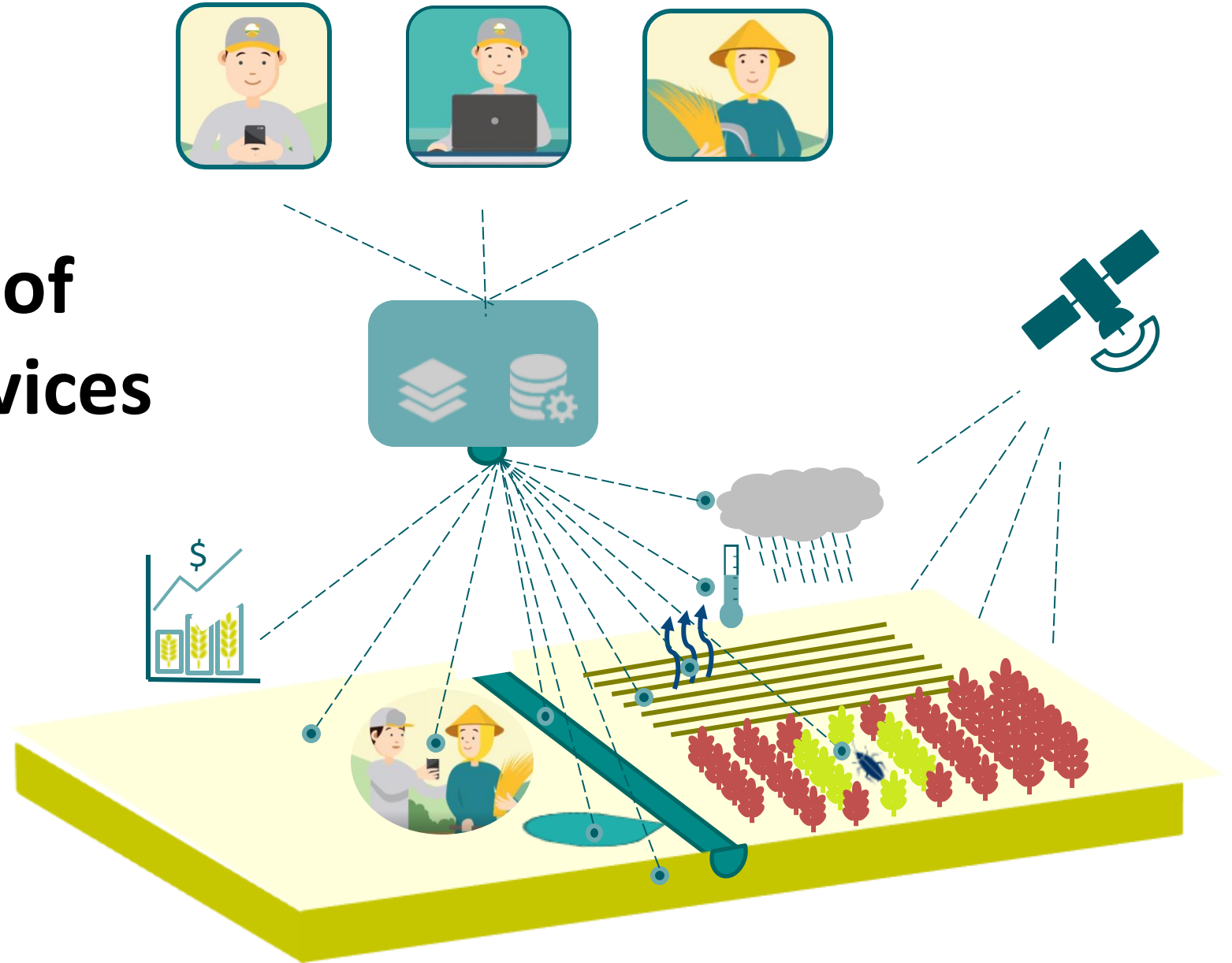


The role and use of IT and digital services for agriculture

Fons Nelen

Nelen & Schuurmans





The end-user wants support, to make the right decision (1)

Farmer: What action can I take ? (at this moment on my farm)



- › What is the best time to seed and to harvest?
- › How to choose the right crops?
- › How to reduce inputs (chemicals, seeds)?
- › How to reduce operational costs? (energy, manpower, equipment)
- › How to save water?
- › How to improve agricultural practices?
- › How to increase profits?
- › When and where to sell the products?
- › How to get a good loan?
- › What are the present market prices
etc.





The end-user wants support, to make the right decision (2)

Agribusiness Firms: How to improve business?

