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Towards a Taiwan Agriculture 4.0 Era with Smart Science and Technologies

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Scenario of Future Farming

https://agfundernews.com/cleantechs-agriculture-gets-smart-agtech-report-600-words.html/

- **Drones fly over fields** scanning and monitoring crop growth status and transmitting the collected information to a **cloud computing platform.**
- **Farmers could simply connect their mobile phones or tablet computers to obtain information** related with agricultural operations.

- By **analyzing** the collected field data in conjunction **with Big Data**, famers could adjust main factors affecting crop growth.

In such a systematic way, a large number of farming and marketing activities can be well planned and managed. Farmers could **participate in global economic activities without leaving their farms**.

Global and Domestic Trends of Agriculture Development

Global Trends		Local Specials
➢ Limited resources ➢ Cross domain integration	Resource	➢ High risk from Typhoons … ➢ Superior R&D capacity
➢ Growing population & aging labors ➢ Emphases on safe and health products	Human	➢ Part-time labor (63.9%) & weak farmers-agribusiness partnership ➢ Lacking trust between consumers and growers
➢ Efficient, flexible & adapting production/marketing ➢ Innovative e-business models	Industry	➢ Lacking ability to stably supply ➢ Small-scale strategic alliances are rising

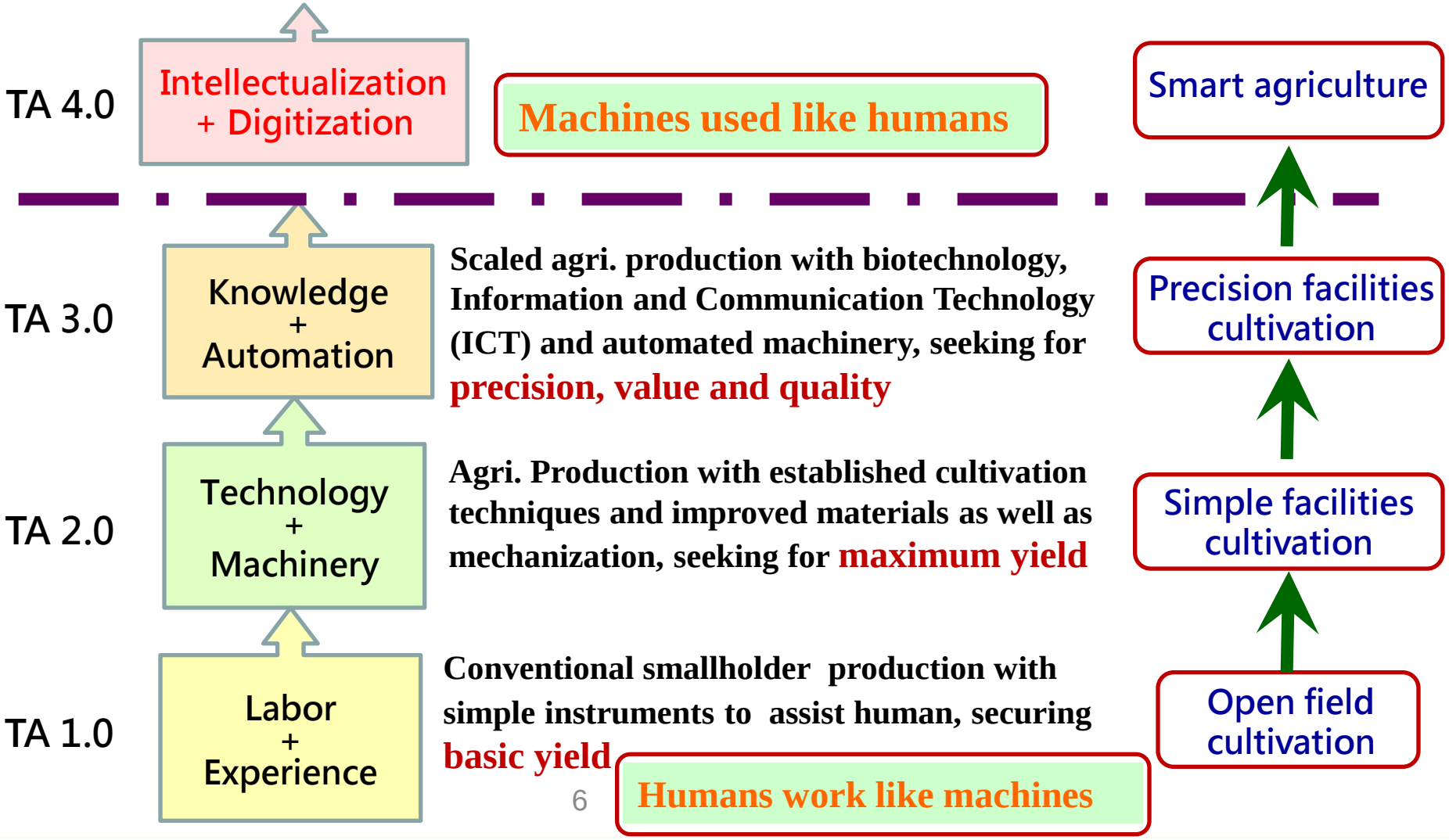
Benchmarks

	Development characteristic	Key features
Germany	Industry 4.0	✓ Conduct Cyber-Physical Systematization and Farming 4.0 pilot projects by integrating M2M and IoTs
Japan	Value-added AG by Technology	✓ Apply Agriculture Informatics technologies and human-machine collaborative devices to promote smart production
