

IOT and Thai Agriculture Development



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- **Introduce**
- **Trends in agricultural technology development in the world**
- **Internet of Thing (IoT) for Agriculture**
- **Example Intelligent Greenhouse System Development**

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Introducing Thai Microelectronic Center



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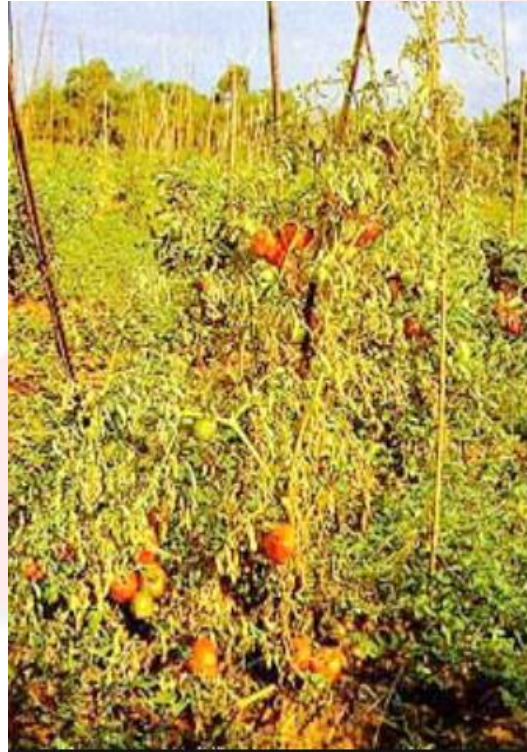
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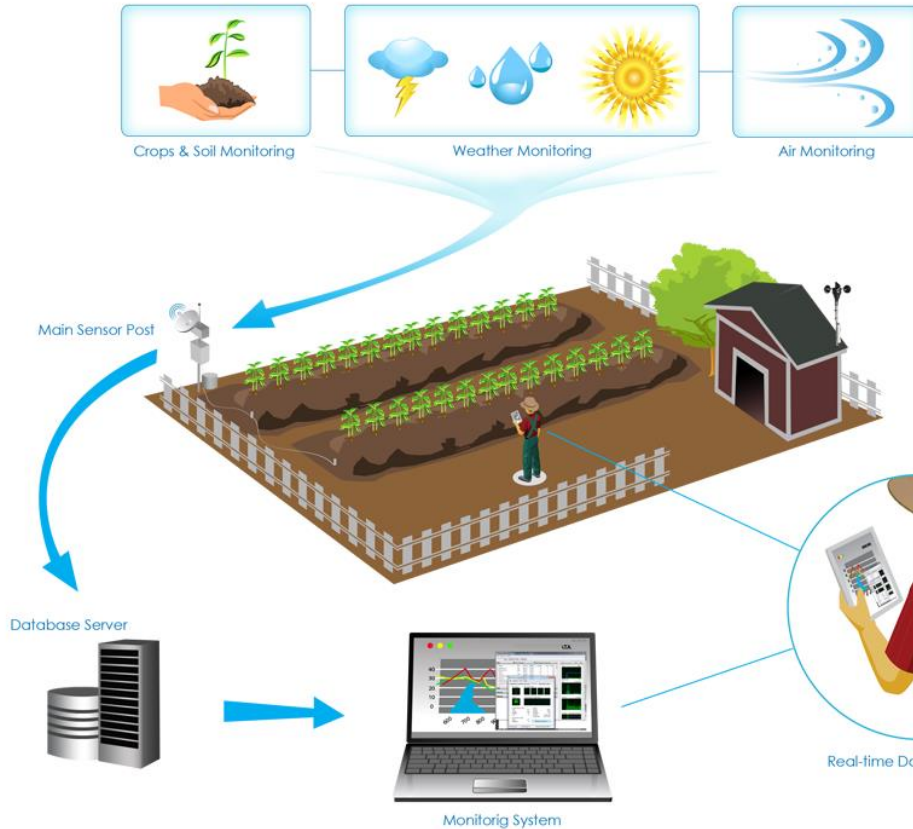


