iDE Ghana - OFSP

Evaluation Report

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Introduction

Purpose

In Ghana, the prevalence of vitamin A deficiency is high among children and pregnant women. Vitamin A deficiency (VAD) affects 72 percent of the country's children younger than 5 years and contributes to one of three of child deaths between the ages of 6 to 59 months. The projected number of childhood deaths attributed to VAD is 104,300 between 2005 and 2014. Sweet potato is considered an excellent food security crop in sub-Saharan Africa. Widespread production and consumption of the vitamin A-rich orange and purple sweet potatoes in Ghana remains limited due to lack of awareness, limited availability of clean-planting materials and limited inclusion in the diet for diversity.

Study Design

Given the small sample size and lack of control group, the study compares differences in means among treatment groups using hypothesis testing. All hypothesis testing was conducted using the Stata survey analysis data package.

Hypothesis testing was conducted on basic household characteristics to determine baseline differences between treatment groups. As significant differences were found; propensity score matching was considered as an evaluation method to reduce biases introduced by the baseline difference. However, given the low degrees of freedom and small number of matching covariates, we found that propensity score matching did not improve the statistical significance of our findings between groups.

Implementation

The sample was collected over the period February - March. An iDE staff member collected data from a sample of new and existing clients using the client registry collected over the course of the OFSP project. In addition, the iDE staff will need to collect a group of indirect treatment group household observations by collecting surveys from the list of households that have purchased or received OFSP vines through a Treatment Group #1 or Treatment Group #2 household. These observations will be pulled from the list of indirect beneficiaries that iDE Ghana has collected since the start of the project, as well as households that are mentioned during the survey itself, when the household is asked if they have sold or given OFSP vines to someone else for production.

According to the M&E system used by iDE Ghana, there were 440 clients that can be sampled from for Treatment Group #1. The sample of new direct clients (Treatment Group #1) will be randomly selected from this cohort of OFSP program participants. In addition, approximately 210 households joined the OFSP program in 2014 and have completed two years of OFSP production. The older direct clients (Treatment Group #2) will be randomly selected from this cohort of OFSP program participants. The following sample will be used for the current evaluation.

Table 1: Sample Sizes for iDE Ghana OFSP Evaluation

Experimental Group	# of Clients
Treatment Group 1 – New Direct Clients	35
Treatment Group 2 – Older Direct Clients	35
Indirect Treatment Group 3	35
Total	105

The sample was drawn from the Upper East region and across nine districts. Sampling was not stratified based on district and thus distribution is unbalanced across the sample. For descriptive purposes the district sample distribution is provided in Table 2.

Table 2: Sample Distribution across Districts

	Treatment Group 1	Treatment Group 2	Indirect Group 3
Bawku West	37%	0%	6%
Binduri	11%	37%	3%
Bolgantanga	11%	9%	26%
Builsa	0%	0%	3%
Garu-Tempane	23%	20%	0%
Kassena Nankana East	0%	17%	26%
Kassena Nankana West	0%	0%	9%
Pusiga	11%	17%	26%
Talensi-Nabdam	6%	0%	3%
Total	100%	100%	100%

Sample Demographics

This section describes the demographic and socio-economic composition from the target population. We define "household" as a group of persons who lived together and shared common feeding arrangements or were economically supported by one agricultural enterprise during the survey period.

Household Characteristics

HEAD OF HOUSEHOLD

Table 3: Average Age of Head of Household

Treatment Group 1	52 (3.2)
Treatment Group 2	59 (3.4)
Indirect Group 3	49 (2.3)
TOTAL	**54 (1.7)**

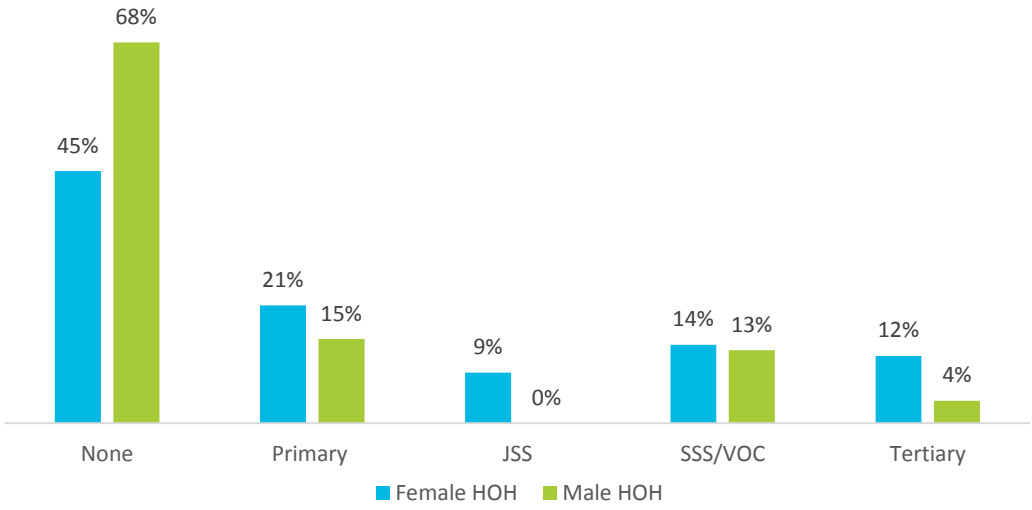
Standard errors in parentheses

Table 4: Level of Education Obtained

	Treatment Group 1	Treatment Group 2	Indirect Group 3	**TOTAL**
None	63% (8)	71% (8)	31% (8)	**55% (5)**
Primary	20% (7)	17% (7)	17% (7)	**18% (4)**
JSS	6% (4)	6% (4)	3% (3)	**5% (2)**
SSS/VOC	9% (5)	6% (4)	26% (7)	**13% (3)**
Tertiary	3% (3)	-	23% (7)	**9% (3)**

Standard errors in parentheses

Figure 1: Level of Education Obtained, by Head of Household Gender



FEMALE HEADED HOUSEHOLDS AND RESPONDENTS

Table 5: Female Headed Households

Treatment Group 1	57% (8)
Treatment Group 2	40% (8)
Indirect Group 3	69% (8)
TOTAL	**55% (5)**

Standard errors in parentheses

Note statistically significant differences between female respondents. This is not likely to affect likelihood of treatment, but could also be another source of bias. Especially when considering the disparity in gender responses about who exclusively grows OFSP as presented in Table 7.

Table 6: Female Respondents

Treatment Group 1	31% (8)
Treatment Group 2	34% (8)
Indirect Group 3	6% (4)
TOTAL	**24% (4)**

Standard errors in parentheses

Table 7: Who Grows OFSP, by Respondent Gender

	Female Respondent	Male Respondent	TOTAL
Exclusively Males	8%	46%	37%
Exclusively Females	12%	3%	5%
Both	80%	51%	58%

POVERTY INCIDENCE – PROGRESS OUT OF POVERTY INDEX

The Progress Out of Poverty Index (PPI) was developed by the Grameen Foundation and is a valuable tool that iDE uses in as many of its country programs as possible to measure the incidence of poverty among iDE customers. The PPI score is obtained by adding together the scores from ten simple, and verifiable, questions pertaining to household size, building materials, education, energy use, etc.[1] Each set of questions has been specifically chosen and weighted for the country in which it is to be implemented – resulting in a concise survey module that may be added to existing M&E instruments. The resulting PPI score is then used to estimate the probability that the household is in poverty using a PPI Scorecard. The PPI scorecard provides probabilities for each possible PPI score, and may be used to estimate the household's likelihood of falling below a number of poverty thresholds, including for the purposes of this analysis the $1.25 PPP threshold.

Table 8: PPI Poverty Rates, by various thresholds

	PPI $1.25	PPI $2.00	PPI Food
Treatment Group 1	27% (2)	60% (3)	18% (2)
Treatment Group 2	24% (2)	55% (3)	16% (2)
Indirect Group 3	14% (3)	33% (5)	9% (2)
TOTAL	**22% (1)**	**49% (2)**	**14% (1)**

Standard errors in parentheses

1 The ten questions are extracted from the respective country's income/expenditure survey and must match the translation and content exactly.

