Farmer Voice

supported by Bayer

2024

The Farmer Voice survey, commissioned by Bayer, gathered insights from over 2,000 farmers across Australia, Brazil, China, Germany, India, Kenya, Ukraine, and the United States. Participants were randomly selected from each market, with the objective to obtain a representative sample covering accurately the diversity of crop farmer profiles. The survey was independently conducted by Kynetec, a global leader in data, analytics and insights in agriculture, animal health and nutrition. In line with market research best practices, respondents were unaware that the survey was being conducted on Bayer's behalf so as to not bias their answers. The interviews were conducted between June and July 2024. The final report was produced in collaboration with Kekst CNC, a global strategic communications firm.

Additionally, 1,450 smallholder farmers in India and Indonesia were surveyed with a shortened questionnaire, in order to understand their specific views and needs. This study was conducted by Q&Q Research Insights between June and July 2024. Data from this additional research is not included in the main survey results; however, topline results from this study are presented on page 18 of this report.

FOREWORD

Farmers are the cornerstone of our food system. Their efforts form the foundation of global food security and, with this, society at large, regardless of where their farm is located in the world. But farming is also tough, gritty work that demands resilience, passion, and a love of the land.

In 2023, Bayer set out to explore the sentiments of farmers and their thoughts around the challenges, opportunities and hopes for the future, commissioning the Farmer Voice survey across eight countries worldwide. The depth and value of insights motivated us to do it again this year. We tracked many of the themes that emerged in last year's study but sought to better understand how farmers are adapting their work in the face of rapid changes in weather and technology.

We know through our day-to-day operations that many farmers strive to farm as sustainably and regeneratively as possible. The survey confirms that farmers believe in the value of regenerative farming practices to protect and restore our planetary resources and the diverse life they support. They also feel strongly that such practices should drive not only environmental benefits, but also higher yields and productivity.

There is a similar motivation when it comes to using digital technologies. Many farmers already use such tools in their farm operations and significant growth is expected in markets where the shift toward digitalization has not yet taken off. The data show that we need to address perceived monetary barriers and skills gaps to help farmers in all markets unlock the potential of digital farming and applied AI. As the pace of change in technology accelerates, we need to ensure that farmers understand the benefits of these technologies and see a clear path toward adopting such tools, which will become ever more prevalent in the future.

For this future many farmers remain optimistic and look to the next generation to build on their work, despite the numerous obstacles that face their operations. But they want to be trusted to do the right thing and recognized for their contributions to society. We can all support this work, whether we write policies, work with farmers directly, or simply benefit from the fruits of their labor.

The voice of the farmer is an important one. With big challenges ahead, we need to continue to listen and learn from them.

RODRIGO SANTOS
President, Crop Science Division, Bayer

FARMING: A VITAL YET CHALLENGING ENDEAVOR

Farmers are cognisant of their essential role in society and their crucial contribution to food security. Yet they are often the first to face the repercussions of global challenges. Among their most pressing concerns are extreme or unpredictable weather patterns, rising costs, and fluctuating incomes. Additionally, political and regulatory decisions have become increasingly significant in shaping their landscape. The survey highlights how ongoing cost and climate challenges are affecting farmers' capacity to sustain productivity and secure our food supply.

