

BIOLOGICAL CROP INPUTS – A Growing Opportunity



KEVIN HELASH
Chief Executive Officer
November 15, 2018

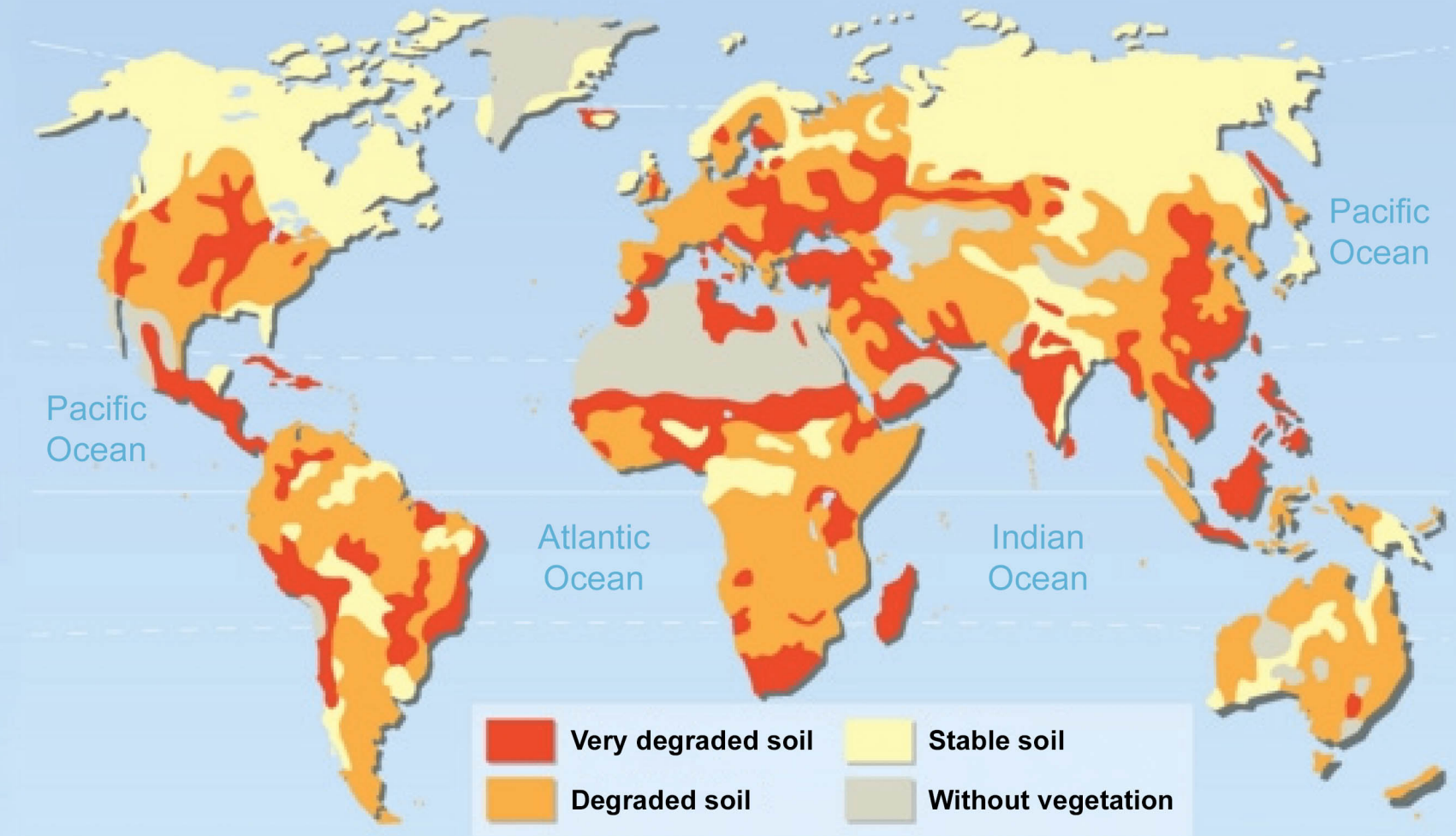


2050: A THIRD MORE MOUTHS TO FEED



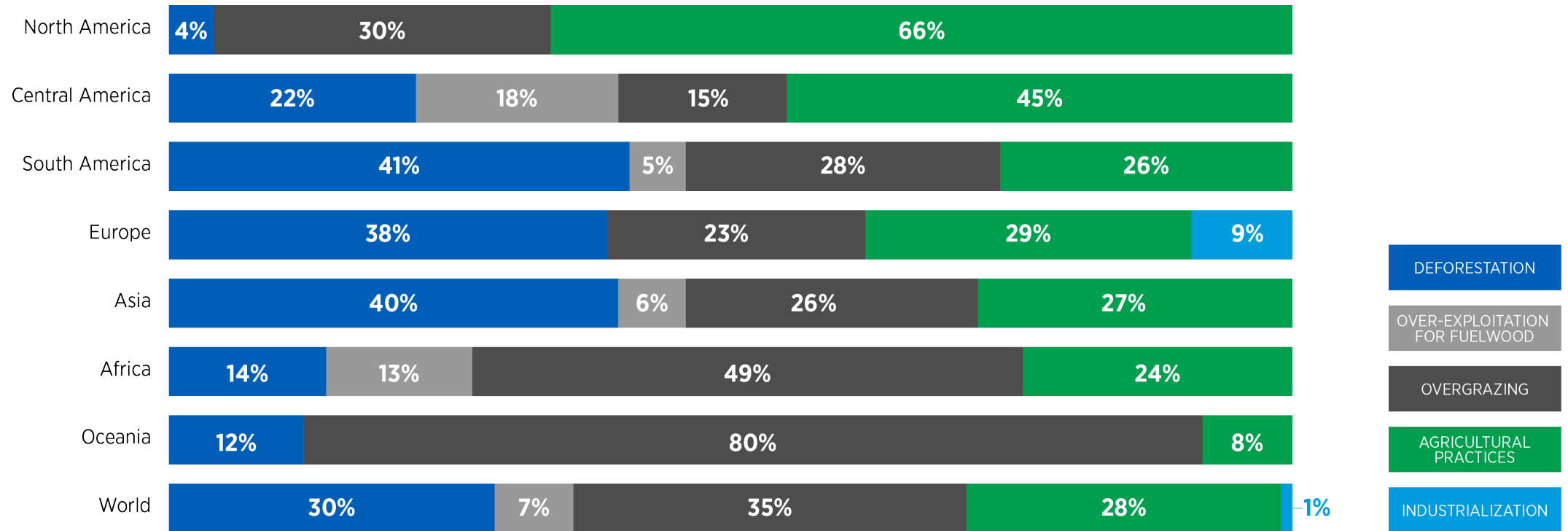
60 YEARS OF FARMING REMAINING

1/3 OF ALL ARABLE LAND IS DEGRADED



SOURCE: UNEP, International Soil Reference and Information Centre (ISRIC), World Atlas of Desertification, 1997.
Philippe Rekacewicz, UNEP/GRID-Arendal

RESTORING SOIL HEALTH IS A SHARED RESPONSIBILITY



PRINCIPAL CAUSES OF SOIL DEGRADATION
(CATEGORIES NOT SHOWN IN A REGION REPRESENT LESS THAN 1%)

