INNOVATION AS A PART OF SUSTAINABILITY

David Green| October 9, 2015

www.thesustainabilityalliance.us

U.S. Sustainability Alliance – Our Partners

USSA sponsors
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Alaska Seafood
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Food Export Association of the Midwest U.S.A.

Food Export USA Northeast

USA Rice Federation

American Hardwood Export Council

U.S. Dairy Export Council
Ingredients | Products | Global Markets

U.S. Wheat Associates

U.S. Grains Council

USSEC
U.S. Soybean Export Council
ASA International Marketing
USB United Soybean Board

USA Poultry & Egg Export Council

NAEGA

Organic trade association
Since 1985

THE SUSTAINABILITY OF U.S. AGRICULTURE

EU stakeholder views with representatives from supermarkets, processors, importers, industry groups, academics, NGOs & media in United Kingdom, Germany, the Netherlands and Brussels

Limited understanding of U.S. agriculture, fishery and forestry.

U.S. farming seen as mechanized, industrial, corporate & less sustainable than the EU.

Unanimous interest in learning more about how U.S. farming 'works'

Most people here see America as less green and not concerned with sustainability; we know that's not the case. Its just that its different.

Food processor.

American farmers often have an easier time adopting new technologies like GMOs. I've been on farms in Illinois and seen GM in the field. It annoys me that I cant choose the technology on my farm.

Farmer, United Kingdom

Linking the individual sustainability accomplishments of U.S. agriculture, forestry and fisheries through the long history of conservation stewardship.

U.S. SUSTAIN ABILITY

THIS IS HOW WE GROW

A CENTURY OF U.S. REGULATION AND INNOVATION

1900s

- federal meat inspection required
- early wildlife protection statutes created

1910s

- National Park Service created
- early regulation of pesticides

1930s

- food safety laws expanded
- soil conservation laws created

1940s

- first federal clean water laws established

1950s

- first federal clean air laws developed
- poultry inspection required

A CENTURY OF U.S. REGULATION AND INNOVATION

1970s

- laws on clean air and clean water expanded
- occupational safety law established
- endangered species protection created

1980s

- environmental stewardship required for farm program benefits
- major new soil conservation programs developed

1990s

- major wetland protection programs developed
- wildlife habitat, other incentive programs created

A CENTURY OF U.S. REGULATION AND INNOVATION

2000s

- conservation, environmental incentive programs expanded to livestock
- established new clean water regulations for livestock
- major public-private study of livestock air emissions

2010s

- food safety laws greatly expanded

U.S. AGRICULTURE, FISHERY & FORESTRY

Toward the Shared Goal of Sustainability:

Predictable, Consistent Supply of Safe Products · Diverse Agricultural Profile · Continuous Environmental Improvement

Our Commitment

- Quality & Consistency
- Scientifically-Based
- Technological Innovation
- Technical Training
- Commitment to Customer Relationships
- Ongoing Customer Support

Our Producers

- Responsible Management for Future Generations
- Efficient Use of Resources
- Conservation Programs Inspire Participation
- Responsible Farming & Fishery Practices
- Commitment to Community
- Family-owned Operations

Our System

- Based on Strong Federal Programs
- Rule of Law & Compliance
- Strong Regulatory Framework
- Transparency
- Public Notification & Engagement
- Worker Protection Standards

Our Foundation

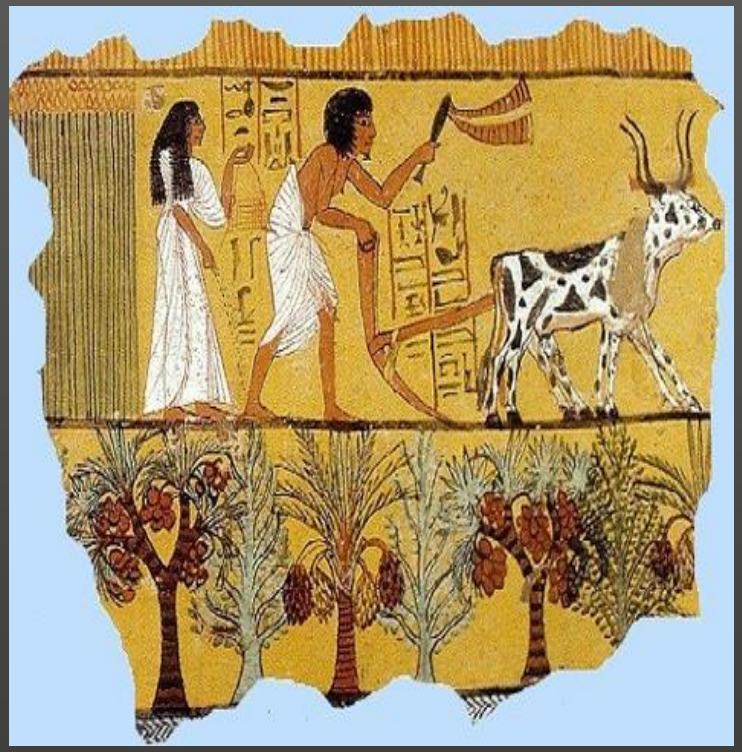
- Federal Laws
- State Laws
- Voluntary Schemes
- Peer-reviewed studies
- Federal Annual Audits

INNOVATION AND FARMING

"There are no miracles in agricultural production."

Dr. Norman Borlaug

INNOVATION AND FARMING



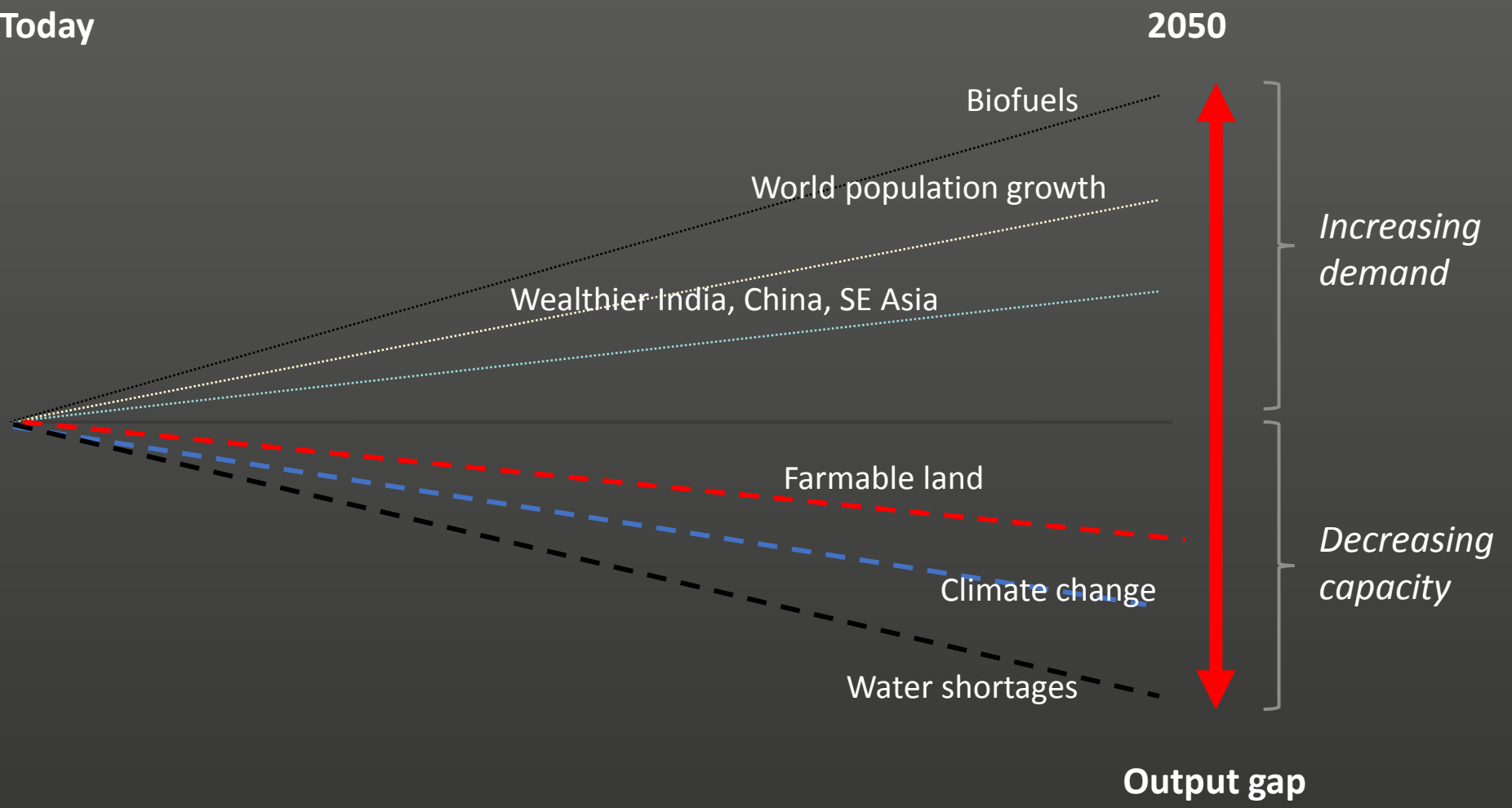
INNOVATION AND FARMING

In 2014, Cambridge University archaeologists find an irrigation system dating to 70 AD

Used for growing grapes or asparagus

INNOVATION IN FARMING

MEETING GLOBAL POPULATION DEMANDS



INNOVATION AND FARMING - SOME CHALLENGES

Efficiency
Nutrition
Environmental impact
Culture
Legislation
Supply chain partnerships
Sustainability
Safety

INNOVATION AND FARMING

"Take it to the farmer."

Dr. Norman Borlaug

VISIT –THESUSTAINABILITYALLIANCE.US

&

THISISHOWWEGROW.ORG

U.S. SUSTAIN ABILITY

THIS IS HOW WE GROW

AGRICULTURAL INNOVATION

Planting the Seeds for a Sustainable Future

Laura Batcha
CEO/Executive Director

Organic trade association
SINCE 1985

Inputs

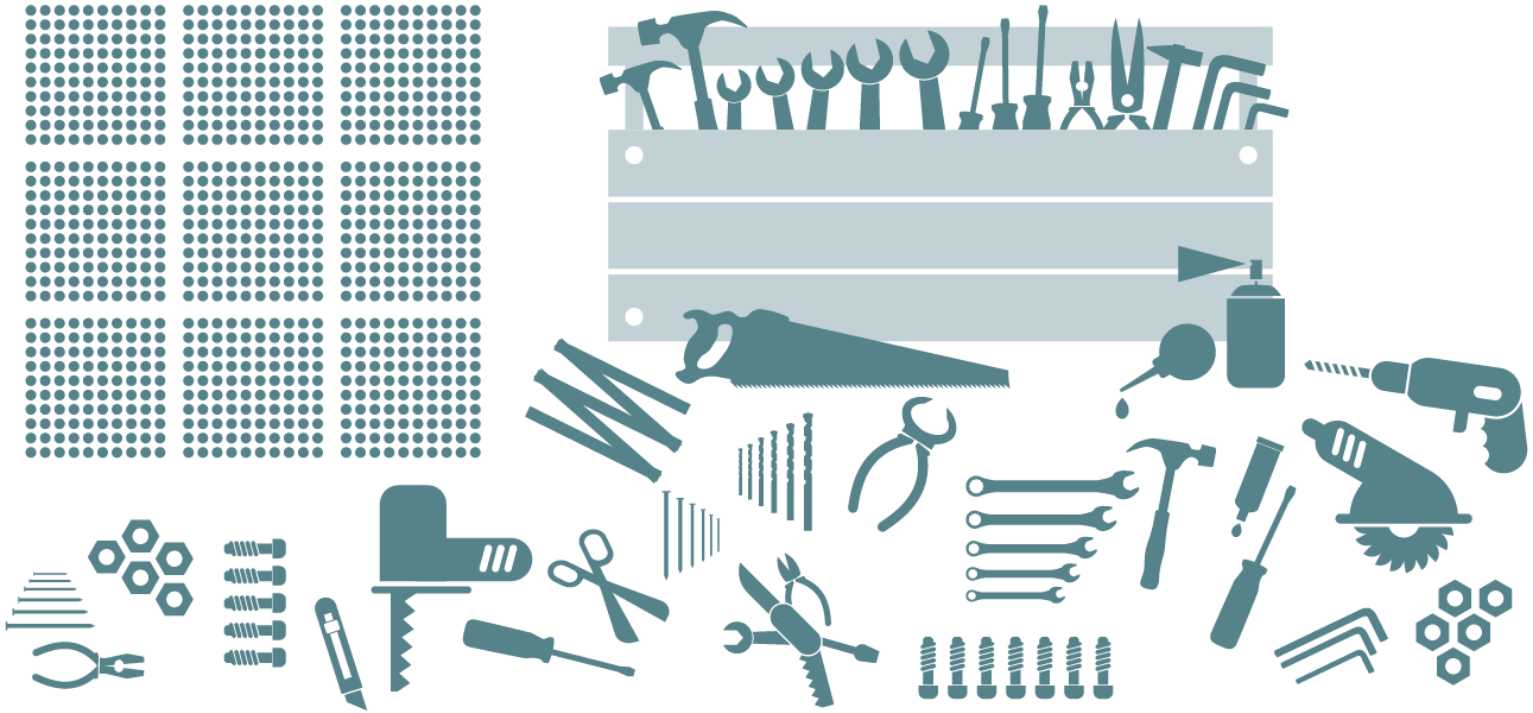
- Crop
- Livestock
- Handling

How do the synthetic pest control products allowed in organic farming compare to the pesticides allowed in conventional farming?

