e-kakashi

The Internet of Things for Agricultural Innovation.

DESIGN AWARD 2016

Vision

We believe that agricultural information innovation should be

Easy, Handy, and Interesting.

We envision using e-kakashi to start developing precision agriculture.

In order to raise safe and tasty vegetables, what can IT do?
In order to vitalize agriculture itself, what can IT do?
Our aim is to contribute to agriculture through IT.
We will support agriculture by using e-kakashi.

IT can do a lot for agriculture in the future.

We would love to use this service

No.1[*1] Agricultural IoT[*2]

＊1. Research by Rakuten Research Inc.
Research period : May 2015
Research method : Website questionnaire comparing five companies
The questionnaire asked, “Which agricultural network and agricultural IoT service would you like to use?”
Target population : Agricultural workers all over Japan
Sample size : 500 people
＊2. IoT stands for the Internet of Things.

The photograph shows the product.

e-kakashi

Concept

Product concept

SENSOR NODE

GATE WAY

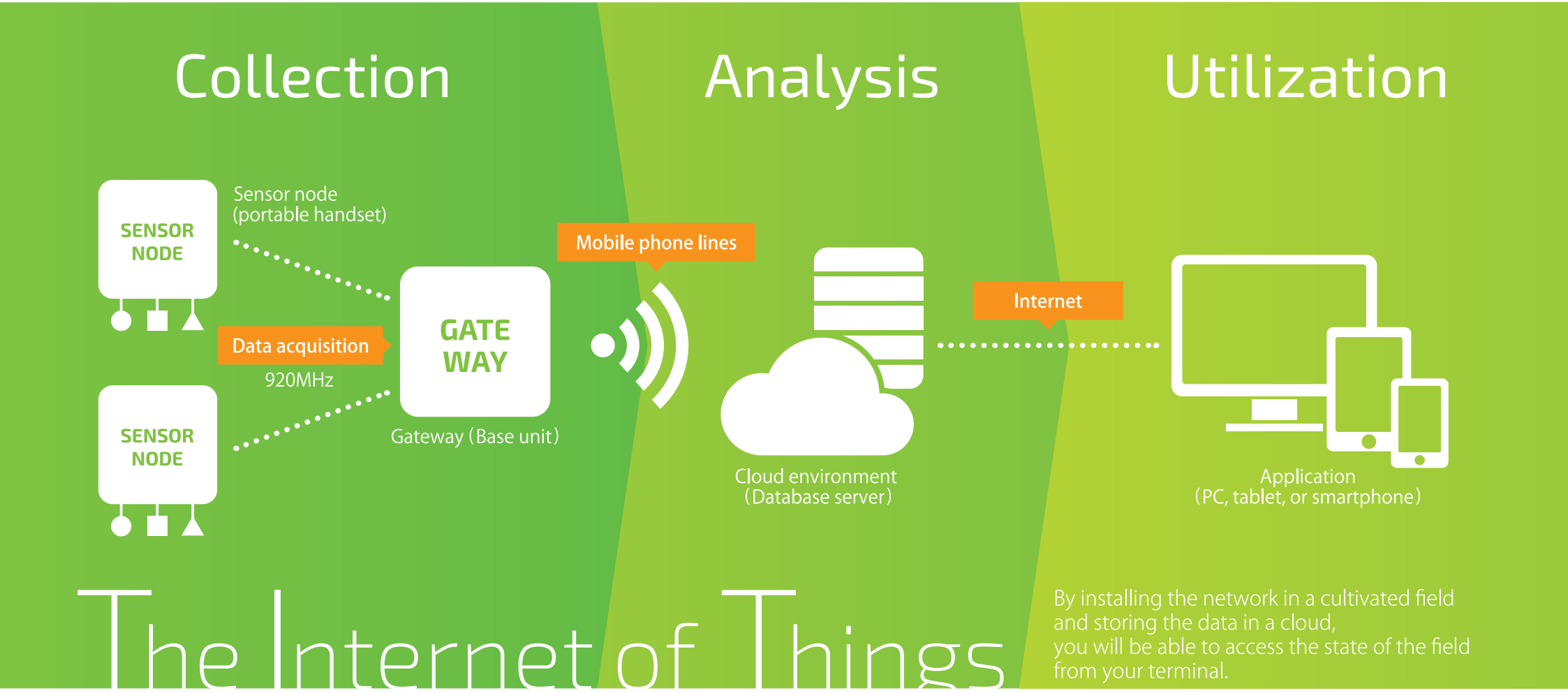
There has been an enormous growth in the amount of environmental data that cannot be processed, while the knowledge and intuition of skilled farmers cannot be effectively utilized.
With e-kakashi, it is possible to convey such knowledge and intuition in a plain and unique manner.
We have designed all elements from scratch.
Installing the new e-kakashi in the field enables you witness its amazingness.