(using geodata, field data, monitoring data, farmer information, etc)



- › How to optimize logistics?
- › How to improve sales?
- › How to reduce operational costs? (energy, manpower, equipment)
- › What yields are expected?
- › What are the needs of my suppliers (the farmers)
- › How to save water? How to reduce waste?
- › When and where to sell the products?
- › How to increase profits?
- etc.



All users of information services want “Actionable App’s”



For this, insight is required in:

- User needs
Why and What ?
- User engagement
How is it used ?
- Added value of the service
or application
How is it paid?





It's all about informed decision making (using IT)



It is not easy, because we are dealing with:

- various users / user groups (with different needs)
- many data sources
- different types of data
- use of different models (forecasts)
- large amounts of data, that needs to be processed very fast (in real time)
- various systems that need to communicate
- etc

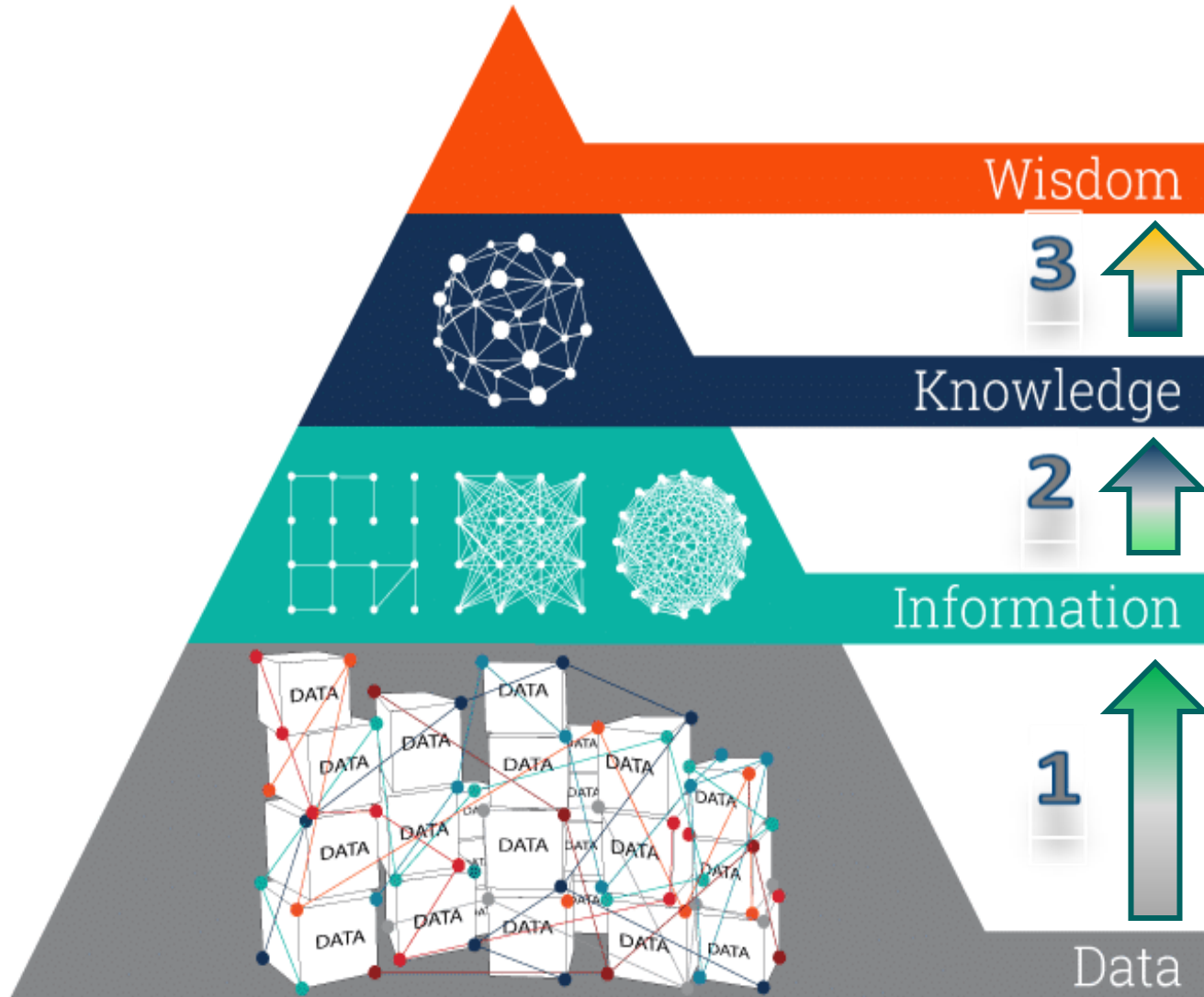
How to organize this?





