Shaping the Future of Food, Agricuture, and the Livestock Industry with Technology

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Change has never happened this fast before…

And it will never happen this slowly again…

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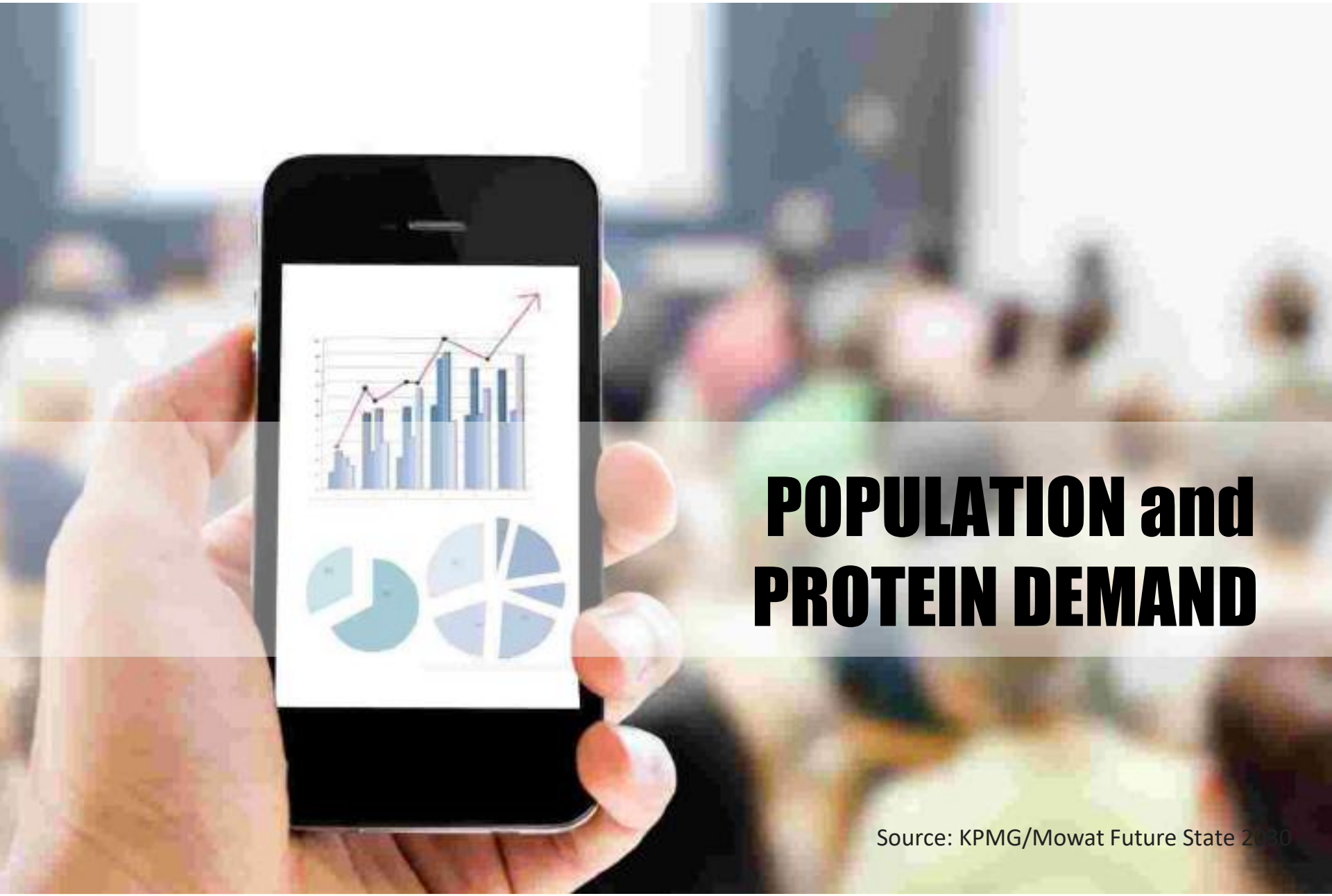
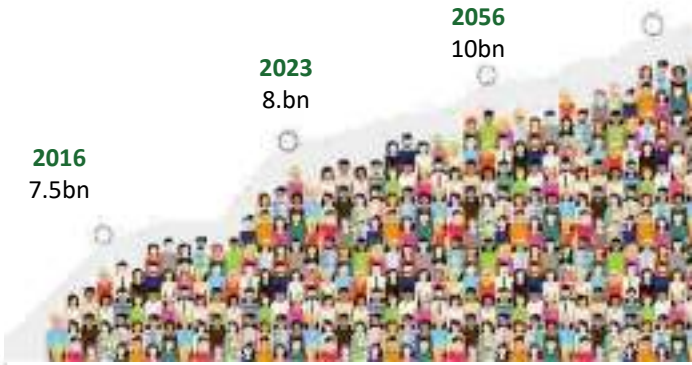