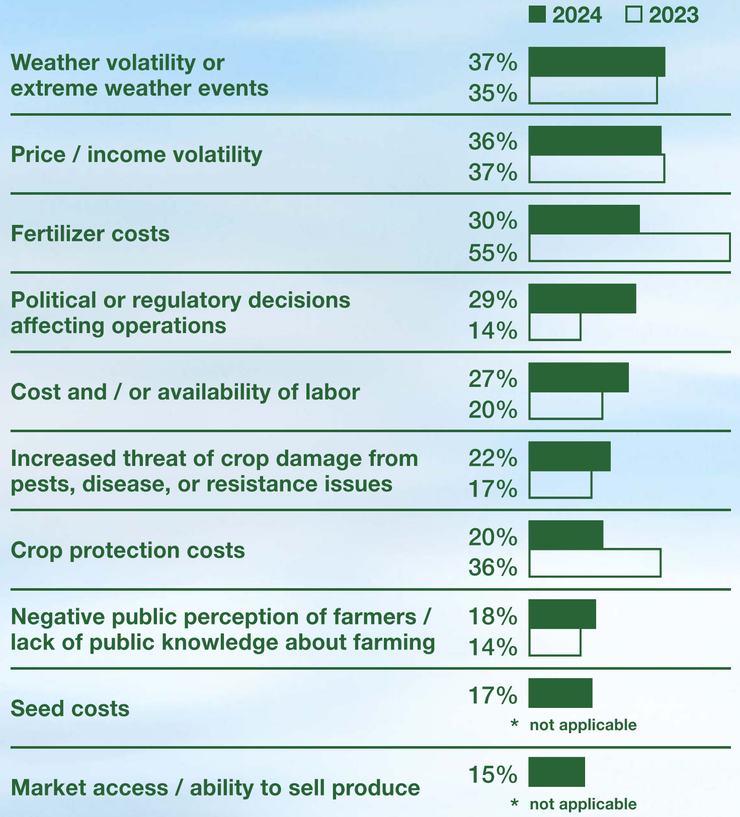
95%

of farmers say they are critical to ensuring food security

94%

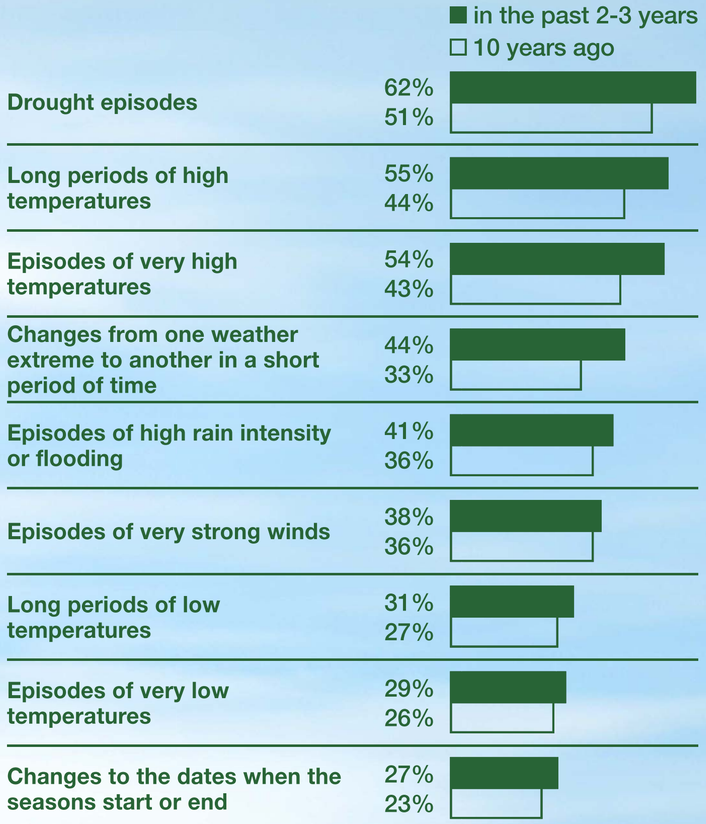
consider their work to be important to society

Weather, price and income volatility remain leading near-term challenges, but concerns around political and regulatory decision-making and labor costs have risen



Respondents indicated their three main challenges for the next three years.

Growers worldwide report that severe weather impacts have intensified over the past ten years



The proportion of farmers who say that respective weather effects have caused significant problems for their operations over the past 2-3 years and 10 years ago.

75%

of farmers are experiencing or are worried about climate change impacts

61%

of farmers have experienced significant revenue loss in the past 2 to 3 years due to adverse weather events

Economic concerns and the challenging nature of farming dominate farmers' mindsets

1. Hard work
2. Profitable / productive
3. Inputs (fertilizers / crop protection)
4. Price
5. Food security

Words most frequently used when farmers described their current mindset.