From data to wise decisions

3 interrelated processes



Insight (“wise decisions”)

*Eg.: This is the best moment to harvest
This level also requires domain knowledge*

Understanding (= information in context)

Eg.: we can expect flooding; droughts; risks for pest and diseases; prices will raise; etc.

Interpretation

Eg. precipitation, evaporation, land use, soil moisture, DEM, assets, crops, change detection, deformation, vegetation-index, water levels, flows, salinity, market prices, etc

facts, figures, observations
numbers, bites, colours, dollars, etc

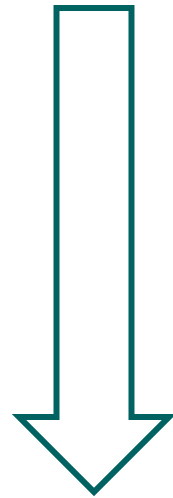




From data to wise decisions

iterative process

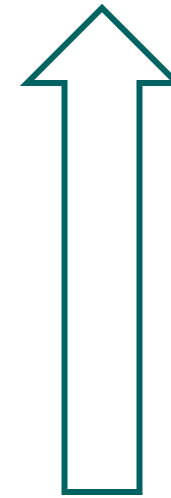
What decisions would we like make, and what knowledge and information is necessary ?



What data do we need?



What decisions can be made, based on the available knowledge and information ?



What data do we have?





Information Chain: 3 different types of IT companies

user needs

data



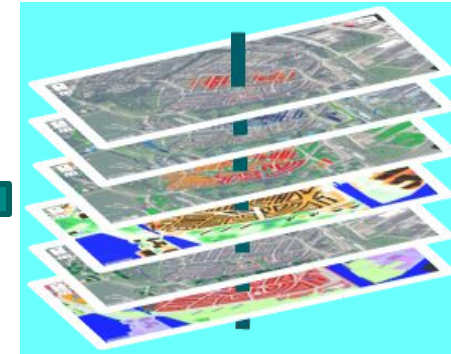
3 application



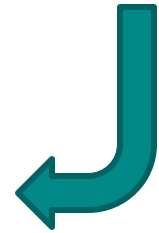
insight &
understanding



organized
information



useful
information



1 processing





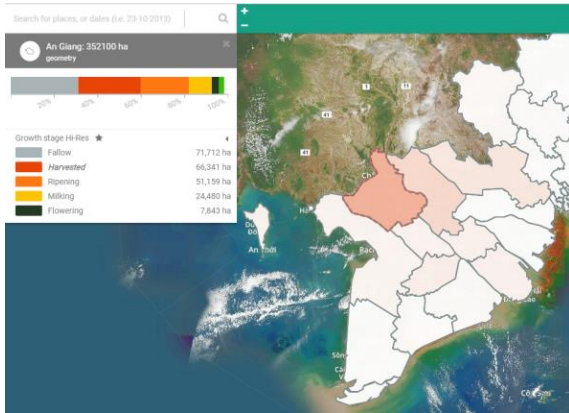
Different IT partners are involved



3. Application Developers;
Agricultural and Financial Experts

2. System Integration;
Data Science;
Modellers;

1. EO experts, Data Providers;
Monitoring Systems;
Information products



Rainfall
Evaporation
Terrain data
Elevation (DEM)
Vegetation
Biomass
Objects
Soil moisture
Groundwater
Sea (tide)