Young Smart Farmer of Chachengchao Province



The big problem





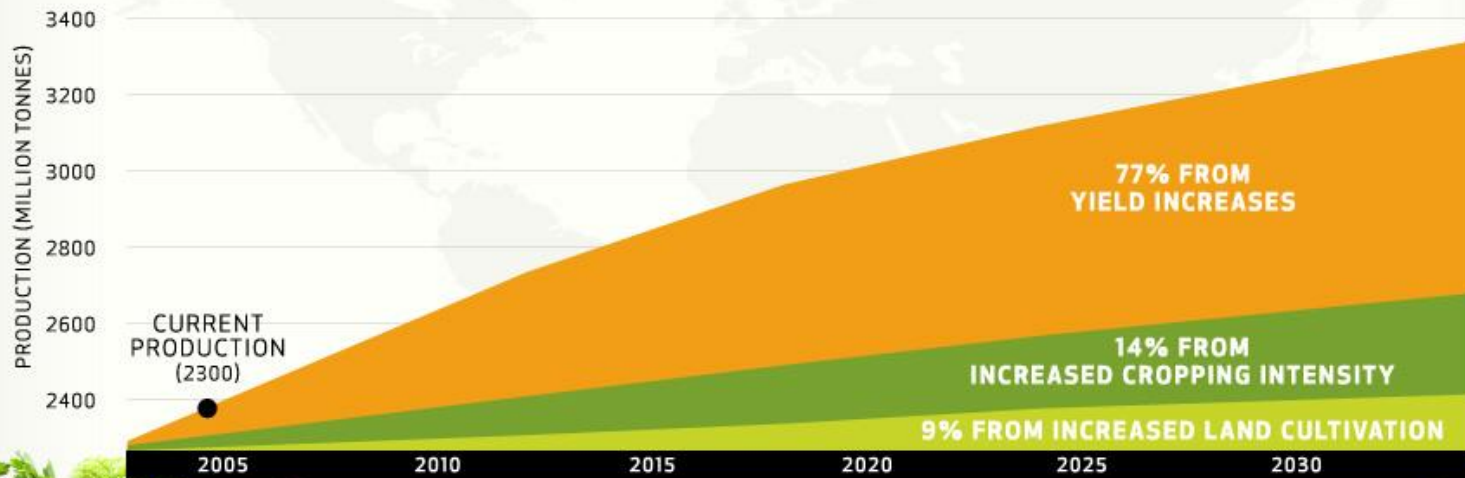
**IOT Technology be integr
management farms in Th**



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CROP YIELD GROWTH

By **2030**, global food demand is expected to rise by 35%. The vast majority of additional food will need to come from increases in the yield achieved, or reductions in food waste.



- YIELD INCREASES
- CROPPING INTENSITY
- LAND



TECHNOLOGY USE

The Global Trends **2030** report – published in 2012 – identifies the technologies below as...

“Likely to be at the forefront of maintaining resources in the next 15-20 years.”



