Sustainable agriculture…

• satisfies human needs;
• enhances environmental quality and the natural resource base;
• sustains the economic vitality of global and local food and agricultural systems, and
• improves the quality of life for society as a whole.

Sustainable growth is…

meeting the needs of the present without compromising the ability of future generations to meet their own needs.
ARE WE DOING ENOUGH?

Agriculture accounts for 24% of global greenhouse gas emissions and 71% of fresh water use.

Soil erosion and desertification have cut land productivity in some parts of the world by ½.

Natural disasters in developing countries caused $96 billion in damaged or lost crop and livestock production.

150.8 million children under 5 are stunted and 383.3 million are overweight.

56 million people live in conflict zones and urgently needs food assistance.
GLOBAL AGRICULTURAL SUSTAINABILITY IMPERATIVE

**EAT**
- 500+ million people depend on livestock for their livelihoods; 2/3 are women

**USE**
- 1/3 of global population depends on forests for income, employment, food, fuel & medicine
- Most of the increase in cotton production in the next 10 years will come from cultivating new land

**ENJOY**
- If U.S. dogs & cats were a sovereign nation, they would be the 5th largest consumer of animal protein in the world
- 800 coastal ecosystems are struggling with algae blooms or other problems due to excess nutrients

4.2 trillion gallons of irrigation water would be needed to produce the food wasted in U.S. annually
STRATEGIES FOR MEETING GLOBAL DEMAND

- LAND EXPANSION
- INPUT INTENSIFICATION
- EXTEND IRRIGATION

TOTAL FACTOR PRODUCTIVITY (TFP)
PRODUCTIVITY IS DIFFERENT FROM...

OUTPUT
GROSS AMOUNT OF CROPS OR LIVESTOCK PRODUCED

YIELD
AMOUNT OF OUTPUT PER UNIT OF PRODUCTION
TOTAL FACTOR PRODUCTIVITY MEASURES CHANGES IN THE EFFICIENCY WITH WHICH INPUTS ARE TRANSFORMED INTO OUTPUTS
2019 Global Agricultural Productivity Index

Total Factor Productivity (TFP) is a ratio that measures changes in how efficiently agricultural inputs are transformed into outputs.

AT CURRENT MILK YIELDS, INDIA WILL NEED AN ADDITIONAL 20 MILLION DAIRY ANIMALS TO MEET DOMESTIC DEMAND IN THE NEXT 10 YEARS.

India has 10 times as many dairy-producing bovines as the U.S., but produces only 50 percent more milk. FAOSTAT (2014).
DRIVERS OF LAND USE CHANGE

Changing consumption patterns

Population growth

Levels of agricultural productivity
Sources of Growth in Agricultural Output:

- **TFP** — Gross amount of crop and livestock outputs per inputs of labor, capital and materials
- **Inputs/Land** — Gross amount of fertilizer, machinery, feed and labor per hectare of agricultural land
- **Irrigation** — Extension of irrigation to agricultural land
- **Land Expansion** — Extending agriculture to previously forested areas or grasslands

*A depicts data for the most recent ten-year period.
Sources of Growth in Agricultural Output:
Latin America, 1961–2016

- **TFP** — Gross amount of crop and livestock outputs per inputs of labor, capital and materials
- **Inputs/Land** — Gross amount of fertilizer, machinery, feed and labor per hectare of agricultural land
- **Irrigation** — Extension of irrigation to agricultural land
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AG TECH + BEST PRACTICES + ATTENTION TO ECOSYSTEM SERVICES = SUSTAINABLE PRODUCTIVITY GROWTH

CROP GENETICS
TILLAGE MANAGEMENT
SOIL HEALTH
DIVERSIFICATION
RUMINANT RECYCLERS
PEST CONTROL AND POLLINATION
INTEGRATED AQUACULTURE
WATER & NUTRIENT MANAGEMENT
Embrace science-based and information technologies

Invest in public agricultural R&D and extension

Reduce post-harvest loss and food waste

Improve access to markets for agricultural inputs and outputs

Expand regional and global trade

Cultivate partnerships for agricultural development, gender equity & improved nutrition
Power of Partnerships