Table 9 presents the results of hypothesis testing between treatment groups for all basic household characteristics previously presented in tables 3-6. The level of significance is noted for each variable for which there is statistically significant difference between group means at the 10% level or less. For example, the difference between group 1's average poverty rate under $1.25/day (27%) and group 3's average poverty rate (14%) is statistically significant to the 1% significance level. In comparison, the difference between poverty rates for groups 1 and 2 (27% and 24%, respectively) are not statistically significant. We find there are no significant differences between treatment groups 1 and 2, while treatment groups 2 and 3 have significant differences on all measures.

Table 9: Significant Differences Between Treatment Groups

	Group 1 and 2	Group 1 and 3	Group 2 and 3
HOH Average Age	-	-	5%
HOH Education	-	1%	1%
HOH Gender	-	-	5%
PPI $1.25	-	1%	1%
Respondent Gender	-	1%	1%

HOUSEHOLD SIZE

Note a majority (66%) of all households have eight or more members and household size is unevenly distributed between treatment groups in our sample.

Table 10: Average Household Size, by Treatment Group

	Four	Five	Six	Seven	Eight or More
Treatment Group 1	-	3% (3)	9% (5)	14% (6)	74% (7)
Treatment Group 2	-	9% (5)	14% (6)	9% (5)	69% (8)
Indirect Group 3	3% (3)	20% (7)	11% (5)	11% (5)	54% (9)
TOTAL	**1% (1)**	**10% (3)**	**11% (3)**	**11% (3)**	**66% (4)**

Standard errors in parentheses

OFSP Production

Table 11 presents the results of hypothesis testing between treatment groups across OFSP production variables as presented in tables 12 - 19. Unfortunately, we do not see any statistically significant differences between groups 1 and 2 on OFSP production. Thus we are unable to draw inferences about impact between clients participating in the program for 2 years and opposed to 1. There are some significant differences between groups 2 and 3 which indicates that older clients are faring better than indirect clients.

In summary, we find that indirect group 3 average OFSP acreage (.35) is significantly lower than treatment groups 1 and 2 average OFSP acreage (.52 and .58 respectively). Further we find that the indirect group used significantly fewer OFSP vine cuttings than treatment group 1 (at the 5% significance level). Finally, the only significant difference in terms of OFSP production between treatment groups can be found in the average root harvest totals for treatment group 2 and indirect group 3. Treatment group 2 harvested 423 Kgs of OFSP roots in comparison to 207 Kgs of roots for indirect group 3.

Table 11: Significant Differences Between Treatment Groups for OFSP Production Variables

	Groups 1 and 2	Groups 1 and 3	Groups 2 and 3
OFSP Acreage	-	5%	1%
Vine Cuttings Quantity	-	-	5%
Roots Harvested	-	-	10%
Vines Harvested	-	-	-
Productivity Yield (kg roots harvested/acre)	-	-	-
Sold Roots Kgs (Total Sample)	-	-	10%
Sold Roots Kgs (Among 48 Sellers)	-	-	-
Sold Vines Kgs (Total Sample)	-	-	-
Sold Vines Kgs (Among 20 Sellers)	-	-	-
Sold Roots Revenue (Total Sample)	-	-	-
Sold Roots Revenue (Among 48 Sellers)	-	-	-
Sold Vines Revenue (Total Sample)	-	-	-
Sold Vines Revenue (Among 20 Sellers)	-	-	-
Total Input and Production Costs	-	-	-
OFSP Profit (Among Sellers)	-	-	-

93% of respondents indicated that the 2015/2016 planting season occurred between June and August. Average area planted ranged from 0 – 1.5 acres and 97% of the sample said the planted on less than once acre.

Table 12: Average Acres of OFSP Planted in 2015/2016 Season

Treatment Group 1	.52 (.05)
Treatment Group 2	.58 (.06)
Indirect Group 3	.35 (.06)
TOTAL	**.47 (.03)**

Standard errors in parentheses

61% of the sample had zero costs for OFSP vine cuttings meaning they either used their own or received them for free. Table 8 presents the average quantity, unit price and total cost of vine cuttings for OFSP production in 2015/2016 season. Note the high standard errors for OFSP vine cuttings total cost. Treatment groups 1 and 2 total cost for vine cuttings are not statistically different from zero given their standard errors. The average vine cutting cost for the total sample is statistically significant at the 10% level.

Table 13: Average Vine Cuttings Quantity, Unit Price, and Total Cost for OFSP

	Vine Cuttings Quantity	Unit Price (cedis)	Total Cost (cedis)
Treatment Group 1	451 (145)	4 (2)	2,503 (1649)
Treatment Group 2	423 (93)	3 (2)	1,307 (935)
Indirect Group 3	207 (30)	1 (.4)	160 (73)
TOTAL	**360 (58)**	**3 (1)**	**1323 (632)**

Standard errors in parentheses

Harvest averages (in kilograms) for OFSP roots and vines. Note, only 20 respondents reported harvesting vines and thus assigned a value of zero to the rest of the sample to generate total sample averages of vine harvests. Note high standard errors on vines harvested within treatment groups. None of those values are statistically significant, though the total sample average is. Also zero statistically significant differences between treatment groups for vines harvested. Only significant difference for OFSP roots harvested is between treatment group 2 and indirect group 3 at the 10% level.

Table 14: Average OFSP Roots and Vines Harvested for Total Sample (in Kgs)

	Roots Harvested	Vines Harvested
Treatment Group 1	336 (78)	101 (66)
Treatment Group 2	421 (92)	346 (253)
Indirect Group 3	220 (50)	242 (193)
TOTAL	**325 (44)**	**230 (108)**

Standard errors in parentheses

Table 15: Average OFSP Roots Harvested (in Kgs), by Household Size

	Treatment Group 1	Treatment Group 2	Indirect Group 3	**Total**
Four Members	-	-	45 -	**45 -**
Five Members	168 -	150 (63)	43 (14)	**83 (25)**
Six Members	50 (17)	852 (427)	153 (73)	**418 (206)**
Seven Members	356 (169)	53 (17)	141 (82)	**209 (84)**
Eight or More Members	371 (98)	411 (86)	324 (81)	**372 (52)**

Standard errors in parentheses

Table 16 presents the average productivity of OFSP producers in terms of kilograms of roots harvested per acre. Note, while productivity yield values are statistically significant, that is they are all significantly different from zero, there are no significant differences between treatment groups.

Table 16: Average Productivity Yield (Kg of Roots Harvested / Acre), by Treatment Group

Treatment Group 1	949 (287)
Treatment Group 2	722 (117)
Indirect Group 3	775 (121)
TOTAL	**815** **(111)**

Standard errors in parentheses

Only 48 respondents sold OFSP roots and only 20 respondents reported selling vines. Note, also had to drop one outlier on self-reporting of vines. One respondent indicated selling more than they harvested to a large magnitude. Given the small sample size of respondents reporting selling vines note the high standard errors for those values. Even though we have large differences between treatment group 1 and 2 in terms of Kgs of OFSP vine sold none of the values are statistically significant, for both the total sample and only sellers.

Table 17: Average OFSP Roots and Vines Sold (in Kgs) for Full Sample and Sub-sample of Only Sellers

	Total Sample		Sellers Only	
	Sold Root	Sold Vine	Sold Root	Sold Vine
Treatment Group 1	142 (49)	12 (8)	355 (101)	59 (40)
Treatment Group 2	177 (56)	354 (226)	326 (90)	2,478 (1312)
Indirect Group 3	71 (27)	100 (86)	178 (59)	437 (371)
TOTAL	**130** **(26)**	**155** **(80)**	**291** **(50)**	**815** **(360)**

Standard errors in parentheses

Table 18 presents the revenue totals for OFSP root and vine sales. However, it is worth noting the high standard errors and that none of the values are statistically different from zero.

