GeoPoll

THE MEDIAE COMPANY
MEDIA FOR EDUCATION AND DEVELOPMENT

THE DIGITAL FARMER:

A Study of Kenya's Agricultural Sector

A GeoPoll study of livestock and crop farming and the effect of mobile technology on farming in modern Kenya

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A Background of Agriculture in Kenya

Agriculture remains the backbone of Kenya's economy, directly contributing 25% of the annual GDP and an additional 27% in indirect contribution (ASDS, 2010 – 2020). The sector employs 75% of the national labor force in a country where 80% of the population lives in the rural areas, deriving their livelihoods directly or indirectly from agriculture. The sector is therefore critical in creating employment and improving the living standards of the Kenyan people. Vulnerable groups such as pastoralists, landless people, and subsistence farmers are fully dependent on agriculture as their main source of livelihood.

Kenya is a major exporter of tea, coffee, vegetables and is the world's leading exporter of black tea and cut-flowers. Despite being a leader in export produce, farming is typically subsistence and maize (corn) remains Kenya's most produced food crop by small holder farmers, who make up a majority of the agricultural producers. Maize is a staple in most homes within and beyond Kenya and is also a key raw material in animal feeds.

Kenya's agriculture is reliant on rainfall and fully dependent on the 2 annual rainfall seasons which are experienced in some parts of the country. More than 80% of land in Kenya is either arid or semi-arid receiving minimal rainfall. Kenya's arable land, which receives enough reliable rainfall to support farming, only constitutes about 10% of the total land mass, but is responsible for 70% of the national commercial agricultural output.

Fundamentally, agriculture and the development of agriculture continues to be a catalyst for sustainable development, primarily for enhanced food security and secondarily for poverty reduction and the overall growth of a country's economy. However, Kenya's agricultural sector remains vulnerable climate change, market fluctuations, pest and disease, infrastructure problems, outdated farming production methods, and other challenges. In this report, we examine some of the characteristics of a subset of farmers in Kenya, looking at the inputs they use, challenges they face, and how they are getting support from new channels such as mobile phones.

The agricultural sector in Kenya continues to be the main source of livelihood for a large proportion of the country's population. But beyond the perennial rainfall, what other factors affect farming?

With Kenya as a trailblazer in the adoption of mobile telephones and related services, how has this advancement impacted this sector? What new trends are emerging in farming throughout Kenya? These were some of the questions we sought answer at the onset of this study.

Small-scale farmers—those who farm on small parcels of land under 2 acres and without much external labor—are an incredibly important part of producing the crops we rely on across the globe. It is often difficult for governments, NGOs, and large corporations to reach these farmers directly and gain knowledge about their processes, their growing challenges, and the points of intervention in the crop production value chain. This is especially true when the farmers are located in rural areas, as is the case for many farmers across Sub-Saharan Africa, where basic infrastructure such as roads and electricity may be lacking or poorly distributed.

This lack of up-to-date data about farming in Kenya led GeoPoll to create a farmer respondent panel in partnership with Mediae. Over 18,000 farmers in Kenya have been recruited into this panel, and for this report we surveyed more than 900 of these farmers, spread across 39 counties of Kenya. We asked questions about various aspects of their farming including:

• Farming land ownership
• Farming as a source of income
• Capital sources
• Most profitable crop and livestock
• The use of inputs such as fertilizer, seeds
• Information on agricultural practices
• Profitable produce & markets
• The biggest challenges affecting them and farming
  in Kenya
• New trends in farming

Our survey was undertaken in September 2018 via SMS. Respondents were drawn from GeoPoll's farmer panel in Kenya, and we relied on the FAOSTAT land use statistics to only target respondents in arable lands.

Due to the lack of data around the composition of the farming population in Kenya and the nature of a mobile phone-based survey, we cannot say that this group of respondents is representative of all farmers in Kenya. However, we did reach a high number of female respondents (54% of the sample), in line with reports from the World Bank that females represent up to 80% of the farming population, and the sample is split between age groups.

Although this report is not a comprehensive study of the agriculture sector in Kenya, it does create a good foundation and basis for additional research. The panel of over 18,000 farmers that has been recruited by GeoPoll opens up a range of possibilities for research, and demonstrates the power of the mobile phone as a tool for collecting fast, regular insights from the farming community. Data can be collected on specific issues in a one-off survey such as this one, or GeoPoll can run regular surveys to the same group in order to view trends in prices, market conditions, and more over time.

Areas we focused on in this report include:

• Drought and climate change
• Digital farming and the use of mobile phones
• Main challenges and latest trends in farming
• Income generation

We hope this publication provides valuable insights on Kenya's food and agriculture industry to international and local NGOs, governments, donors, and consumer companies, and inspires additional research on the agricultural last mile.

SMS
'SHAMBA'
**70555**

About GeoPoll's Farmers Panel

In 2017, GeoPoll partnered with **Mediae** – a small social enterprise that produces media programs designed for farmers, known for their flagship TV program Shamba Shape Up. As part of this partnership, GeoPoll utilized the reach of Mediae and **Shamba Shape Up** and related programming to recruit survey respondents into our database. GeoPoll created a text-in campaign which was shared via advertisements included in the Shamba Shape Up program broadcast via TV and radio. Ads ran weekly during Shamba Shape Up, which aired for 12+ weeks. GeoPoll also conducted an SMS campaign to Mediae's group of farmers in Kenya who were subscribed to their **iShamba short messaging service.**

This campaign encouraged farmers to text a keyword to GeoPoll's shortcode in Kenya in order to take surveys, share their voice, and earn airtime credit. Once they texted-in, they received a short survey verifying that they were a farmer or worked in agriculture and collecting their demographic information. From this joint partnership, GeoPoll has recruited 18,000 Kenyan farmers to be part of our Kenya farmer panel.

Study Methodology and Sample

Our survey was undertaken in September 2018 via mobile SMS. The respondent sample was 972 farmers drawn from our newly recruited panel of over 18,000 Kenyan farmers who are currently active in crop and/or livestock farming. Respondents were over 15 years old and came from 39 counties. The gender split was 54% female, 46% male falling in the following age brackets; 32% were aged between 15-24 years, 34% were 25-34 years and 33% were above 35 years old.

For more technical information about this study contact us at info@geopoll.com.

