

TomorrowNow and KALRO: Post-Harvest Lean Evaluation Study

Kenya



Welcome To Your 60dB Results

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Introduction

About the Study

The Busara Center for Behavioral Economics and 60 Decibels received a grant from the Bill & Melinda Gates Foundation to develop a lean, replicable, yet robust methodology for evaluating the impact of digital farmer services (DFS.) We piloted our lean evaluation approach with TomorrowNow's hyper-local SMS advisory for maize farmers in Kenya.

In October and November 2023, we conducted interviews with maize farmers in Baringo, Bomet, and Nyeri to measure their adoption of farming practices recommended by the SMS advisory.

About TomorrowNow

TomorrowNow.org is a climate-tech nonprofit dedicated to empowering communities on the frontlines of climate change with next-gen technology and strategic partnerships. Their founding technology company, Tomorrow.io, provides hyperlocal weather information through its API, intelligence platform and satellites. Together, they collaborate with public entities such as national meteorological agencies and national agricultural research systems to support and sustain next-generation agro-weather services, fostering proactive climate adaptation and resilience. In Kenya, TomorrowNow.org partners with the Kenya Agriculture and Livestock Research Organisation (KALRO) to deliver climate-smart agriculture information and timely advisory services to farmers via free SMS. Farmers can receive one of two types of messages:

- **Version 1 (V1):** KALRO's value-chain specific general farming advisory (**Comparison**)
- **Version 2 (V2):** KALRO's value-chain specific general farming advisory enhanced with TomorrowNow's hyper-local weather advisory (**Treatment**)

About this Report

The report aims to:

- Explore the differences in practices based on the type of advisory received, including the use of CAN fertilizer and soil water management.
- Examine differences in outcomes such as pest infestations, crop loss, and maize yield and quality.
- Provide feedback to KALRO and TomorrowNow on user experience.

Methodology (1/3)

Survey mode	Phone
Country	Kenya
Language	Swahili
Dates of data collection	October-December 2023
Response rate (Treatment)	52%
Response rate (Comparison)	56%
Confidence level	95%

Methodology

For the lean evaluation, we have conducted two rounds of data collection:

- 1. Post-Planting Study:** The survey took place in May - June 2023, after farmers finished planting maize for the long rains season. We interviewed 605 treatment farmers and 401 comparison farmers to understand their demographic and agricultural profiles, as well as the difference in adoption of maize planting practices after receiving TomorrowNow's V2 advisory compared to KALRO's V1 advisory. We shared this report in July 2023.
- 2. Post-Harvest Study:** Interviews were carried out in October - December 2023, following the maize harvest from the long rains season. It allowed us to compare the harvest and post-harvest outcomes experienced after receiving TomorrowNow's V2 advisory against KALRO's standard V1 advisory. Interviews were conducted with the same treatment and comparison farmers as permitted by attrition rates.

To estimate the difference in practices and outcomes between farmers receiving V1 and V2 messages, we rely on a **cross-sectional** methodology. We control for observable factors such as location, land size, age, and education. Using a regression model based on the collected outcomes of interest, we estimate the difference between the two groups.

In addition, we employ a concurrent triangulation mixed methods design, combining both quantitative and qualitative data at the customer-level. This approach ensures a comprehensive evaluation of TomorrowNow and KALRO services and facilitates the answering of key research questions using the same customer-level data.

Methodology (2/3)

We spoke to 1229 farmers, of whom 622 received KALRO messages enhanced with TomorrowNow's technology (V2) and 607 receive KALRO's standard messages (V1).

Logistic Regression

To analyse the impact of V2 (Treatment) of the model compared to V1 (Comparison), we use a logit regression, which is a tool for studying the relationship between binary outcomes and multiple predictor variables at a specific point in time.

The outcomes of interest are:

- Use of CAN fertilizer
- Awareness and use of soil cover and drainage techniques
- Crop damage and loss
- Maize quality and yield

In the regression analysis, we control for various observable characteristics such as gender, age, education, land size, location (county), income source, and others. This helps to minimize potential bias arising from unobserved omitted variables and enhances the reliability and validity of the estimates. We focus on a 95% (p-value less than 0.05) confidence level or higher to determine statistical significance.

Sampling

Our sample consists of two groups of farmers:

- **Treatment:** Maize farmers registered with KALRO to receive advisory messages and selected to receive the KALRO messages that incorporate TomorrowNow's technology (V2).
- **Comparison:** Maize farmers registered with KALRO to receive advisory messages and receive KALRO's standard messages (V1).



Methodology (3/3)

“They have helped me very much in making my farm look nice. I planted my farm earlier than most of my neighbours, and I was weeded my crop when I was told to weed so my plants were healthy and performed well. I got 16 bags of maize which was way better than before.”

- Male, 37, Treatment

“My quality of life has very much improved because now we can eat healthy as we get our food straight from the farm. This has also reduced family expenses.”

- Female, 24, Treatment

Limitations of the analysis

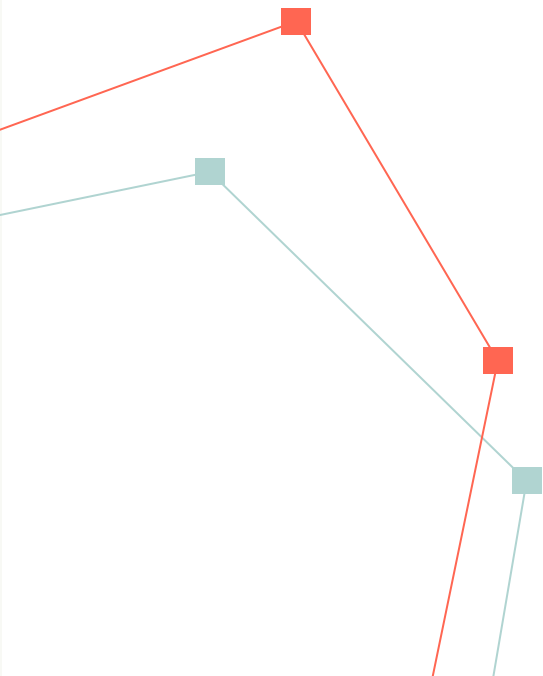
1. **Linearity assumption:** In logit regression, the linearity assumption assumes a linear relationship between the control variables and the log-odds of the binary outcome. If this assumption is violated, and there is a non-linear relationship, the model may not accurately capture the true underlying associations.
2. **Cross-sectional data:** Cross-sectional analyses have limitations in establishing causality since the data is captured at a single time point. While they can provide associations between variables at a specific moment, they cannot determine cause-and-effect relationships.
3. **Variation in desired outcomes:** TomorrowNow tailors its recommendations to individual farmers based on their geolocation and unique requirements. We did not have the specific recommendations given to each farmer, so we were unable to determine if they adopted the recommended practice. Our regression analyses are therefore restricted to practices that were recommended to all farmers.

Key Research Questions

Here are the key learning questions for this round of the study:

1. How does the adoption of maize growing practices differ between farmers receiving V2 messages and farmers receiving V1 messages?
2. Are farmers who receive V2 messages more likely to read the messages?
3. Do farmers' perceptions of the SMS service differ between those who receive V2 messages and those who receive V1 messages?
4. What is the impact of more accurate and relevant SMS-based advice on farmers' level of trust in digital advisory services? Does this trust differ between farmers receiving V2 messages and those receiving V1 messages?
5. Is there a difference in the quality and yield experienced by farmers who receive V2 messages compared to those who receive V1 messages?

TomorrowNow Snapshot



Who Are The Farmers?

Treatment	Comparison	
49%	51%	Are female
43%	44%	Completed secondary schooling or higher
34%	34%	Have access to a smartphone
24%	40%	Mainly earn income from non-farm source
1%	3%	Sold 'all' or 'almost all' of farm produce

Outcomes of Interest

Treatment	Comparison	
33%	24%	Report season was "much better" because of the advisory
19%	18%	Experienced no damage to their crops this season
8%	5%	Are unaware of techniques for water drainage channels
25%	25%	Are unaware of soil cover techniques
22%	16%	Report total production has "very much increased" because of the advisory
23%	19%	Say their quality of life has "very much improved" because of the advisory

Customer Voices

Opinions On [Company] Value Proposition

34% were Promoters and were highly likely to recommend

"The text message I receive from KALRO helps me to know the right fertilizer to apply and the best time to start inspecting my maize crops for any pests or diseases." - Female, 32, Treatment

"I have learned a lot from KALRO. From the accurate weather predictions, how to know when the soil is highly fertile or less fertile. I always have food in my food as stock, so I never lack." - Male, 27, Comparison

"The advisory SMS I receive for them is very easy to understand because they are simple to understand as they are usually in English and Kiswahili and they are very informative, and I have been able to learn new farming ways." -Female, 32, Treatment

Alternative Practices from KALRO

64% had a specific suggestion.

"I would like information on how to plant seeds that are not certified and manage them so that we do incur low yields, different types of pesticides to use for rainy and dry seasons." - Male, 40, Treatment

"They should advise on how to harvest and reduce post-harvest wastage and when to harvest in different weather seasons. - Female, 34, Treatment

Top Insights

1 Only a third of farmers interviewed report receiving SMS advisory messages from KALRO.

This is a decrease from the post-planting survey, when nearly two thirds reported receiving the messages. Among those who report receiving SMS advisory, farmers in both the treatment and comparison groups report receiving and reading messages with similar frequency.

We interviewed a different sample of farmers during the post-planting survey under the assumption that both samples are equally representative of the population receiving KALRO messages. However, the difference in reported receipt of the messages suggests the two samples (post-planting and post-harvest) may differ in dimensions we did not observe, such as mobile connectivity or how they were onboarded.

2 Farmers receiving TomorrowNow enhanced messages are not more likely to adopt recommended practices than those receiving standard KALRO messages.

Use of fertilizer and soil coverage was similar across both groups, with 3 in 10 farmers using plant material as soil cover. Farmers receiving KALRO messages are more likely to weed more than once and bury or burn their infected maize than those in the receiving TomorrowNow messages.

3 Satisfaction with both types of advisory service is fair, and lower at post-harvest time than after planting.

The overall Net Promoter Score is 10, which is lower than in the post-planting survey (44). In both groups, farmers mention irrelevant or disorganized content and the need for more practical assistance, which mirror the complaints mentioned in the post-planting survey, although fewer farmers at post-harvest said 'most' or 'all' the content was relevant and accurate.

Post-harvest, farmers report similar levels of understanding and perception of message accuracy across the two groups. More farmers receiving TomorrowNow messages say it is timely and relevant than those receiving standard messages, and more farmers receiving TomorrowNow messages would be 'very disappointed' if they no longer received them.

4 Farm outcomes at harvest are slightly better for farmers receiving the TomorrowNow enhanced advisory.

Farmers in the treatment group are less likely to report that more than half their maize crop was spoiled or damaged, and more likely to say the quality of their maize crop was 'much better' than an average year.

However, there was no significant difference in reported maize yield or in farmers' reported change in total production between the two groups.

“My yield this season was very good. Given that my land is very small, I was able to get three bags of maize and I even sold one at a very good price. I owe this harvest to KALRO because their advisory helped me to apply the best practices to my farming and get very good yields.”

- Male, 52, Treatment

Balance Test

We conducted equivalence tests to assess whether there are any systematic differences between the treatment and comparison groups. This is critical because the treatment allocation, in this case, the selection of who receives V2 messages, is not random. The balance tests will assist us in evaluating the degree of similarity between the treatment and comparison groups, ensuring that they are comparable for the analysis.

In our regression analysis, we control for observable differences.

Blue box: Statistically significantly difference at 95% confidence

The treatment and comparison groups are similar, with differences in household size, land size, and dependence on farm income.

Balance Test

The degree to which treatment and comparison farmers' profiles are similar.