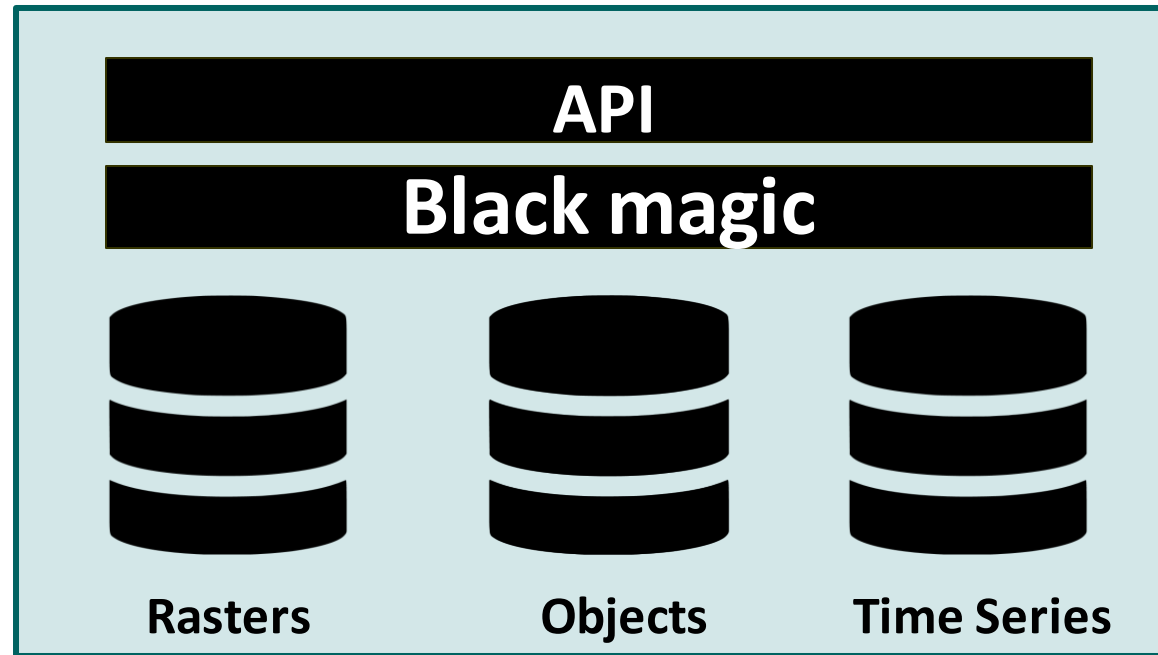
Water levels
Water availability
Water quality par.
Flows
Agricultural inputs
Production figures
Market Prices

etc.
etc.





System Integration



Data
Analyst



Data
Analyst



Data
Analyst



Data
provider

Data
provider

Data
provider

Data
provider





Some technical challenges

- › Collaboration between the IT partners
(partnership agreement; project management; different business models)
- › System Architecture (various separate components)
- › Operation and maintenance (hosting, updates, bug fixing, 1st line support)
- › New releases of various components of the service; updates
- › Data quality, data ownership, data sharing ! (willingness is not great)
- › In G4AW, only one or two data providers ?
- › Number of users





Other challenges

- › User needs and user demands (extra features)
- › User engagement (how and how often is the service used)
- › Training and capacity building
- › Implementation of the service (local expertise; legal restrictions; confidentiality)
- › Marketing
- › Operational costs (IT is considered expensive)
- › Return on investment (who pays for the service ?)
- › **Added value of the service and a good business case !
(which user is able and willing to pay ?)**