25 synthetic active pest control products allowed in organic crop production

The organic farmer must first use mechanical, cultural, biological and natural materials and move onto the toolbox only when and if they don't work. In this way the toolbox is "**restricted**."

900+ synthetic active pesticide products registered for use in conventional farming by EPA*



How do the synthetic livestock health treatments allowed in organic livestock production compare to the drugs allowed in conventional livestock production?

22 synthetic livestock health treatments allowed in organic livestock production

The organic farmer must first use preventive practices and biologics to prevent sickness and move onto the toolbox only when and if they don't work. In this way the toolbox is "**restricted**."

550+ synthetic active ingredients approved by FDA* in animal drug products


Supply chain management
Traceability
Audits + Inspections

Equipment

Precision Agriculture

Robotics + Weed Control

Research

Sustainability

Soil Health

Climate Change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U.S. SUSTAIN ABILITY

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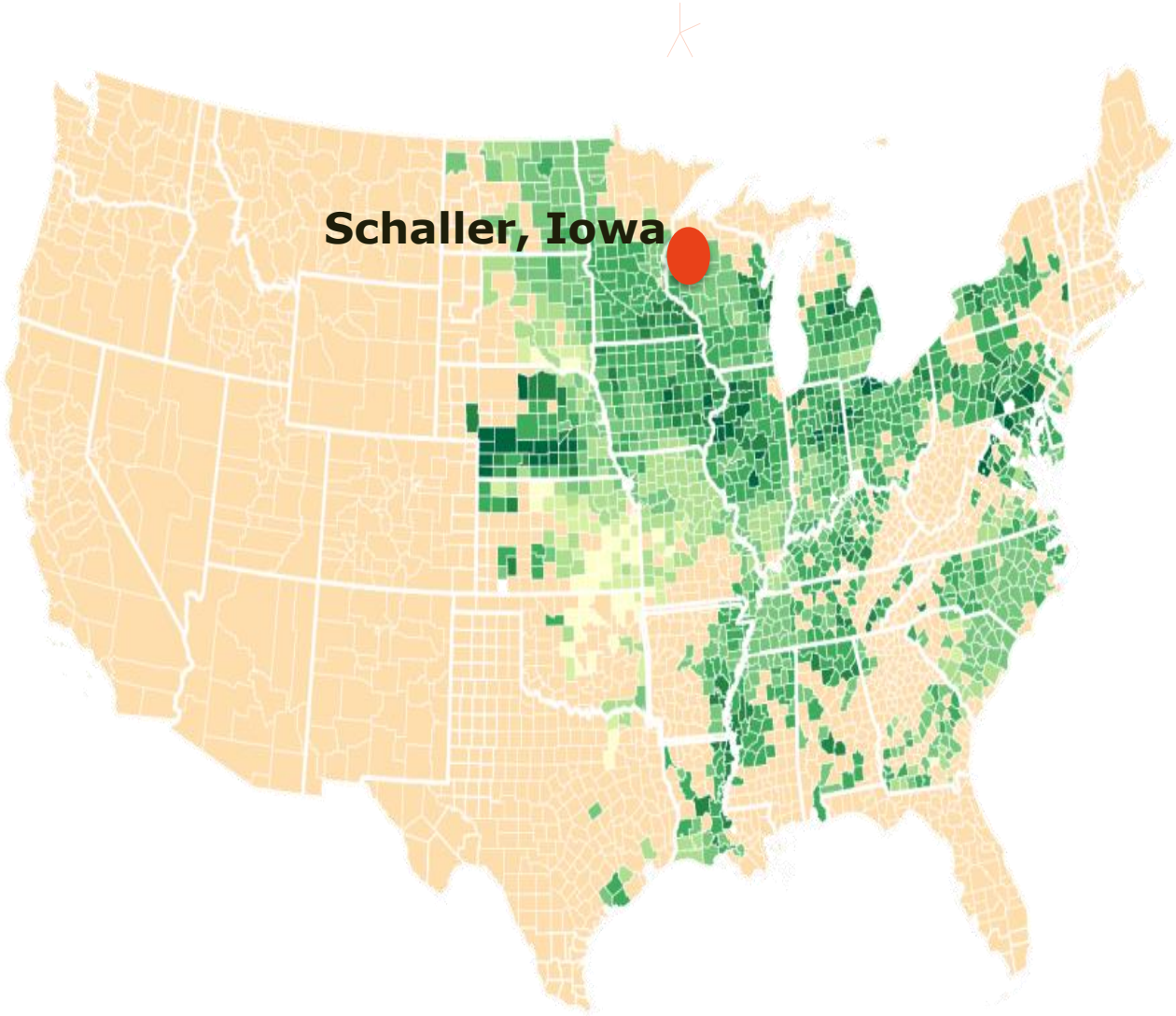
Sustainability on the Farm: Ongoing Innovation and Improvement

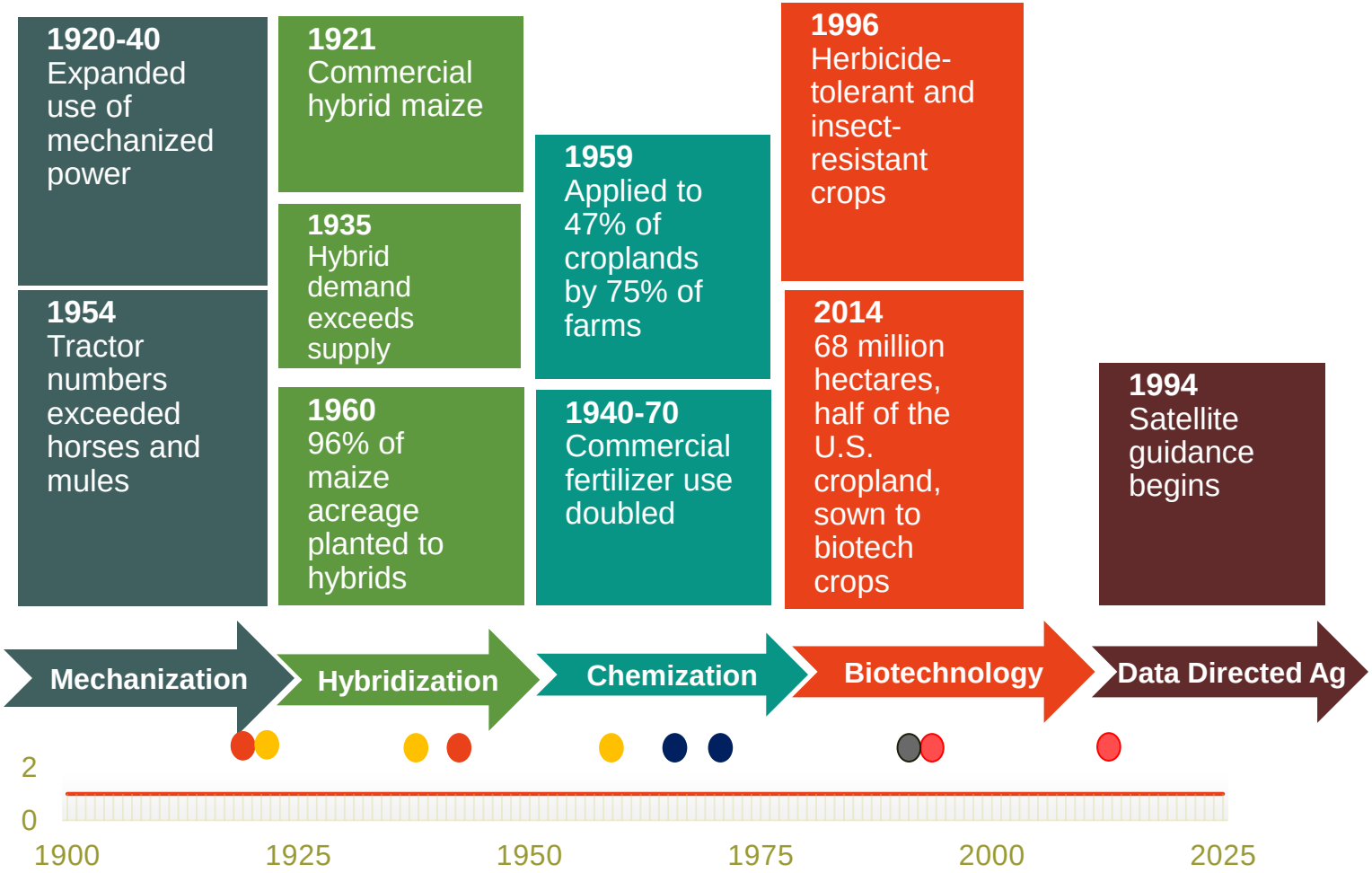
Laura Foell, Chairman, U.S. Soybean Export Council
Iowa Soybean farmer


Schaller, Iowa

Agenda

1. Innovation on the farm – past, present & future
2. Big Data
3. Precision agriculture
4. Drones in agriculture
5. Summary

Technological Eras



Source: Dr. J. B. Penn, Deere & Co., The Snyder Memorial Lecture at Purdue University

Big Data Defined

Oxford English Dictionary:

"Data of a very large size, typically to the extent that its manipulation and management present significant logistical challenges."

Forbes:

"A new attitude by businesses, non-profits, government agencies, and individuals that combining data from multiple sources could lead to better decisions."

Big Data – How It Is Used

Precision Agriculture:

- Collecting data – Crop maturity, weather, soil, etc.
- Biotechnology is an example.

Prescription Agriculture:

- Implementation – Start new processes using the data.
- Using GPS to help map the crop is an example.

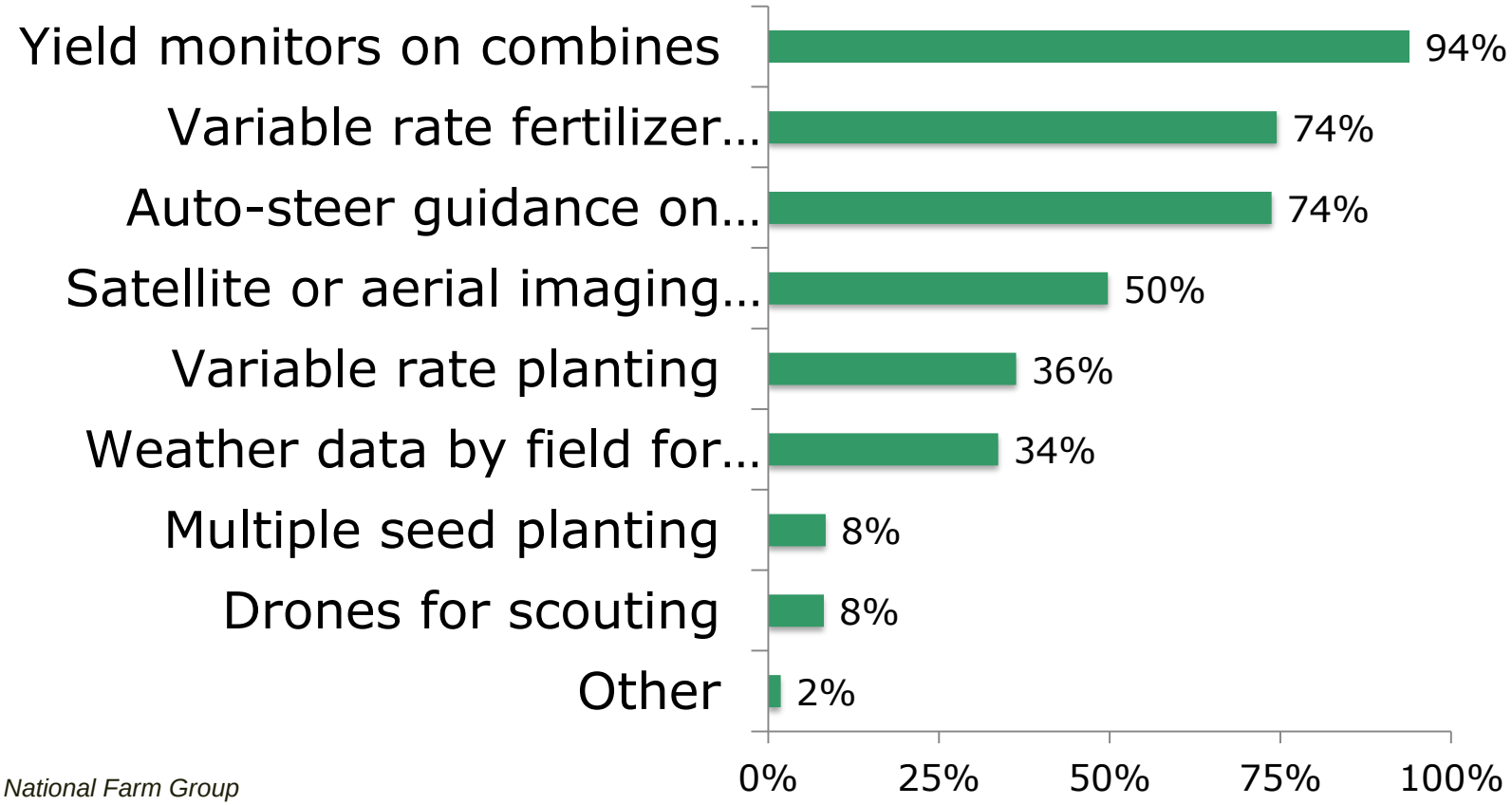

Precision
Agriculture

Precision Agriculture

Reduces inputs with precise applications down to the millimeter

Innovation In Agriculture

Precision Ag Tools Utilized



Source: National Farm Group

Conservation Tillage & Biotech Production

- Reduces labor, saves time
- Saves diesel fuel
- Reduces machinery wear
- Increases earthworms and improves soil condition
- Increases organic matter
- Traps soil moisture to improve water availability
- Reduces soil erosion
- Improves water quality
- Increases wildlife
- Improves air quality

Drones in Agriculture

PHOTO CREDIT: SAM HENDREN 89.7 NPR NEWS

How Do Drones Improve Crop Yield?