	Treatment	Comparison
n =	622	607
Gender % female	51%	49%
Gender of head of household % female	13%	14%
Age in years	47	48
Education % completed secondary education	58%	57%
Household size average size	5.2	5.7

	Treatment	Comparison
n =	622	607
Source of income % with non-farm income as main source	40%	24%
Land used for farming in acre	2.0	2.3
Land under maize in acre	1.3	1.3
Smartphones % smartphone users	43%	44%

Farmer Profile

This section highlights the demographics and farm characteristics of farmers in both the treatment and comparison groups.

The key indicators in this section are:

- **Demographics:** What is the typical farmer like in terms of gender, age, region, household size, gender of household head, education level, and income source?
- **Land:** How much land do they cultivate in general and for maize?
- **Farm Profile:** Do they mostly sell or consume their crops?
- **Digital Access:** What type of mobile phones do they have?
- **Advisory Access:** Did farmers receive advisory related to maize crops this season or in previous seasons? How often did they receive the advisory and how much do they read them?



About The Farmer

We asked questions to understand the farmers' demographics.

Half of the farmers we spoke to are male with an average household size of 6.

The majority of farmers (86%) said the head of their household is male.

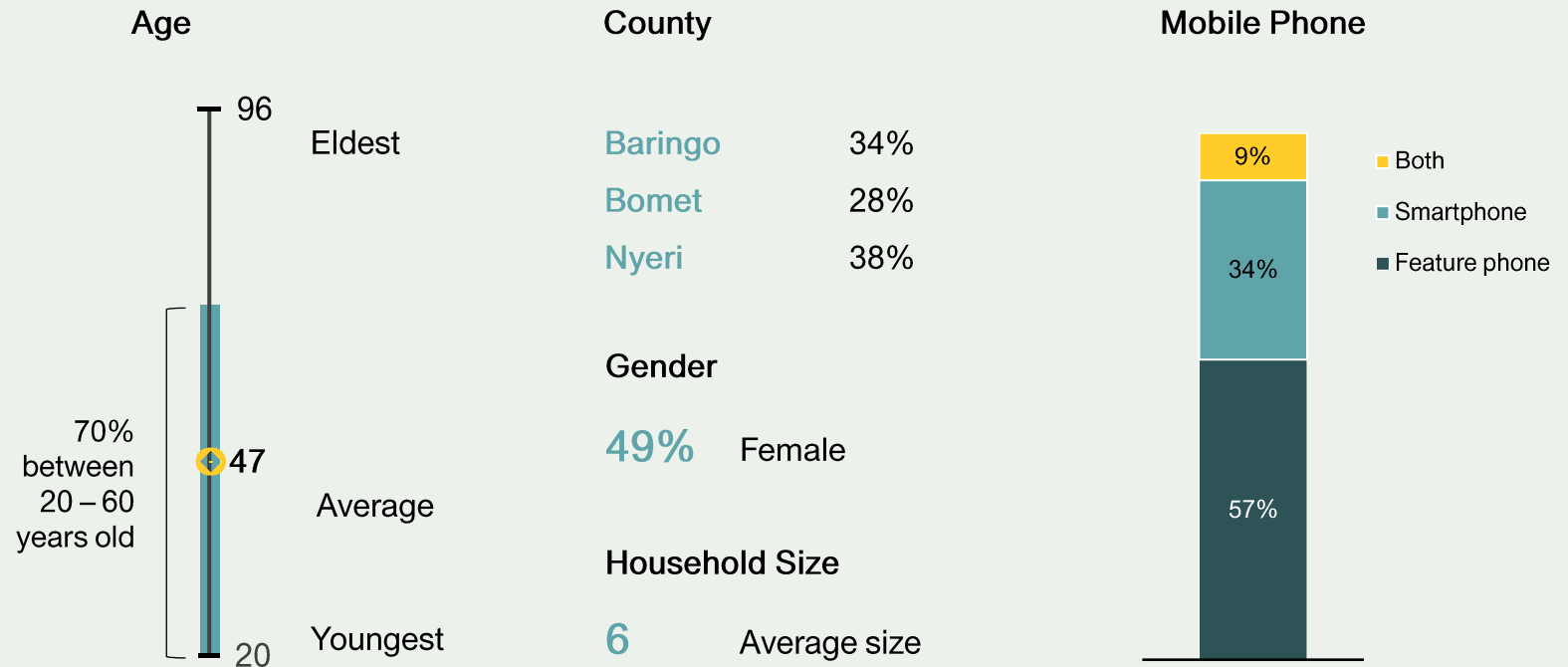
More than half (57%) of treatment farmers use only feature phones. Over a third use smartphones only. Female farmers are more likely to use a feature phone exclusively (68%) compared to male farmers (49%).

The farmers we spoke to are similar to those in the post-planting report, with a slightly higher proportion of men, an older age group, and more representation from Baringo County.

We spoke to a mix of male and female farmers in Baringo, Bomet, and Nyeri counties.

About The Farmers We Spoke With

Data relating to farmer characteristics (n = 1,229 | Treatment = 622; Comparison = 607)



About The Farmer

We also asked about the farmers' education and household income sources.

16% of farmers hold a university or post-graduate degree.

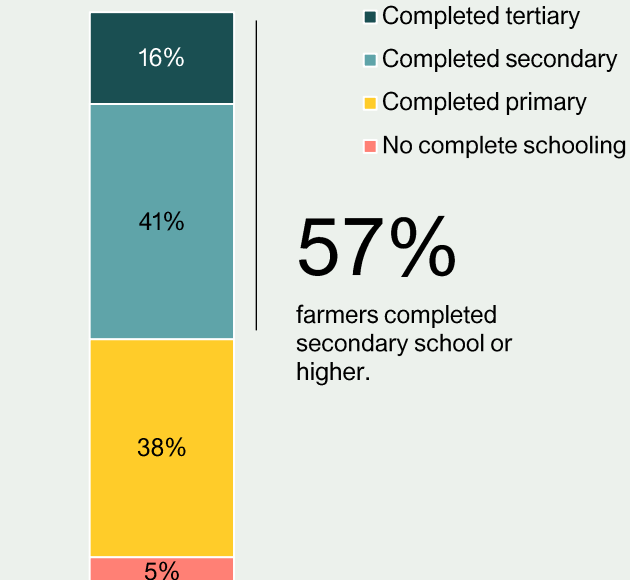
There is a correlation between education level and phone use, as farmers who use feature phones are more likely to have only primary schooling (79%) compared to farmers who use smartphones (18%).

57% of farmers have a secondary school education or higher and 3 in 4 rely on farm income as their primary household income source.

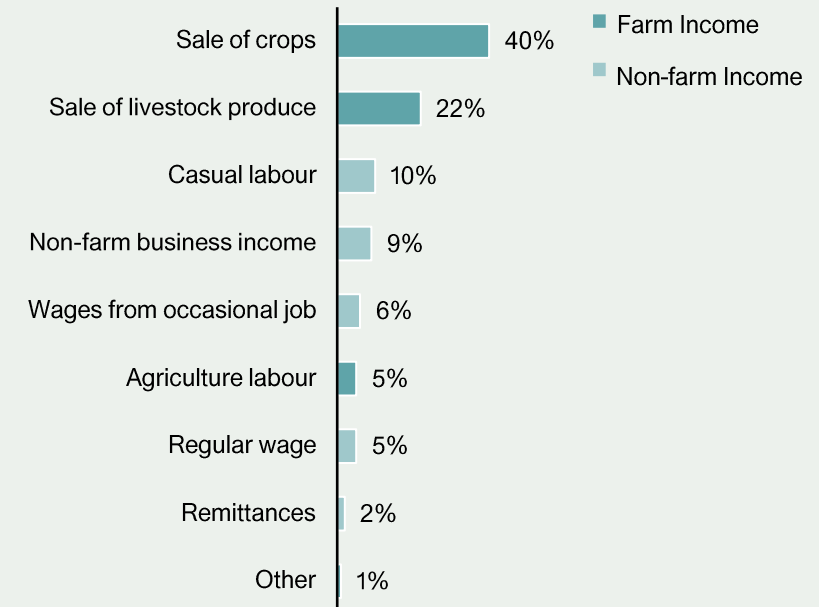
About The Farmers We Spoke With

Data relating to farmer characteristics (n = 1,229 | Treatment = 622; Comparison = 607)

Household Education Level



Main Source of Household Income



About Their Farm

We wanted to understand the farmer's agricultural and livelihood activities in the last 12 months.

Treatment farmers cultivated an average of 2.0 acres, slightly less than the 2.3 acres cultivated by comparison farmers. Although there were similar trends in the consumption or sale of farm produce, treatment farmers (40%) are more likely to report consuming 'all' or 'most' of their produce compared to comparison farmers (32%).

Baringo farmers report higher consumption of all or almost all farm produce (44%) compared to Nyeri (34%) and Bomet (29%).

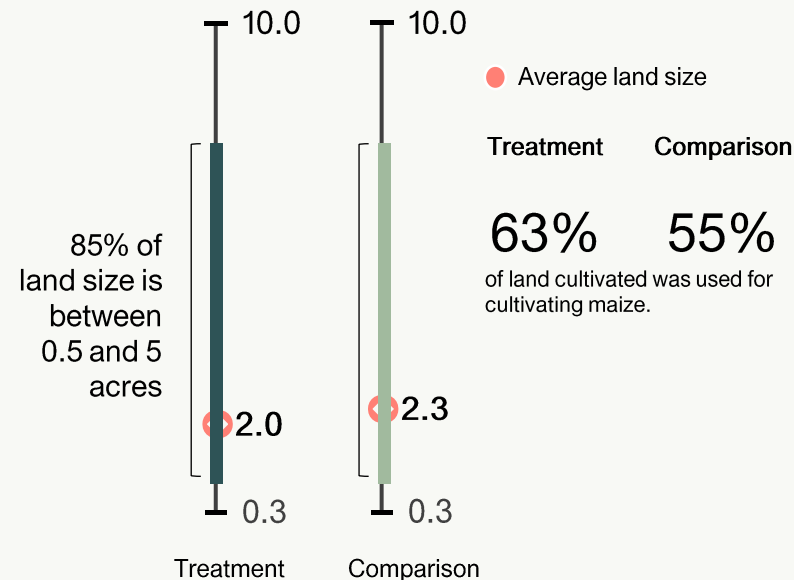
*Data was winsorized at 5%. Extreme values were replaced with the corresponding 5th and 95th percentiles, reducing the impact of outliers while preserving the overall distribution.

The average land size cultivated by farmers is 2.2 acres.
36% of farmer report consuming 'all' of their farm produce.

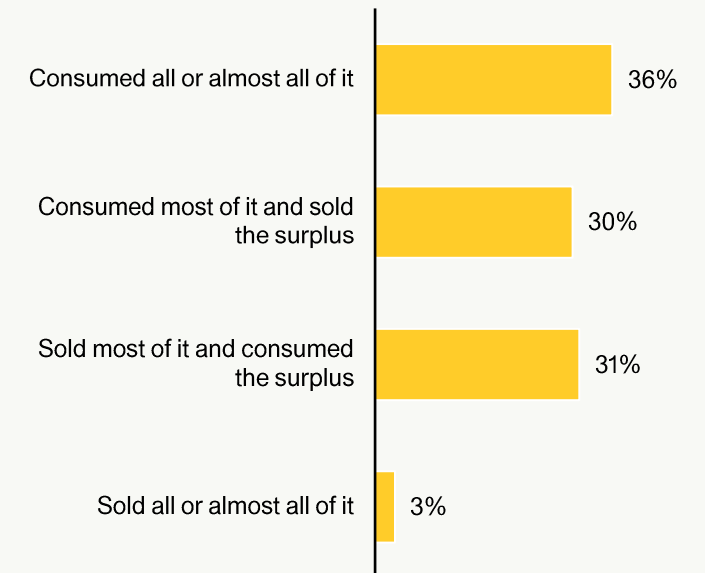
About The Farmers We Spoke With

Data relating to farm characteristics (n = 1,229 | Treatment = 622; Comparison = 607)

Size of Land Cultivated*



Use of Farm Produce for Consumption and Sale



Awareness of KALRO SMS Advisory

Although we expect all farmers in both groups to receive SMS advisory messages from KALRO, only 34% of treatment farmers and 40% of comparison farmers report receiving these messages.