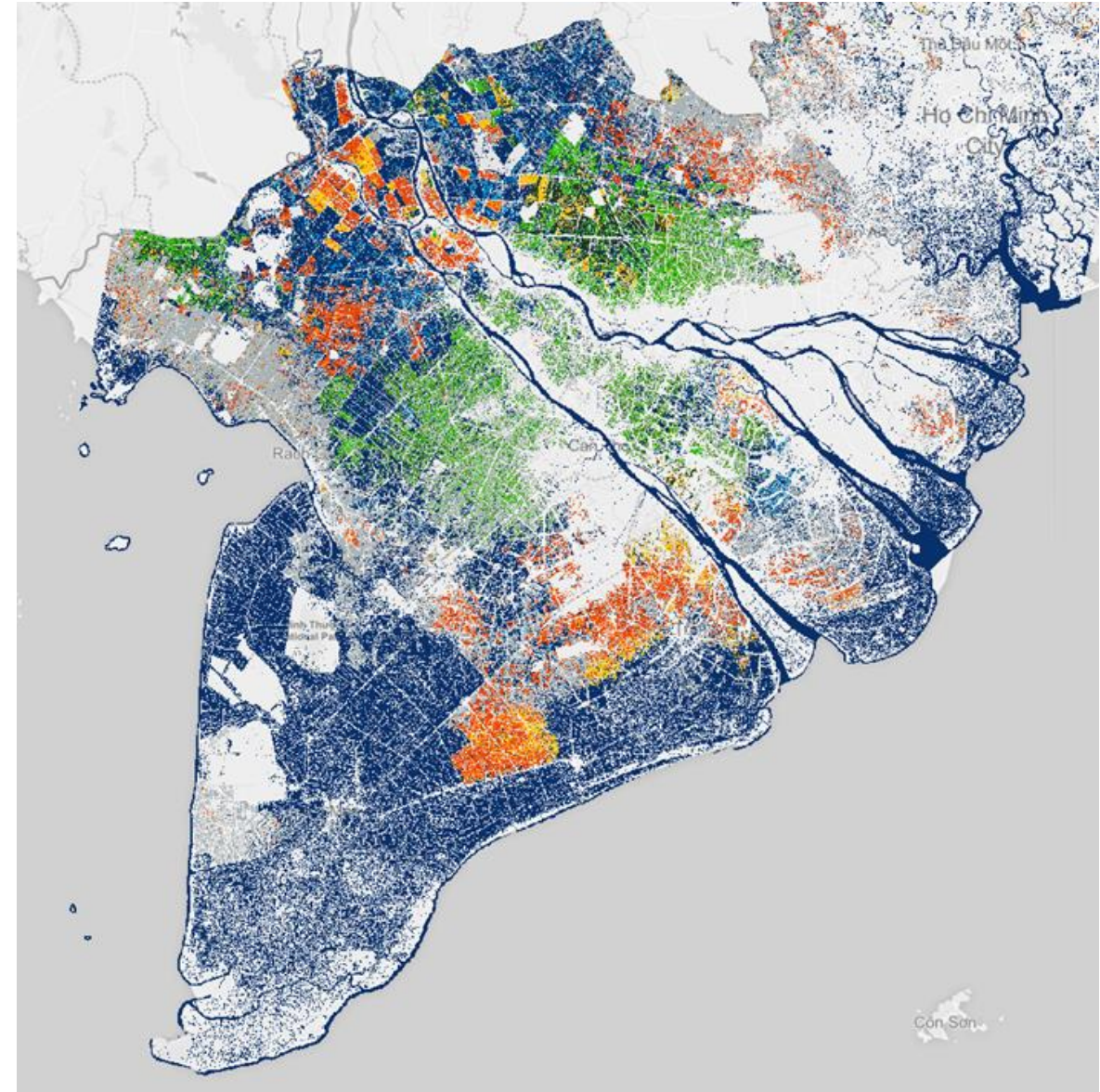
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Various data sources

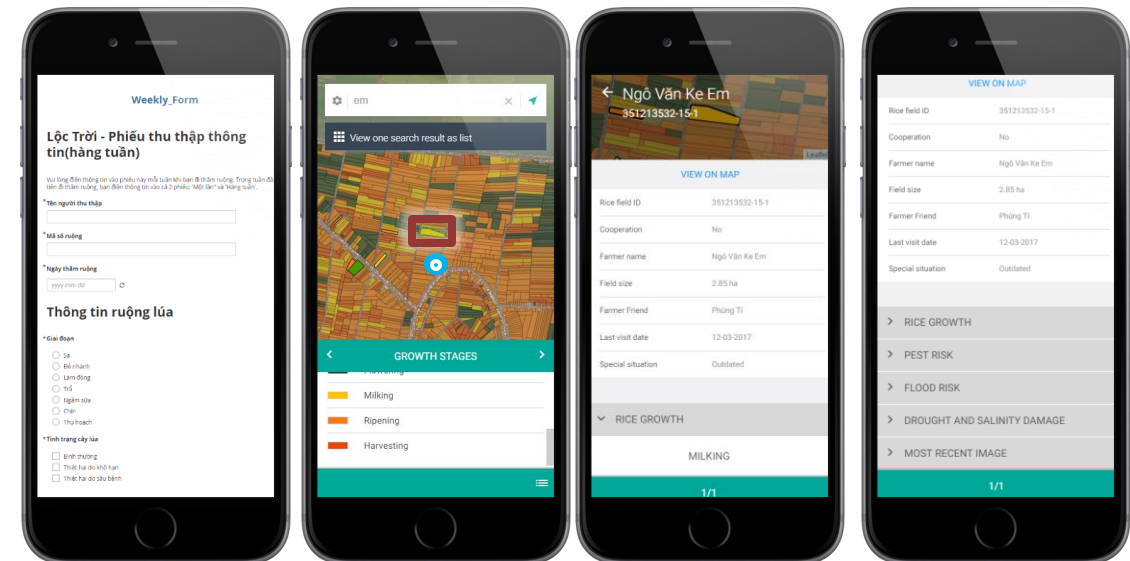
- › E.O. data
 - High resolution (15m) rice growth maps
 - inundated fields
- › Field measurements
- › Administrative data
- › Location of all farmers





