EMBEDDED WORKS
Embedded in IoT

GC Builders of IoT.
Track. Sense. Build.

Sensors in Smart Farming and Precision Agriculture

TFL TRACKINGFORLESS

EMBEDDED WORKS
Embedded in IoT

Sensor Works

EMBEDDED WORKS SOLUTIONS

DIVERSITY IN WIRELESS

Whether you are designing a product or looking for a turn-key IoT solution, let us help you solve it.

CONNECTIVITY FOR IOT

Data Plans for IoT Applications
Any Size.
Global SIM.
Multi-Carrier.

TFL — TRACKING FOR LESS

www.trackingforless.com

ONE DASHBOARD. MANY APPLICATIONS.

TrackingForLess provides affordable GPS tracking solutions:

- Fleet Management
- Asset Tracking
- Video Dashcam
- Transportation Sensors
- ELD & Cold Chain Compliance

Sensor Works

www.sensorworks.net

SENSE THE WORLD AROUND YOU.

SensorWorks offers turn-key sensor solutions to maximize your productivity:

- AgTech and Farm Tech
- Industrial Automation
- Smart City and Building
- Smart Garage and Parking
- Restaurant and Food Service

Divisions of Embedded Works Corporation.

OUR BRANDS

- TFL is a universal tracking platform that can support consumer and enterprise applications, along with a multitude of IoT technologies.

- SensorWorks is a general purpose "Sensors-As-A Service" platform to utilize IoT to solve everyday problems in consumer and commercial applications.

Sensor Applications

Sensor Works

Temp-Humidity

Water Leakage

Water Quality

Waste Bins

Agriculture

Pest Control

People Presence

Air Quality

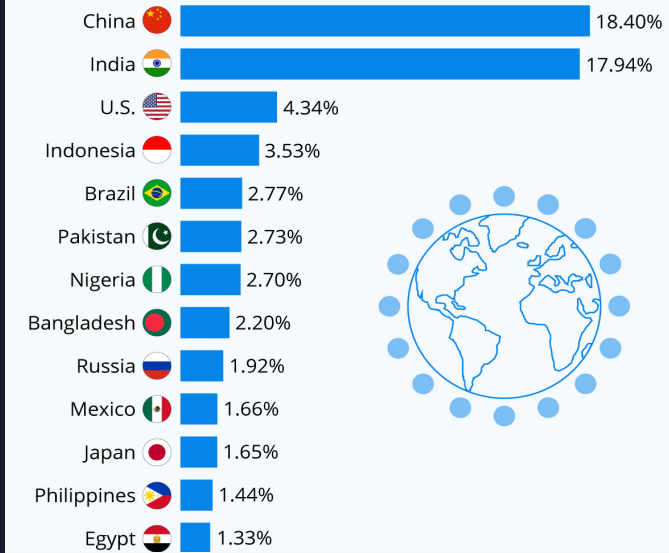Parking Lot

Tank Level

Security

Volume

Population Stats

- Human Milestone Alert!
  On Nov 15, 2022 world's population reached 8 billion people. (UN)

  - Born in Manila

- Population expected to reach 9 billion by 2037 (UN)

- China and India together make up 36.3% of world's population, and India expected to overtake as most populous this year (UN).
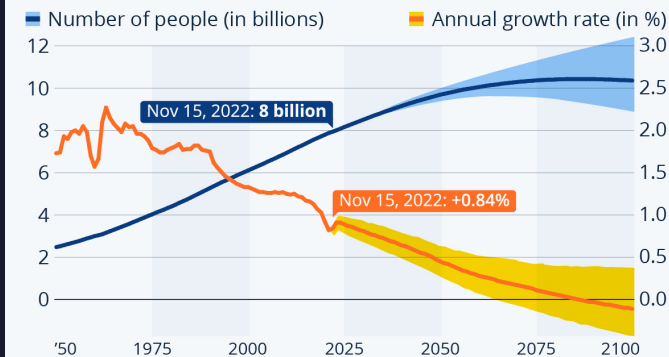
- **How do we feed everyone?**

Source: United Nations Population Stats 2023

The Most Populous Nations on Earth
Estimated share of the world population by country (2020)

Country	Share
China 🇨🇳	18.40%
India 🇮🇳	17.94%
U.S. 🇺🇸	4.34%
Indonesia 🇮🇩	3.53%
Brazil 🇧🇷	2.77%
Pakistan 🇵🇰	2.73%
Nigeria 🇳🇬	2.70%
Bangladesh 🇧🇩	2.20%
Russia 🇷🇺	1.92%
Mexico 🇲🇽	1.66%
Japan 🇯🇵	1.65%
Philippines 🇵🇭	1.44%
Egypt 🇪🇬	1.33%

World Population Reaches 8 Billion
(Forecast) number of people on Earth and annual growth rate of the world population

- Number of people (in billions)
- Annual growth rate (in %)

Nov 15, 2022: **8 billion**
Nov 15, 2022: +0.84%

'50 1975 2000 2025 2050 2075 2100

Forecast from 2022 according to the medium scenario with moderate fertility
Source: UN Population Division

THE WORLD AT 8 BILLION:
Solusyon at oportunidad sa hinaharap para sa lahat

November 15, 2022

Symbolic 8 Billionth Baby

statista

Arable Land & Livestock Stats

- Arable land is land ploughed or tilled regularly, generally under a system of crop rotation.