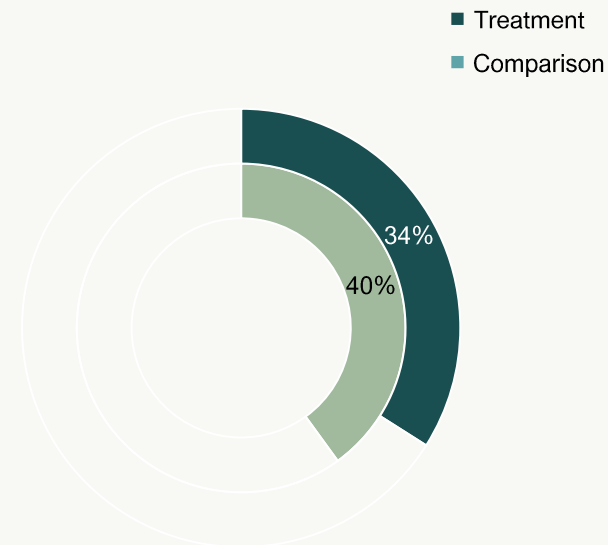
Receipt of SMS advisory has decreased by half compared to the study conducted in July.

The lower reported receipt of SMS advisory messages among farmers could be due to several factors, such as potential connectivity issues that hinder messages from reaching farmers, or the possibility that farmers are not receiving or noticing the messages, leading to a lack of awareness altogether. 10% of treatment farmers had received the messages in previous seasons, but not this season.

A third of farmers in the treatment group report receiving messages from KALRO this season.

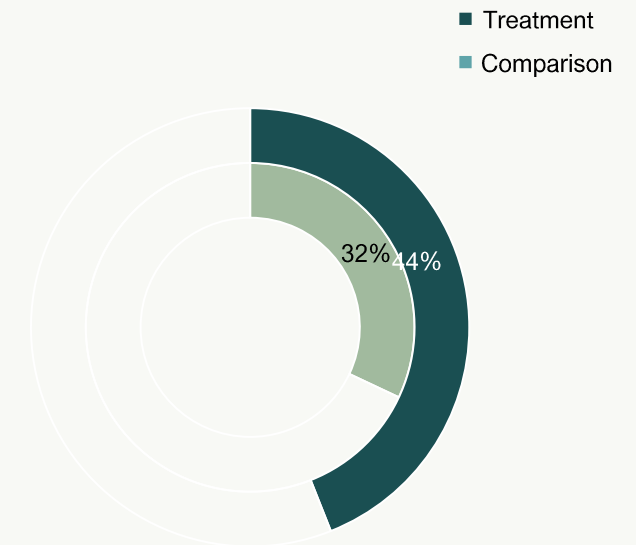
Advisory Received this Season

Q: Did you receive SMS information and advisory related to your maize crop from KALRO this Masika season (i.e. since March 2023)? (n = 1,217 | Treatment = 617; Comparison = 600)



Advisory Received in Past Seasons

Q: Have you received SMS information and advisory related to your maize crop from KALRO in previous seasons? (n = 1,208 | Treatment = 613; Comparison = 595)



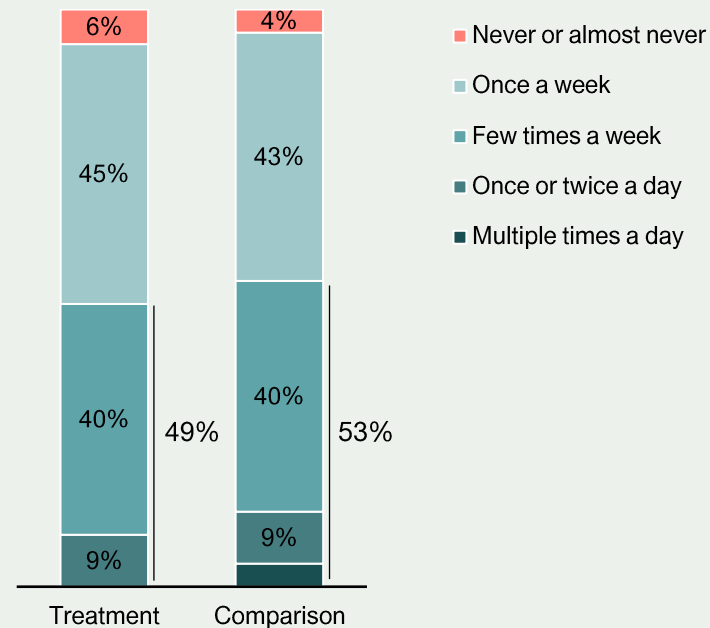
Engagement with Advisory

The readership of KALRO advisory is higher for farmers in the treatment group. This is also affected by educational differences. Farmers who did not complete secondary education are less likely to read notifications in full (30%) compared to the others (60%).

More than half of farmers who report receiving SMS advisory from KALRO say they get at least one notification per day. The same proportion report reading 'all of it' in full.

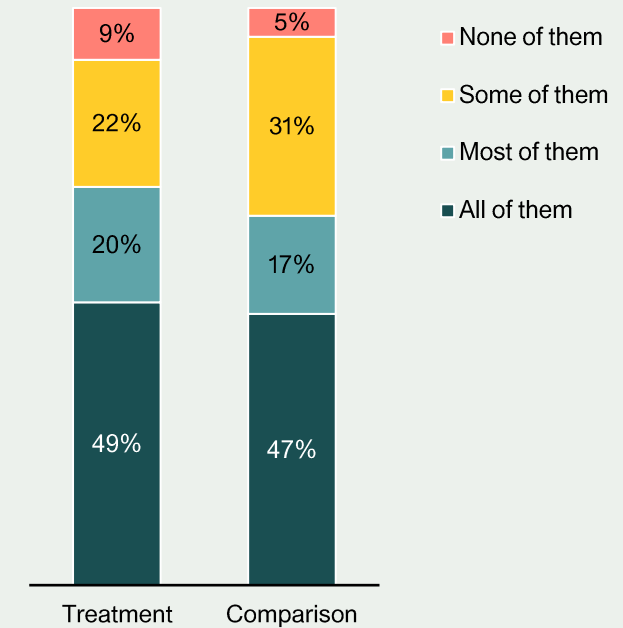
Frequency of Advisory Received

Q: How often did you receive SMS advisory from KALRO this Masika season? (n = 435 | Treatment = 198; Comparison = 237)



Amount of Advisory Read in Full

Q: Approximately how many of the advisory SMSs you received from KALRO this Masika season did you read in full? Did you read: (n = 449 | Treatment = 209; Comparison = 240)

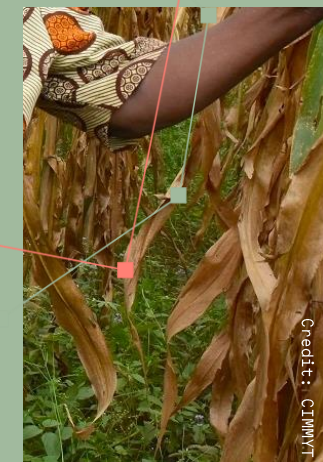


Primary Outcomes

In this section, we examine the key practices and outcomes reported by farmers during the post-harvest season, and we compare them between the treatment and comparison groups. Where appropriate, we present the results of our regression analysis.

The key indicators in this section are:

- **Fertilizer Usage:** What type of fertilizer did farmers use during growth and establishment?
- **Soil and Water Management:** Did farmers create water channels and use plant material for soil cover?
- **Crop Damage:** What percentage of were damaged this season, and if so, what were the causes?
- **Weeding and Waste Management:** How frequently did farmers weed their maize crop? How were damaged or infected crops disposed of?
- **Harvest Quality:** What is the quality of the harvest?
- **Yield:** What is the quantity of the harvest yield, and was the increase attributed to the KALRO advisory?
- **Sales:** What portion of the harvested produce was sold, and what was the prevailing market price?
- **Quality of Life Impact:** Did implementing KALRO's advisory lead to an improvement in the farmers' quality of life?
- **Farming Decisions based on Advisory:** What farming decisions have farmers made based on the advisory they received from KALRO?



Type of Fertilizer

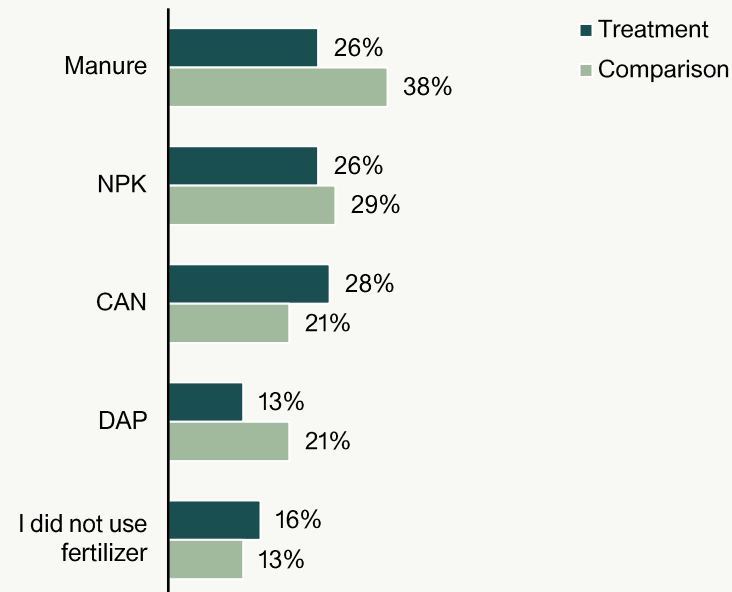
We asked farmers to reflect on the type of fertilizer they used during the growth and establishment stage this season.

During this period, more treatment group farmers reported using CAN fertilizer than comparison group farmers. However, this relationship becomes statistically insignificant when controlling for observable factors (see the regression results in the [Appendix](#)).

Farmers are equally likely to use CAN fertilizer during the maize growth and establishment phase, regardless of the type of message they receive from KALRO.

Type of Fertilizer Used

Q: What types of fertilizer did you apply when you were growing your maize? (n = 1,229 | Treatment = 622; Comparison = 607). Multi-select question.



Soil Cover and Drainage

Nearly half the farmers in both groups reported creating drainage channels. 3 in 10 farmers reported using plant material as soil cover.

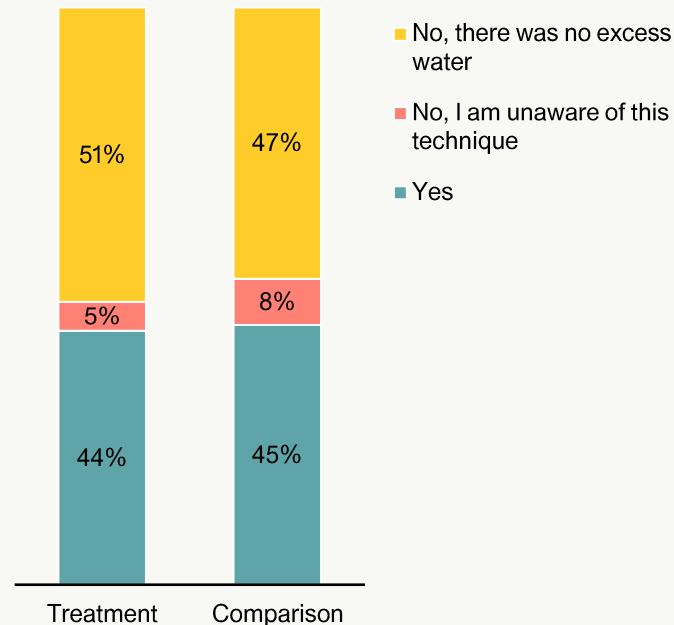
Treatment farmers and comparison farmers use soil cover and drainage techniques at the same rate.