Frog Eye Leaf Spot

Drone Use Around the World

Many Countries have Unmanned Aerial Vehicle (UAV) laws, such as:

- Canada
- Mexico
- European Union (28)
- Brazil
- Japan
- China
- Australia
- New Zealand

Source: University of Missouri Drone Journalism Program

Summary

- Big Data + Precision Agriculture
  - new Technology brings advantages
- Innovations Yield Monitors + Drone Use
  - Increase Farm Operational efficiencies
- Practice Conservation Tillage + Biotech Production
  - Reduce Environmental Impact
  - Increase time and labor savings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Thank You!

“AGRICULTURAL INNOVATION – PLANTING THE SEEDS FOR A SUSTAINABLE FUTURE”

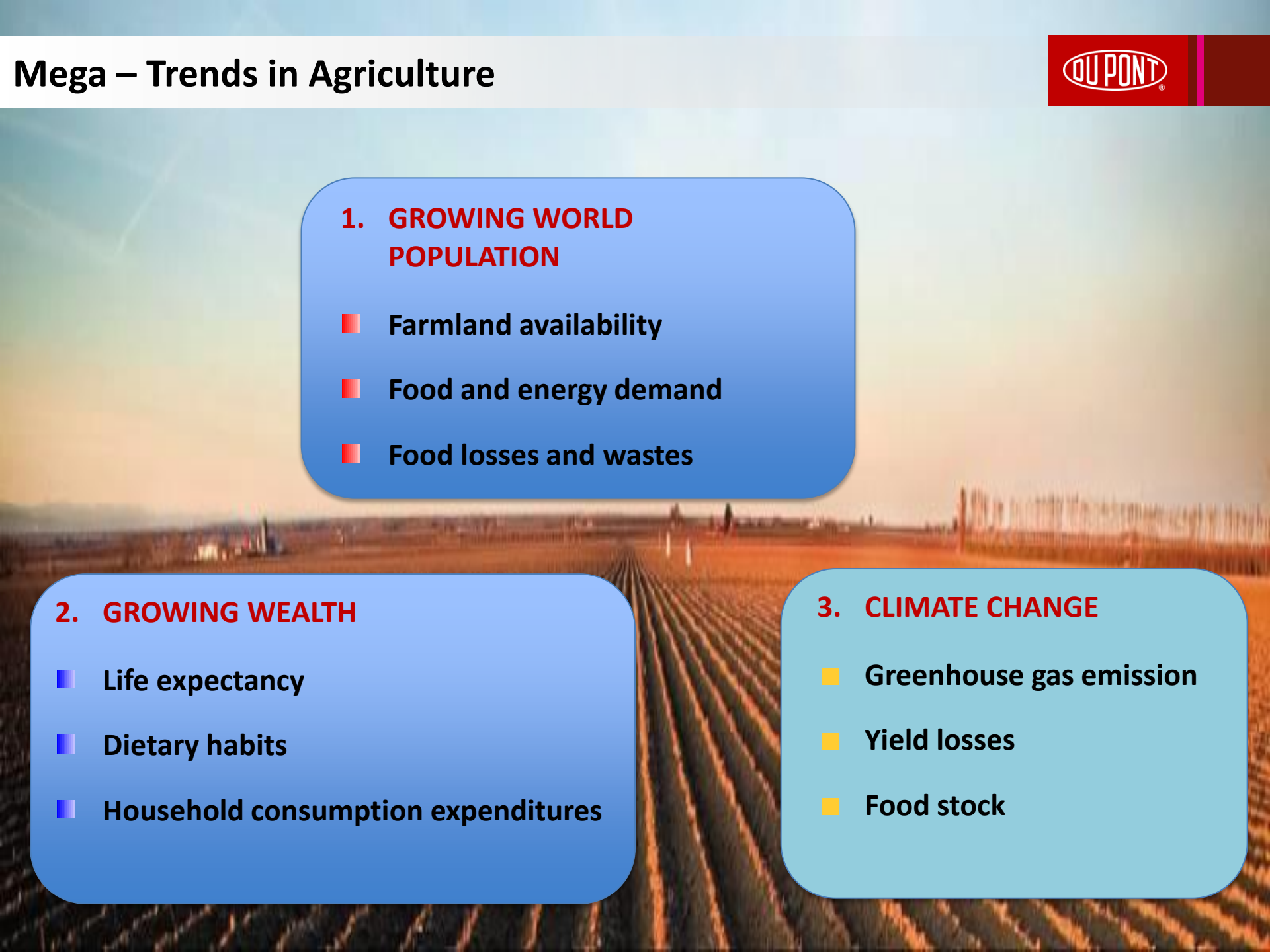
Luigi Coffano, Country Leader Italy

Global Challenges

As the global population climbs up to 9 billion people in 2050, DuPont uses its science-powered innovation to help solve the challenges facing the world, with a focus on:

FOOD **ENERGY** **PROTECTION**

Mega – Trends in Agriculture



1. GROWING WORLD POPULATION

- Farmland availability
- Food and energy demand
- Food losses and wastes

2. GROWING WEALTH

- Life expectancy
- Dietary habits
- Household consumption expenditures

3. CLIMATE CHANGE

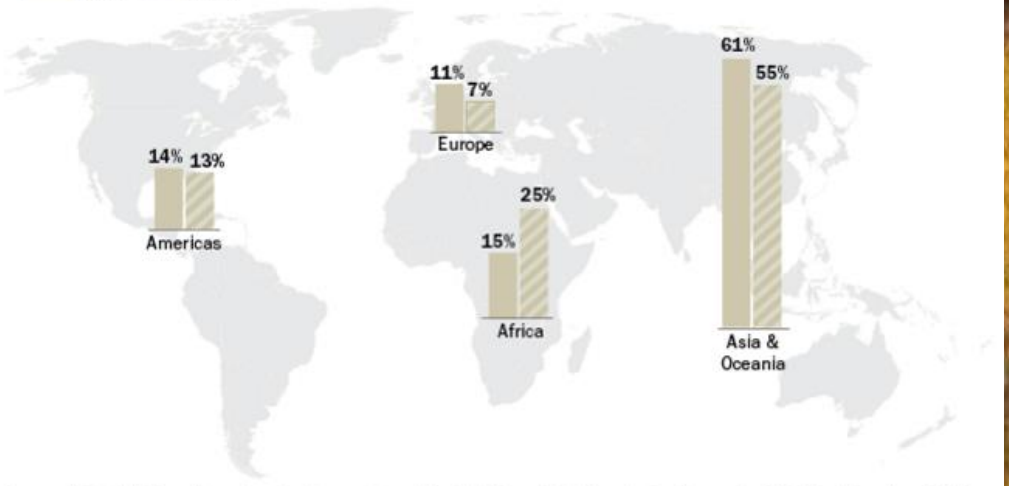
- Greenhouse gas emission
- Yield losses
- Food stock

Sustainable Food Solutions

WHERE ARE WE NOW?

The current world population of 7.2 billion is projected to increase by 1 billion over the next 12 years and **reach 9.6 billion by 2050**, according to the United Nations. It points out that growth will be mainly in developing countries, **with more than half in Africa**.

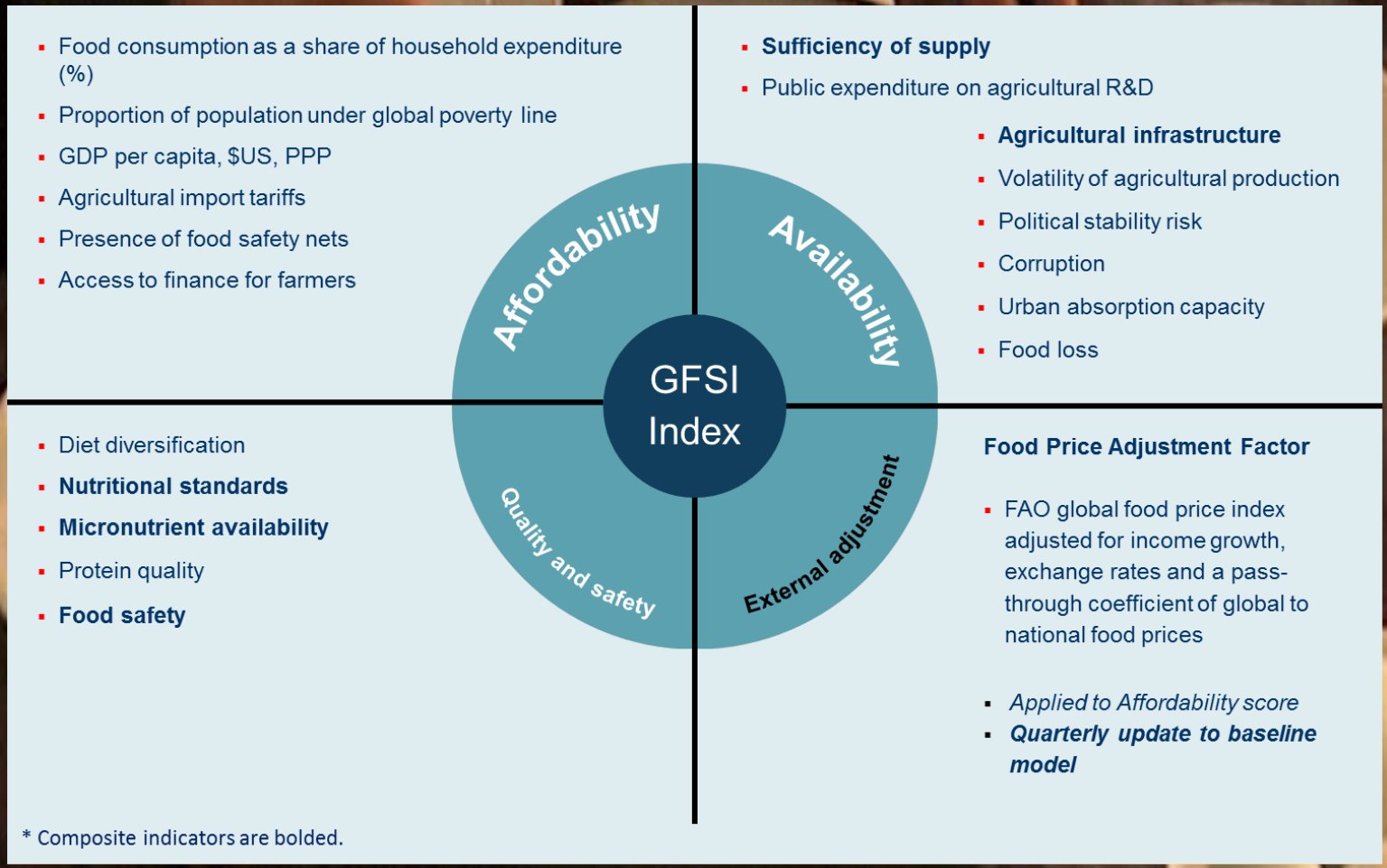
Regional distribution of global population by region, 2010 and 2050



Source: United Nations, Department of Economic and Social Affairs, *World Population Prospects: 2012 Revision*, June 2013, http://esa.un.org/unpd/wpp/index.htm

Sustainable Food Solutions

Food security exists when people at all times have physical, social and economic access to sufficient and nutritious food that meets their dietary needs for a healthy and active life.



- Food consumption as a share of household expenditure (%)
- Proportion of population under global poverty line
- GDP per capita, $US, PPP
- Agricultural import tariffs
- Presence of food safety nets
- Access to finance for farmers

- **Sufficiency of supply**
- Public expenditure on agricultural R&D
- **Agricultural infrastructure**
- Volatility of agricultural production
- Political stability risk
- Corruption
- Urban absorption capacity
- Food loss

- Diet diversification
- **Nutritional standards**
- **Micronutrient availability**
- Protein quality
- **Food safety**

