2018 GAP REPORT®

GLOBAL AGRICULTURAL PRODUCTIVITY REPORT®

GLOBAL HARVEST INITIATIVE

COLLEGE OF AGRICULTURE AND LIFE SCIENCES VIRGINIA TECH™

GAP REPORT® GLOBAL AGRICULTURAL PRODUCTIVITY REPORT®

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CORTEVA™ agriscience

Agriculture Division of DowDuPont™

JOHN DEERE

Mosaic®

Smithfield®

Good food. Responsibly.®

CONSULTATIVE PARTNERS

9b nineb group

ACDI VOCA Expanding Opportunities Worldwide

Congressional Hunger Center

Conservation International

Farm Foundation

gain Global Alliance for Improved Nutrition

IDB

IICA

The Nature Conservancy Protecting nature. Preserving life.

NML New Markets Lab

Purdue Agriculture

Water for Food Robert B. Daugherty Institute University of Nebraska

SoAR Foundation

GAP REPORT® IS DIGITAL!

www.GlobalAgriculturalProductivity.org

THE GLOBAL AGRICULTURAL IMPERATIVE FOR A HEALTHY SUSTAINABLE WORLD

FEWER WORKERS, LESS FOOD?

CONSUMER TRENDS AROUND THE WORLD

MILLENNIALS AND WOMEN DRIVING CHANGE

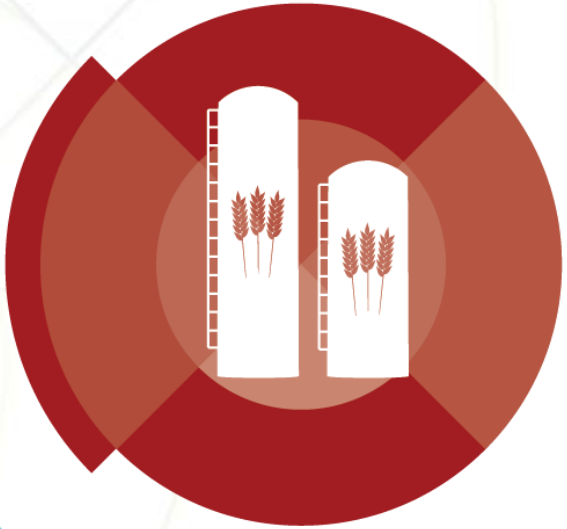
WHAT DOES THIS MEAN FOR OUR FOOD SYSTEM?

ENABLING POLICY ENVIRONMENT

POLICIES FOR PRODUCTIVE SUSTAINABLE AGRICULTURE

R&D AND EXTENSION

TECHNOLOGY



PRIVATE-SECTOR INVOLVEMENT

CULTIVATE PARTNERSHIPS

TRADE

PRODUCTIVITY IS DIFFERENT FROM...

OUTPUT

GROSS AMOUNT OF CROPS
OR LIVESTOCK PRODUCED

YIELD

AMOUT OF OUTPUT
PER UNIT OF PRODUCTION

TOTAL FACTOR PRODUCTIVITY (TFP)