A quarter of farmers in both groups say they are 'unaware' of using plant material.

Farmers from Nyeri (45%) and Bomet (40%) were more likely to report that the conditions were not dry enough for them to cover the soil, in contrast to farmers from Baringo (32%). Farmers in Nyeri are also less likely to indicate unawareness of soil cover techniques (18%).

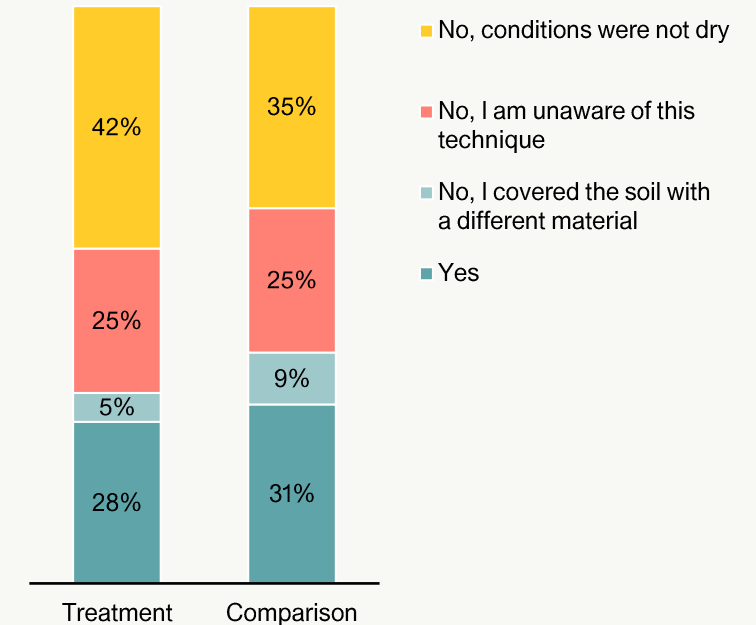
Channels for Water Drainage

Q: Did you create channels to drain excess water this season? (n = 1,229 | Treatment = 622; Comparison = 607)



Plant Material as Soil Cover

Q: Did you cover the soil with plant material? (n = 1,226 | Treatment = 621; Comparison = 605)



Weeding and Waste Management

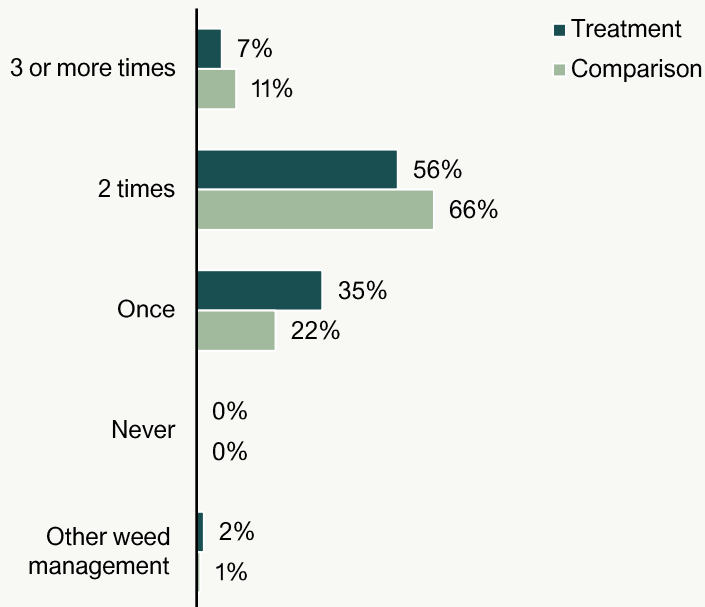
After controlling for observable factors, comparison farmers were more likely than treatment farmers to report weeding their maize crop more than once this season, as shown in the [Appendix](#) regression results.

TomorrowNow enhanced messages suggested removing and either burning or burying infected maize crops. However, few farmers report this practice, and after controlling for observable factors, we find that treatment farmers are less likely to report burning or burying the damaged maize.

Treatment farmers report weeding their maize less often than comparison farmers. A third of farmers in both groups report leaving infected maize on the plant.

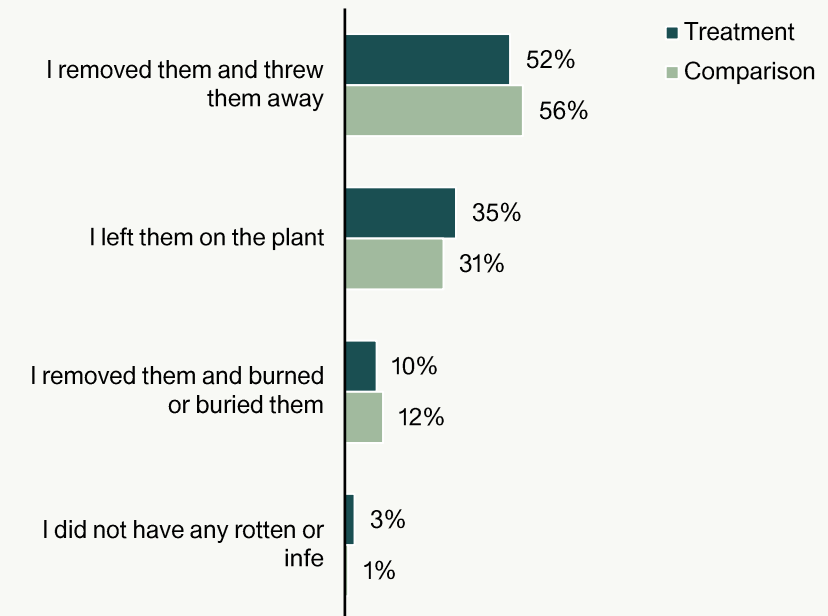
Weeding

Q: How often did you weed your maize crop this Masika season? (n = 1,229 | Treatment = 622; Comparison = 607)



Crop Waste Management

Q: How did you manage most of your infected or rotten maize this Masika season (n = 945 | Treatment = 475; Comparison = 475)



Crop Damage

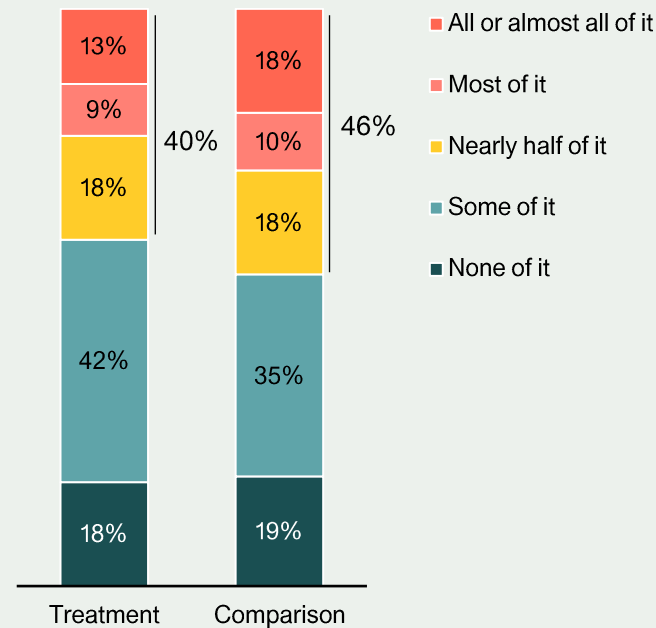
More comparison farmers (46%) report damage to half or more of their crop compared to treatment farmers (40%). This difference is statistically significant after controlling for observable characteristics in both groups (see the regression results in the [Appendix](#)).

Treatment farmers more often attribute crop damage to pests, while comparison farmers more frequently cite moisture as the cause.

Farmers receiving the TomorrowNow enhanced advisory report less crop damage.

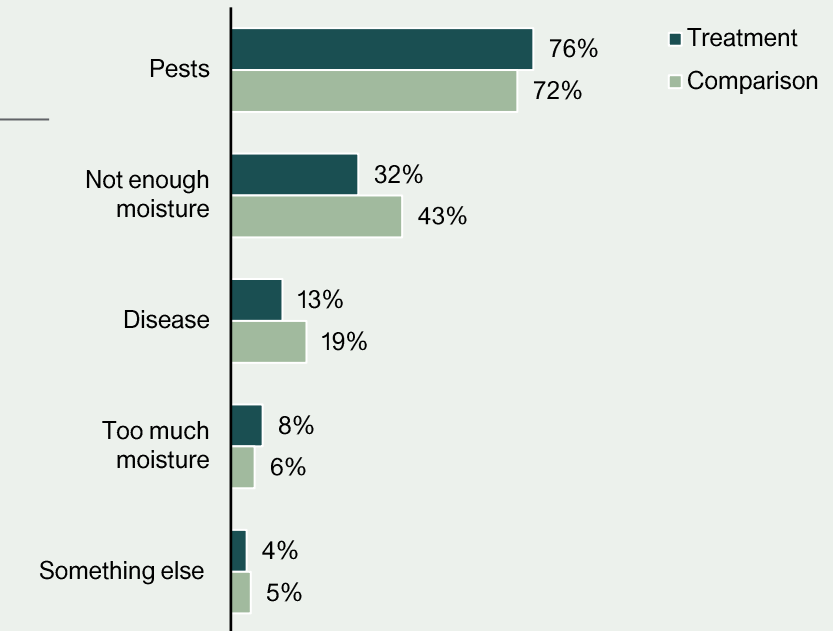
Proportion of Crop Damaged

Q: How much of your maize crop was spoiled or damaged this Masika season? (n = 1,229 | Treatment = 622; Comparison = 607)



Reason for Crop Damage

Q: Was it damaged or spoiled because of: (n = 1,003 | Treatment = 513; Comparison = 490) Multi-select question.



Quality of Harvest

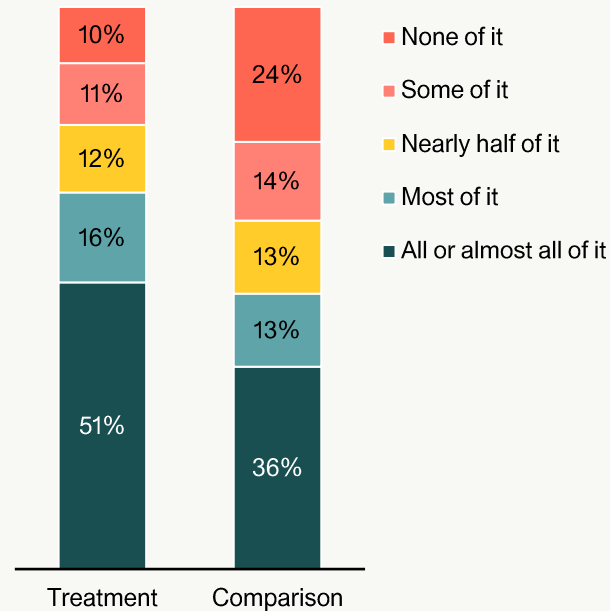
After controlling for covariates, treatment farmers are more likely to report that their harvest quality was 'much better' compared to the average masika season (see regression results in [Appendix](#)).

