

THE GLOBAL FOOD MARKET
IN 10 YEARS:

SERGEI IVANOV / RUSSIA

DRIVERS & CHALLENGES

TECHNOLOGICAL AND SOCIOCULTURAL TRENDS THAT WILL DETERMINE THE FUTURE OF FOOD

400 YEARS OF CAPITALISM EVOLUTION

- **THE MAIN DRIVER IS COMPETITION**
- **THE MAIN RULE –**
«EVERYTHING THAT IS NOT PROHIBITED IS PERMITTED»

IN THIS MODEL THE STRONG HAS THE RIGHT TO DESTROY THE WEAK

EVOLUTION OF REGULATION

TWO DIFFERENT SOURCES OF MOTIVATION IN CHOOSING TECHNOLOGIES AND SETTING THE PRICE

(LEVEL OF PROFITABILITY)

VALUES

DOING GOOD FOR OTHERS

PASSIONS

GREED, I WANT MORE

**THE PHILOSOPHY OF COMPETITION
AS A SOCIAL INSTITUTION IS VOLUNTARY
ACCEPTANCE BY SOCIETY THAT GREED
IS THE ENGINE OF PROGRESS**


THE RESULTING TRENDS ARE:

- **CONSOLIDATION OF BUSINESS**
- **SPECIALISATION OF LABOR**

AS A CONSEQUENCE, A PERSON WORKING ON A JUNIOR OR MID-LEVEL POSITIONS DOES NOT HAVE TO POSSESS HOLISTIC COMPETENCE

BUSINESS GETS BIGGER

PEOPLE GET SMALLER



**AS A RESULT,
WITH THE INCREASING COMPLEXITY OF TECHNOLOGY,
IT IS INCREASINGLY DIFFICULT FOR A MODERN PERSON
TO UNDERSTAND WHAT IS USEFUL
AND WHAT IS DANGEROUS FOR THE HEALTH**

**AS MODERN BIOTECH ENGAGES
IN HUMAN PHYSIOLOGY WE NEED TO AGREE ON PARTICULAR RED LINES,
BEFORE WE MOVE ON TO TECHNOLOGY**



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A CODE OF ETHICS FOR BIOTECHNOLOGISTS



**BEFORE TALKING ABOUT ETHICS
WE WILL HAVE TO ANSWER THE QUESTION:**

«HOW DO WE SEE MAN?»



THERE ARE TWO
OPPOSITE POINTS OF VIEW:

1. MAN IS PERFECT BY NATURE.

AND THE MEANING OF LIFE IS TO REVEAL THE POTENTIAL INHERENT TO HIM

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1. MAN IS PERFECT BY NATURE.

AND THE MEANING OF LIFE IS TO REVEAL THE POTENTIAL INHERENT TO HIM

2. MAN IS IMPERFECT BY NATURE.

THEREFORE, HE NEEDS TO BE IMPROVED, UPGRADED, STRENGTHENED



**WITHOUT CLARIFYING THESE ISSUES,
WE SHALL CREATE**

DISTRUST AND FEAR OF THE NEW

(FOOD INNOVATIONS)



HOW DO WE PREPARE OURSELVES TO GET READY FOR A LACK OF QUALIFIED STAFF?

