Designing a 2 ways information system for site-specific agriculture implementation

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What is the idea ?

Each time a farmer establish a crop, manage it and harvest it, he is experimenting a **unique combination of environmental conditions and management decisions** that result in the observed production level.

If we are able to finely characterize the soil and climate conditions in which a crop grew, and if we have access to the management and yield records…
…then **each cropping events represent an experiment from which we can learn.**

Characterizing **many cropping events**, we can gain knowledge from highly diverse conditions, and **learn about how do crops response** to those variations, and to the different management strategies.
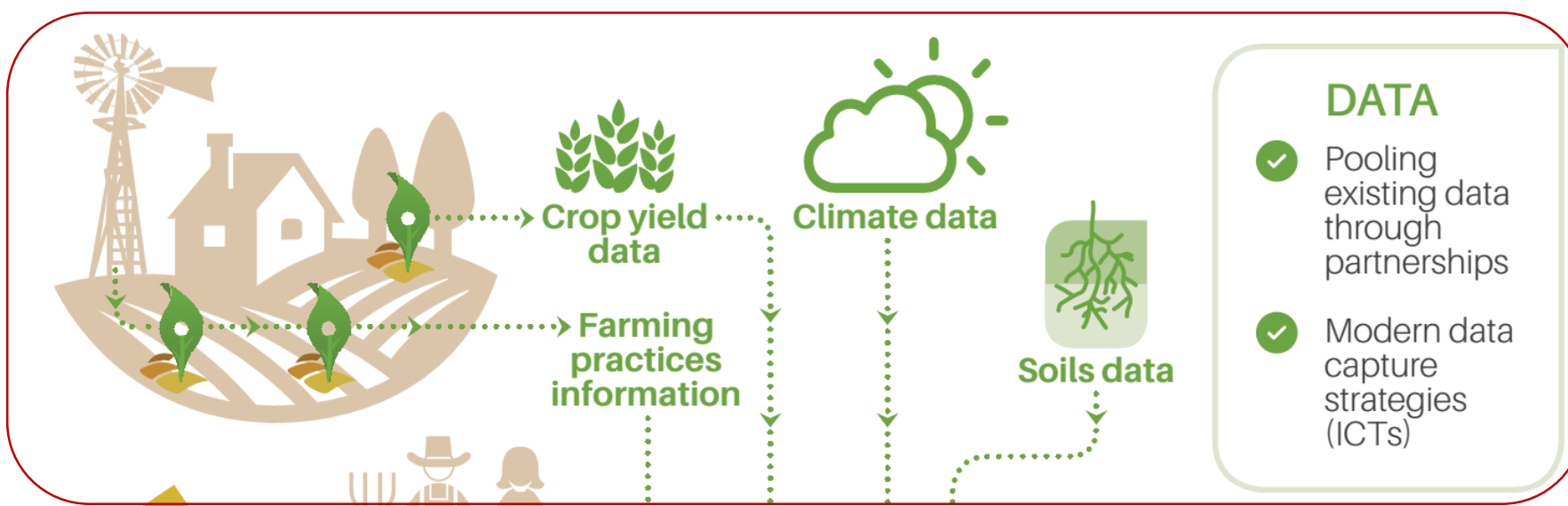
See: Cock, J., Oberthür, T., Isaacs, C., Läderach, P. R., Palma, A., Carbonell, J., … Anderson, E. (2011). Crop management based on field observations: Case studies in sugarcane and coffee. *Agricultural Systems*, *104*(9), 755–769. doi:10.1016/j.agsy.2011.07.001
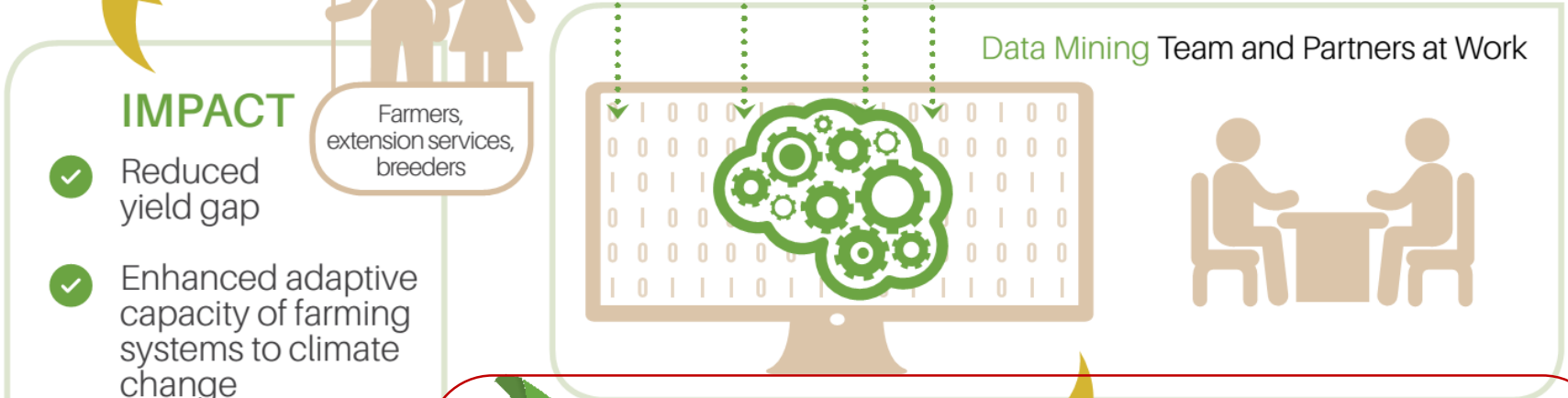
AEPS
Agricultura Específica Por Sitio