PRECISION AGRICULTURE



WATER-IRRIGATION TECHNIQUES



GMO CROPS



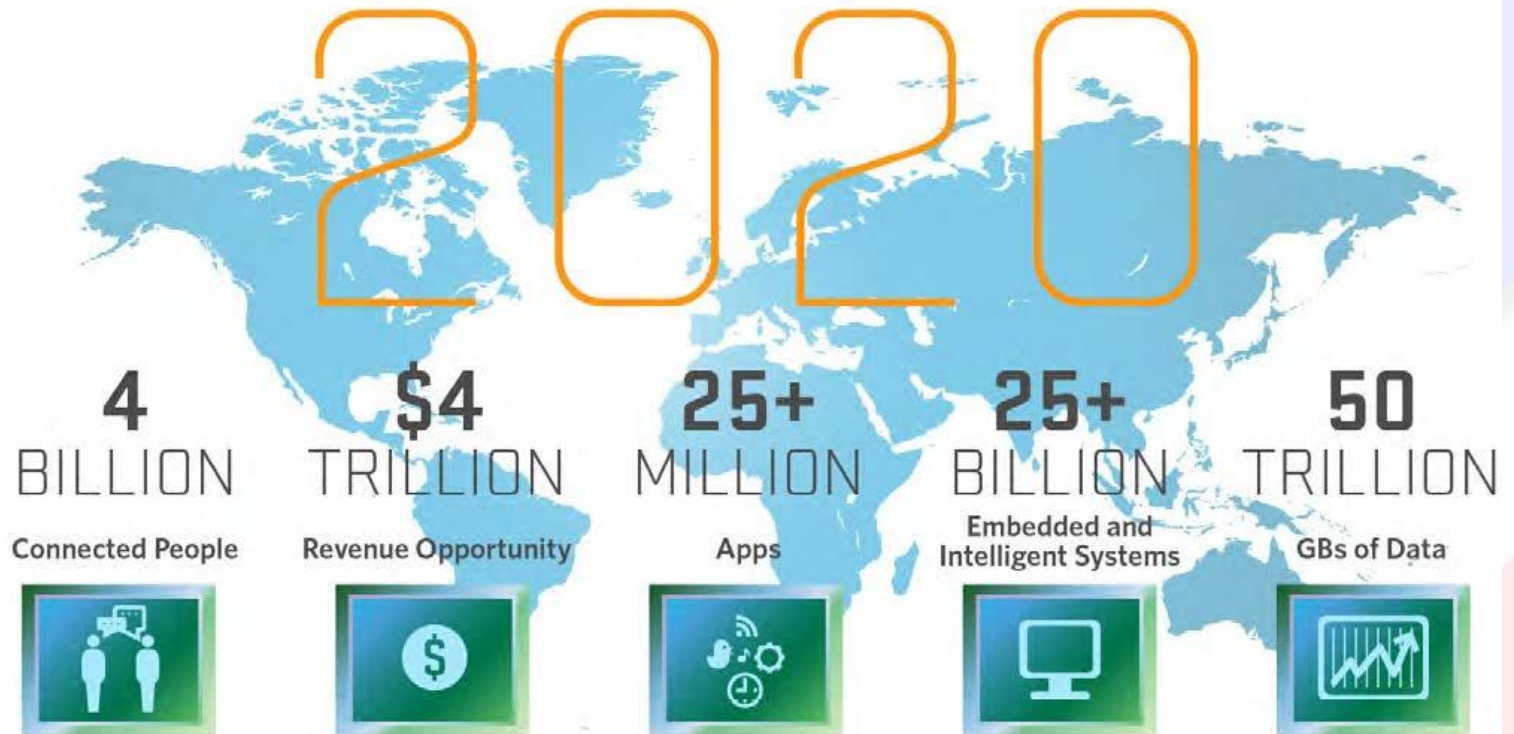
SOLAR ENERGY



ADVANCED BIO-BASED FUELS

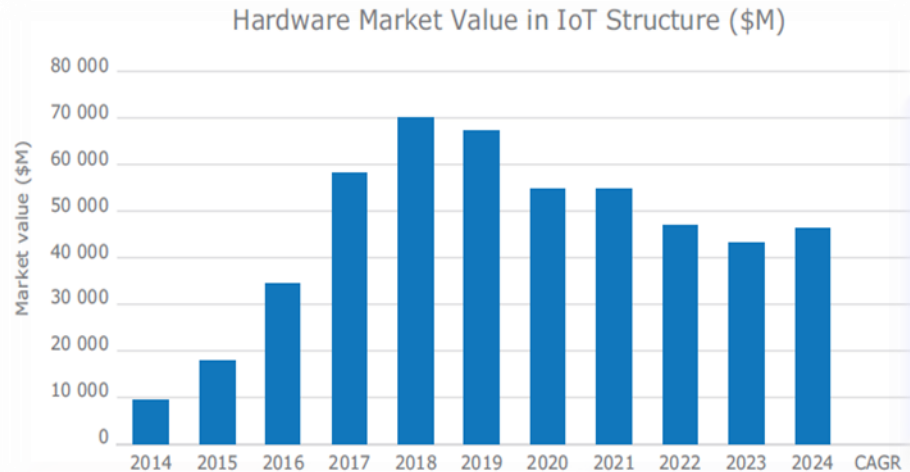
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Internet of Thing (IoT) for Agriculture



Source: Mario Morales, IDC

Internet of Thing (IoT) for Agriculture



The Internet of Things (IoT) is a mix of hardware, cloud and data processing.

IoT Analytics - Quantifying the connected world

Applications	Overall popularity (and selected examples)	Scores
1 Smart Home	Smart thermostat, Connected lights, Smart fridge, Smart doorlock	100% 61k, 3.3k, 430
2 Wearables	Smart watch, Activity tracker, Smart glass	63% 33k, 2.0k, 320
3 Smart City	Smart parking, Smart waste management	34% 41k, 0.5k, 80
4 Smart grid	Smart metering	28% 41k, 0.1k, 60
5 Industrial internet	Remote asset control	25% 10k, 1.7k, 30
6 Connected car	Remote car control	19% 5k, 1.2k, 50
7 Connected Health		6% 2k, 0.5k, 5
8 Smart retail		2% 1k, 0.2k, 1
9 Smart supply chain		2% 0k, 0.2k, 0
10 Smart farming		1% 1k, 0.0k, 1

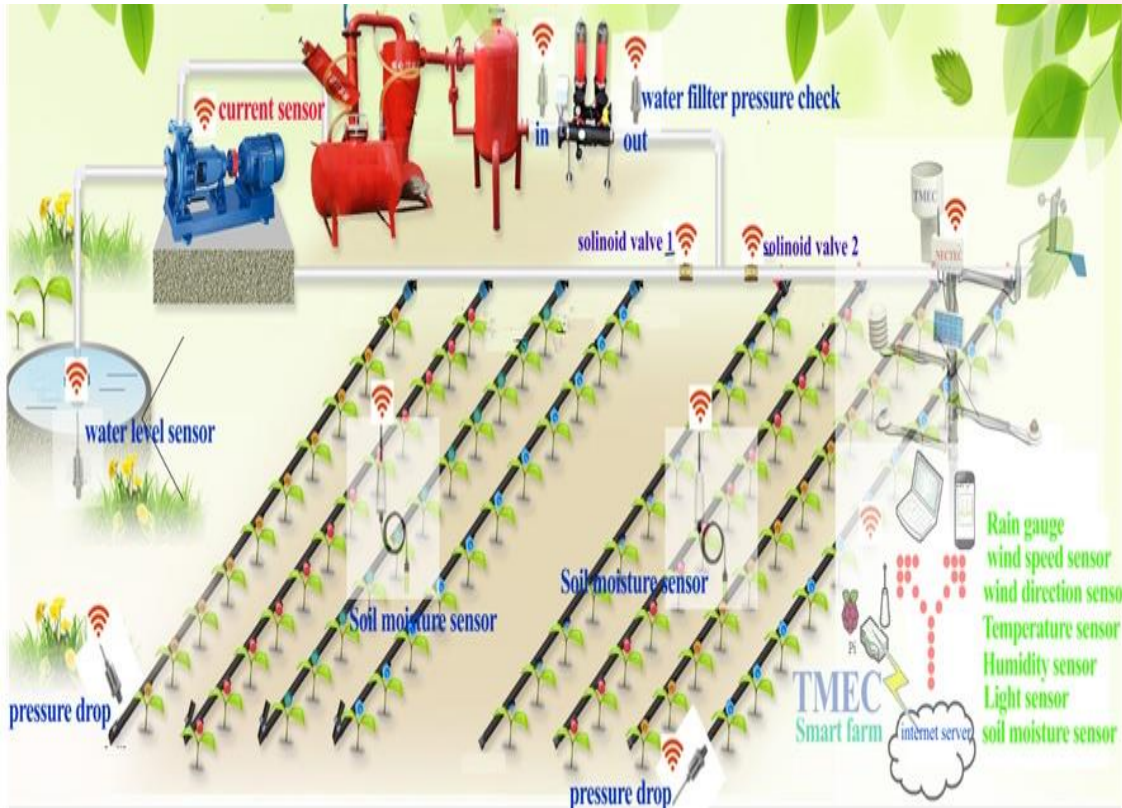
Source:
(Yole Développement,
June 2014)