- **AUTOMATION**
- **DIGITALIZATION**
- **ROBOTIC APPLICATION**
- **ARTIFICIAL INTELLIGENCE**

**WHAT A NATURAL REACTION TO THESE TRENDS?
EVEN GREATER DISTRUST OF EVERYTHING NEW
IN TECHNOLOGY**

**TRANSPARENCY OF MOTIVES IS ONE OF THE KEY
CONSUMER REQUESTS**






FOOD AS A HUMANITARIAN MISSION



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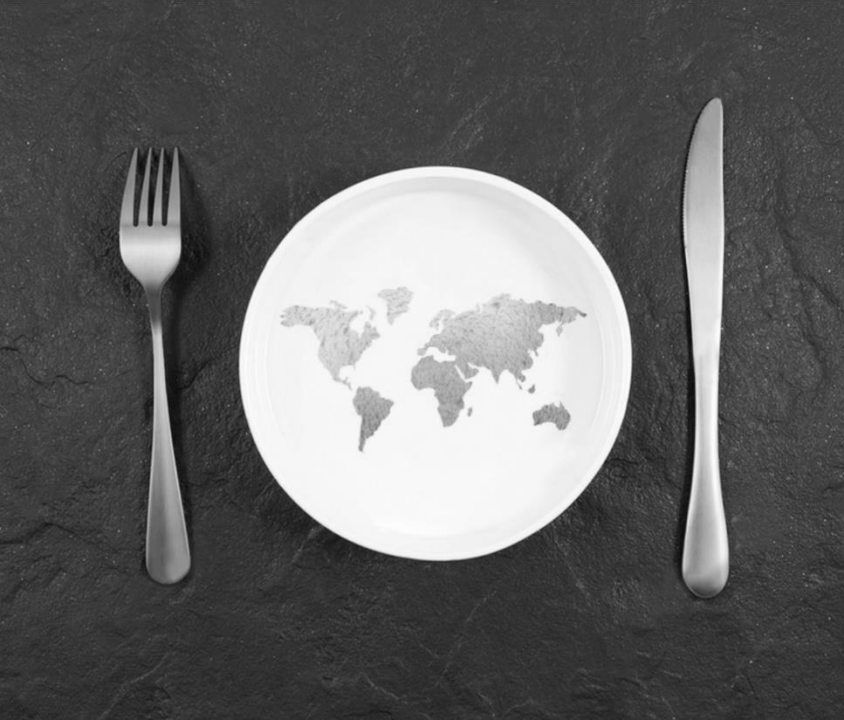
TO PROVIDE ALL OF HUMANITY WITH **TASTY, AFFORDABLE, HEALTHY** FOOD PRODUCED
IN HARMONY WITH NATURE