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How do we use ICTs ?

IN
- Responsive forms
- Instant validations
- Automatized GPS coordinates capture
- Allow edition
- Cloud-based DB = data instantly available
- Interoperability: data can be exported to any format for reuse

OUT
- Personalized reports
- Real-time information
- Interactive graphs
- Mapping
- PUSH

Crop yield data

Farming practices information

Climate data

Soils data

DATA
- ✓ Pooling existing data through partnerships
- ✓ Modern data capture strategies (ICTs)

IMPACT
- ✓ Reduced yield gap
- ✓ Enhanced adaptive capacity of farming systems to climate change
- ✓ Increased livelihoods
- ✓ Empowered partners

Farmers, extension services, breeders

Data Mining Team and Partners at Work

Site-specific information
What, where, when, and how to plant

KNOWLEDGE
- ✓ Yield and quality limiting factors
- ✓ Favorable / unfavorable climate patterns
- ✓ Optimal site-specific management practices

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Web platform to interact with end-users

cropster.org

Do it yourself S.A.

http://www.open-aeps.org:8080/

Conclusions

- About 500 direct users
- Personalized reports including benchmarking and alternative crops

- 50 % user friendly
- Preexisting platform from an external provider = Low adaptation capacity and high costs !
- Code under copyright

Conclusions

- About 2000 records in Maize, Beans
- 70% user-friendly
- Fully adaptable
- Relatively cheap
- Open-source (easy to release to partners)

- Technical issues harder to solve
- Longer to develop

Obstacles – lessons learnt

Several user profiles
Generate confidence for the user to trust the sustem (more tan the paper):
Technical issues and breakdowns alter users' trust which eventually make the adoption process harder.

Offer sufficient services to enroll the user: adoption of the tool must be as easy as a Gmail: service is so good you even don't care of privacy, commercials ! :-O

Data ownership: transition perdiod in which we still have to respect the users' ownership on the data.