MEASURES CHANGES

IN THE

EFFICIENCY

WITH WHICH

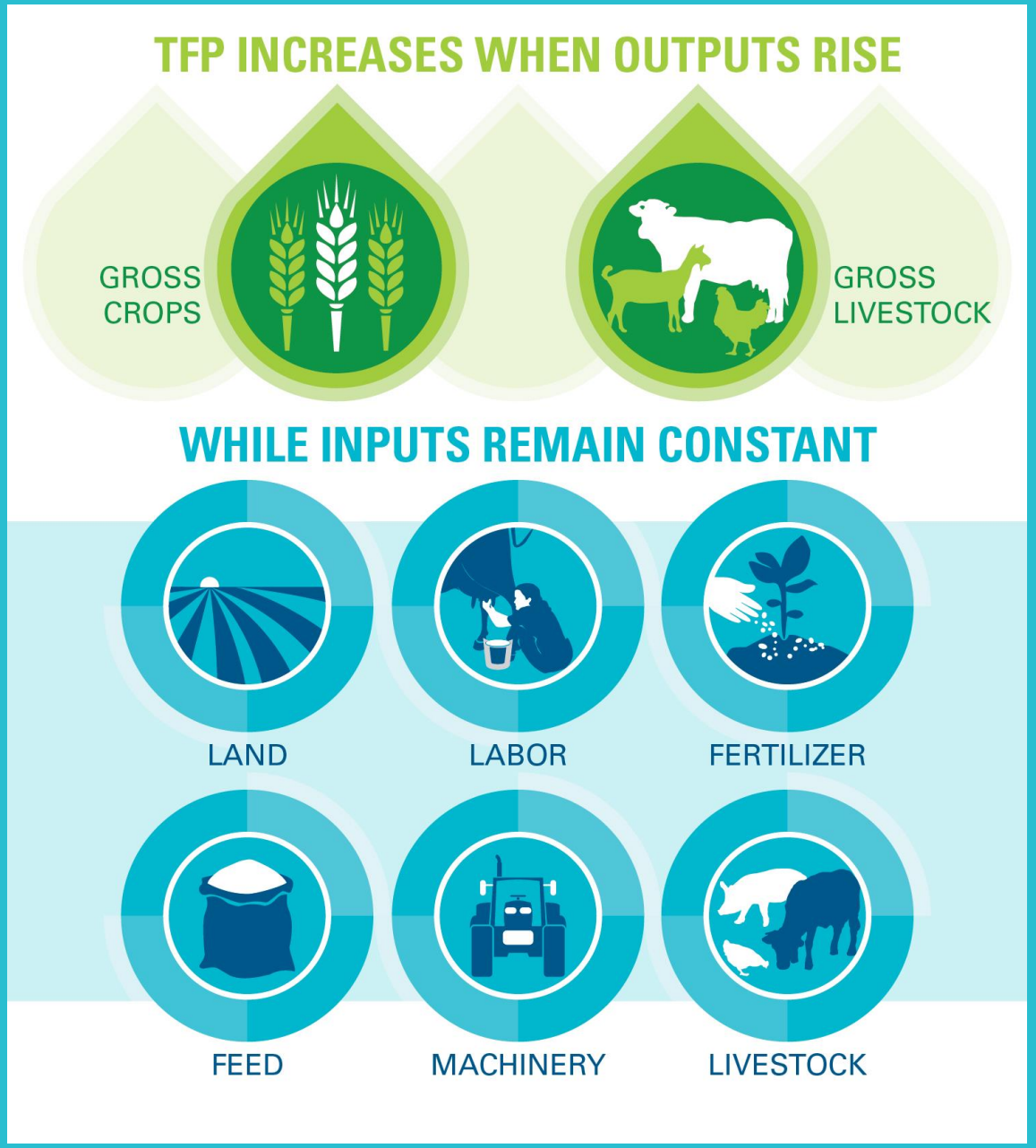
INPUTS

ARE