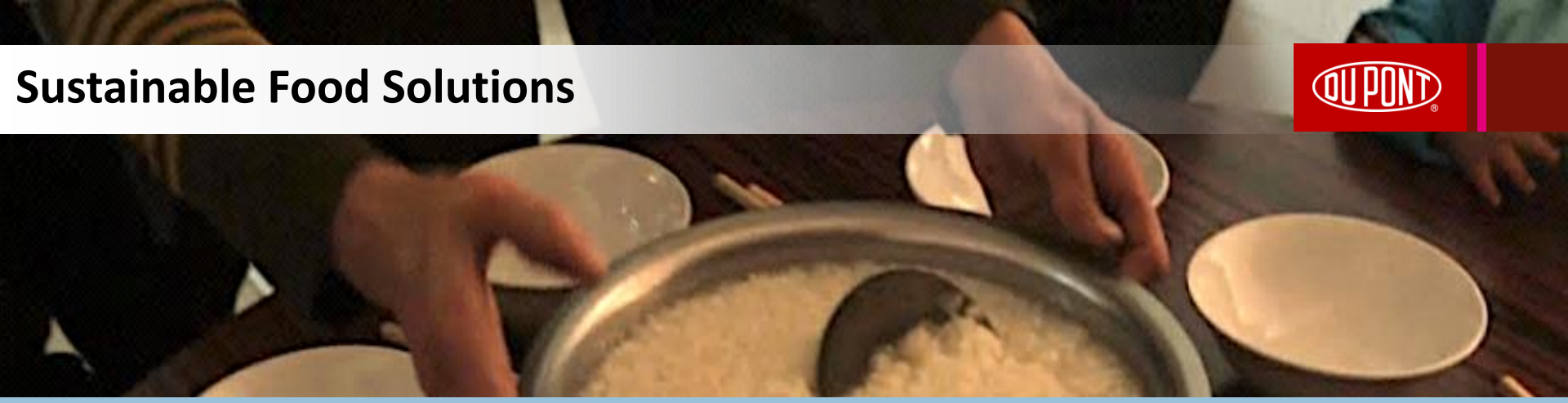
Food Price Adjustment Factor

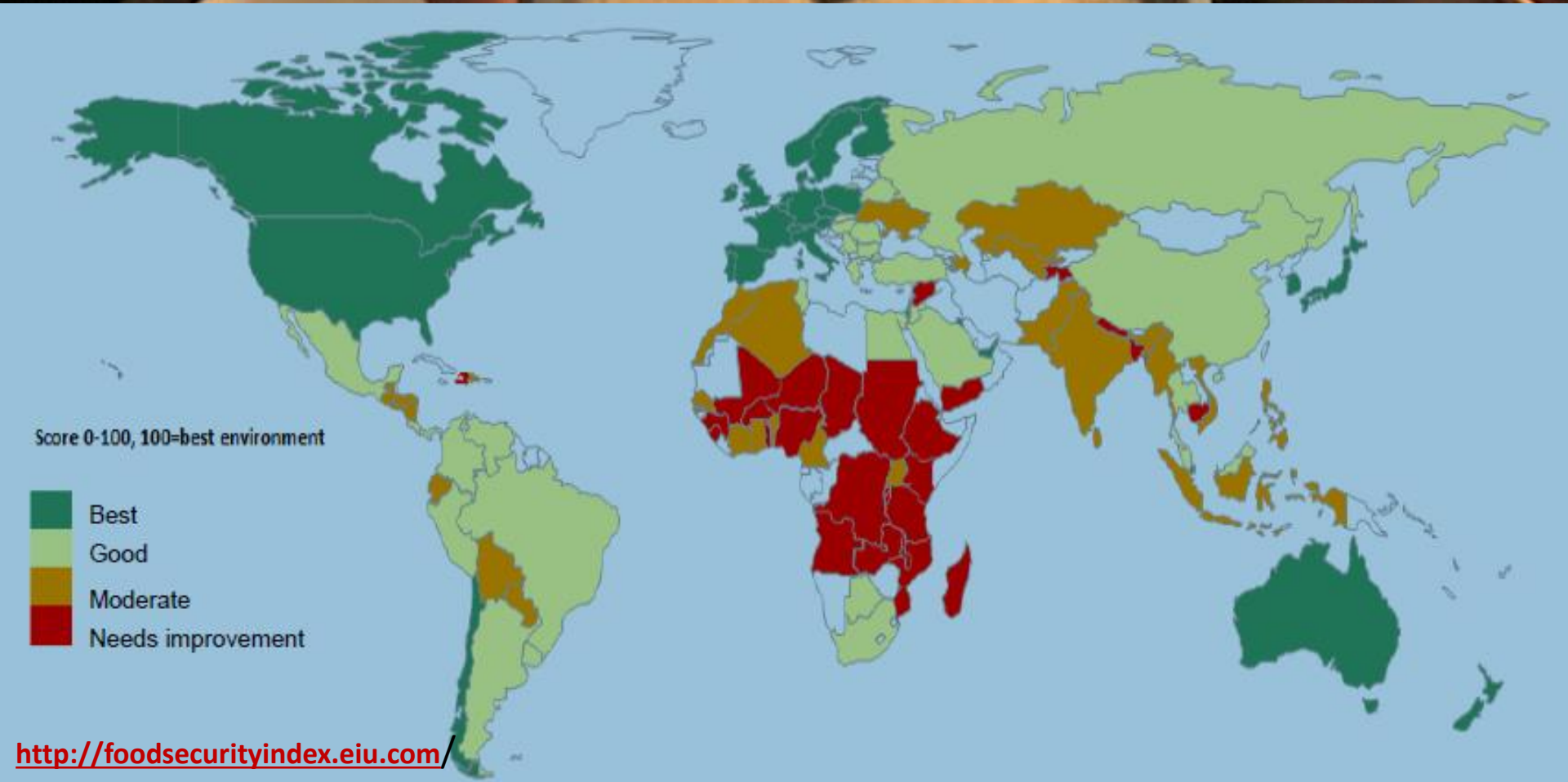
- FAO global food price index adjusted for income growth, exchange rates and a pass-through coefficient of global to national food prices

- *Applied to Affordability score*
- ***Quarterly update to baseline model***

* Composite indicators are bolded.

Sustainable Food Solutions





http://foodsecurityindex.eiu.com/

Sustainable Food Solutions

How can we improve the elements of the food system?
- Agricultural Production -

AGRICULTURAL PRODUCTION

Teaching local farmers more effective farming techniques can result in a higher yield with less input.

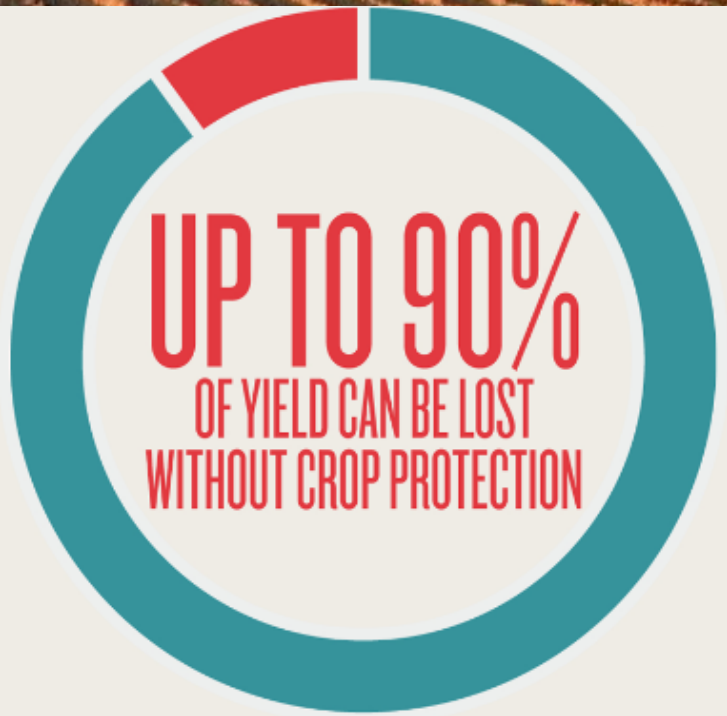
EDUCATION

High quality seed is not just about its yield potential but also its ability to adapt to the local environment.

FARMING

In developing countries, nearly 30-40% of yield can be lost before it reaches the consumer. Without crop protection products this overall yield could fall another 50-90%.

SCIENCE



Sustainable Food Solutions

How can we improve the elements of the food system?
Post Harvesting & Processing - Distribution

POST HARVEST & PROCESSING

INFRASTRUCTURE

A household metal silo with a capacity of 1000 kilos can conserve enough grain to feed a family of five for one year.

INFRASTRUCTURE

With the growing need for the transportation of fresh food and other perishables, time and temperature sensitive cargo protection are key challenges facing the industry

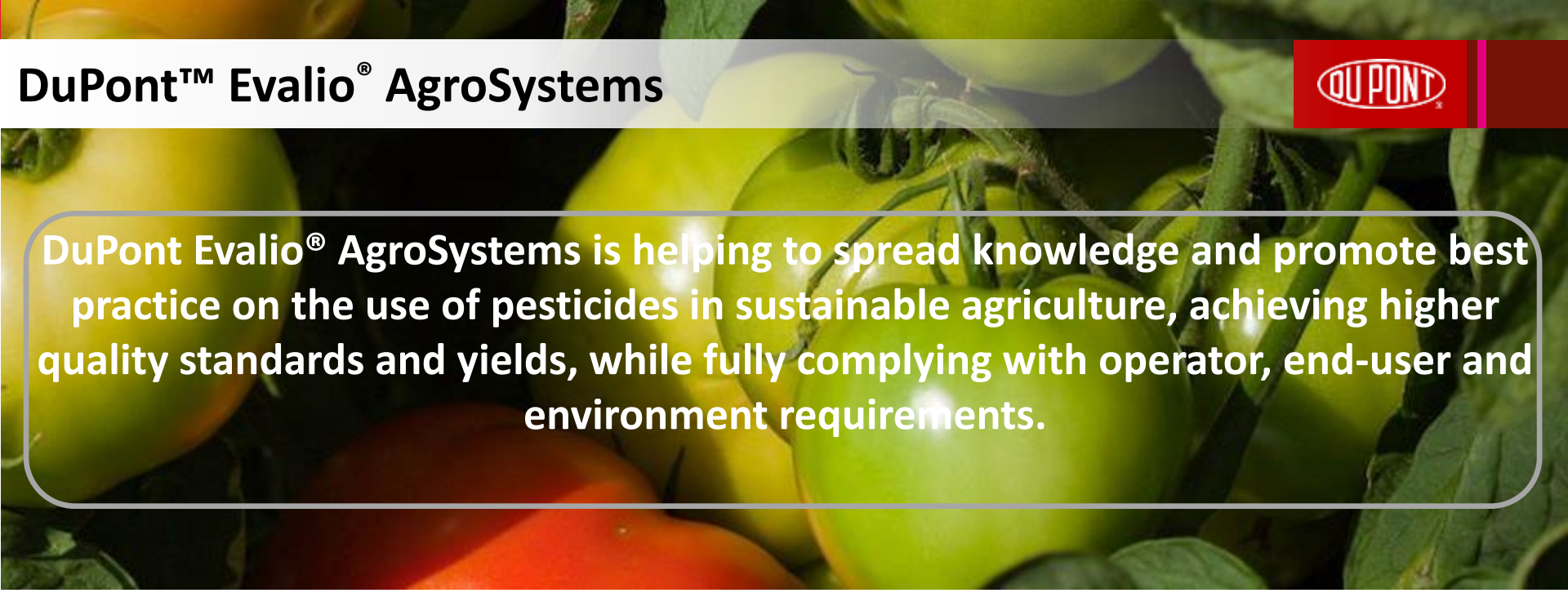
33%
OF ALL FOOD PRODUCED IN THE WORLD IS WASTED

DISTRIBUTION

Food producers have innovative solutions to meet the highest global standards in food quality and safety

SCIENCE

DuPont™ Evalio® AgroSystems



DuPont Evalio® AgroSystems is helping to spread knowledge and promote best practice on the use of pesticides in sustainable agriculture, achieving higher quality standards and yields, while fully complying with operator, end-user and environment requirements.

- DuPont™ Evalio® AgroSystems is a free monitoring service for sustainable pest control in high value crops such as tomatoes, lettuce, corn, potatoes, and oilseed rape.
- Evalio® AgroSystems looks at pest populations and their movement during the season. It offers real-time warnings to growers enabling them to optimize their use of pesticides to help protect crop yield and quality. It allows them to apply the right amount of product at the right time for maximum benefit.
- Evalio® AgroSystems is a valuable tool for use in Integrated Pest Management programmes (IPM).

DuPont™ Evalio® AgroSystems

Monitoring points : 877

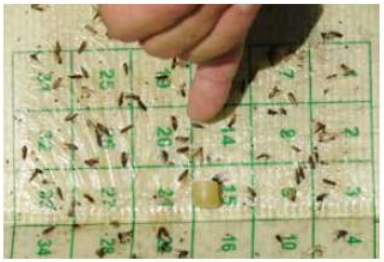
Pest : 7

Countries : 132

Crops : 13

Local pheromone traps capture adult pests before they can reproduce

Pests caught in traps are counted manually and then data is submitted to a central database

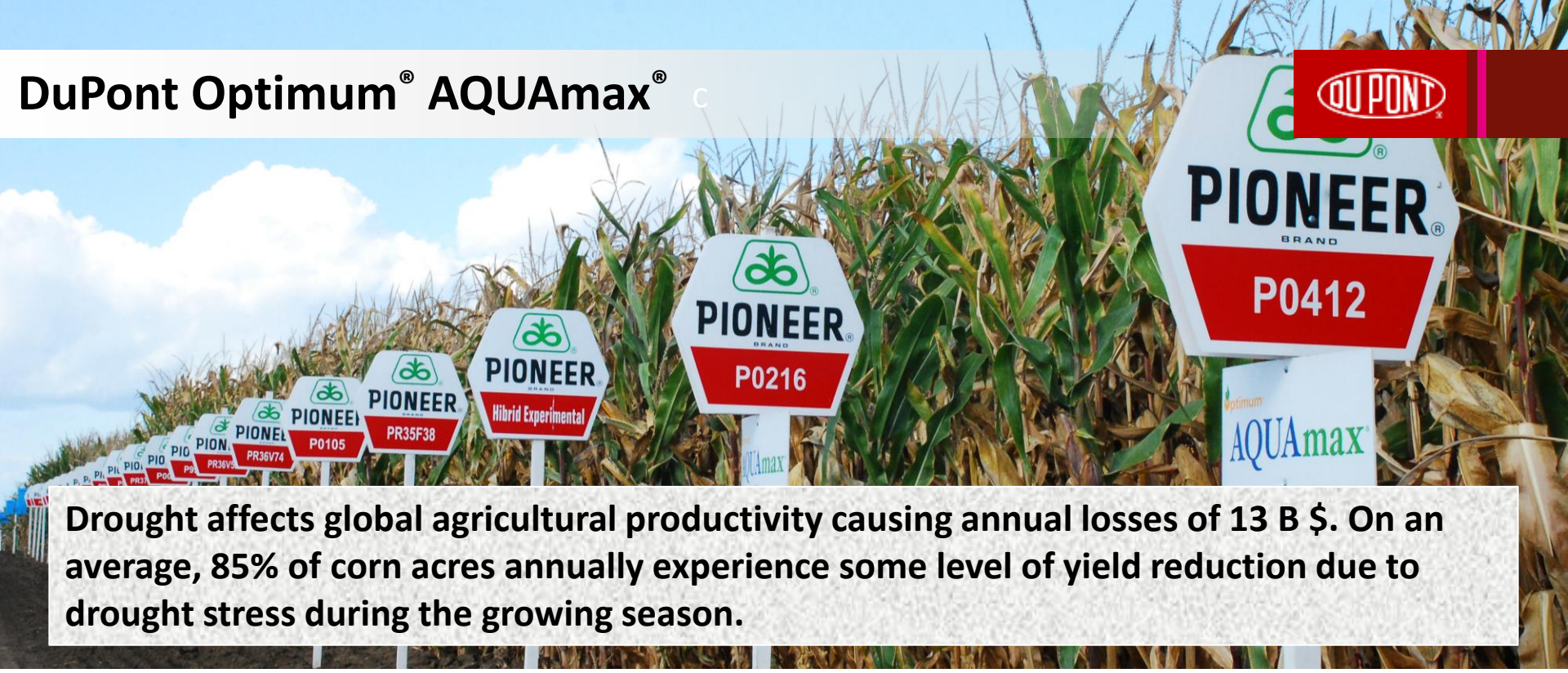


Evalio® AgroSystems helps to determine the right application time for insecticide treatment