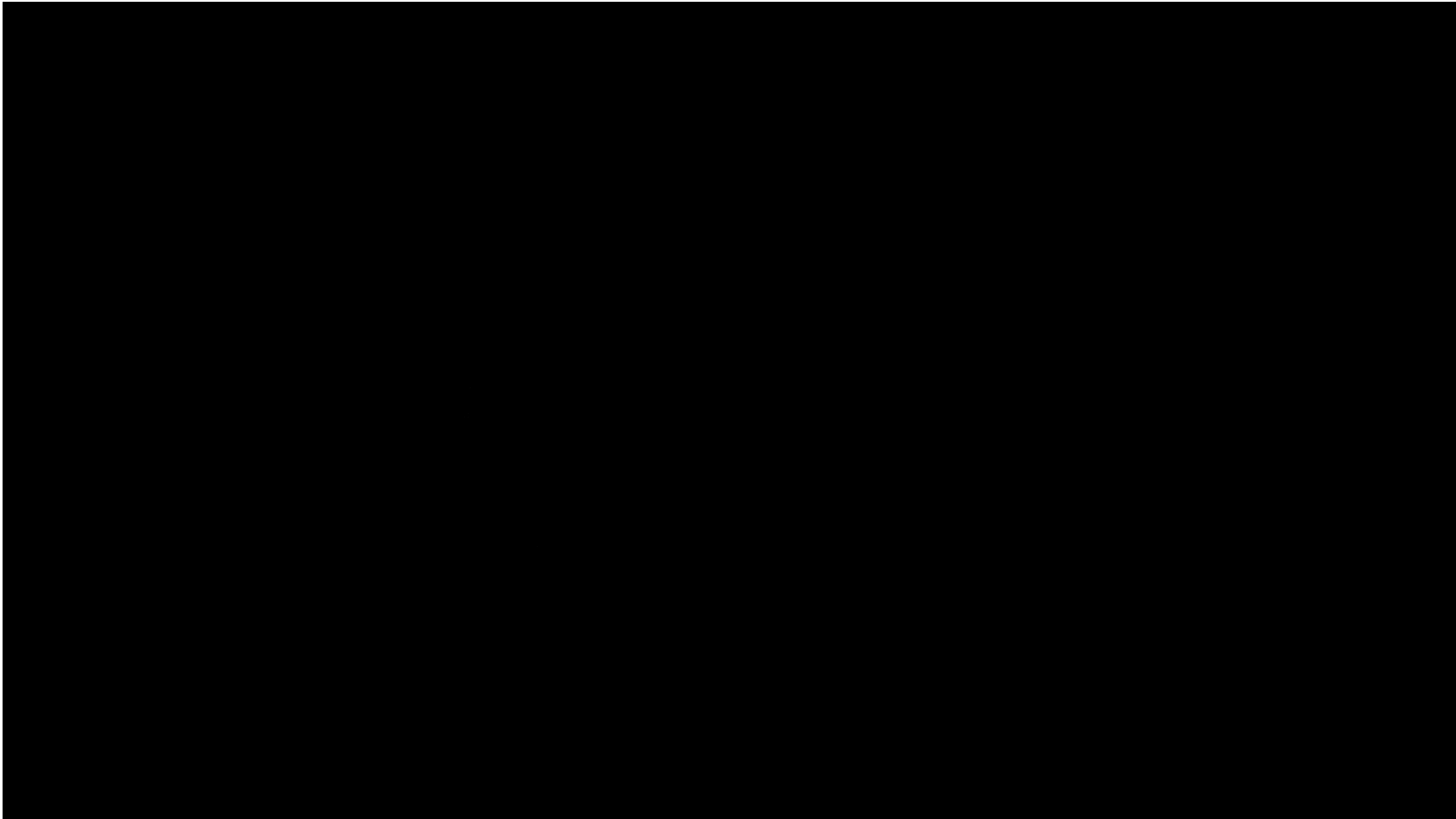
1. Monthly worldwide Google searches for the application 2. Monthly Tweets containing the application name and #IOT 3. Monthly LinkedIn Posts that include the application name. All metrics valid for Q4/2014. Sources: Google, Twitter, LinkedIn, IoT Analytics