New Zealand	Small farmers conquer the world	✓ Cooperatives organized by farmers ✓ Value global allocation based on integration of resources and direct connection between production and marketing ✓ Apply ICTs to realize production management, quality control and product tracing
Netherlands	Internationalized Agriculture	✓ Value automatic and technological innovation ✓ Fulfill Agricultural-Industrial cooperation ✓ Good supporting system for agricultural production
Israel	Create AG turnkeys by Technology	✓ Address resource lacking by integrating cross domain engineering technologies ✓ Create desert farming with drip irrigation

Proactive Plan ?

- **To face the global challenge to upgrade the agricultural sector**, how should we take advantage of the development of science and technologies to improve Taiwan's agricultural productivity?

Progress of Agricultural Productivity in Taiwan



Overall goals of Smart Agriculture

It is expected to **establish systems of smart production/marketing and digital service.**

- ✓ **To overcome the predicament of small farmers struggling singly**, increase efficiency and capability of agricultural production via smart production and intelligent management
- ✓ **To establish active and omni-directional agricultural consumption and service platforms** to meet requirements of all agricultural stakeholders and strengthen consumers' confidence on agricultural products through big data analyses on production, supply and demand

Five commissions:

- **To digitize knowledge**
- **To automate intelligent production**
- **To optimize produce quality**
- **To facilitate operation**
- **To promote cloud-based source-tracing**

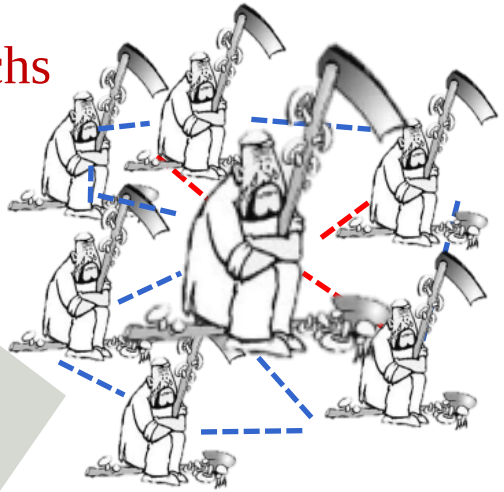
Action Strategies of TA 4.0

Strategy I: Improve the ability to stably supply of produce by innovating the agricultural management model with Smart Farmers Union (SFU)