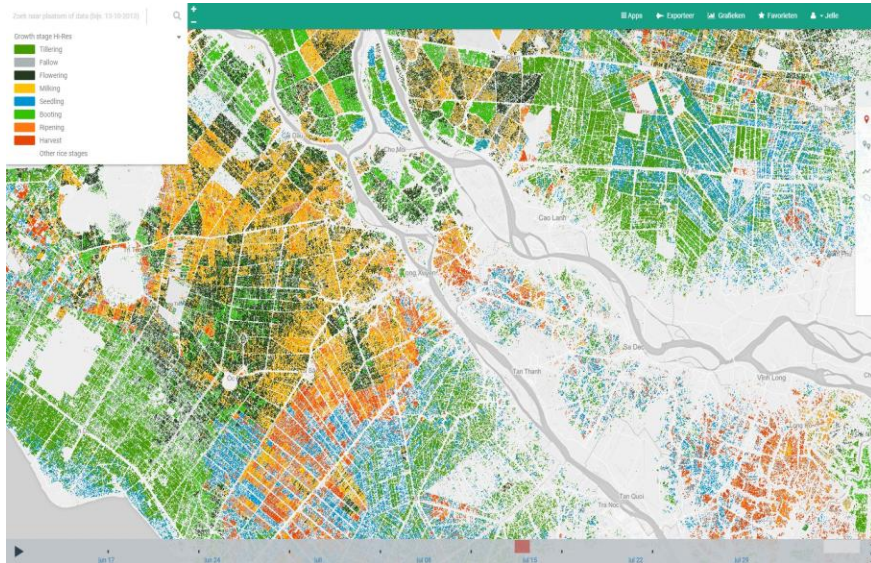
Combine EO data with field data

- › Calibration of EO data
- › Monitor fertilizer and pesticide use during the season
- › Locate nearby pest to take measures in advance
- › Farmers inform each other
- › Smartphone to collect and receive information from farmers (more reliable and cost-effective sampling of farmer and field data)

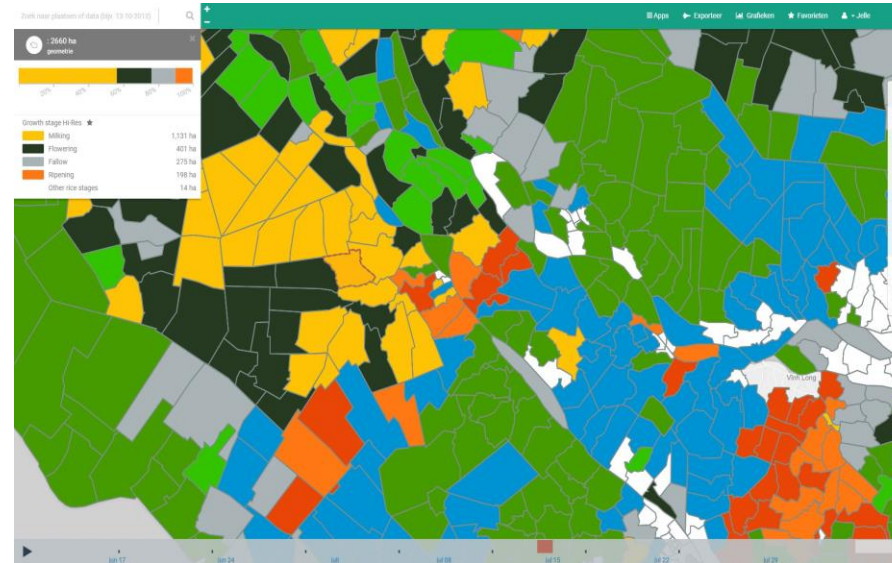




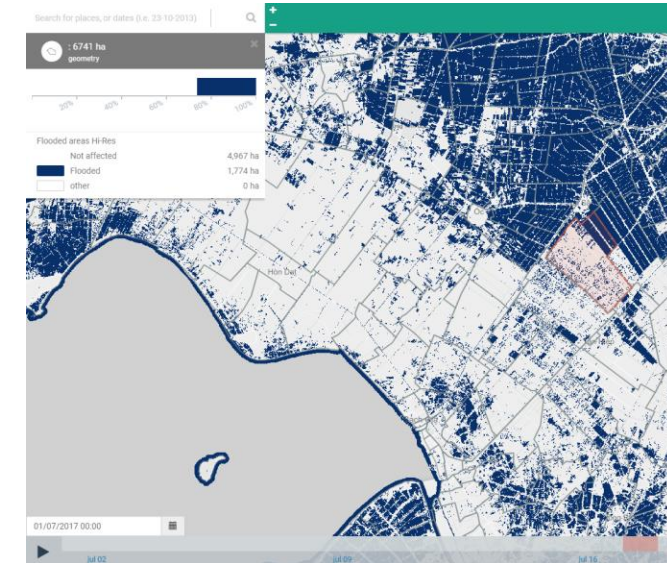
Rice growth stages (aggregated information)