POPULATION and PROTEIN DEMAND

Source: KPMG/Mowat Future State 2030

World Population Milestones



10 Billion (2056)

The United Nations projects world population to reach 10 billion in the year 2056.

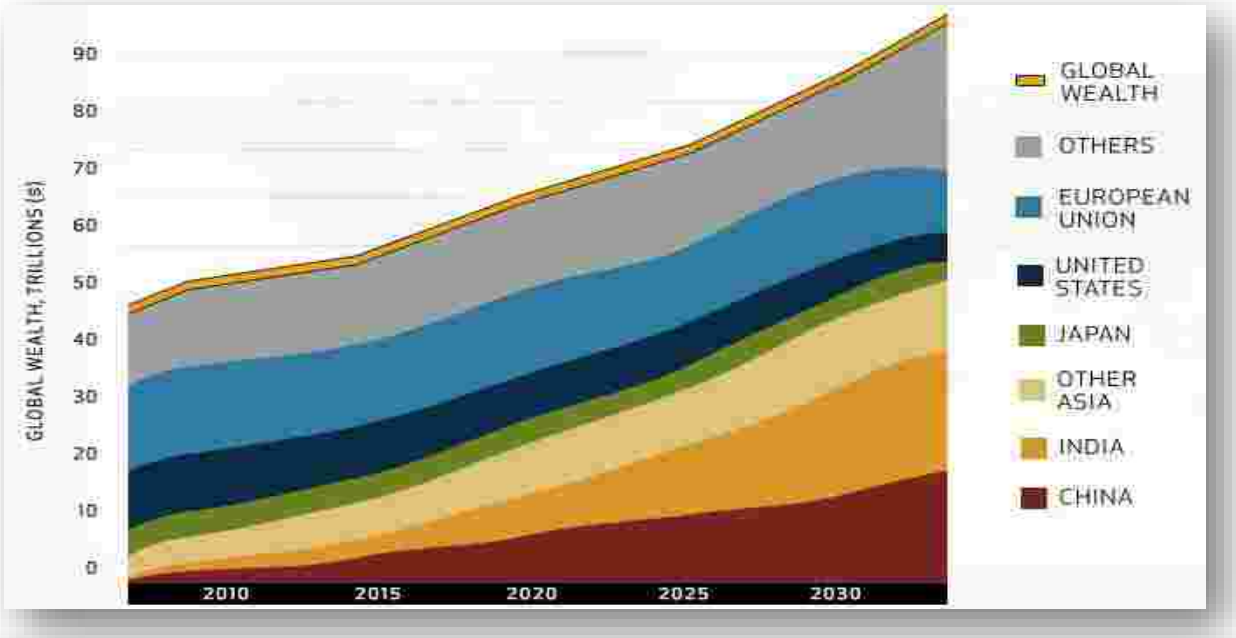
8 Billion (2023)

According to the most recent United Nations estimates, the human population (the total number of humans currently living) of the world is expected to reach 8 billion people in 2023.

7.5 Billion (2016)

According to United Nations estimates elaborated by Worldometers, the current world population is **7.5 billion** as of November 2016 [1].