Smart Farmers Union + Farming by Techs

New partnership between contractor and agribusiness

Farmers Struggling singly



Smart Farmers Unions

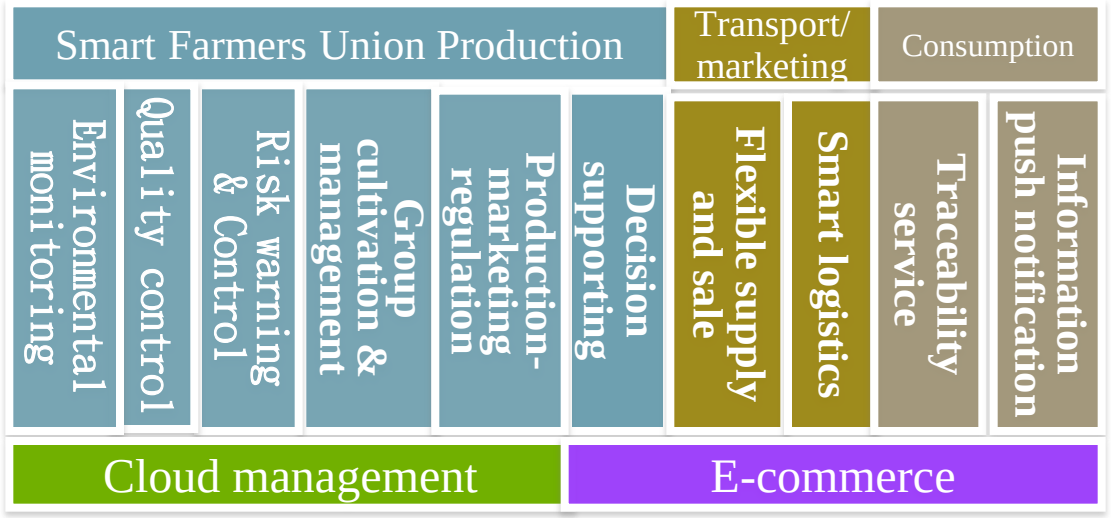
Union of special production districts

Small union of products

Big union of industries

Action Strategies of TA 4.0

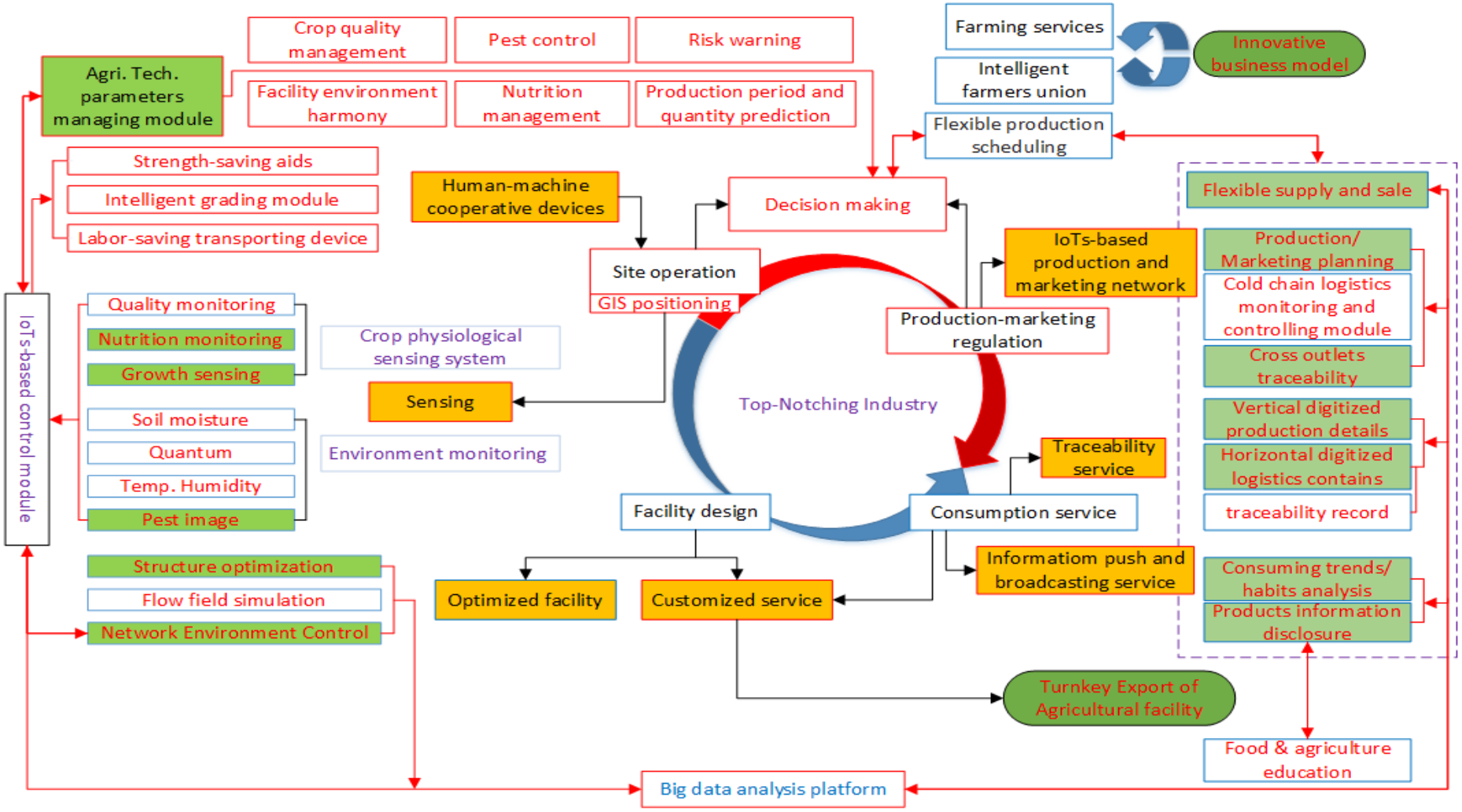
Strategy II: **Build an application model integrating convenient and diversified agricultural digital services with value chains via ICTs**