SUSTAINABLE INTENSIFICATION OF AGRICULTURE

Making the Green Revolution...Greener

AG BIOLOGICALS DEFINED

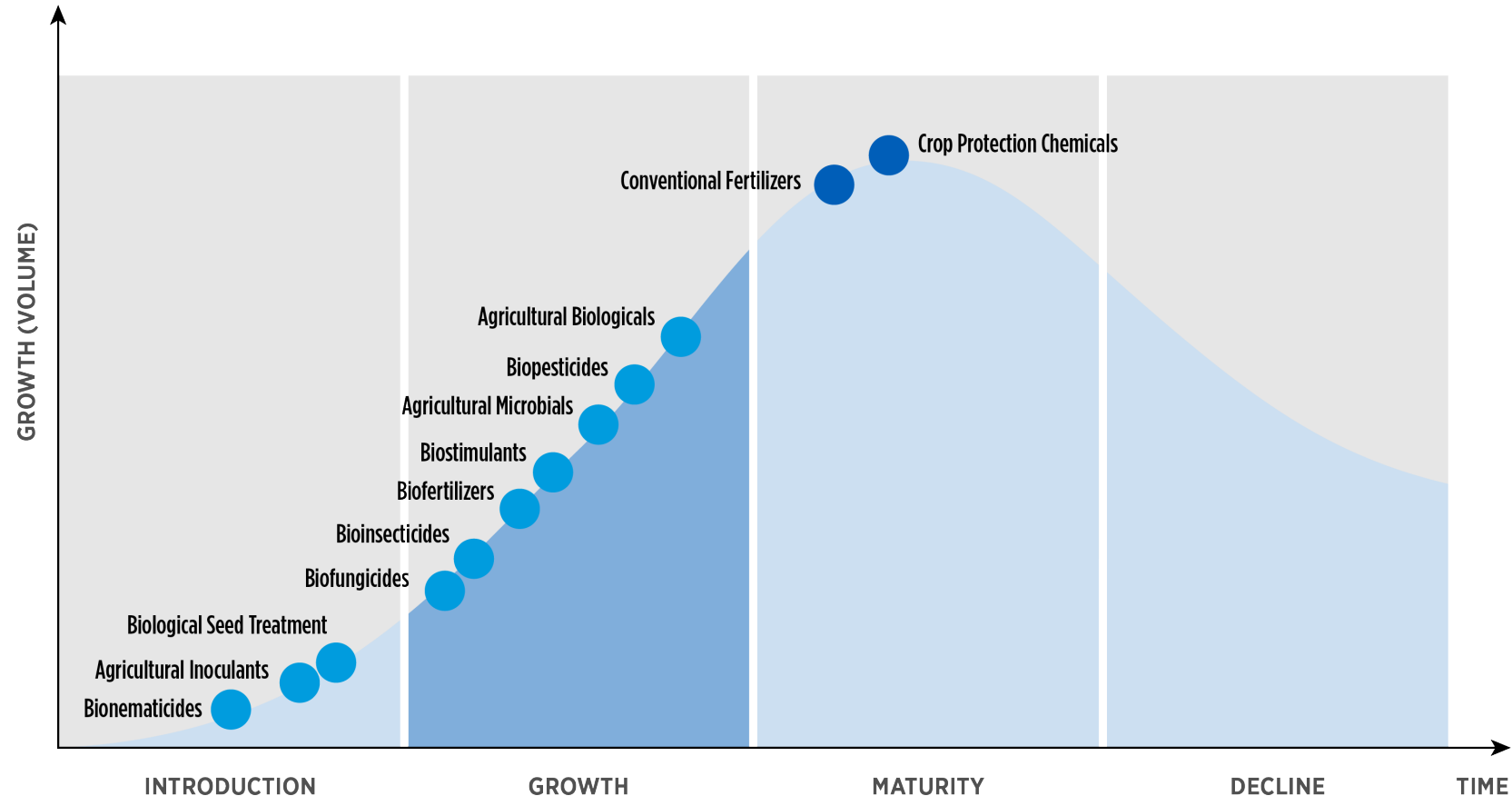
Diverse group of products, derived from naturally occurring microorganisms, plant extracts, beneficial insects or other organic matter.



A young green seedling with several leaves is growing out of dark, textured soil. A black plastic mulch strip is visible in the foreground, curving around the base of the plant. The background is a blurred expanse of similar soil and vegetation.