Regular news on key pest population density is sent via SMS or is available on the Evalio® AgroSystems website

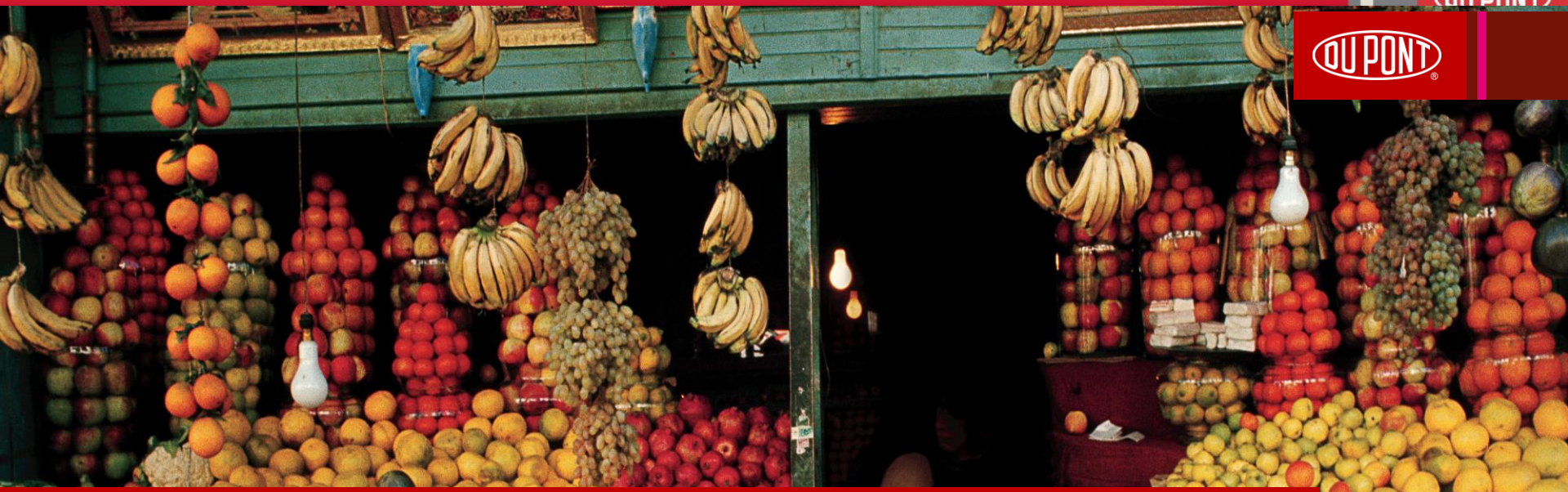
(http://evalio.dupont.com)

DuPont Optimum® AQUAmax®



Drought affects global agricultural productivity causing annual losses of 13 B $. On an average, 85% of corn acres annually experience some level of yield reduction due to drought stress during the growing season.

- **Optimum AQUAmax ® products deliver a yield advantage in water-limited environments and offer top-end yield potential under optimal growing conditions.**
- **Drought tolerance is controlled by a large number of genes and is heavily influenced by environmental factors (e.g. heat, water stress, soil types).**
- **Optimum AQUAmax ® hybrids are equipped with strong agronomics and the latest technology packages, including key native traits that improve root systems and the plant's ability for silk emergence under drought stress.**

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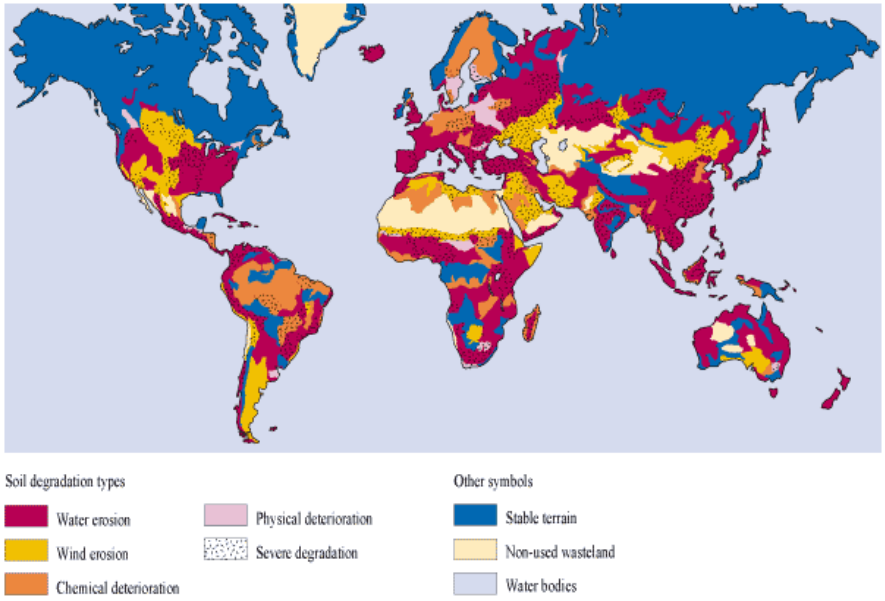
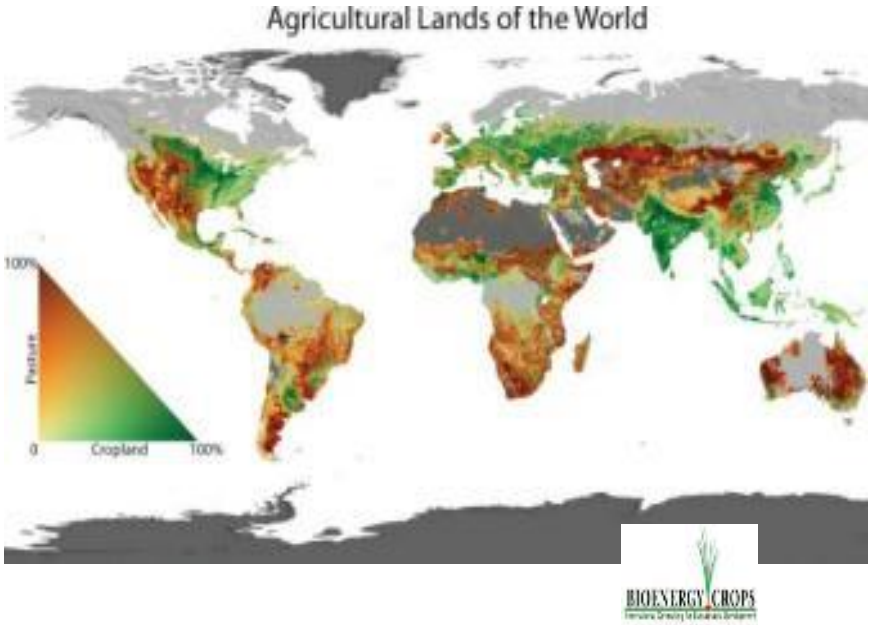
New Holland Agriculture Trends and Innovations for Agricultural Equipment

Paolo Andreone, Marketing and Communication Manager New Holland Agriculture

The agricultural environment

- The global agricultural environment is extremely varied and complex
- Each region has unique characteristics and specifications that must be considered in the agronomic choice and agricultural equipment
- Every day farmers have to adapt to changing conditions





What can we do

- Today the economy of farms and contractor companies is a fundamental management of the entire cultivation process

Soil preparation

Seeding

Fertilization

Spraying

Irrigation

Harvesting

Transport

Silo compaction

Handling products

Which are the demands of farmers?

- **How we manage the production process:**

- Apply the right technology?
- The worksites are efficient?
- Can we save fuel?
- Can we increase operational performance?
- Can we reduce waste?

Manufacturers of agricultural machines are working to respond to these questions

Agricultural Trend / Innovation

CLEAN ENERGY LEADER

01. GROWING ENERGY

- BIODIESEL
- BIOETHANOL
- BIOMASS
- THE ENERGY INDEPENDENT FARM

03. SUSTAINABLE FARMING

- PRECISION FARMING
- CONSERVATION AGRICULTURE
- CARBON FOOTPRINTING
- ECOBRAUD

02. EFFICIENT PRODUCTIVITY

- TIER 4A AND TIER 4B TECHNOLOGY
- PRECISION LAND MANAGEMENT (PLM)
- MECHANIZATION
- INNOVATIONS

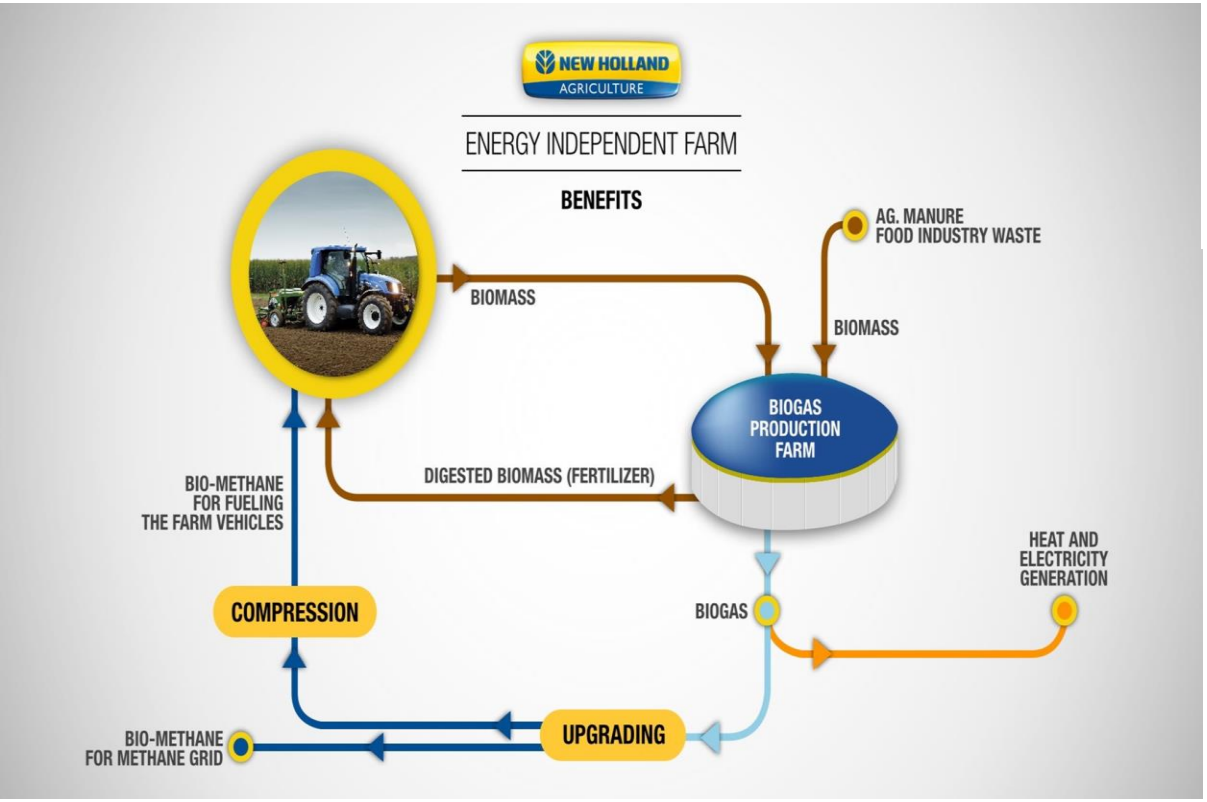
04. COMMITTED COMPANY

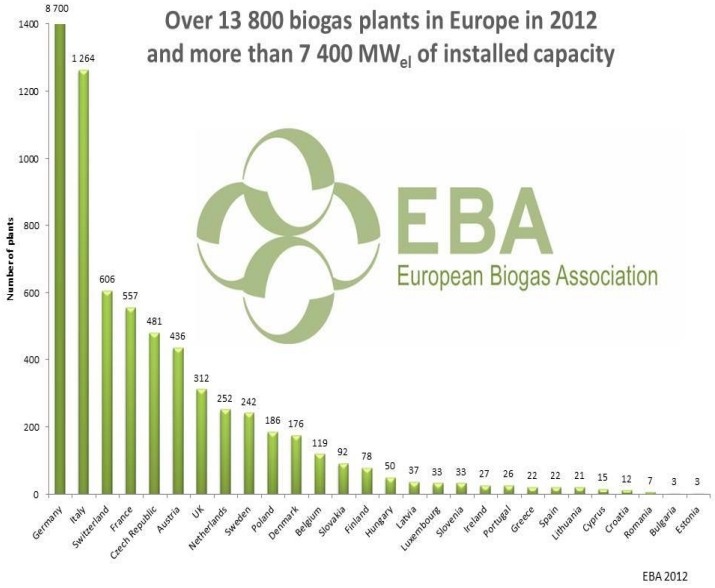
- PLANT CERTIFICATION
- RECYCLING

Growing energy

ENERGY INDEPENDENT FARMS

- Biogas: it is a consolidated reality in Europe
- Bio-methane new opportunity for farms





