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Enhancing the Impact of Technology Transfer for Poor Households: Lessons from The Livelihoods Initiatives for Eastern Uganda (LIFE) Project

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Abstract:

AT Uganda Ltd. (Appropriate Technology Uganda Limited) implemented the DFID (Department for International Development) funded LIFE Project (1999-2003) in six Districts. It addressed food and income insecurity by improving the quality/quantity of key food security crops and appropriate production practices. An external impact assessment found significant achievement of project targets including observably higher adoption of recommended production practices than non-group members, and higher reporting of enhanced incomes and food security compared to the broader community.

Key lessons learned include:

Donor support which targets final beneficiaries directly with a result oriented approach was found to be very effective. Farmers develop faster when organized into self controlled groups, but important to actively include women and poor households in groups. Successful working with groups to achieve agricultural extension/adoption however, was found to require:

- ✓ Assessing the strengths and weaknesses of the groups,
- ✓ Providing capacity building early in the project and timing interventions to incrementally introduce key concepts of group development, FAAB, savings, and group marketing,
- ✓ Encouraging enforcement of group bylaws and self regulation is the key to sustainability.

Poverty Targeting requires Poverty assessments at beginning and during project to ensure poverty focus. Active beneficiary participation in a) planning, b) budgeting, c) implementation and d) M&E enhances project ownership. The savings and credit repayment culture was found to be essential to adoption of improved production and income generation technologies.

A two pronged approach to distribution of agricultural inputs is needed. Projects should develop commercial Private sector supply channels for services and then support the capacity of poorer groups to access and pay for these available services.

Key words: Poverty focus, technology transfer, impact assessment, adoption.

1. Background

The Livelihood Initiatives for Eastern Uganda (LIFE) Project was a four-year project (1999-2003) funded by the Department for International Development (DFID) and implemented by Appropriate Technology Uganda Limited. The project operated in six districts of Eastern Uganda, namely, Kumi, Pallisa, Tororo, Mbale, Sironko and Kapchorwa. The goal of the LIFE Project was to enhance household food security in Eastern Uganda. The project therefore aimed to address food and income insecurity by targeting and improving the quantity of key food security crops and appropriate modern production practices.

The LIFE Project commenced at a time when the Ministry of Agriculture, Animal Industries and Fisheries (MAAIF) was in the process of restructuring public extension delivery. Under decentralisation extension had been devolved to the districts. Lack of funds handicapped the extension services. The LIFE Project collaborated with district extension personnel, oriented them on participatory farmer development approaches and motivated them to execute project activities.

These extension workers worked with pre-existing Farmer Groups to ease delivery of project outputs. Two hundred groups were strengthened in the four-year period with total membership of 5,397 farmers (40.8 % men and 59.2 % women). The groups were exposed to improved production practices and supporting skills through:

- On farm demonstration of agronomic practices involving seed, integrated crop management, plant population, and fertility enhancement.
- Training in "Farming as A Business"
- Saving mobilisation schemes
- Training in "Group Development and Management"
- Training in Marketing
- Dissemination of information to the general public by means of crop production brochures, farmer exchange visits, farmer field days, and radio promotion programmes.

LIFE project provided technical back-up to uplift farm productivity by bridging the gap between farmers, development agents and input stockists. Informal and formal input distribution arrangements were integrated to enhance access to improved seed of maize, sorghum, bean, cow pea, irish/sweet potato, groundnuts and millet by disadvantaged farming households. Emphasis was on linking the farming households with the frontline agricultural development workers, formal input delivery channels, and seed-bulking centres producing improved varieties of planting materials.

2. Project Impact Assessment

After four years of implementation the project undertook an extensive impact assessment in order to document experiences, drawbacks, and impact with respect to expected targets. AT Uganda Ltd contracted Nkoola Institutional Development Associates (NIDA) to undertake the assessment and produce a quantitative project evaluation. Emphasis was placed on the importance of disaggregating result to determine the specific impact on women and the poor.

Impact is defined as the effect of an intervention/project on clients during or after implementation. Impact assessment entails the evaluation of the effects of a project on its clients. It establishes the extent to which a project brought about changes at national, local government, community and individual household levels. This impact assessment focused on generating tangible evidence of the magnitudes of the effect of project interventions with particular focus on the level of adoption of project recommendations and the effects of adoption on the socio-economic status of the farming households in the project area.

3. Methodology

3.1 The Study Design

The methodology involved: literature review, key informant interviews, focus group discussions and individual interviews with group members and non-group members from the same communities. A multi-stage sampling procedure was used to select respondents.

Data collection involved both qualitative and quantitative methods, but analysis and presentation relied predominantly on quantitative techniques. Qualitative information was used to explain the quantitative data and put findings into perspective.

3.2 Selection of Farmer Groups

Stratified random sampling was employed to select two groups from each of the 20 project sub-counties. In each sub-county the list of participating farmer groups provided the sampling frame for selection of the groups. Care was taken to ensure that the groups were not from the same village/parish.

Individual interviews were conducted in half of the subcounties. Ten sub-counties were randomly selected from the list of project sub-counties using the fish bowl method. All districts were represented in the sample for individual interviews with no more than two sub-counties from the same district. The communities with the selected groups then became the communities from which non-group representatives were selected for individual interview.

3.3 Selection of Individual Households

Participatory wealth ranking exercises were conducted. During these exercises all members of the selected communities (including farmer group members) were registered and categorized into wealth rank by their fellow community members. A total of 20 households were then selected in each sample community. The names were randomly selected from the list of households categorized in terms of well being and group membership. Ten households were randomly selected from the group members and another 10 from the non-group members, ensuring that half of the respondents were of average and above wealth while the other half came from the poor and very poor categories. This gave a total of 20 households from each village. With 2 villages per sub-county, this gave a total of 40 respondents from each sub-county; 400 from the 10 sub-counties. Half (200) of the

respondents were group members and half (200) non-group members. Half were from well-off and middle categories and half from poor categories.

3.4 Data Collection Methods

Guided focus group discussions were held with 40 of the farmer groups that participated in LIFE project activities. The focus group discussions involved mixed groups of women and men with care taken to explore the separate perceptions of women and men on pertinent issues. Four hundred in-depth individual interviews were conducted using structured questionnaires. Data collected included information on the benefits from project participation; total acreage of new planting materials received/multiplied; level of adoption of improved production practices for each of the focus crops – including improved varieties, row planting, recommended spacing, and soil conservation measures; levels of input purchases in the last 2 years; impact of project on food security; and perceived income changes resulting from production and productivity changes.

3.5 Data Analysis

Qualitative data from the focus group discussions and individual interviews was subjected to content analysis: Responses were standardized into content categories and subjected to quantitative analysis. Descriptive statistics (percentages and means) were used to analyse both the qualitative and quantitative data. Cross tabulations with chi-square tests were applied to establish the extent of association between above variables and membership in groups, gender and wealth status of the farmers.

4. Study Findings

4.1 Focus Group Discussion of Project Benefits

Focus groups were questioned about the benefits from project activities (table 4.1). The majority (89%) of appreciated the training provided under the LIFE project. Training in

farming as a business, savings mobilisation, record keeping, group dynamics, and crop management were specifically mentioned. Groups especially appreciated capacity building in savings mobilization. Groups' manage books of accounts, keep minutes and group records. Members have savings passbooks. Savings mobilisation was especially appreciated by the groups in Kumi, Sironko, Mbale and Tororo. Groups mobilise savings which they loan to others with interest. They also help members save their money with the group. The mobilised savings enable group members and the general community to access credit, which they use to address emergency needs and invest in petty business.

Training on crop management (e.g line planting, spacing and fertilizer) has improved yields. Farmers noted that line planting makes weeding easy and reduces the labour and drudgery of weeding. Access to improved planting materials was also cited by 89% of the groups as a major benefit. This has greatly assisted poor households, who could not afford to purchase them from the market. Better-off households saved the money they would have used in purchasing planting materials. Even members who are yet to receive planting materials are confident they will get since materials are now widely available in their groups/communities.

Focus groups concurred that the LIFE project has greatly contributed to improved food availability (cited by 66% of the groups). This was attributed to the increased yields from improved planting materials that are disease/drought resistant and early maturing. Gender relations improved due to availability of food. Women gained independence from men in terms of food requirements, leading to improved health of women and children. The community has more food and poor farmers can afford to save seed for the next season. High yields contribute to increased incomes through sale of marketable surplus and reduced expenditure on food (cited by 86% of the groups). This improved household's ability to send children to school and meet health requirements. Men spend less on buying food and the savings is invested in livestock and agricultural inputs. Women use the income to acquire household utensils and clothing.