TRANSFORMED

INTO

OUTPUTS



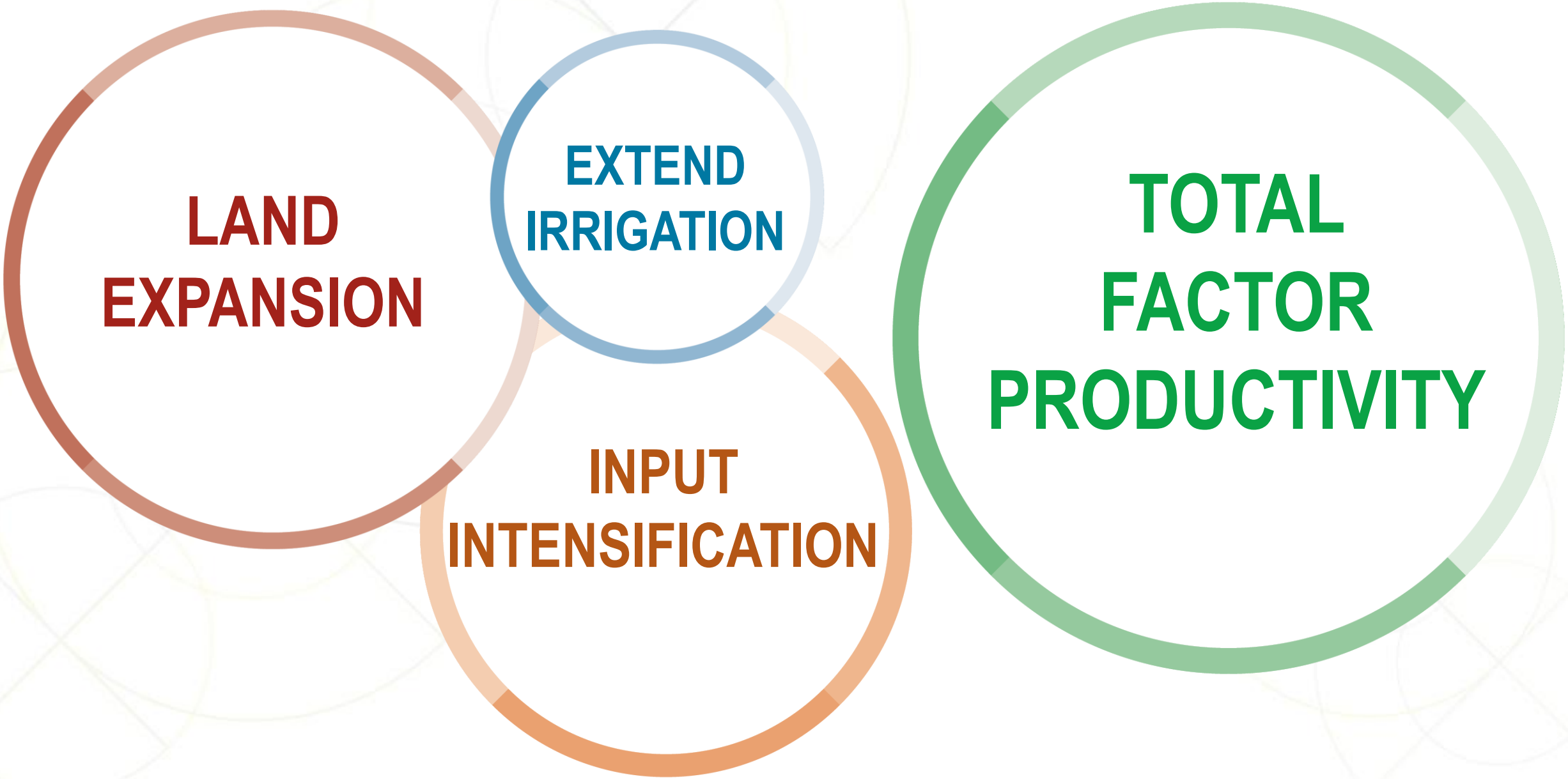
HOW DOES PRODUCTIVITY GROW?