Growing energy

BIO-METHANE

- New application in agriculture as fuel

Growing energy

BIO-METHANE

- New generation of tractors powered Bio-methane

-40% operating costs

-80% pollutant emission

Simple after-treatment system

Low tractor noise

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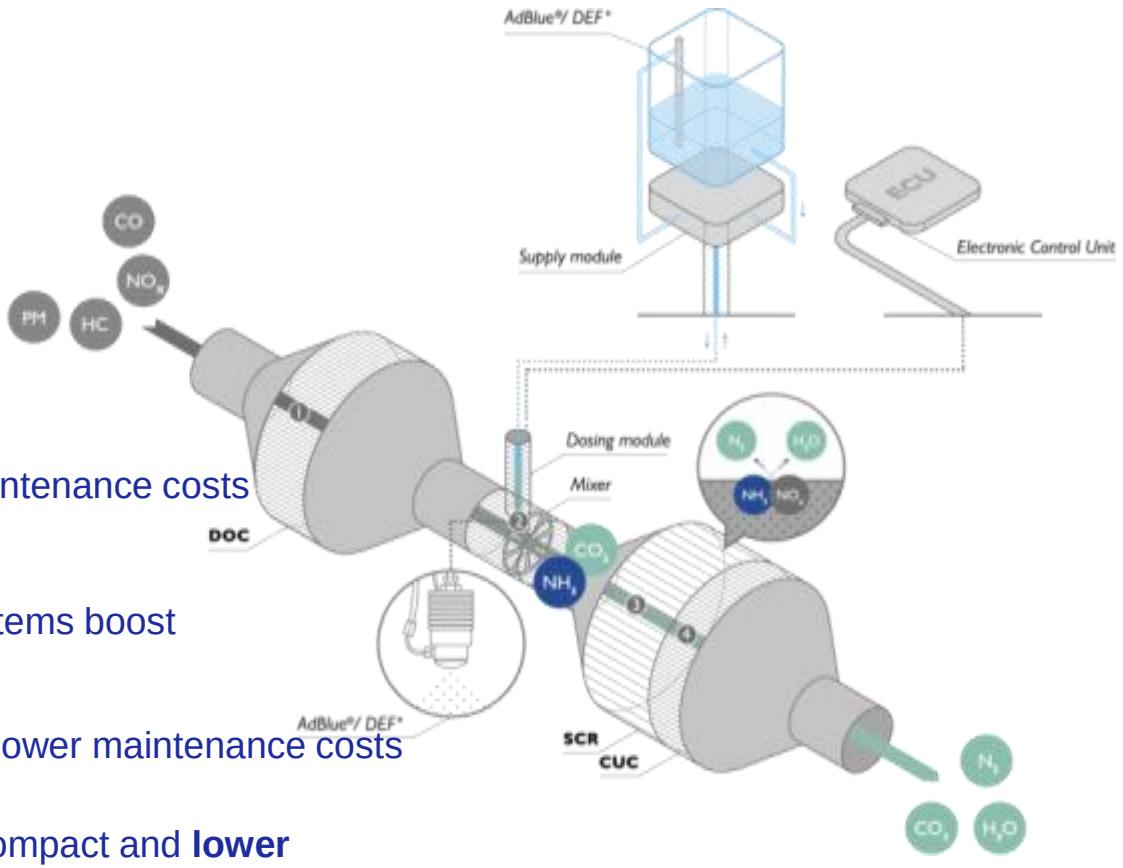
Evolution of agricultural engines

Treatment of exhaust gases

HI-eSCR

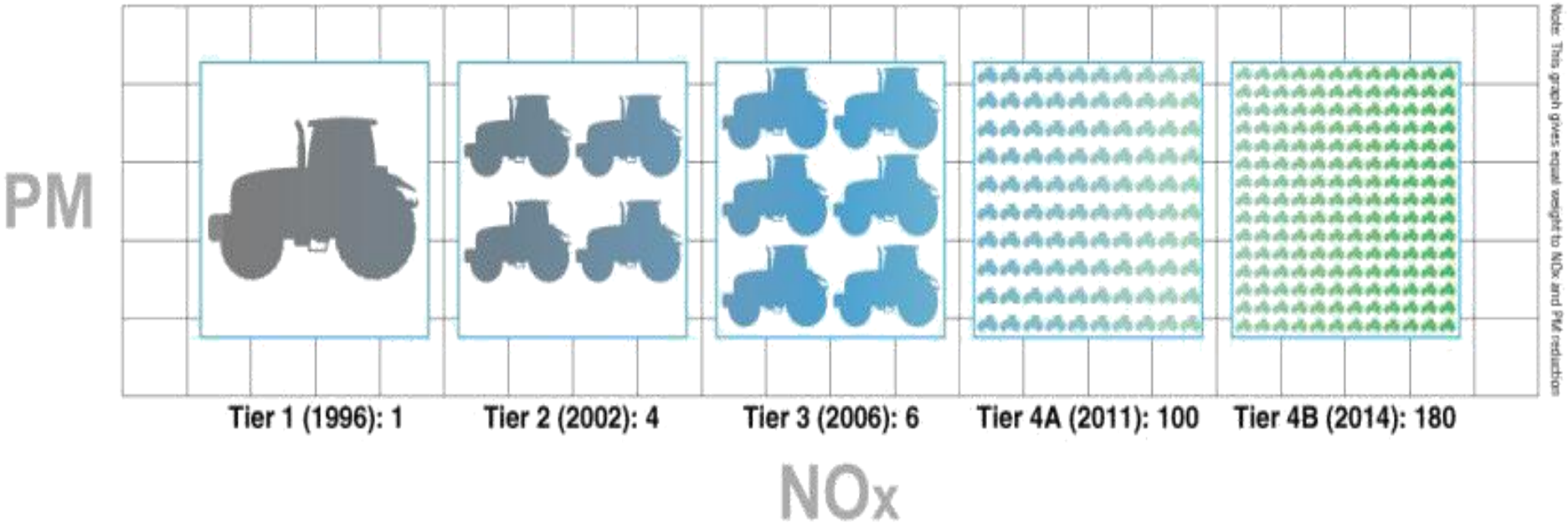
(No EGR - No DPF)



- **Low power** consumption and maintenance costs
- **More power** without complex systems boost
- PM No DPF→**greater reliability** and lower maintenance costs
- No EGR→cooling system more compact and **lower power absorption**

Evolution of emission Level

- Reduction of emissions level over the past 20 years



Evolution of agricultural engines

26% | 39% | 42% | 46% | >55%

Efficiency

1893	1980	1999	2014	2020
FIRST DIESEL ENGINE	FIRST TURBOCHARGED HEAVY DUTY ENGINE	ADVANCED AIR-HANDLING SYSTEMS	TIER 4 FINAL HI-eSCR ENGINES	INTEGRATED ENERGY MANAGEMENT SYSTEM

Evolution of agricultural engines

- High-efficient transmission

OUR AIM

Develop and offer to our customers the most efficient transmission on the market

AS RESULT

- Higher Productivity
- Higher Profitability
- Lower Fuel Consumption

Agricultural Trend / Innovation

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Precision Farming the Technology at your service

PRECISION LAND MANAGEMENT

INTELLISTEER™ SYSTEM

New Holland's fully integrated guidance solution offers you hands-off operation and 1-2cm levels of accuracy for improved productivity and efficiency.

PLM™ SOFTWARE

Precision Farming Software is your key to improved productivity as it enables you to download precise field data from your machines and analyse it on your PC to tailor your activity for future seasons.

MOISTURE AND YIELD MONITORING

Real time moisture sensing on CX, CR and FR tells you if it's too wet to harvest. BB large square balers even regulate additive application in response to the reading. With real time yield sensing, you can track the true yield of your field, then download and analyse.

PLM CONNECT TELEMATICS

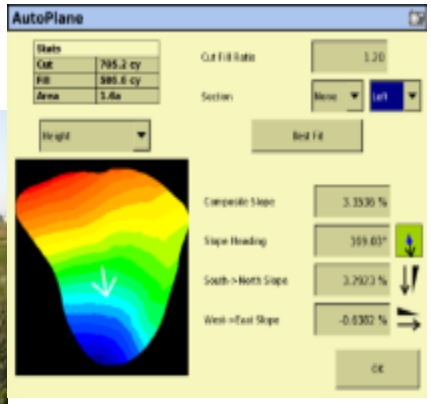
PLM™ CONNECT TELEMATICS

Telematics enables you to connect with your machine from the comfort of your office and view your machine's location and current hours or enjoy remote diagnostic capabilities, which even advises you of scheduled maintenance.

Precision Farming the Technology at your service

INNOVATIVE APPLICATIONS

- Leveling soil management

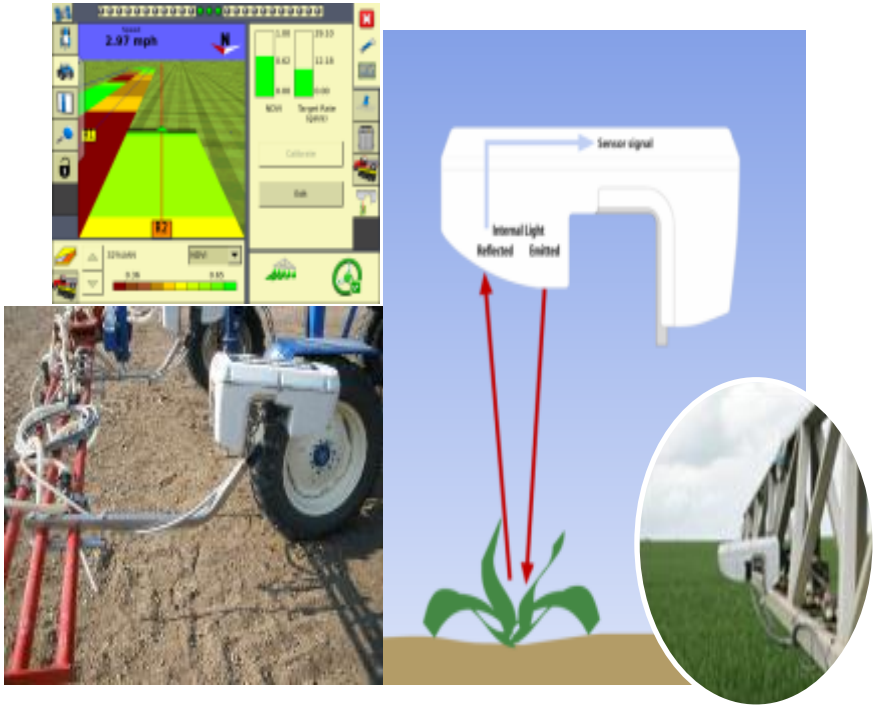


- Variable distribution in the field

Precision Farming the Technology at your service

INNOVATIVE APPLICATIONS

- Direct reading of the vegetation color



- Continuous monitoring of crop quality

Why is it worth investing in Precision Farming?

- A common technology for the management of processes and monitoring of the crops products.

Reduction in fuel consumption

Save time

Reduce waste (fertilizer, seed, pesticides)

Increase in operating performance

Higher product quality

Flexibility in farm business management

Conclusion

AGRICULTURE TREND AND INNOVATION

The success is finding the right balance

This man has found the right balance

New Holland with EXPO MILANO 2015

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Together we feed the world.

