

Final Technical Report:

Communicating Science for Impact: Radio for Reaching Farmers with Research Results 4R (CultiAF)



IDRC Project Number: 108018

Research Organizations:

Farm Radio International
ICIPE
Makerere University

Location of study: Uganda & Kenya

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EXECUTIVE SUMMARY

This project has provided additional evidence that interactive radio is an effective and efficient means for scaling out improved agricultural practices to farmers and audiences, improving knowledge, and increasing the uptake of research results. We have also learned a lot about the intricacies and issues involved with sharing research results with intended end users whilst research is still in progress. We have achieved or exceeded key project milestones and outcomes.

Key results include:

- Insects: A higher percentage of listeners (38%) than non-listeners (24%) regularly feed insects to their poultry or fish. Of those who feed insects to their poultry or fish, a higher percentage of listeners than non-listeners started doing so either this year (34%-18%) or last year (11%-8%). This corresponds to the period when the radio programs were being broadcast.
- Insects: 65% of respondents in communities that could hear the radio programs listened to them, including 61% of women and 68% of men.
- Insects: Listeners' average knowledge levels rose from 35% at baseline to 50%, an increase of 43%. Knowledge scores for listeners at endline were 61% higher than non-listeners (50% vs. 31%).
- Insects: More frequent listening to the radio programs was associated with more frequent regular feeding of insects to fish and poultry.
- Insects: Family was the major influence on respondents' decision to start feeding insects to their livestock and fish. Radio was the second strongest influence on listeners, with 26% of listeners choosing it as the major influence.
- Beans: Average knowledge scores for listeners in Uganda were 14% higher than non-listeners (56% vs. 49%). Average knowledge scores in Kenya were 62% for listeners and 60% for non-listeners.
- Beans: 38% of Ugandan respondents in communities that could hear the radio program listened to them, with a higher proportion of men than women listening (43% - 32%).
- Beans: The overall rate of listening to the beans programs in Kenya was 72%, with men listening at a higher rate than women (94% - 64%).
- There were 12,656 unique callers to six radio stations, resulting in 40,610 interactions.
- It is estimated that the six project radio stations reached a total of 9,000,000 listeners throughout the project period.

This innovative project went one step further than sharing improved agricultural practices with targeted end users. Through our interactive systems, FRI encouraged both engagement between researchers and end users while the research was ongoing, and uptake of brand new research results “straight from the lab.” By using radio as an innovative pathway for uptake of ongoing research efforts, the project has increased our understanding of the intricacies and issues involved in ensuring that this is safe and effective.



In particular, we note the importance of:

- solid, open relationships between the implementing team (FRI), the researchers, and private partners (e.g., bean processors);
- ensuring that the programs on air are relevant to the season, existing knowledge, and farmers' priorities;
- the timing of radio programs in the research and product development cycle, and how this correlates with project timelines; and
- gathering feedback from listeners, or those using the research results on-farm, and passing this on to the researchers to inform ongoing activities.

Results are different for the work with promoting bean varieties for pre-cooking, and insects as animal feed. Two main factors contributed to this: First, that the idea of using insects as feed for poultry or fish is little known and used. It is relatively new and there is a lot of room for expansion, learning, and expanded use.

On the other hand, beans are a crop which very commonly grown and eaten, and there are high rates of existing knowledge and use. At first, the intention was to promote new bean varieties and a new product, pre-cooked beans. But, because the research component of the project required time and product development faced processing / production delays, the results of the radio activities were not as robust, as there was no clear, new research output to promote.

As a result, focused was put on bean agronomy and marketing—the programs promoted improved bean varieties, storage in bags, cleaning after harvest, use of pesticides and fertilizer, early land preparation, and record keeping. But because farmers were adding to existing knowledge, or making small changes to their systems, the results are not as impressive as for the insects.

As we assess the results in-depth and prepare to publish, these and other observations will make useful contributions to research into use in agricultural development, scaling up, and communication for development.

THE RESEARCH PROBLEM:

The “Research Uptake: Radio for reaching farmers with research results (4R)” initiative aimed to share latest research results and respond to farmers’ feedback in real time. This project was unique in many ways, as it was an ambitious attempt to bring results direct from researchers to the intended end-users, within the duration of the two supported research projects.

This venture was based on the acknowledged issue among researchers and institutions that their findings - especially in the field of agriculture, and with topics relevant to small scale farmers - rarely reach the intended end-user in a timely fashion, if at all. In recent years, there has been greater emphasis from donors and researchers alike on putting research into use, and this project intended to assess interactive radio as a means to contribute to this endeavor. While results would be shared and published in journals, as usual in an academic research project, the key practical findings would already be in use by small-scale farmers - while research was continuing.



FRI selected two Cultiaf funded projects to work with: the “Integrating insects in poultry and fish feeds in Kenya and Uganda” project, known as INSFEED, and the “Precooked bean products for food and nutrition security, and incomes in Kenya and Uganda” project. The project’s key hypothesis was that the use of effective, interactive and entertaining radio strategies would increase widespread understanding and uptake of research conducted by two selected Cultiaf research projects, and therefore contribute to their success and achieving their project objectives.

During the two years of project implementation, FRI has worked closely with the two research teams, who have shown great enthusiasm and support for radio as a means for reaching, and interacting with, small scale farmers. This project has shown us that such support and involvement from the researchers is vital to the success of the radio strategy. Our key research question has remained largely unchanged, but during the course of two radio series developed with each research team and private partners, we have adjusted our methods, responded to both farmers and researchers needs and feedback, and uncovered some prerequisites for success.

The project has increased our understanding of the intricacies and issues involved when sharing research results with intended end users, whilst the research is still in progress. These and other observations will make useful contributions to the field of research into use in agricultural development, scaling up, and communications for development.

PROGRESS TOWARDS MILESTONES

Table 1 below summarizes our progress in reaching the milestones. In general, we achieved the milestones, and present evidence in the table. We are still working on one or two key end of project milestones - progress and plans for completion are noted below.

Table 1. Progress towards milestones

Milestones	Comment/evidence of achievement
1.1 Inception activities completed (Project Implementation Plan in place, staff hired and trained, inception meetings held with two project teams, detailed work plan developed and agreed upon)	Completed. Project Implementation Plan (PIP), Inception Meeting reports/notes. The PIP was very instrumental in ensuring that the implementation of activities was accomplished within the agreed timelines.
1.2 Contracts/MoUs with four radio stations	Completed. Six contracts signed and archived. MOUs helped track performance of radio stations and achievement of deliverables on time. They are available on request.
1.3 Production teams at four radio stations trained and capacitated for producing interactive radio programs about poultry and or fish	Completed. Fourteen broadcasters and producers completed in station training. See training reports. Certificates presented.



