ARTES 20 Demonstration Project

GrapeLook / FruitLook

Space based services to improve water use efficiency of vineyards and deciduous fruit orchards in South Africa

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2nd ARTES Applications Workshop

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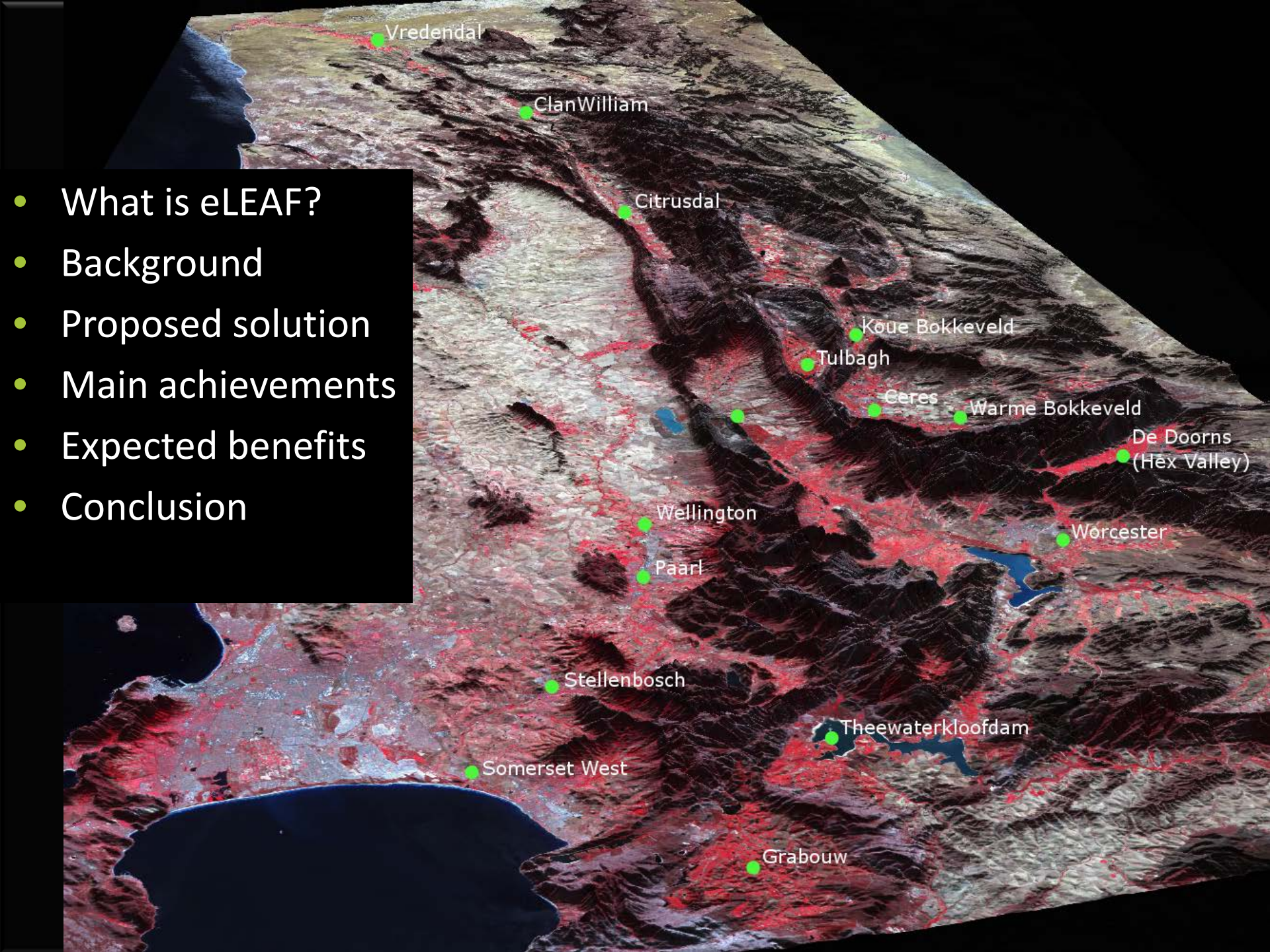
eleaf.com