PRODUCTIVITY IS IN THE GENES

PRODUCTIVITY FROM SEED TO FEED

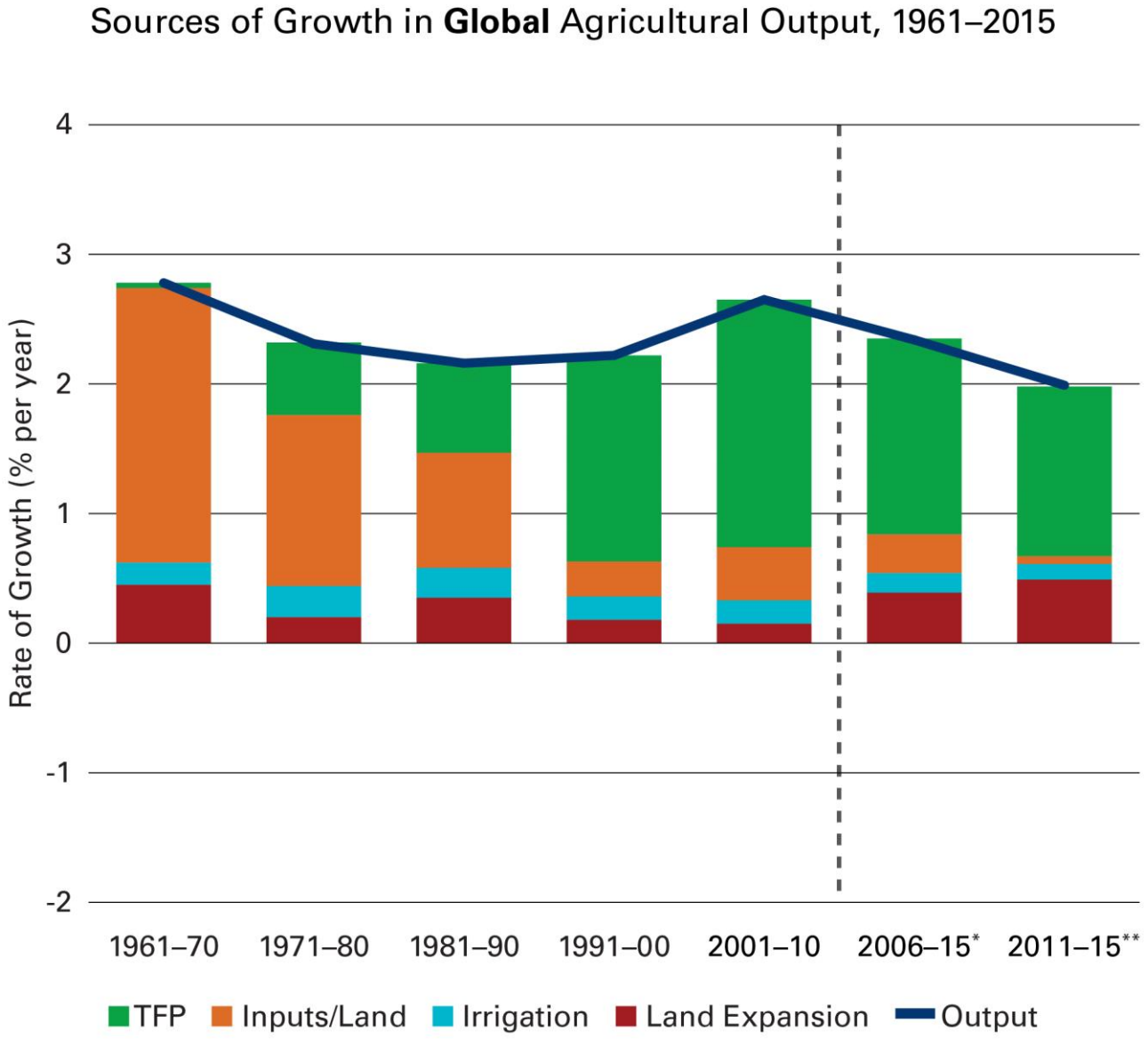
HEALTHY PRODUCTIVE PIGS

STRATEGIES FOR MEETING GLOBAL DEMAND



Sources of Growth in Agricultural Output