A new form of cultivation guidance that has not existed until now.

× Agricultural IoT

Configuration Diagram

Diagram of the Basic Structure



＊The line-of-sight communication distance between the gateway (base unit) and sensor node (portable handset) can be a maximum of 1 km. ＊An AC power supply is required for the gateway.
＊Up to 100 sensor nodes (portable handsets) can be connected to a single gateway (base unit).

Product Design and Quality

Highly stable operation by removing unnecessary functions

It is possible to obtain stable device operation
when it is connected outdoors.
We have solved this difficult problem,
which seems superficially easy,
by reviewing the design of the device from every angle.

Stable, remote, outdoor device monitoring;
data transmission to the cloud;
and data reception were first realized
by incorporating mobile phone modules.

Wireless communication with
the sensor nodes is stable and highly secure.
This device fulfills a mission.

GATE WAY

The gateway compiles data from the sensor nodes and transmits and receives data to and from the cloud via a mobile phone line.

Perfectly designed for the cultivation field

The new sensor node is designed to meet
the needs of all cultivation fields.

Further distances are possible using antenna diversity.
Power-saving specifications are driven
by a battery lifetime of three years.
The sensor interface is installed
with the minimum number of required functions;
however, its functionality can be expanded.

The casing design has been
fully engineered so that the device can be
easily installed on any structure,
such as piles, walls, or beams.

SENSOR NODE

The sensor node has multiple sensor interfaces
that are installed in the field and conduct measurements.

Functions

Functions that support the agricultural IoT

Further evolution of the agricultural IoT

The new e-kakashi will enable novel applications.
In addition to the widget display, which is easy to understand, ek Field View will be available.

You will surely think, “I’d love to look at this forever.”

Dashboard

Sensor Data

ek Recipe

ek Field View

Graph

A new form of agriculture that integrates data and know-how

Sensor Data

Measured data is collected from the sensor node.

- Temperature
- Humidity
- Soil moisture
- Amount of insolation
- ⋮

ek Recipe

Data consolidates the experience, intuition, and knowledge of cultivation techniques.

- Experience
- Intuition
- Knowledge

Integration

ek Field View

A new function that integrates measured data, intuition, and knowledge.

Sensor data + ek Recipe

Problems at the site (sensor data) and the results of cultivation (ek Recipe) are recorded. eK Field View integrates these two data sources and appears to independently find answers. (patent pending)

Flexible expansion when the external interface is used

SENSOR NODE → GATE WAY → Cloud environment (server database) → Expansion

Sensor node (portable handset)

Gateway (Basic unit)

Cloud environment (server database)

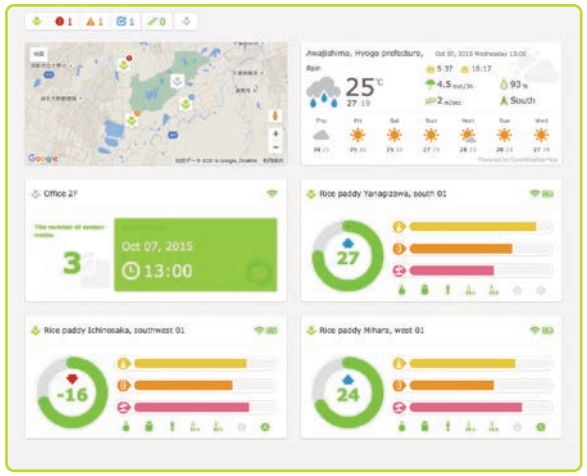
e-kakashi for API

The measured data collected by e-kakashi can be accessed through e-kakashi for API. Tailored IoT solutions can be developed in fields outside of agriculture, as a matter of course, by installing the measured data obtained through API into this unique software.