Table 18: Average OFSP Roots and Vines Revenue (in Cedis) for Full Sample and Only Sellers

	Total Sample		Sellers Only	
	Root Revenue	Vine Revenue	Root Revenue	Vine Revenue
Treatment Group 1	450 (336)	3 (2)	1,125 (824)	15 (10)
Treatment Group 2	138 (48)	81 (61)	254 (81)	564 (393)
Indirect Group 3	62 (29)	7 (6)	145 (62)	31 (25)
TOTAL	**217** **(114)**	30 (21)	**474** **(243)**	**159** **(99)**

Standard errors in parentheses

Other OFSP Costs and Profit

Table 19: Average OFSP Input and Production Costs (Cedis) by Treatment Group

	Treatment Group 1	Treatment Group 2	Indirect Group 3	**TOTAL**
Chemicals	2 (1)	4 (1)	3 (2)	**3 (1)**
Fertilizers	21 (8)	45 (10)	24 (9)	**30 (5)**
Labor/Services	21 (7)	37 (18)	9 (3)	**22 (6)**
Fuel	3 (3)	1 (1)	4 (4)	**3 (2)**
Other Inputs	3 (2)	0 (.3)	2 (2)	**2 (1)**
Total Costs	**49 (14)**	**87 (24)**	**43 (15)**	**60 (11)**

Standard errors in parentheses

OFSP profit takes into account root sales, vine sales, minus vine cutting costs and other input costs. None of these values are statistically significant.

Table 20: OFSP Profit (in Cedis) Among Sellers Only

Treatment Group 1	-6,751 (8403)
Treatment Group 2	547 (632)
Indirect Group 3	-61 (55)
TOTAL	**-2366 (3100)**

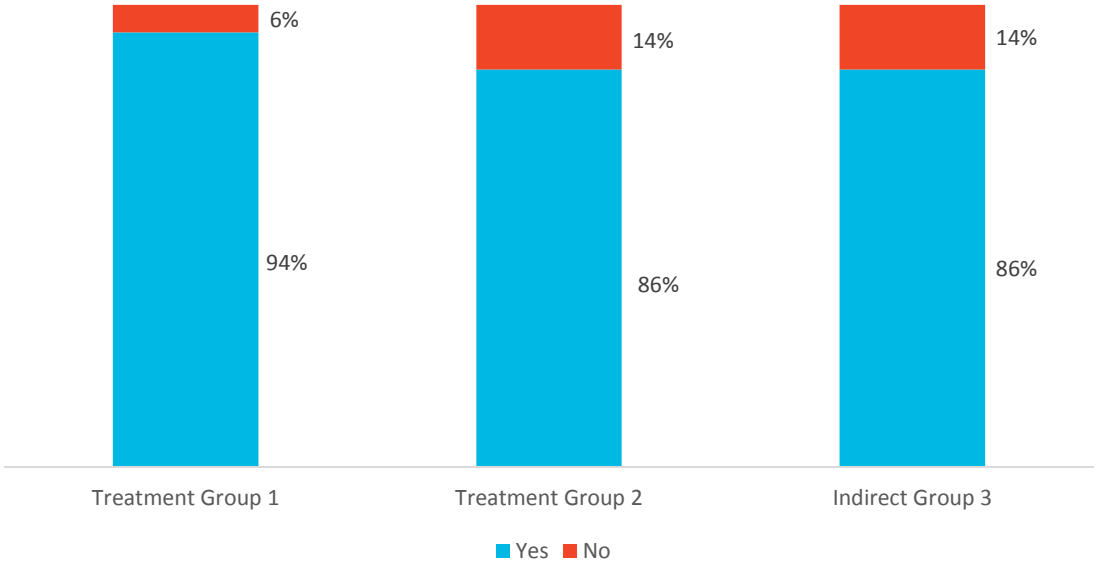
Knowledge About Vitamin A

Table 21: Significant Differences Between Treatment Groups for Vitamin A Knowledge Variables

	Groups 1 and 2	Groups 1 and 3	Groups 2 and 3
Heard about vitamin A	-	-	-
Mention yes vitamin A protects the body	10%	-	-
Mention yes vitamin A protects the eyes	1%	-	-
Mention yes vitamin A enhances childhood brain development	5%	-	-

89% of total respondents have heard about vitamin A. Differences between treatment groups are presented below.

Figure 2: "Heard About Vitamin A" Proportions, by Treatment Group



WHY IS VITAMIN A IMPORTANT FOR US

Of those that responded yes they have heard of Vitamin A (total 93 respondents), a series of questions were asked regarding their knowledge of vitamin A and OFSP. It was up to enumerator discretion to judge if the respondent mentioned specific vitamin A characteristics after the open prompt, "Why is Vitamin A important for us?

Table 22: Proportions of Respondents that Mentioned Key Characteristics of Vitamin A

		Protect the body?	Protect the eyes?	Enhances childhood brain development?
Treatment Group 1	Yes	91%	76%	51%
	No	6%	15%	12%
	Don't Know	3%	9%	36%
Treatment Group 2	Yes	73%	40%	27%
	No	17%	37%	47%
	Don't Know	10%	23%	27%
Indirect Group 3	Yes	83%	57%	43%
	No	17%	40%	37%
	Don't Know	0%	3%	20%
Total	**Yes**	**83%**	**58%**	**41%**
	No	**13%**	**30%**	**31%**
	Don't Know	**4%**	**12%**	**28%**