1.4 Radio program designs aimed at raising awareness and knowledge of feeding options completed	Completed. Each station produced a radio program design document, signed off by FRI's Radio Craft Development Team
1.5 Strategy for Community Listeners Groups and listener engagement in place	Completed. Guidelines developed and shared.
1.6 Radio stations trained and equipped to use various ICTs	Completed. ICT assessment forms completed and equipment (computer, tablet or modem as needed) signed over at each station.
2.1 Audience "reach maps" produced for the four stations showing total rural population reached by their FM signals	Completed. One map per station showing their coverage were produced. See Annex 1.
2.2 Formative research report, including baseline knowledge and practice levels	Completed. Formative research report available, and used to select stations and shape program content.
2.3 Four radio stations produce and broadcast at least 6 episodes of interactive radio programs (24 unique episodes) about affordable and nutritious poultry or fish feed options, including insects.	Completed, over target. Four stations completed 10 episodes each. All programs archived and available on request
2.4 Forty community listener groups (10 per station) are formed with at least 50% female membership to actively engage in the PRCs.	Completed. 679 farmers from listener groups trained, of which 423 (62%) were female. Names of groups are available on request.
2.5 Each radio strategy monitored to ensure accuracy, quality, and other aspects in adherence with FRI VOICE Standards, including obtaining feedback from women listeners.	Completed. 102 weekly monitoring notes sent to all the radio stations during the entire series of programs.
2.6 Surveyed female and youth respondents confirm that broadcast times are convenient and that the radio partner and presenters are appealing to females and youth	Field monitoring visits were done and reports show that 98% of female and youth respondents appreciated the broadcast time and program in general.

2.7 Four outcome stories and six blog posts completed	Completed and available on FRI and Barza Wire websites, respectively.
3.1 Midterm review report available and findings incorporated into following radio series	Completed. Report circulated. It highlighted the improvements for phase 2 like improved communication and involvement among all stakeholders.
3.2 Initial radio programs are aired and receiving favourable feedback from listeners	Completed. Evidence from Uliza and CLG's whereby 50,732 listeners participated in ULIZA interactions and 679 participated in the CLG's engagement.
3.3 Strategy for reaching youth in place and plans for operationalizing agreed	Completed. Strategy document developed.
3.4 Total of six outcome stories and nine blog posts completed	9 outcome stories and 1 blog have been published and are available on FRI and BarzaWire website. http://wire.farmradio.fm/en?
3.5 Process evaluation strategy agreed and completed	Process evaluation conducted with all stakeholders reporting success of the in the implementation. Report, testimonies and Audio clips can be seen in the Annex.
4.1 One station broadcasts 12-16 weeks programming promoting bean consumption, knowledge, increased production and use, plus use of any new product	Completed with adjustment: see 4.2 below Logsheets from broadcasters and all programs archived on Soundcloud or similar.
4.2 Three stations broadcast a 12-14 week PRC on insect-based food options for poultry and/or fish.	Completed with adjustment: During the project Inception phase, in discussion with the two research teams, it was agreed that two radio stations would be sufficient to serve the two INSFEED regions. This meant there was budget available to add one more radio station for beans - Buddu FM. The station was selected by farmers in the target region, therefore we had one series on station working on beans in Kenya and one in Uganda. Logsheets from broadcasters and all programs archived on Soundcloud.
4.3 Each radio strategy monitored to ensure accuracy, quality and other aspects to adhere to FRI VOICE Standards, including obtaining feedback from women listener.	Completed. Weekly monitoring notes taken and shared to radio stations. This enabled broadcasters to always plan, produce and evaluate the radio programs always in order to be able produce better programs.
4.4 One outcome evaluation completed and evaluation report written	Completed. Outcome evaluation data has been gathered and report will be submitted in due course.

4.5 Two peer reviewed manuscripts	In process. ICIPE agreed in principle to co-author one paper. Discussions opened with KARLO on developing three papers.
4.6 One scientific & conference presentation	In process. Currently seeking relevant conference. Conference presentation was done in September 2016 at AGRF. Also presented at IDRC event in Nairobi June 2016.
4.7 Five “resources for broadcasters” produced and distributed to over 570 radio stations across Africa on animal feeding practices and alternatives (through radio scripts, news stories, “how-to” documents)	Completed. See Project Outputs section below for full list and links.
4.8 Total of eight outcome stories and twelve blog posts published.	<p>Completed. Eight success stories and 1 gender outcome story were published in the BarzaWire. Links are in Project Outputs section below.</p> <p>Blog posts are ongoing and will speed up as academic writing is completed and the final outcome evaluation data is analyzed.</p>



SYNTHESIS OF RESEARCH RESULTS AND DEVELOPMENT OUTCOMES

All planned activities were completed, with some minor adjustments for season or external factors such as availability of seed. We are happy to report that the proposed development outcomes have been largely achieved, and in some cases we have exceeded targets.

DEVELOPMENT OUTCOMES

Table 2. Summary of development outcomes

Proposed development outcomes	Achievements towards outcomes
1. Surveyed rural listeners involved in poultry or fish production (extrapolated total 400,000) demonstrate significantly higher knowledge about a variety of affordable and nutritious poultry or fish feed options OR how insects can be used as an affordable and nutritious poultry or fish feed than non-listeners	Listeners' average knowledge levels on insects rose from baseline level 35% to 50% at endline, an increase of 43%. Knowledge scores for listeners were 61% higher than non-listeners (50% vs. 31%). <i>Further analysis is needed to produce extrapolated numbers around knowledge. We intend to revisit this in academic publications.</i>
2. 20% of surveyed rural listeners involved in poultry and/or fish production (estimated 80,000) have added insects to the diets of their poultry or fish.	38% of surveyed listeners reported using insects as feed regularly on their farm. 45% of the listeners who are feeding insects to their poultry or fish, started either this year (34%) or last year (11%), the period when the radio programs were being broadcast. <i>Further analysis is needed to produce extrapolated numbers around knowledge. We intend to revisit this in academic publications.</i>
3. 50% of surveyed rural listeners involved in bean production and consumption demonstrate significantly higher knowledge about bean nutrition, production, and new precooked bean varieties and products	In Uganda listener knowledge rose from 48% at baseline to 56% at endline (a 17% increase) In Kenya listener knowledge rose from 55% at baseline to 62% at endline (a 13% increase) Average knowledge scores for listeners in Uganda were 14% higher than non-listeners (56% vs. 49%). Average knowledge scores in Kenya were 62% for listeners and 60% for non-listeners.
4. 20% of surveyed rural listeners in target regions involved in bean production have increased production and use of beans OR precooked bean varieties and products in the household.	In Uganda baseline levels of practice rose from 39% at to 71% at endline (an 82% increase) In Kenya baseline levels of practice rose from 61% to 65% at endline (a 7% increase)
5. 50% of community listener group members (of	- 83% of women in listening groups compared to 55%

<p>which 50% are women) demonstrate a high level of knowledge of poultry/fish feeding practices and or bean production/consumption as relevant</p>	<p>of women not in listening groups knew that beans are rich in protein.</p> <ul style="list-style-type: none"> - 80% of women in listening groups compared to 57% of women not in listening groups knew that the most effective way to address pests in beans is to spray with pesticides. - 32 % women in listening groups compared only 17% of women not in listening groups knew that feeding poultry and fish on insects increases immunity to disease and reduces the need for antibiotics. - 95% of women in listening groups compared with only 55% of women not in listening groups knew that feeding fish or poultry on insects is more nutritious than on other kinds of feeds. - 95% of women in listening groups compared to 58% of women not in listening groups knew that feeding fish or poultry on insects is cheaper than feeding them on other kinds of feeds.
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RESEARCH RESULTS

This section presents the findings from across the four objectives of the project. The findings on knowledge and practice were largely generated by comparing endline against baseline numbers, where the data allowed direct comparison. Other key findings include estimates of listeners and practitioners, indicators related to listening behavior, interactive radio features such as beep-to-call, and training/capacity building.

Objective 1. *To develop and implement a PRC strategy coupled with innovative information and communication tools*

This project has succeeded in developing the capacity of four radio stations to produce and air quality interactive radio programs. Continuous monitoring for quality and accuracy of content - and the good working relationships this has produced - has ensured excellent programs which have attracted good sized audiences and produced impressive results. The stations now have access to knowledge networks, improved radio design systems, extra equipment and resources and are therefore in a great position to continue producing relevant, timely and quality farm radio programs to continue serving their communities.