Cooperation services

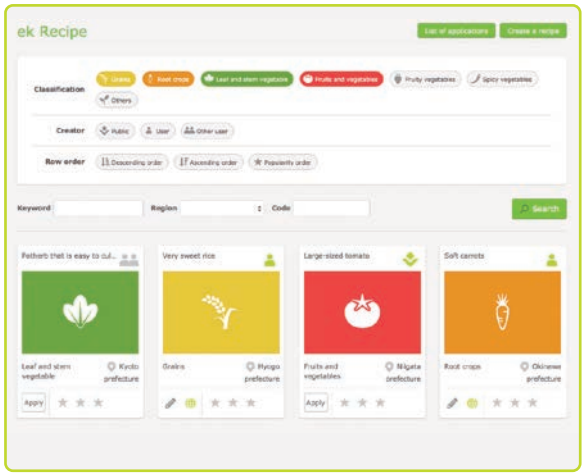
e-kakashi is available for mutual cooperation with external agencies. Please feel free to contact us to learn about opportunities for collaboration with e-kakashi.
Web⇄external services.

Applications
Web applications



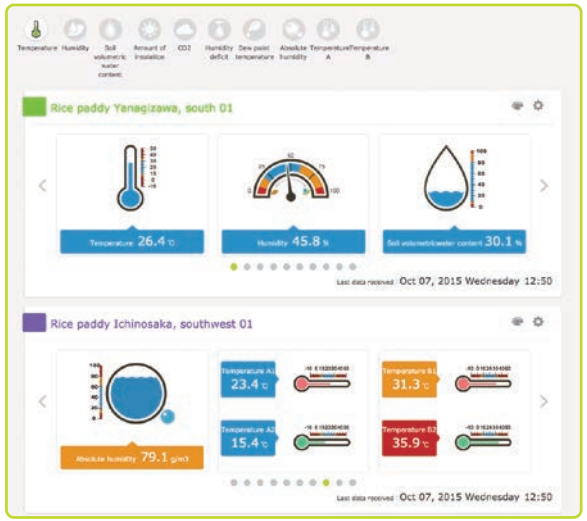
Dashboard

On the dashboard, users can easily observe the status of e-kakashi or activity in the cultivation field. Users can receive support from IoT and the web.



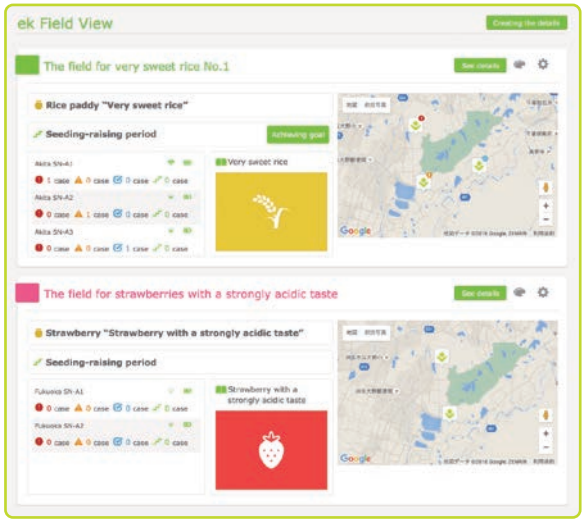
ek Recipe

ek Recipe is available to create cultivation management techniques and know-how, like cooking recipes. It can also install e-kakashi sample recipes and new recipes created by others. (To use recipes created by others, the approval of the creators is required.)