Figure 3: Mentions "Protects the Body" Proportions, by Treatment Group

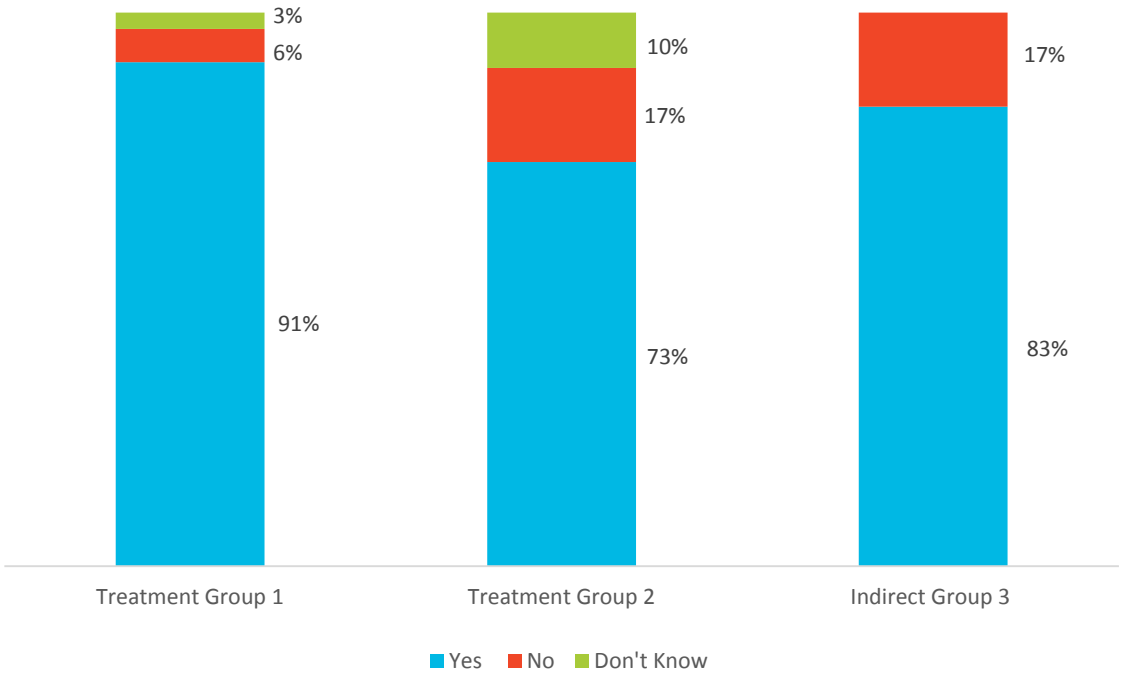


Figure 4: Mentions "Protects the Eyes" Proportions, by Treatment Group

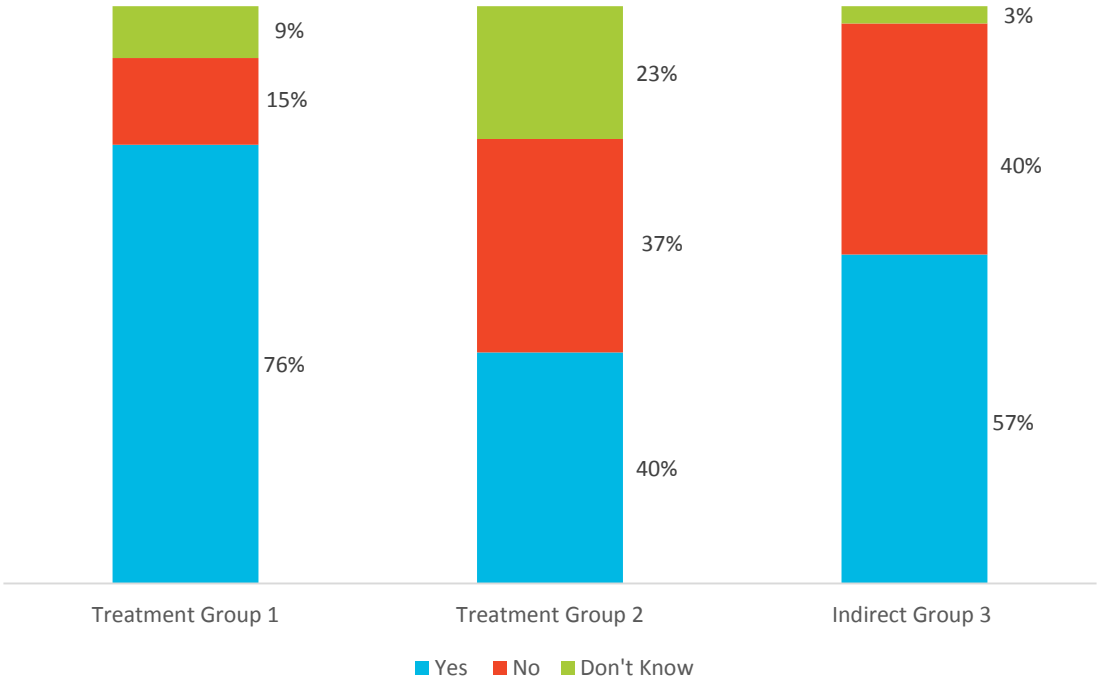
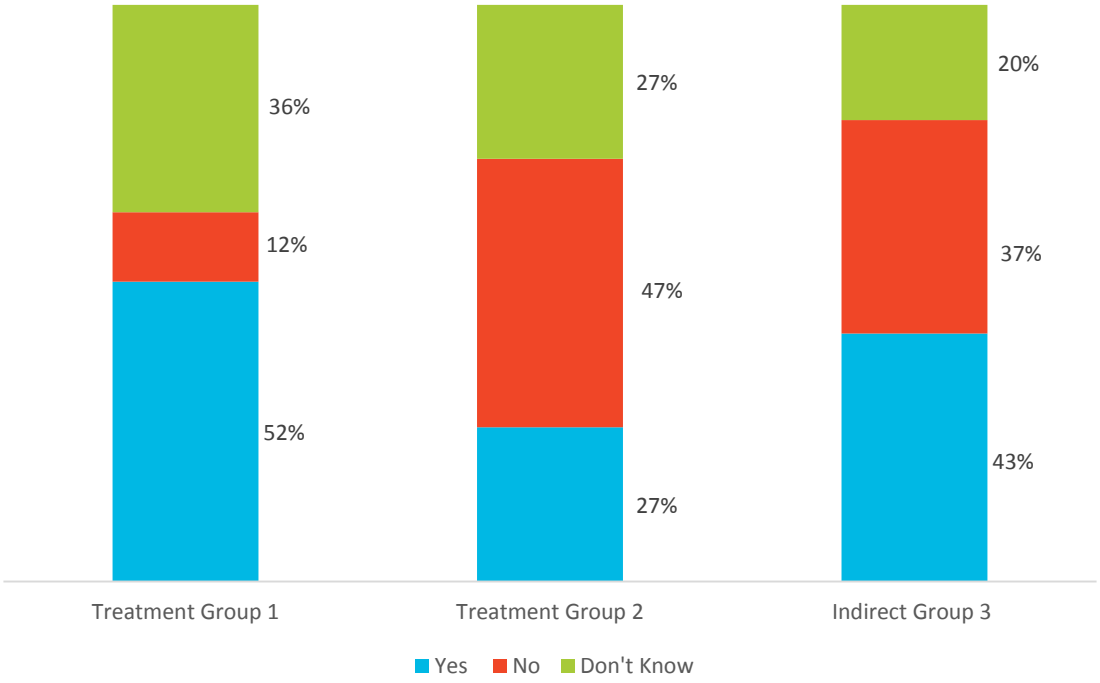


Figure 5: Mentions "Enhances Childhood Brain Development" Proportions, by Treatment Group



FACTORS CONSIDERED WHEN SELECTING OFSP PLANTING MATERIALS:

Table 23 presents the results of hypothesis testing on the average differences between treatment groups for OFSP knowledge variables. For example, 91% of treatment group 1 indicated yes they consider healthy vines when selected OFSP materials while only 69% of treatment group 2 indicated yes. This difference is significant to the 5% level as noted in Table 21. However, differences between groups 1 and 3 and between groups 2 and 3 for the same question are not statistically significant.

Table 23: Significant Differences Between Treatment Groups for OFSP Knowledge Variables

	Groups 1 and 2	Groups 1 and 3	Groups 2 and 3
Considers disease free OFSP vines	-	-	10%
Considers healthy OFSP vines	5%	-	-
Considers actively growing OFSP vines	10%	-	-
Stated weevils cause holes in OFSP	1%	1%	-
Stated unspecified insect causes holes	-	-	-
Stated millipedes cause holes	10%	5%	-
Don't know what causes holes	-	-	-
Say sand storage can be used for OFSP storage longer than 3 months	-	-	-

Table 24: Proportions of Respondents that Mentioned Key Factors to Selecting OFSP Materials

	Disease Free	Healthy	Actively Growing

		Vines	Vines	Vines
Treatment Group 1	Yes	40%	91%	69%
	No	20%	6%	14%
	Don't Know	40%	3%	17%
Treatment Group 2	Yes	29%	69%	43%
	No	40%	20%	31%
	Don't Know	31%	11%	26%
Indirect Group 3	Yes	49%	83%	54%
	No	23%	17%	31%
	Don't Know	28%	0%	14%
Total	Yes	39%	81%	55%
	No	28%	14%	26%
	Don't Know	33%	5%	19%