Android app for field data capture

Main characteristics
- Work offline
- Just another face of the web platform (=)
- Capture GPS coordinates using one button
- Allows edition
- Support wide range of Android versions, and low conectivity

What we did :
- External provider from Cali
- About 18 millions COP
- Open source (but tied to a licensed forms constructor)
- 1 year including post release quality controls

Lessons learned
Hybrid language is not functional
Need more solid testing framework in real situations
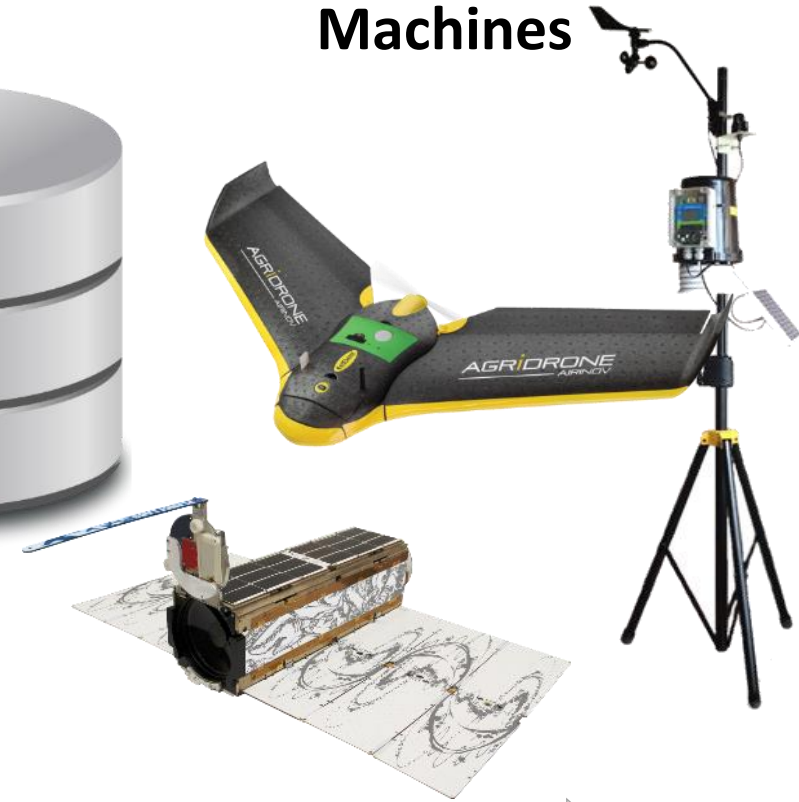User experience is your Graal. Without that, no adoption

https://play.google.com/store/apps/details?id=com.aepsmovil.aepsmovil
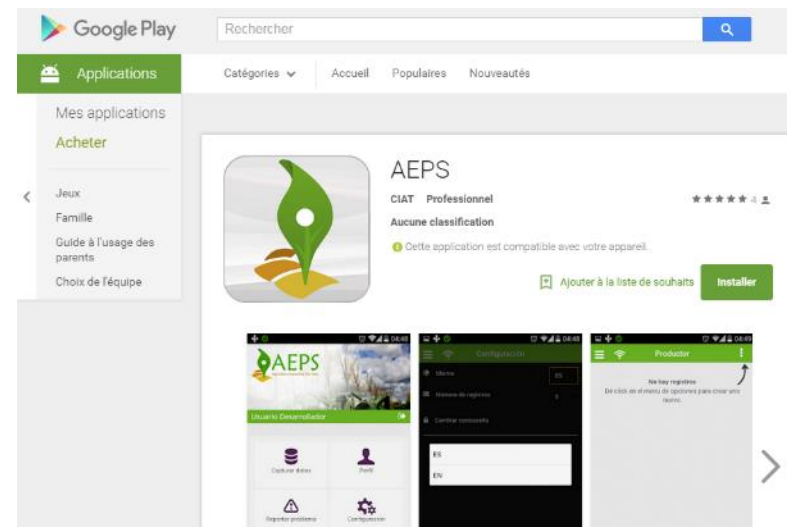
Humans 1.0

What is next ?

- Slow process
- Many steps = many opportunities for error
- Information spread over offices, personal computers...

Humans 2.0

- Information is centralized and immediately available
- Less steps = more safe
- Automatic validations
- Possible errors and/or omissions
- Trained staff required

Machines

- High frequency measuring allowed
- No humans = no errors
- Transparent process for the users, no need to bother him

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Thank you !

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