Strategy III: **Create a new communication model between growers and consumers via friendly interactive technologies**

Growers /Smart Farmers Union ⟷ **Digital managing platform w/Traceable products + E-commerce** ⟷ **Consuming habits** **Consumers /Digital service**

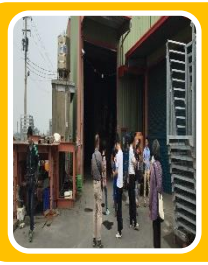
Facilitating Measures



Ongoing Case - conduct Smart Farmers Union productions with three agricultural enterprises

鮮綠農產科技

- 統一超、全聯、COSTCO、網路商店、自銷通路
- 主要作物：甜玉米（全台最大）



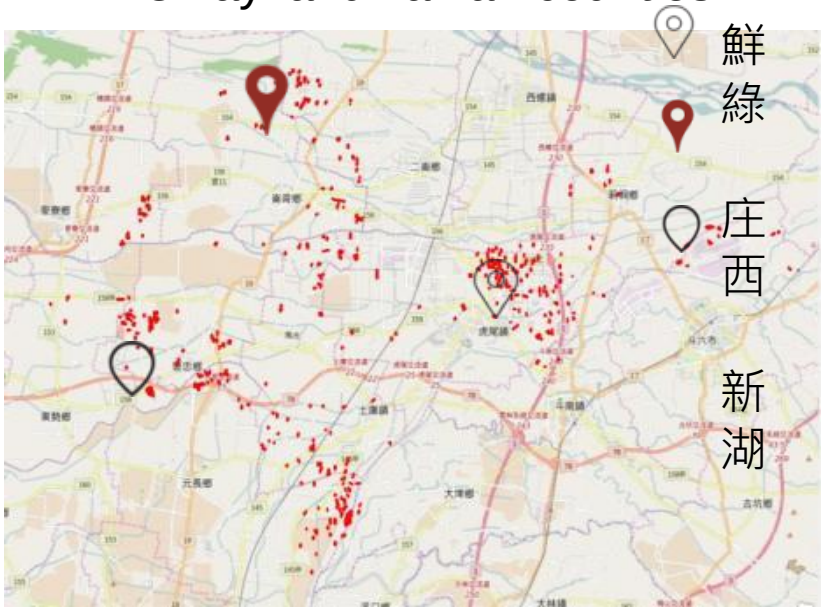
庄西合作農場

- 麥當勞、外銷
- 主要作物：結球萵苣（全台前三）

新湖合作農場

- 統一超光合沙拉系列、好樂迪、外銷
- 主要作物：結球萵苣（全台前三）

Totally 802 contracted farmlands located in Yunlin, Changhua, Chiayi and Tainan counties