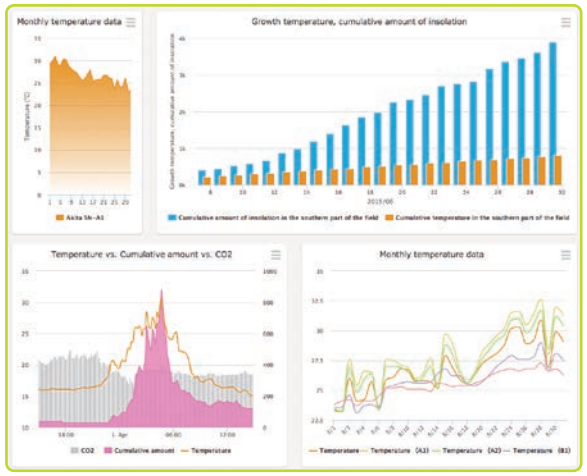
Sensor Data

The sensor data is UI, which is familiar to existing users of e-kakashi. In addition, the software is reliably updated. Its fluid operation will amaze users.



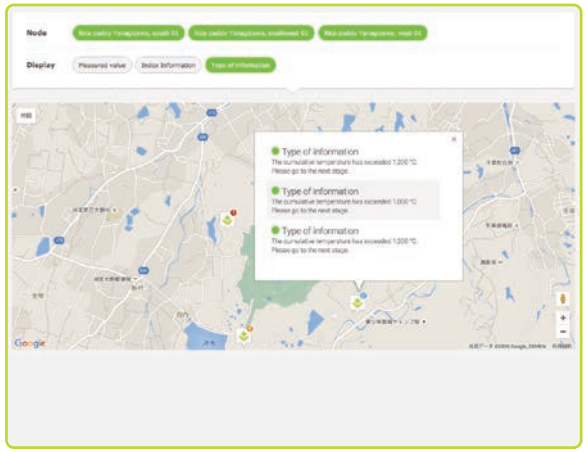
ek Field View

ek Field View is the new function that integrates sensor data with ek Recipe. It supports guidance in the cultivation field, addressing problems such as what management work is necessary, whether the value of a measurement is appropriate, or how many days are expected until harvest time.



Graph

Original graphs can be created on the basis of measured data and freely stored.
The settings of the axes can be changed; various graphs, such as line graphs, bar graphs and cumulative plots can be constructed, and the original data can be downloaded.



Map

When e-kakashi is installed in a field, the field is displayed on the map. Information about the location is automatically obtained from the incorporated GPS. Both the location display and the status of the cultivation field can be monitored in real time by linking the status of the field to eK recipe.

Data

Information is extracted from the measured environment and can be downloaded.
Please use the downloaded data in accordance with the terms of use.

Report

Events that occur daily and summaries can be recalled from past data.

Journal

It is possible for users to independently post texts or pictures.
The posted information will be presented on the report or ek Field View.

Mail

Questions on the inquiry form will be supported by the e-kakashi service center.

*The images show products that are still in development. The description or contents may differ from the actual product.

Easy Settings

Easy to Install

Points

1 No need for Wi-Fi in the field

It is not necessary to build a Wi-Fi environment in the field because the communication module is incorporated into the gateway (base unit); it can be used immediately.

2 No need for initialization

The unit can start measuring as soon as it is switched on. Without troublesome initialization, data can be measured immediately.

3 No need for construction

No large-scale construction is required. Anyone can easily install the device using only the materials that can be obtained at a home center.

4 No need for a server

It is not necessary to install a server. The cloud environment is used, so information is accessible anywhere.

5 No need for outdoor inspection

The device has passed intense durability tests. It has excellent water-proof and dust-proof properties and is amenable to outdoor installation (corresponding to IP55).