Good radio programs start with the listeners, and in each station, we worked closely with station staff, the research teams and other local stakeholders to talk to three communities per radio station to identify knowledge levels, attitudes and listening preferences. A comprehensive contract was developed with each station, after which we conducted planning workshops to develop a detailed radio program series design. These workshops used the formative and baseline research outputs as a basis for the program design. They were attended by the research teams, plus the radio producers, FRI staff, farmers and other relevant actors. This event also helped to build the relationships between the researchers and the radio station, which has been vital to project success.

Trainings on radio craft took place in each station, where broadcasters topped up their knowledge of editing software, interview strategy, gender awareness and also learned how to use FRI's own software such as Uliza (which hosts interactivity) and FRI-Log (a monitoring tool).

Table 3. CultiAf project radio station details - Phase one

Station and frequency	Topic	Start date	End date	Live Time & day	Repeat time & day	No. Eps	CLGs	Name of Radio Program
Mega FM 102FM	Insects as feed	22nd Dec '15	23rd Feb '16	Tuesday 2-3pm	Thursday 2-3pm	10	No	Lobo pa lupur (The world of farming)
Radio Simba 97.3 and 92 FM	Insects as feed	13rd Dec '15	24th Feb '16	Sunday 7-8pm	Saturday 6-7am	10	No	Lutabanjaliire (Sit we Discuss)
Radio Buddu	Bean production	15th Dec '15	16th Feb '16	Monday 7-8pm	Thursday 11 -12pm	10	No	Twezimbe (Let us develop ourselves)
Sky fm (Kenya)	Bean production	5th April '16	7th June '16	Tuesday at 7:8pm	N/A	10	No	Twezimbe (Let us develop ourselves)

Table 4. CultiAf project radio station details - Phase two (as of 15th March 2017)

Station and frequency	Topic	Start date	End date	Live Time & day	Repeat time & day	No. Eps	CLGs	Name of Radio Program
Mega FM 102FM	Insects	11th Oct '16	21st March '17	Tuesday 2-3pm	Thursday 2-3pm	24	Yes	Lobo pa lupur (The world of farming)



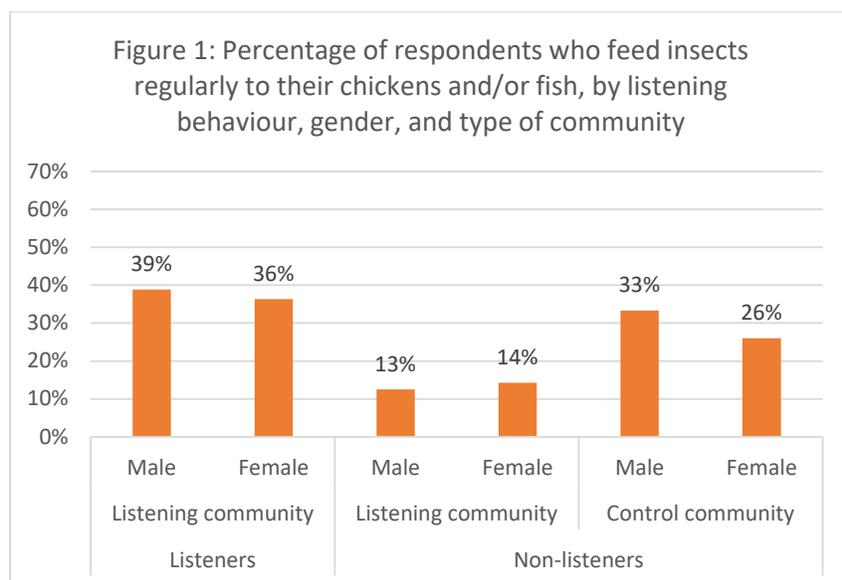
Radio Simba 97.3 and 92 FM	Insects	23rd Oct '16	19th March '17	Sunday 7-8pm	Saturday 6-7am	24	Yes	Lutabanjaliire (Sit we Discuss)
Akaboo-zi 87.9 FM	Beans consumption	6th Dec '16	16th May '17	Tuesday 10-11am	Sunday 12 -1pm	24	Yes	Kalamayanzi (Mid-morning show)
Ramogi FM (Kenya)	Beans consumption	10th March '17		Friday at 6:30pm	N/A	14	Yes	Pith gi pur (Farming and Livestock)

Objective 2. To increase awareness of relevant research results and related information on integrating insects in poultry and fish feed and precooked beans products reaching 650,000 listeners, with 80,000 using the research results

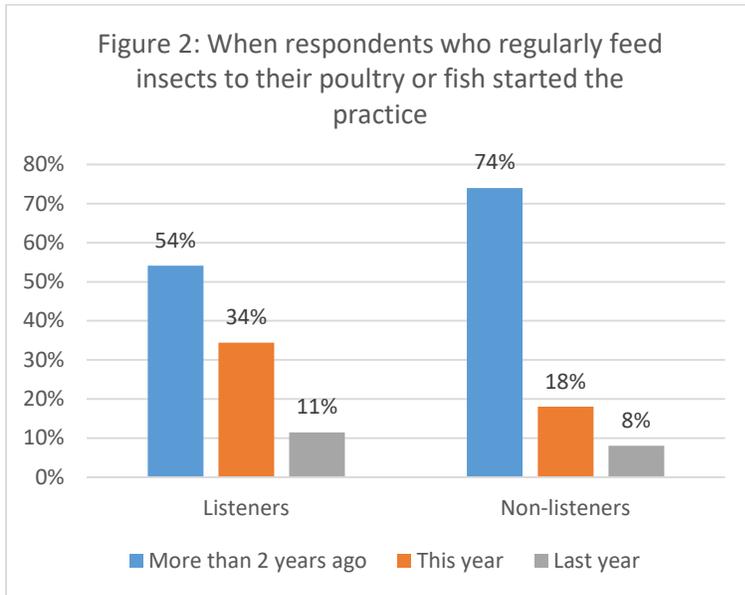
Here we report on uptake of research results firstly for insects, followed by beans, with highlights from the results of beans work in Kenya and Uganda presented separately.

INSECTS AS FEED (INSFEED)

As shown in **Figure** _ below, the percentage of listeners in listening communities who fed insects regularly to chickens or fish was much higher than non-listeners in listening communities, and somewhat higher than respondents from control communities. There were only small gender-based differences. The question posed was “Do you now regularly feed insects to your chicken or fish?”



As shown in Figure 2 below, of those who regularly feed insects to their fish or poultry, a higher percentage of listeners (45%) than non-listeners (26%) started doing so either this year (34%-18%) or last year (11%-8%). This corresponds to the period when the radio programs were being broadcast.



Listenership

As shown in **Figure 3**, 65% of respondents who lived in areas that could hear the radio programs listened to them, including 61% of women and 68% of men.

