting technology development.

Of the three divisions, a cattle asset division would appear to be the most useful for programme planning related to equity issues. This is because this division most strongly is associated with food consumption and overall household assets. Also, there is much variability among female-headed households which lessens the value of a gender division [Kerven, 1982]. A traction access division would not be sufficient because many wealthy

households have voluntarily switched to hiring tractors, particularly in the Central Region during the 1980s drought.

With respect to technology development research, there is a problem with either a gender or a cattle division. Both lack a clear relationship with agricultural production performance. In other studies [CSO, 1982], it has been argued that head-gender is related to crop production through a shortage of male labour. The commonly postulated relationship between cattle assets and crop production comes via access to traction. However, both linkages are suspect in the Central Region.

ATIP demographic data do not support the argument that the gender structure of female-headed households is significantly different from that of male-headed households.[2] Moreover, female-headed households which have assets and therefore the money to hire traction or to gain labour through draught exchange, do not necessarily have to have male labour. In the Central Region, a majority of households have been ploughing with hired tractors lately, so the need for cattle or male labour is becoming less and less. Also, many farmers are beginning to plough with donkeys -- further reducing the linkage between cattle, male labour, and ploughing.

In contrast, there is much evidence that traction control is significantly related to the number of days of ploughing and the timeliness of ploughing (over the season and with respect to individual rains). In addition, the evidence is clear that the number of days spent ploughing and planting, and the timing of those day relative to rains, is a dominant determinant of cropping outcomes and the ability to implement multiple tillage operations [FMU, 1984; ATIP, 1986, Baker, 1987; Baker and Siebert, 1987]. Therefore, a traction access division has a clearer relationship to cropping outcomes and the relevance of interventions to improve crop production than the other divisions.

In brief, it may be a mistake to concentrate too much attention on the gender of household head. Poor female-headed households are vulnerable and solving their problems should be a top priority, but their problems need not necessarily be addressed through a policy of gender-head targeting. Rather, policy makers might concentrate on a cattle asset division while technical scientists set up research domains based on traction control. If both are done, the problems of poor female-headed households might be better addressed, for three reasons among others:

(a). No unsupportable assumptions will be required (e.g., all female-headed households are poor, households without cattle cannot plough, female-headed households cannot gain the male labour necessary for crop production, etc.).

(b). Essentially all interventions designed to help draught-dependent households will help impravished households, including poor female-headed households.

(c). While technical scientists might actually target based on draught access and male policy makers might target based on wealth, whereas neither group has as yet demonstrated an interest in targeting based on head-gender.

GENDER EQUITY WITHIN HOUSEHOLDS

A second gender issue is the notion of targeting certain activities and interventions to females or males, regardless of the gender of household head. This issue arises because there is a distinct gender division of labour in Botswana agriculture [Bond, 1974; CSO, 1982]. In most parts of Botswana, males account for most livestock tending labour and are relatively more engaged in wage employment than are females. Females, on the other

hand, account for nearly all household maintenance activities and a majority of the fieldwork. Of fieldwork activities, males usually are responsible for ploughing, fencing and destumping. Females do most other activites. As a result, women tend to work substantially more hours than do men.[3]

ATIP Mahalapye findings suggest, in contrast to the first gender issue, that the issue of intra-household gender equity needs to receive more attention than it has received. This belief stems from an assessment of the opportunities for improving arable production in the Central Region, as well as the fact that women work harder than men.

Generally speaking, increases in production can come via expanding the area cultivated or by intensifying land use (and thereby increasing yields). In Botswana, farmers have traditionally relied on the first strategy -- reflecting their early shift to animal traction.

There are two basic limitations to a land extensification strategy: (a) erratic rains may prevent adequate ploughing in many seasons; and (b) in seasons with good rains, the area which might be ploughed and planted is limited by the hours required for hand weeding. The land intensification strategy is constrained by a prevailing impression that the marginal returns are too low and uncertain relative to other alternatives. ATIP research has shed light on these limitations, necessitating some rethinking.