HUNGER



HEALTH



ECOLOGY



2018. Y-COMBINATOR

C16 Biosciences



**IF WE DO FOOD AND DON'T DO BIOTECH,
SOONER OR LATER,
BIOTECH WILL START «DOING» US
AND OUR FOOD**



SCIENCE TOWN

100 RESEARCHERS

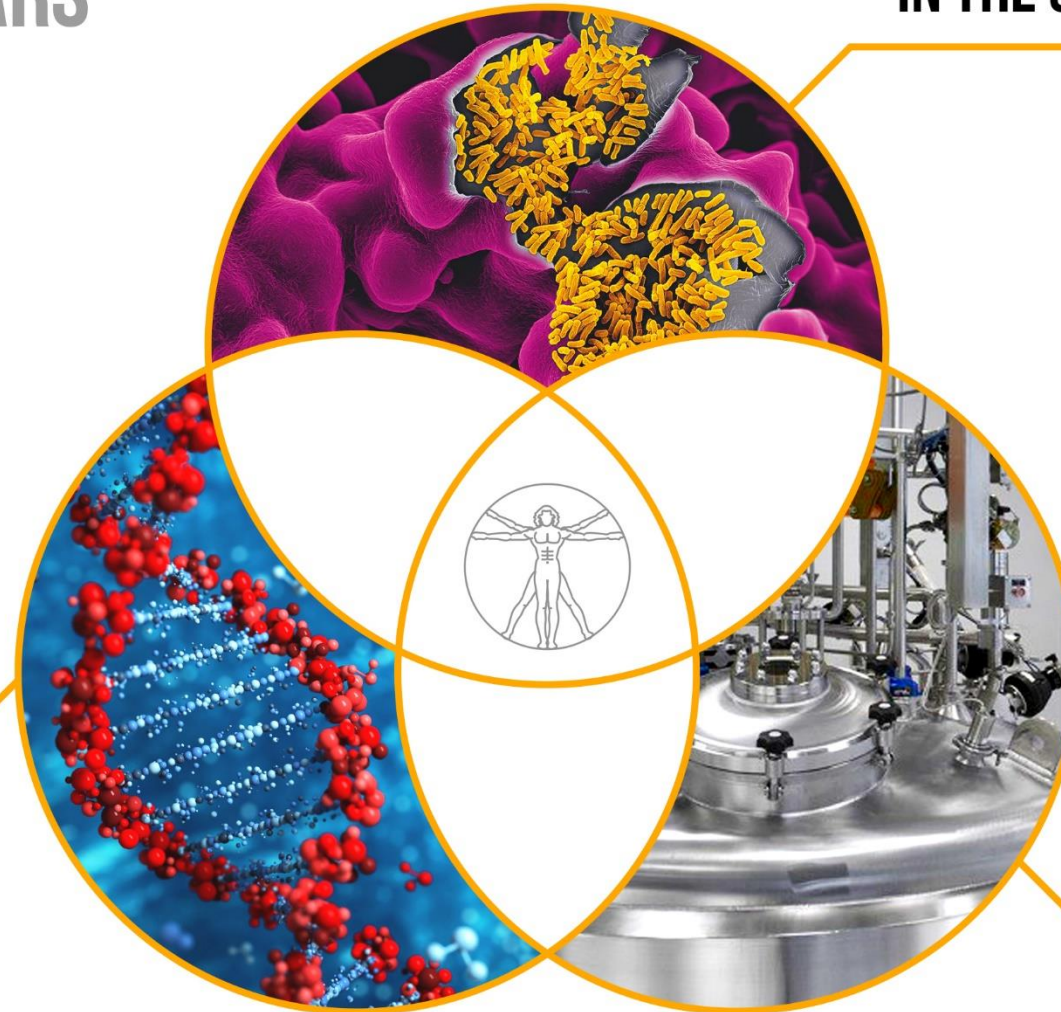
| 12 LABORATORIES

| 20 PARTNER INSTITUTES

SCIENTIFIC DISCOVERIES OF THE PAST 20 YEARS

**BREAKTHROUGH
IN THE STUDY OF MICROBIOTA**

**HUMAN GENOME
SEQUENCING**



**BIOTECH
REVOLUTION**

THREE GROUPS OF TECHNOLOGICAL TRENDS:

1. TRANSFORMATION OF **BASIC TECHNOLOGIES**
2. BREAKTHROUGH IN **BIOTECHNOLOGY**
3. DEVELOPMENT OF **MOLECULAR-BASED METHODS**

1. TRANSFORMATION OF BASIC TECHNOLOGIES

➤ **GETTING BENEFITS FROM PLANTS** (CHEMICAL SUBSTRATE)

➤ **GETTING BENEFITS FROM ANIMALS**

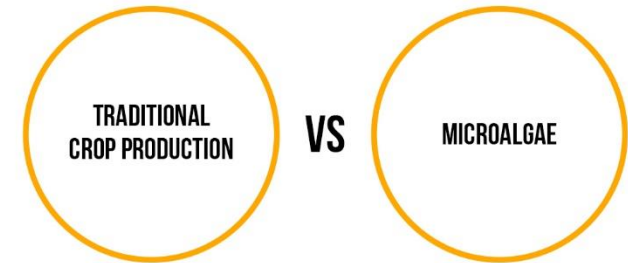
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➤ GETTING BENEFITS FROM PLANTS (CHEMICAL SUBSTRATE)

DIVERSIFICATION MANAGEMENT (PURITY AND UNIFORMITY OF MOLECULES)