MARKET SIZE AND FIVE-YEAR OUTLOOK

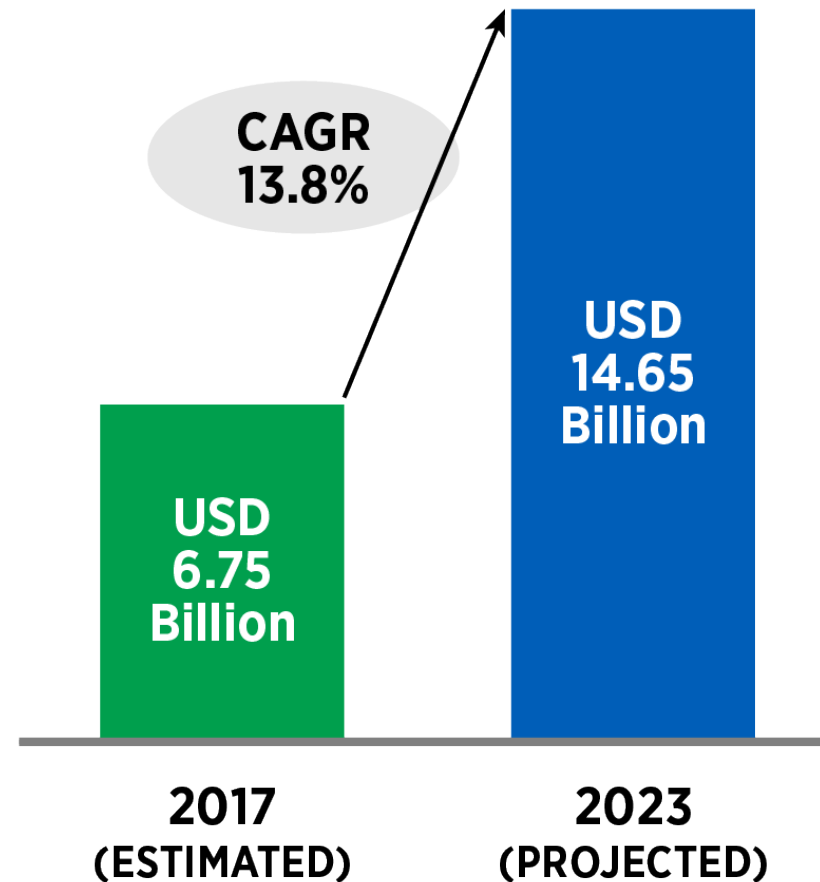
OUR MARKET SEGMENT IS AT THE EARLY GROWTH STAGE



LIFE CYCLE ANALYSIS: KEY AGRICULTURAL BIOLOGICAL SUBCATEGORIES

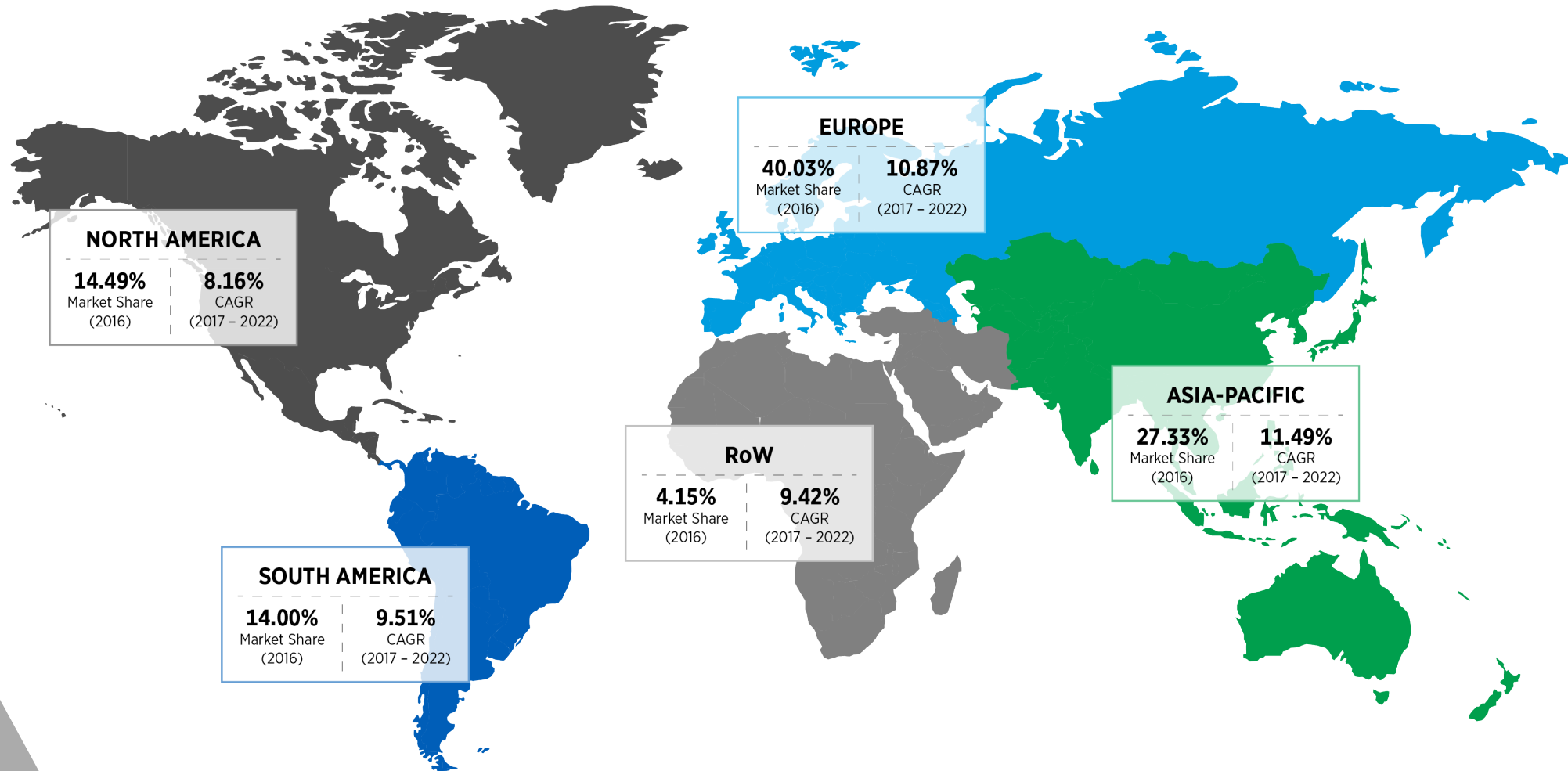
SOURCE: Industry Journals, Company Websites, Company Publications, Secondary Literature, Expert Interviews and MarketsandMarkets Analysis