Growing wealthy population wants an American diet

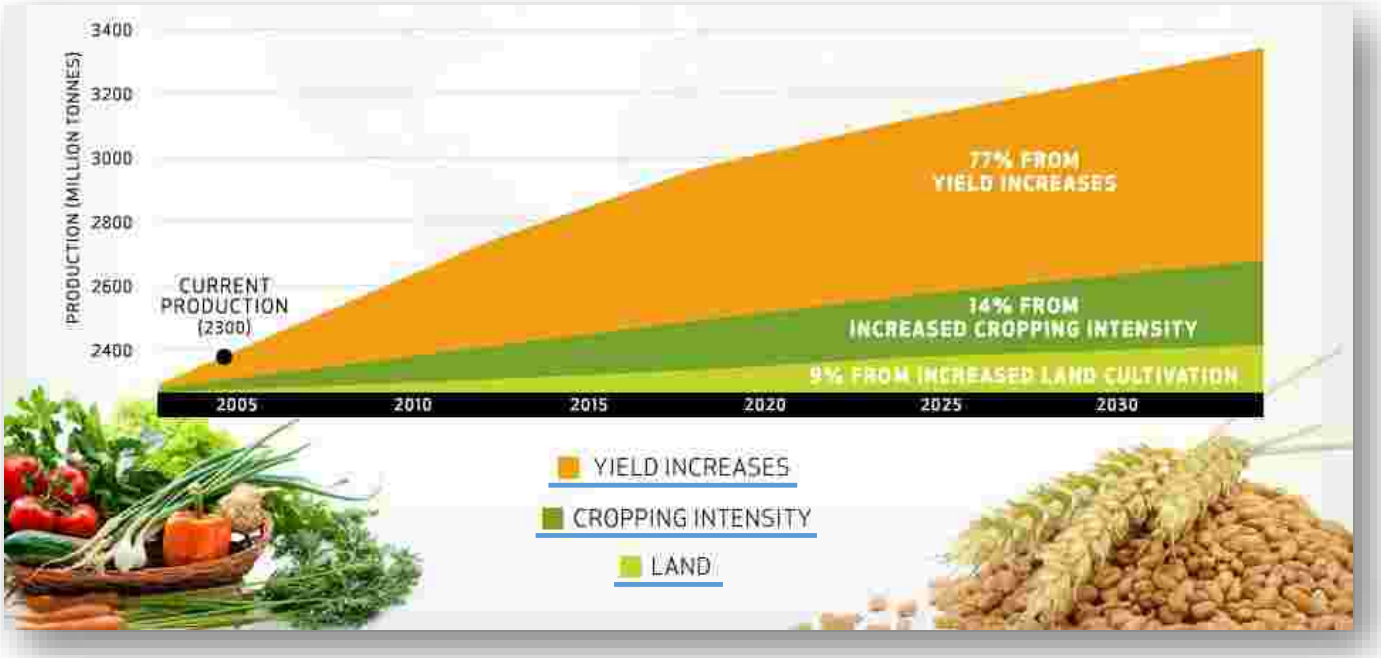


Equivalent to 4 planet Earths

Have to grow more wheat and corn over the next 40 years than was grown in the previous 500.

Meat production will need to increase to 470m tonnes by 2050, almost double its current level.

Where will the extra food come from?



Increase Meat Production

(millions ton)

	Bovine	Swine	Broiler	Ovine	Others	Total	Human Population
2010	66.2	102.2	96.9	14.4	5.6	285.4	6,908
2020	75.4	115.1	124.1	17.1	6.1	337.9	7,674
Incr (%)	13.9	12.6	28.1	18.7	8.9	18.4	11.1

Adapted from OCDE-FAO, Agricultural Outlook 2010-2019

Next 10 years? 20 Years? 30 Years? How can the industry double or more to meet the population needs while still managing the increasing challenges of regulations, consumer demands, sustainability, food safety…..

DIGITALIZATION

Source: KPMG/Mowat Future State 2030

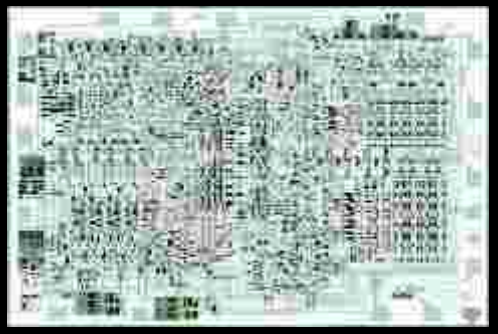
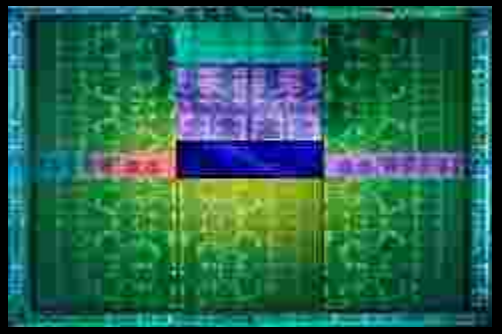
Agricultural Stages:

1. Paleolithic - Early domestication
2. Antiquity - More efficient
3. Modern Era - Mechanization & Fertilization emerged
4. Green Revolution - Transformative crop genetics & fertilization practices

Coming soon…

5. **Digital Revolution – Will transform agriculture**

Integrated Circuits

	1958: 2 Transistors	1971: Intel 4004	2016: Intel **Core i7-6950X**
			
Transistor Count:	2	2,300 Transistors	14.4 ***Billion*** Transistors
Gate Process Length:	½ inch	10,000 Nanometers	14 Nanometers
Speed:		740 KHz (.00074 GHz)	60 GHz
Cost Of A Transistor:		≈ $1 (1968)	≈ $. **00000024**

← 80K (faster) & 4.2M (cheaper) →

330+ Billion-fold improvement (45 yrs.)

Sensor Explosion

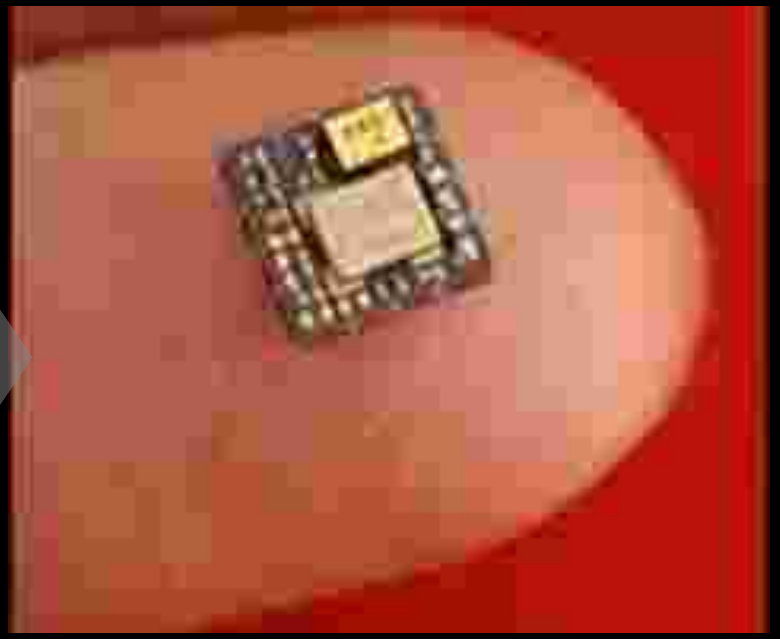
1976 – 1st Digital Camera
0.01 MP / 3.75 lbs / $10K