- What is eLEAF?
- Background
- Proposed solution
- Main achievements
- Expected benefits
- Conclusion

ELEAF

eLEAF

- Merge between WaterWatch (Competence Center) and Basfood
- Based in the Netherlands
- 31 employees
- Active worldwide & completed projects in > 30 countries

- Global reference in supply of reliable data to support:
  - sustainable water use
  - increase food production
  - protect environmental systems

- PiMapping® Technology

eLEAF

- eLEAF creates an information infrastructure with global coverage
- eLEAF delivers over 50 data components including biomass production, crop water requirements, nitrogen content, as well as water productivity
- eLEAF works with partners to deliver actionable applications
- PI-Mapping technology of eLEAF and its database of plant and water is worldwide unique and enables authorities and individual farmers / landowners to optimize in a sustainable way biodiversity, water usage and increase of food production.

BACKGROUND

South Africa

National Water Act (1998): "*water should be used more efficiently and has to be reserved for basic human needs and for protecting aquatic eco-systems first*"

Western Cape Province

Water is a critical resource:

Climate change (variable rainfall)

Growing population (competition between water sectors)

Less water available for agriculture

Economic importance grape/fruit industry:

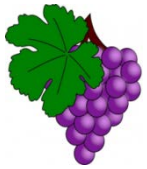
32 % of export

6.7 or adult persons (15-64) work in agriculture

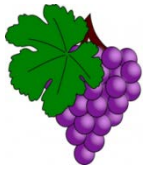
maintain agricultural production

Water Use Efficiency (WUA)

Improved water use efficiency:

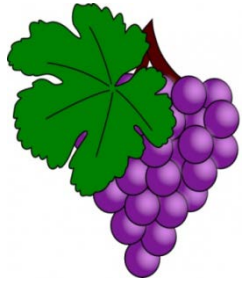
WUE =  *Crop yield (kg)*

 *Water consumption (m^3)*



Reduce water consumption without decrease in yield

or



Increase yield without increasing water consumption

Need to improve water use efficiency in vineyards in Western Cape province!
Spatial information on water use efficiency required.

Physical process behind water consumption is Actual Evapotranspiration (ET_{act})

Sophisticated earth observation algorithms provide field level data on Actual Evapotranspiration and Water Use Efficiency worldwide.

