FEEDING NINE BILLION:
THE ISSUES FACING GLOBAL AGRICULTURE

CropLife INTERNATIONAL

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ABOUT US

CropLife International is a global network of plant science companies and regional and national crop protection and biotechnology associations that share the common goal of creating and promoting solutions for sustainable agriculture.

For us, sustainable agriculture means employing a wide range of solutions incorporating nature and technology, which can:

> Meet the world's growing food needs;
> Enhance environmental quality and the natural resource base;
> Make efficient use of technologies, renewable resources, and on-farm resources while integrating natural biological cycles;
> Sustain the economic viability of the farm and farmers; and
> Enhance the quality of life for farmers and society.

CropLife International's mission is to encourage a dialogue that will help foster the understanding that nature and technology are not mutually exclusive, but rather complementary and synergistic. In fact, the plant sciences industry has made an impact on everything in our lives from the food we eat, to the clothes we wear, to the fuel we can use in our cars. Even more, innovations developed by the plant sciences industry have revolutionised the lives of the more than 2.5 billion farmers around the globe and reduced agriculture's footprint by, for example, reducing the amount of land and water resources needed to grow crops and making crops more resistant to pests and drought.

Together with our global network of partners, including non-governmental organizations (NGOs), farmer groups, agriculture and biotechnology experts, and regional associations, CropLife International serves as a catalyst for information sharing and discussion about the latest innovations in agriculture.

WE INVITE YOU TO EXPLORE THE ISSUES FACING AGRICULTURE AND THE GLOBAL ENVIRONMENT, AND SEE WHAT PLANT SCIENCE IS DOING TO SUPPORT ECONOMIC DEVELOPMENT AND FOOD SECURITY.

THE ISSUES...

VISIT ACTIONFORAG.ORG
TO LEARN MORE ABOUT GLOBAL ISSUES AND PLANT SCIENCE SOLUTIONS

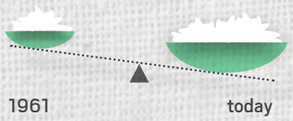
FEEDING NINE BILLION

IN 2011, THE WORLD'S POPULATION REACHED SEVEN BILLION PEOPLE, AND BY 2050 IT WILL SURPASS NINE BILLION. THIS MEANS FARMERS WILL NEED TO PRODUCE 70%

MORE FOOD ON LESS LAND THAN EVER BEFORE. CROP PROTECTION PRODUCTS AND PLANT BIOTECHNOLOGY CAN IMPROVE YIELDS TO HELP FARMERS MEET THIS GOAL.

IMPROVING YIELDS
THROUGH NEW VARIETIES & PROTECTION FROM PESTS & DISEASES

BETTER YIELDS



SINCE 1961 YIELDS FOR RICE HAVE MORE THAN **DOUBLED**

REDUCING LOSSES

CROP PROTECTION PRACTICES **PREVENT NEARLY 1/2** OF THESE CROP LOSSES

MORE FOOD

BIOTECH CROPS HELP FARMERS GROW **MORE FOOD PER ACRE**

IMPROVING LIVES

FOR MILLIONS OF FAMILIES IN THE DEVELOPING WORLD, FARMING IS NOT JUST AN OCCUPATION; IT IS THE SOLE MEANS OF SURVIVAL. THESE SMALLHOLDER FARMERS GROW SEVERAL CROPS ON SMALL PLOTS OF LAND TO SUPPORT THEIR FAMILIES AND LOCAL COMMUNITIES. MAKING AGRICULTURE MORE PRODUCTIVE AND PROFITABLE THROUGH PLANT SCIENCE TECHNOLOGIES WILL ENABLE SMALLHOLDER FARMERS TO IMPROVE THEIR QUALITY OF LIFE.

SUSTAINABLE LIVELIHOODS & STRONGER COMMUNITIES
ARE CREATED BY MAKING AGRICULTURE MORE PRODUCTIVE

HERBICIDES REDUCE STRENUOUS HANDWEEDING

Herbicide use could eliminate the need for 90% of strenuous handweeding in Africa.

THIS CAN SAVE **24 BILLION HOURS** AND PRODUCE AN ADDITIONAL **40 MILLION TONNES** OF CROPS

DISEASE-FREE HARVESTS BOOST INCOMES

In Kenya, using pesticides to produce disease-free fruit means a four-fold income increase for small-scale passion fruit farmers; and extra income for avocado farmers.

HIGHER INCOMES **IMPROVE HEALTH,** PROVIDE **SCHOOLING** AND CREATE NEW **BUSINESS** OPPORTUNITIES

HIGHER YIELDS IMPROVE LIVELIHOODS

In India, Bt cotton is boosting yields, leading to higher farm incomes and quality of life improvements.