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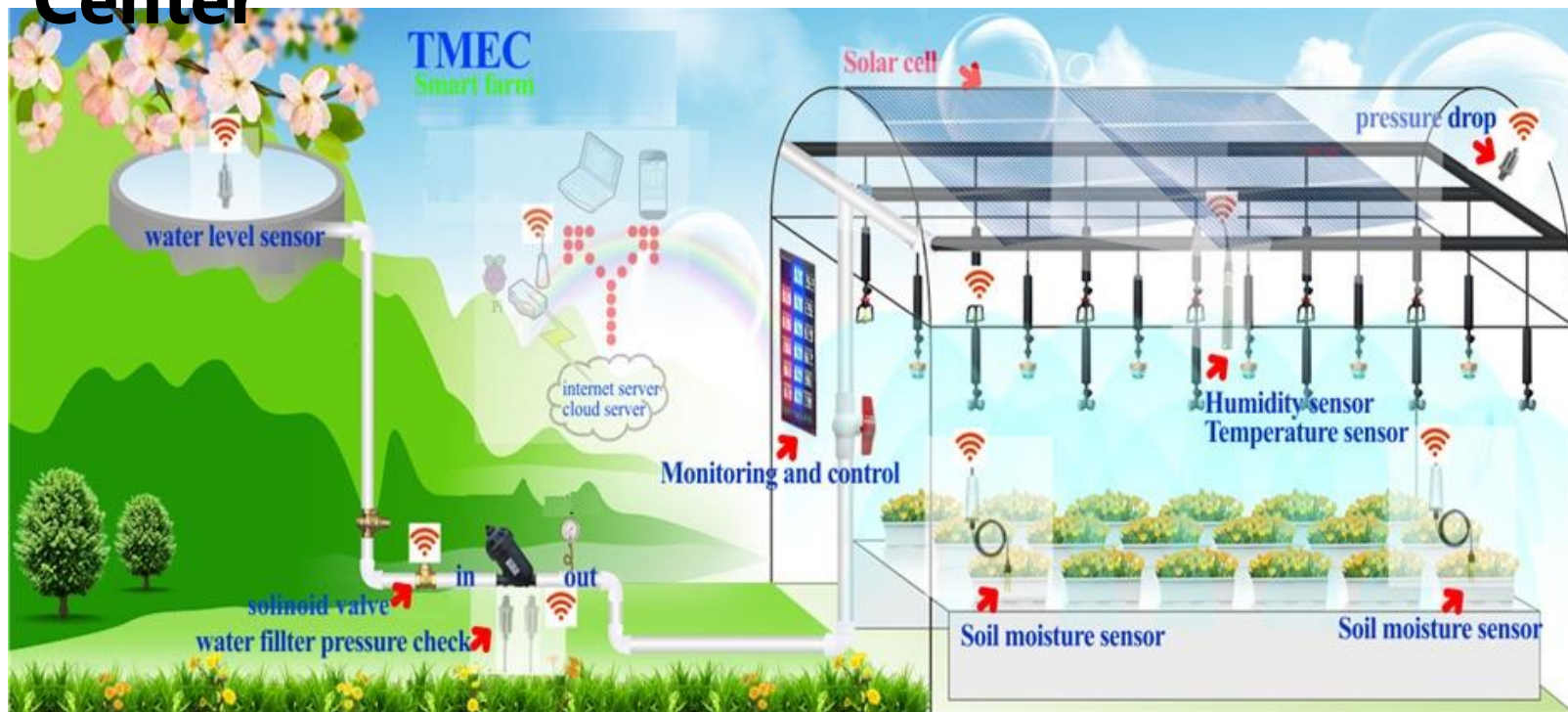
Intelligent Irrigation System

- Water Pressure sensor วัดความดันในระบบท่อน้ำหยด
- Water Level Sensor ควบคุมแหล่งจ่ายน้ำ
- Soil Moisture Sensor เพื่อควบคุมปริมาณการให้น้ำ