Extensification

Even in drought seasons, most farmers waste opportunities to plough and/or plant. For example, early season rains could be used to plough without planting. ATIP research has shown during five seasons of trials that double plowing (the addition of a "sole ploughing" tillage at least one rain prior to normal plough-planting) increases yields on average by 75 percent. ATIP research also has shown that even with single-ploughing, farmers need not avoid planting just because the soil is drying. Because there is substantial delayed emergence (emergence on the basis of a post-planting rain), a reasonable population can be achieved even if there is drying soil at planting. While the production potential of such plots is low, it certainly is above unplanted plots. As a third example, it can be noted that there are now short cycle varieties of cowpeas and millet which can grow and mature even if planted in February.

In brief, if men are willing to work, many households should be able to plough all their fields in every season. ATIP monitoring data support this view in the sense that several households have managed to plough all their fields during this drought.

This leads to the issue of a weeding labour constraint. There are (at least) two potential solutions to this problem. One is to switch to the double ploughing system mentioned above. This not only increases yields, it reduces weed burdens and the requirements for weeding. During last season, weeding labour time was cut by 50 percent due to the extra tillage operation. The second option is to adopt row planting and mechanical inter-row cultivation as a substitute system for broadcast-ploughing and hand weeding. The row planting system tends to increase yields as well as reduce total labour requirements. In fact, ATIP data show that the total time required for both row planting and inter-row cultivating a hectare is about half that required for hand weeding a hectare.

A major constraint on either system is that men must work harder. This requires what economists call an "inter-personal utility comparison." Specifically, a judgement must be made that women would benefit more from either modified system than men would lose. Unfortunately, there is no objective way of establishing the validity of inter-personal utility comparisons. However, informal observations in this case are reinforced by

economic analysis showing that most households would gain from either system change when male and female labour is valued equally. The benefit is even greater if one values female weeding labour higher than male labour (since the former often is the most constrained household resource).

Intensification

ATIP research has identified two promising avenues to intensification. The first entails investments in "high potential sites," (that is, in terms of ury years). A minimum requirement for high potential sites is that the soil is relatively deep (generally greater than 125 cms) and has a high water holding capacity. In addition, high potential sites are those parts of the field where rainfall run-off (from off the field or on the field) tends to accumulate. Because there is more water available to plants in high potential sites, it is consistently those sites where the greatest yields are obtained -- thus the name "high potential sites."

Although ATIP has been following this line of investigation for only two seasons, research to date suggests that farmers can profitably develop the production potential of high potential sites. Already it appears that such sites should be ploughed twice and should receive an application of 20 units phosphate per hectare. In addition, it may be possible to show that farmers can profitably apply manure to such sites and should incorporate stover. Such investments as the above are too risky when done across entire fields but are worthwhile on appropriately selected sites.

The benefits may be further increased if farmers try to harvest additional rainfall run-off for high potential sites. Following on this concept, ATIP is now investigating a few alternative systems involving bunding or band ploughing on the contour. Contour field tillage is not common in Botswana but may be worth the change from ad hoc rectangle plots when done on high potential sites.

A second, complementary strategy for intensification is labour investments in post-establishment stand management. Over three seasons, ATIP trials have shown that the returns to hand planting labour invested in gap filling (open spots on broadcast planted plots) exceed the urban minimum wage rate by 200-300 percent. Thinning has a less reliable benefit, but does seem to increase production if done at the right time. Of course, the issue is: Who will do these operations, and when?

ATIP observations and data show that women generally do hand planting and thinning, when these are done by anyone. However, as stated above, women face a weeding labour constraint. There may be three ways around this constraint. First, if ploughing started earlier and extended to later in the season, weeding labour requirements could be spread over two to three more months. This would allow women to combine gap filling and thinning with their weeding operation. Second, if men assumed total responsiblity for ploughing, rather than primary responsibility, then women could hand gap fill and thin early planted plots while the men continue ploughing. Third, and most important, if men were to begin double ploughing or row planting, then the requirements for hand weeding could be greatly reduced and women would have the time for thinning and gap filling.