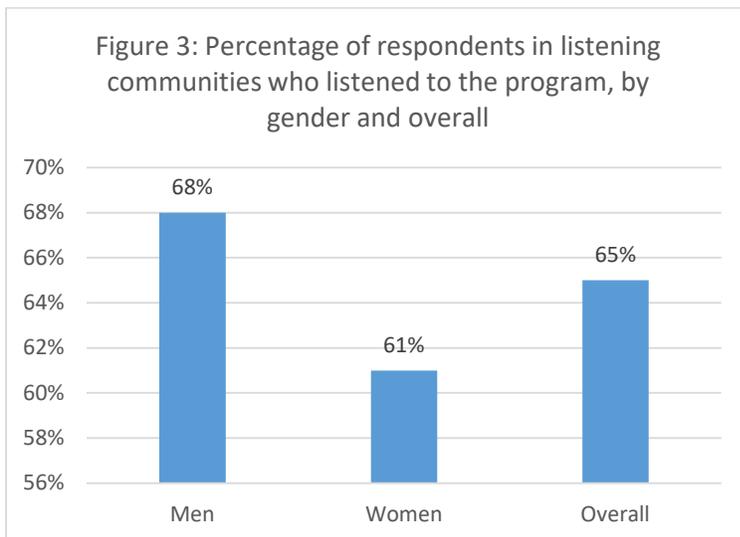
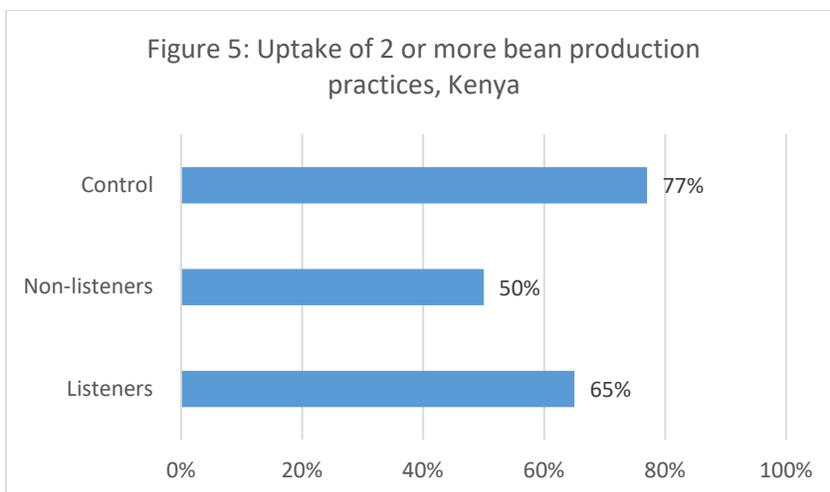
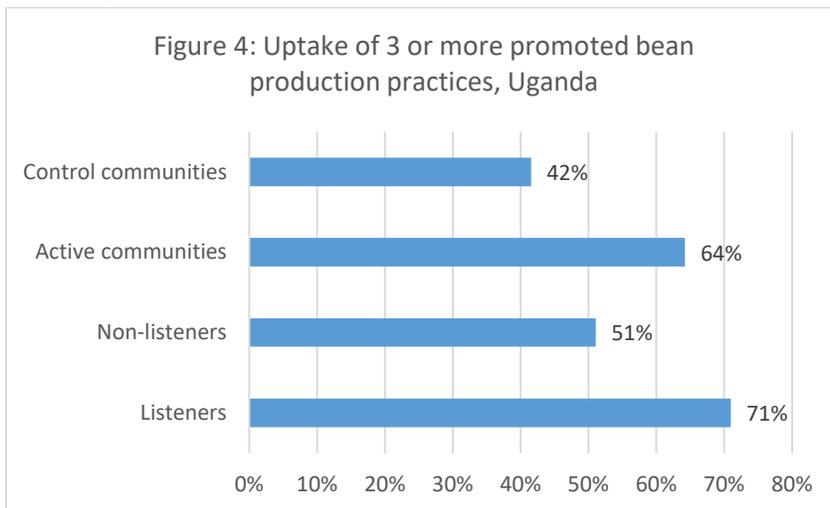


Table 5 in the next section breaks down listenership by radio station, and estimates the total number of listeners to the PRC programs on the all stations, based on the percentage of survey respondents who said they had listened to the programs. An estimated **9,000,000** men and women listened to the PRC programs on the two stations. This estimate is based on the FM coverage of the stations, as shown in the maps available in Annex 1.

BEANS

The radio programs promoted a variety of production practices, for example, on storage, input use, processing, and varietal use. Figure 4 shows that listeners in Uganda had a much higher rate of uptake of 3 or more production practices, compared to either non-listeners in listening communities, or respondents in control communities. Figure 5 shows that listeners in Kenya had higher rates of uptake of 2 or more production practices than non-listeners in listening communities, but a lower rate of uptake than respondents in control communities.



LISTENERSHIP (BOTH INSECTS AND BEANS PROJECTS)

Extrapolating listenership and practice

A major target of the endline survey was to estimate the number of farmers who had started regularly feeding insects to their fish and poultry or practiced the promoted bean production methods. FRI uses a statistical extrapolation to estimate the number of farmers who listened to the programs, and used the promoted practice. These estimates are calculated by multiplying the percentages obtained through the survey by the estimated rural working-age population covered by the two radio stations, and by using FRI's in-house FM radio coverage mapping system, which uses the GIS system QGIS and population estimates from the latest Uganda census.

The figures in Table 5 below are estimates rather than exact numbers. However, they do show clearly that the programs exceeded the targets established at the beginning of the project for listenership and uptake of practices.

Table 5: Estimated listenership

Country	Sub-project	Radio station	Radio coverage (potential listeners)	Rural radio coverage (less than 400 people per square km)	Rural coverage without overlaps	Listenership % (from survey)	Listenership % (women)	Listenership % (men)	Radio reach (listeners extrapolated)
Uganda	Insects as feed	Mega FM	1,389,979	789,038		91.00%	87.00%	94.00%	718,000
		Radio Simba	6,251,797	1,014,688		37.00%	35.00%	40.00%	375,000
	Beans	Buddu FM	9,940,628	2,575,502	9,000,000 ¹	39.00%	33.00%	44.00%	3,510,000
		Akaboozi FM	25,215,312	8,840,959					
Kenya	Beans	Ramogi FM	25,157,067	5,798,335		74.00%	64.00%	94.00%	4,200,000
		Sky FM							
		TOTAL	67,954,783	19,018,522		60.25%	54.75%	68.00%	9,000,000

¹ Buddu FM and Akaboozi FM have significant overlap in coverage. Therefore we used a custom technique to eliminate all double and triple counts in this geography. All other stations do not overlap one another significantly so this technique was not needed.



Objective 3. To track the use of research results and innovations on insects for feed and precooked beans by small scale producers and consumers

BEANS

Table 6 compares a variety of contextual information and practices between baseline and endline, focusing on the three districts surveyed at both baseline and endline. It also compares the context or changes in practice between listeners and non-listeners. Particularly positive or interesting findings are further discussed below.

Table 6: Uptake of practices recommended on the radio programs (by percentage of respondents), Uganda by all, female and male respondents

PRACTICE	ENDLINE									BASELINE		
	Listeners			Non-listeners			Control			All	F	M
	All	F	M	All	F	M	All	F	M			
Use promoted varieties	20	23	19	5	5	6	4	4	4	9	6	13
Use recommended storage practices	41	37	44	28	28	27	35	33	37	28	28	29
Process beans by threshing, sorting, or grading	98	97	100	99	99	98	100	100	100	93	93	93
Spray beans with pesticides	75	72	76	54	47	62	32	21	43	66	59	73
Apply fertilizer to beans	60	53	64	58	63	52	25	20	30	54	49	59
Sort beans after drying	90	92	89	76	77	75	68	68	68	87	88	86
Prepare bean garden at recommended time	50	43	54	57	56	58	61	57	66	51	53	48
Belong to farmers' group	38	31	43	35	36	35	34	28	40	78	79	77
Belong to savings group or marketing collective	72	83	63	65	62	69	45	40	49	83	79	87
Keep farm records	40	37	42	17	12	23	13	7	18	35	27	44

In Uganda, the rate of uptake of promoted practice was higher for listeners than non-listeners for 9 of 10 practices, as shown above in Table . Listeners' rate of uptake was also higher than the rate in control communities for 8 of 10 practices. Finally, listeners' rate of uptake was higher than baseline for 7 of 10 practices.