"Agriculture is a better job that reduces poverty in the community. Also every farmer must get respect because it's only farmers who make sure everyone has food on their table. Both the rich and the poor depend on farmers to produce whatever they prefer to eat."

FARMER FROM KENYA

"The risks that we take every season due to weather uncertainty, are by far greater than most other professions and yet we are still charged with the tasks of feeding this nation and the world. Sometimes, I think the general population forgets where their food comes from and does not appreciate the hard work that every farmer must endure to make a living."

FARMER FROM USA

DIGITAL FARMING ACCELERATES AS FARMERS STRIVE TO IMPROVE

In an increasingly volatile world, farmers are turning to digital technology to optimize their operations. As global food demand continues to grow, farmers are actively seeking innovative solutions to improve yield and quality while maintaining affordability and promoting sustainable practices. Farmers view digital technology as a vital resource for addressing these challenges, leveraging tech to inform their strategies and drive efficiency in their farming operations.

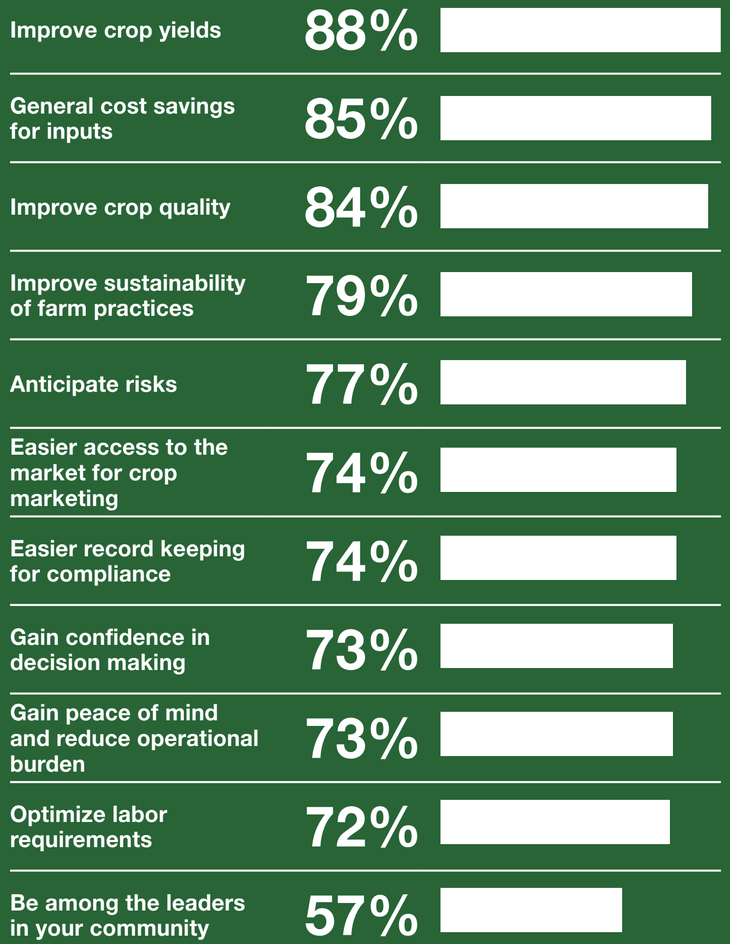
Most farmers are already using, or plan to use digital technology on their farms. Only one out of ten has no plans to use digital tools

Farmers were asked about their usage of digital technologies defined as a broad range of tools that digitally collect, store, analyze, and share electronic data and / or information, all aimed at optimizing crop production, resource management, and overall farm efficiency or promoting sustainability.

Farmers use digital technologies for a wide range of purposes. Among the most common are forecasting, improved decision-making, and precision applications

Current applications of digital technologies among farmers.

Improving productivity and quality as well as reducing costs are key factors driving digital adoption



Motivations behind adopting digital technologies.

"It is essential because today there's GPS, autopilot, drones for spraying, which make the job easier, give us lower input costs, greater coverage of the land, give us more productivity."