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Thanks for your attention


U.S.
SUSTAIN
ABILITY
THIS IS HOW WE GROW

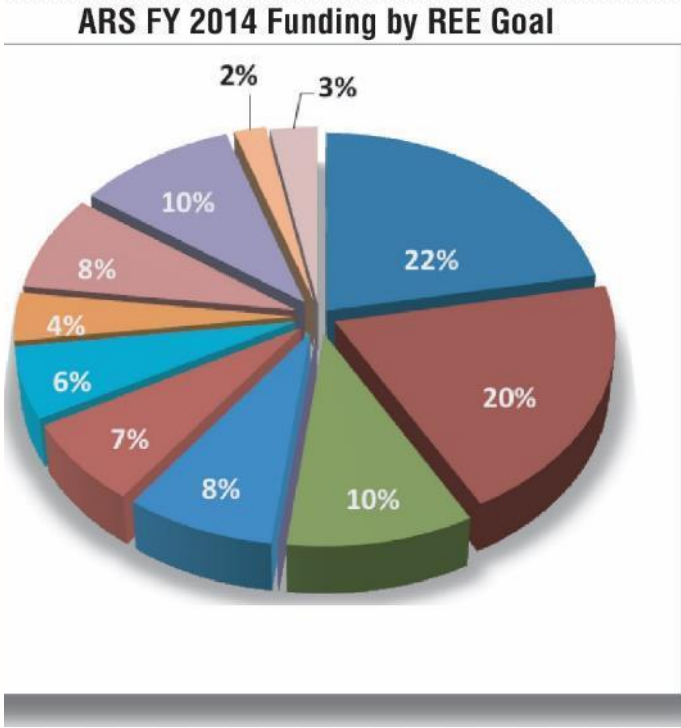
R&D / U.S. Innovation Agenda

Agricultural Innovation – Planting the Seeds for a Sustainable Future
Milan EXPO
October 9, 2015

Sally Schneider
Deputy Administrator
Natural Resources & Sustainable Agricultural Systems
Agricultural Research Service, USDA

USDA Research, Education, and Extension Action Plan

Goal 1.	**Local and Global Food Supply and Security**	
1.A.	Crop and Animal Production	22%
1.B.	Crop and Animal Health	20%
1.C.	Crop and Animal Genetics, Genomics, Genetic Resources, and Biotechnology	10%
1.D.	Consumer and Industry Outreach, Policy, Markets, and Trade	--
Goal 2.	**Responding to Climate and Energy Needs**	
2.A.	Responding to Climate Variability	8%
2.B.	Bioenergy/Biofuels and Biobased Products	7%
Goal 3.	**Sustainable Use of Natural Resources**	
3.A.	Water Availability: Quality and Quantity	6%
3.B.	Landscape-Scale Conservation and Management	4%
Goal 4.	**Nutrition and Childhood Obesity**	8%
Goal 5.	**Food Safety**	10%
Goal 6.	**Education and Science Literacy**	2%
Goal 7.	**Rural Prosperity/Rural-Urban Interdependence**	3%
	Total :	100%



Goals of Sustainability

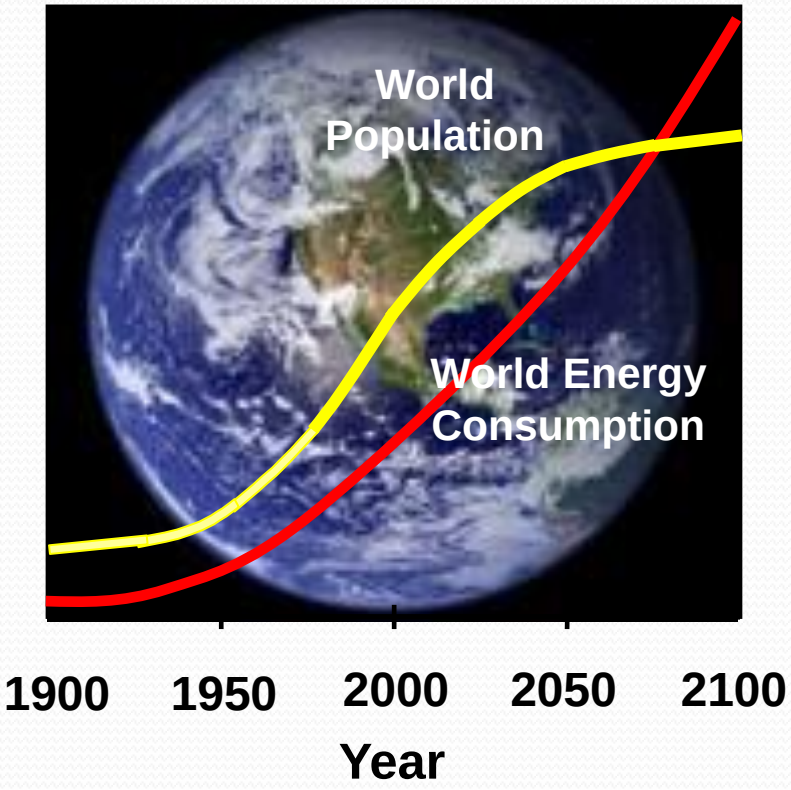
- Satisfying human needs for food, feed, fiber, and fuel
- Enhancing environmental quality and the resource base
- Sustaining the economic viability of agriculture
- Enhancing the quality of life for farmers, ranchers, forest managers, workers, and society as a whole. National Research Council, 2010





"Development that meets the needs of the present generation, without compromising the ability of future generations to meet their own needs." Brundtland Commision, 1987

Grand Challenges Facing Agriculture in the 21st Century



By 2050, agriculture will need to:

- Supply enough agricultural products to support a global population of 9.7 billion people;
- Without depleting our natural resources or degrading our environment;
- Against a background of changes in climate that are expected to alter patterns of temperature and precipitation on which the world's food production systems depend.
- Even in the absence of climate change, this would be a significant challenge.

These challenges threaten our food security & the availability of fresh water for a variety of needs.

To Increase Amount of Available Food

- Put more land under cultivation
- Produce more per unit land area (sustainable intensification)
- Reduce Waste

Calls for the Creation of a Long-Term Research Network for Agro-ecosystems (Walbridge & Shafer 2011)

(Similar to NSF's LTER network for Non-Managed Ecosystems)

- ***Infrastructure to:***
  - ***enable research on agricultural processes from field to landscape scales;***
  - ***support long-term investigations into key components of the sustainable intensification of agricultural production;***
- ***Historical data records would provide a baseline against which to evaluate future changes;***
- ***Collect common datasets using shared research protocols over the next 30-50 years—likely representing the most important datasets collected by such a network.***

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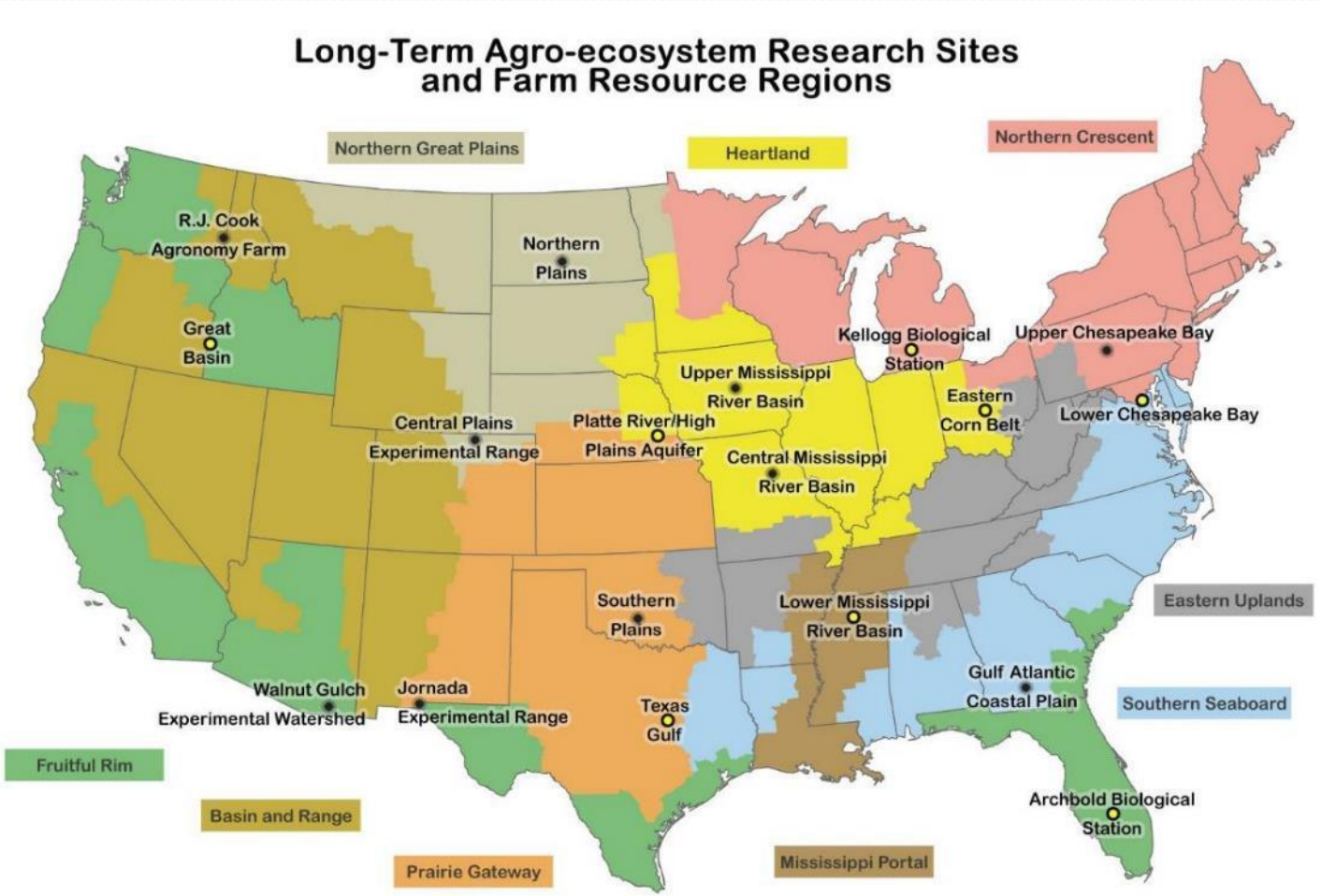
Long Term Agro-ecosystem Research Network (LTAR)



Long Term Agro-ecosystem Research Network

Shared Research Strategy

- Four Priority Areas of Concern
  - Agro-ecosystem Productivity;
  - Climate Variability and Change;
  - Conservation and Environmental Quality;
  - Socio-economic Viability and Opportunities.

- Four Key Products
  - New knowledge of processes & systems;
  - New technologies & management practices;
  - Improved agro-ecological models;
  - Comprehensive, accessible data.

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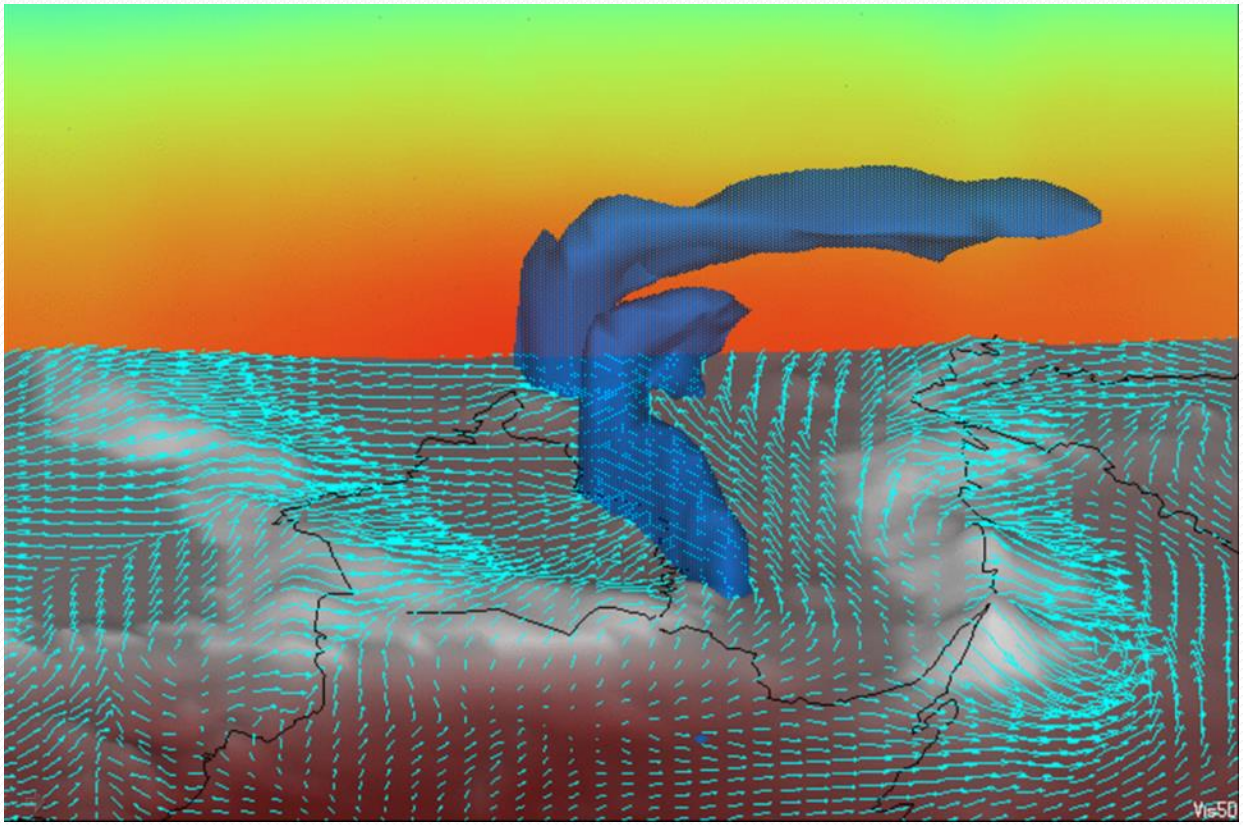
Genetics x Environment x Management
G x E x M

Wind Erosion Prediction System (WEPS)



Regional dust prediction over Mexico City using WEPS

Natural Resources Conservation Service uses WEPS to evaluate erosion potential on *35 million acres* where conservation practices are applied through conservation programs.
Other users: Universities, Industry, International collaborators

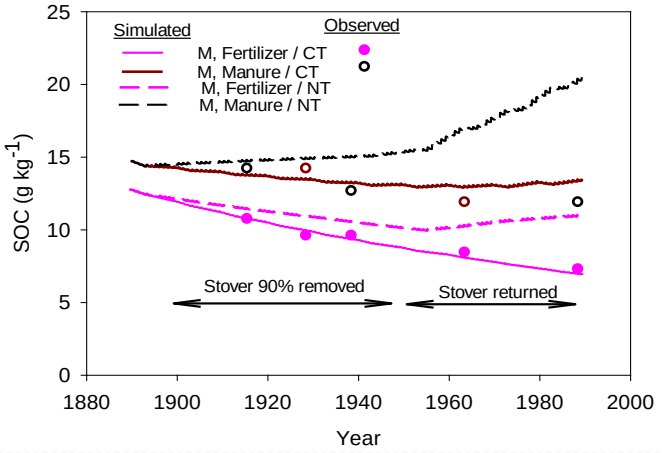
CQESTR: Soil organic carbon model

CQESTR Model

- Predicted decreases in SOC due to cultivation & crop residue removal.
- Simulated the potential of various agricultural management systems to maintain SOC.

