Food Security in a Changing Climate
Climate change causes erratic weather patterns, extreme temperatures and changes in natural resources, threatening farmers' ability to sustainably produce and maintain quality crops.

**EXCESSIVE HEAT**
- Reduces surface water and depletes aquifers
- Disrupts flowering and pollination of crops
- Increases weed, insect and disease pressures

**DROUGHT**
- Causes crop failures and loss of arable land
- Removes habitats and food for beneficial insects
- Dries up water sources

**EXCESSIVE PRECIPITATION**
- Increases difficulty of planting
- Raises flood risk
- Damages crops

**LOSS OF NATURAL RESOURCES**
- Removes habitats
- Dries up water sources
- Removes topsoil
- Drowns crops

**NEW PESTS AND DISEASE PRESSURES**
- More competition for soil and water resources
- Greater damage to crops

**FLOODING**
- Removes topsoil
- Drowns crops

**HOWEVER, OUR WORLD’S CLIMATE IS CHANGING**
rapidly and as droughts, floods and unpredictable weather become more common, it is becoming harder for farmers to grow our food.

**TO MEET OUR NEEDS GROWERS WILL**
need to produce more food—as much as 70% more than today—while reducing farming’s footprint.

**BY 2050**
our world’s population will surpass 9 BILLION

**WE NEED NEW AGRICULTURAL TECHNOLOGIES**
that can help our farmers adapt, become more resilient and meet the growing challenges our world will hand to them in the decades ahead.

**HOW CAN FARMERS MITIGATE AND ADAPT TO CLIMATE CHANGE?**
- New crop protection and plant science products instead of tillage practices.
- Farmers remove yield-robbing weeds using No-Till Agriculture.
- New crop protection products like biotech products can help farmers:
  - Greater control of insects, diseases and weeds.
  - Allow farmers to avoid tillage and use less fuel.
  - Reduce costs of production by up to 30% and maize productivity and yield risk.

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**Crop protection products**
- In 2012, biotech crops adoption.
- As new varieties reach the market, farmers will continue to build their new crop protection products.
- Greater yield of biotech crops find a growing population and look after our planet, feed and increase global food — as much as 70% more than today.

**Plant science researchers are developing**
- Heat-tolerant varieties that are drought-tolerant and can enable a crop to better absorb and utilize nitrogen fertilizers, reducing carbon footprints.
- New crop protection products that could revolutionize agriculture in the decades ahead.

**Long-term studies**
- New crop protection products instead of tillage practices.
- Biotech varieties are currently in development for rice and wheat.
- If successfully created, they could nearly double yields.
- Biotech varieties for rice could improve global staple crop yields by 20-30% and African maize yields by nearly 50% in 2050.
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No-till can increase global maize yields on irrigated hectares equivalent to 11.9 million cars off the road for a year, due to less tillage, less fuel use and more carbon capture.

**How does climate change impact agriculture?**

Climate change causes erratic weather patterns, extreme temperatures and changes in natural resources, threatening farmers’ ability to sustainably produce and maintain quality crops.

**Excessive heat**
- Redistribution of water and drought conditions
- Decreased flowering and pollination
- Increases weed, insect and disease pressures

**Drought**
- Causes crop failures and loss of arable land

**Excessive precipitation**
- Increases difficulty of planting
- Raises flood risk
- Damages crops

**Flooding**
- Increases difficulty of planting
- Damages crops

**Loss of natural resources**
- Decreases habitats and food for beneficial insects
- Dries up water sources

**New pests and disease pressures**
- Increases competition for soil and water resources
- Greater damage to crops

**How can farmers mitigate and adapt to climate change?**

A full suite of crop protection and plant biotech products can help farmers:

- **Increase food production**
- **Reduce food prices**
- **Lower food security risk**

Farmers need access to the best mix of technologies to look after our planet, feed a growing population and progress their communities.

**Today’s technologies**

**No-Till Agriculture**
Farmers remove yield-robbing weeds using herbicide-tolerant varieties and crop protection products instead of tillage practices.

**Increase yields 67%**
No-till can increase global maize yields on irrigated hectares.

**Flood tolerance**
Farmers remove yield-robbing weeds using herbicide-tolerant varieties and crop protection products instead of tillage practices.

**Heat-tolerant varieties**
Greater control of insects, weeds and diseases through new crop protection products prevent nearly 40% of global rice and maize harvests from being lost every year.

**Nitrogen-use efficient varieties**
Nitrogen-use efficient varieties enable a crop to better absorb and utilize nitrogen from the soil, reducing nitrogen leaching and reducing the carbon footprint and enabling a good harvest even in a volatile climate. Science and technology are now in development that could nearly double yields in Africa and Latin America when combined with irrigation.

**Future pipeline**

Plant science researchers are developing products that could revolutionize agriculture in 2050.

Nitrogen-use efficient varieties
- Can cut global wheat and rice production costs by 10%.

Heat-tolerant varieties
- Can cut global wheat and rice production costs by 10%.

Greater yield stability in erratic weather
Long-term studies of biotech crops find significant reductions in yield volatility after adoption. As new varieties reach the market, farmers will continue to build their resilience to climate change.

Greater control of insects, weeds and diseases through new crop protection products could improve global staple crop yields by 5-10% and African maize yields by nearly 50% in 2050.
WORLD'S CLIMATE IS CHANGING

HOWEVER, OUR rapidly and as droughts, floods and unpredictable weather become more common, it is becoming harder for farmers to grow our food.

WE NEED NEW AGRICULTURAL TECHNOLOGIES TO MEET OUR NEEDS

GROWERS WILL need to produce more food — as much as 70% more than today — while reducing farming's footprint.

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70% MORE FOOD

References

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Helping Farmers Grow