UNIVERSALIZATION MANAGEMENT IN USING DIFFERENT TYPES OF RAW MATERIALS

➤ GETTING BENEFITS FROM ANIMALS

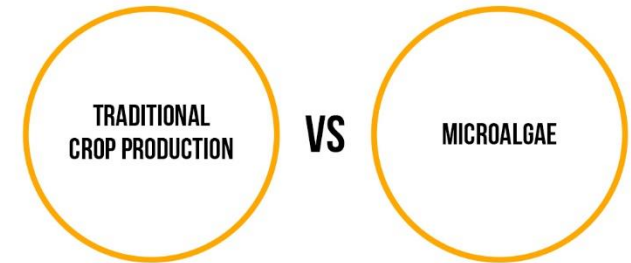


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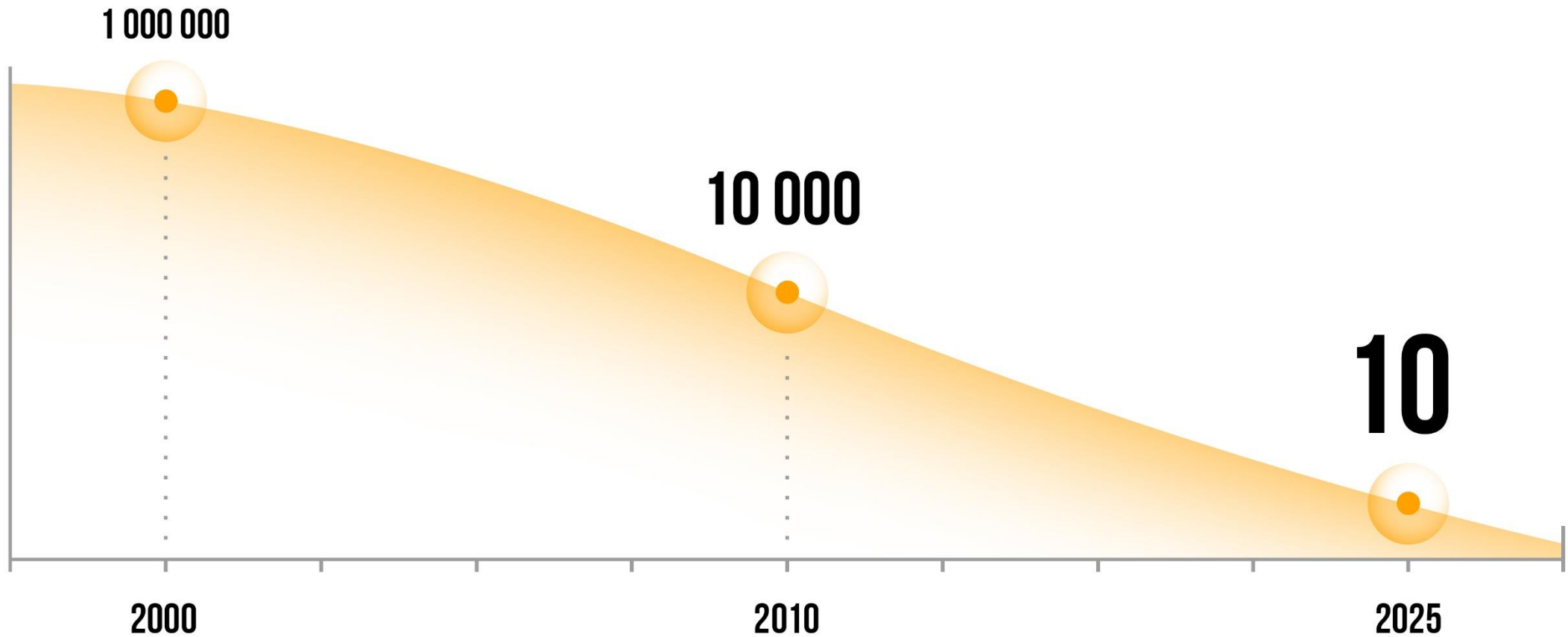
➤ GETTING BENEFITS FROM ANIMALS