Table 4.1. Benefits Attributed to LIFE Project

Benefit	Percent of Focus Groups						
	Overall	Kumi	Mbale	Sironko	Pallisa	Tororo	Kapchwora
Training/advice	89	86	100	100	63	100	100
Access to planting material	89	100	100	100	75	85	83
Income	86	100	100	100	88	88	50
Adult literacy	83	71	75	50	75	100	100
Savings	71	100	75	100	50	75	50
Increased Food availability	66	71	100	100	75	38	50
Strengthening groups	49	43	50	50	50	25	83
Collective responsibility	37	43	50	50	50	13	33
Access group loans	20	57	0	50	0	25	0
Met school requirements	26	14	50	0	0	63	17

4.2 Use of Improved Seed by District, Group Membership, Wealth Status and Gender

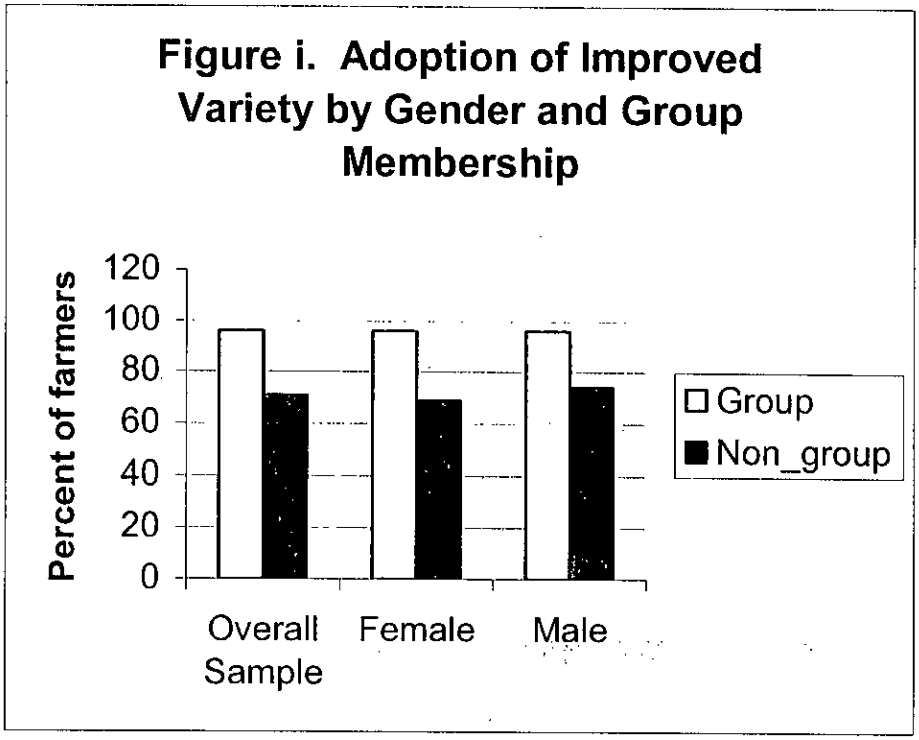
In order to obtain a more objective assessment of the actual benefits accrued to group members, it was necessary to conduct individual household interviews and to compare the findings for project participants with those from similar farmers in the same communities. In particular, the project was interested to know whether exposure to extension training and messages, and participation in farmer participatory research trials made any difference in the agricultural practices of the household on their own fields.

Survey results indicate that 84% of the sampled farmers were using improved seed for at least one of the crops they grow. The non-group farmers formed the bulk of the non-adopters. This overall trend is manifested across all project districts. District disaggregated data reveals that in all districts, group members exhibited a higher propensity to adopt improved varieties compared to the non-group members (table 4.2). Adoption levels for group members were 100% in Sironko and Tororo districts, 98% in Kumi and Kapchorwa, 93% in Pallisa and 85% in Mbale. Corresponding adoptions levels for non-group members were 75%, 58%, 93%, 78%, 58% and 70%. Chi-square tests were run for group versus non-group members. The results point to existence of a strong association between belonging to groups and use of improved variety [X^2 =44; $p<0.01$].

The current levels of improved variety adoption in the project area are well above adoption levels before start of the project reported to be about 30% in Uganda at the time (PEAP 2000). In the second half of the 1990s, 20% and 8% of the well-off and poor farmers respectively in the Eastern region were reported to use improved seed. Therefore, findings suggest that the LIFE project has made major strides in raising use of improved seed.

Wealth disaggregation reveals that the percentage of adopters increases with wealth. Within the sample of group members, the difference in adoption levels of the poor and the well off is quite small (only 4 percent points) compared to the non-group sample where the difference between these two categories is 20 percentage points. This suggests that the tendency for the affluent farmers to adopt improved planting material more readily than the underprivileged is more pronounced in the non-group farmers than among members of the groups. Findings reveal adoption by 100% of the most well off; 97% for the average well off; 96% for the poor and 75% for the very poor group members. The corresponding adoption levels for the non-group members are 86%, 81%, 66% and 43% respectively. Within each wealth category group members exhibit higher adoption levels compared to the non-group members. The Chi-square on adoption by wealth status and group membership shows that within each wealth category, there is a real association between membership in groups and ability to adopt improved variety [X^2=30.2, $p<0.01$].

While there is no difference in adoption according to gender among group members (both registering 96% adoption (figure i)) within each sex category, group members register higher adoption compared to non-group members. Adoption levels for women non-group members was only 69% while that for men non-group was 74%. Chi-square test attests to the relationship between sex, group membership and adoption of improved varieties. The statistics show that being a female or male group member is positively associated [X^2 =24.6, $p<0.01$ and X^2=18.8, $p<0.01$] with use of improved seed compared to non-group. The findings suggest that group membership was more significant in determining adoption than gender.


Figure i. Adoption of Improved Variety by Gender and Group Membership
Percent of farmers
120
100
80
60
40
20
0
Overall Sample
Female
Male
Group
Non_group

4.3 Use of Modern Production Practices by Group Membership and Wealth Status

Modern production practices encompass more than adoption of new varieties, however. The project also aimed to introduce appropriate plant spacing, weed control, and soil fertility measures. Results of the impact assessment, however, showed that adoption of these other factors proved more difficult. Most farmers either adjust the recommended production practices or disregard other components of the package particularly for soil nutrient enhancement.

For all crops the level of adoption diminishes from variety through use of row cropping to use of recommended spacing despite project efforts to train farmers on all aspects of improved production methods. A similar trend for adoption of improved varieties is observed with respect to management practices. Crops with high adoption levels for improved variety retain their relative position with adoption of row cropping and recommended spacing. Relatively low adoption of recommended spacing is noted. Adoption by farmers is stepwise. They initially take-up just parts of the technology package and gradually integrate the full package. The use of manual planting methods is one factor. Farmers practice mixed cropping to address food, income and risk aversion - multiple objectives that may not be accommodated by the recommended spacing.

Data on adoption of recommended production practices, disaggregated by wealth status and gender is presented in Table 4.3. Adoption rates vary by crop, with better off farmers generally exhibiting better adoption than poorer farmers, and women's adoption falling slightly below that of their male counterparts. Findings do reveal however, that for all varieties and recommended packages the level of adoption is higher for group members than non-group members. The overall conclusion, therefore, is that the project made a significant contribution towards the promotion of improved production practices, even though adoption of spacing, and soil fertility recommendations was lower than targeted.

Table 4.3: Use of Recommended Production Practices by Group Membership

Variable	Improved Variety		Row cropping		Recommended Spacing	
	Non-group	Group	Non-group	Group	Non-group	Group
	Adoption Modern Practices for Beans (%)					
Well-Off	67	83	60	83	20	56
Average	36	70	29	68	11	27
Poor	**39**	**54**	**34**	**54**	**10**	**19**
Very Poor	30	67	10	67	0	33
Female	**41**	**71**	**33**	**62**	**12**	**24**
Male	42	62	35	67	9	32
	Adoption Modern Practices for Groundnuts (%)					
Well-Off	65	75	35	80	17	55
Average	41	75	38	73	12	39
Poor	**45**	**73**	**47**	**69**	**11**	**34**
Very Poor	22	67	22	100	0	33
Female	**45**	**77**	**45**	**74**	**14**	**41**
Male	48	71	33	71	8	38
	Adoption Modern Practices for Maize (%)					
Well-Off	70	100	65	96	48	82
Average	65	91	52	75	33	49
Poor	**52**	**80**	**52**	**67**	**34**	**43**
Very Poor	35	57	29	71	12	29
Female	**51**	**83**	**44**	**65**	**25**	**44**
Male	64	88	61	82	44	55
	Adoption Modern Practices for Cassava (%)					
Well-Off	76	88	52	88	20	75
Average	73	88	58	75	46	62
Poor	**64**	**84**	**52**	**70**	**31**	**50**
Very Poor	50	100	50	100	33	75
Female	**63**	**87**	**53**	**73**	**35**	**57**
Male	75	87	56	77	34	61

	Adoption of Soil Fertility enhancement Practices (%)			
	Chemical Fertiliser		Organic manure	
	Non-group	Group	Non-group	Group
Well-Off	17	36	7	27
Average	9	20	8	9
Poor	**5**	**9**	**2**	**10**
Very Poor	0	13	5	0
Female	**2**	**15**	**5**	**10**
Male	15	19	5	14

It might be argued, however, that group adoption only appears higher because members were given small quantities of free improved seed for multiplication. The impact study therefore needed to test for the intensity of adoption. Table 4.4 reveals that group members devote a higher proportion of their land under beans, maize, cassava, groundnuts and millet to improved varieties than non-group members. A comparison of adopters in the study area to adopters of improved varieties of the same crops in Uganda prior to start of the project reveals a significant increase in the proportion of their land under the respective crops to improved varieties over the last four years. Proportions devoted to improved varieties has increased from 74%, 72%, 65% and 54% in 1999 for beans, cassava, millet and groundnuts to 92%, 94%, 84% and 83% in 2003 respectively.