Table 7: Uptake of practices recommended on the radio programs (by percentage of respondents), Kenya

PRACTICE	ENDLINE									BASELINE		
	Listeners			Non-listeners			Control			All	F	M
	All	F	M	All	F	M	All	F	M			
Use promoted varieties	43	40	48	31	30	40	34	34	37	83	83	83
Use recommended storage practices	64	65	64	61	61	67	89	87	91	63	61	68
Process beans by threshing, sorting, or grading	95	95	97	99	99	100	91	93	89	95	95	94
Spray beans with pesticides	32	26	43	15	14	33	54	51	59	40	36	48
Apply fertilizer to beans	20	14	32	8	8	0	38	38	37	26	23	33
Sort beans after drying	100	100	100	100	100	100	83	86	80	84	84	84
Prepare bean garden at recommended time	31	34	23	25	27	0	57	57	58	25	26	22
Belong to farmers' group	37	38	36	38	39	33	16	15	17	42	39	47
Belong to savings group or marketing collective	47	42	56	65	63	100	54	43	70	47	37	68
Keep farm records	24	26	20	8	8	0	13	11	15	14	10	22

In Kenya, listeners' rate of uptake was higher than or equal to non-listeners for 9 of 10 practices. Uptake rates were higher for listeners than control communities in 5 of 10 practices, and higher than or equal to baseline for 6 of 10 practices.



Objective 4. To assess the effectiveness and impacts of interactive radio programs in influencing farmers adoption decisions.

INSECTS AS FEED

Knowledge

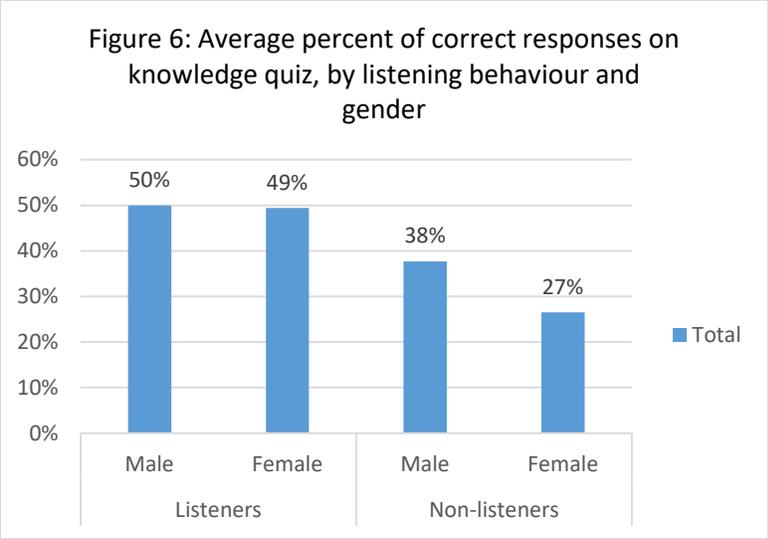
This section of the report presents the survey findings on farmers’ current knowledge about feeding insects to chickens and fish. It compares endline levels of knowledge with baseline levels. **Table 8** compares the percentage of correct responses to all knowledge questions at both baseline and endline, and also compares scores between women and men.

Table 8: Baseline and endline results of knowledge survey (percentage correct), disaggregated by listenership

Question	BASELINE	ENDLINE LISTENERS	ENDLINE NON-LISTENERS
% of respondents who knew that feeding fish and poultry on insects increases fish and poultry’s immunity to disease and reduces the need for antibiotics	14	31	16
% of respondents who knew that it was true that feeding fish or poultry on insects is more nutritious than feeding them on other kinds of feeds	62	82	54
% of respondents who knew that it was not true that insect feed makes chicken and fish grow faster	13	10	10
% of respondents who knew that it was true that feeding fish or poultry on insects is cheaper than feeding them on other kinds of feeds.	66	81	55
AVERAGE SCORE	35	50	31

As shown in the last row of **Table 8** above, listeners’ average knowledge levels rose from 35% to 50 %, and increase of 43%. Also, as shown in **Figure 6**, knowledge scores for listeners were 61% higher than non-listeners (50% vs. 31%).



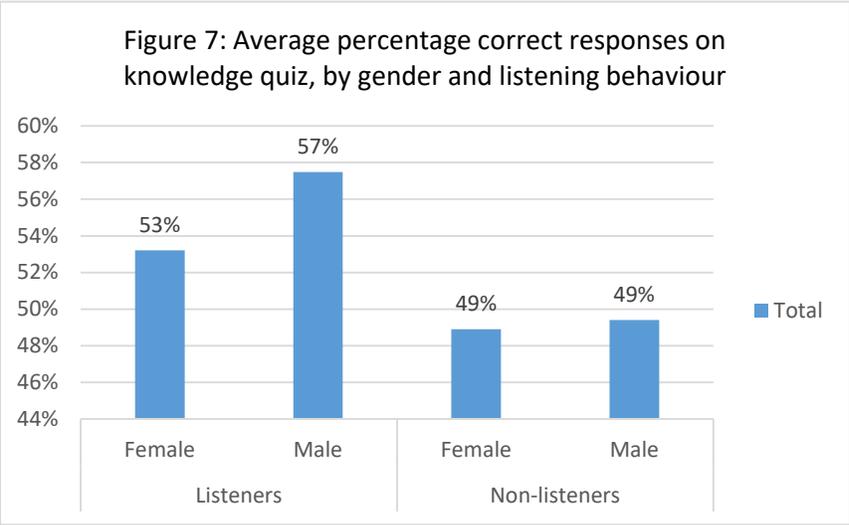


BEANS

Knowledge

This section of the report presents the survey findings on farmers’ knowledge about bean production and nutrition. It compares endline levels of knowledge with baseline levels, and listeners’ knowledge to non-listeners.

Figure 7 below shows that average knowledge among listeners in Uganda was higher than among non-listeners, and is over 50%.



The knowledge scores in Kenya are approximately 60% for both listeners and non-listeners, indicating higher base knowledge in the target region. There is little difference in knowledge scores between men and women. Average scores are summarized in **Figure 8** below.



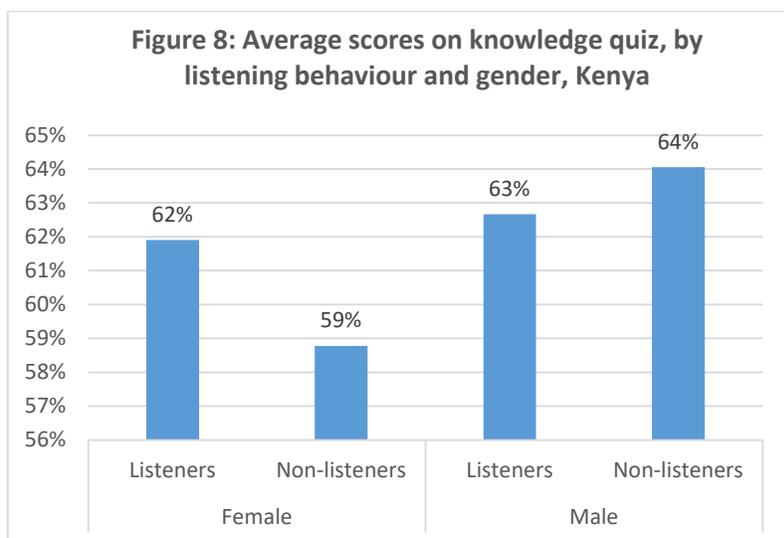


Table 12 compares the percentage of correct responses to all knowledge questions at both baseline and endline in Uganda, between listeners and non-listeners at endline, and between women and men.

