DateGIS - Precision Agriculture for the Date Sector
Dr. Laurens Bierens (TEC-IB), Dr. Mohamed Ali Bob (Al Mohamadia)
ISAF-2018, Khartoum, Sudan, 24-26 September 2018

What is DateGIS?

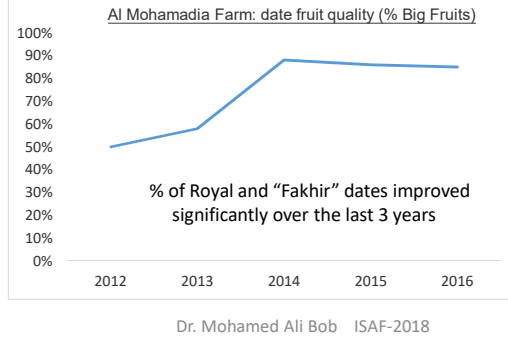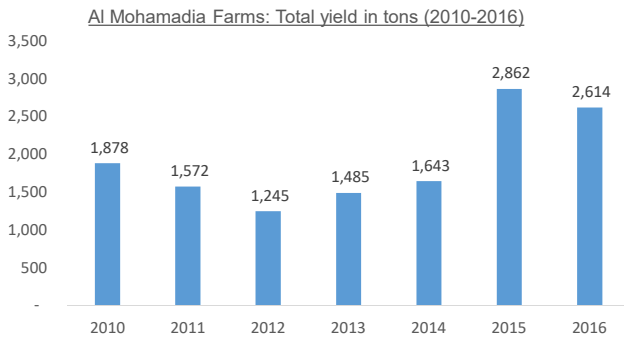- DateGIS is a cloud-based IT-platform for precision agriculture applications in the date sector

  - Management, mapping, registration, and monitoring services for palm trees, date farms, and RPW traps

  - Mobile applications for in-field data collection and management

  - Input data can extended with satellite, aerial (drone) and/or ground remote sensing data and information

- Analysis of data and information collected in the DateGIS platform for effective Integrated Pest Management (IPM) on farm or regional level (especially RPW)

- DateGIS as a concept has been developed with in-field data and support from **Al Mohamadia** pilot farm in Al Kharj, Saudi Arabia, who embraces innovations to improve yield and quality and reduce water waste and pest

Al Mohamadia:

A model farm in KSA with 40,000 palm
trees producing ≈ 2,800 tons of quality dates.

Mohamadia dates are produced, processed, handled
and marketed utilizing advanced husbandry practices
and technical procedures, that closely adhere to
standard requirements and quality specifications.

Al Mohamadia Farms: Total yield in tons (2010-2016)

Year	Yield
2010	1,878
2011	1,572
2012	1,245
2013	1,485
2014	1,643
2015	2,862
2016	2,614

Al Mohamadia Farm: date fruit quality (% Big Fruits)

% of Royal and "Fakhir" dates improved
significantly over the last 3 years

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Dr. Mohamed Ali Bob

- Farms Manager, Al-Mohamadia
  Dates Co., Al Kharj, Riyadh,
  Kingdom of Saudi Arabia

- PhD, Agric. Sciences, 1995

- Date farming in the region,
  last 15 years.

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Challenges for date palm producers in the MENA region

- Declining date palm productivity due to pests & diseases e.g.:

  - The Red Palm Weevil (*Rhynchophorous ferrugineus*);