2. BREAKTHROUGH IN BIOTECHNOLOGY

\$/KG OF PROTIEN

SOURCE: RETHINKX



2. BREAKTHROUGH IN BIOTECHNOLOGY



**BIOSYNTHESIS
OF FATS**



**RECOMBINANT
PROTEINS**



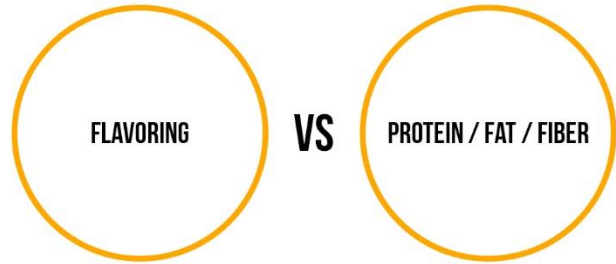
**CULTURED
MEAT**



**TEST TUBE
MILK**

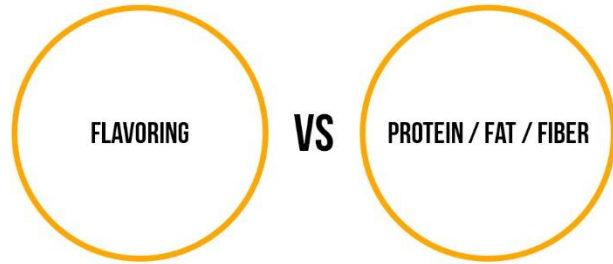
3. MOLECULAR-BASED METHODS

➤ **BASIC TECHNOLOGIES.** FEED AND DO NO HARM (3X CHEAPER WITHOUT ANTIBIOTICS AND GROWTH HORMONES)