- 7% of world arable land

  - India and the United States account for 22%

- Livestock represents 40% of Agriculture output

- The World Bank estimates the world will need to produce about 70 percent more food by 2050 to feed an estimated 9 billion people!

- **How do we feed everyone?**

Countries With The Most Arable Land

World		15,749,300	
Rank	Country	km(2)	% Of U.S.
1	India	1,753,694	11.14%
2	United States	1,652,028	10.49%
3	Russia	1,248,169	7.93%
4	China	1,084,461	6.89%
5	Brazil	732,359	4.65%
6	Australia	479,954	3.05%
7	Canada	469,281	2.98%
8	Argentina	386,476	2.45%
9	Nigeria	344,577	2.19%
10	Ukraine	338,619	2.15%
11	Sudan	292,566	1.86%
12	Indonesia	247,598	1.57%
13	Mexico	231,799	1.47%

Source: United Nations Population Stats 2023

Precision Agriculture = Smart Farming

- ## Optimize Resources

  - Assists farmers to use resources, such as water, fertilizers, pesticides, and energy, more efficiently.

- ## Increased Productivity

  - Optimize crop yields by identifying variations in field conditions and improving farming practices.

- ## Environmental Sustainability

  - Minimize the negative environmental impacts, reduce chemical runoff into water bodies, mitigate soil erosion, and minimize greenhouse gases.

- ## Risk Reduction

  - Using remote sensing technologies and data analytics, farmers can monitor crop health, detect pest and disease outbreaks, and identify nutrient deficiencies early on.

- ## Economic Advantage

  - Help farmers increase profitability by reducing expenses, improving marketable yields, and digitize their operations.

- ## Sustainable Food Production

  - Increasing productivity and minimizing waste, helps meet the increasing demand for food while reducing the need for expanding agricultural land, preserving natural habitats and biodiversity.

Smart Farm (IoTea)

- Tea Farm in Southwest China at 3600 ft elevation "High Mountain Tea".

- Has low planting density, with high management cost

- Uneven budding, with a low yield

- Difficulty in demonstrating the tea's organic environment in the high mountains, thus making it difficult to get a good price or recognition for his tea brand

- Sensors were able to monitor the following environmental data which are crucial to tea quality. Air Temperature, Air Humidity, Barometric Pressure, Light Intensity, CO_2, Soil Moisture, Soil Temperature

- Lowered labor cost. Provided QRCode with webpage to end consumers to show tea's organic authenticity.

Smart Farm (Fruit Farm)

- Durian "King of Fruit" - one of the most expensive.

- Malaysia is expected to increase to 443K metric tons by 2030. Malaysia alone exports $315M worth annually.

- Farm has 200 acres, 6000 durian trees

- Fruit requires lots of labor to harvest,

- Sensitive to environment (24-32°C) 75-89F and with 75-80% humidity and requires moist soil.

- Soil moisture sensor replaces manual inspection of trees every 2 hours.

- Monitor PH acidity levels in soil

-

Smart Farm (Poultry)

- Feed, water, and environment are the three fundamentals that determine the condition of animal farming

- CO_2, light, air temperature and humidity are critical for farmers to analyze the growth and health conditions of chicken

- Ventilation or the accumulation of animal waste, ammonia, and CO_2 – connected to smart fans

- Sensors deployed in multiple farms, using LoRaWAN technology to connect farms up to 2 km away

Smart Farm (Cattle Tracking)

- Ability to track cattle location and count over vast distances in open range farms

- Utilizes GPS + LoRaWAN technology with lowest battery consumption

- Solar Powered Ear Tags never needs recharging

Supply Chain of Agriculture

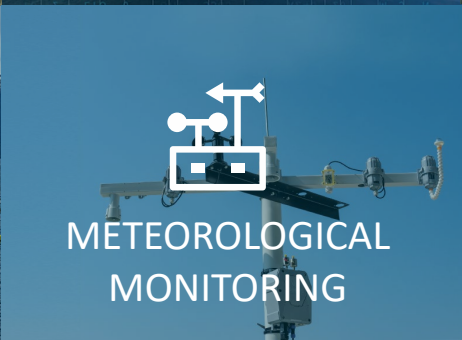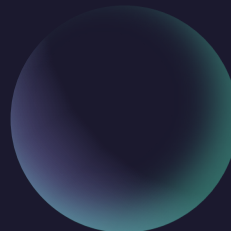| Supply	Production	Process	Distribute	Sales
• Fertilizer • Seed • Pesticide • Livestock • Machinery	• Plantation • Horticulture • Aquaculture • Cultivation • Floriculture	• Bakery • Meat • Dairy • Snacks • Beverages	• Certification • Logistic • Traceability • Global Trade • Wholesale	• End Customer • Consumer

Let's Make IoT Together.

Andy Do

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