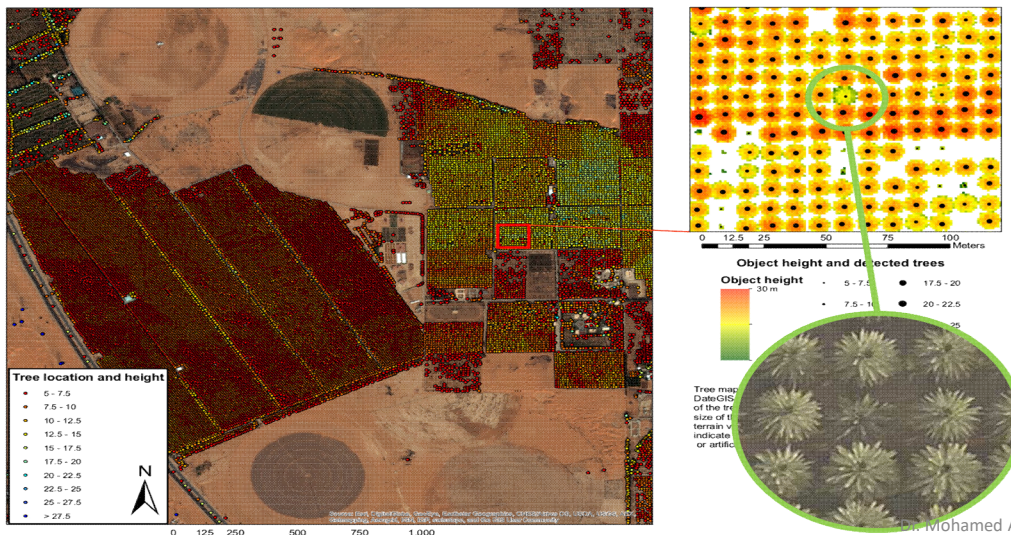 - Bayoud disease caused by *Fusarium oxysporum f.sp albedinis*.

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Opportunities for date palm producers in the MENA region:

✓ Utilization of modern information system for precision agriculture of date palm farming: geo-spatial modeling, decision support systems, remote & proximal sensing;

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Utilization of new technologies:

Koppert: biological agents;
ISCA: natural and pheromone based tools and solutions; and
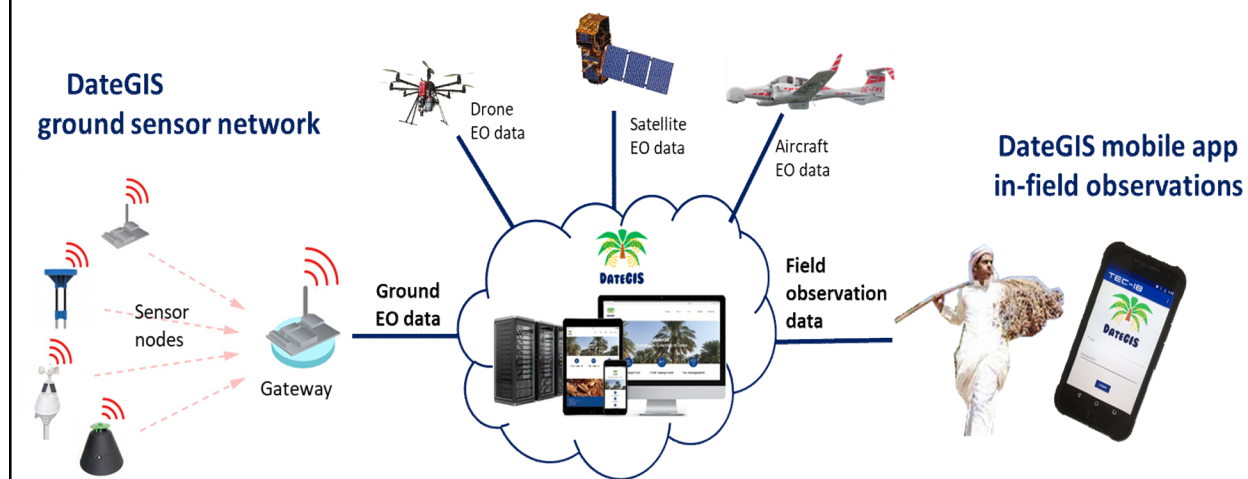TEC-IB: (remote sensing solutions):

Offer great comprehensive control system against the Red Palm Weevil.