Use of soil fertility enhancement practices is still very low, however. Findings reveal that the current levels have slightly increased as compared to the 7% levels for use of chemical fertiliser prior to start of LIFE project (PEAP 2000). Fertiliser use was cited by 12% of the sample while 10% used organic manure. Fertiliser use is highest in Kapchorwa and lowest in Kumi, Tororo and Pallisa. Use of soil fertility enhancement practices is also directly related to wealth status as adoption levels diminish from 28% for well off to 17% for average and 6% for the very poor.

Table 4.4 Intensity of Adoption of Improved Crop Varieties

Crop	% Acreage Under improved for Group sample	% Acreage Under improved for Non-Group sample	% Acreage Under improved for adopters	
			Now	Four years ago[a]
Beans	59	49	92	74
Maize	85	69	96	-
Cassava	85	79	94	72
Gnuts	68	48	83	54
Millet	42	13	84	65

[a] *Source of Figures for 1999 is T. Sengooba and D. Kisauzi. Organisation Performance Assessment, NARO 1999.*

4.4 Benefits Realized From Use Of Modern Production Practices

The LIFE project promoted modern production practises and thus contributed to the availability of improved varieties in the project area. It was therefore necessary to examine the farmer's assessment of the extent to which modern production practices have contributed to individual farm performance. Farmer perceptions were classified into three categories, 1) no improvement, 2) little/slight changes and 3) drastically felt improvement.

Overall 74% of the sampled respondents reported having realised some benefit from use of modern production practices. A higher proportion of group members (86%) cite getting benefits compared to 63% for non-group members. District disaggregated data reveals that Kumi (98%) had the highest number reporting benefits from use of modern production practices. Tororo, Kapchorwa, Sironko, Mbale and Pallisa followed with 74%, 73%, 70% 63% and 61% respectively (Table 4.5). In all districts, a higher proportion of group members reported benefiting from modern production practises than non-group members (figure ii).

Across all districts a higher proportion of non-group members reported marginal benefits compared to group members who are much more likely to report significant benefits. In situations where there clear improvement in farm performance is reported, group members manifest a persistently larger proportion compared to non-group members.

Group members' perceptions of the extent of benefits from modern production practices are evenly split in the districts of Kumi, Sironko and Pallisa. In Mbale and Tororo however, 85 and 86% respectively reported drastic benefits. In Kapchorwa, however, the majority (69%) of group members reported limited benefits from improved production practices. This is not unexpected, however, since farmers in Kapchorwa have for a long time been noted for their hybrid maize production and use of recommended fertiliser. Project interventions will not result in as significant a change in yields in Kapchorwa as in less progressive areas.

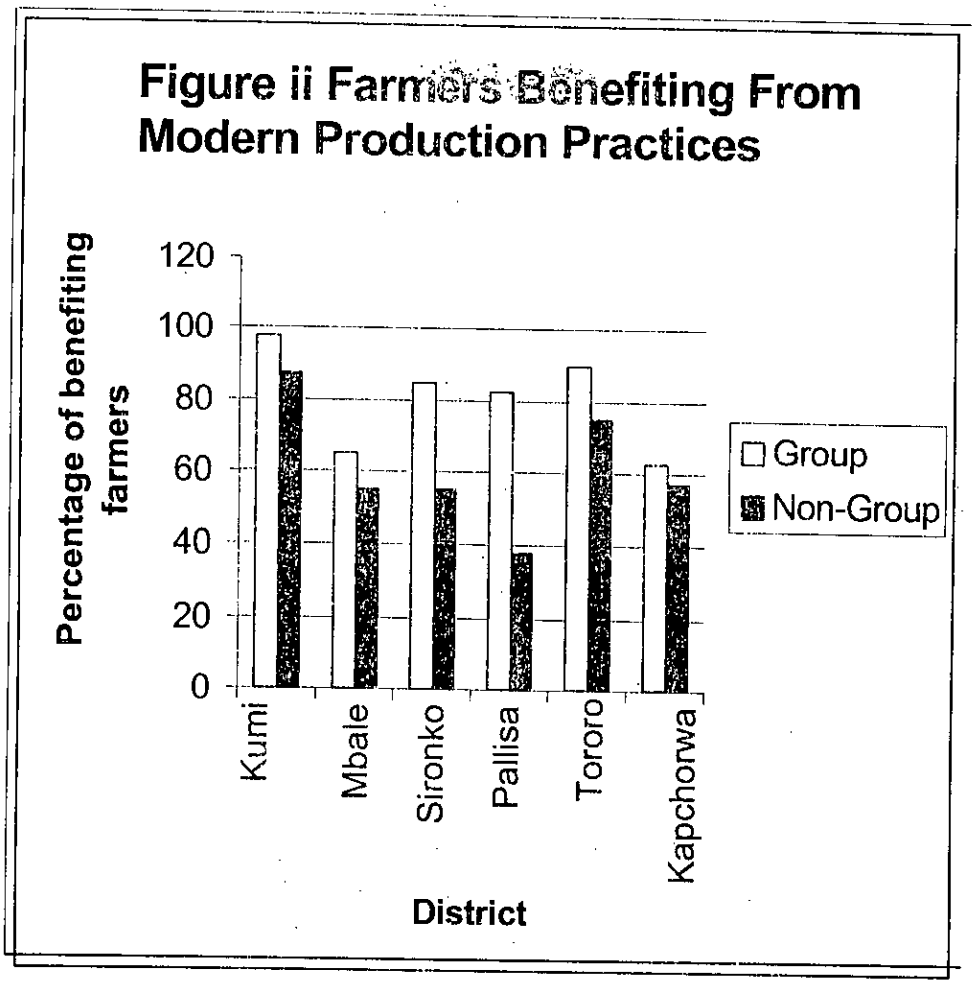
Table 4.4: Perceptions on Extent of Benefits from Modern Production practices

Variable	Group(N= 200)		Non-group (N=200)		Overall (N=400)		% of Total sample	
District	Marginal (%)	Drastic (%)	Marginal (%)	Drastic (%)	Marginal (%)	Drastic (%)	Observed	%
Kumi (N=80)	48	52	66	34	56	44	78	98
Mbale (N=40)	15	85	25	75	20	80	25	63
Sironko(N=40)	23	77	82	18	46	54	28	70
Pallisa (N=80)	50	50	67	33	55	45	49	61
Tororo (N=80)	14	86	30	70	20	80	59	74
Kapchwora (N=80)	69	31	77	23	71	29	58	73
Gender								
Female (N=209)	43	57	58	42	50	50	146	70
Male (191)	36	64	60	40	46	54	151	79
Wealth status								
Well-off (N=57)	8	92	41	59	23	77	48	84
Average (N=139)	35	65	54	46	42	58	106	76
Poor (N=175)	55	45	69	31	61	39	131	74
Very Poor (N=29)	20	80	71	29	50	50	12	41

Total & % (observed N / sample N)	Group N=200		Non-group N=200		Overall sample	
	Count	%	Count	%	Count	%
	172	86	125	63	297	74

The proportion of farmers acknowledging benefiting from improved varieties reduces as one moves from the well off to the very poor - 84%, 76%, 74% and 41% of the sampled well-off, average, poor and very poor farmers respectively cite having benefited something from use of modern production practices. A higher percentage of the well-off report drastic benefits compared to other categories.

Overall 69% of the sampled farmers acknowledge benefiting from modern production practices with the well-off accounting for 11%, average 25.6% while the poor account for 32%. So in total, nearly half of those who benefited from improved production practices are from the poor category. Across all wealth categories, more group members report substantial benefits compared to non-group members. Findings reveal that 92%, 65% and 45% of the well off, average and poor group members respectively realised drastic benefits compared to 59%, 46% and 31% for non-group farmers. The relation between belonging to group, wealth status and realisation of benefits is strong in case of the well-off (X^2 =7.4 $p<0.01$) and fair in case of the average farmers (X^2 =3.4 $p<0.05$). Gender disaggregation reveals that for both women and men, group members report more drastic benefits than their non-group counterparts.


Figure ii Farmers Benefiting From Modern Production Practices
Percentage of benefiting farmers
120
100
80
60
40
20
0
Kumi
Mbale
Sironko
Pallisa
Tororo
Kapchorwa
District
Group
Non-Group

4.5 Purchase of Improved Seed by Farmers.

A second objective of the project was to have farmers sufficiently convinced of the benefits of improved inputs that they would be willing to invest in purchasing such inputs. Purchase of improved seed was recorded among 52.5% of group members (Figure iii) and 44% of non-group members. Wealth standing of households has a strong bearing on purchases of improved seed. Across group and non-group sub-samples, proportions of households, which cited buying seed sharply, declined as the gradient of wealth status declines. Between members of groups and non-group farmers there was a distinct contradiction between the two categories at the level of the well off with non-group farmers exhibiting more enthusiasm in purchasing improved seed than the group members. The respective figures are 69% and 57% (figure iv). This is probably because wealthier group members had access to project multiplied seeds and therefore did not need to purchase as much as their non-group counterparts.