Rice growth stage
(15m resolution)



Regional aggregation:
dominant growth stage



Flooded area
(15 m)

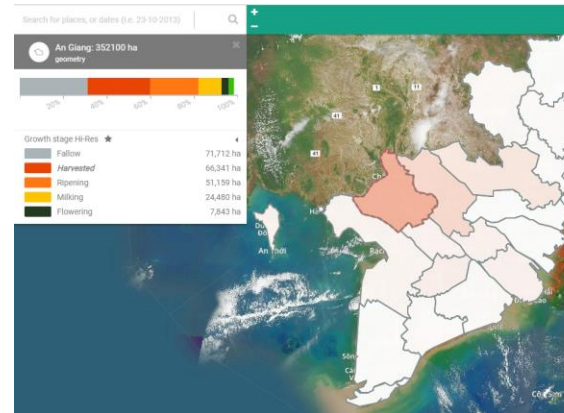




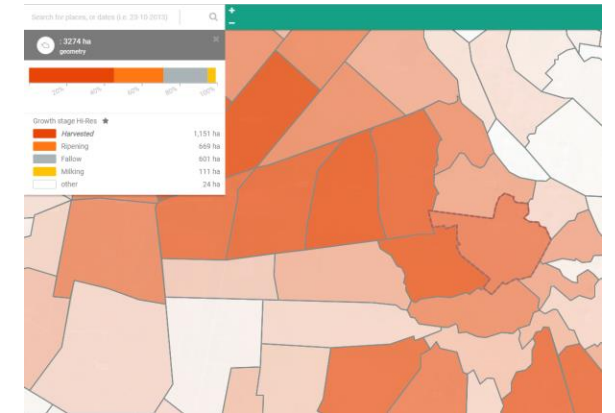
Insight in rice grow at different spatial scales

- › Where and when will the rice be harvested
- › Allocate resources
- › Regional overview combined with detailed field information