6 No need for an exclusive terminal

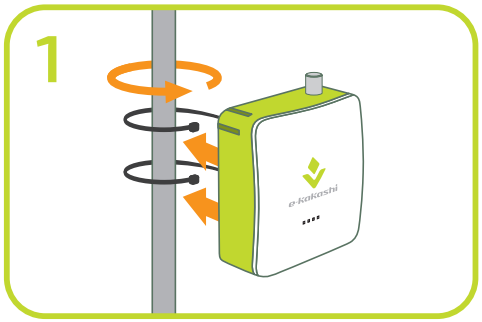
A designated terminal is not necessary; the application can be used on your PC, tablet computer, smartphone, or other devices.

How to Use

Starting measurements

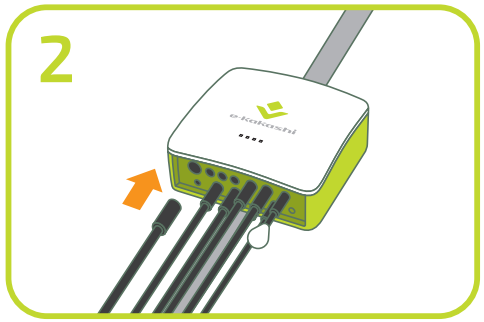
Introducing (installing) e-kakashi as an agricultural sensor network allows environmental data in the field to be measured.

The device is easy to install: simply switch it on



Installation in the field

The device is installed in the field using a cable, cable tie, or suspending belt.



Sensor connection

Insert each sensor/power cable into the fixed outlet.

Switching on

No complicated network settings are needed. The device can start making measurements immediately just by switching it on.

Conveying ek Recipes

Easy use of data

It is easy to access the e-kakashi application site using your PC, smartphone, or tablet computer. That is all there is to it.

Creating an ek Recipe

An ek Recipe incorporates data about farm products and regional characteristics and uses this information to provide cultivation guidance. This contributes to solving regional problems, such as stabilizing the quality/yield of a crop and maintaining personnel.

Conveying ek Recipes

Sharing/spreading ek Recipes guides and secures new agricultural workers. Based on the characteristics of each field, the ek Recipe can be optimized to provide improved guidance for cultivation.

Sensors Family

e-kakashi Sensor Family

e-kakashi is a sensor network platform.
In addition to sensors that can currently be connected,
such as those monitoring temperature, humidity, insolation, soil moisture, and CO_2,
the product lineup will continue to expand in the future.
The system for sensor connections will be automatically updated,
so it is not necessary to purchase new sensor nodes or gateways.

- Temperature and humidity sensor
- Insolation sensor
- Soil moisture / EC sensor
- Multi-point temperature sensor (Thermistor)
- Serial sensor port
- Analog sensor port

Spec
Basic specifications

Specifications / correspondence system

Device specifications	Gateway	Sensor node
Basic function	Wireless communication ·920M wireless communication …IEEE802.15.4g ·3G/4Gwireless communication …FDD-LTE / AXGP/ HSPA / W-CDMA Positional information acquisition(GPS)	Measurement of temperature / humidity, Measurement of soil moisture, Measurement of electric conductivity, Measurement of insolation, Measurement of temperature, Analog(option1), Serial(option2), Maintenance of measured data, Time synchronization, Monitoring the residual capacity of the battery, Monitoring the communication status, Positional information acquisition(GPS)
Power source	AC power supply AC100/200V	lithium battery or AC battery supply AC100/200V
Operating environment	Temperature : -10～60°C, Humidity : 20～900RH	Temperature : -20～60°C, Humidity : 5～950RH
Terms of use	Outdoors (IP55 or more)	
External dimensions	196 mm × 196 mm × 68 mm	
Mass	0.8kg or less	1.0kg or less
Installation method	Fixed by pole/suspending only	
Electricity consumption	10.0W or less	2.0W or less

Correspondence system	
O S	Windows7 SP3 or higher / Mac OSX or higher
Browser	Internet Explorer 11 or higher / Firefox (latest version) / Chrome (latest version) / Safari (latest version)

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We ask in advance for your understanding that some of the specifications or appearances shown here have been changed to improve our products. In some cases, the colors of the products differ from the ones shown.

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October 2015 version