Figure 6: Mentions "Disease Free Vines" Proportions, by Treatment Group

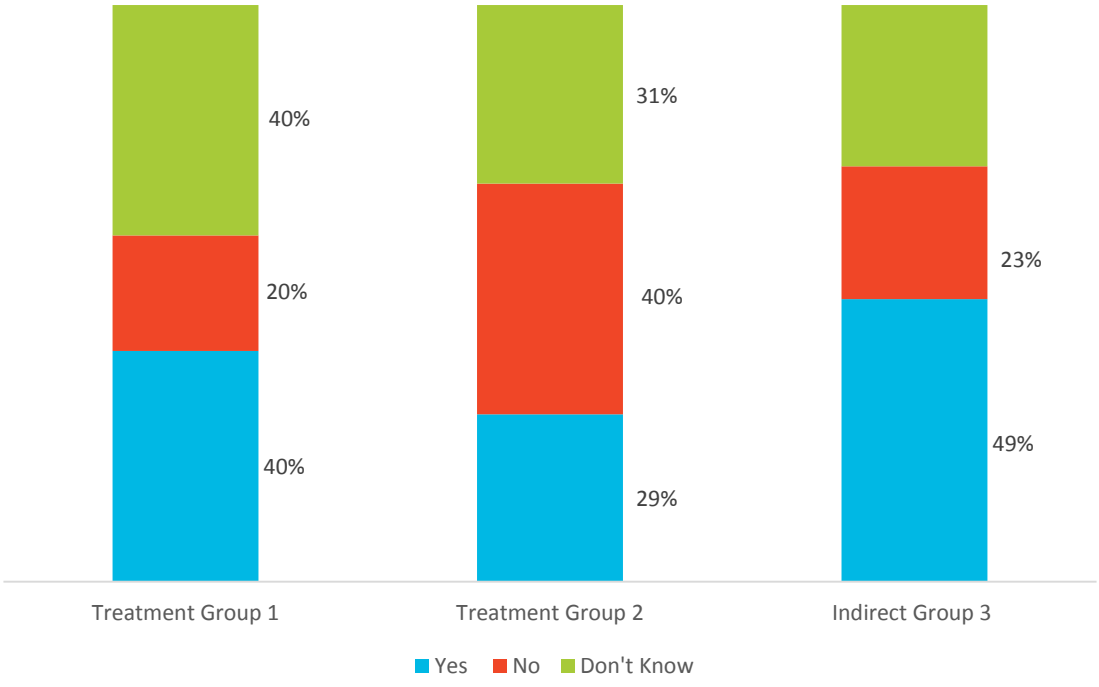


Figure 7: Mentions "Healthy Vines" Proportions, by Treatment Group

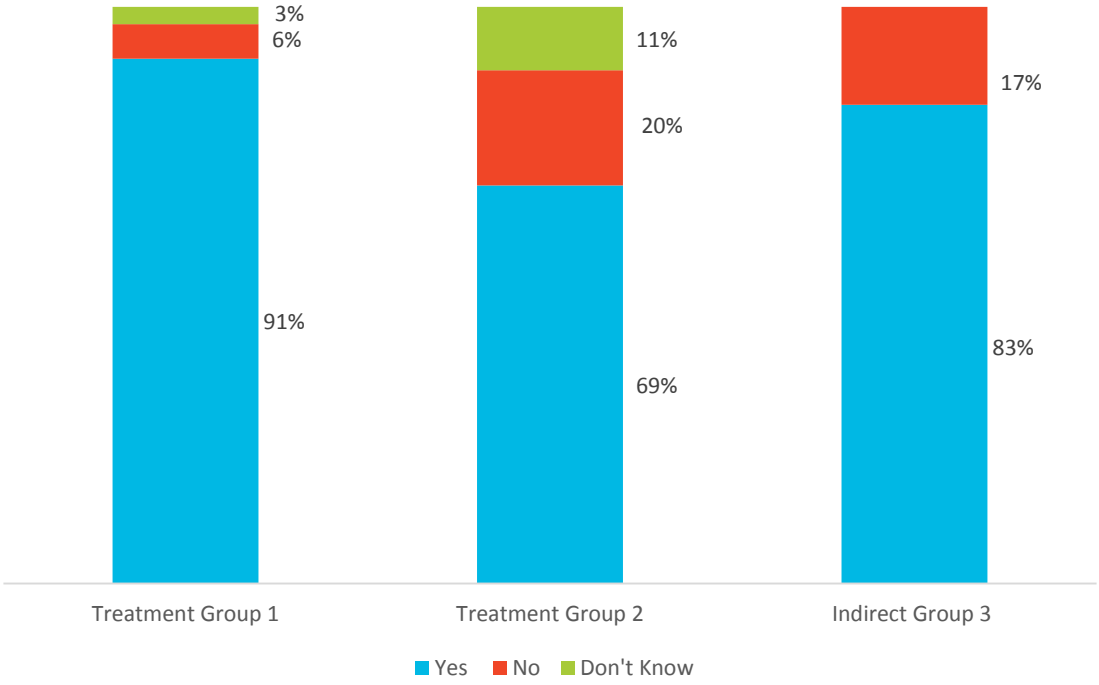
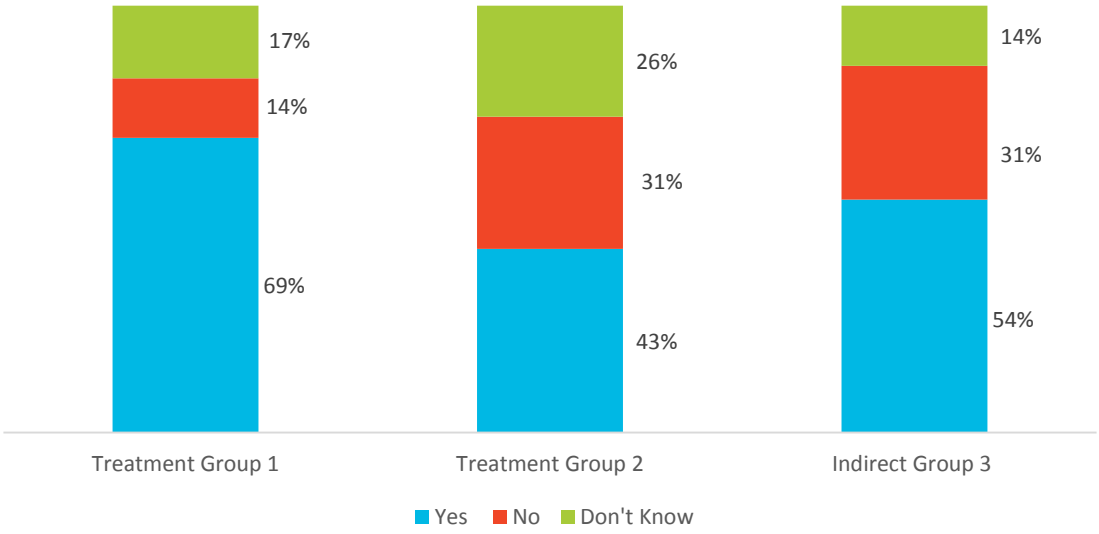


Figure 8: Mentions "Healthy Vines" Proportions, by Treatment Group



OFSP PESTS AND STORAGE

Respondents were asked what causes holes in OFSP and were able to mention more than one source and thus percentages do not total 100. For example, a respondent could have stated that both sweet potato weevils and another type of insect cause holes.