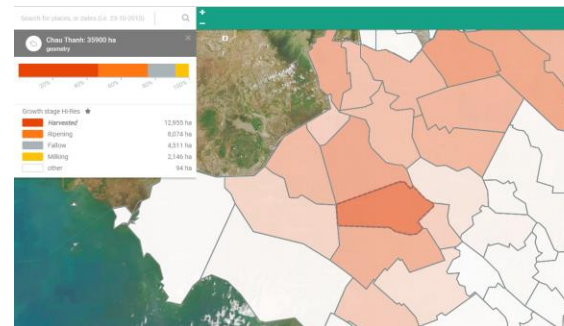
Province



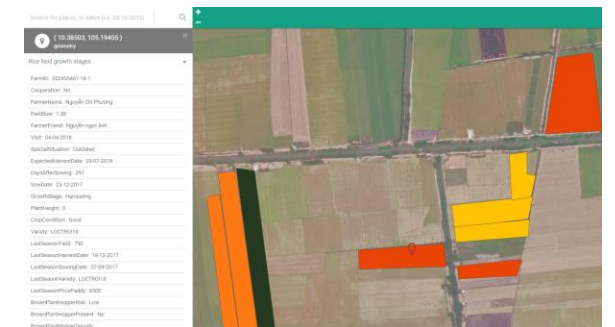
Commune



District



Field

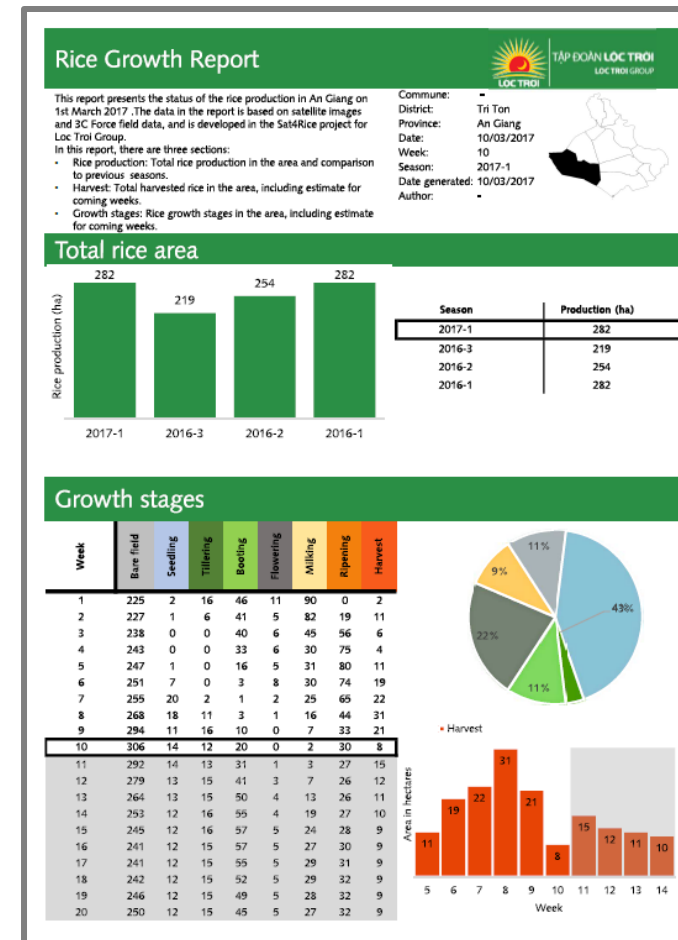




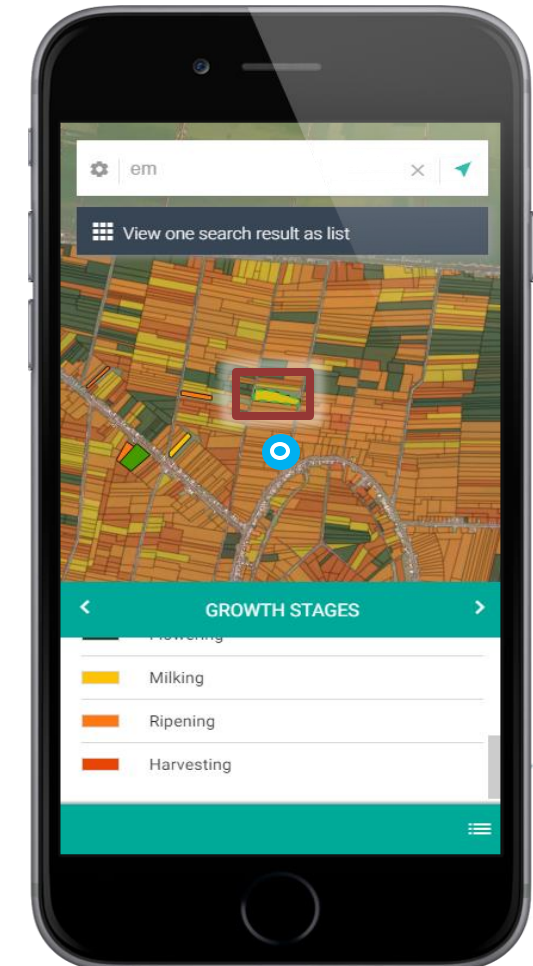
Automated reports

- › Automated reports and dashboard provide direct overview of key indicators
- › Up to date information on field level is directly available (from any place)

Automated reports Dashboards



Most recent data in the field

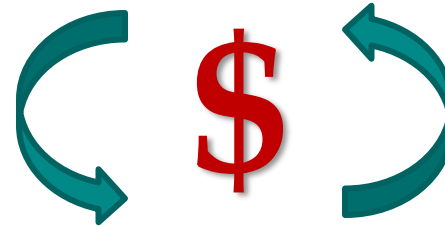




The business case (?)

Use cases have been formulated on the use of various information services

- › Rice Grow stages
- › Harvest prediction
- › Flood risks
- › Allocate resources
- › Optimize logistics
- › Reduce inputs
- › Automated reports and dashboards
- › etc





Some lessons learned

- › System is operational.
- › Much effort has been put into
 - › Data collection
 - › Validation of the information services
 - › Training of the field workers
 - › Convincing the management that the service really works
 - › Marketing
 - › Desk research to formulate use cases and business cases
- › Discussion on added value of the possible services with the decision makers appears to be very difficult, making the business case difficult to formulate.
- › Working processes within the company are still not always clear. Company does not want to share relevant data.
- › The farmers and field workers use both the application and their paper forms. It is difficult to change a habit, especially if the company continues to use both systems





Building an advanced IT system, with information services, and applications for the farmers is challenging, but