*We conducted interviews with 216 farmers in the treatment group in December while the rest of the interviews were conducted in October. This is likely driving the higher portion of treatment farmers having harvested their maize at the time of the interview.

Treatment farmers are more likely to report improvements in maize quality compared to an average year.

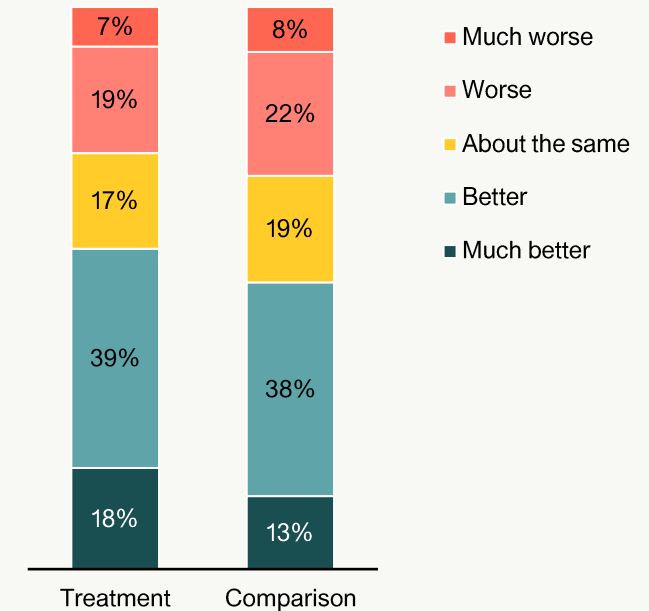
Proportion of Maize Harvested

Q: How much of your maize have you harvested this Masika season? (n = 1,227 | Treatment = 622; Comparison = 605) *



Quality of Harvest

Q: How would you rate the quality of this year's maize harvest compared to the average Masika season? (n = 1,017 | Treatment = 559; Comparison = 458)



Yield

Farmers in both the treatment and comparison groups were asked about their maize harvest this season.

In the treatment group, farmers reported an average of 567 kg/acre, while those in the comparison group reported 676 kg/acre.


Controlling for observables, this difference is not statistically significant, suggesting that it is not influenced by the type of message received by farmers (see regression results in [Appendix](#)). The main drivers of this difference are gender, county, and education.

22% of farmers in the treatment group reported an increase in production due to KALRO, compared to 16% in the comparison group.

Treatment farmers report smaller harvests but are more likely to say their production 'very much increased' because of KALRO's advice.

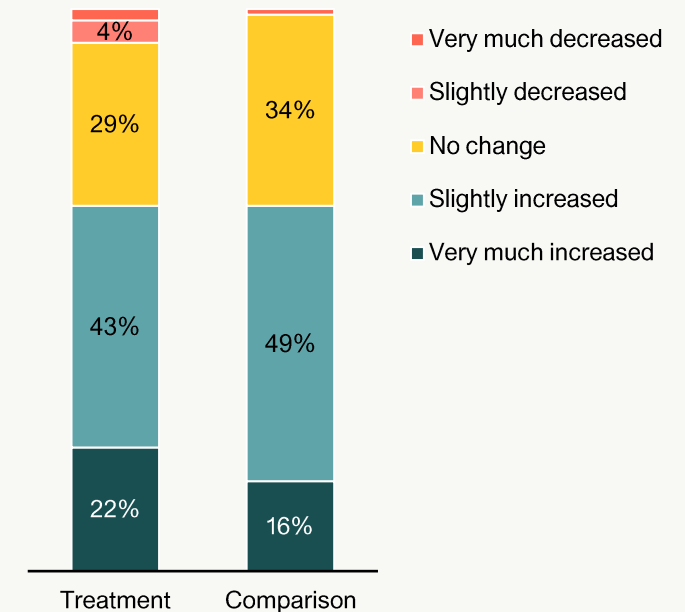
Harvest Volume (Maize)

Q: In total, how much maize per acre or hectare did you produce this Masika season? (n= 989 | Treatment = 538 | Comparison = 451)

Metric	Treatment	Comparison
 Harvest Volume (average kg per hectare)	567	676

Production Change

Q: Has the total production from your maize changed because of KALRO's advisory? (n = 426 | Treatment = 199; Comparison = 227)



Sale of Maize

Fewer treatment farmers (24%) reported selling their crop this season compared to male farmers (42%), despite treatment farmers harvesting more. This might be because treatment farmers are more likely consume all of their produce (see page [14](#)).

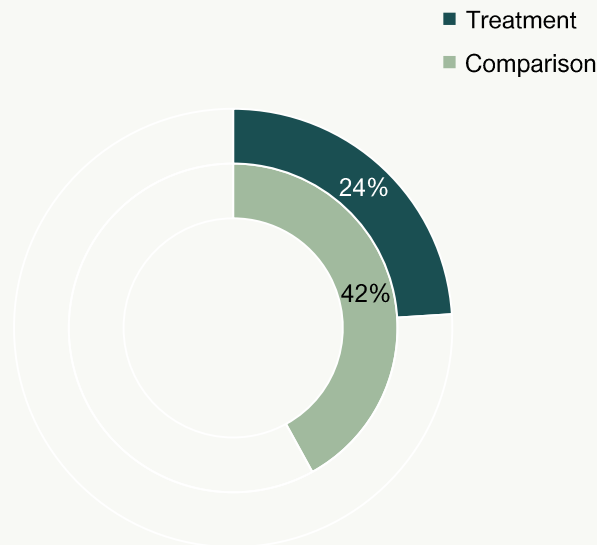
We asked farmers who had sold their maize to reflect on the price they received for it. Farmers receiving TomorrowNow messages are less likely to say they received a 'good' or 'very good' price. This is statistically significant after controlling for observables.

(See regression results in [Appendix](#)).

Farmers in the comparison group are more likely to say the price they received for their maize was 'good' or 'very good.'

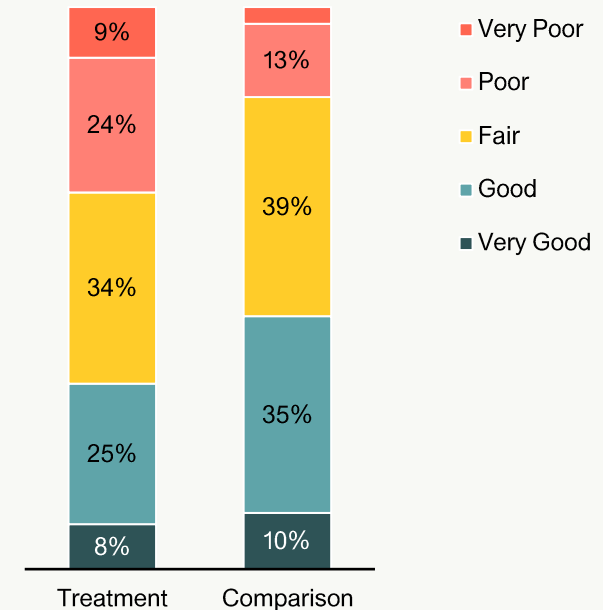
Maize Sold

Q: Have you sold any of your maize from this maize season?
(n = 1,021 | Treatment = 561; Comparison = 460)



Price Received

Q: Do you feel the price you received for your maize this Masika season was ? (n = 327 | Treatment = 135; Comparison = 192)



Quality of Life

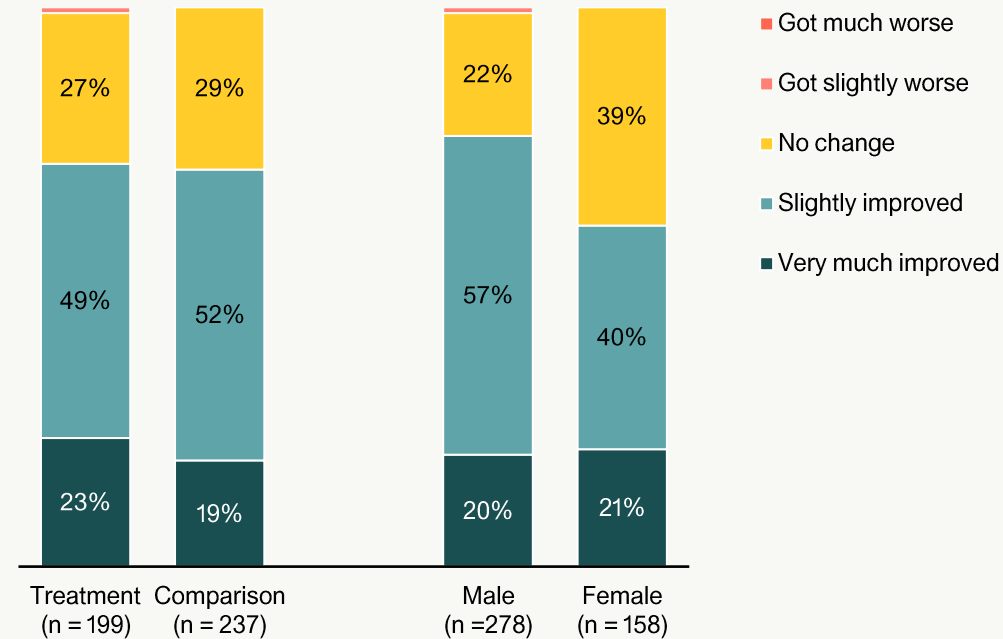
Among farmers who report receiving advisory messages from KALRO, 7 in 10 say their quality of life has improved. This is consistent across treatment groups.

To measure depth of impact, we asked farmers if KALRO's advisory changed their quality of life. Male farmers in both groups were more likely to report improvements compared to their female counterparts.

Learn about the reasons behind these improvements on the next page.

Perceived Quality of Life Change

Q: Has your quality of life changed because of KALRO's advisory? Has it (n = 436 | Treatment = 199; Comparison = 237)



Comparison: Agriculture Benchmark

● ● ● ● ● - Bottom 20%

Quality of Life: Top Outcomes

Farmers were asked to describe – in their own words – the changes they were experiencing because of KALRO’s services.

The top outcomes for improvement in quality of life are shown on the right. Others notable outcomes are:

- > Ability to afford education (14%)
- > Ability to afford household expenses and bills (14%)

Farmers stating 'no change' indicate that the advice didn't make a difference in their farming outcomes. They also encountered adverse weather conditions or faced challenges related to literacy and finance.

Treatment farmers mention increased ability to buy food, enhanced farming knowledge, and higher income as their top quality of life improvements.

Top Outcomes for Quality-of-Life Improvement: Treatment Group

Q: How has it improved? (n = 310). Open-ended, coded by 60 Decibels.

- 50%** mention **ability to afford food** (11% of all farmers)
- 36%** talk about improved **farming knowledge** (8% of all farmers)
- 18%** say **income increased** (4% of all farmers)

“The improvement is that I had a better harvest which is a saving for me when it comes to stocking food for the family.”
– Female, 46, Treatment

Top Outcomes for Quality-of-Life Improvement: Comparison Group

Q: Why has it not changed? (n = 124). Open-ended, coded by 60 Decibels.

- 41%** talk about improved **farming knowledge** (11% of all farmers)
- 30%** mention **ability to afford food** (8% of all farmers)
- 30%** say **income increased** (8% of all farmers)

“I never knew when to start planting or harvesting. I used to wait to see other people planting but now I know when to start” – Female, 50, Comparison

Farming Decisions Based on Advisory

We directly asked farmers who reported receiving KALRO SMS advisory about the decisions they made using the advisory.

The most common decisions made by farmers in both groups, based on the advisory received, include inspecting for pests and weeds, deciding on sowing and soil preparation time, and selecting the type of fertilizer and seeds to be used.








19% of farmers reported not using the advisory for any listed farming decisions, compared to 10% in the post-planting report.

Blue indicates >10 percentage point difference between groups.