The catch with all of the above is that each of the alternatives for improvement requires that men assume a greater share of the household labour burden. Therefore, one of the key issues affecting the future of Botswana agricultural development is whether men will work harder in arable production even if it can be demonstrated that the household will benefit.

CONCLUSIONS

Since there is a large overlap between poverty, lack of control of draught resources, and gender of household head, any of a number of household divisions might be used for targeting technology development and dissemination activities. Draft access has the major advantage in that the relationship between technological options and draught access is the clearest. Targeting based on draught access would in most cases effectively address the needs of poor and female-headed households.

In contrast, the issue of intra-household gender equity is so important in Botswana that debates regarding gender of household head pale in comparison. ATIP is beginning to understand how arable production can be substantially increased in Botswana even under drought conditions. But most options depend on: (a) increased male fieldwork time and/or (b) more efficient use of female fieldwork time. Unless Batswana men increase their investement in arable production relative to women, there is relatively little than can be done.

To address intra-household gender equity, the Ministry might try to do the following:

(a). Develop improved tillage-planting systems which provide an attractive return to additional male time investments (at least 50 thebi to one pula per hour, or more).

(b). Allocate more research and extension resources to female-dominated activities, particularly post-establishment and harvesting practices.

(c). Design an extension campaign to convince men that they are relying too much on women (along with cattle) and therefore must work harder. At present, it appears that men subjectively value their labour according to formal sector wages or the returns from cattle tending -- even though the opportunities for increasing employment in either are are limited.

(d). Direct extension agents to work with women when discussing activities which are generally carried out by women.

ENDNOTES

1. Selected data illustrating this point are presented in the Appendix.

2. Female-headed households do tend to have more grandchildren (relative to children) than male-headed households, but this reflects the influence of a particular class of female-headed household -- those headed by elderly widows.

3. See, for example, Table A.5 in the Appendix.

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APPENDIX:

GENDER ISSUES DATA TABLES

TABLE

A.1 Household Structure, 1983-84

A.2 Value of Farm Assets (Pula), 1983-84

A.3 Chi-Square Statistics for Differences in Food Consumption Frequencies, 1984-85

A.4 Household Labour Use by Age-Gender Categories, 1983-84

A.5 Gender Roles in Arable Farming Decision Making, 1985

TABLE A.1: HOUSEHOLD STRUCTURE, 1983-84

	VILLAGE		SEX OF HEAD		CATTLE ASSETS		DRAUGHT ACCESS		
	SHOSHONG	MAKWATE	MALE	FEMALE	>35	0-35	OWN	DEPENDENT	ALL
HOUSEHOLD SIZE:									
All Members	11.8	12.6	11.6	12.8	10.5	13.2	12.4	11.6	12.1
Local Residents	9.4	10.9	9.5	10.7	8.8	10.6	9.9	9.9	9.9
Percent Resident	79	83	79	83	73	85	82	82	81
AGE-GENDER COMPOSITION ALL MEMBERS (%):									
Men	23	22	24	21	25	21	24	21	23
Women	22	20	20	23	21	17	20	23	21
Boys	22	31	29	21	31	23	29	20	26
Girls	33	26	27	35	23	35	27	36	31
AGE-GENDER COMPOSITION RESIDENTS (%):									
Men	15	12	16	13	16	14	14	12	15
Women	21	23	22	22	21	22	20	23	22
Boys	26	33	32	24	36	25	34	22	29
Girls	38	31	30	42	26	40	32	43	35
COMPOSITION BY RELATION TO HEAD (%):									
Head	9	8	9	8	9	8	8	9	9
Spouse	6	6	9	2	7	6	7	4	6
Child	50	49	56	41	51	49	54	43	50
Grandchild	19	29	17	31	18	25	23	22	23
Other Relative	14	9	8	18	12	11	6	23	12
Non-Relative	3	0	3	0	4	0	3	0	2
CONSUMER UNITS/a:	6.6	8.2	7.3	6.9	7.2	7.2	7.5	6.5	7.2