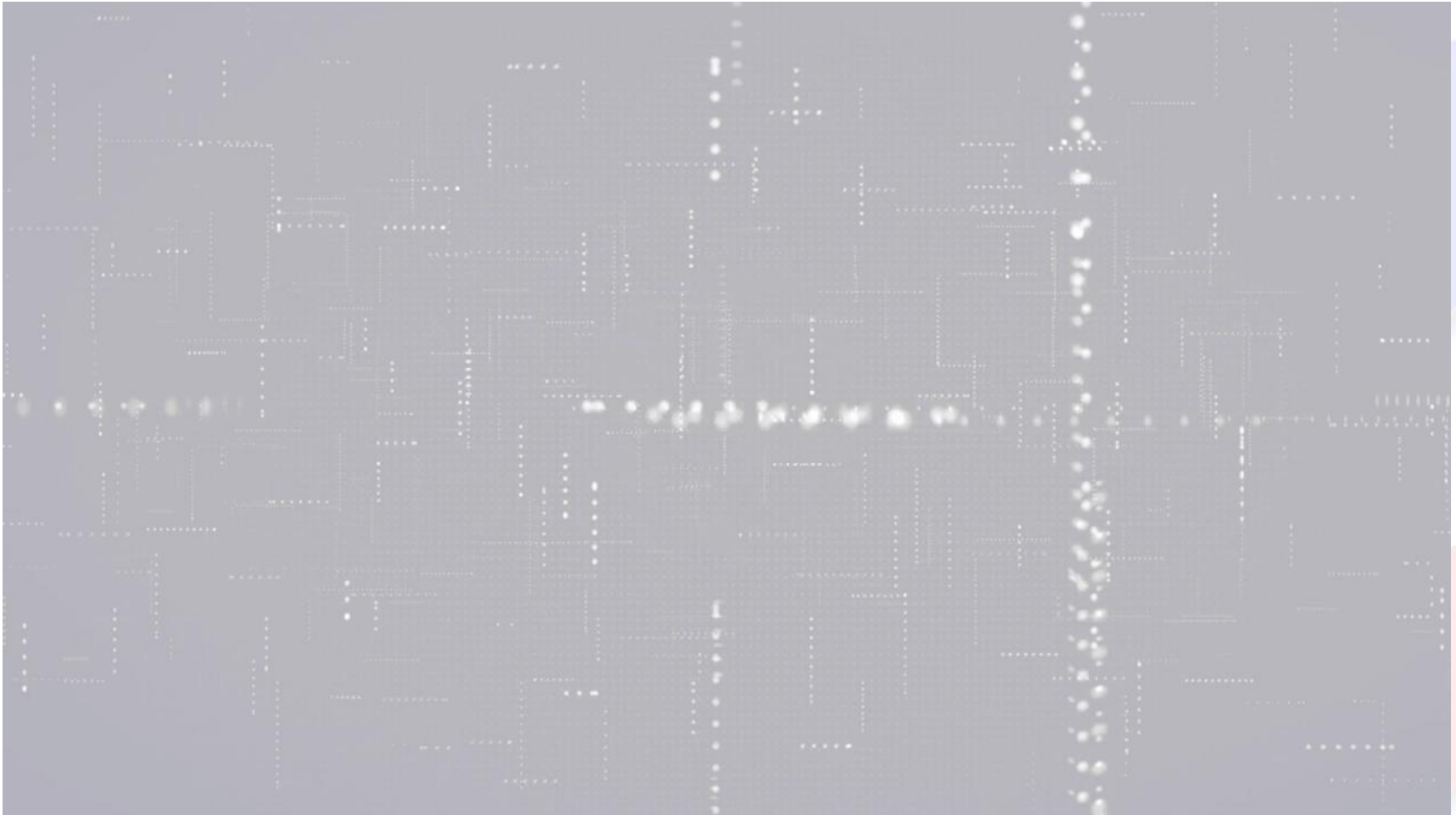


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Intelligent Greenhouse System

- Soil Moisture Sensor
- Temperature & Humidity Sensor
- Solar Sensor
- Water Pressure Sensor
- Chemical Sensor



Internet of Thing (IoT) for Agriculture



Internet of Thing (IoT) for Agriculture



Internet of Thing (IoT) for Agriculture

Hardware (sensor transmitter)



Transmitter Type

Type 01

- Temp Sensor
- temp Sensor

Type 02

- Temp Sensor
- Humidity Sensor

Type 03

- Soil Moisture Sensor
- Light Sensor

Type 04

- Soil Moisture Sensor
- Soil Moisture Sensor



Function

Control parameter

- Select agriculture type
- Min/Max Target
- Alarm for over Min/Max
- Set sampling rate

Monitoring

- Real Time
- Select Date

Internet of Thing (IoT) for Agriculture

HOME | LOGIN | CUSTOMER NOTE | ID | CONFIG | Logout

Phone: user1
Batt:70% Signal:Lost
Plant: rice [v] Select

No	Value	Datetime	Min	Max
T1A	Soi Mois (%) 81.0	2016-09-05 10:44:52	20	80
T1B	Soi Mois (%) 56.0	2016-09-05 10:44:52	20	80
T2A	Soi Mois (%) 41.0	2016-09-01 15:20:29	20	80
T2B	Soi Mois (%) 51.0	2016-09-01 15:20:29	20	80
T3A	Air Hu (%) 61.0	2016-09-01 15:15:15	50	60
T3B	Air Temp (°C) 22.2	2016-09-01 15:15:15	25	33
T4A	Air Hu (%) 61.0	2016-09-01 15:23:06	50	60
T4B	Air Temp (°C) 21.2	2016-09-01 15:23:06	25	33
T5A	Soi Mois (%) 70.0	2016-09-01 15:24:51	20	80

- User ID
- Battery charge
- Device Connection
- Choose type of plant

Remind the status of a variable.
If in the appropriate range, the value is blue.
If not in the appropriate range, it will be red.

Date, time, and variable values of the given range of plants. The value of the plant variable is not the same, depending on the type of plant selected. And can be customized.