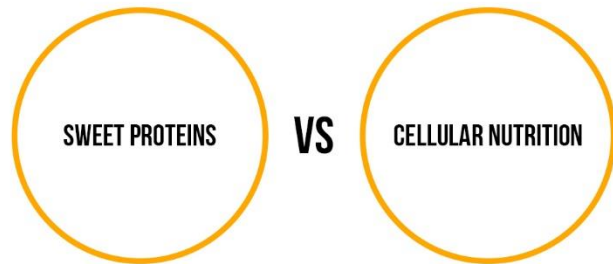


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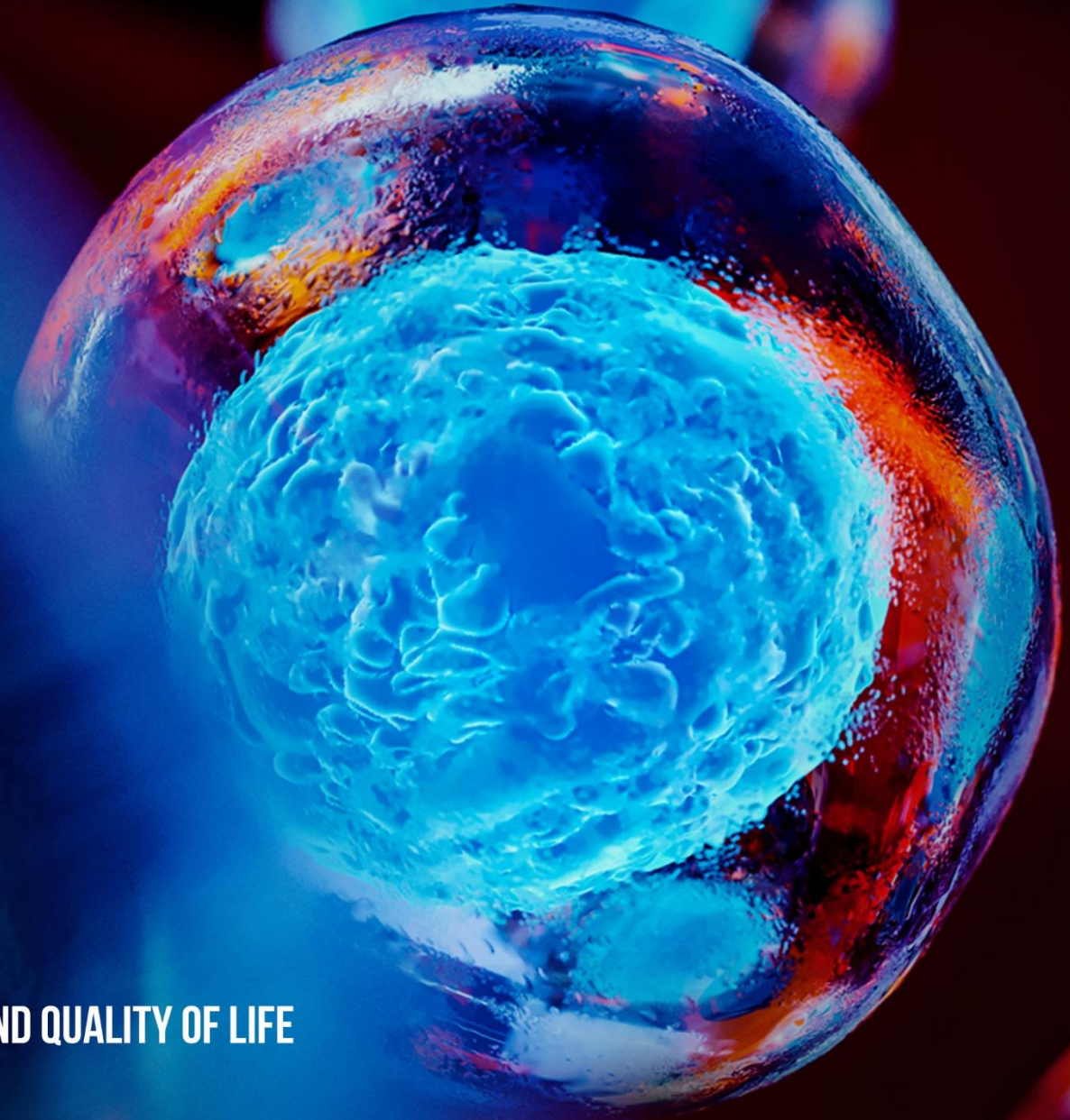
- **TECHNOLOGIES THAT CHANGE THE QUALITY OF LIFE. FOR EXAMPLE:**



CELLULAR NUTRITION

SOMETHING THAT **TRANSFORMS**
OUR UNDERSTANDING OF THE VERY POSSIBILITIES
OF INFLUENCING THE QUALITY OF HUMAN LIFE

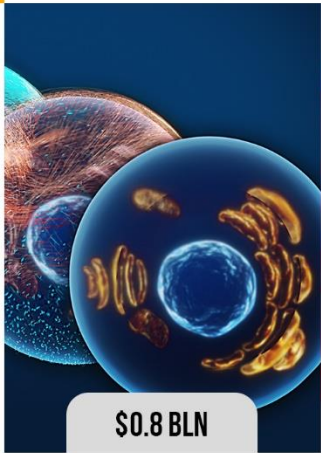
WHAT MAKES IT POSSIBLE TO RADICALLY CHANGE
OUR UNDERSTANDING OF THE HEALTH, LONGEVITY AND QUALITY OF LIFE



SOURCES OF PROTEIN

BASIC TECHNOLOGIES

BIOTECHNOLOGIES



\$10.4 BLN

\$0.7 BLN

\$1 BLN

\$0.8 BLN

\$3 BLN

\$1.1 BLN

LIVESTOCK FARMING
(MILK AND MEAT)

AQUACULTURE
(BREEDING AND GROWING
OF AQUATIC ORGANISMS)

CROP PRODUCTION
(PLANT-BASED MEAT AND MILK)