FARMER FROM BRAZIL

"Digital technology has given us access to critical information on an acre-by-acre basis to better be able to make informed decisions on our farm. We now have information related to every field pass ... all at our fingertips."

FARMER FROM USA

"We can no longer do without them if we want to be environmentally conscious."

FARMER FROM GERMANY

OVERCOMING KNOWLEDGE GAPS AND PERCEIVED COST BARRIERS IS CRITICAL TO BROADER DIGITAL ADOPTION

Bridging the knowledge and skills gap is essential for unlocking the full potential of digital farming. This gap presents a significant barrier for many farmers. Growing awareness of the transformative power of AI to analyze data and automate decisions has not yet translated into widespread usage. In fact, nearly two-thirds of farmers express a desire for a deeper understanding of AI applications in agriculture.

Investment requirements, skill gaps, and availability are the biggest barriers to digital adoption

Barriers preventing the use of digital technology among those who plan to start using digital technologies in the next three years.

62% Required monetary investment

56% Do not have the required skills / knowledge to work with the tools yet

47% Digital technologies are not available in my area yet

40% Digital technologies are too complex

38% Required time investment

36% Benefits of digital technologies are not clear to me

25% Connectivity problems

There is a gap between awareness and usage of AI in farming. About half of farmers have heard of specific applications but have not used them

54% Imagery tools that automatically recognize certain weeds, diseases or pests

59% Sprayers that recognize weeds and apply an herbicide automatically only on them

43% Chatbots that provide automated recommendations for the use and timing of application of inputs like seeds, fertilizers, crop protection products or irrigation

The proportion of respondents who indicated they have heard of but never used these AI applications.

6%
say they have a profound or good knowledge of AI in agriculture

62%
are extremely or rather interested in knowing more about potential applications of AI in agriculture

“Digital technology is the new thing, the new science, and you have to learn it slowly as you grow the land.”

FARMER FROM CHINA

“This is the future of the agricultural business, and agriculture will reach such profitability with digital technologies. Those who do not keep up with the times will not stay in business.”

FARMER FROM UKRAINE

FARMERS SEE LONG-TERM VALUE IN REGENERATIVE AGRICULTURE

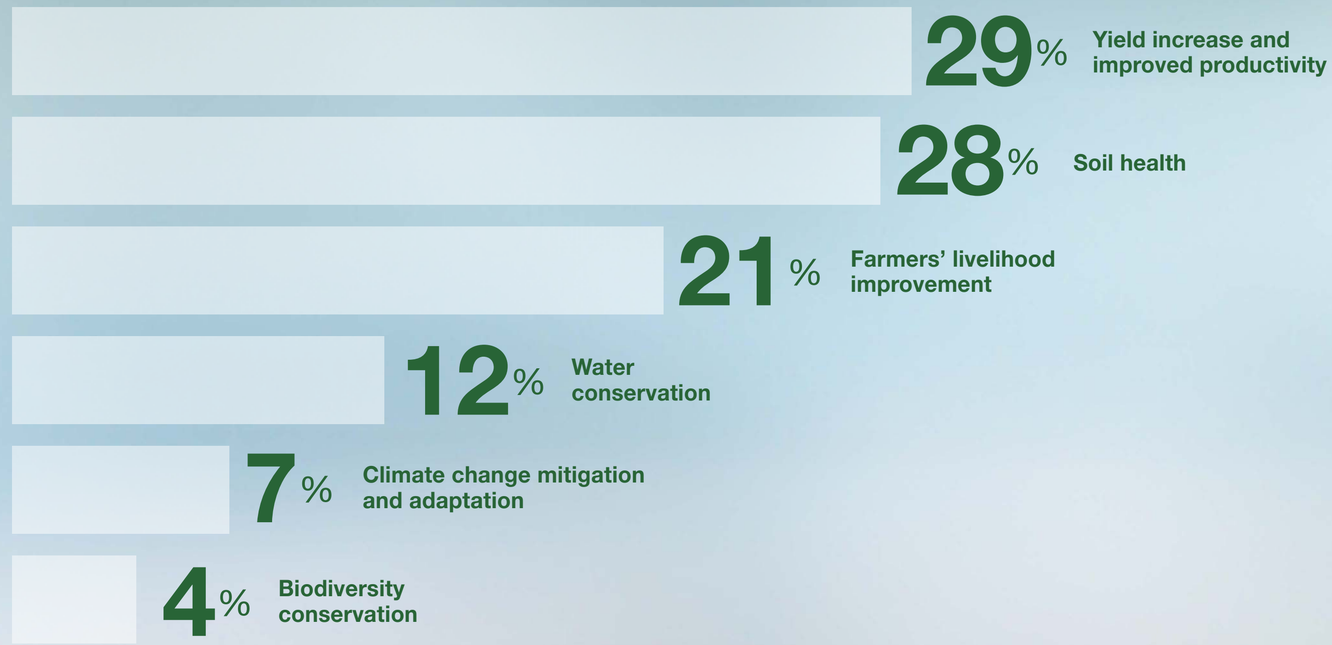
As farmers consistently work towards improving their operations, they see a clear role and value in regenerative agricultural practices. Many farmers expect regenerative agriculture to have a positive impact on the future, both in terms of sustainability and productivity. They want regenerative practices to pay dividends for their operations, especially in terms of soil health, higher yields and productivity, and their livelihoods.