2014 – Digital Camera
>10 MP / 0.03 lbs / $10

← 1 BILLION TIMES BETTER →

← 1,000x resolution & 1,000 lighter & 1,000 cheaper →

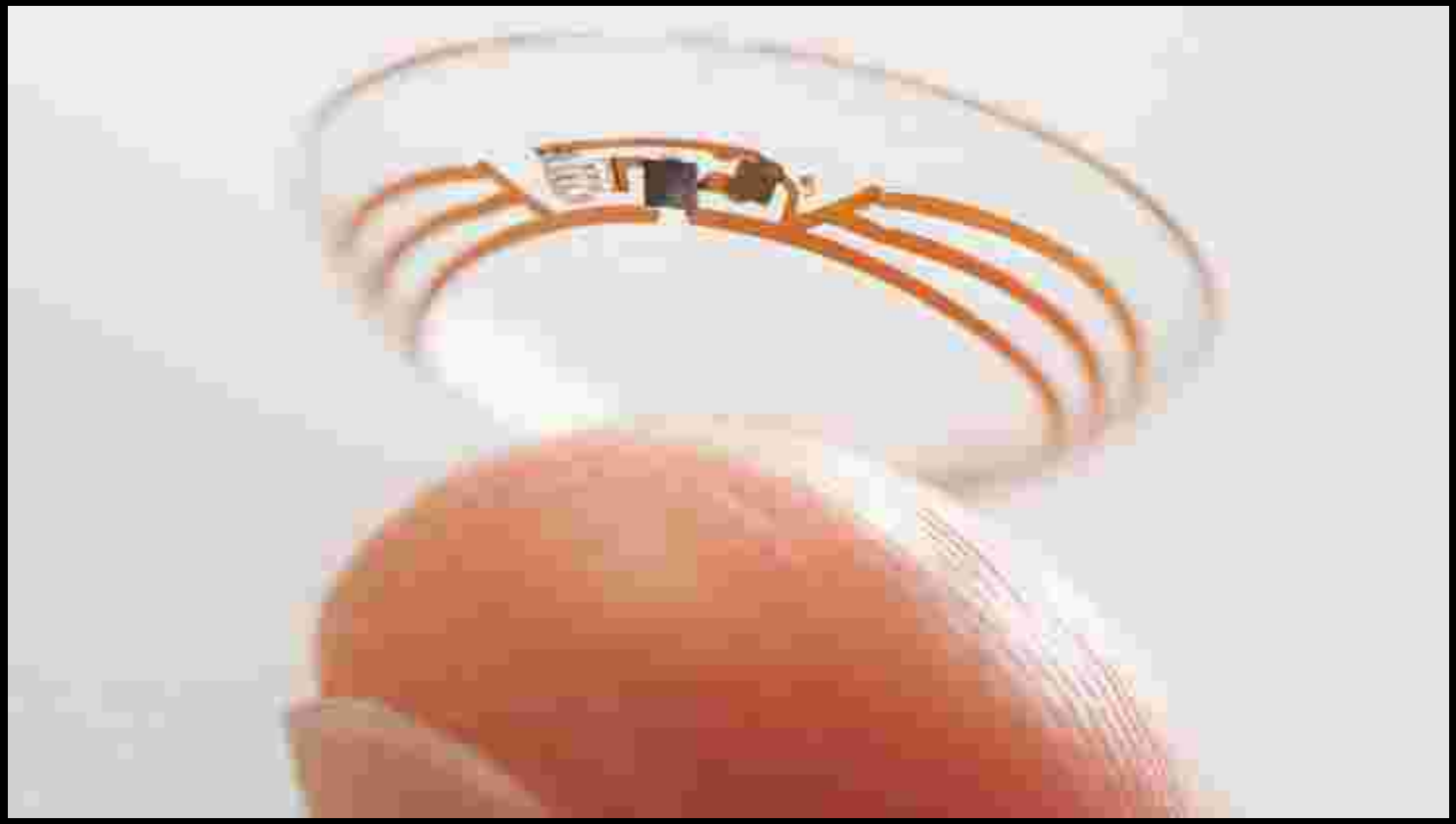
Sensor Explosion



1st commercial GPS receiver in 1981
Weight: 53 lbs.; Cost: $119,900

Single Chip GPS Receiver
2010; <$2 each

Biometric Sensors



"Transform Decision- Making"

Faster,
Cheaper,
Computing
Power

Networks

Sensors

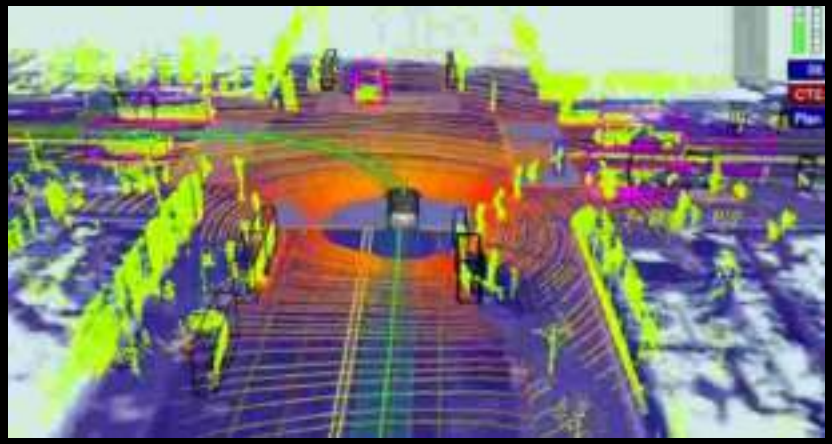
Robotics

Machine Learning

Artificial Intelligence

Real-Time
Predictive
Prescriptive
Cloud-Based
Unstructured
External

Perfect Information: Know Anything, Anytime, Anywhere



WE ARE ON THE CUSP OF THE AGRICULTURAL DISRUPTION

Emerging Agriculture Technologies are changing our world

Sensors

- Air & soil sensors
- Equipment telematics
- Livestock biometrics
- Crop Sensors
- Infrastructural health sensors