Table 25: Causes of Holes in OFSP, by Treatment Group

	Treatment	Treatment	Indirect	**TOTAL**

	Group 1	Group 2	Group 3	
Sweet Potato Weevil	63% (1)	31% (1)	26% (1)	**40% (1)**
Insect (Unspecified)	23% (7)	37% (8)	31% (8)	**31% (5)**
Insect (Specified Incorrectly)	29% (8)	23% (7)	37% (8)	**30% (4)**
Other (millipedes)	14% (6)	3% (3)	0%	**6% (2)**
Don't know	17% (6)	29% (8)	31% (8)	**26% (4)**

Standard errors in parentheses

Table 26: Method of OFSP Storage for Longer than 3 Months, by Treatment Group

	Treatment Group 1	Treatment Group 2	Indirect Group 3	**TOTAL**
Sand Storage	66% (8)	60% (8)	51% (9)	**59% (5)**
Other	20% (7)	20% (7)	11% (5)	**17% (4)**
Don't Know	14% (6)	20% (7)	37% (8)	**24% (4)**

Standard errors in parentheses

Other responses provided:

- Dig a hole pour the broits inside and cover up with sand
- Dug a hole abutbit was dry keep millet stalks before placing the potatoes after cover with the stalks and cover with sand
- I store in an open area where there is fresh air
- I store OFSP in a room and cover them grass or crop residue
- I store the OFSP in the room
- Kept it in the room spread leaves on top
- Lays a tapoline on the floor and places the OFSP on them without covering
- Pour sand on the floor spread the potatoes on top but it doesn't last up to three months
- Spread on cocoa sack
- Spread rice husk on the floor in a room and keep the sweet potato on then
- Spread sand on floor and poured the potatoes on top
- Spread sand on floor in an open room then spread the rest on top
- Spreading the roots in a ventilated room
- Spreads dry leaves in the in the room and arranges the OFSP on it, then covers it with more dry leaves
- Stores in his room
- Use of cocoa bags to cover them in layers and pack
- Use of Millets stalks spread it put the sweet potatoes on,
- Used it for only household

- Uses soya bean or rice leaves. Spreads them in a room and puts the roots on them. Then puts some more leaves to cover them and sprinkle water on it

Sales and Market Diversification

OFSP SALES

Respondents were asked to select whom do they sell most of their OFSP to. They were permitted to chose from more than one option, thus percentages do not total 100. This question was also only answered by the 48 respondents who indicated they sell OFSP. Tables 27, 28 and 29 are representative only of the 48 person sample who indicated they sell OFSP.

Figure 9: OFSP Client Sales Proportions

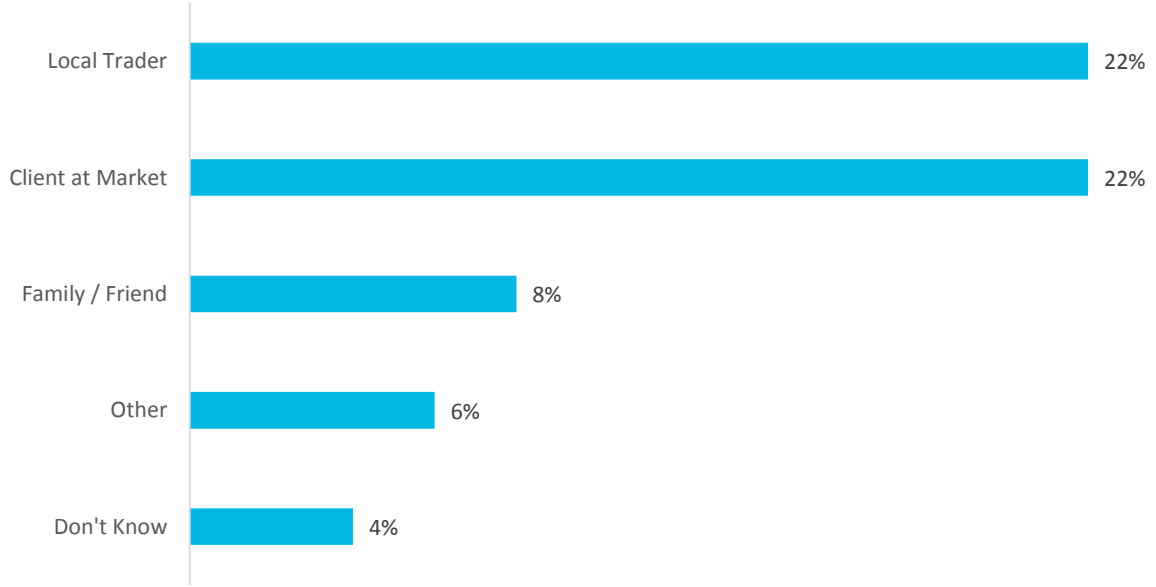


Table 27: OFSP Client Sales, by Treatment Group

	Treatment Group 1	Treatment Group 2	Indirect Group 3	**TOTAL**
Local Trader	17% (6)	29% (8)	20% (7)	**22% (4)**
Client at Market	23% (7)	31% (8)	11% (5)	**22% (4)**
Family / Friend	6% (4)	11% (5)	6% (4)	**8% (3)**
Other	3% (3)	0% -	14% (6)	**6% (2)**
Don't Know	3% (3)	3% (3)	6% (4)	**4% (2)**

Standard errors in parentheses

OFSP PRICE INFORMATION

Table 28: Proportions of Where Respondents Receive OFSP Price Information From, by Treatment Group

	Treatment Group 1	Treatment Group 2	Indirect Group 3	**TOTAL**
Other	36% (13)	53% (12)	40% (13)	**44% (7)**
Don't Know	43% (14)	21% (10)	40% (13)	**33% (7)**
Family / Friend	7% (7)	11% (7)	7% (7)	**8% (4)**
Mobile Phone (Esoko)	7% (7)	5% (5)	7% (7)	**6% (4)**
iDE	-	5% (5)	7% (7)	**4% (3)**
Farmer Group	7% (7)	5% (5)	-	**4% (3)**

Standard errors in parentheses

SPEND MONEY FROM OFSP SALES

Table 29: Proportion of How OFSP Sellers Spend their Income, by Treatment Group

	Treatment Group 1	Treatment Group 2	Indirect Group 3	**TOTAL**
Improving Farm	20% (7)	29% (8)	23% (7)	**24% (4)**
Education	17% (6)	37% (8)	14% (6)	**23% (4)**
Health	6% (4)	11% (5)	-	**6% (2)**
Food	6% (4)	11% (5)	-	**6% (2)**
Clothing	6% (4)	6% (4)	3% (3)	**5% (2)**

Standard errors in parentheses

USE OF KEPT OFSP

Table 30: Proportion of how all Respondents Use their Kept OFSP Harvest, by Treatment Group

	Treatment	Treatment	Indirect	**TOTAL**

	Group 1	Group 2	Group 3	
Boil for Personal Consumption	71% (8)	97% (3)	80% (7)	**83% (4)**
Eat Leaves	89% (5)	77% (7)	69% (8)	**78% (4)**
Fry for personal consumption	66% (8)	57% (8)	29% (8)	**50% (5)**
Feed Animals with Leaves	34% (8)	34% (8)	37% (8)	**35% (5)**
Make Porridge	29% (8)	26% (7)	-	**18% (4)**
Store in Protected Hole	20% (7)	23% (7)	11% (5)	**18% (3)**
Make Chips/Beef Loaf/Cake	6% (4)	11% (5)	6% (4)	**8% (3)**
Feed Animals with Roots	9% (5)	6% (4)	6% (4)	**7% (2)**
Other	17% (6)	-	3% (3)	**7% (2)**
Make Flour	11% (5)	6% (4)	-	**6% (2)**
Does not keep any	3% (3)	-	6% (4)	**3% (2)**
Make Ice Cream/Yoghurt	3% (3)	-	3% (3)	**2% (1)**
Make Pudding	3% (3)	-	-	**1% (1)**

Standard errors in parentheses

OFSP Radio and Recipe Exposure

Table 31 presents the results of hypothesis testing on the differences between treatment groups for exposure levels certain program aspects. For example, 94% of treatment group 1 indicated they had knowledge of the OFSP radio program while only 80% of treatment group 2 had heard of the radio program. This difference is statistically significant at the 10% level. Further, the difference of radio program knowledge between treatment group 1 (94%) and the indirect treatment group (66%) is significant at the 1% level. However, given the standard errors we cannot find a significant difference between treatment groups 2 and 3 in radio program exposure. That is, their respective averages are within the margin of error of one another.

In addition, we find that 74% of the sample in both treatment groups 1 and 2 indicated they had received recipe training from iDE. In contrast, only 34% of the indirect group 3 indicated they had received recipe training. The differences in recipe training exposure between treatment group 1 and group 3, as well as treatment group 2 and group 3, are statistically significant to the 1% level.