MALE
46%

FEMALE
54%

GENDER

34%

32%

33%

AGE GROUP

- 15-24
- 25-34
- 35+
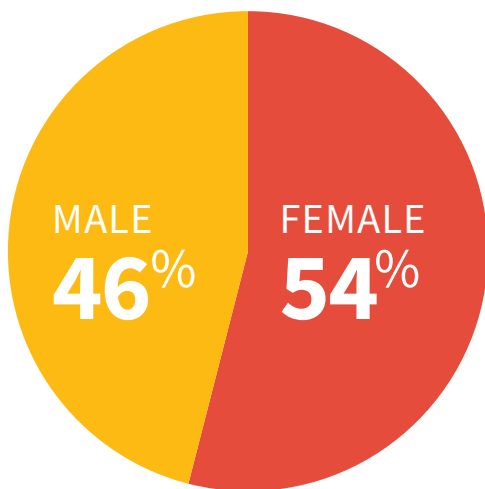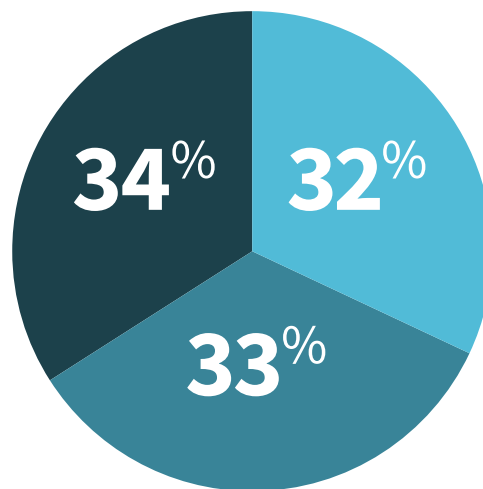
Nakuru	

Tharaka-Nithi	
Nyeri	
Uasin Gishu	

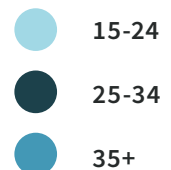|	
Narok	
Meru	
Kiambu	
Kericho	
Kisii	
Busia	
Trans Nzoia	
Laikipia	
Nyandarua	
Bomet	
Murang'a	

Vihiga	
Kirinyaga	
Embu	
Kisumu	

Siaya	
Nairobi	
Baringo	
Kakamega	
Nandi	
Migori	
Bungoma	

Kajiado	
Makueni	
Nyamira	
Mombasa	
Elgeyo-Marakwet	
Machakos	
Homa Bay	

Kilifi	
Kwale	
Taita-Taveta	
Kitui	
Samburu	
Lamu	

Legend:
- 7%
- 5%
- 4%
- 3%
- 2%
- 1%
- < 1%
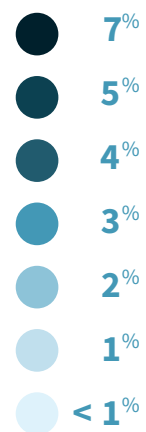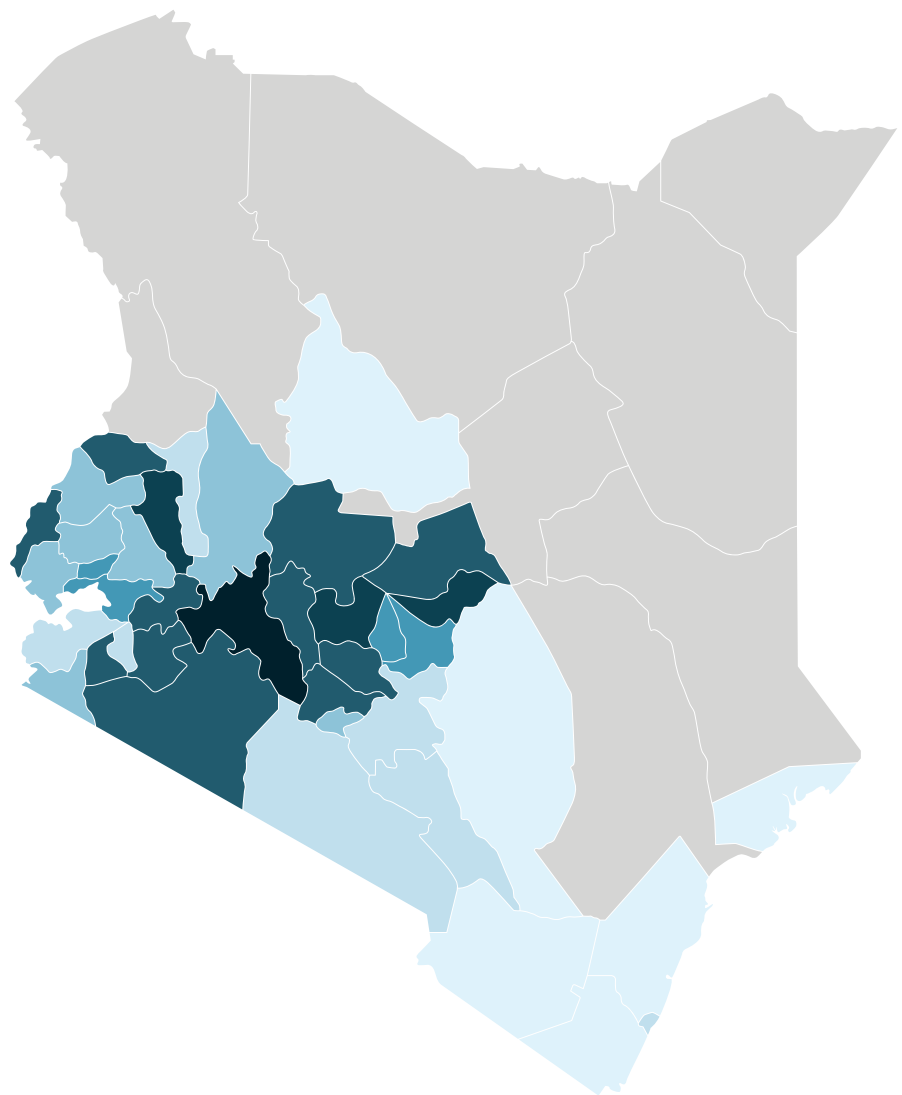
Throughout this report we will share the findings from our study about this group of farmers in Kenya. We have grouped related questions into sections which focus on basic information about farming in Kenya, how climate change and drought affect farmers, mobile phone and social media usage, and challenges and new trends in farming. Some of the key findings from the study are also listed below:

93% Produce for the local market, only 7% for export

80% Report that their farms are under 4 acres in size

79% of commercial farmers report that they're making a profit from their farming activities

68% Grow maize, the highest % growing any food crop

56% Identified as subsistence farmers

48% Practice both crop and livestock farming

34% Use fertilizer and 32% use manure on their farm

31% Use radio to get information on farming needs, and 29% gather information from other farmers
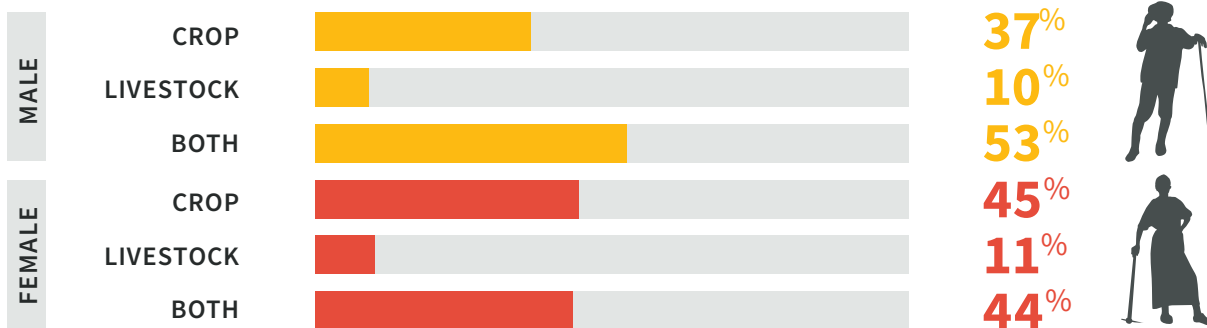
Crop and Land Information on Farmers in Kenya
a) Crop vs livestock and type of crops farmed

According to the Kenya Youth Agribusiness Strategy 2017-2021, a majority of those engaged in agricultural activities are in older age groups and practice subsistence farming. Our study found that, out of the 972 respondents, 400 (41%) are crop farmers, 106 (11%) are livestock farmers and 466 (48%) practice both. We observed a difference in type of farming based on gender, with a higher percentage of males (53%) farming both livestock and crops than females (44%). Type of farming did not differ significantly based on age group, although the middle age group (ages 25-34) were slightly more likely than the younger age group and older age group to farm livestock, with 13% of those aged 25-34 farming livestock, 11% of age 15-24 farming livestock, and only 8% of those aged over 35 primarily farming livestock.