**PROTEIN
FROM SEAWEED**

**PROTEIN
FROM MUSHROOMS**

**PROTEIN
FROM MICROORGANISMS**

**CULTURED
MEAT**

**PROTEIN
FROM INSECTS**

DOUBTFULLY PROMISING

PROMISING

PROMISING

PROMISING

DOUBTFULLY PROMISING

PROMISING

DOUBTFULLY PROMISING

DOUBTFULLY PROMISING

SOURCES OF FATS

BASIC TECHNOLOGIES

BIOTECHNOLOGIES



\$5 BLN

\$0.7 BLN

\$50 MLN

\$1 BLN

LIVESTOCK FARMING

CROP PRODUCTION

FAT FROM SEAWEED

FAT FROM MICROORGANISMS

«CULTURED FAT»

NOT PROMISING

PROMISING

DOUBTFULLY PROMISING

PROMISING

NOT PROMISING

ALTERNATIVE SOURCES OF SWEETNESS

BASIC TECHNOLOGIES



CHEMICAL
(ASPARTAME)

NOT PROMISING



\$305 MLN

PLANT-BASED
(STEVIA)

DOUBTFULLY PROMISING

BIOTECHNOLOGIES



\$46 MLN

SWEET PROTEINS

PROMISING



\$16 MLN

CASCADE FERMENTATION

PROMISING

SUGAR BURDEN ON THE FOOD SYSTEM:

**2 BILLION TONS OF SUGAR CANE AND SUGAR BEET
(20% OF TOTAL FOOD VOLUME)**

FOR REFERENCE: WHEAT - 700 MILLION TONS, RICE - 700 MILLION TONS



IS IT POSSIBLE TO FEED 10 BILLION?



MAIN DRIVERS OF THE «GREEN REVOLUTION»

1. CHEMICALS

(SYNTHESIZED NITROGEN FERTILIZERS, PESTICIDES, INDUSTRIAL VETERINARY MEDICINE)