Table 31: Significant Differences Between Treatment Groups for Program Exposure

	Groups 1 and 2	Groups 1 and 3	Groups 2 and 3
Radio Exposure	10%	1%	-
Recipe Training Exposure	-	1%	1%

Prepare Recipes from Training	-	-	-

Table 32: Knowledge of OFSP Radio Program, by Treatment

Treatment Group 1	94% (4)
Treatment Group 2	80% (7)
Indirect Group 3	66% (8)
TOTAL	**80% (4)**

Standard errors in parentheses

Of those that responded yes, they know of any radio program about OFSP, 100% said the topics discussed on the radio are beneficial and 100% said they would like to have more of such discussions. Additional topics requested include:

- Agronomy and more on how beneficial OFSP is.
- Best method of storing vines to the next planting season
- Continues talks on the importance of the roots
- Discussion on health benefits of OFSP and good methods of producing OFSP
- Discussion on integrated pest control methods
- Discussion on where to get more vines and health benefits
- Discussions on how the OFSP is important for our health
- Diseases and pests prevention and control
- Encourage more farmers to form groups and grow OFSP
- How to increase yields
- Health benefits of OFSP
- How to deal with weevils, importance of the OFSP
- I want more knowledge on OFSP cultivation
- I want them to discuss about the health benefits of OFSP especially for the children
- I want them to talk about the best way of controlling the potato weevils and how to get market for the OFSP roots after harvest.
- I will want them to discuss the importance of OFSP and best production methods
- I would like them to discuss how to get market and sell OFSP at competitive prices
- I would want them to discuss topics like how the OFSP can be stored longer than 5 months
- Insects prevention and control
- Market for OFSP
- Marketing information, availability of ready market, recipes
- Nutritional Value. Economic benefits. Production methods
- Planting time
- Preparation of OFSP for consumption. Good methods of producing OFSP
- Pricing
- Production and nutrition
- Promoting its market to be sold on high rate and after its peak season those who need it can still get some to buy
- Public awareness, education on how to deal with pest and infections

- Recipes, nutritional values, production processes
- Respondent will like the platform to educate them on how to prevent holes in the OFSP
- Respondent will like the radio station to add how farmers can get credit to cultivate
- Respondent would want the radio to discuss how they can connect farmers to the market
- Respondent would want them to discuss the nutritional and health value of sweet potatoes.
- Sensitize community members on the benefits of cultivating OFSP
- Since our soil is dry would to know more ways on growing it so that it can yield more
- Talk about the effects of chemical fertilizers on OFSP
- The opportunity to call into the show and talk about their concerns
- The right chemicals to use in order for the vines not to destroyed when its growing
- They want more of the topics to be spoken in their local language (frafra), also to enable them know the right chemicals to use to prevent attacks on the potatoes.

Table 33: Received Recipe Training from iDE, by Treatment Group

Treatment Group 1	74% (7)
Treatment Group 2	74% (7)
Indirect Group 3	34% (8)
TOTAL	**61%** **(4)**

Standard errors in parentheses

If a respondent indicated receiving recipe training, he or she was asked if they prepared any of the recipes for family consumption. The results are below in Table 34.

Table 34: Prepare Recipes for Family Consumption, by Treatment Group

Treatment Group 1	100% -
Treatment Group 2	96% (4)
Indirect Group 3	83% (11)
TOTAL	**95%** **(3)**

Standard errors in parentheses

General Market Information

Note, there are no statistically significant differences among treatment groups for any of the market distance and duration traveled questions.

Table 35: Average Distance and Time to Markets, by Treatment Group

	Closest Market		OFSP Market	
	Distance (Km)	Time (Min)	Distance (Km)	Time (Min)
Treatment Group 1	2.8 (.4)	20 (2)	5.3 (1)	27 (3)
Treatment Group 2	6.5 (3)	27 (5)	7 (3)	27 (4)
Indirect Group 3	3.8 (.5)	19 (3)	6 (1)	22 (3)
TOTAL	**4.4 (1)**	**22 (2)**	**6 (1)**	**26 (2)**

Standard errors in parentheses

Questions regarding market price information were answered only by the 48 respondents that indicated they sell OFSP. Tables 36 and 37 are proportions only among the 48 sub-group and not total sample. It is worth noting that the indirect group had a statistically significant difference from both treatment groups 1 and 2 in regards to identifying a market for price information. 40% of respondents in the indirect group were unable to identify a market and thus receive OFSP market price information in comparison to treatment group 1 (7%) and group 2 (5%). This could argue that iDE clients have better market price information regarding OFSP sales.

Table 36: Proportion of When Market Information is Received, by Treatment Group

	Treatment Group 1	Treatment Group 2	Indirect Group 3	**TOTAL**
Before going to the market	50% (14)	32% (11)	20% (11)	**33% (7)**
Same day	29% (13)	53% (12)	33% (13)	**40% (7)**
Next Day	-	5% (5)	-	**2% (2)**
After two days or more	7% (7)	5% (5)	-	**4% (3)**
Never	7% (7)	-	7% (7)	**4% (3)**
N/A (no market identified)	7% (7)	5% (5)	40% (13)	**17% (5)**

Standard errors in parentheses

Table 37: Proportion of Satisfaction Level with Market Information, by Treatment Group

	Treatment	Treatment	Indirect	**TOTAL**

	Group 1	Group 2	Group 3	
Very satisfied	36% (13)	21% (10)	7% (7)	**21% (6)**
Somewhat satisfied	43% (13)	47% (12)	33% (13)	**42% (7)**
Neither satisfied nor dissatisfied	7% (7)	5% (5)	-	**4% (3)**
Somewhat dissatisfied	-	11% (7)	7% (7)	**6% (4)**
Very dissatisfied	7% (7)	11% (7)	13% (10)	**10% (5)**
Don't know	7% (7)	5% (5)	40% (13)	**17% (5)**

Standard errors in parentheses

OFSP Consumption

Table 38 presents the average daily consumption of OFSP per household member in grams as OFSP recommended consumption is 100 grams per day. Average daily OFSP consumption was estimated by taking total OFSP root harvest, subtracting quantity of OFSP roots sold, and then dividing by household size. Given that OFSP production data was reported for the 2015/2016 season those results were divided by 365 to generate a daily average. For households that indicated "8 or more" in size, a household size of 8 was selected to generate the estimate which approximates the best case scenario of OFSP consumption per member. It is very likely that households are larger than 8 people and their average consumption would be less.

Table 38: Average Daily OFSP Consumption (grams) per Household Member

Treatment Group 1	7 (2)
Treatment Group 2	10 (3)
Indirect Group 3	6 (1)
TOTAL	**7 (1)**

Standard errors in parentheses

iDE

QUESTIONNAIRE NUMBER | | | | | |

Appendix 1: Questionnaire

1. INTERVIEW DATA

1.1	INTERVIEWER NAME												
1.2	INTERVIEW DATE		Y	Y	Y	Y		M	M		D	D	
1.3	SUPERVISOR NAME												
1.4	SUPERVISOR SIGNATURE												

LOCATION

1.5	REGION		1.9	LATITUDE	
1.6	DISTRICT		1.10	LONGITUDE	
1.7	VILLAGE				
1.8	FARMER GROUP				

2. BASIC HOUSEHOLD DATA

RESPONDENT DETAILS

2.1	RESPONDENT'S FULL NAME	2.6 SEX OF RESPONDENT	Male / Female
2.2	IS RESPONDENT THE HEAD OF HOUSEHOLD? YES |___| NO |___|	2.7 RESPONDENT PHONE NUMBER	|_|_|_|_|_|_|_|_|_|_|
2.3	HEAD OF HOUSEHOLD'S FULL NAME	2.8 SEX OF HOUSEHOLD HEAD	Male / Female
2.4	AGE OF HOUSEHOLD HEAD (in years)		
2.5	EDUCATION OF HOUSEHOLD HEAD |_____| Education Code **EDUCATION CODES** *00 NONE* *01 PRIMARY* *02 JSS* *03 SSS/VOC.* *04 TERTIARY* *88 DON'T KNOW* *99 REFUSED*		

3. OFSP PRODUCTION

Please provide details for the OFSP you harvested in **2015/2016 SEASON***.