Farmers associate regenerative agriculture mainly with soil health and sustainability

1. Improve soil health
2. No degradation
3. Future proofing
4. Long-term sustainability
5. Reducing inputs

Most used terms given by respondents when asked to explain regenerative agriculture in their own terms.

However, farmers expect regenerative agriculture to also enhance productivity and livelihoods



The proportion of respondents who rank each area as the most important.

"Regenerative agriculture helps us improve the health of our soil; it makes you a profitable farm owner, you don't have to work under someone else."

FARMER FROM INDIA

"Regenerative agriculture allows for better quality and yield through working with the land and using natural cycles / crop diversity and rotation. This allows for good harvest without complete depletion of soil nutrients."

FARMER FROM USA

THE JOURNEY TOWARD REGENERATIVE AGRICULTURE HAS ALREADY BEGUN

Nearly all farmers worldwide take steps to farm regeneratively and restore natural resources. But at the same time, there remains considerable room for improvement. The transition to more regenerative farming operations requires tailoring practices and solutions to the conditions of each farm and region, reducing the risk of changing practices and protecting financial pay-off. Farmers have highlighted financial factors and upskilling as key barriers to more holistic adoption. This is reflected in the practices with the lowest uptake, with those requiring new or specialist equipment tending to be used the least.

Crop rotation, maintaining soil fertility, soil health monitoring, and reduced tillage are the regenerative practices most frequently used

Respondents selected regenerative agriculture practices they currently use.

Farmers use nearly

7

out of 17 common regenerative practices on average

91%

of farmers use at least one regenerative agricultural practice

Financial considerations, uncertain outcomes, and knowledge gaps are the biggest barriers to further adoption of regenerative practices

Required monetary investment	52%
Lack of incentives to implement regenerative agriculture practices	37%
Uncertainty / risks for crop outcome	37%
Lack of knowledge of regenerative agriculture practices	37%
Required time investment / learning curve	34%
Not enough clarity on benefits of regenerative agriculture practices	32%
Increased complexity of farm management / practices	25%
None	6%

Excluding those who are implementing all regenerative practices, farmers identified the barriers preventing them from implementing more.

“It is essential to take care of the soil – you have to manage it properly, take care of the environment, rotate crops, use biologics so that the soil doesn't lose its nutrition.”

FARMER FROM BRAZIL

“What every good farmer has been doing for a long time now.”