TYPES OF FARMERS

CROP	41%
LIVESTOCK	11%
BOTH	48%
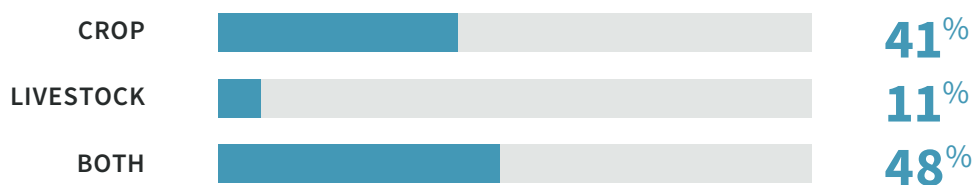
TYPES OF FARMERS BY GENDER

MALE

CROP	37%
LIVESTOCK	10%
BOTH	53%

FEMALE

CROP	45%
LIVESTOCK	11%
BOTH	44%

Out of those who farm crops, maize is by far the most popular, with 68% of respondents stating that they farm maize. Maize is a staple crop in Kenya which accounts for 3% of the GDP; It is utilized as a main food source for 80% of the population, and is also a source of feed for livestock. The growth of maize is high among all age groups and both genders, solidifying its status as one of the most important crops farmed in Kenya.

MOST COMMON CROPS FARMED IN KENYA

|	
MAIZE	68%
BEANS	24%
POTATOES	21%
TOMATOES	15%
OTHER	14%
FRUIT	9%
RICE	2%
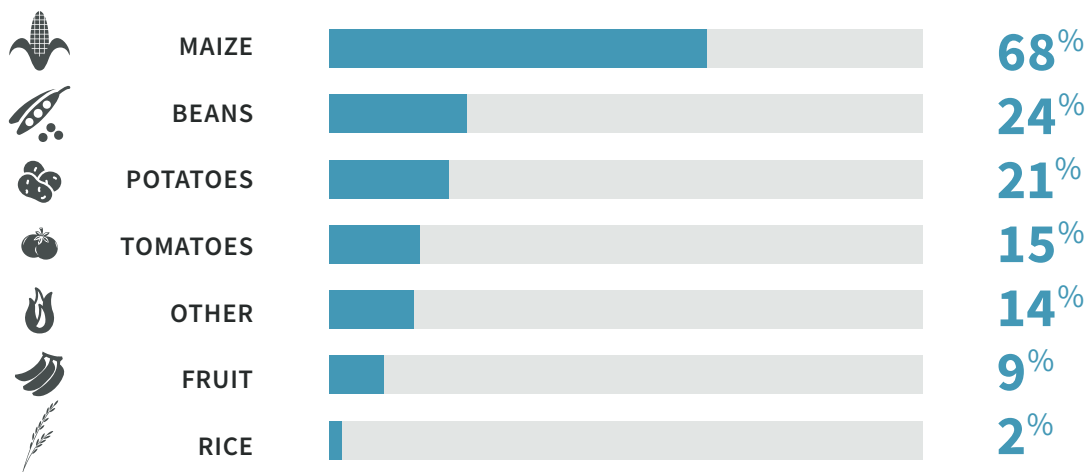
Other popular crops include beans, farmed by 24%, potatoes, farmed by 21% of respondents, and tomatoes, farmed by 15% of respondents. Interestingly potatoes seem to be farmed more often by the older age group, with 25% of those aged 35 and over farming potatoes, compared to 20% of those age 25-34 and 18% age 15-24 farming the crop. Tomatoes are also more popular with the older age groups, with 17% of those aged 25-34 and 16% of those age 35 and over farming tomatoes, and only 11% of those age 15-24. This suggests that as farmers become more experienced in their fields and the type of crops that are successful, they diversify their offerings from maize and beans.

CROPS FARMED BY AGE

|	MAIZE	BEANS	POTATOES	RICE	TOMATOES	FRUIT	OTHER
15 - 24	69%	22%	18%	1%	11%	6%	13%
25 - 34	67%	21%	20%	2%	17%	7%	11%
35 +	67%	30%	25%	2%	16%	12%	16%

For livestock farmers, cows are the most common livestock farmed, at 61%, followed by poultry at 43% and goats at 20%. For those who are farming livestock there is not a huge difference in type of livestock being farmed by gender; while males farm cows at slightly higher rates than females (65% to 57% of livestock farmers) and females farm poultry more often (45% of female livestock farmers to 41% for males), in general they farm different types of livestock at similar rates.

COW		61%
GOATS		20%
PIGS		4%
POULTRY		43%
FISH		1%
OTHER		3%
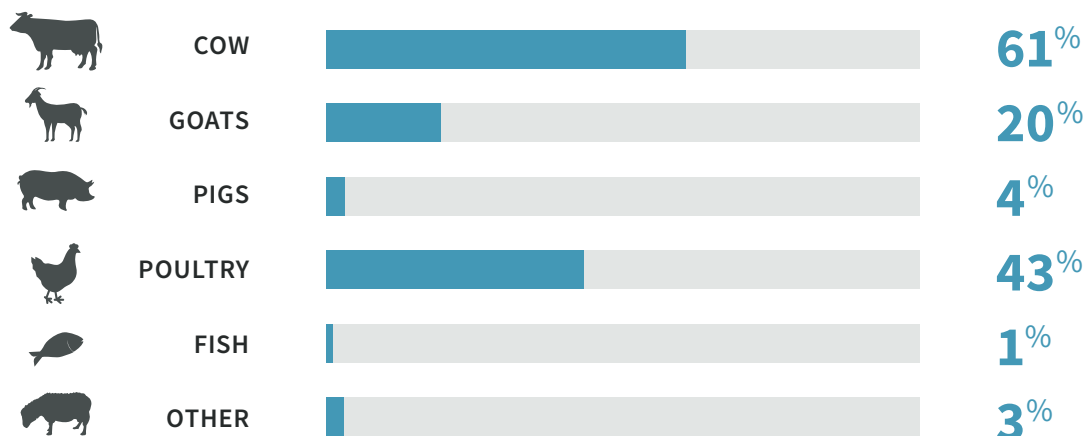
b) Land size and ownership

In May this year, UNCTAD released a report showing that 76 percent of women in Kenya are employed in agriculture. However, there is a disparity on land ownership and land cultivation. In Kenya, as in most African countries, women are responsible for crop and animal production and are given ownership of the produce, but they often do not own the land they farm. Our study found that 54% of respondents overall own the land they farm, with 29% leasing land and 11% saying that they neither own nor lease the land they farm on. While there are differences in land ownership by gender, with 57% of males owning their land compared to 51% of females, there is still a high rate of ownership reported by this group of farmers. This could indicate a changing trend, or could indicate that women farm on land owned by their families or that husbands still consider themselves as owning the land.