3.1 Grown exclusively by (M/F/X	3.2 Month planted (use 1-12, where Jan = 1)	3.3 Area planted (In Acres)	3.4 Vine cuttings/seedlings Cost *(if farmer uses their own vines, unit price is zero*		3.5 Harvest Root Quantity		3.6 Harvest Vine Quantity		3.7 Sold Root Quantity			3.8 Sold Vine Quantity		
			A. Quantity	B. Unit Price Cost	A. Quantity	B. Unit (bags)	A. Quantity	B. Units (bags)	A. Quantity	B. Unit (bags)	C. Unit Price Received	A. Quantity	B. Unit (bags)	C. Unit Price Received

3.9	What production information do you get from esoko?	1. Weather 2. Agronomic Advice 3. Postharvest Information 4. Soil Management Information 5. Cropping Calendar Advice	Multi Select

4. OTHER INPUT AND PRODUCTION COSTS

#	INPUT TYPE	COST FOR OFSP PRODUCTION IN **2015/2016 SEASON***	Remark
4.1	CHEMICALS (pesticides- herbicides, acaricides, fungicides, etc)		
4.2	FERTILIZERS (inorganic and purchased)		
4.3	LABOR/SERVICES (hired labor, machinery/tool rent, land rent)		
4.4	FUEL		
4.5	Other inputs (plastics, transport, etc.)		

5. KNOWLEDGE ABOUT VITAMIN A

#	Question	Responses	2014/2015 SEASON *
5.1	Have you heard about Vitamin A?	0. No 1. Yes	|__| If No, Skip to Section 6.
5.2	Why is Vitamin A important for us?	A. Does the respondent mention that it protects the body? B. Does the respondent mention that it protects the eyes? C. Does the respondent mention that it enhances childhood brain development?	A. |__| B. |__| C. |__| Codes: No = 0; Yes = 1; Don't know = 9
5.3	What are the factors you will consider when selecting your OFSP planting materials?	A. Does the respondent mention Disease free vines? B. Does the respondent mention Healthy vines? C. Does the respondent mention Actively growing vines?	A. |__| B. |__| C. |__| Codes: No = 0; Yes = 1; Don't know = 9
5.4	What causes holes in OFSP?	1. Sweet potato weevil 2. Insect unspecified 3. Insect (specified incorrectely) 4. Other (specify) 9. Don't know	|__| If other, specify _____
5.5	How can OFSP be stored for longer than three months?	1. Sand Storage 2. Other (Specify) 9. Don't know	|__| If other, specify _____

6. SALES AND MARKET DIVERSIFICATION

#	Question	Responses		2014/2015 SEASON *
6.1	To whom did you sell most of your OFSP to?	1. Family/friend 2. Local trader 3. Client at the market 4. Company/marketing group 5. NGO e.g IDE 6. School/health post/restaurant 7. Other(specify)……. 9. Don't know		Multi Select
6.2	To whom did you give some of your OFSP roots to without taking any money or goods in return?	1. Friends 2. Family 3. Neighbor 4. School 5. None → Skip to 6.4		Multi Select
6.3	Can you please give name and location of those that you can OFSP roots to?	A. Name of Recipient _____	B. Cell Number _____	C. Village _____
6.4	Where do you get your information on OFSP price?	1. Family/friend 2. Farmer group member 3. iDE 4. Other NGO not iDE 5. MOFA 6. Radio/television 7. Mobile phone e.g esoko 8. Other (specify)…… 9. Don't know		Single Select |__|
6.5	How did you spend the	1. Health		

	money from the sale of OFSP?	2. Education 3. Food 4. Clothing	Multi Select
6.6	How do you use the OFSP that you choose to keep?	1. Eat OFSP leaves 2. Make OFSP flour 3. Feed animals with OFSP leaves 4. Make OFSP porridge 5. Feed animals with OFSP roots 6. Store OFSP in a protected hole after harvest 7. Make OFSP chips/beef loaf/cake 8. Make OFSP pudding 9. Make OFSP ice cream/yoghurt	Multi Select

7. OFSP RADIO PROMOTION EXPOSURE

7.1	Do you know of any radio program about OFSP	Yes |_____| No |_____| -> IF NO, SKIP TO 8.1
7.2	Are the topics discussed on the radio station beneficial to you?	Yes |_____| No |_____|
7.3	Will you like to have more of such radio discussions?	Yes |_____| No |_____|
7.4	What other topics will you want discussed on radio	Free text _____

8. OFSP RECIPE TRAINING EXPOSURE

8.1	Did a member of the household receive OFSP recipe training from iDE?	Yes |_____| No |_____| -> IF NO, SKIP TO 9.1
8.2	Do you prepare any of the recipes for your family consumption	Yes |_____| No |_____|
8.3	Do you include OFSP in your local meals preparation for the family?	Yes |_____| No |_____|

9. GENERAL MARKET INFORMATION

9.1	Where is your closest market?	|____| kilometers
9.2	On average, how long does it take for you to get to the closest market during the time of year that you sell goods at it?	|_____| Minutes
9.3	Where is the market where you sell the majority of your goods?	|____| kilometers
9.4	On average, how long does it take for you to get to the market where you do the majority of your selling?	|_____| Minutes

9.5	When do you typically get price information from this market? *[Read options; select one]*	Before going to the market		1
		Same day		2
		Next day		3
		After two days or more		4
		Never		5
		Not Applicable (no market identified)		9

9.6	How satisfied are you with your access to market information? *[Read options; select one]*	Very satisfied		1
		Somewhat satisfied		2
		Neither satisfied nor dissatisfied		3
		Somewhat dissatisfied		4
		Very dissatisfied		5
		Don't know		9

10. PROGRESS OUT OF POVERTY INDEX

#	Question	Response Options		Code
10.1	How many members does the household have?	One		1
		Two		2
		Three		3
		Four		4
		Five		5
		Six		6
		Seven		7
		Eight or more		8
10.2	Are all household members ages 5 to 17 currently in school?	No		0
		Yes		1
		No one ages 5 to 17		2
10.3	Can the male head/spouse read a phrase/sentence in English?	No		0
		No Male head/spouse		1
		Yes		2
10.4	What is the main construction material used for the outer wall?	Mud bricks/earth, wood, bamboo, metal sheet/slate/asbestos, palm leaves (grass/taffia) or other		1
		Cement/concrete blocks, landcrete, stone, or burnt bricks		2
10.5	What type of toilet facility is used by the household	No toilet facility (bush, beach) or other		1
		Pit latrine, bucket or pan		2
		Public Toilet (e.g. W.C, KVIP, pit pan)		3
		KVIP, or W.C.		4
10.6	What is the main fuel used by the household for cooking?	None, no cooking		1
		Wood, crop residue, sawdust, animal waste or other		2
		Charcoal or Kerosene		3
		Gas, or electricity		4
10.7	Does any household member own a working box iron or electric iron?	No		0
		Yes		1
10.8	Does any household member own a working television, video player, VCD/DVD/MP3/MP4 Player/IPod, or satellite dish?	No		0
		Only Television		1
		Video player, VCD/DVD/MP3/MP4 Player/IPod, or satellite dish (regardless of T.V.)		2
10.9	How many working mobile phones are owned by members of the household?	None		0
		One		1
		Two		2
		Three or more		3
10.10	Does any household member own a working bicycle, motor cycle, or car?	None		0
		Only bicycle		1
		Motorcycle or car (regardless of bicycle)		2

END INTERVIEW.

[Ask the respondent if he/she has anything to add or any questions to iDE]

11. DATA ENTRY RECORD

11.1	DATA ENTRY CLERK NAME											
11.2	DATA ENTRY CLERK SIGNATURE											
11.3	DATA ENTRY DATE											
			Y	Y	Y	Y		M	M		D	D