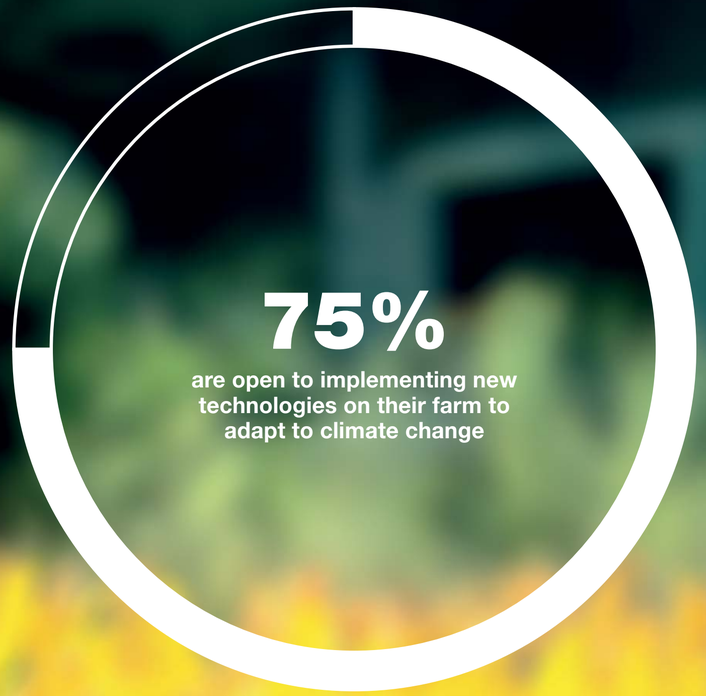
FARMER FROM USA

“Many of us are using regen ag principles in some way, shape, or form … it is a means of improving our sustainability and profitability.”

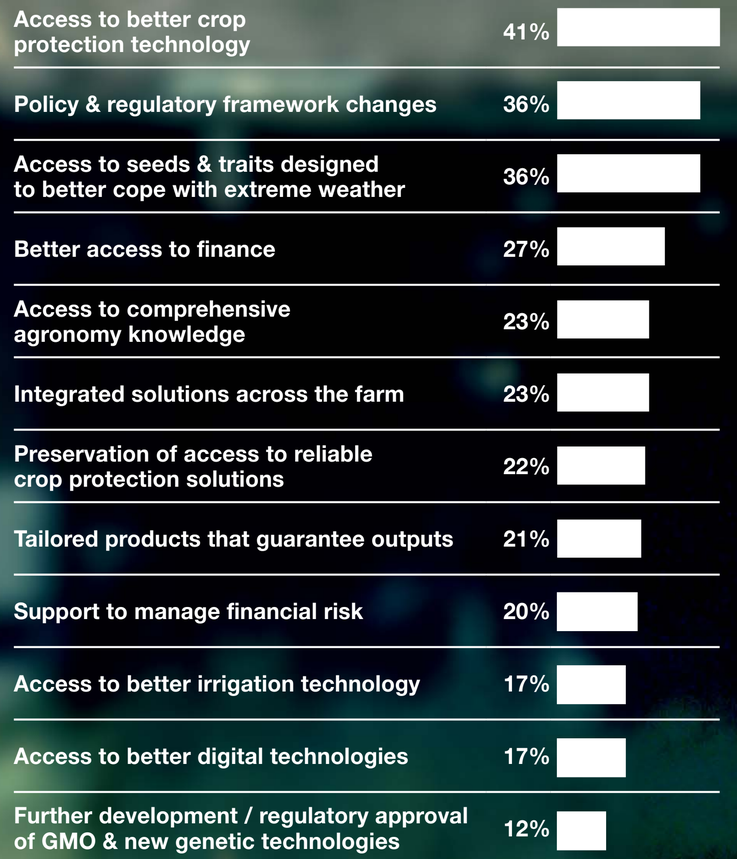
FARMER FROM AUSTRALIA

FARMERS ARE FORWARD-THINKING AND SOLUTIONS-ORIENTED

Globally, farmers are eager to embrace solutions that will help them as they work to feed, clothe and fuel the world. Their desired solutions mirror the challenges they face. The pressures from extreme weather and climate change lead them to prioritize access to new technologies and innovative seeds and traits to improve their operations in the future. Many farmers' passion motivates an advocacy of their career path to younger generations, though the presented challenges also cause some to warn against pursuing farming.



Farmers want access to new solutions and a more favorable policy environment



Respondents selected the top three factors to benefit the future of their farms in order of importance.