LAND OWNERSHIP

- 17%
- 54%
- 29%
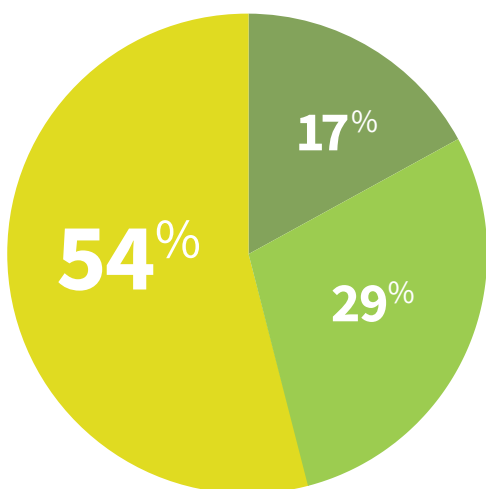
- I own the land I farmed on
- I lease the land I farmed on
- I neither own/lease the land I farmed on

Fifty percent of farmers in our study have small farms, under 1 hectare or 2.5 acres in size. An additional 30% of farmers report that their farms are between 1-2 hectares or 2.5 – 5 acres in size, demonstrating that the vast majority (80%) of farmers in our study are small-scale farmers. These figures are in line with 2005 figures from FAO, which indicate that the average farm size in Kenya is 0.86 hectares.

FARM SIZES

UNDER 1 HECTARE		50%
BETWEEN 1-2 HAS.		30%
BETWEEN 2-5 HAS.		15%
BETWEEN 6-10 HAS.		3%
BETWEEN 11-100 HAS.		1%
MORE THAN 100 HAS.		0%
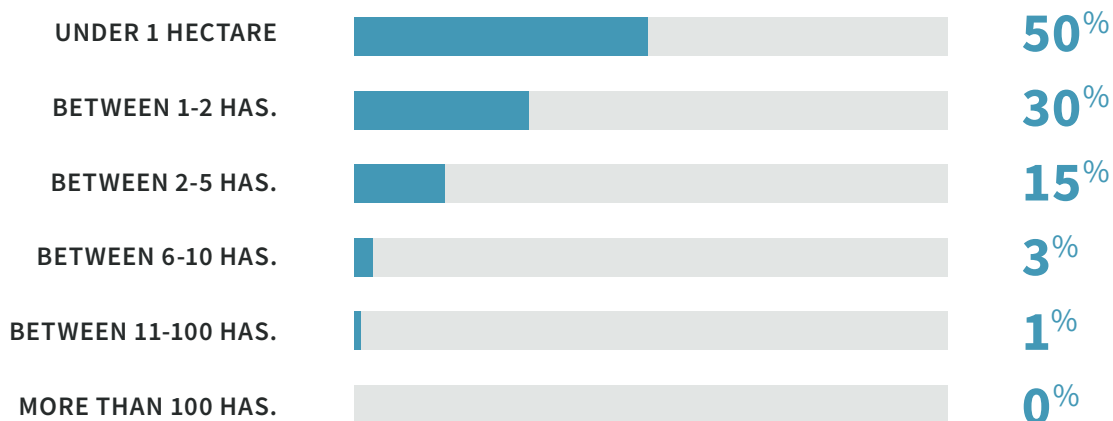
We also asked about commercial versus subsistence farming. Our study found that 56% were engaging in subsistence farming, i.e. keeping and consuming the vast majority of crops themselves, and 44% in commercial farming. Of those who farm in order to sell goods, 93% are selling goods locally, with only 7% selling to international markets or for export. Most are selling directly to buyers at a market, with 63% of commercial farmers stating this is the case. Twenty-three percent sell to food distributors, and 16% to friends and family.

SUBSISTENCE VERSUS COMMERCIAL FARMING

SUBSISTENCE **44%**   COMMERCIAL **56%**
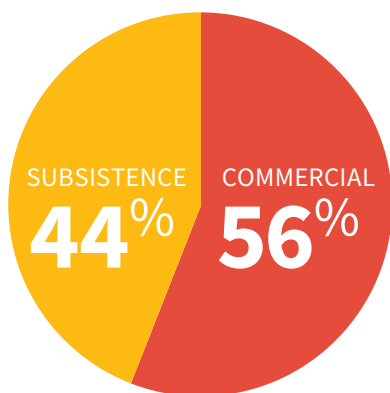
LOCAL MARKET VERSUS INT'L/EXPORT MARKET

7%   LOCAL MARKET **93%**

10%   **11%**   **79%**
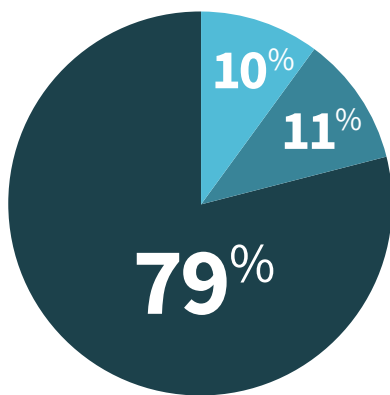
PROFIT FROM FARMING

- **I am making a profit**
- **I am making losses**
- **I am breaking even**

The majority (79%) of those selling their farmed goods in Kenya are able to make a profit, and an additional 10% say they are breaking even, with only 11% of those who farm commercially stating that they are experiencing losses.

Drought/Climate Change

Climate change has significantly affected global agriculture in the 21st century. A 2007 assessment report by Intergovernmental Panel on Climate Change (IPCC) indicates that most countries will experience an increase in average temperature, more frequent heat waves, more stressed water resources, desertification, and periods of heavy precipitation. Farmers in Kenya face a variety of challenges from pests to drought and seed quality. The changing climate has led to erratic weather that often catches farmers unaware, and has become a major concern as the situation is likely to worsen in the future. A research paper titled 'Effects of climate variability and change on agricultural production: The case of small-scale farmers in Kenya' found that temperature has a greater impact on crop production than rainfall, by reducing the production of staple crops like maize which directly reduces revenue from all the crops. Kenya has, in the recent past, experienced severe drought that has left Kenyans vulnerable because of the country's high dependency on natural resources and its low capacity to adapt and cope with climate-related impacts.

a) Factors affecting yield

Due to the factors noted above, it is not surprising that this study found climate change and drought are among the biggest factors affecting yield. Fifty percent of the farmers we surveyed said that climatic changes had affected their yield in the past season, and 17% said that drought had affected yield. Climate was also listed as one of the key challenges farmers face overall, with 27% identifying the climate as a challenge they face.