INDUSTRY PROJECTED TO GROW BY USD 7.9 BILLION OVER 5 YEARS



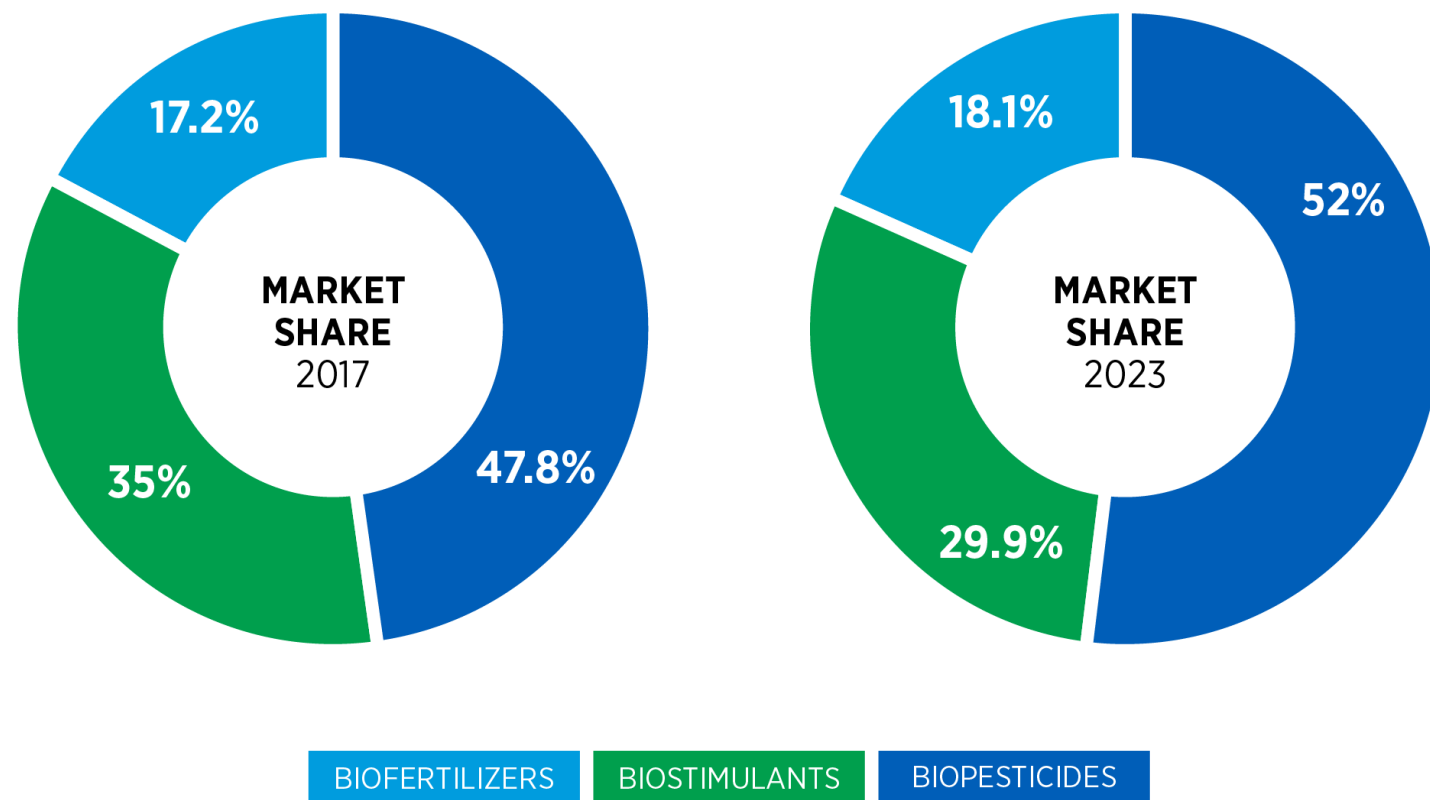
ATTRACTIVE OPPORTUNITIES IN THE AGRICULTURAL
BIOLOGICALS MARKET (2017 vs. 2023)