2. MECHANIZATION

AND INTENSIVE CULTIVATION OF NEW LANDS

3. IRRIGATION

WITH POWERFUL PUMPS, HUMANITY FOR THE FIRST TIME REACHED THOSE WATERS TO WHICH THERE HAD NEVER BEEN ACCESS

4. MONOCULTURE

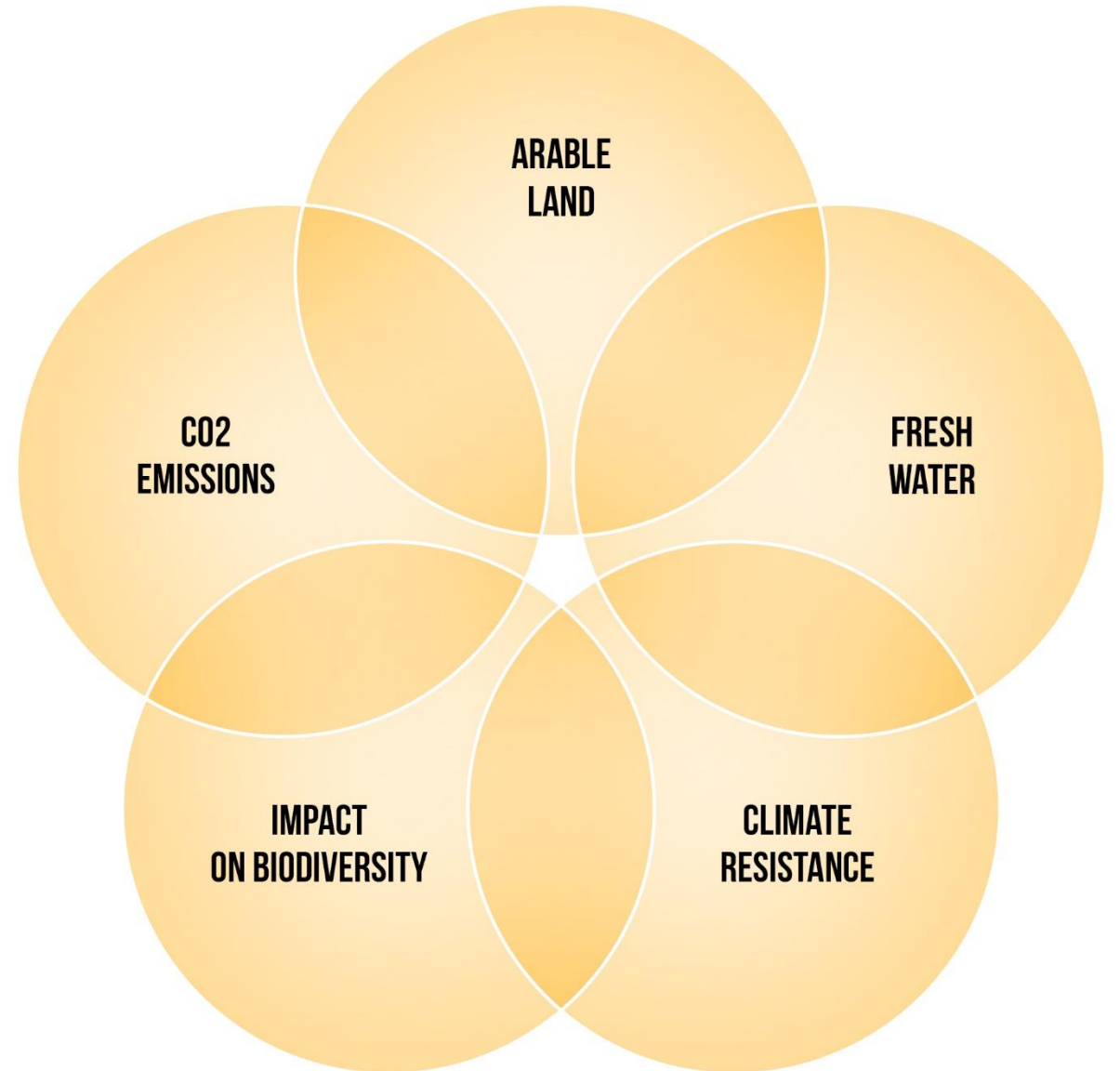
BORLAUG DEVELOPED SHORT VARIETIES OF WHEAT AND RICE THAT HELPED FEED LATIN AMERICA AND CHINA

SIDE EFFECT OF «GREEN REVOLUTION»

- **30% OF EMISSIONS — FOOD SYSTEM SHARE**
- **2 BILLION HECTARES OF DESTROYED FORESTS**
- **LOSS OF 30% OF FERTILE ARABLE LAND**
- **BIODIVERSITY IS BEING DESTROYED**
- **HEALTH TRADE-OFFS**

UNIT OF NATURE —

**MAIN LIMITING FACTOR
ON THE POSSIBILITY
OF FOOD PRODUCTION GROWTH:**



HEALTHY INNOVATION FOOD:

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- **GOOD FOR THE PEOPLE**
- **GOOD FOR THE PLANET** (WITH MINIMAL COST PER UNIT OF NATURE)
- **AFFORDABLE** (OR AT LEAST WITH THE POTENTIAL FOR MASS PRODUCTION)

**AFFORDABLE
FOR EVERYBODY**

HUNGER



**MAKING
PEOPLE'S LIVES BETTER**

HEALTH



PLANET-FRIENDLY

ECOLOGY



IS IT POSSIBLE TO FEED 10 BILLION?

IS IT POSSIBLE TO FEED 10 BILLION?

YES, IT IS!

BUT WE ALL NEED **TO WORK HARD!**

TOGETHER! BUSINESSES, SCIENTISTS, SOCIETY AND GOVERNMENTS!

WE NEED **TO COOPERATE**, NOT COMPETE!





HEALTHY



AFFORDABLE



**PRODUCED IN HARMONY
WITH NATURE**



DELICIOUS



THANK YOU