Table 12: Baseline and endline results of knowledge survey, disaggregated by listenership and gender, Uganda

QUESTION	BASELINE			ENDLINE LISTENERS			ENDLINE NON-LISTENERS		
	All	F	M	All	F	M	All	F	M
Percentage of respondents who knew that beans are rich in protein	61	60	61	69	64	72	56	56	55
Percentage of respondents who knew that you begin ensuring the quality of beans at seed selection stage	36	35	37	38	31	43	35	36	34
Percentage of respondents who knew that you weed beans for the first time three weeks after germination	34	36	33	30	28	31	29	32	25
Percentage of respondents who knew that you should wait one week after seed bed preparation before planting beans	15	13	16	14	17	11	9	10	9
Percentage of respondents who knew that the importance of beans to people's health is that they provide protein which helps build muscles, bones, and other body tissues	71	70	72	70	67	73	71	71	72
Percentage of respondents who knew that a few small portions of beans can supply the daily requirement of protein for children between 6-23 months old	92	92	92	88	91	86	86	84	88
Percent of respondents who knew that the most effective way to address pests in beans is to spray with pesticides	63	57	70	81	75	85	58	54	63
AVERAGE SCORE	48	47	50	56	53	57	49	49	49

As shown in the last row of **Table 12** above, listeners' average knowledge levels rose from 48% to 56%. Also, as shown in **Figure 9**, average knowledge scores for listeners were 14% higher than non-listeners (56% vs. 49%). Men's knowledge scores were slightly higher than women (53%-50%).

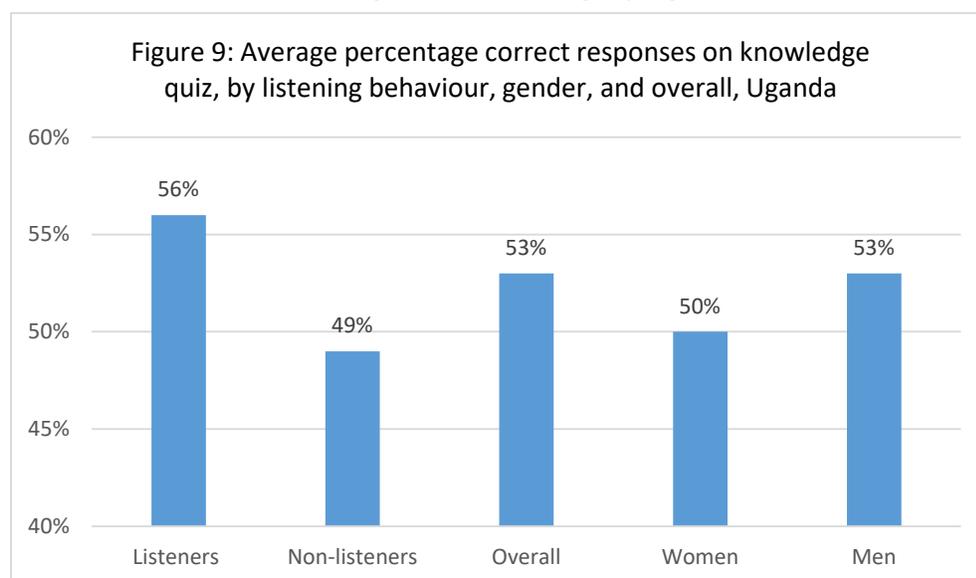
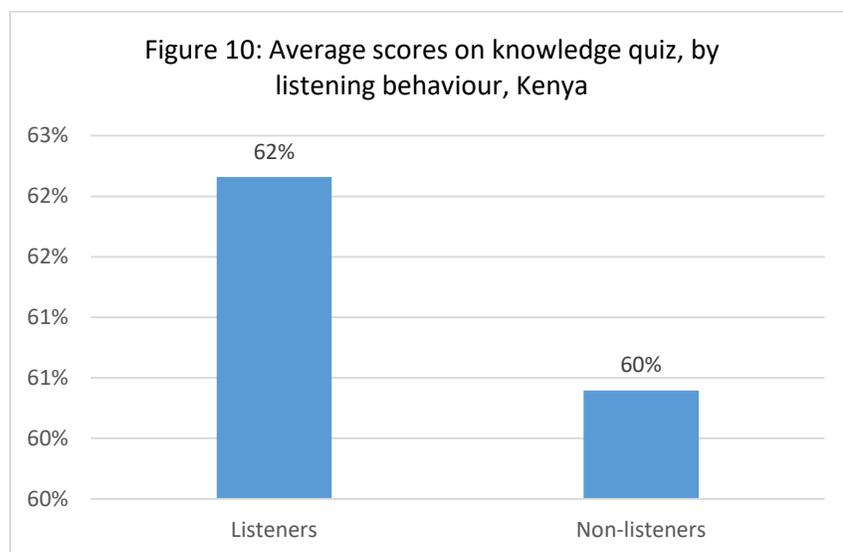


Table 13: Baseline and endline results of knowledge survey, disaggregated by listenership and gender, Kenya

QUESTION	BASELINE			ENDLINE LISTENERS			ENDLINE NON-LISTENERS		
	All	F	M	All	F	M	All	F	M
Percentage of respondents who knew that beans are rich in protein	73	74	70	92	93	91	85	85	84
Percentage of respondents who knew that you begin ensuring the quality of beans at seed selection stage	58	58	58	57	58	57	70	68	76
Percentage of respondents who knew that you weed beans for the first time three weeks after germination	14	12	17	17	16	18	8	7	11
Percentage of respondents who knew that you should wait one week after seed bed preparation before planting beans	26	26	23	15	15	14	13	11	18
Percentage of respondents who knew that the importance of beans to people's health is that they provide protein which helps build muscles, bones, and other body tissues	74	74	75	94	93	95	89	89	89
Percentage of respondents who knew that a few small portions of beans can supply the daily requirement of protein for children between 6-23 months old	91	91	90	95	94	98	81	81	81

Percent of respondents who knew that the most effective way to address pests in beans is to spray with pesticide	68	66	78	65	64	66	76	70	90
AVERAGE SCORE	55	55	55	62	62	63	60	59	64

As shown in the last row of **Table 13** above, listeners’ average knowledge levels rose from 55% to 62%. Also, as shown in **Figure 10**, knowledge scores for listeners were slightly higher than non-listeners (62% vs. 60%).



Radio listening behaviour and audience interactions

This section presents the findings on access to radio, and radio listening behaviour, and listenership to the radio programs.

Table 14: Radio access and listening behaviour, Uganda

INDICATOR	RESULT
% of respondents with home access to radio	Overall: 87% Men: 92% Women: 81%
% of respondents who had listened to the radio in the last 6 months	Overall: 79% Men 86% Women: 71%

As shown in **Table 14**, men have a slightly higher rate of access to radio at home in Uganda and had listened to the radio in the last 6 months at a slightly higher rate than women.