At the three lower levels the normal trend is resumed with group members taking on the lead role. 56% of the group average well off purchased improved seed as opposed to 50% from the non-group farmers. Among the poor 52% from the groups and 37% from the non-group farmers purchased improved seed. For the very poor the difference was slight with 25% and 24% respectively for group and non-group. It is noted that 52% for the poor group members surpasses the project design target of 30% of poor group farmers buying inputs.

Figure iii

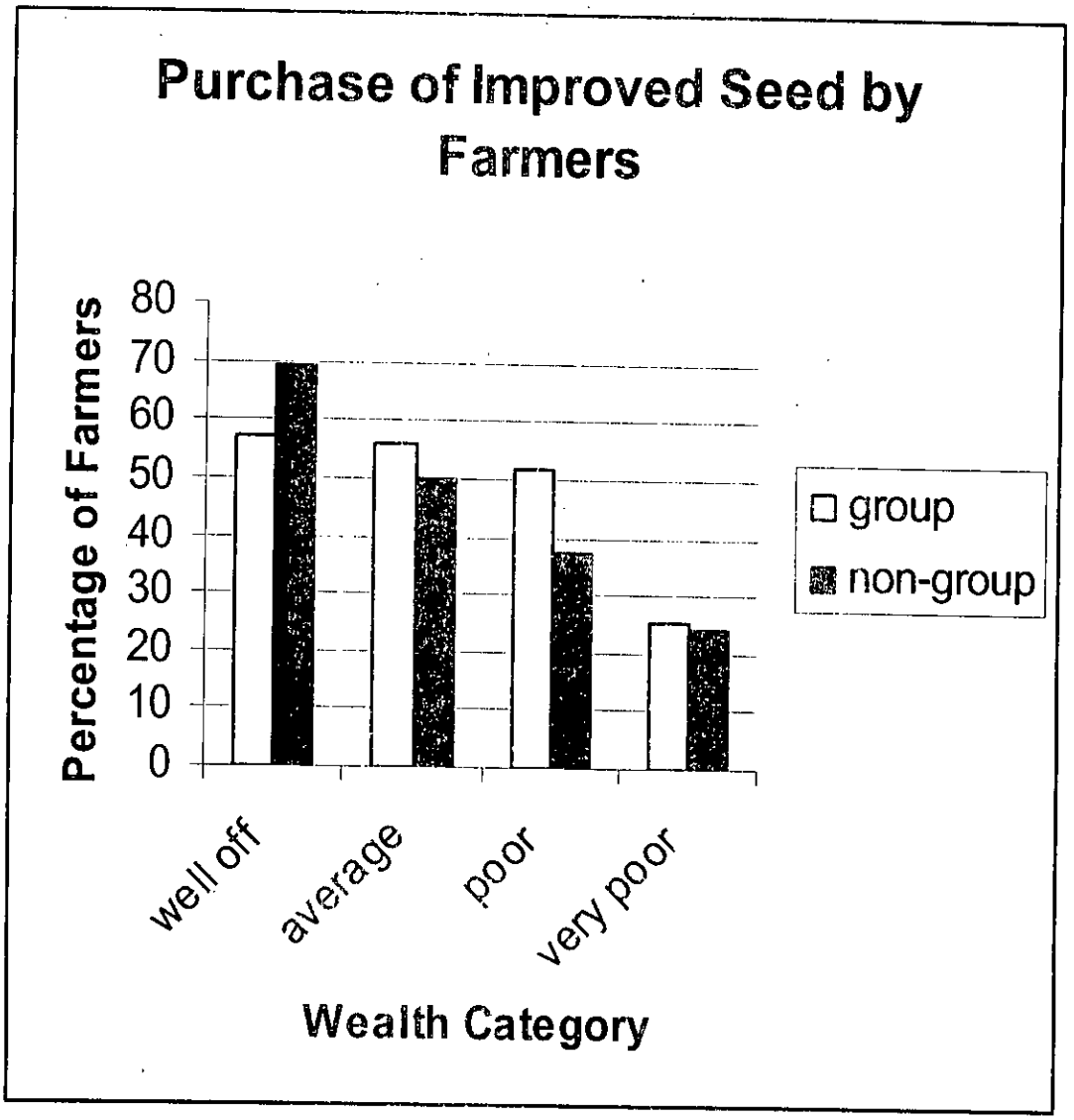
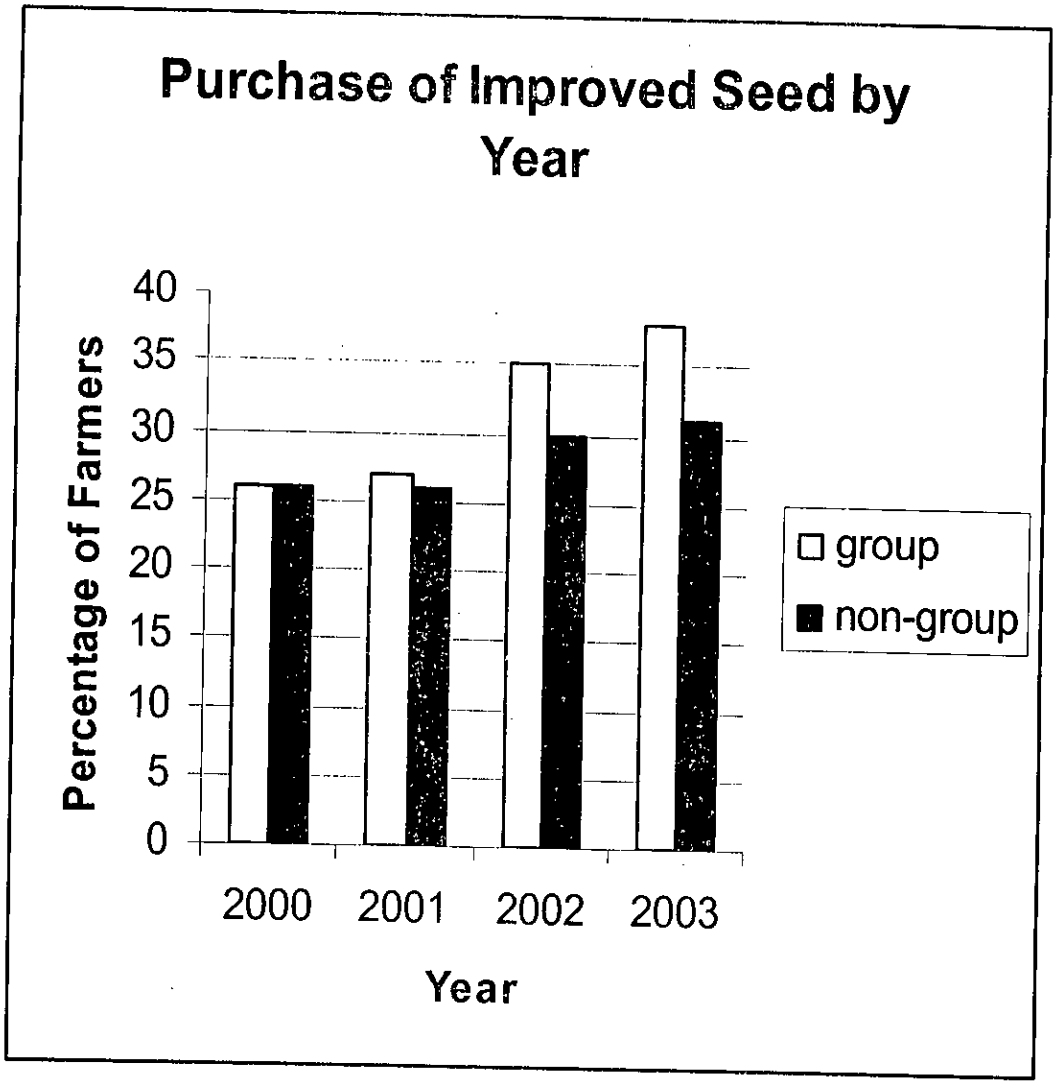

Purchase of Improved Seed by Farmers
Percentage of Farmers
80
70
60
50
40
30
20
10
0
well off
average
poor
very poor
Wealth Category
group
non-group