Internet of Thing (IoT) for Agriculture

Dem... Logout

SERIAL NUMBER

Add SN

SN

SN	S1	S2	DELETE
shsh001	Soi Hu	Soi Hu	<input type="button" value="Del"/>
shsh002	Soi Hu	Soi Hu	<input type="button" value="Del"/>
ahat001	Air Hu	Air Temp	<input type="button" value="Del"/>
ahat002	Air Hu	Air Temp	<input type="button" value="Del"/>
shl001	Soi Hu	Light	<input type="button" value="Del"/>
shl002	Soi Hu	Light	<input type="button" value="Del"/>
abcd001	Air Hu	Air Temp	<input type="button" value="Del"/>
T06ED	Light	Air Temp	<input type="button" value="Del"/>

Add and remove transmitter

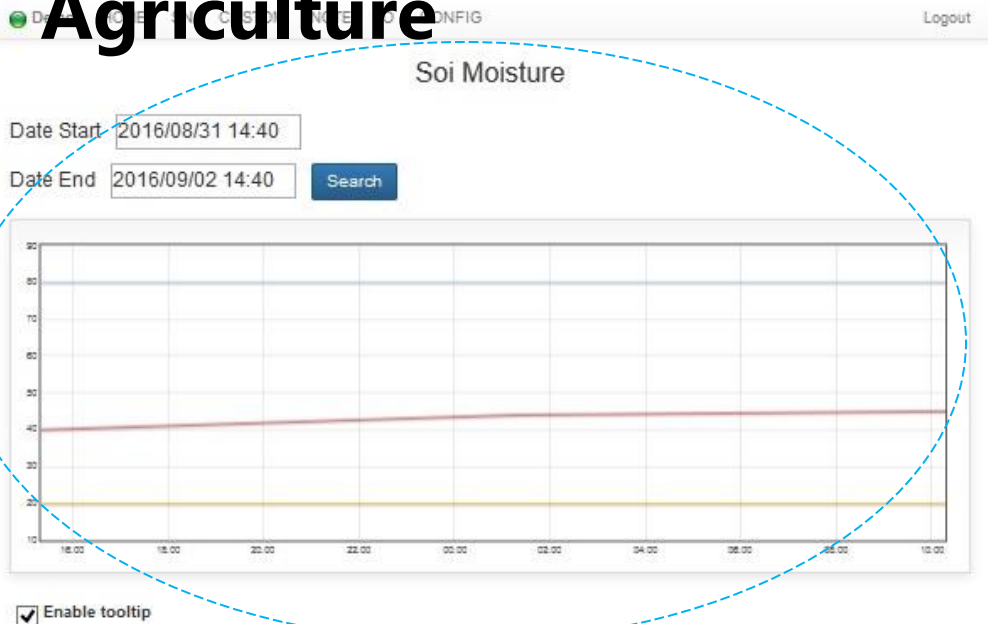
Record daily crop information.

Dem... HOUSE SN CUSTOM NOTE IO CONFIG Logout

Note History

Description	Edit
Date: <input type="text"/>	<input type="button" value="Add"/>
Date: 2016-10-03 11:40 test1	<input type="button" value="Upd"/> <input type="button" value="Del"/>
Date: 2016-10-03 11:50 test2	<input type="button" value="Upd"/> <input type="button" value="Del"/>

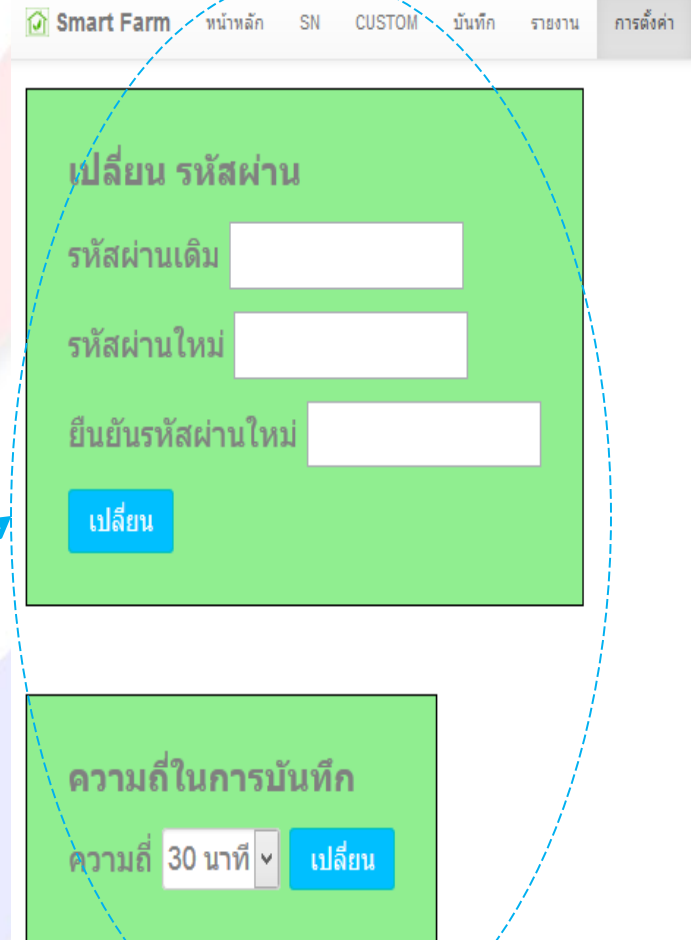
Internet of Thing (IoT) for Agriculture



Graph showing saved values You can select the time period.