GLOBAL

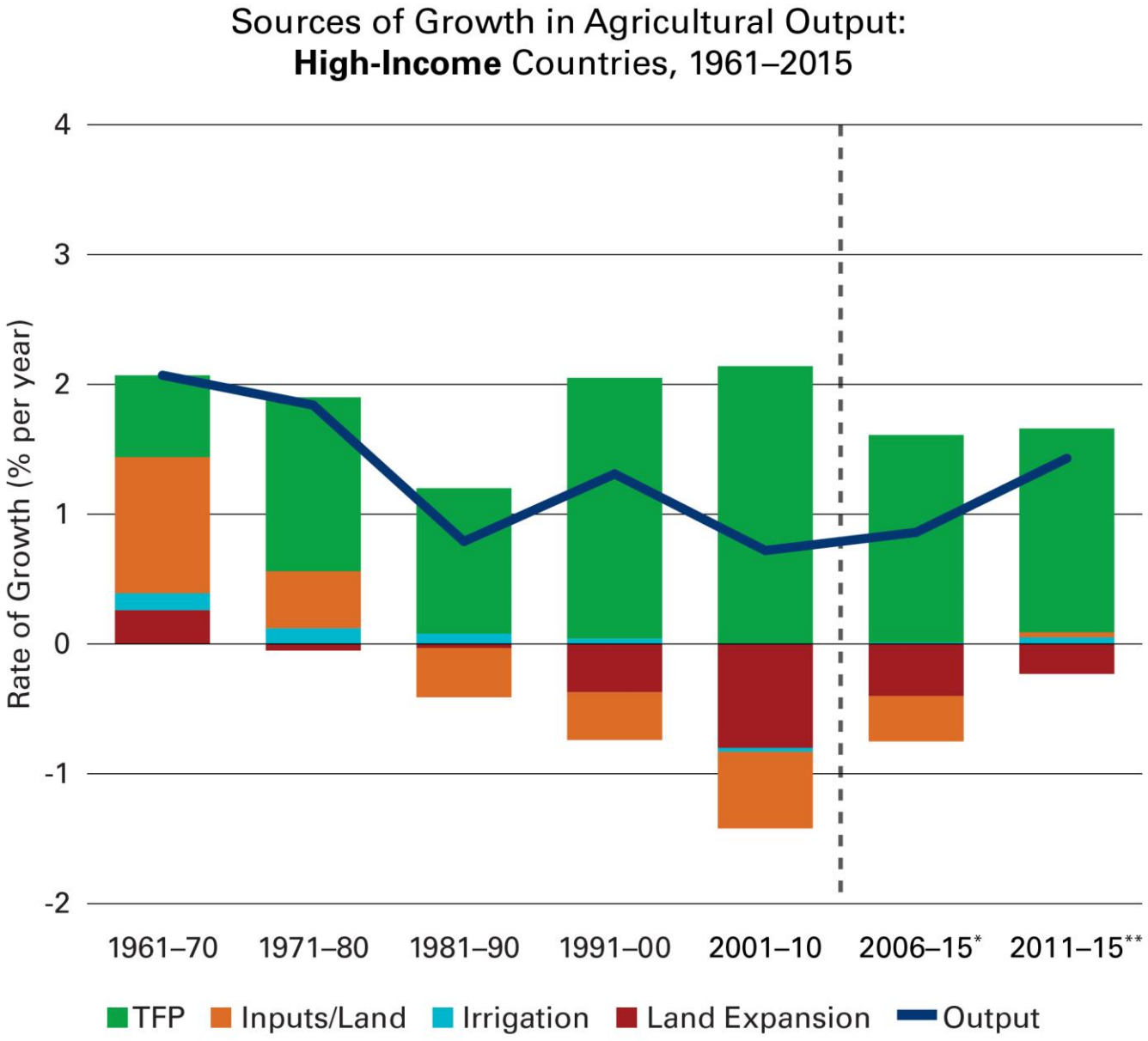


*Depicts data for the most recent ten-year period. **Depicts data for the most recent five-year period.

Source: USDA Economic Research Service (2018).