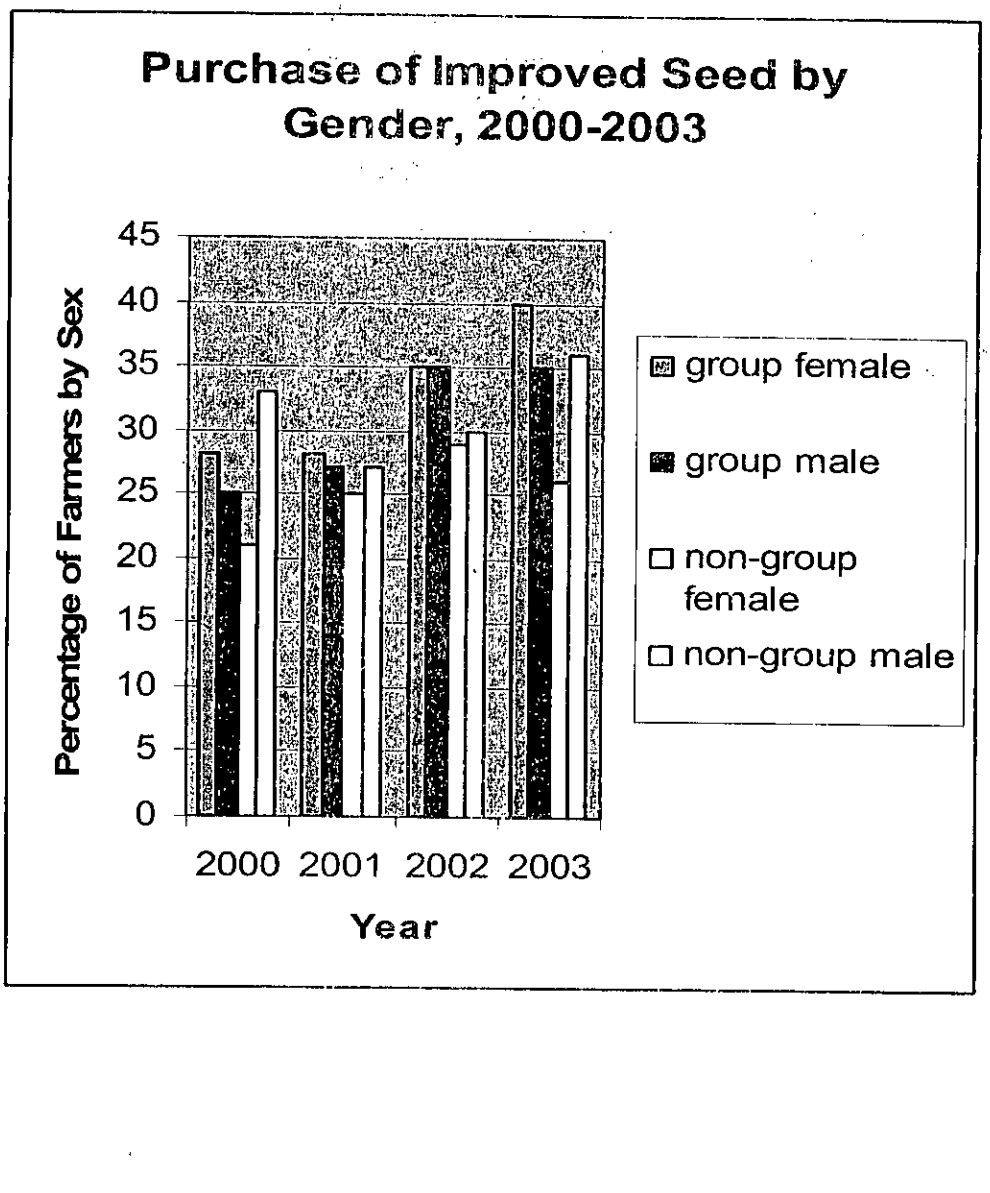
Figure iv


Purchase of Improved Seed by Year
Percentage of Farmers
40
35
30
25
20
15
10
5
0
2000
2001
2002
2003
Year
group
non-group

The project demonstrated superiority of improved varieties through on-farm trials, provision of planting material for multiplication and farmer training. After being convinced that improved planting materials were better than local seed, the farmers started buying improved seed from input stockists trained by the project. Over the years there has been a growing trend by farmers to purchase improved seed with both categories making commendable strides especially over the last two years (figure iv). It would appear that seed purchase is gaining momentum but a favourable environment is required to sustain the trend. Although group members exhibit higher percentages, Chi-square tests did not find a strong association between group membership and seed purchase. This suggests that the message was equally received by both participating and non-participating farmers but financial capability and attitudes rather than group membership were the major factors determining actual seed purchase.

Purchases by gender are reflected in the figure v. It is apparent that since 2001 group women have steadily increased their purchases of improved seed. They have consistently lead their male counterparts in the groups who appear to have levelled off after 2002. Except in 2000 when non-group males surpassed them, group women come out as the dominant purchasers of improved seed.

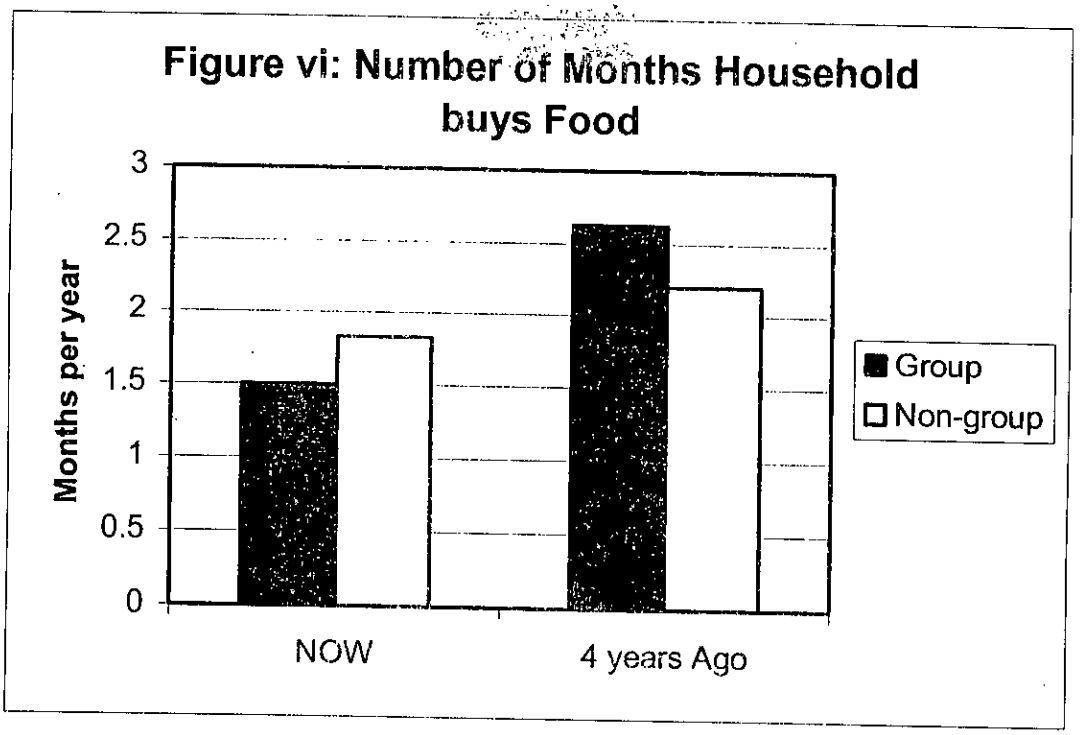
Figure v


Purchase of Improved Seed by Gender, 2000-2003
Percentage of Farmers by Sex
45
40
35
30
25
20
15
10
5
0
2000
2001
2002
2003
Year
group female
group male
non-group female
non-group male

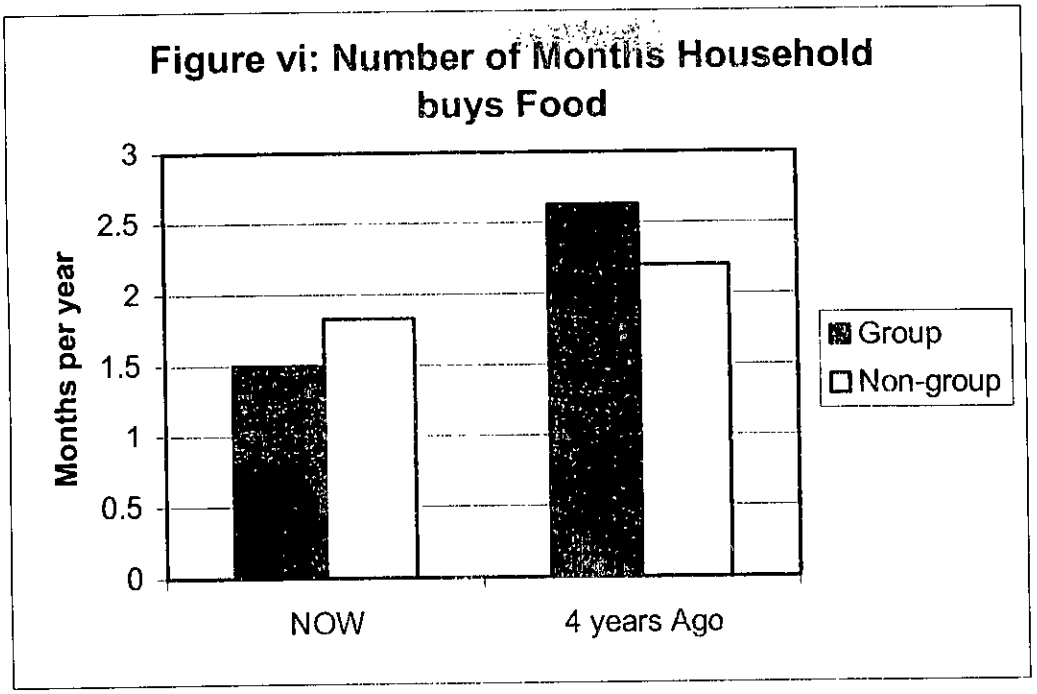
4.6 Food Availability

The project goal was to enhance household food security. Due to production below subsistence levels farmers always find themselves in the paradoxical situation of having to buy food despite other pressing demands on money. Studies conducted prior to this project revealed that about 40% of the population is food insecure and that up to 60% of household expenditure was spent on food in 1999 (Poverty status report 1999). Reduction in food purchases was therefore used as an indicator of increase in household food availability and food security.