Two thirds of farmers would encourage future generations to pursue farming as a career

65% Encourage future generations

18% Neither discourage nor encourage

17% Discourage future generations

Farmers were asked to what extent they would encourage farming as a career to future generations.

90%

consider farming to be a valuable career

"Farming is an excellent business, but you have to be very dedicated. It's a very enjoyable activity. Working with nature is therapy, stress-free, better than sitting in front of a computer."

FARMER FROM BRAZIL

"Farming is a good career as it has profits, maize has profits. Farming is interesting because of output; market prices have helped me reach where I am now. Farming is not tiring, and we should take farming seriously as it brings profits."

FARMER FROM KENYA

"The land is like our mother. It is a good source of income. The economic needs of the country are met through agriculture. Agriculture is necessary for everyone."

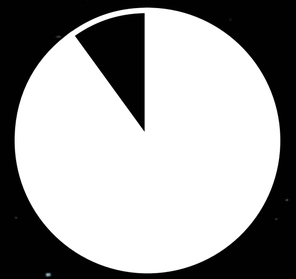
FARMER FROM INDIA

FARMER ATTITUDES VARY ACROSS MARKETS

The USA and Australia lead in tech adoption for productivity and efficiency, while Ukraine is embracing digital tech to combat climate change and Indian farmers want to catch up on digitalization. Brazil is championing regenerative practices and China prioritizes crop rotation and soil health for regenerative farming. Kenya promotes farming as a positive career while Germany seeks solutions amid political challenges.

Australia

At the forefront of technology adoption

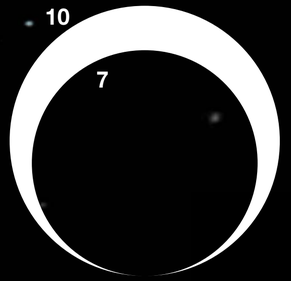


90%

use digital technologies on their farm, largely to improve operations and reduce costs

Brazil

At the forefront of regenerative agriculture



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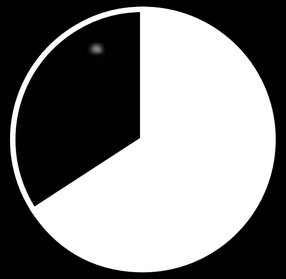
regenerative agricultural practices are used on average by Brazilian farmers, compared to the global average of 7

China

Favor crop rotation and soil health as regenerative approaches

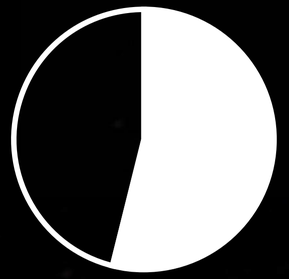


66%

currently use crop rotation or have used it in the past, and roughly half use methods to improve soil health

Germany

Pragmatic and seeking solutions

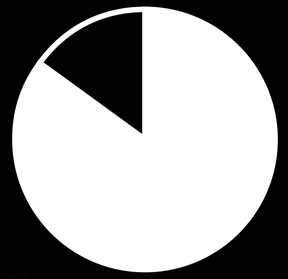


54%

feel political and regulatory changes would be beneficial

India

Positive and eager to embrace digital technology

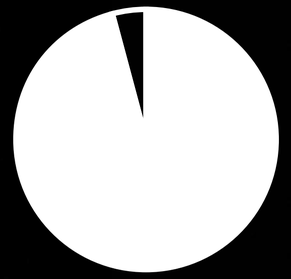


85%

While only 8% use digital tools on their farms today, 85% plan to use them in the future

Kenya

Most positive about farming as a business and as a career

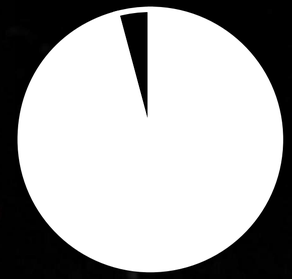


94%

would encourage future generations to pursue farming as a career, compared to 63% of farmers globally