FACTORS AFFECTING YIELD IN THE PAST SEASON

DROUGHT	17%
PEST	35%
WEEDS	14%
FERTILIZER	10%
SEED QUALITY	17%
CLIMACTIC CHANGES	50%
OTHER	3%
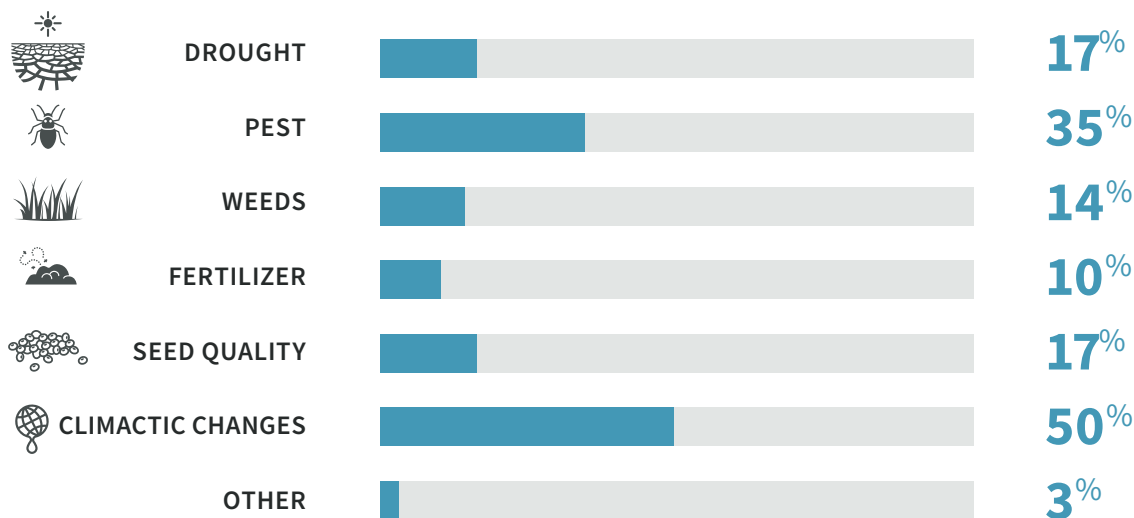
b) Availability of water for farming

We also looked into the availability of water for farming, with 45% saying water is "occasionally available", 16% "rarely available" and 3% "never available". Only 36% said water was "frequently available".

45% Occasionally available

36% Frequently available

16% Rarely available

3% Never available

Water availability differed by region, with 30% of respondents in Narok County, which experienced a dry spell in September, reporting water was "rarely available". Two of the other counties in the Rift Valley, which has experienced drought over the past few years, also reported lower than average availability of water: In Baringo just 19% said water was frequently available, and 24% said water was rarely available, and in Bomet 26% said water was rarely available.

By contrast Busia and Trans Nzoia, which are both on the border with Uganda and have not been subject to early drought warnings from the Kenyan Government, have higher than average availability of water: 43% of those in Trans Nzoia say that water is frequently available for farming, with only 8% saying it is rarely available, and in Busia just 10% say water is rarely available for farming.

c) Food security

Climate change and drought also have an impact on food security, when all individuals in a population have access to enough food to meet dietary needs and maintain a healthy lifestyle. Food security in a region is linked to the production of food, and is therefore impacted when yields are low as a result of drought or changes in climate. As noted by the World Food Programme "For millions of people across Africa, Asia and Latin America, climate change means more frequent and intense floods, droughts and storms, accounting each year for up to 90 percent of all natural disasters. These can quickly spiral into full-blown food and nutrition crises."

In Kenya, climate change continues to threaten food security. Its farming sector is increasingly dependent on rainfall as its primary source of water, which is exacerbated by its low adoption rates of irrigation and other modern farming processes. As part of this study, we examined levels of food security among this group farmers in Kenya. Of all respondents 24% stated that there had been no food to eat in their household at some point in the past 4 weeks. Of those who had suffered from a lack of food, 69% reported this had occurred once or twice, and 24% said they had had no food available between 3-10 times in the past 4 weeks.

In the past 4 weeks, was there ever no food to eat of any kind in your house because of a lack of resources to get food?

NO **76**%
YES **24**%
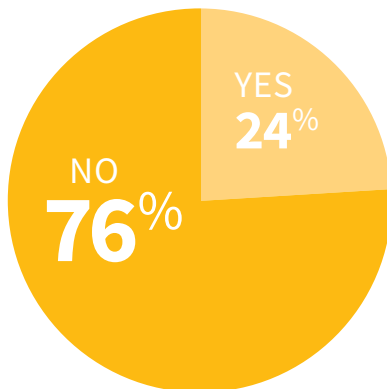
How often did this happen in the past 4 weeks?

- 🔴 1- 2 times
- 🔴 3 - 10 times
- 🔴 More than 10 times

69%
24%
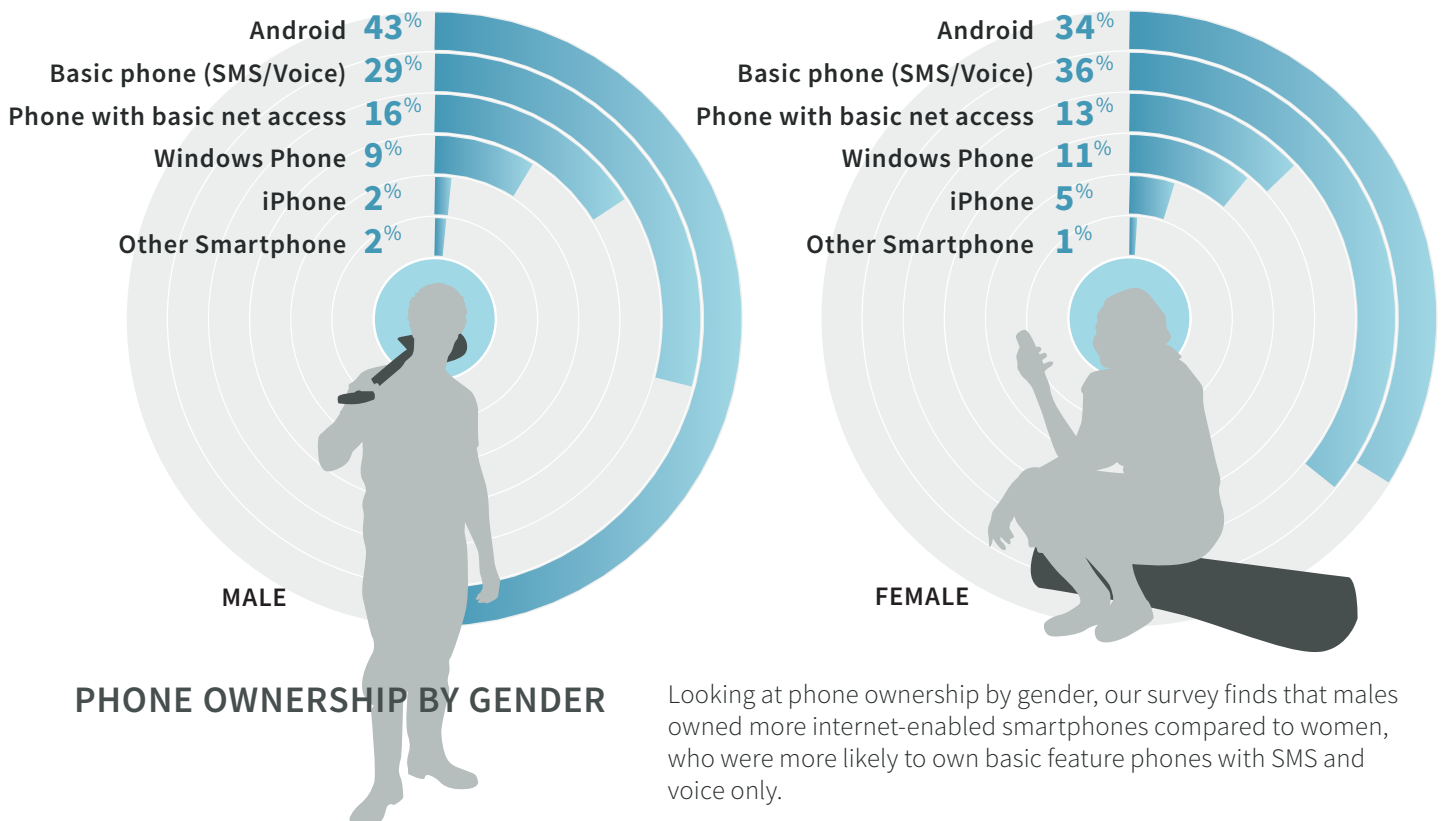**7**%
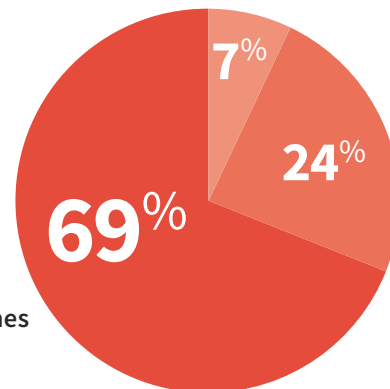
The Digital Farmer