Automation

- Variable rate swath control
- Rapid iteration selective breeding
- Agricultural robots
- Precision agriculture
- Robotic farm swarms

Engineering

- Closed ecological systems
- Synthetic biology

BUSINESS INSIDER

A CASE STUDY

Source: KPMG/Mowat Future State 2030

Early Intervention

Feedback Loops

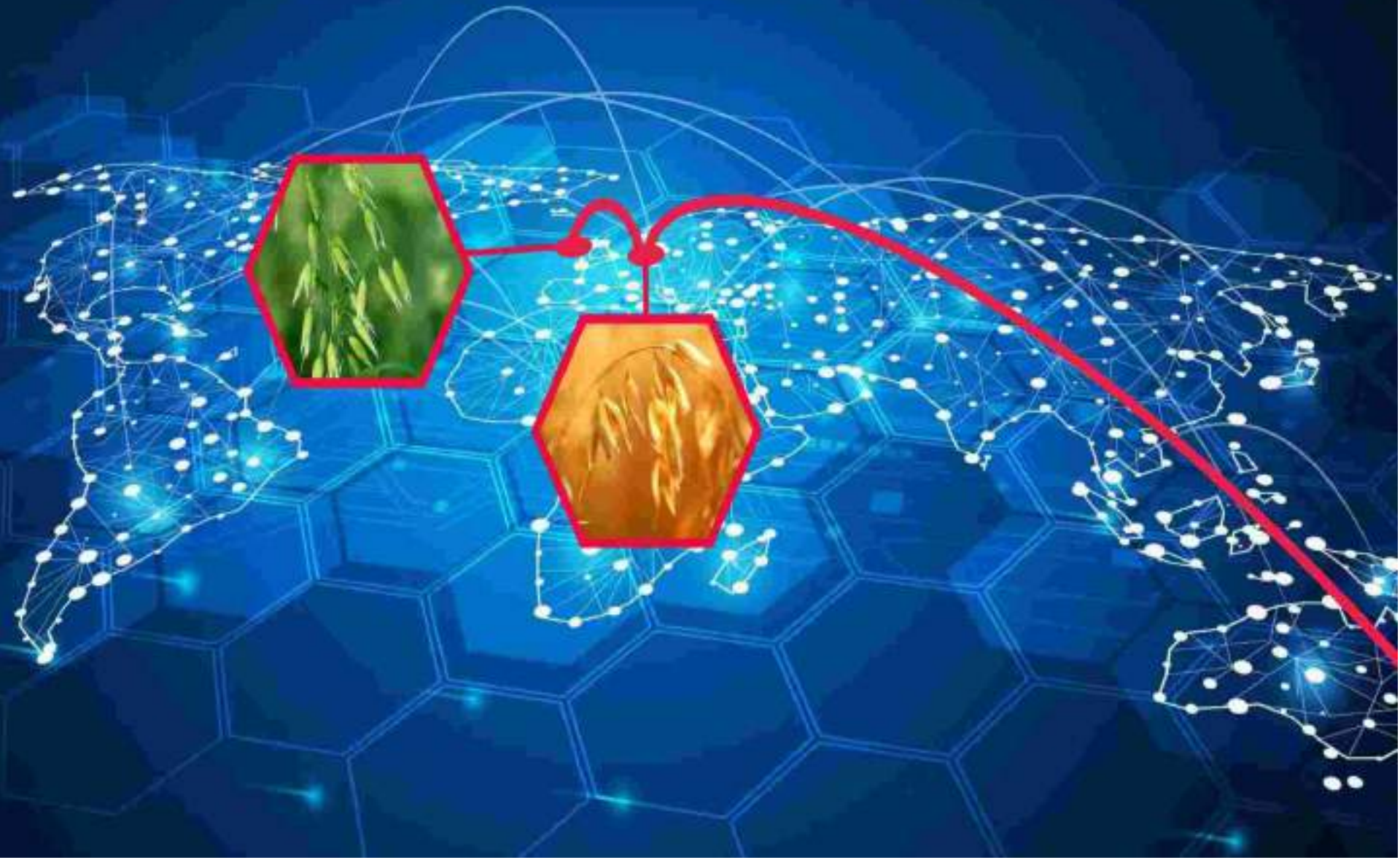
ID

ALERT

MEASURE

INTERVENE

Meaningful benchmarking



Introducing "Alex", the only system in the world that can measure feed/water intake

Alex provides individual cow:

- Feed intake analysis
- Water intake analysis
- Behavioural tracking
- Health alerts

Each animal is its own sensor

cainthus

What is Alex?