$9.4 BILLION IN FARM INCOME
GAINS FROM 2002 TO 2010

IMPROVED ACCESS TO TELEPHONE SYSTEMS, DRINKING WATER AND ECONOMIC INFRASTRUCTURE

MORE MATERNAL HEALTH CARE, HIGHER SCHOOL ENROLMENT AND VACCINATION RATES

FIGHTING POOR NUTRITION

IN THE DEVELOPING WORLD, AN ESTIMATED ONE IN THREE CHILDREN SUFFERS FROM MALNUTRITION. AT LEAST HALF OF THE 10.9 MILLION CHILD DEATHS EACH YEAR COULD BE PREVENTED WITH IMPROVED NUTRITION. PLANT SCIENCE CAN HELP BY PRODUCING MORE FOOD FOR A GROWING POPULATION AND CREATING PLANT VARIETIES WITH HIGHER NUTRITIONAL VALUES.

CREATING HEALTHIER DIETS
THROUGH NEW VARIETIES AND ABUNDANT FOOD CHOICES

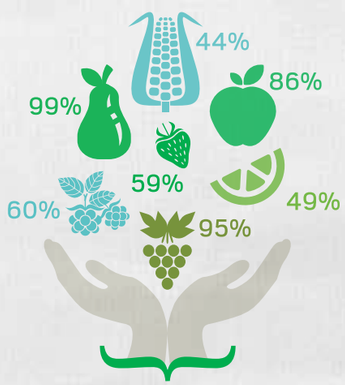
HIGHER NUTRITIONAL VALUE

The Africa Biofortified Sorghum project is using biotechnology to develop sorghum with higher levels of essential nutrients such as vitamin A, iron and zinc.

THIS HAS POTENTIAL TO IMPROVE THE HEALTH OF
300 MILLION
PEOPLE IN AFRICA

MORE FRUITS & VEGETABLES

Yield loss prevented by fungicides:



WITHOUT FUNGICIDES, WHICH PROTECT PLANTS FROM DISEASE, IT'S ESTIMATED THAT YIELDS OF MOST FRUIT AND VEGETABLES WOULD FALL BY
50-95%

HEALTHIER STAPLES

Bt corn contains built-in protection from insect damage, lowering the levels of mycotoxins (harmful fungal toxins).

THIS
ENHANCES SAFETY
OF CORN-BASED FEED AND FOOD STAPLES

CONSERVING WATER

IN THE NEXT 20 YEARS, IT'S PREDICTED THAT NEARLY HALF OF THE WORLD WILL BE LIVING UNDER SEVERE WATER STRESS. TODAY, WITH EVERY CALORIE WE EAT REQUIRING ABOUT ONE LITRE OF WATER TO PRODUCE, AGRICULTURE ACCOUNTS FOR 70% OF GLOBAL WATER USE. NEW TECHNOLOGIES CAN HELP US CHANGE THE WAY WATER IS USED AND MANAGED.