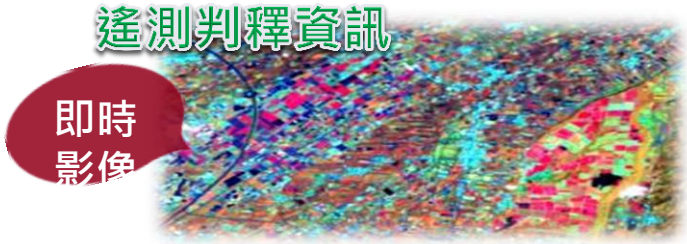


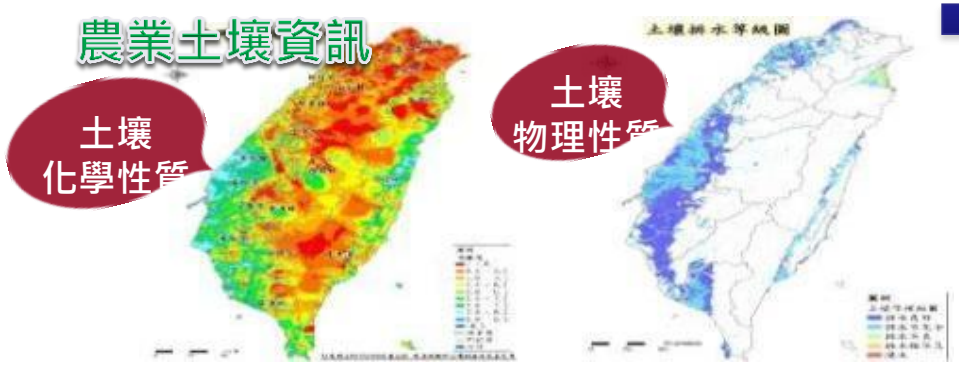
Biggest Difficulty–
Abundant contracted farmlands are scattered and not easy to manage.

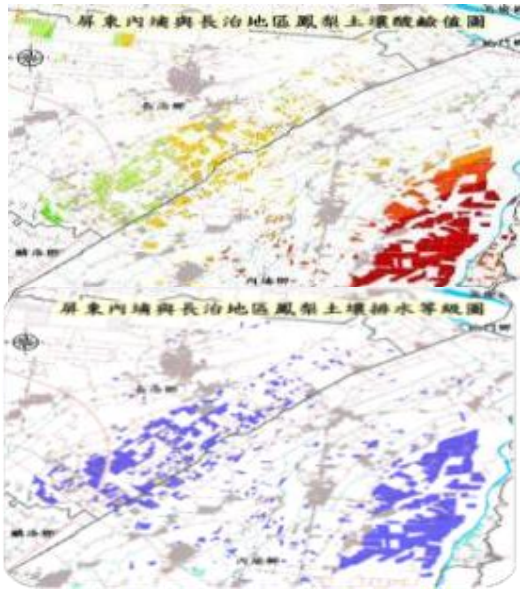
Approach I: Introduce and Apply Agricultural GIS system

- Establish crop management information based on soil characteristics and interpreted results by integrating grid-calculated environmental information with GIS technology

- Offer the manager with decision-making reference for crop management based on real time crop growing information







Approach II: Establish Exclusive Farmland Database for Individual Agribusiness

Integrate agric. spatial data of 11 million parcels with information pertaining to farmer, growing operation, crop production and management record

The information of affiliated farmlands could be efficiently managed via farmland management module in background

Approach III: Develop Integrated farmland information showcasing module (FarmCloud)

- Smart farming management system for small-hold farmer

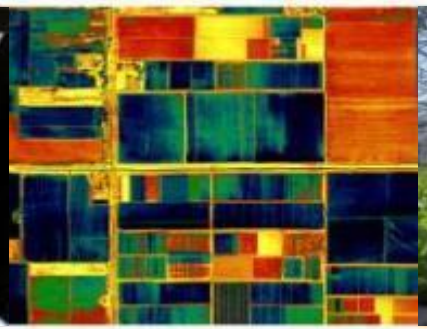
Concepts:

- Based on Common Land Unit (CLU)
- Connecting the Farmland Management with Expert Knowledge
- Giving a suitable management advice according to time differences
- Precision AG Management : Building a small-hold farming institution

Techniques:

- Friendly Dashboard Design
- Various Statistical Charts
- Simple Map Interface
- Abundant Farmland Information

http://soilsurvey.tari.gov.tw/FarmerWeb



Thank you for Attention