Sources of Growth in Agricultural Output

HIGH-INCOME

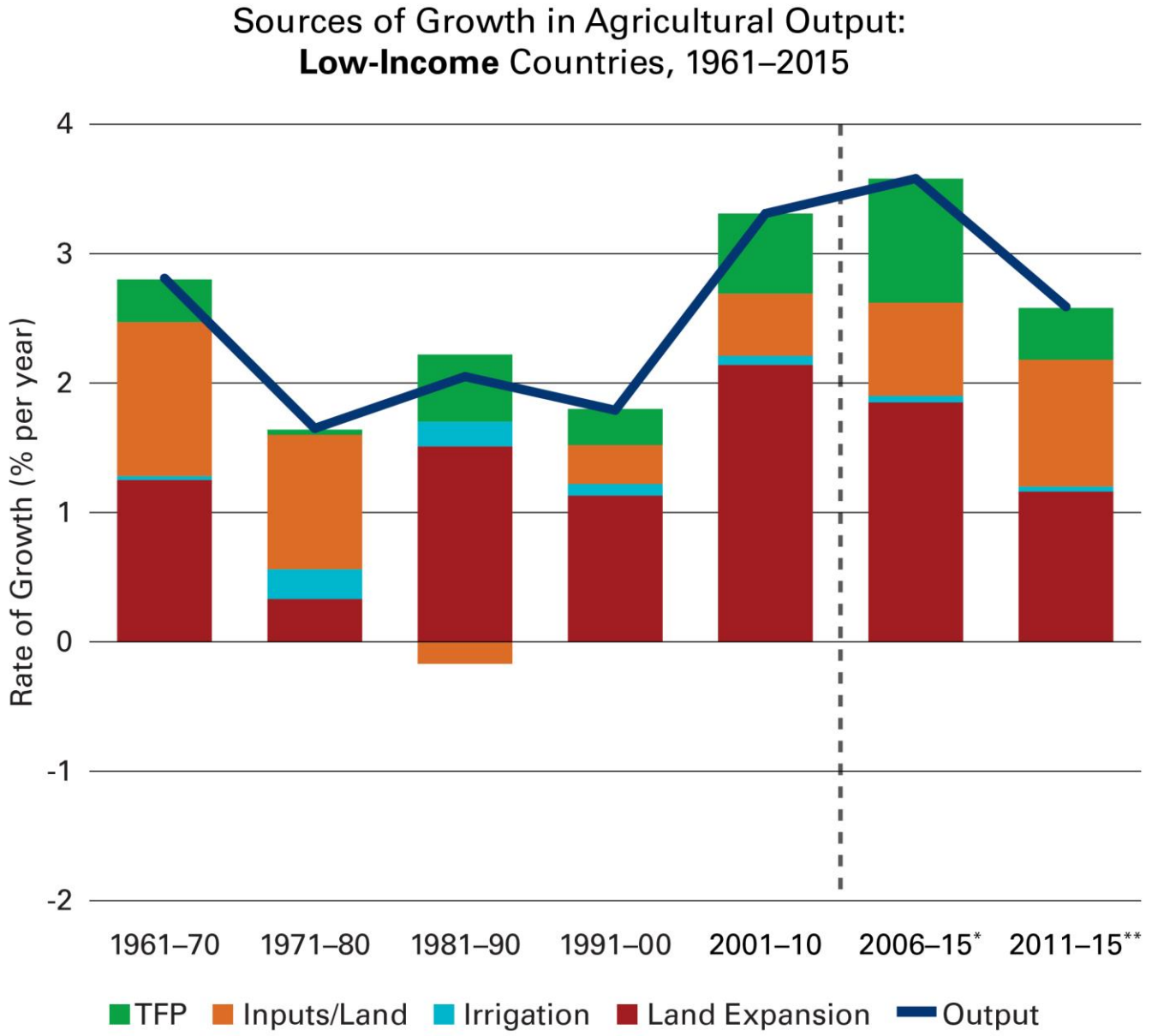


*Depicts data for the most recent ten-year period. **Depicts data for the most recent five-year period.

Source: USDA Economic Research Service (2018).