REDUCING WATER NEEDS
THROUGH PLANT SCIENCE TECHNOLOGIES

WATER EFFICIENT CROPS

ONE POUND OF COTTON CAN NOW BE PRODUCED WITH ABOUT
1/2 THE IRRIGATION WATER
REQUIRED 20 YEARS AGO

CONSERVATION TILLAGE

HERBICIDES AND BIOTECH CROPS REDUCE THE NEED FOR TILLAGE,
LEAVING MORE MOISTURE
IN THE SOIL FOR THE GROWING CROP

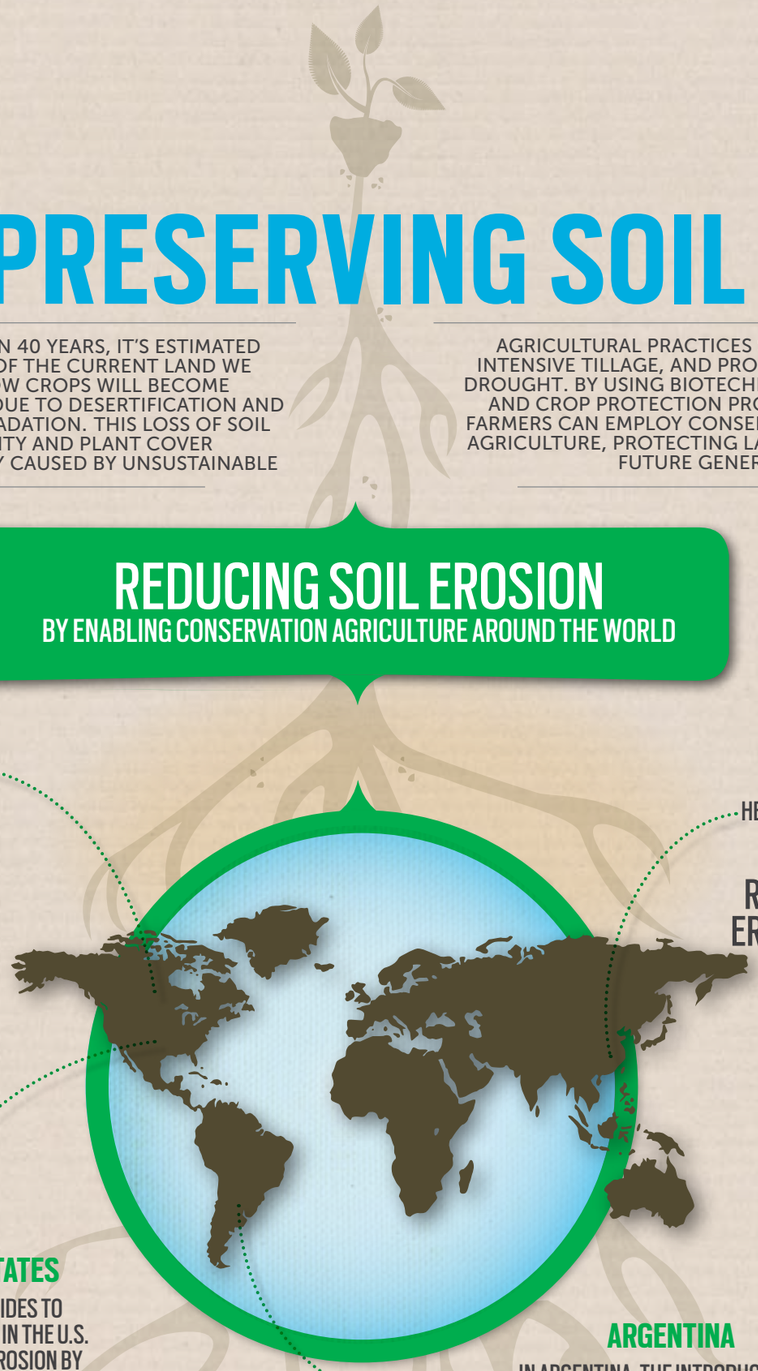
DROUGHT TOLERANT CROPS

DROUGHT TOLERANT CORN IN AFRICA HAS THE POTENTIAL FOR
20-35%
HIGHER YIELDS UNDER DROUGHT CONDITIONS

PRESERVING SOIL

IN LESS THAN 40 YEARS, IT'S ESTIMATED THAT HALF OF THE CURRENT LAND WE USE TO GROW CROPS WILL BECOME UNUSABLE DUE TO DESERTIFICATION AND LAND DEGRADATION. THIS LOSS OF SOIL PRODUCTIVITY AND PLANT COVER IS PRIMARILY CAUSED BY UNSUSTAINABLE AGRICULTURAL PRACTICES SUCH AS INTENSIVE TILLAGE, AND PROLONGED DROUGHT. BY USING BIOTECHNOLOGY AND CROP PROTECTION PRODUCTS, FARMERS CAN EMPLOY CONSERVATION AGRICULTURE, PROTECTING LAND FOR FUTURE GENERATIONS.

REDUCING SOIL EROSION
BY ENABLING CONSERVATION AGRICULTURE AROUND THE WORLD



CANADA

IN CANADA, 64% OF FARMERS PLANTING HERBICIDE-TOLERANT CANOLA ARE USING ZERO AND MINIMAL TILLAGE PRACTICES – 86% HAVE **REDUCED SOIL EROSION** AND 83% INDICATED **GREATER SOIL MOISTURE**

UNITED STATES

USING HERBICIDES TO CONTROL WEEDS IN THE U.S. REDUCES SOIL EROSION BY AN ESTIMATED **356 BILLION POUNDS EACH YEAR**

CHINA

IN CHINA, USING HERBICIDES INSTEAD OF TILLAGE IN TEA FIELDS CAN **REDUCE SOIL EROSION BY UP TO 80%**

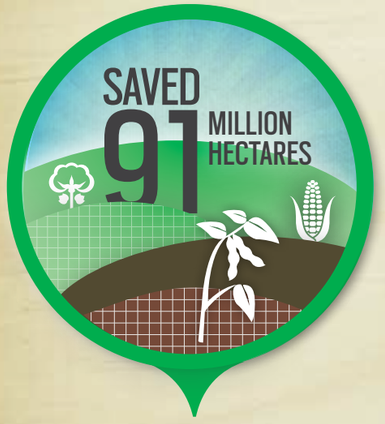
ARGENTINA

IN ARGENTINA, THE INTRODUCTION OF HERBICIDE-TOLERANT SOYBEANS INCREASED NO-TILL ADOPTION FROM ABOUT 33% TO **MORE THAN 80%** BETWEEN 1996 AND 2008