Among farmers receiving messages, more farmers in the treatment group say the advisory influenced their decision to use soil cover and make drainage channels.

Farming Decisions Based on Advisory

Q: Did you make any of the following decisions on your maize farm using the advisory SMS sent by KALRO in this Masika season? (n = 450 | Treatment = 210; Comparison = 240) Multi-select question.

Activity	Treatment	Comparison
 When to prepare the soil	57%	53%
 When to plant	53%	47%
The type of seed to plant	31%	34%
 How much fertilizer or pesticide to use	32%	38%
 The type of fertilizer or pesticide to use	33%	40%
When to inspect for pests or weeds	40%	44%
 The type of pests to inspect for	28%	37%
 How to remove pests and weeds	32%	27%
Using soil cover	21%	11%
 Making water drainage channels	26%	18%

Experience with Advisory

This section highlights farmers' experience with the advisory they received. These indicators are only collected for farmers who report receiving KALRO advisory messages this season.

The key indicators in this section are:

- **Farmer Satisfaction:** How satisfied are farmers with the advisory they received? What are the top drivers for satisfaction?
- **Engagement with Advisory:** How accurate was the advisory for farmers? Do farmers find relevance and apply advisory to their farms?
- **Overall Farming Experience:** How do farmers perceive if they no longer have access to the advisory? Has their farming experience changed because of the advisory?
- **Alternative Practices from KALRO:** What farming practices would farmers like to receive advisory on from KALRO but currently do not?



Farmer Satisfaction

KALRO's SMS advisory service has a Net Promoter Score® of 10, which is fair, and similar for both types of messages.

The Net Promoter Score® is a gauge of satisfaction and loyalty. Anything above 50 is considered very good. A negative score is considered poor.

Overall, KALRO's SMS advisory service has a Net Promoter Score of 10. This is fair but below our 60 Decibels Agriculture Benchmarks, and lower than the NPS reported in the post-planting survey (44). This suggests that the information provided by KALRO may be more relevant earlier in the season.

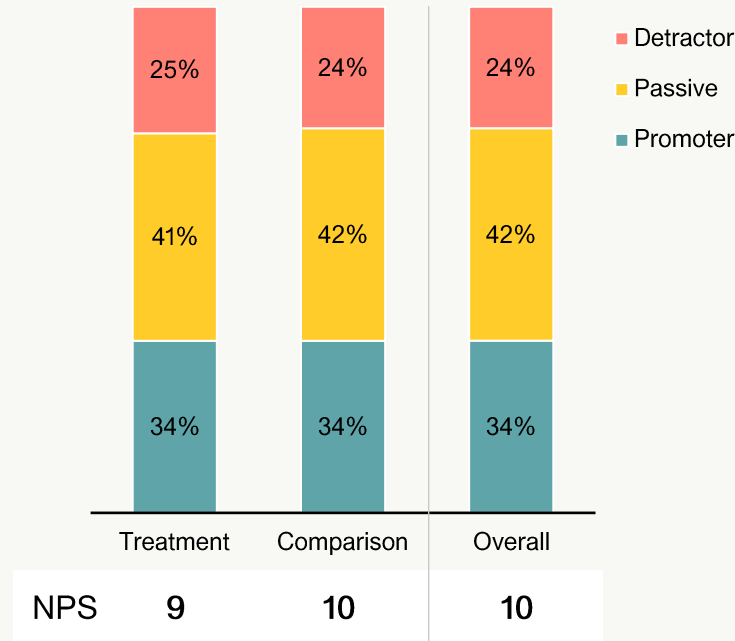
Asking farmers to explain their rating provides insight into what they value and what creates dissatisfaction. These details are on the [next page](#).

Comparison: Agriculture Benchmark



Net Promoter Score® (NPS)

Q: On a scale of 0 to 10, how likely are you to recommend KALRO to a friend or family member, where 0 is least likely and 10 is most likely? (n = 450 | Treatment = 210; Comparison = 240)



NPS = % Promoters — % Detractors

9-10 likely to recommend 0-6 likely to recommend

NPS Benchmarks

60 Decibels Global Benchmark 50
583 companies

Eastern Africa Benchmark 47
188 companies

Agriculture Benchmark 46
29 companies

Drivers of Satisfaction

Promoters value empowering and engaging learning experiences while Detractors complain about a lack of practical assistance.

34% are Promoters :)

They love:

	Treatment	Comparison
1.	Content on crop management (35% of Promoters; 4% of all respondents)	Educative farming knowledge (28% of Promoters; 4% of all respondents)
2.	Ability to prepare and plan (31% of Promoters; 4% of all respondents)	Content on crop management (27% of Promoters; 4% of all respondents)
3.	Educative farming knowledge (25% of Promoters; 3% of all respondents)	Information on pest control and prevention (27% of Promoters; 4% of all respondents)

“The information they gave me is relevant, made my planting season more successful. Without the advice, I would not have known when to prepare my farm.” - Male, 43, Treatment

42% are Passives : \

They like:

	Treatment	Comparison
1.	Accuracy and reliability (28% of Passives; 4% of all respondents)	Accuracy and reliability (35% of Passives; 6% of all respondents)
2.	Educational value (27% of Passives; 4% of all respondents)	Educational value (34% of Passives; 6% of all respondents)
But complain about:		
1.	Irrelevant content (15% of Passives; 2% of all respondents)	Irrelevant content (25% of Passives; 4% of all respondents)

“They give relevant information to help my farming, but it is not perfect due to the climate conditions. They should also add information about poultry.” - Female, 53, Treatment

24% are Detractors :(

They want to see:

	Treatment	Comparison
1.	Need for practical assistance (26% of Detractors; 2% of all respondents)	Organized and relevant messaging (40% of Detractors; 4% of all respondents)
2.	Organized and relevant messaging (15% of Detractors; 1% of all respondents)	Need for practical assistance (21% of Detractors; 2% of all respondents)
3.	Better communication (13% of Detractors; 1% of all respondents)	Better communication (18% of Detractors; 2% of all respondents)

“KALRO should increase the frequency in which they send text messages to me. I can receive once or twice in a month which is not enough.” - Male, 44, Comparison

Comprehensibility and Accuracy of Advisory

We asked farmers to assess the accuracy and ease of understanding of the advisory messages they received from KALRO.

We detected no difference in ease of understanding the information shared in the advisory and the perception of accuracy of the advisory between the two groups.

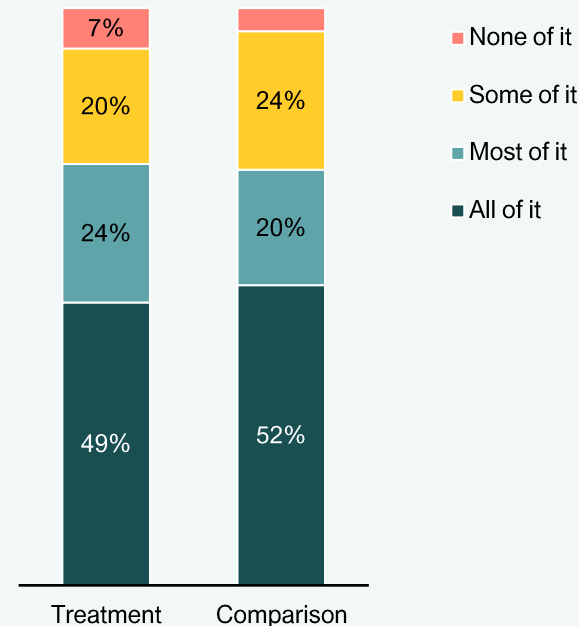
Male farmers (60%) and those with secondary education or higher (59%) are more likely to fully comprehend advisory information, whereas female farmers (39%) and those with only primary education or below (32%) have lower comprehension rates.

Treatment farmers are more likely to report that 'most' or 'all' of the information they receive is accurate.

Half of farmers understood all the information shared in KALRO's advisory and 18% found all of it accurate.

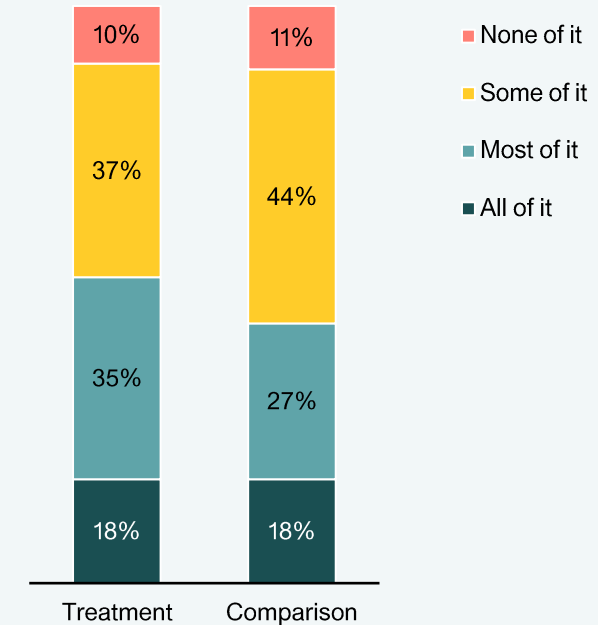
Ease of Understanding Advisory

Q: How much of the information and advice you received through KALRO's SMS service this Masika season was easy to understand? (n = 443 | Treatment = 206; Comparison = 237)



Accuracy of Advisory

Q: How much of the weather information you received from KALRO's SMS advisory this Masika season was accurate? (n = 428 | Treatment = 201; Comparison = 227)



Timeliness and Relevance of Advisory

We assessed whether farmers found the information in the advisory messages relevant to their maize farming practices.

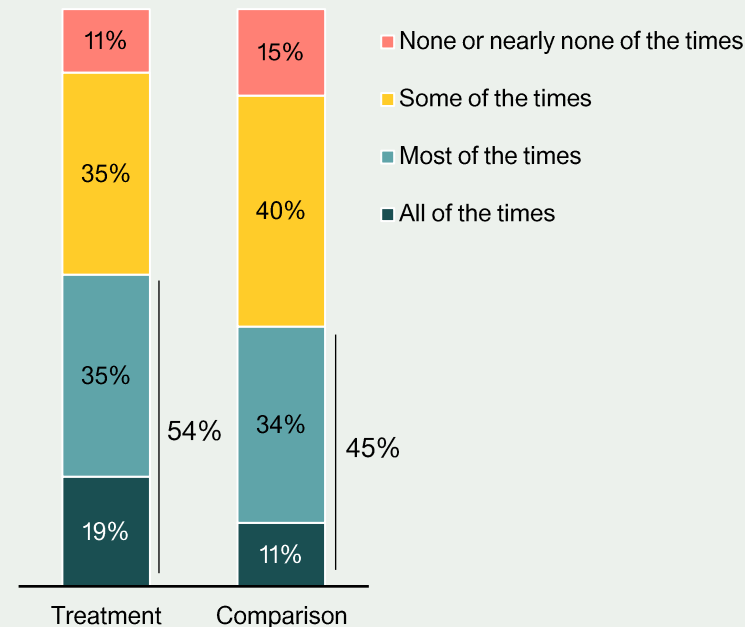
Farmers in the treatment group were more likely to report that “all” or “most” of the advisory was relevant to their farm (54%), compared to farmers in the comparison group (45%).

The proportion is lower than in the post-planting period, suggesting that the information received during planting is more timely and relevant.

Farmers receiving TomorrowNow messages are more likely to report that the service is timely and relevant than farmers in the comparison group.