The impact study found a significant reduction in the number of months during which group members buy food now compared to four year ago. Four years ago group members used to buy food for 2.5 - 3 months per year. This has been reduced to just under 1.5 months. This trend is also reflected among non-group farmers who used to buy foodstuffs for an average of 2.2 months while now average 1.8 months. The overall finding is that group members who depended more on food purchases than non-group farmers four years ago have been able to reduce dependency on purchases due to increased food production. The decreases in dependence on food purchases by non-group farmers have not been as rapid (figure vi).


Figure vi: Number of Months Household buys Food
Months per year
3
2.5
2
1.5
1
0.5
0
NOW
4 years Ago
Group
Non-group

Data on household food availability is depicted in figures vii and viii. 60% of sampled farmers reported an improvement in household availability of food. A higher proportion of the group members, 75%, reported improved food availability compared to 44% for non-members. Overall a slightly higher percentage of men (65%) cited improvement in household food availability compared to 55% of the women. Within group and non-group sub-samples, it is evident that a higher proportion of male (77%) and female (74%), group members reported improved food availability compared to the non-group members with 51% and 39% respectively. Chi-square tests for female group and female non-group ($X^2 = 25.4$ $p<0.01$) confirm a high level of association between belonging to a group and acknowledging improvement in food security. (Pearson Chi square for males is $X^2 = 13.9$.)


Figure vi: Number of Months Household buys Food
Months per year
3
2.5
2
1.5
1
0.5
0
NOW
4 years Ago
Group
Non-group

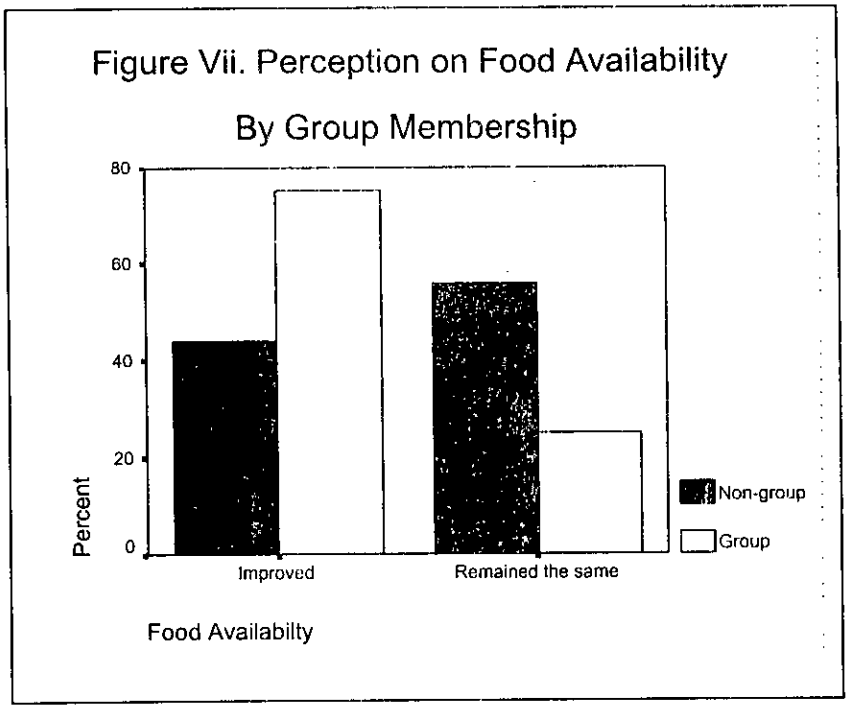
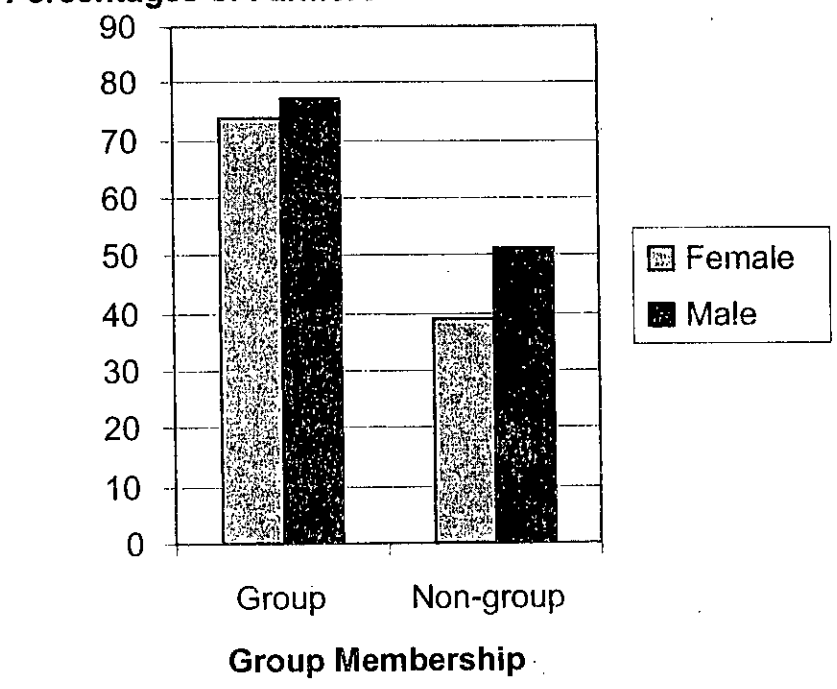

Figure Vii. Perception on Food Availability
By Group Membership
80
60
40
20
0
Percent
Improved
Remained the same
Food Availabilty
Non-group
Group

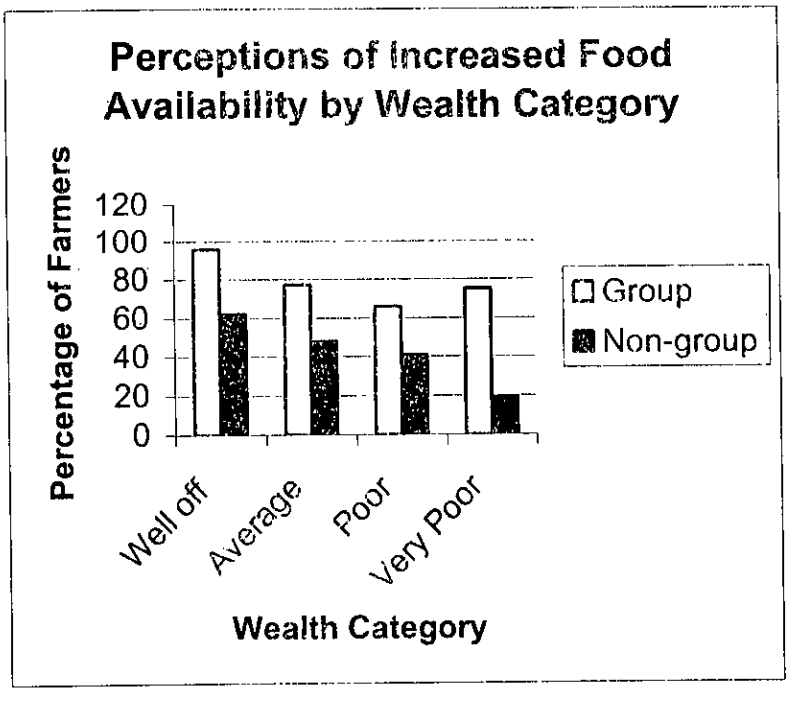
Figure viii. Reported Improved Food Availability by Gender



There is also a relationship between wealth status and improvement in household food availability. Group members, regardless of wealth ranking, report that their food situation has improved since the project began. 96% of the well off; 77% of the average; 66% of the poor and 75% of the very poor report access to more meals today than previously. It is pertinent to note while access to food is still a problem for poor households, a sizeable majority of the poor and very poor report a fundamental change in their food availability. In contrast, improvement in food availability for non-group farmers shows a distinctive trend with improved food availability declining as you cut across from the well off to the very poor. The corresponding figures for non-group farmers are 62%, 48%, 41% and 19% respectively for the well off, average, poor and the very poor – significantly lower than for group members.