PROTECTING BIODIVERSITY

BIODIVERSITY IS THE VARIETY OF LIFE ON EARTH. THIS INCREDIBLE WEALTH OF ABOUT 8.7 MILLION DIFFERENT SPECIES FORMS AN INTEGRAL PART OF OUR ENVIRONMENT AND LIVELIHOODS. BUT BIODIVERSITY IS UNDER THREAT, DRIVEN LARGELY BY THE CONVERSION OF WILD NATURAL HABITATS TO AGRICULTURE. HOWEVER, WITH THE HELP OF BIOTECHNOLOGY AND CROP PROTECTION PRODUCTS, FARMERS CAN NOW GROW MORE FOOD ON THE SAME AMOUNT OF LAND - TAKING PRESSURE OFF OF THE NEED TO CONVERT NATURAL HABITATS INTO FARMLAND.

SAFEGUARDING BIODIVERSITY
BY REDUCING THE NEED FOR ADDITIONAL FARMLAND & IMPROVING NATURAL HABITATS



HIGHER YIELDS

IF HIGHER YIELDING BIOTECH CROPS HAD NOT BEEN AVAILABLE FROM 1996 TO 2010, AN **ADDITIONAL 91 MILLION HECTARES** OF FARMLAND WOULD HAVE BEEN NEEDED TO MAINTAIN GLOBAL PRODUCTION LEVELS

DEFENSE AGAINST INVADERS

FORESTS AND OTHER NATURAL **HABITATS CAN THRIVE** WHEN PESTICIDES ARE USED TO CONTROL INVADING PLANTS OR INSECTS THAT THREATEN NATIVE SPECIES

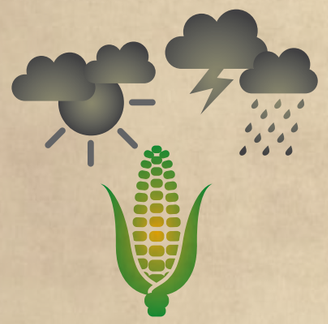
CONSERVATION TILLAGE

CONSERVATION TILLAGE LEAVES CROP STUBBLE IN THE FIELD, **IMPROVING HABITAT** AND **FOOD SOURCES** FOR INSECTS, BIRDS AND OTHER ANIMALS

RESPONDING TO CLIMATE CHANGE

CLIMATE CHANGE HAS ALREADY SIGNIFICANTLY IMPACTED GROWING CONDITIONS AND WEATHER PATTERNS. AND IF CURRENT TRENDS CONTINUE, IT'S PREDICTED THAT TEMPERATURES WILL RISE BY 2-3°C OVER THE NEXT 50 YEARS, LEADING TO SERIOUS IMPACTS. FARMERS MAY FACE EVEN MORE DROUGHT, FLOODING AND EXCESSIVE HEAT AS THEY ARE CHALLENGED TO PRODUCE FOOD FOR AN INCREASING WORLD POPULATION. PLANT SCIENCE TECHNOLOGIES CAN HELP FARMERS MITIGATE CLIMATE CHANGE AND DEAL WITH ERRATIC WEATHER PATTERNS.

MANAGING OUR CHANGING CLIMATE
THROUGH INNOVATIVE TECHNOLOGIES AND PRACTICES



NEW TRAITS

PLANT SCIENTISTS ARE DEVELOPING NEW TECHNOLOGIES AND TRAITS THAT CAN

ALLOW CROPS TO THRIVE

IN HARSH GROWING CONDITIONS LIKE DROUGHT, FLOODING OR EXTREME HEAT

CONSERVATION AGRICULTURE

HERBICIDE-TOLERANT BIOTECH CROPS REDUCE THE NEED FOR TILLAGE - USING LESS FUEL AND KEEPING CARBON IN THE SOIL. IN 2010, THE AMOUNT OF CO_2 SAVED BY BIOTECH CROPS WAS

EQUAL TO REMOVING 9 MILLION CARS

FROM THE ROAD FOR ONE YEAR

HIGHER YIELDS

BY INCREASING YIELDS, FARMERS ARE UNDER LESS PRESSURE TO CONVERT CARBON-RICH FORESTS TO FARMLAND, REDUCING GREENHOUSE GAS EMISSIONS. SINCE 1961, HIGHER-YIELDING CROPS HAVE PREVENTED

590 BILLION TONNES OF CARBON EMISSIONS

The technologies offered by the plant science industry have a long history in improving agriculture and a critical role to play as we look to the future. Population growth, climate change and the limitations of natural resources means that agriculture must become even more productive, efficient and environmentally sound. The plant science industry is committed to being part of the solution, contributing to sustainable farms around the world.

VISIT ACTIONFORAG.ORG

TO LEARN MORE ABOUT GLOBAL ISSUES AND PLANT SCIENCE SOLUTIONS

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