Mobile phones have become ubiquitous in Kenya. No longer a luxury item, mobile phones are now tools for production and trade in addition to communication. Kenya has one of the highest rates of mobile phone penetration in Africa after Nigeria and South Africa: Mobile penetration is currently at 95%, according to the latest statistics from the Communications Authority of Kenya (CAK).

The impact of mobile phones extends beyond the telecom sector, with mobile-based innovations that aim to solve everyday problems regularly developed in Kenya. This is particularly true for the agricultural sector, where mobile farming applications have become more and more popular. Reliance on rain-fed farming, temperature fluctuations due to climatic changes, unpredictable market prices, and the need to access all this information quickly are some of the factors that have given rise to mobile-enabled farming (mFarming). Mobile phones are reducing the information deficit by addressing challenges such as keeping up with weather patterns, knowing where to purchase certain farm inputs at an affordable cost, and determining the current market conditions.

Twenty-eight percent of our farmer panel reported 'prices' as one of their key challenges. The mobile phone is now disrupting the agricultural value chain which has in the past led to the exploitation of small-scale farmers by middlemen and traders, who previously were the only custodians of information about market conditions with sole access to the buyers. Although traders, distributors, and middlemen continue to participate in the value chain, the farmer is now more informed and has more bargaining power due to the increased use of mobile phones as a source of information on market conditions.

a) Mobile phone ownership

All 972 farmer respondents for this study owned either a basic feature phone or a smartphone due to the mode through which they were recruited and subsequently surveyed. This sample is therefore more likely to have a higher mobile phone usage rate than the average farmer in Kenya, however we can still glean interesting information about the usage of mobile phones from this study. Out of our respondents, 53% percent indicated that they were using a smartphone, whereas 47% had access to either a basic feature phone with SMS or one that has basic Internet access.

	MALE	FEMALE
Android	43%	34%
Basic phone (SMS/Voice)	29%	36%
Phone with basic net access	16%	13%
Windows Phone	9%	11%
iPhone	2%	5%
Other Smartphone	2%	1%

PHONE OWNERSHIP BY GENDER

Looking at phone ownership by gender, our survey finds that males owned more internet-enabled smartphones compared to women, who were more likely to own basic feature phones with SMS and voice only.

	ANDROID	BASIC PHONE (SMS/VOICE)	PHONE WITH BASIC NET ACCESS	WINDOWS PHONE	iPHONE	OTHER SMARTPHONE
15 - 24	49%	28%	11%	1%	5%	7%
25 - 34	38%	34%	15%	0%	2%	11%
35 +	28%	36%	16%	3%	3%	13%

b) Other sources of information

Despite the prevalence of mobile phones throughout Kenya and the high level of mobile phone and smartphone usage among GeoPoll's farmer panel, low-tech methods remain king for farmers looking to gather information. Word of mouth (from other farmers and from agricultural officers) is still the predominant medium through which farmers get information on their farming needs, with 49% stating they get information through one of these sources. When we asked our panel about information sources, 29% indicated they use their mobile phones by either relying on social media or mobile apps. Radio also continues to be a valuable information source, with 31% indicating they gather information from radio, 25% from TV, 29% from other farmers, and 18% from agricultural officers.

When we compared information sources by age, we made some interesting observations. Radio is the sole leader across all age groups, however the younger age groups use social media more and agricultural officers less than older age groups, as shown below:

INFORMATION SOURCES FOR FARMING NEEDS BY AGE

	TV	RADIO	SOCIAL MEDIA	MOBILE APPS	OTHER FARMERS	AGRICULTURAL OFFICERS	OTHER
15 - 24	23%	29%	22%	10%	29%	18%	4%
25 - 34	27%	31%	19%	9%	27%	13%	3%
35 +	24%	33%	17%	11%	29%	17%	4%

c) Usage of mobile money and other mobile services

We also looked specifically at the usage of various mobile services, finding that 15% of the respondents said that they use farming apps, websites and or videos during farming and 7% report using Whatsapp groups for farming.

|	
MOBILE LENDING	**46**%
MOBILE BANKING	**14**%
WHATSAPP GROUPS	**7**%
FARMING APPS	**15**%
NONE	**23**%
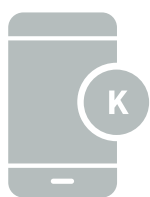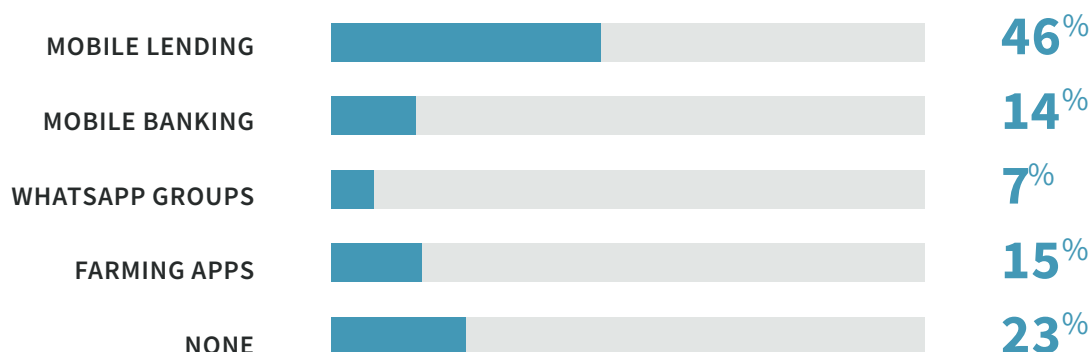
Perhaps not surprisingly, mobile banking and lending were the most popular mobile services used by farmers, with 46% of respondents stating they utilize mobile lending or mobile money services such as mPesa. Kenya has achieved a 50 percent increase in financial inclusion within the last 10 years, and this growth has been driven by the variety of mobile money services now available and the strong adoption of mobile money among populations not served by traditional banks.