Sources of Growth in Agricultural Output

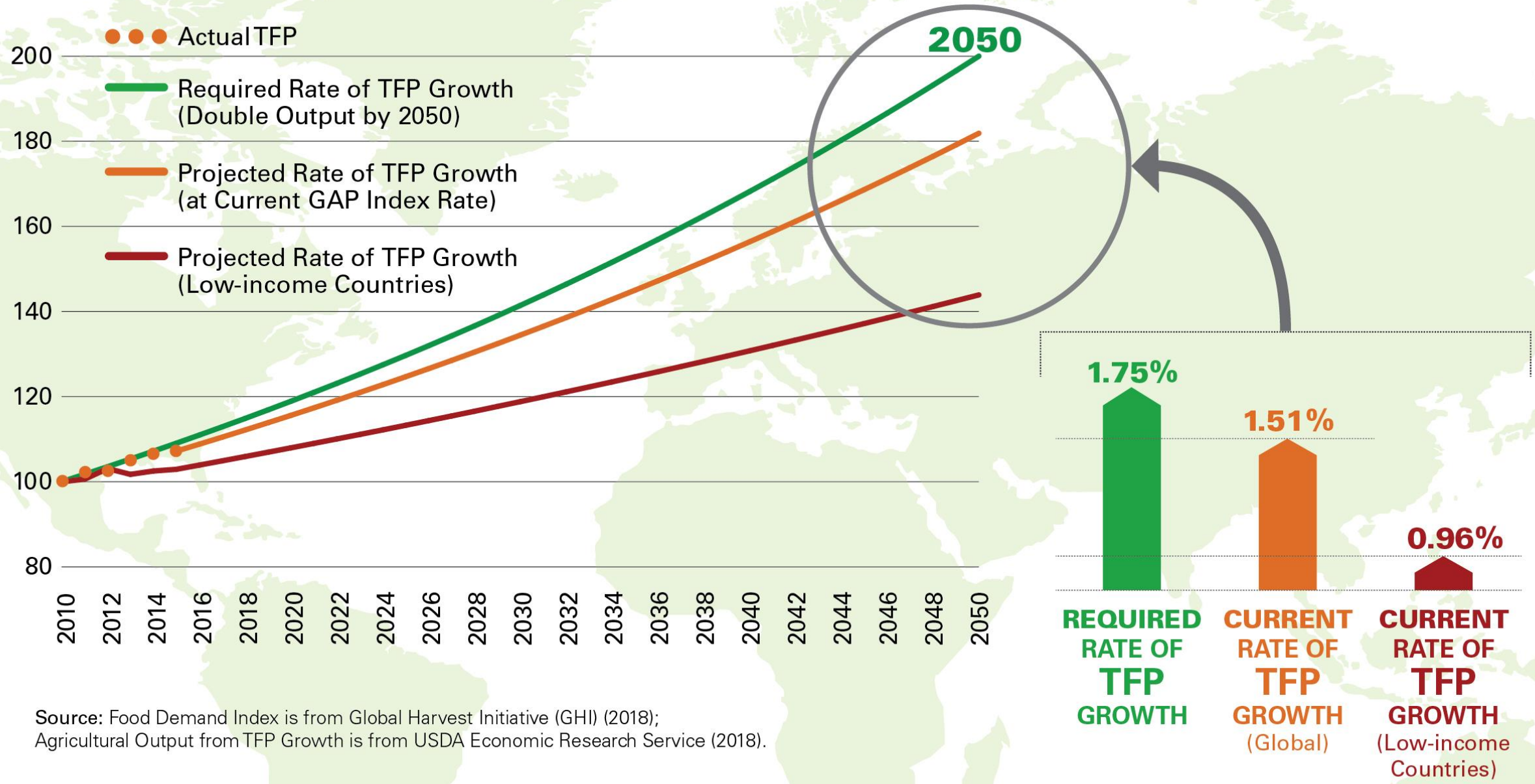
LOW-INCOME



*Depicts data for the most recent ten-year period. **Depicts data for the most recent five-year period.

Source: USDA Economic Research Service (2018).

TRACKING PRODUCTIVITY: THE GAP INDEX™



Source: Food Demand Index is from Global Harvest Initiative (GHI) (2018); Agricultural Output from TFP Growth is from USDA Economic Research Service (2018).

We Are on the Cusp of a Third Revolution in Agriculture

1764 — 1840 — 1920 — 1930 — 1950 — 2018

1st Industrial Revolution

Grain Elevators, Steam Engine, Modern Rail and Highways

2nd Green Revolution

Modern Breeding, Synthetic Fertilizers, Pesticides, GMOs

3rd Digital Revolution

Microbiology, Data Sciences, Precision Agriculture

John Deere

MECHANIZATION IS A PATH TO PRODUCTIVITY

- Fewer farmers available for labor
- Larger farm size
- Artificial Intelligence (AI) brings precision, using less herbicide, pesticide and water

ROBOTS VISIT THE FARM!

- Responding to farmer labor needs
- Precisely applies crop protection and seeds fields
- Dot Technology Corporation

Monsanto Company
(Bayer AG)