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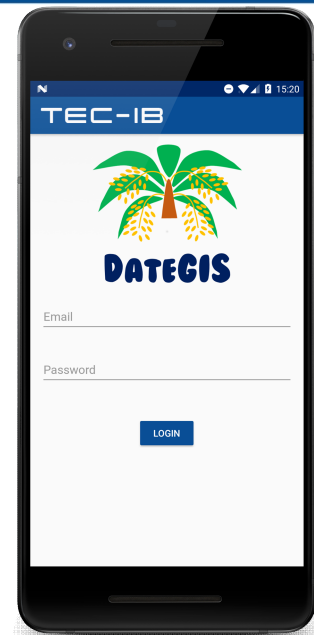

DateGIS sensor data sources

DateGIS mobile application
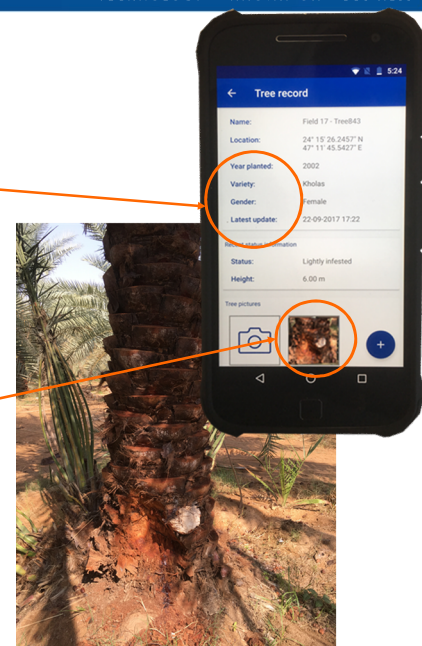
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- **DateGIS Mobile Application** downloadable from Google Playstore (Apple store in Q3-2018)
- On-the-go date farm management decision making, field data registration/recording and data documenting
- For farm managers, farm engineers, farm supervisors, scouts, farm input suppliers, agri-consultants, researchers, government administrators, etc.
- In-field operable, even without GSM / internet coverage – automatic syncing when connected to (mobile) internet
- Applications for farm management & scouts:
  - Mapping and registration
  - Tree status recording
  - RPW trap monitoring & management
  - Soil moisture sensing
  - Weather information & forecast
  - and more..
- All registered information is timestamped and GPS-tagged for performance tracking, truth finding, statistics, data analysis and prediction
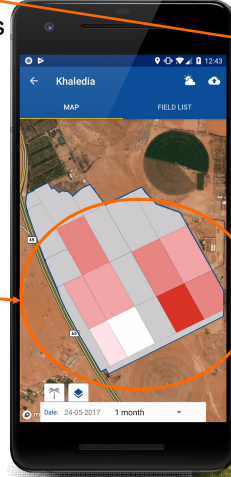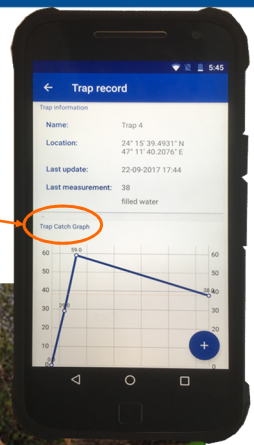

Tree status recording

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- Mobile registration, recording and visualization of:

  - Basic date palm tree credentials:
    - ID
    - GPS location
    - Year planted
    - Variety (sukkari, khodri, kholas, barhi, reziz, etc..)
    - Gender (male, female, unknown)
  - Date palm tree status information:
    - Yield
    - Health status / RPW infestation level
      (healthy, light, medium, high, dead, removed)
    - Tree height
    - Tree photos / notes
  - Tree status info can be updated in the field
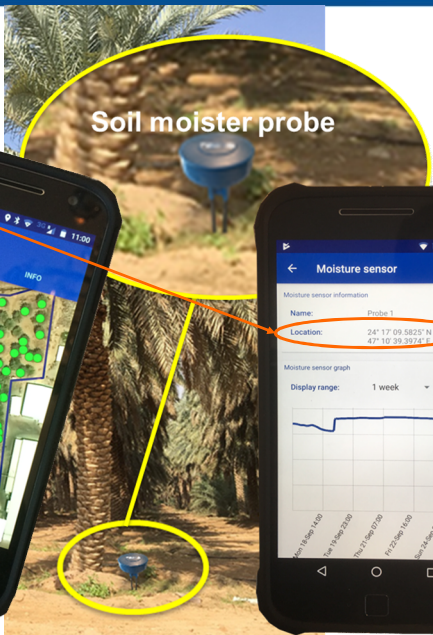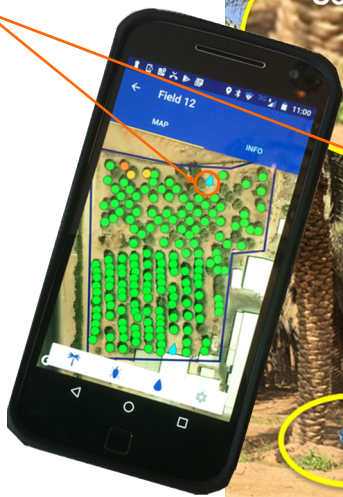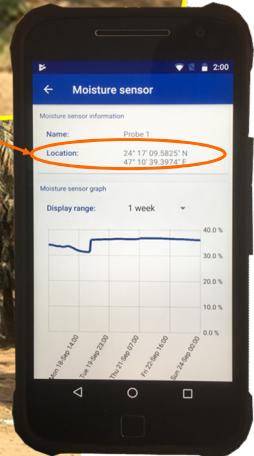
RPW trap monitoring & management

- Mobile registration, recording and visualization of RPW traps:
  - RPW Trap ID and location
  - Manual recording of captured RPWs*
  - Graphic display of past captures for historic analysis
  - Maintenance information (pheromone lure placing)
  - Trap photos (for scout performance and control purposes)
- With sufficient RPW Traps real-time RPW distribution maps of the fields can be provided

* Automated remote recording / counting / alerting of captured RPWs with **Smart RPW Traps**, available end of 2018
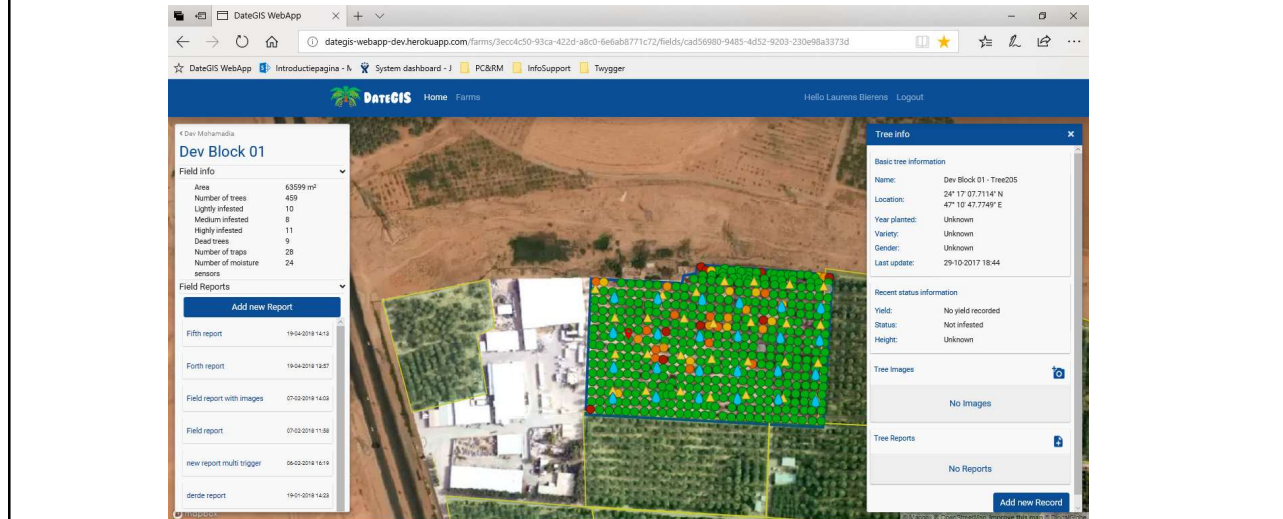
Soil moisture sensing