Generally, the findings suggest that food security in the project area has improved, for non-group members as well as group farmers, but to a lesser degree. It appears safe to say, therefore, that LIFE project has contributed significantly towards its development goal.

Figure ix

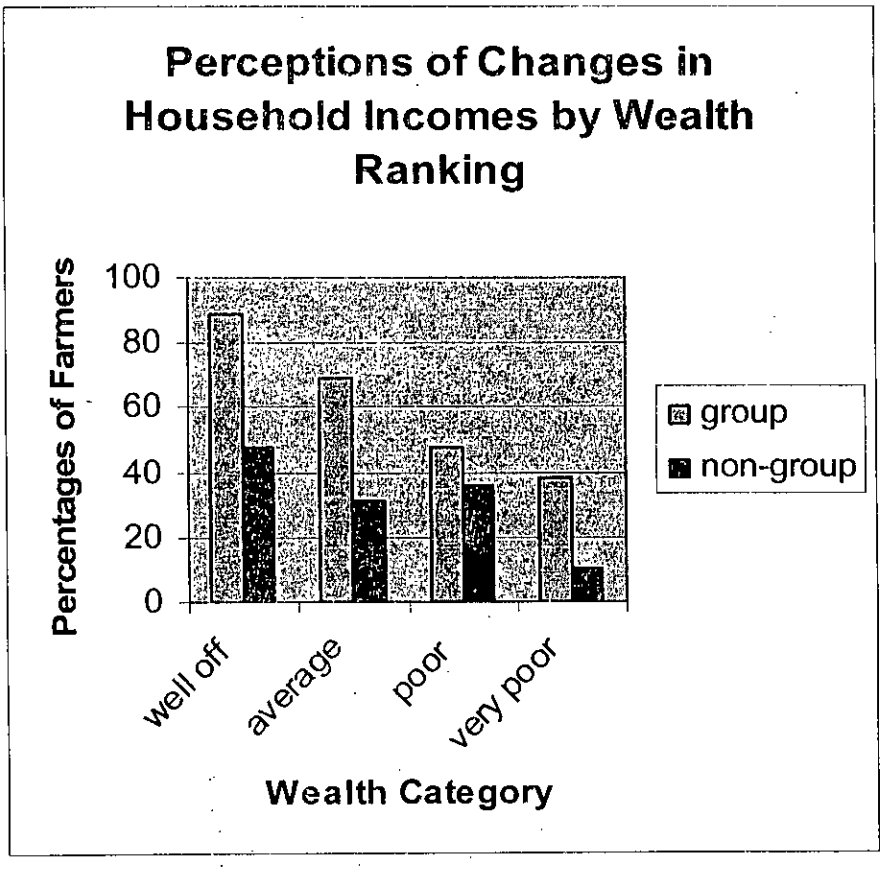

Perceptions of Increased Food Availability by Wealth Category
Percentage of Farmers
120
100
80
60
40
20
0
Well off
Average
Poor
Very Poor
Wealth Category
Group
Non-group

4.5 Perceptions Of Changes In Household Incomes

Study findings revealed that 48% of all respondents perceived changes in household incomes as a result of project interventions. Of these 62% members and 34% non-members perceived increased incomes as a result of interventions. Members attributed higher income to use of improved agronomic practices and access to improved planting materials that led to increased production. Thus households were able to have food and a surplus to sell.

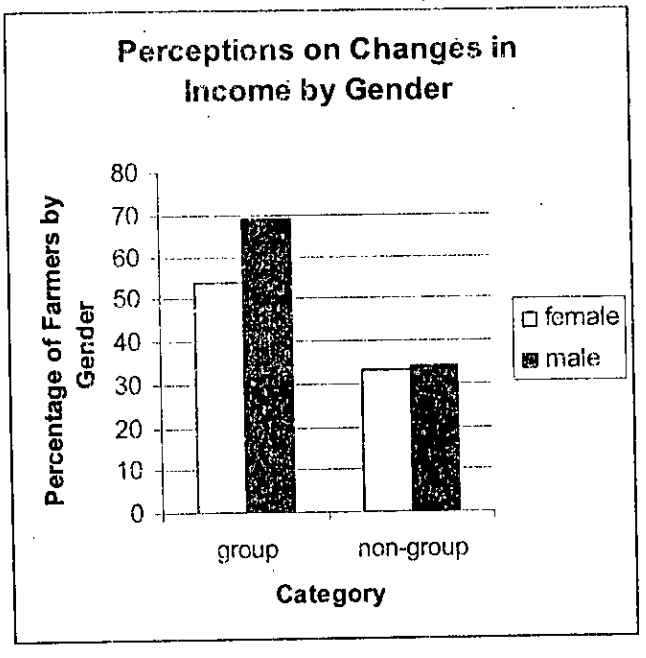
The perception differed among wealth categories as shown in figure x. The perception was highest in the well off (68%), average (52%), poor (42%) and least among the very poor (17%). The poor attributed increase in income to access to free planting materials and saving the money they would have used to purchase seed. The rich attributed the increase more to improved knowledge and adoption of improved practices. The rich saved on purchase of improved varieties, but could also afford purchase on the market. Regardless of the level of affluence/poverty the generic picture that emerges confirms that all wealth classes enjoyed greater increases in incomes as a result of project activities than non-group farmers. Among group members the percentage reporting increased income over the last four years are 69%, 69%, 48% and 38% compared to 48% and 31% 36% and 10% for non group members for the well off, average, poor and very poor farmers respectively. The Chi-square test run for each wealth category gives $X^2=11.08$, $p<0.01$; and $X^2=20$, $p<0.01$ for the well off and average. This relationship is clearly not as strong with respect to the poor and very poor.

Figure x.


Perceptions of Changes in Household Incomes by Wealth Ranking
Percentages of Farmers
100
80
60
40
20
0
well off
average
poor
very poor
Wealth Category
group
non-group

As regards gender of the 48% reporting improved income, 47% were females and 53% were males. For both men and women the increase in incomes was attributed primarily to access and adoption of improved planting materials. Men attributed increased income to not purchasing food, seed/ planting materials and sale of cash crops. Women attributed increased incomes to sale of surplus food crops and being independent to control those crops that were considered female crops. More female group farmers, 54%, affirm increase of income than the non-group female, 33%, and male, 34%, farmers. The group male farmers, 69%, however, acknowledge more of the increased income than the female group members. The Chi-square tests run separately for females [X^2=9.1, p>1%] and males [X^2=23, p>1%] for income increase shows a real association between group membership and access to increased incomes.

Figure xi


Perceptions on Changes in Income by Gender
Percentage of Farmers by Gender
80
70
60
50
40
30
20
10
0
group
non-group
Category
female
male

5.0 Conclusions And Recommendations

The impact study findings confirm that the LIFE project made a significant contribution toward enhancing adoption of improved production practices, increasing food security and household incomes. The study cannot explain, however, exactly what aspects of the project were most effective in achieving this result. At the final project evaluation the discussion focussed on key lessons contributing to project success in improving food security and livelihoods for the poor. The following conclusions and recommendations were considered by all stakeholders to have contributed to project impact and to be essential to successful future replication:

1. Donor support which targets final beneficiaries directly with a result oriented approach has proven to be very effective.
2. Farmers can initiate faster development when organized into self controlled groups, but it is important the project interventions actively target the involvement of women and poor households in these groups.
3. Successful working with groups to achieve adoption entails:
   a) Assessing the strengths and weaknesses of the groups,
   b) Providing the necessary capacity building early in the project,
   c) Timing the interventions to logically introduce key concepts of group development, FAAB, savings, and group marketing in an incremental fashion,
   d) Encouraging development and enforcement of group bylaws, and creating a culture of self-regulation is the key to sustainability.
4. Poverty Targeting is essential. This requires that the project carry out poverty assessments at beginning and during project to ensure a poverty focus, and check each activity to verify whether approaches exclude the poorest in certain activities. For each intervention, however, it is important to consider whether targeting the poor directly is the best way to impact on them in the long run, or whether other interventions that impact richer groups are necessary as a means to impact the poor in the longer term.

5. Beneficiaries and implementers active participation in a) planning, b) budgeting, c) implementation and d) M&E greatly enhances awareness and ownership of the process leading to achievement of outputs and purpose.
6. There is a need for clear agreements between project management, local government, and front line extension workers spelling our roles, benefits and compensations. These should be reviewed periodically as necessary.
7. Instilling of the savings and credit repayment culture is essential to successful promotion of adoption of improved production and income generation technologies. But formulation/enforcement of group byelaws and close guidance and monitoring are necessary to ensure that the process does not go astray.
8. A two-pronged approach to distribution of agricultural inputs is needed. Projects should develop private sector services along purely commercial lines, and then simultaneously support the capacity of poorer groups to access and pay for the services whose availability has been enhanced.

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NOTE:- Further details are required for complete references and will be supplied in the next couple of days. Apologies for poor citation format at the moment.

The following tables provide details for the reviewers and are not intended for inclusion in the article itself.