In Kenya, despite small-scale subsistence farmers accounting for over 70% of the country's agricultural production, there still exists a massive financing gap that prevents these farmers from making investments in day-today farming operations, agricultural equipment, and infrastructure needed to increase productivity and income according to a report by AGRA.

Despite the strong usage of mobile money services among farmers, the majority are not borrowing money for their businesses, but using their own savings to fund their farming. Ninety-three percent say they use their savings to invest in farming, with 3% using Chama, 2% using Saccos, and 2% using mobile lending platforms to borrow, suggesting that farmers are using mobile money services personally but not to acquire money for their business. This finding opens the door to further research regarding funding for agriculture and the best ways of communicating funding opportunities to farmers.

SOURCE OF FUNDS FOR FARMING

|	
SACCOS	**2**%
CHAMA	**3**%
MOBILE LENDING PLATFORMS	**2**%
FAMILY	**3**%
OWN SAVINGS	**93**%
OTHER	**0**%
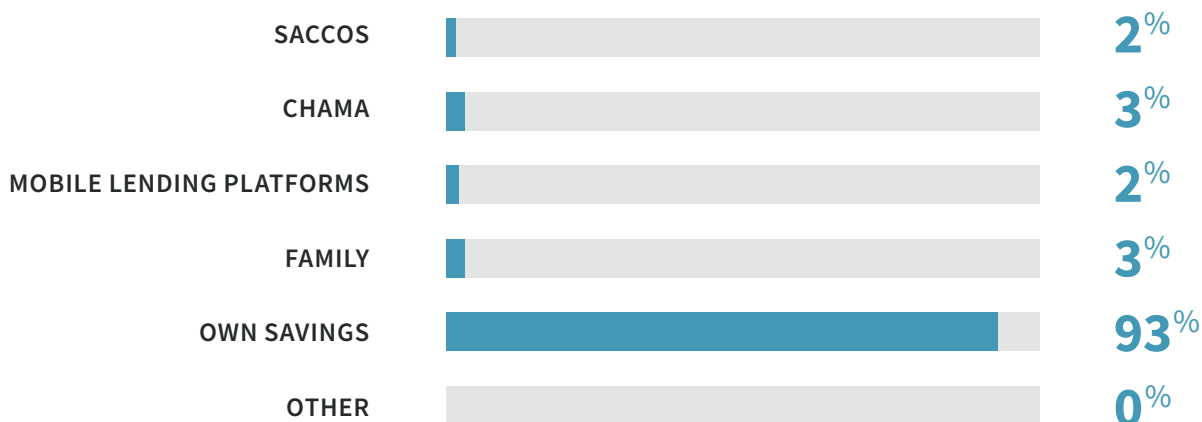
Main Challenges and Latest Trends

a) Challenges faced by farmers

Apart from climatic changes, which farmers in this study reported as the biggest factor affecting yield, we also sought to identify other challenges and examine upcoming trends in agriculture in Kenya. In addition to climate, other factors affecting yield included pests, drought, seed quality, weeds, and infrastructure respectively. Key challenges faced yielded similar answers, with pests and disease ranking as the top challenge faced, followed by the cost of farming, prices, climate, and infrastructure. Despite the high percentage of those indicating pests as a challenge, only 14% mentioned using insecticides or pesticides to manage pests, demonstrating that perhaps not all farmers have access to these farming inputs
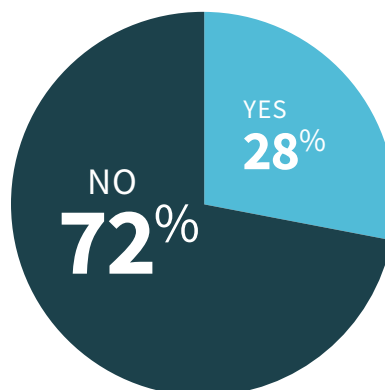
KEY CHALLENGES FACED IN FARMING

CLIMATE	27%
PESTS & DISEASES	41%
INFRASTRUCTURE	11%
PRICES	28%
FARMING COST	33%
OTHERS	1%
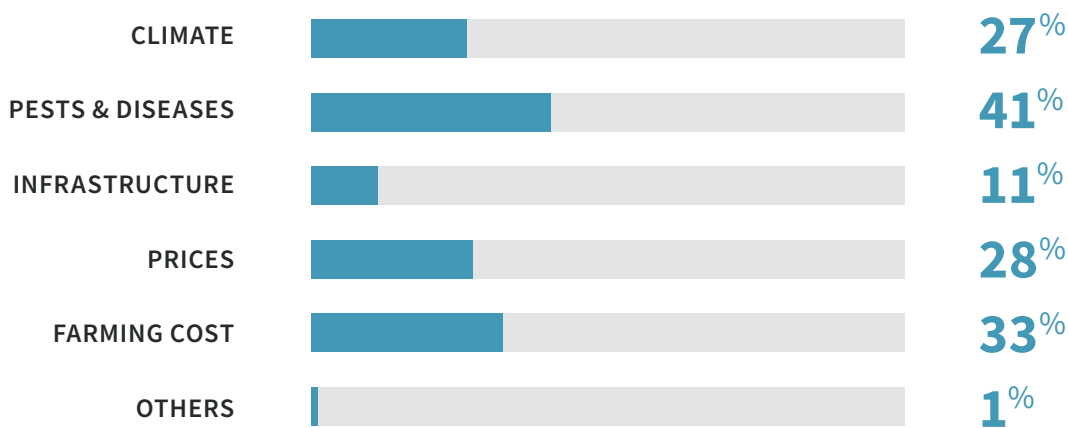
b) Use of organized groups for education

Our study indicates that despite small scale farmers facing a myriad of challenges, a majority do not belong to any organized groups such as formal farmer based groups (*chama*) or cooperatives. Only 28% of those surveyed belong to a farmer group or cooperative, and of those who belong to a farming group, 55% work with agricultural extension officers. Those who do work with farming groups or cooperatives cite training and education as the greatest benefit, followed by access to information. This demonstrates the strength of these groups in assisting farmers with the common challenges they face.