BIOSTIMULANT DEMAND GROWING IN ALL GEOGRAPHIES



SOURCE: Expert Interviews, Related Associations/Institutes, Related Research Publications/Journals, Government Publications and MarketsandMarkets Analysis

MARKET EVENLY SPLIT BETWEEN BIOPESTICIDES AND BIOSTIMULANTS



**AGRICULTURAL BIOLOGICALS MARKET SHARE
(VALUE) 2017 vs. 2023**

SOURCE: National Greenhouse Manufacturers Association, U.S. Department of Agriculture, Company Websites, Investor Presentations, Expert Interviews, Industry Journals, Magazines and MarketsandMarkets Analysis

DEMAND IS BEING DRIVEN BY ALL KEY STAKEHOLDERS

Consumers

- Desire for greener food

Farmers

- Soil health
- Disease & Pest resistance
- Health & Safety

Food Companies

- Growing commitment to sustainability

Industry

- Bolster product pipeline
- Cost to develop a Biological vs new Chemical is ~80%-90% lower

**THE
PRODUCTS
WORK!**

An aerial photograph of a rural landscape. In the foreground, a wide, light-colored dirt road curves through lush green fields. The fields are divided into sections by subtle ridges and furrows. In the middle ground, there are several farm buildings, including a large white barn with a tall silo, a smaller house, and other outbuildings. The background shows more distant farm structures and a line of trees under a clear blue sky. The overall scene is peaceful and depicts a typical agricultural setting.

**WILL BIOLOGICALS AFFECT
THE FERTILIZER INDUSTRY?**

IMPROVING NUTRIENT USE EFFICIENCY IS A KEY TARGET OF THE AG BIOLOGICAL SECTOR

NUTRIENT	EFFICIENCY PERCENTAGE
N	30 – 50
P	10 – 20
K	<80
S	8 – 12

NUTRIENT	EFFICIENCY PERCENTAGE
Zn	2 – 5
Fe	1 -2
Cu	1 – 2
Mn	1 - 2

PRODUCT EFFICACY IS BASED UPON SCIENTIFIC RESEARCH

CROPS	REGION/ COUNTRY	# TRIALS (EST. BIG DATA)	AGRINOS YIELD INCREASES
Corn, Wheat, Soybean, Onions, Sorghum, Cotton, Potatoes, Citrus, Strawberry, Fruit Trees, Almonds, Tomatoes	USA	150	5 – 30%
Melons, Tomatoes, Peppers, Strawberry, Fruit Trees	Spain	35	7 – 19%
Wheat, Potatoes, Rape, Corn, Vegetables, Sugarbeets	Europe	30	10%
Tea, Peanut, Cotton, Potatoes, Rice, Wheat, Tomatoes, Sugarcane, Grapes	India	130	14%
Sugarcane, Eucalyptus, Tomato, Potatoes, Wheat, Corn, Soybean, Coffee, Garlic	Brazil	140	15%
Oil Palm, Corn	Asia	12	7 – 20%
Peppers, Tomatoes, Tobacco, Rice, Potato, Vegetables, Ginger, Banana	China	25	14 – 17%