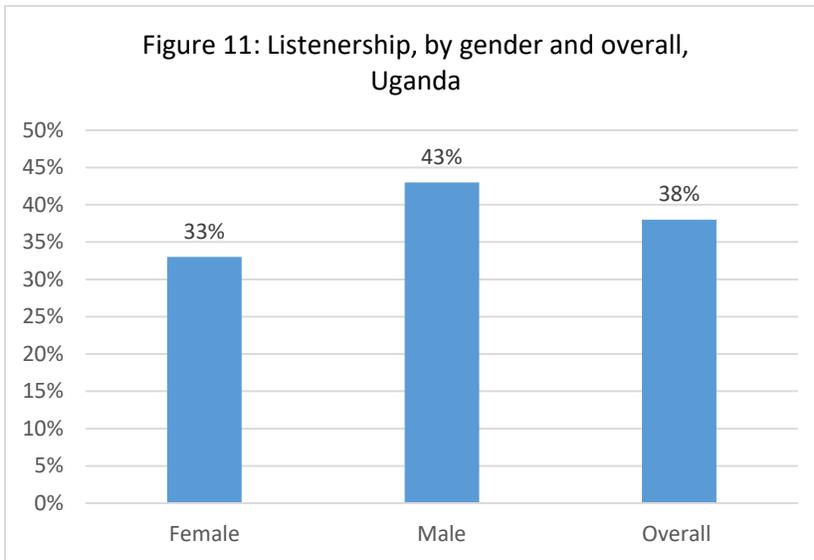


Table 15: Radio listening behaviour, Kenya

INDICATOR	RESULT
% of respondents with home access to radio	Overall: 89% Men: 95% Women: 86%
% of respondents who had listened to the radio in the last 6 months	Overall: 90% Men 97% Women: 87%

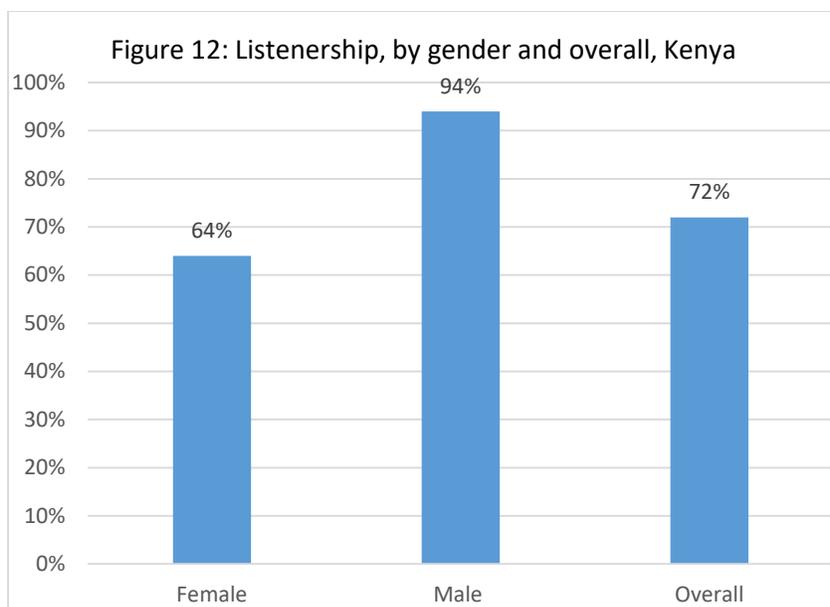
As shown in **Table 15**, men have a slightly higher rate of access to radio at home in Kenya and had listened to the radio in the last 6 months at a slightly higher rate than women.

Listenership rates showed that an average of 38% of respondents had listened to the programs supported by FRI in Uganda. See **Figure 11** below.



As shown in **Figure 12**, 72% of respondents in listening communities listened to the radio programs, with male listenership considerably higher than female listenership.





RADIO LISTENING BEHAVIOR AND AUDIENCE INTERACTIONS

This section presents endline findings related to radio listening behaviour and respondents’ opinions of the most valuable influence on their decision to regularly feed insects to their chickens or fish. As shown in **Table 15**, men have a slightly higher rate of access to radio at home and had listened to the radio in the last 6 months at a slightly higher rate than women.

Table 15: Radio listening behaviour

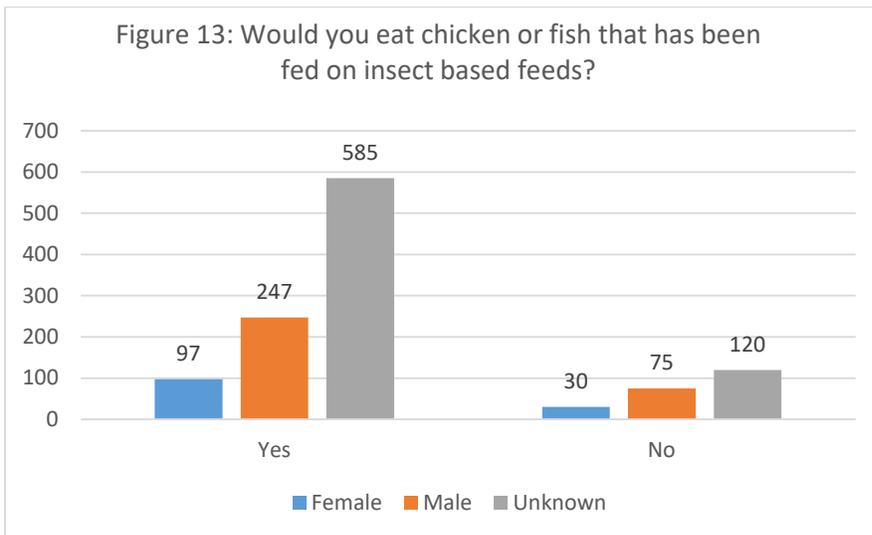
INDICATOR	RESULT
% of respondents with home access to radio	Overall: 81% Men: 85% Women: 77%
% of respondents who had listened to the radio in the last 6 months	Overall: 81% Men 84% Women: 78%
% of respondents who belong to a listening group	Overall: 12% Men: 15% Women: 9%

FRI uses a platform called Uliza to manage interactions between listeners and project radio stations. These interactions include call-ins and the various beep-to services which use interactive voice response (IVR) in the back-end, including, in this project, beep-to-call. Table 16 below shows the number of individual interactions tracked through Uliza during the project, in total more than 34,000.

Table 16: Interactions with the radio stations throughout the project

Radio Station	Number of people that interacted on Uliza platform
Mega FM	17,150
Radio Simba	7,470
Akaboozi FM	6425
Ramogi FM	3697
TOTAL	34,742

Figure 13 below shows just one example of the type of data collected through FRI’s Uliza feedback system on a weekly basis. This example is from the INSFEED project where we were trying to gain an understanding listeners’ attitude toward insects as feed. Each bar shows the number of votes by registered (we know their gender) and non-registered listeners.



SYNTHESIS OF RESULTS TOWARDS AFS THEMES

The project team assess that the 4R project is contributing to two of the four AFS themes: “Increasing agricultural productivity (Availability)” and “Improving access to resources, and/or markets and income (Accessibility)” are more relevant to project activities, as described below.