PERCENT WHO BELONG TO FARMER GROUPS OR COOPERATIVE

YES 28%

NO 72%

BENEFITS FROM FARMER GROUPS/COOPERATIVES

PROVIDE AFFORDABLE FINANCE	14%
ACCESS INFORMATION	21%
TRAINING AND EDUCATION	60%
MARKETING	24%
OTHER	3%
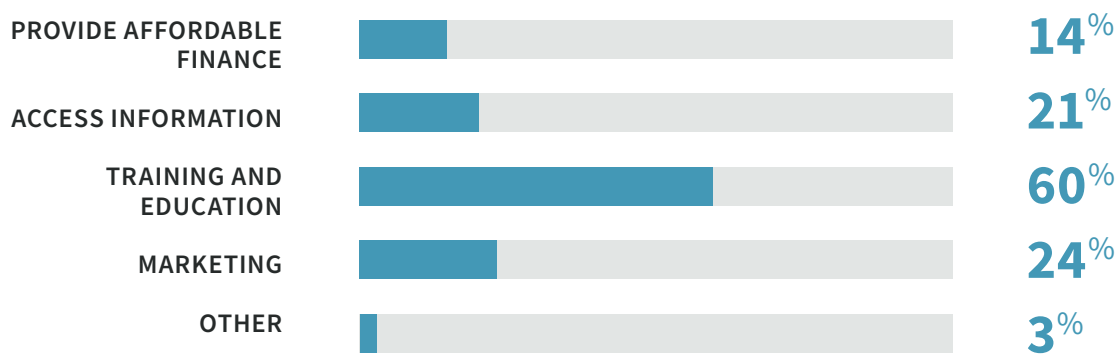
c) New trends in farming

We also wanted to look at trends in farming, and to do this posed an open-ended question, "in your view, what are the latest trends in farming?" to all respondents. The responses ranged from the use of technology for farming, to agribusiness, use of hybrid seeds, increased use of fertilizers, and more. Of particular interest was the theme on use of technology, either in the form of modern farming practices or in use of agricultural machines or using farming groups and marketing via social media. The other general trend we noted was the mention of greenhouse farming, agribusiness, doing soil tests to farms, and the increase in the use of fertilizer.

TRENDS IN FARMING

USE OF TECHNOLOGY FOR FARMING IDEAS	6%
AGRIBUSINESS	6%
IMPROVEMENT IN AGRICULTURAL MACHINES	5%
CROP FARMING	4%
GREENHOUSE FARMING	4%
INCREASE IN THE USE OF FERTILIZERS/VALUE ADDITION OF THE SOIL	4%
A LOT OF RAIN THAT DESTROYS CROPS/UNPREDICTABLE WEATHER	4%
POOR MARKET	3%
PEST AND WEED CONTROL	3%
NEW PESTS AND DISEASES	3%
ORGANIC FARMING/TRADITIONAL FARMING	3%
HYBRID SEEDS	3%

FULL ANSWERS FROM FARMERS INCLUDE:

"Shifting farm structure and acceleration in technology"

"Use of modern technology like latest machines and fertilizer"

"Use of drones to manage farming"

"Use of information from the internet to diversify farming"

"Biotech in seeds and Biocontrols"

"Use of high yielding and drought resistant varieties and market driven farming"

"Dwelling on short term crops e.g peas"

"Doing a soil test to my farm before taking a decision on what to plant"

These detailed answers show that farmers throughout Kenya are thinking about how to incorporate new innovations in farming into their work, and indicates a willingness to adapt their practices when they are able to. Open-ended questions are an excellent tool for gathering feedback directly from farmers themselves, and can provide more nuanced information than a purely quantitative survey.

Kenya's over-reliance on rain-fed agriculture has reached a critical point, putting the country in a precarious position as millions of people continue to face famine due to changing weather patterns caused by climate change. The ability of the agricultural sector to continue significantly contributing to the economy is starting to come into question, and some politicians are calling for immediate intervention. The ongoing climate changes resulting in increased temperatures, flooding, and drought have had adverse effects on both crop & livestock production. At stake is the country's ability to feed its population: in 2017, Kenya was one of the several East African countries suffering a food crisis. Three million Kenyans faced starvation necessitating food aid due to a devastating drought caused by two failed rainy seasons in a row, hugely reducing crop harvests. It is clear from our study that there is a growing concern over climate changes by Kenyan farmers, in line with these recent events.

There is a need for Kenya's agricultural sector to diversify and utilize new methods such as irrigation farming, as well as a need for more investment in agricultural research to enable farmers to adapt to climate change. While our study demonstrated that farmers have interest in new technologies and farming methods, we found that maize, which relies significantly on rainfall and reliable temperatures, is still the most popular crop in Kenya. Only recently have new farming techniques been developed to grow maize using new methods such as drip irrigation, and according to the Ministry of Agriculture, Kenya's use of irrigation-based farming is still limited.

One of the ways to strengthen the capacity of farmers is through giving them information that is accurate, reliable, and timely to enable them to make informed decisions.

The impact of mobile phone technology on the agricultural sector in Kenya cannot be overstated. Now more than ever, farmers need up-to-date information on weather patterns, food and livestock production tips, modern farming methods, market conditions amidst fluctuating food prices, and access to credit that is customized to their needs. Mobile phones are reducing this information deficit and becoming a tool can be utilised to access credit through mobile money lending services and mobile banking.

Our findings demonstrate the increased adoption of the mobile phone—in terms of phone ownership and usage—as well as a source of information for agriculture. Although mobile phones are yet to replace word of mouth recommendations and the use of mass media channels such as radio, mobile phones are increasingly serving as a key tool to disseminate critical farming information. Several studies also see great potential for employing mobile phones in the delivery of other public services.

Kenya is widely seen as a global frontrunner in the development and adoption of mobile money services. The use of mobile money in the agricultural sector has the potential to assist small-scale farmers by addressing some of the constraints that they face, such as the ability to scale production and to buy farm inputs. Our study indicates that there is a high usage of mobile money lending services and mobile banking among farmers, though most are still funding their businesses through their savings. Financial institutions issuing agricultural loans often need more data and credit information on those applying for loans, and the use of mobile money as a way of tracking transactions and creating a credit history should be explored further.

We hope this study has provided valuable insights into the farming community in Kenya, and we look forward to continuing to survey this community. As more data on farming needs, innovations, prices, and more is gathered, organizations around the world can more effectively support the agricultural industry in Kenya and beyond.
To conduct your own research with GeoPoll's farmer panel, please contact us today.

About Us

GeoPoll is a leader in providing fast, high-quality market research from areas that are difficult to access using traditional methods. Working with clients including global brands, media houses, and international development groups, GeoPoll facilitates data collection and research to remotely monitor changes in food security and agricultural conditions around the world.

GeoPoll combines a robust mobile surveying platform that has the ability to conduct research via multiple modes with a database of over 240 million respondents in more than 60 countries. Strengths lie in GeoPoll's ability to target extremely specific populations, deploy surveys in multiple countries, and provide expert guidance on how to collect accurate, reliable data through the mobile phone.

For more information about our services and case studies in international development and the agricultural sector, visit our website: **https://www.geopoll.com**

Contact Information

GeoPoll works with with agricultural suppliers, international development partners, agricultural research organizations, and commercial organizations to collect data on food security, market changes, food prices and other indicators.

Talk to us about our data collection capabilities and panel of respondents across the world by contacting us here.

For press inquiries, please contact marketing@geopoll.com.

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