Ukraine

Most likely to use digital technologies to adapt to climate change

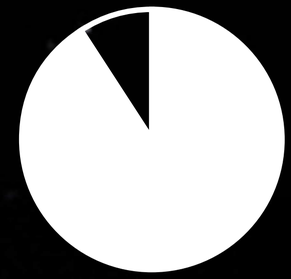


96%

are using digital tools or are planning to use them in the short term, and 93% agree they are open to adopting new technologies to adapt to climate change

USA

Tech-savvy and driven by productivity and yields



91%

use digital technologies on their farms, compared to the 65% global average

INDONESIAN AND INDIAN SMALLHOLDERS FACE DIFFERENT CHALLENGES

Smallholder farmers in India and Indonesia were interviewed in a separate survey. This revealed widespread concerns about input costs and crop damage, balanced by awareness and adoption of some regenerative farming practices as well as willingness to use digital tools.

Input costs, crop threats and volatility are top smallholder concerns in Indonesia and India

INDIA

1	Increased threat of crop damage from pests, diseases or resistance issues
2	Weather volatility or extreme weather events
3	Crop protection costs
4	Cost and / or availability of labor
5	Price income / volatility

INDONESIA

1	Fertilizer costs
2	Price / income volatility
3	Seed costs
4	Weather volatility or extreme weather events
5	Cost and / or availability of labor

Top five near-term smallholder challenges by country.

80% of Indian and Indonesian smallholders use at least one regenerative agricultural practice. Crop rotation and soil fertility practices are common

INDIA

Variable rate fertilization / crop protection	55%
Crop rotation	50%
Soil health monitoring / testing	44%
Maintaining soil fertility by adding all necessary nutrients	41%
Usage of biofertilizers / biostimulants	41%

4 to 5 regenerative practices are used on average by Indian smallholders

INDONESIA

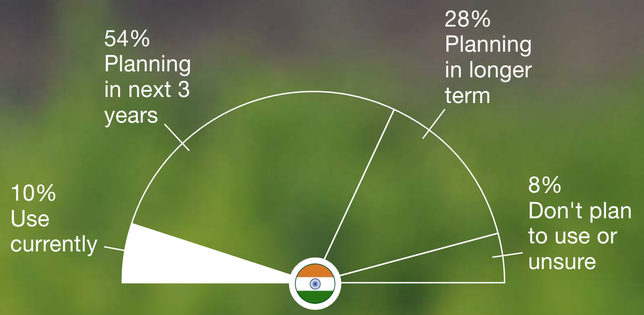
Maintaining soil fertility by adding all necessary nutrients	56%
Variable rate fertilization / crop protection (herbicides, insecticides, fungicides)	50%
Crop rotation	49%
Crop selection for reduced input needs, improved resilience and sustainability	28%
Usage of biofertilizers / biostimulants	20%

2 to 3 regenerative practice are used on average by Indonesian smallholders

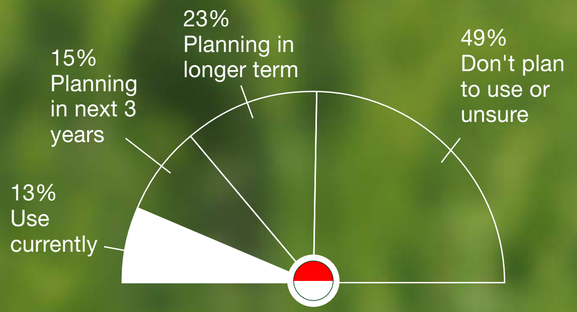
Top five most commonly used regenerative agriculture practices by country.

Despite low current uptake of digital technologies, many smallholder farmers in India and Indonesia plan to use them in the future

INDIA



INDONESIA



Farmers were asked about their current and planned usage of digital technologies on their farms.

“Farming is not profitable these days due to unpredictable weather conditions.”

“The virtues of regenerative agriculture include soil protection, water conservation, soil conservation, and adherence to traditional methods.”

“Digital technology means increasing the productivity of agricultural equipment.”

SMALLHOLDER FARMERS FROM INDIA

Farmer Voice

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