Managment page

- set password
- Record rate



Smart Farm หน้าหลัก SN CUSTOM บันทึก รายงาน การตั้งค่า

เปลี่ยน รหัสผ่าน

รหัสผ่านเดิม

รหัสผ่านใหม่

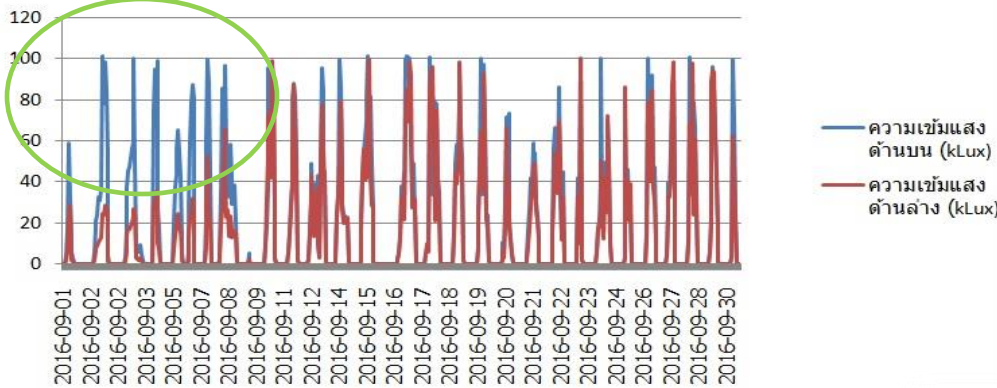
ยืนยันรหัสผ่านใหม่

ความถี่ในการบันทึก

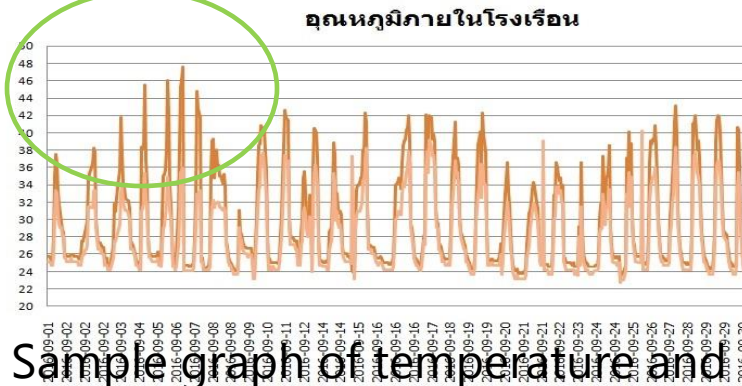
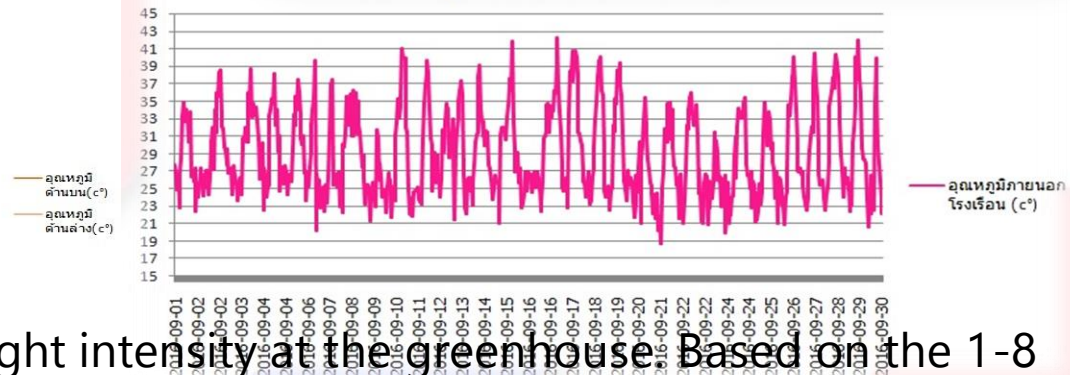
ความถี่ 30 นาที

Internet of Thing (IoT) for Agriculture

ปริมาณความเข้มแสง 2 จุดในโรงเรือน



อุณหภูมิภายนอกโรงเรือน



Sample graph of temperature and light intensity at the greenhouse. Based on the 1-8 day chart data.

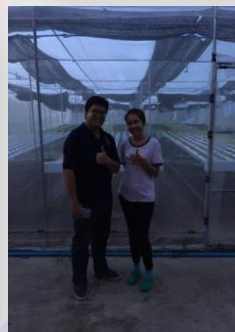
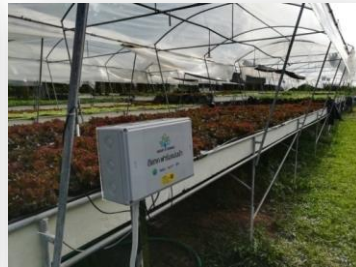
The sun shines in the greenhouse, because the amount of light intensity at the top and bottom is different clearly.

This is consistent with the data of the indoor greenhouse temperature, while the indoor and outdoor greenhouse temperatures are different 3-5 degrees in which the greenhouse temperature is higher.

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We are Smart Farmer.



Thanks

Club Farmday The Series ตอน โรงเรือนอัจฉริยะ

<https://youtu.be/HMx-8iGYJCI>