Autonomous Learning by Example

The First Dairy Ai in the World!

What is its Purpose?

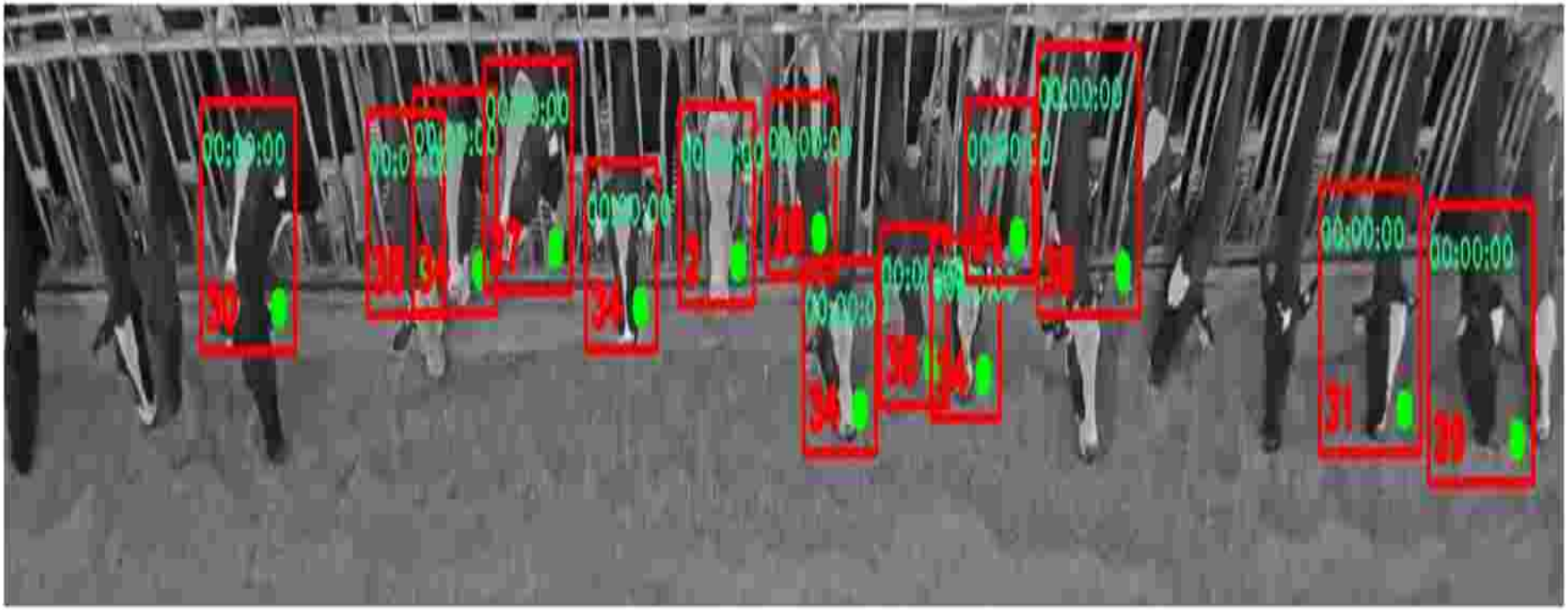
To ID and Quantify cow Ethology.

- Know what she is doing.
- Where she is doing it.
- Why she is doing it.

Maximize Production & Minimize Stress

5 million images in 24 hrs

Alex Learning New ID's



Alex

32 GB per Camera per Day converted to

1,000 events per Cow per Day

2,000 Herd Dairy

5,230 GB raw data per Day converted to

2 million events per Day

cainthus

CONSUMER

Source: KPMG/Mowat Future State 2030


Consumers have never cared more, nor known less, how their food was produced

When the public has a false belief it is more often in the interest of industry to cater to the belief than to try eradicate.


The global story of food

WE ARE ON A MISSION TO BRING BETTER NUTRITION FOR BETTER LIVES.

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