Source: 1984 Household Census; 27 MVRU Survey households, 315 people enumerated.

a. Consumer unit weights: age 0-4 = 0.20; age 5-9 = 0.50; age 10-15 = 0.75; adult women = 0.90; adult men = 1.00.

TABLE A.2: VALUE OF FARM ASSETS (PULA), 1983-84

	VILLAGE		SEX OF HEAD		CATTLE ASSETS		DRAUGHT ACCESS		
	SHOSHONG	MAKWATE	MALE	FEMALE	>35	0-35	OWN	DEPENDENT	ALL
TOTAL ASSETS/a	11742	5733	11187	6866	16024	4803	11212	7193	9514
LIVESTOCK:									
Cattle	6225	3449	7101	2324	10080	1732	6859	3089	5264
Goats	488	154	399	332	516	267	384	356	373
Poultry	59	51	61	50	71	41	59	45	57
Donkeys	96	260	207	65	124	173	243	29	153
Other	173	66	95	0	81	43	99	5	59
TOTAL	7041	3980	7863	2771	10872	2255	7644	3524	5906
AGRICULTURAL CAPITAL:									
Ploughs	68	140	131	33	144	60	135	35	94
Other Equipment	353	284	204	536	155	446	233	464	328
Hand Tools	58	50	61	46	75	41	55	56	55
Receptacles	122	96	115	108	131	99	123	97	112
TOTAL	601	570	511	723	505	646	546	652	589
BUILDINGS:									
Lands Area	506	163	484	202	647	195	484	220	379
Village	3594	1020	2329	3170	4000	1706	2538	2791	2640
ASSET STRUCTURE (% OF ASSETS):									
Livestock	60	69	70	29	68	47	68	49	62
Agric. Capital	5	10	5	11	3	14	5	9	6
Buildings	34	21	25	60	29	39	27	42	32

Sources: 1984 Livestock Inventory and Farm Fixed Capital Surveys.

a. Valuation of ploughs, other equipment, and buildings based on farmer's assessments of current cost to obtain a replacement in the same condition. Livestock values based on average sales prices. Hand tools and receptacles valued at new replacement cost. One Pula = around $ 0.65 in 1984.

TABLE A.3: CHI-SQUARE STATISTICS FOR DIFFERENCES IN FOOD CONSUMPTION FREQUENCIES, 1984-C[illegible]'a

	PERIOD	VILLAGE	SEX OF HEAD	DRAUGHT ACCESS	CATTLE ASSETS
GRAIN AND MEAL:/b					
Sorghum Meal	20.7 (1-,3+)/c	70.0 (S+)	1.1	0.4	17.8 (R+)
Maize Meal	38.8 (2-,4+)	6.2	2.0	0.9	4.2
Bread	42.5 (3-,4+)	51.8 (M-)	0.3	9.1	21.7 (R+)
OTHER CROPS:					
Lands Morogo	79.0 (2+,4-)	0.6	7.9	2.0	2.8
Vegetables	53.2 (1-,4+)	62.9 (M-)	1.4	10.5	22.0 (R+)
ANIMAL PRODUCTS:					
Beef	23.6 (1-,4+)	54.1 (S+)	8.3	9.8 (D+)	20.1 (R+)
Goat/Mutton	11.0	36.8 (S+)	6.0	9.0	9.5 (R+)
Cow Milk	69.3 (2+,4-)	37.4 (M+)	14.3 (M+)	6.1	8.2
Goat Milk	79.5 (1+,4+)	3.8	2.7	17.4 (C+)	3.2

a. Period has 6 degrees of freedom while village, sex of head, draught access and cattle assets have 2 degrees of freedom. Significance levels for the Chi-Square Statistic are as follows:

Significance	0.05	0.01
6 dof	12.6	18.8
2 dof	6.0	9.2

b. Items consumed less than once a week on more than 85% of the household months are not included.

c. The symbols in parentheses indicate the main deviations from the cell expected values for grouping of which the Chi-Square is significant at a 0.99 confidence level. A plus represents a larger proportion than the expected value, while a minus represents a smaller proportion. The symbols used are as follows:

Period: 1 = Jan.-March; 2 = April-June; 3 = July-Sept.; 4 = Oct.-Nov.

Village: S = Shoshong; M = Makwate.

Sex of Head: M = male; F = female.

Draught Access: C = control of draught; D = draught dependent.

Cattle Assets: P = 0 to 35; R = more than 35.

TABLE A.4: HOUSEHOLD LABOUR USE BY AGE-GENDER CATEGORIES, 1983-84

	MEN	WOMEN	BOYS	GIRLS
		(Hours)		
FIELDWORK:				
Plough & Plant	48	20	01	1
Weed & Thin	12	40	6	6
Birdscare	23	143	11	34
Harvest (inc. Morogo)	11	103	4	11
Field Maintenance/a	100	32	26	2
LIVESTOCK:				
Tend	400	72	732	18
Milk	18	7	40	1
BEER:				
Make	1	98	<1	1
Sell	<1	159	1	<1
HOUSEHOLD MAINTENANCE:				
Gather Firewood	37	77	45	29
Fetch Water	55	306	48	122
Cook	3	865	24	175
Wash	3	197	10	23
Construct & Repair	11	57	5	3
OFF-FARM:				
Wage Employment	261	154	25	19
Other Field	14	28	8	4
TOTAL:				
Per Household	1071	2435	1052	453
Per Active Person/b	729	1188	612	246

Source: 1983-84 MVRU Survey.

a. Includes clearing, destumping, fixing threshing floor, and fencing.

b. Active people were defined to be the number of residents in each category who were not inactive due to age or health (determined on the basis of the Household Census). The number of individuals actually contributing labour fluctuated as other individuals moved in and out of the household on a temporary basis.

TABLE A.5: ROLES IN DECISION-MAKING, 1985

	MALE HEADS	FEMALE HEADS	FEMALE SPOUSES	SONS/ DAUGHTERS.
	(Indices of Relative Control/a)			
WHETHER DRAUGHT ANIMALS FIT	56	107	112	121
WHEN TO PLANT VIA RAINS	68	88	115	121
WHEN TO START PLOUGHING	72	93	112	118
WHETHER SOIL MOISTURE OKAY	82	77	111	120
TO HIRE-IN LABOUR/TRACTION	92	77	108	115
TO HIRE-OUT LABOUR/TRACTION	101	73	112	108
TO SELL CROPS	102	61	106	119
TO USE NON-HH WEEDING LABOUR	104	68	104	114
TO ENTER COOP ARRANGEMENT	105	79	108	104
WHETHER & WHEN TO REPLANT	109	60	92	124
TO HELP NON HH FAMILY	109	75	112	100
HOW MUCH SEED TO PLANT	113	54	82	128
WHEN TO WEED	146	59	59	120
AVERAGE	96	75	104	116

Source: 1985 Decision Unit Profile Survey.

a. Each respondent ranked his/her own role in each decision from 1 (= decide alone) to 5 (= not even involved in the decision). The numer of respondents was: 23 male heads, 13 female heads, 21 female spouses, 30 daughters and sons. For each respondent category, the index of control was calculated as the mean value for that group relative to the average value for all groups combined (multiplied by 100). The lower the index, the greater the perceived sense of control for that group.

12