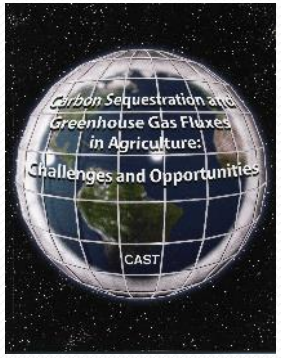
CQESTR Model

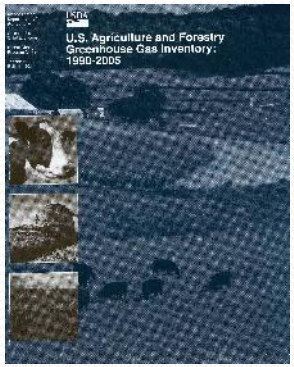
- Using fertilizer alone was insufficient to overcome impact of residue removal on SOC.
- *Addition of manure* or use of *cover crop/intensified crop rotation under NT* were options to mitigate loss of crop residue C from agricultural soils.

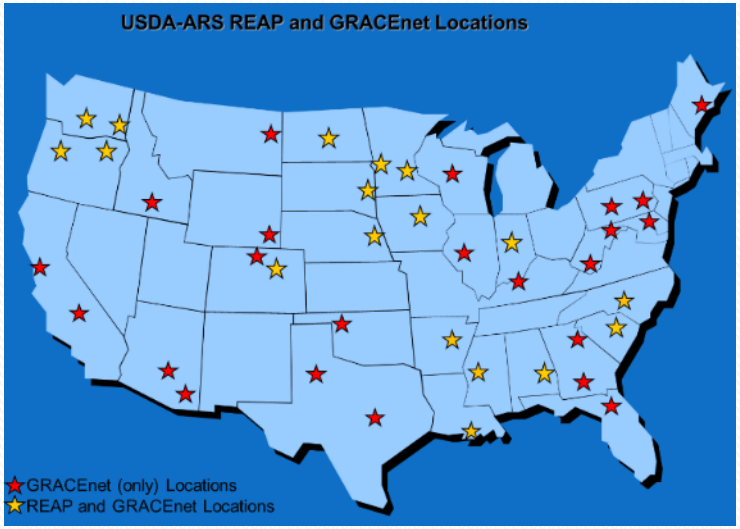


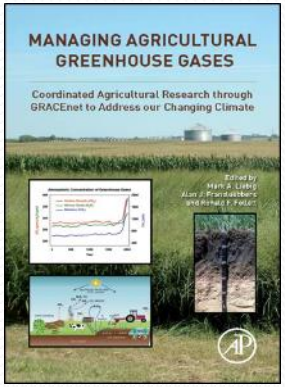
Greenhouse gas Reduction through Agricultural Carbon Enhancement network: *GRACEnet*

- 33+ ARS Locations
- Soil C & GHG crops & rangelands
- Develop new management practices
- Common
  - Methods & calibration: on-line manual
  - Experimental design
  - Data base
  - Model (**CQESTR)**







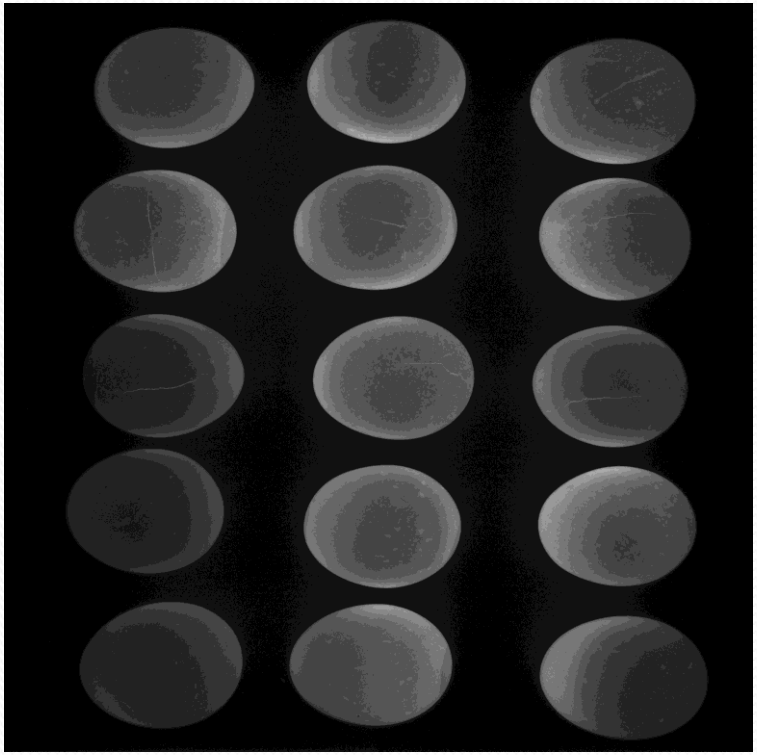


World Bank Global Food Loss & Waste Estimate

Developed

Egg Detection Systems

Micro cracks



- 96+ Billion eggs produced
- Pressure/light technology developed for the Ag Marketing Service that detects faults in shell eggs
- 99.7% accuracy

Studies from ARS Athens, Georgia

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Radiofrequency Pasteurization of Shell Eggs

- Currently only 1% of all eggs are pasteurized.
- 5 log reduction in bacteria in yolk and egg white.
- Maintains fresh egg white appearance.
- If eggs were pasteurized > 100,000 Salmonella illnesses would be prevented.

Studies from ARS ERRC, Pennsylvania

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ARS Food Wastes and Losses Research

WASTE: Undersized, Blemished Produce

Puree

Forming Technology

Casting Technology

100% Fruit Bars

Fruit/Veggie Edible Films

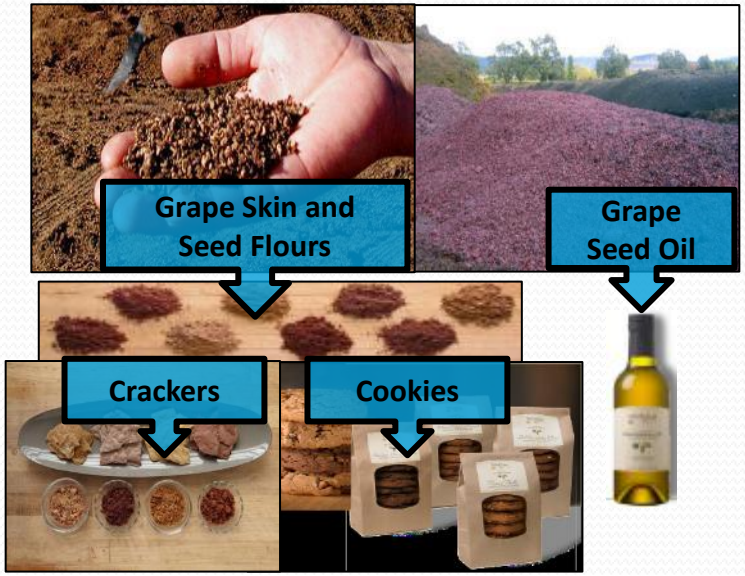
WASTE: Fish Processing Co-Products

Extract Gelatin

Fish Gelatin & Nanofibers

ARS Food Wastes and Losses Research

WASTE:
Wine Grape and Olive Pomace



WholeVine™ PRODUCTS

Edible Products

WASTE:
Potato Skins and Rice Hulls

Biodegradable Plates and Utensils

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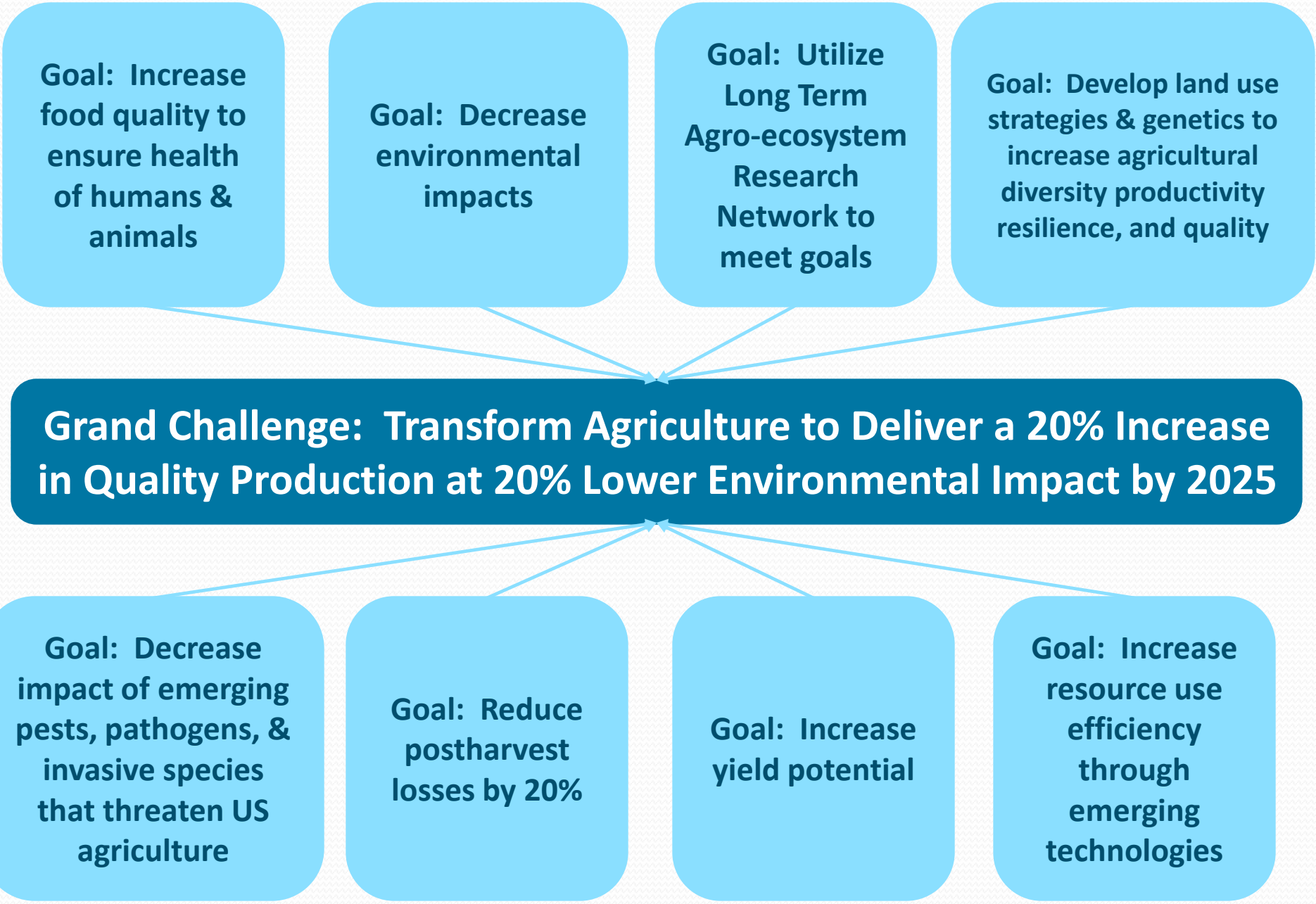

Goal: Increase food quality to ensure health of humans & animals
Goal: Decrease environmental impacts
Goal: Utilize Long Term Agro-ecosystem Research Network to meet goals
Goal: Develop land use strategies & genetics to increase agricultural diversity productivity resilience, and quality
Grand Challenge: Transform Agriculture to Deliver a 20% Increase in Quality Production at 20% Lower Environmental Impact by 2025
Goal: Decrease impact of emerging pests, pathogens, & invasive species that threaten US agriculture
Goal: Reduce postharvest losses by 20%
Goal: Increase yield potential
Goal: Increase resource use efficiency through emerging technologies

Imagine the Future

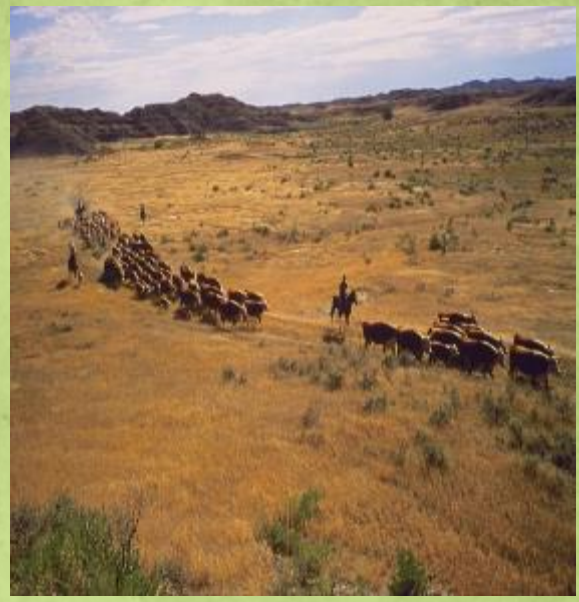
- Remote & in situ sensing of influential soil factors for a given crop production system – preplant
- Superimpose weather estimations, field topography, and market factors
- Use models and agri-informatics to generate map of the genetic traits needed based on environmental factors and yield & quality targets
- Plant crop & apply beneficial microbes & timed-release fertilizer

Imagine the Future

- Remote sensing of real-time crop status (biotic & abiotic stressors) and environmental impacts which trigger real-time adjustment when any management threshold is reached
- Real-time sensing of product “ripeness” based on weather forecast and market targets
- Automated harvest, with reduced waste
- Models to begin planning for best use next year taking into account field conditions, global markets, forecast weather, environmental goals

Leading America towards a better future through agricultural research and information.

www.ars.usda.gov



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