INNOVATIONS BENEFIT FARMERS & THE PLANET

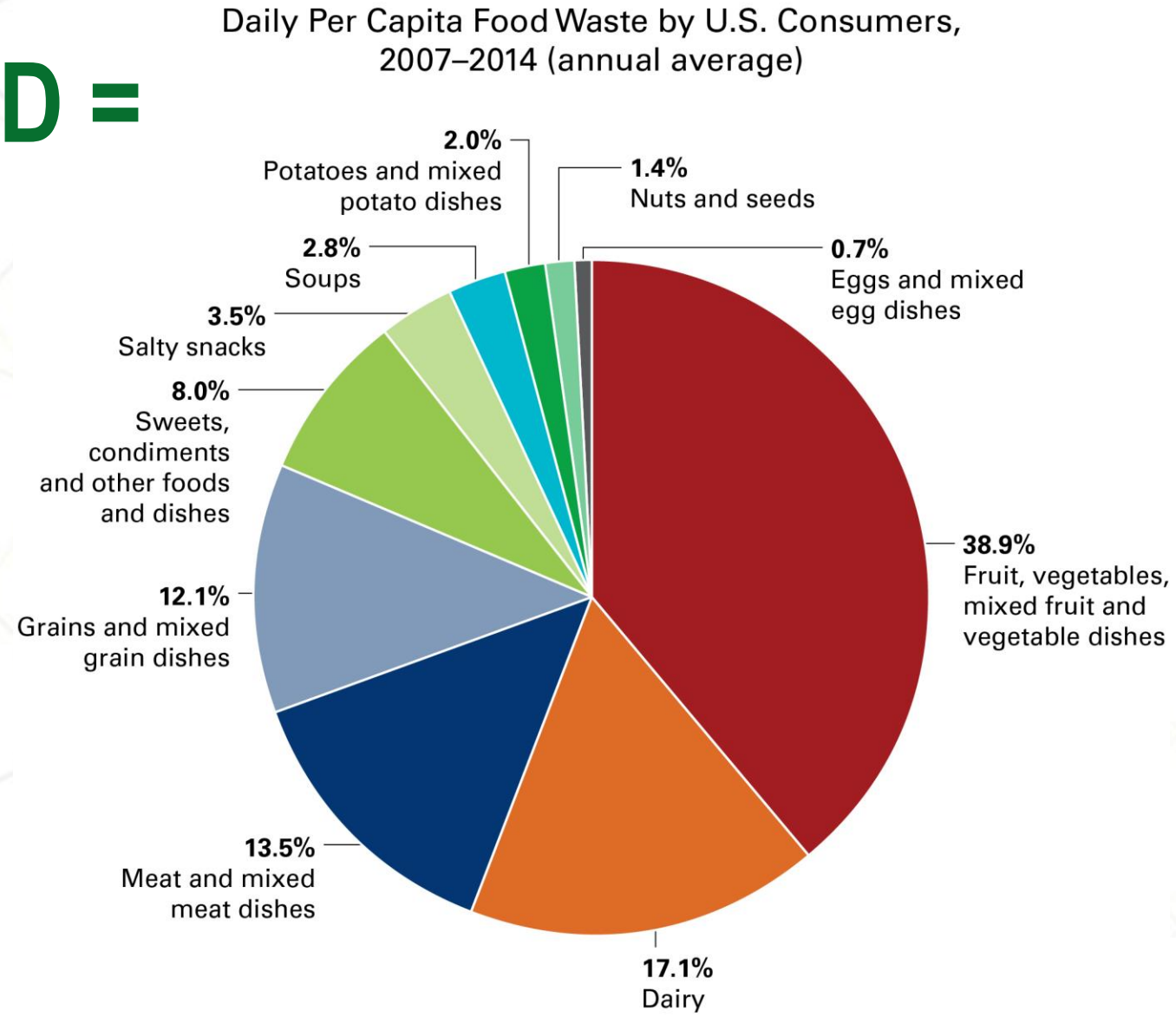
- Developing pest resistant varieties that:
  - ✓ Dramatically decrease insecticide use
  - ✓ Support no-till systems
  - ✓ Ease land-expansion pressure
  - ✓ Reduce CO_2 emissions

LEADING THE WAY IN ANIMAL WELFARE

- Responding to consumer interest in animal welfare
- Breeding for animal health, as well as taste and productivity
- Creating a more innovative, transparent animal agriculture system

Smithfield Foods

FOOD WASTED = NUTRIENTS LOST



Source: Conrad Z, Niles MT, Neher DA, Roy ED, Tichenor NE, Jahns L (2018) Relationship between food waste, diet quality, and environmental sustainability. PLoS ONE 13(4): e0195405. https://doi.org/10.1371/journal.pone.0195405.

FOOD WASTED = PRODUCTIVITY LOST

AGRICULTURAL INPUTS AND RESOURCES USED TO PRODUCE WASTED FOOD (U.S.)	
Cropland	30 million acres
Irrigation Water	4.2 trillion gallons
Pesticide	780 million pounds
Fertilizer (Nitrogen, Phosphorus, Potash)	5.6 billion pounds

Productivity for Nutrition

THE QUALITY REVOLUTION ARRIVES!

CONSUMERS

ENVIRONMENT

PRODUCERS


indigo
marketplace


QUALITY TAKES
TIME
&
COMMITMENT!