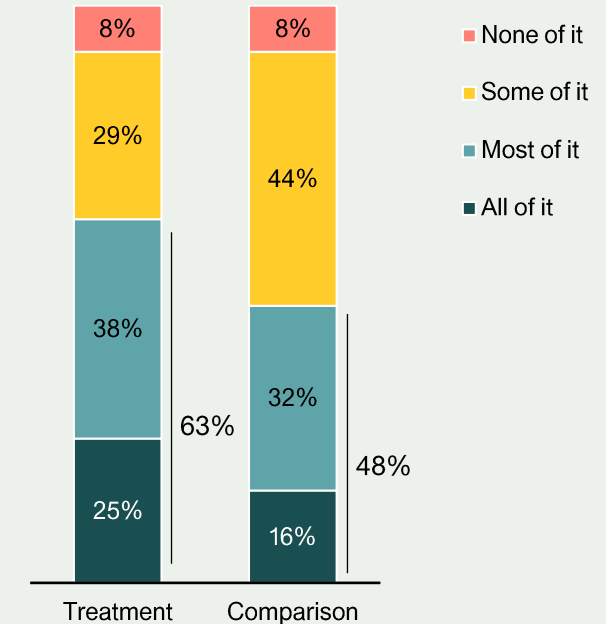
Timeliness of Advisory

Q: How often did you receive information or advice for your maize farm from KALRO exactly when you needed it this Masika season? (n = 426 | Treatment = 195; Comparison = 231)



Relevance of Advisory to Farm

Q: How much of the information and advice you received through KALRO's SMS service this Masika season was relevant to your farm? (n = 430 | Treatment = 200; Comparison = 230)



Application of Advisory

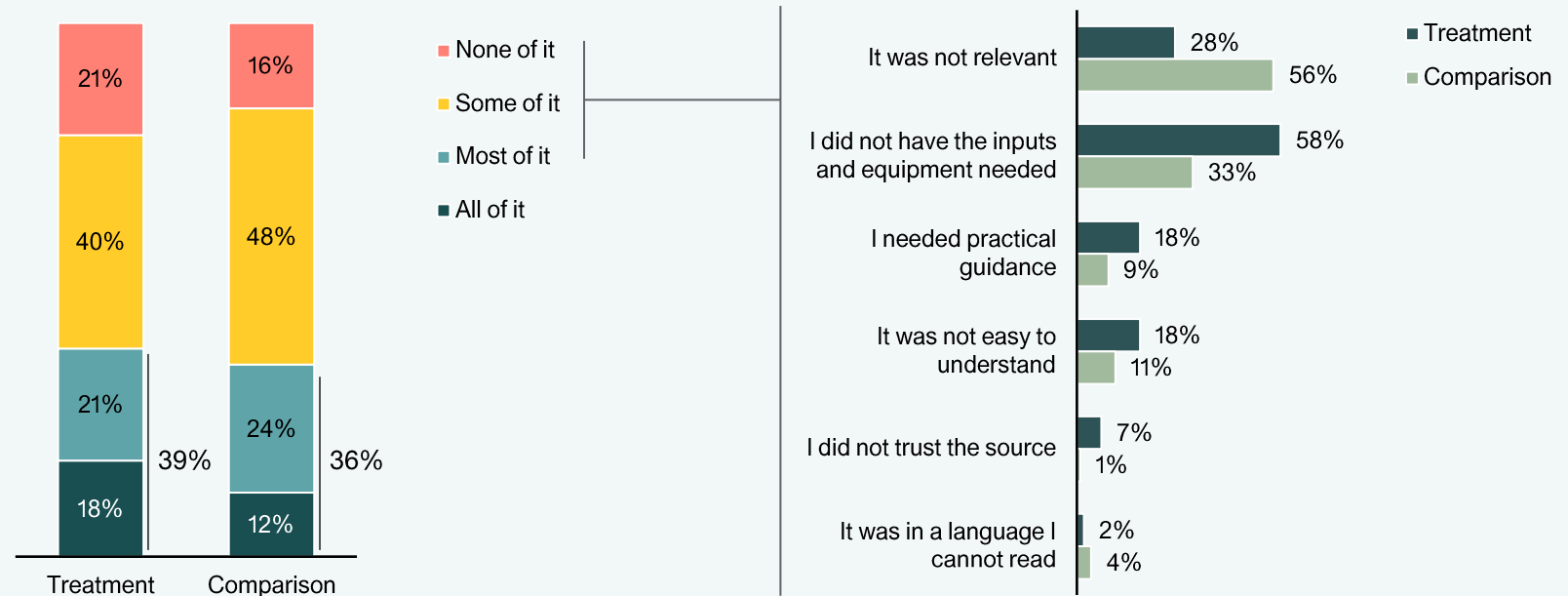
4 in 5 treatment farmers did not implement all the advice received from KALRO, primarily due to the lack of necessary inputs and equipment.

We asked farmers to reflect on how much of the advisory they applied to their maize farm this Masika season.

For farmers who did not apply 'all' the information to their farm, 56% of comparison farmers said the reason was a lack of relevance, compared to 28% of treatment farmers. The top barrier for treatment farmers was a lack of inputs and equipment (58%).

Application of Advisory to Farm

Q: How much of KALRO's SMS advisory did you apply to your maize farm this Masika season? (n = 447 | Treatment = 208; Comparison = 239)



Overall Farming Experience

We assessed the farmers' perceived impact of the SMS advisory by asking farmers about their feelings if they could no longer use the service and its impact on their overall farming experience.

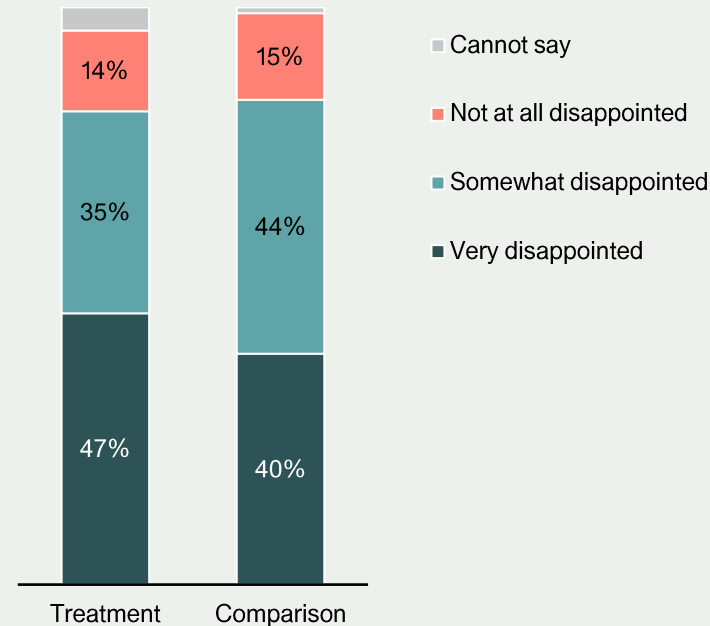
Treatment farmers were more likely to report they would be 'very disappointed' at the loss of the services, and that their farming season was 'much better' as a result of the advisory (33%), compared to the comparison group (24%).

Farmers who applied 'all' the information from the advisory are much more likely to report feeling very disappointed (80%) compared to farmers who applied only some of it (40%).

More farmers receiving TomorrowNow messages say they would be 'very disappointed' if they could no longer use it.

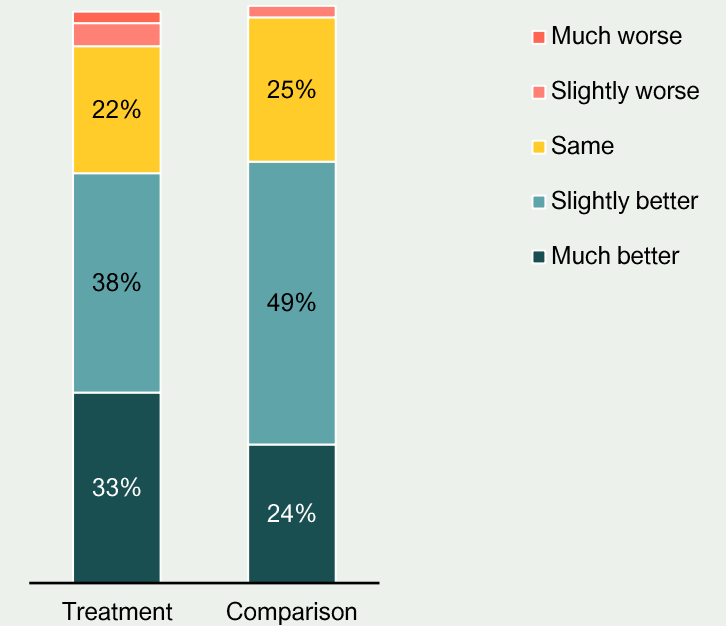
Perception of Non-Access to Advisory

Q: How would you feel if you could no longer receive and use KALRO's SMS advisory? Would you be: (n = 450 | Treatment = 210; Comparison = 240)



Overall Experience with Farming

Q: Overall, has your experience of this Masika season been better, the same, or worse because of KALRO's SMS advisory? Has your experience of the farming season been: (n = 437 | Treatment = 200; Comparison = 237)



Alternative Practices from KALRO

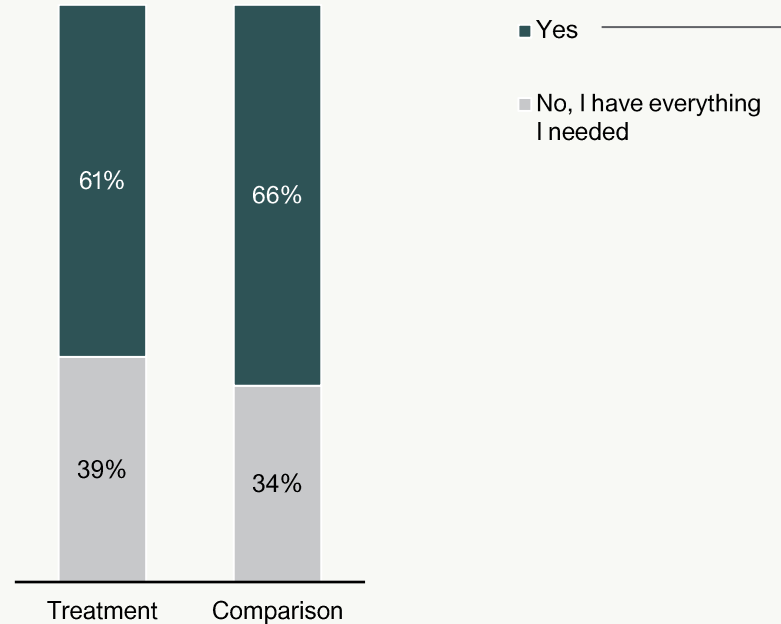
Farmers were asked about any additional information and advice they want to receive from KALRO.

While some suggested topics align with KALRO's existing messaging, responses indicate a preference for more specific guidance, particularly tailored to crops and regions.

3 in 5 treatment farmers want more targeted advice from KALRO, especially on crop and disease management and diversification.