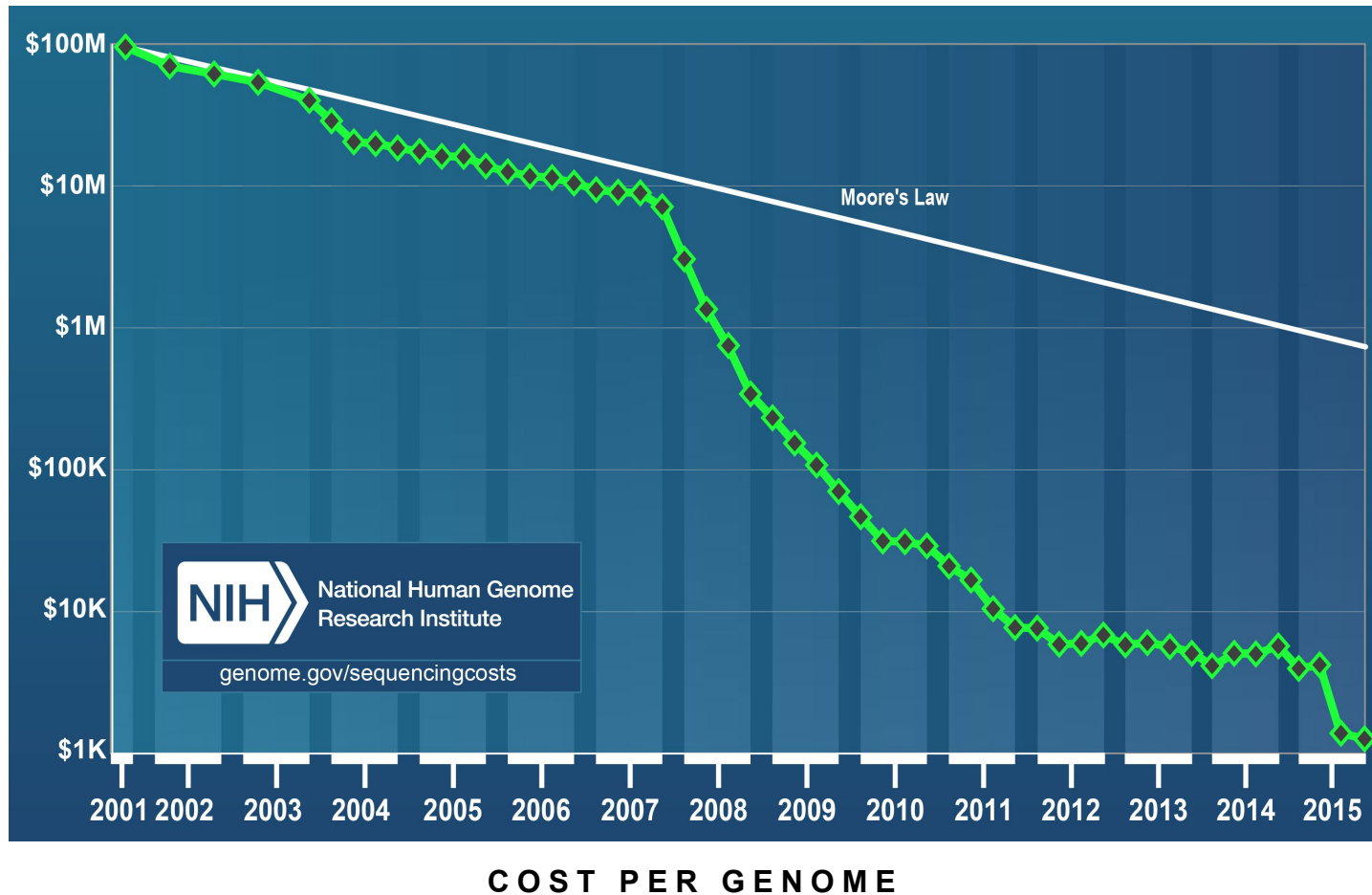
TOTAL

13

522

6 – 16%

ADVANCEMENTS IN GENOME SEQUENCING WILL ALLOW FOR RAPID PROGRESS IN BIOLOGICAL RESEARCH



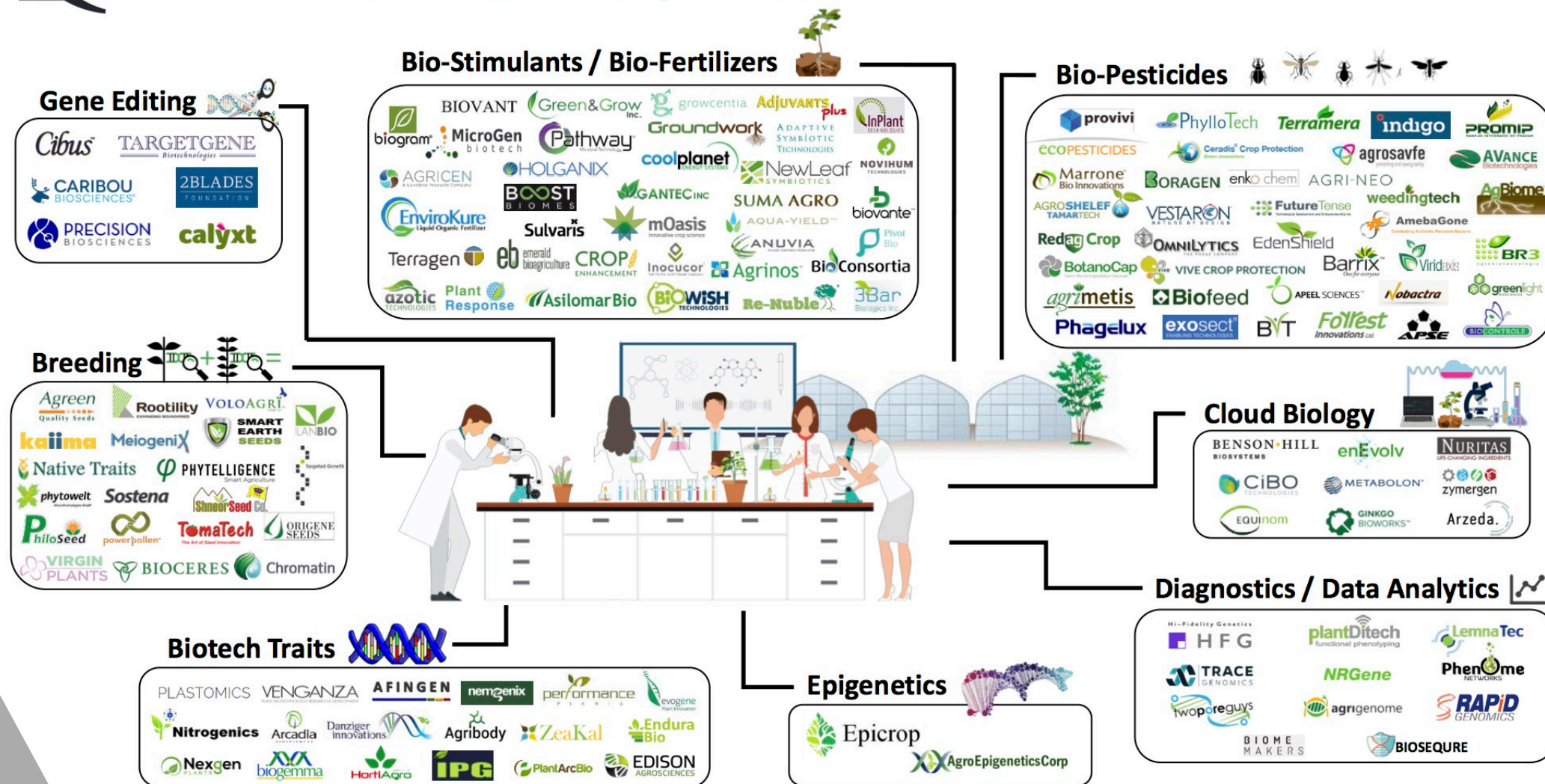
5 million trillion bacteria
living on the earth

If they were pennies,
the stack would reach a
trillion light years.

\$2.9 BILLION IN FUNDING RAISED



Plant Biotech Landscape 2017



BIOLOGICALS SUPPORT SUSTAINABLE INTENSIFICATION OF AGRICULTURE PRODUCTION

Technological
breakthrough
with more
advancements
coming

Support nutrient use
efficiency and
sustainable
production

Synergistic
relationship with
traditional crop
inputs and fertilizer

Ag Biologicals represent a technological breakthrough
and will become a mainstay of modern agricultural
production around the world.

Kevin Helash
Chief Executive Officer