1. Adoption Of Crop Production Practices By Wealth, Gender And District.

Variable	Improved Variety (%)				Row cropping (%)				Recommended Spacing (%)			
	Non-group		Group		Non-group		Group		Non-group		Group	
	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%
Adoption Modern Practices for Beans (N=202)b												
Well-Off N=33	10	67	15	83	9	60	15	83	3	20	10	56
Average N=72	10	36	31	70	8	29	30	68	3	11	12	27
Poor N=84	**16**	**39**	**23**	**54**	**14**	**34**	**23**	**54**	**4**	**10**	**8**	**19**
Very Poor N=13	3	30	2	67	1	10	2	67	0	0	1	33
Female N=96	**21**	**41**	**32**	**71**	**17**	**33**	**28**	**62**	**6**	**12**	**11**	**24**
Male N=106	18	42	39	62	15	35	42	67	4	9	20	32
Adoption Modern Practices for Groundnuts (N=250)												
Well-Off N=43	15	65	15	75	8	35	16	80	4	17	11	55
Average N=93	14	41	44	75	13	38	43	73	4	12	23	39
Poor N=102	17	**45**	47	**73**	18	**47**	44	**69**	4	**11**	22	**34**
Very Poor N=12	2	22	2	67	2	22	3	100	0	0	1	33
Female N=122	25	**45**	51	**77**	25	**45**	49	**74**	8	**14**	27	**41**
Male N=128	23	48	57	71	16	33	57	71	4	8	30	38
Adoption Modern Practices for Maize (304)												
Well-Off N=45	16	70	22	100	15	65	21	96	11	48	18	82
Average N=103	30	65	52	91	24	52	43	75	15	33	28	49
Poor N=132	32	**52**	56	**80**	32	**52**	47	**67**	21	**34**	30	**43**
Very Poor N=24	6	35	4	57	5	29	5	71	2	12	2	29
Female N=155	43	**51**	59	**83**	37	**44**	46	**65**	21	**25**	31	**44**
Male N=149	41	64	75	88	39	61	70	82	28	44	47	55
Adoption Modern Practices for Cassava (N=291)												
Well-Off N=49	19	76	21	88	13	52	21	88	5	20	18	75
Average N=108	35	73	53	88	28	58	45	75	22	46	37	62
Poor N=118	33	**64**	56	**84**	27	**52**	46	**70**	6	**31**	33	**50**
Very Poor N=16	6	50	4	100	6	50	4	100	4	33	3	75
Female N=145	49	**63**	58	**87**	41	**53**	49	**73**	27	**35**	38	**57**
Male N=146	44	75	76	87	33	56	67	77	20	34	53	61
Adoption Modern Practices for Millet (N=251)												
Well-Off N=41	2	10	14	67	0	0	3	14	0	0	2	10
Average N=90	8	20	25	50	0	0	10	20	0	0	3	6
Poor N=105	7	16	26	43	3	7	11	18	1	2	4	7
Very Poor N=15	0	0	2	33	0	0	2	33	0	0	0	0
Female N=133	10	14	30	48	2	3	9	15	1	1	4	7
Male N=118	7	16	37	49	1	2	17	23	0	0	5	7

Adoption Of Crop Production Practices By Wealth, Gender And District Continued

Adoption of Soil Fertility enhancement Practices (N=400)

	Chemical Fertiliser				Organic manure			
	Non-group		Group		Non-group		Group	
	Count	%	Count	%	Count	%	Count	%
Well-Off (N=57)	5	17	10	36	2	7	8	27
Average (N=139)	6	9	15	20	5	8	7	9
Poor (175)	**4**	**5**	**8**	**9**	**2**	**2**	**9**	**10**
Very Poor (N=29)	0	0	1	13	1	5	0	0
Female	**2**	**2**	**15**	**15**	**6**	**5**	**10**	**10**
Male	13	15	19	19	4	5	14	14

2. Adoption of modern production practices by District

Farmer Adoption of crop production practices by District	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%
	Kumi		Mbale		Sironko		Pallisa		Tororo		Kapchwora		Total	
Farmer use of modern maize production practices by district														
	N=68		N=29		N=30		N=58		N=48		N=17		(N=250)	
Use improved Maize	30	75	26	68	31	80	27	55	37	60	67	88	218	72
Group Member (N=156)	18	86	14	78	18	95	22	82	26	81	36	92	134	86
Non-group Member (N=148)	12	63	12	60	13	65	5	23	11	37	31	83	84	57
Grow maize in rows	29	73	25	66	25	64	27	55	44	71	42	55	192	63
Recommended Spacing	18	45	19	50	18	46	16	33	24	39	32	42	127	42
Recommended spacing by group	9	43	11	61	10	53	12	44	18	56	18	46	96	62
Recommended spacing by non-group	9	47	8	40	8	40	4	18	6	20	14	38	49	33
Farmer use of modern groundnut production practices														
	N=68		N=29		N=30		N=58		N=48		N=17		(N=250)	
Use improved	50	74	25	86	22	73	30	52	26	54	3	18	156	62
Improved variety by Group	27	77	15	94	17	90	23	70	23	72	3	27	108	74
Improved variety by non-group	23	70	10	77	5	46	7	28	3	19	0	0	48	46
Row cropping	57	84	20	69	17	57	22	38	28	58	3	18	147	59
Plant in rows non-group member (N=104)	25	76	7	54	3	27	3	12	3	19	0	0	41	39
Row cropping by group (N=146)	32	91	13	81	14	74	19	57	25	78	3	18	106	72
Recommended spacing	28	41	9	31	7	23	8	14	15	31	2	12	69	28
Recommended spacing by group	21	60	6	38	6	32	8	24	14	44	2	28	57	39
Recommended spacing by non-group	7	21	3	23	10	9	0	0	1	6	0	0	21	20
Farmer use of modern cassava production practices														
	N=73		N=31		N=29		N=65		N=66		N=27		N= 291	
Improved variety (N=291)	70	96	19	61	22	76	51	79	51	77	14	52	227	78
Use of improved variety non-group memb. (N= 137)	35	95	8	47	5	46	21	68	20	69	4	33	93	68
Use of improved variety by group memb. (N= 154)	35	97	11	79	17	94	30	89	31	84	10	67	134	87
Row cropping	57	78	15	48	14	45	42	65	50	76	12	44	190	65

Farmer Adoption of crop production practices by District	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%
	Kumi		Mbale		Sironko		Pallisa		Tororo		Kapchwora		Total	
Recommended Spacing	46	63	13	42	6	21	31	48	37	56	5	19	138	47
Recommended spacing by group	26	72	10	71	6	33	18	53	26	70	5	33	91	59
Recommended spacing by non-group	20	54	3	18	0	0	13	42	11	38	0	0	47	34
Farmer use of modern bean production practices														
	N=9		N=30		N=34		N=33		N=31		N=65		N=202	
Improved variety (N= 202)	4	56	13	43	26	77	13	39	17	55	36	55	109	54
Use of improved variety by group members (N=108)	3	50	6	43	14	82	12	63	13	77	23	66	71	66
Use of improved variety by non-group members (N=78)	1	67	7	44	12	71	1	7	4	29	13	43	38	49
Row Cropping	6	67	18	60	19	56	12	36	22	71	25	39	102	50
Recommended Spacing	2	22	10	33	8	24	5	15	9	29	26	55	60	30
Recommended Spacing by group	1	17	6	43	6	35	5	26	8	47	23	66	48	44
Recommended spacing by non-group	1	33	4	25	2	12	0	0	1	7	13	44	22	28
Farmer use of modern Millet production practices														
	57		33		24		55		67		15			
Improved variety (N=251)	10	17	13	39	17	71	17	31	22	33	5	33	84	33
Use of improved variety by group members (N=137)	8	27	9	56	14	93	13	41	19	59	4	33	67	49
Use of improved variety non-group (N=114)	2	7	4	24	3	33	4	17	3	9	1	33	17	15
Row Cropping (251)	1	2	0	0	16	67	7	13	5	8	0	0	29	12
Row Cropping group	1	3	0	0	14	93	6	19	5	16	0	0	26	19
Row Cropping non-group	0	0	0	0	2	22	1	4	0	0	0	0	3	3
Recommended Spacing	0	0	0	0	3	13	5	9	2	3	0	0	10	4
Recommended Spacing by group	0	0	0	0	2	13	5	16	2	6	0	0	9	6
Recommended spacing by non-group	0	0	0	0	0	1	11	0	0	0	0	0	11	9
Use fertiliser	3	6	6	12	5	10	7	14	3	6	25	51	49	12
Use organic Manure	4	12	7	20	6	18	4	12	2	6	11	32	34	9

3. Extent of Benefits From Modern Production Practises

District	Group			Non-Group		
	Marginal	Drastic	Total %	Marginal	Drastic	Total %
Kumi	47.5	50	97.5	60	27.5	87.5
Mbale	10	55	65	15	40	55
Sironko	20	65	85	45	10	55
Pallisa	40	42.5	82.5	25	12.5	37.5
Tororo	12.5	77.5	90	37.5	37.5	75
Kapchorwa	35	27.5	62.5	42.5	15	57.2