- Mobile visualization of soil moisture condition:
  - Soil moisture sensor ID and location
  - Soil type information
  - Real-time (each hour) soil moisture measurements visualization
  - Graphic display of historic soil moisture data for irrigation optimization
- With sufficient soil moisture sensors real-time moisture distribution maps of the fields are provided
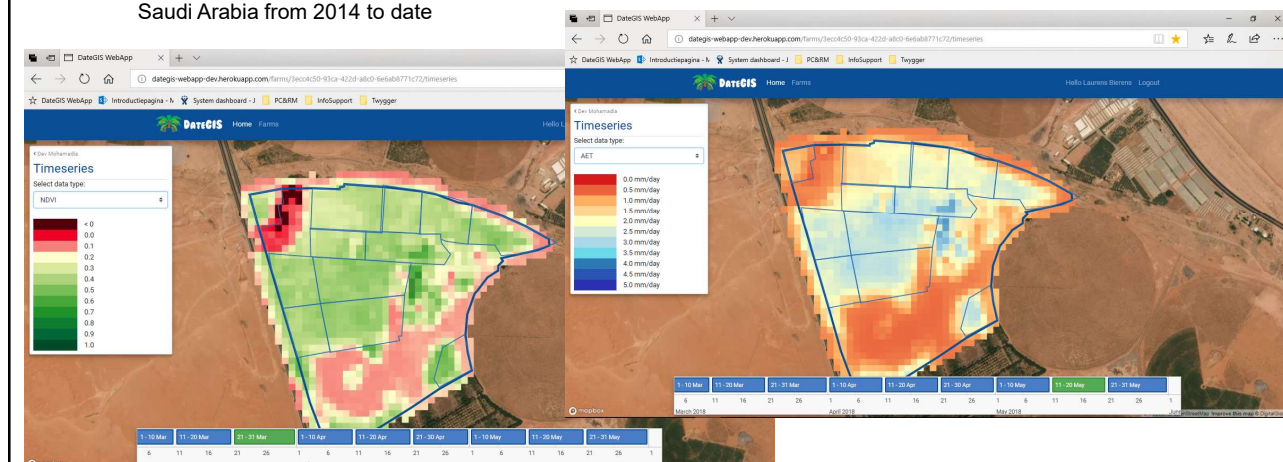
DateGIS web portal

- Management portal in web-browser for all captured information
  - Data acquired with mobile app is instantaneously visible in Web Portal

DateGIS data layers

- As option in the web-portal (if data is available)
  - Remote sensing data layers and time series through DateGIS WMS-server
  - Currently available:
    - Archive of Evapotranspiration and NDVI data (30m resolution) from Al-Kharj and Qassim region in Saudi Arabia from 2014 to date

Conclusive remarks

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- DateGIS is a cloud-based IT-platform for precision agriculture applications in the date sector

- DateGIS provides management, mapping, registration, and monitoring services for palm trees, date farms, and RPW traps includes mobile applications for in-field data collection and management

- Analysis of data and information collected with DateGIS for effective IPM approach on farm or regional level, especially to combat RPW

- DateGIS enables EFFICIENT application of EFFECTIVE agriculture input products

- DateGIS as a holistic precision agriculture solution is scalable to other (high value) fruit crops (avocado, mangos, coconuts, etc.)