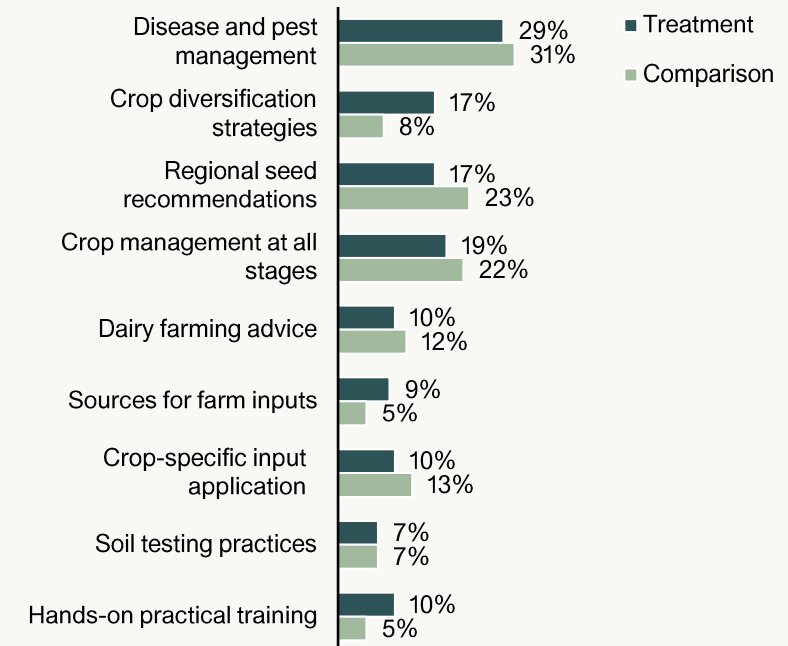
Additional Advisory from KALRO

Q: Are there any practices on which you would like to receive advisory from KALRO but currently do not?? (n = 425 | Treatment = 190; Comparison = 235)



Top Suggestions

Q: If "Yes", please specify. (n = 230 | Treatment = 116; Comparison = 156). Open-ended, coded by 60 Decibels

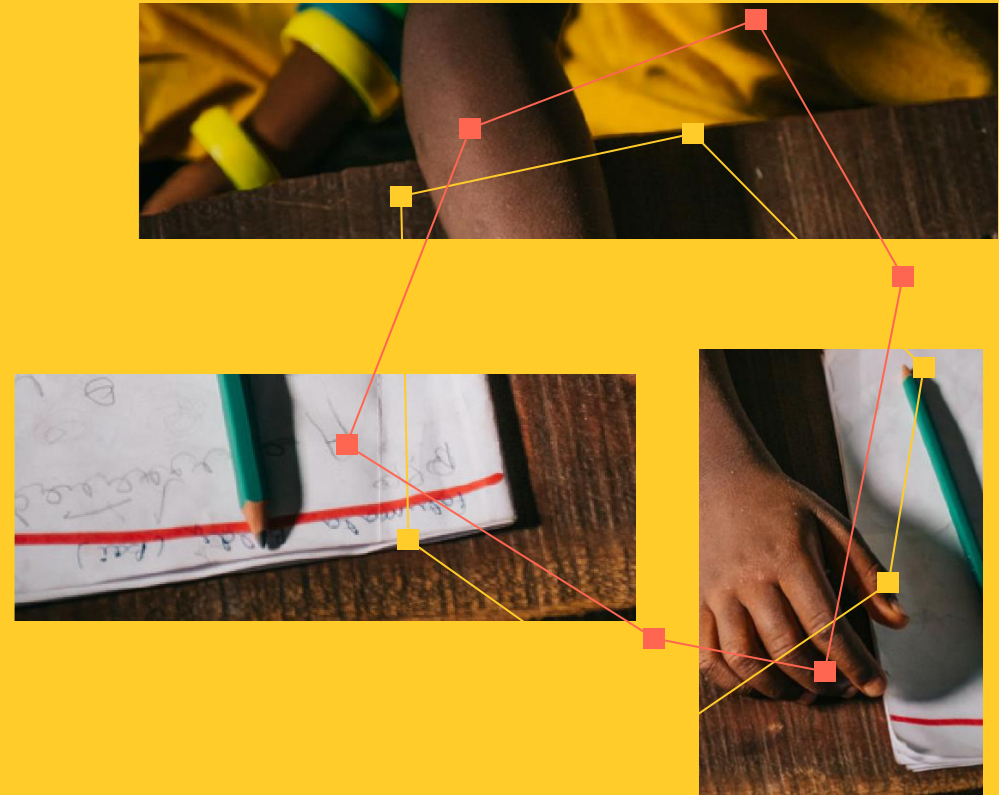


“Because KALRO messages come in handy at the right time, just when you need them. They provided us with forecasts of the predicted El Niño, making us harvest our maize crops early.”

- Female, 26, Treatment

Appendix

- Additional Insights
- Regression Table
- Calculations & Definitions
- Summary Of Data Collected
- Detailed Benchmarking Comparison
- How to Make the Most of These Insights



Regression Results

Treatment-effects estimation estimator: regression adjustment

Estimator (1-6,8-9): Logit

Estimate (7): Linear Regression

Number of observations: 1,229

How to read:

Logit fits a logit model for a binary response by maximum likelihood. It models the probability of a positive outcome given a set of regressors.

ATET is the average treatment effect on the treated, or the change in probability of an outcome if an individual receives TomorrowNow-enhanced messages. For example: A farmer is 13 percentage points less likely to report weeding more than once per season if they receive TomorrowNow-enhanced messages.

	(1) Use of CAN	(2) Unaware of soil cover techniques	(3) Weed more than once	(4) Bury or burn infected maize	(5) More than half of maize crop damaged	(6) Quality is 'much better' than average	(7) Yield (kg/acre)	(8) Production 'very much increased' due to KALRO	(9) Price is 'good' or 'very good'
ATET	0.040	0.023	-0.131***	-0.097***	-0.065**	0.077**	-59.819	0.0249	-0.146**
Standard Errors	(0.027)	(0.025)	(0.028)	(0.034)	(0.029)	(0.033)	(59.857)	(0.014)	(0.091)

Covariates included in the regression (controlled for): Gender, Age, Baringo County, Bomet County, Completed Highschool, Gender of Head of Household, Smartphone Use, Household Size-Adults, Household Size-Children, Land Size (Acres), Main Income Source (Non-Farm)

* Significant at 90% confidence
 ** Significant at 95% confidence
 *** Significant at 99% confidence

Additional Insights

We've segmented key metrics by gender and age groups. The results are presented below.

Question	Indicator	Gender		Young Adult	Adult	Middle Age	Old Age
		Male (n = 714)	Female (n = 515)	(18 - 25) (n = 27)	(26 - 44) (n = 478)	(45 - 59) (n = 382)	(60 and above) (n = 264)
What did you do with the crop produce from your farm in the past 12 months?	Consumed all or almost all of it	32%	41%	26%	39%	34%	33%
	Consumed most of it and sold the surplus	32%	28%	44%	26%	35%	30%
	Sold most of it and consumed the surplus	34%	29%	26%	32%	30%	36%
	Sold all or almost all of it	2%	2%	4%	3%	2%	1%
Approximately, how many of the advisory messages you received from KALRO this season did you read in full? Did you read:	All of them	53%	39%	50%	48%	51%	42%
	Most of them	17%	20%	25%	17%	22%	16%
	Some of them	26%	30%	25%	29%	21%	33%
	None of them	4%	11%	0%	6%	6%	9%

Additional Insights

We've segmented key metrics by county, gender, and age groups. The results are presented below.

County	Gender	Youth	Middle Age	Old Age
		(18 - 34) (n = 224)	(35 - 64) (n = 773)	(65 and above) (n = 154)
Baringo	Female	26%	67%	7%
	Male	34%	58%	8%
Bomet	Female	28%	67%	5%
	Male	25%	67%	8%
Nyeri	Female	6%	72%	22%
	Male	4%	71%	25%
Overall	Female	20%	69%	11%
	Male	19%	66%	15%

Calculations & Definitions

For those who like to geek out, here's a summary of some of the calculations we used in this deck.

Metric	Calculation
Net Promoter Score®	The Net Promoter Score is a common gauge of customer loyalty. It is measured through asking customers to rate their likelihood to recommend your service to a friend on a scale of 0 to 10, where 0 is least likely and 10 is most likely. The NPS is the % of customers rating 9 or 10 out of 10 ('Promoters') minus the % of customers rating 0 to 6 out of 10 ('Detractors'). Those rating 7 or 8 are considered 'Passives'.

Detailed Benchmarking Comparison

Comparison farmers are observed to have slightly more positive changes in their quality of life and satisfaction experiences than treatment farmers.

Comparison to benchmarks can be useful to identify where you are under or over-performing versus peers and help you set targets. We have aligned your results to the [Impact Management Project](#) framework – see the next slide.

Information on the benchmarks is found below:

TomorrowNow Data:

# treatment	622
# comparison	607

60dB Global Average:

# companies	646
# customers	172k+

60dB Eastern Africa Average

# companies	199
# customers	52k+

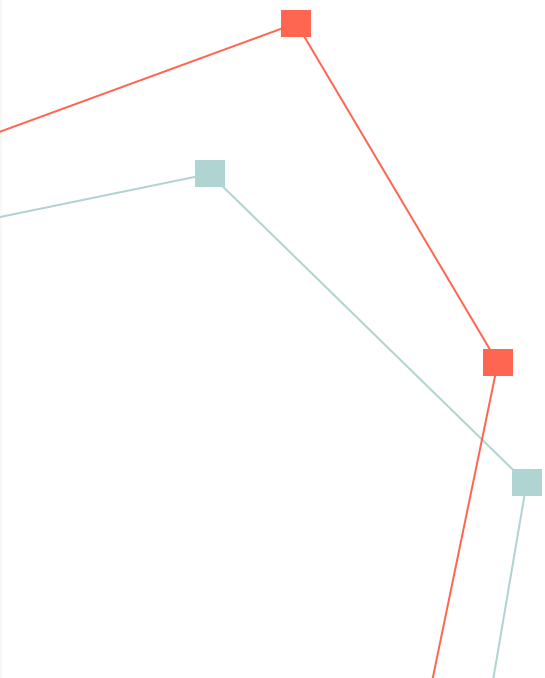
60dB Agriculture Average

# companies	32
# customers	8k+

Comparison of Company Performance to Selected 60dB Benchmarks

Dimension	Indicator	Treatment	Comparison	60dB Global	60dB Eastern Africa	60dB Agriculture
Who	% female	41	43	42	39	25
Impact	% 'very much improved' quality of life	23	19	37	47	36
Experience	Net Promoter Score	9	10	50	47	46

Summary Of Data Collected



1229 phone interviews completed in October - December 2023.

		Treatment	Comparison
Methodology			
Survey mode	Phone		
Country	Kenya		
Language	Swahili, English, Giriama, Kalenjin and Kikuyu		
Dates	October – December 2023		
Accuracy			
	Confidence level	~95%	~95%
	Margin of error	~3%	~3%
	Response rate	53%	56%
	Average time p/interview	18 mins	17 mins
Responses Collected			
Customers (Treatment)	622		
Customers (Comparison)	607		
Research Assistant Gender			
	Female	8	11
	Male	4	2

Thank You For Working With Us!

Let's do it again sometime.

About 60 Decibels

60 Decibels makes it easy to listen to the people who matter most. 60 Decibels is an impact measurement company that helps organizations around the world better understand their customers, suppliers, and beneficiaries. Its proprietary approach, Lean Data, brings customer-centricity, speed and responsiveness to impact measurement.

60 Decibels has a network of 830+ trained Lean Data researchers in 70+ countries who speak directly to customers to understand their lived experience. By combining voice, SMS, and other technologies to collect data remotely with proprietary survey tools, 60 Decibels helps clients listen more effectively and benchmark their social performance against their peers.

60 Decibels has offices in London, Nairobi, New York, and Bengaluru. To learn more, visit 60decibels.com.

We are proud to be a Climate Positive company. 

Your Feedback

We'd love to hear your feedback on the 60dB process; take 5 minutes to fill out our feedback survey [unique link!](#)

Acknowledgements

Thank you to TomorrowNow and KALRO for their support throughout the project.

This work was generously sponsored by the Bill & Melinda Gates Foundation .

The SMS I receive are usually in English and Kiswahili.

The SMS are easy to understand because they are simple.

Through KALRO advisories, the decisions I make on the farm have changed.

Ellie Turner

Hanadi Al-Saidi

Charles Kibigo

Saisi Emma

Louis Tran Van Lieu

Ivy Kinyanjui

Wanjiku Mwangi

Fred Ouma

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