INCREASING AGRICULTURAL PRODUCTIVITY (AVAILABILITY)

Although some of the promoted bean varieties were already known to the farmers, some of the recommended agronomic practices have facilitated improved production. There is often a trade-off between optimal agronomic practices and what can be achieved on the farm with limited resources including labour constraints at key times in the production process. The radio programs focused on increasing productivity through improved agronomic practices therefore establishing a good basis for regular and reliable production in groups. The programs promoted improved bean varieties, storage in bags, cleaning after harvest, use of pesticides and fertilizer, early land preparation, and record keeping. The widespread uptake by listeners of one or more of these practices has led to increased agricultural productivity. In addition, farmers have benefited from being able to sell to the private partner for processing through collective marketing.

In discussion with the research team developing pre-cooked bean varieties, it was agreed that at the early stages of the radio work, the improved varieties to be promoted, which were selected for pre-cooking would be (NABE- 4, NABE-6, NABE-14, NABE-17, NABE-19, NABE-20, NABE-21) for Uganda and (KAT B1-Yellow, KAT B9, KAT B 56, Roskoko, Royal, etc.) for Kenya.

While beans are viewed by some as a “women’s crop”, men often have decision-making power once it comes to marketing and selling. Decisions about resource allocations in small-scale farming families mean it is important that the whole family can see the advantages of investing in bean farming. The programs include nuanced messages for women – and have recently focused more on gender aspects.

Some varieties of the promoted beans are faster maturing – but may have other disadvantages, such as producing less biomass which may be used as fodder for example. However, as legumes fix nitrogen in the soil, they can form part of an integrated farming system or wider program that supports enhanced soil fertility, and therefore contributes to soil conservation and future production.

The use of insects as poultry or fish feed has provoked great interest among small-scale farmers, as chicken rearing especially is common among small-scale farmers. If the issue of the high cost of feeds can be addressed through use of insects, many farmers (both male and female) will be keen to expand their business.

IMPROVING ACCESS TO RESOURCES, AND/OR MARKETS AND INCOME (ACCESSIBILITY)

As noted above, the use of insects as poultry or fish feed offers an opportunity to expand small business enterprises for many. Farmers have experience with raising chickens and fish, but cost of feed is a key constraint. Sharing of new research results through the radio contributes directly to improving access to the resource of feed, and creating new business and income opportunities.

The 4R team has found farmers and farmers groups who are taking advantage of business opportunities they see, and are reaching new markets or having better incomes. The pre-cooked beans project will also offer market opportunities as farmers will be able to sell beans to the processors. The 4R project has brought together public, private-sector, academic institutions, and NGOs to pool resources to address the challenges of both information and legume input supply chains.



Promotion of improved varieties and improved agronomical practices in beans is also improving access to markets, through the link with processors. A feature of the radio programs was on how to prepare the harvested beans for sale to processors (e.g. sorting for quality), and how to operate and market goods as a group. The aim of this focus was to improve access to new markets and income for bean farmers, and results show that the research and radio projects in collaboration have contributed to this.

PROJECT OUTPUTS

The following broadcaster resources were produced in English and in French as part of this project:

Scripts and backgrounders

- [Why insects might be the ideal feed for chickens and fish, part 1](#)
- [Why insects might be the ideal feed for chickens and fish, part 2](#)
- [Kenyan farmer switches from wheat to beans: Better yields with new bean varieties](#)
- [Managing diseases and pests in common beans](#)

Broadcaster how-to guide

- [Interviewing experts: Best practices for broadcasters and experts](#)

Table 17 below gives an idea of how many times each resources has been accessed since it has been published.

Table 17: List of project resources published

Title	FRRP #	Downloads from FRRP email EN	Downloads from FRRP email FR	Unique pageviews EN (as of June 15)	Unique pageviews FR (as of June 15)
Why insects might be the ideal feed for chickens and fish, part 1	104 Sept. 2016	4	1	124	56
Why insects might be the ideal feed for chickens and fish, part 2	104 Sept. 2016	2	1	78	33
Kenyan farmer switches from wheat to beans: Better yields with new bean varieties	105 Feb. 2017	0	0	42	2
Managing diseases and pests in common beans	105 Feb. 2017	2	1	34	35
Broadcaster how-to guide Interviewing experts: Best practices for broadcasters and experts	106 May 2017	0	22	6	4



Barza Wire stories

Working with local journalists, we have developed and published eight outcomes stories and shared on our Barza Wire (<http://wire.farmradio.fm/en>) website, in our weekly mailout to over 4,000 subscribers, and via Twitter and Facebook:

Table 18: Barza Wire stories published

Title	Date published	Unique pageviews EN (as of June 14)	Unique pageviews FR (as of June 14)
Uganda: Growing beans for a ready market	Nov. 28, 2016	332	44
Uganda: Farmers save money by making chicken feed with insects	Dec. 5, 2016	398	119
Uganda: Feeding insects to fish boosts farmer's income	Dec. 5, 2016	118	58
Uganda: Maggots, termites, and flies as feed	Dec. 12, 2016	215	146
Uganda: Farmer fights bean pests and diseases with quality seed and pesticides	Dec. 12, 2016	116	41
Kenya: Farmer makes the switch from wheat to beans	Dec. 12, 2016	153	38
Uganda: Saving money by using insects as chicken feed	June 5, 2017	69	32
Uganda: New bean varieties grow - and cook - quickly	June 5, 2017	43	12

PROBLEMS AND CHALLENGES:

The project has provided yet more evidence that interactive radio is an effective and efficient means for reaching farmers and audiences, improving knowledge and increasing uptake of new practices. This innovative project went one step further, reaching intended end users, and allowing for engagement between researchers and end users while the research was ongoing. In using radio as an innovative uptake pathway for ongoing research efforts, the project has increased our understanding of the intricacies and issues involved.

In particular, we note the importance of:

- strong support for radio as a two way information source for reaching farmer
- buy-in from all non-FRI partners, and therefore in efforts to get programs to air on time
- solid, open relationships between the implementing team (FRI), the researchers and any private partners (eg beans processors)



- ensuring that the programs on air are relevant to season, existing knowledge, and farmers priorities
- timing of radio programs in the research and product development cycle, and how this correlates with project timelines
- the opportunity to gather feedback from listeners, or those using the research results on-farm, and passing this on to the researchers to inform ongoing activities.

For example, an early challenge was recognised as that of timing. The radio programs were due to begin while the researchers were in the early stages of research. In both cases, for INSFEED and the Precooked beans project, FRI took this as an opportunity to air the first series as programs which would prepare audiences for potential upcoming research results - for example, sensitizing audiences to the potential for rearing and using insects as feed, or concentrating on improving agronomical practices and collective marketing in beans, while introducing the concept of pre-cooked bean products.

The second radio series was intended to promote the products of the research - for example, provide recommendations on how to rear specific insects as feed, or promote the on-the-shelf precooked bean products among consumers. However, as research can itself be unpredictable, and the process from research to shelf for new products can be complicated, we learned that flexibility and good working relationships are needed when research results are not clear, or other prerequisites are not in place for the results to be made public and acted upon. It is important to keep audiences engaged, yet at the same time to strategize among the whole project team to decide which research results are ready to be shared with the public, and when. At this stage it is vital that all project partners maintain communication channels and provide realistic timeline so that radio production teams can act accordingly. In addition, an effective feedback loop is needed for farmers/listeners to engage with the broadcasters and teams behind the recommendations aired on radio.

OVERALL ASSESSMENT AND RECOMMENDATIONS

We have found IDRC to be a very supportive partner, for example by providing opportunities for sharing and learning at gender and communication workshops and other events. The feedback received from the IDRC team on financial and narrative reports has come in a timely manner and been constructive. This project has been a great opportunity to develop innovative partnerships between researchers, radio stations and farmers, in getting research results to their intended users as soon as possible, and we have learned a lot.