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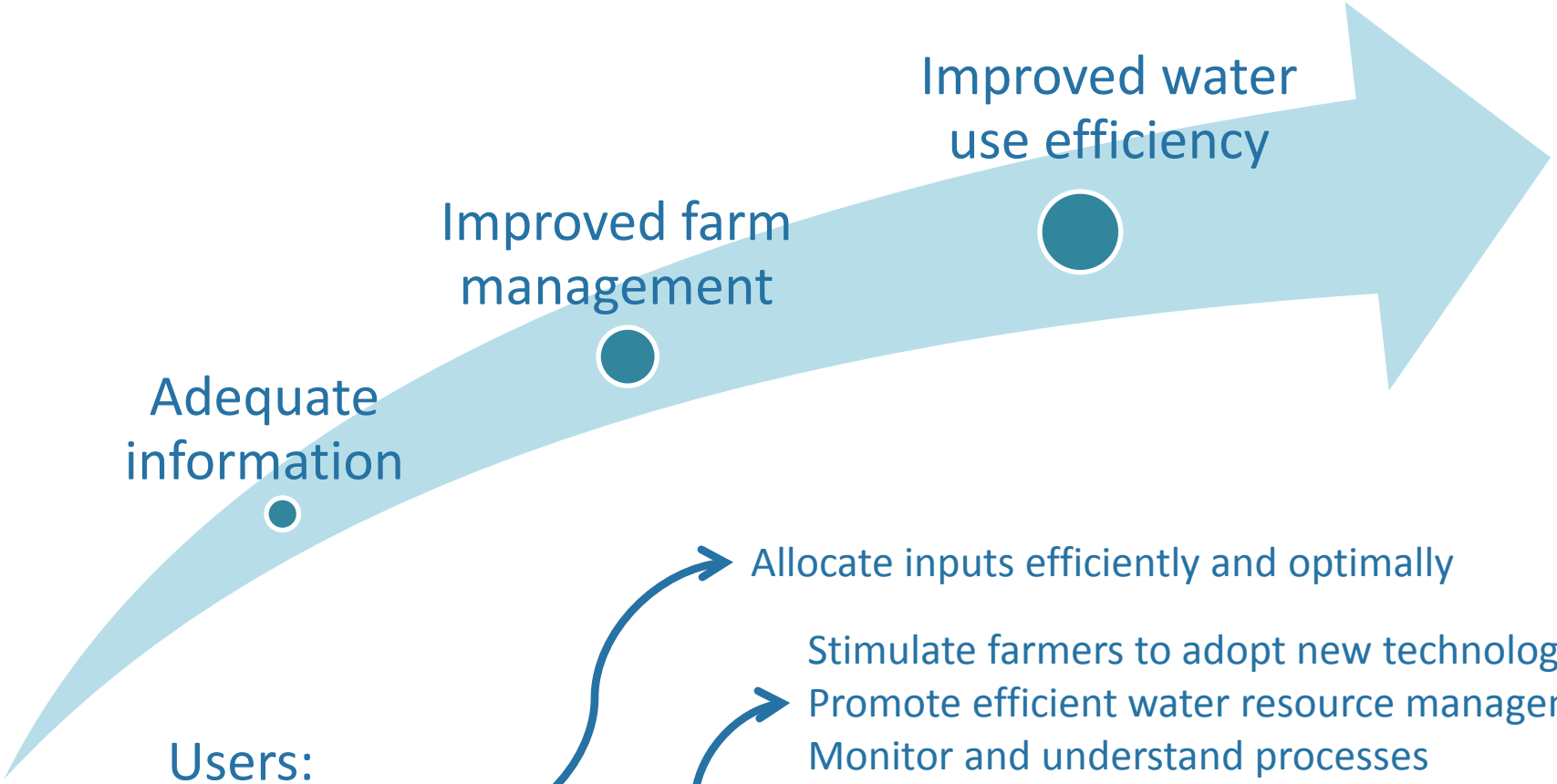
FEED THE WORLD

User needs:



Users:

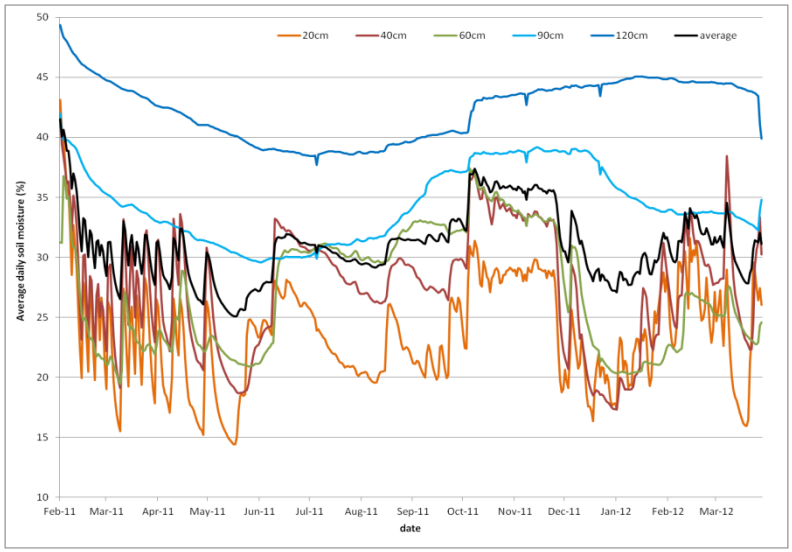
- Farmers
- Decision makers
- Farmer advisors
- Farmer service providers

Allocate inputs efficiently and optimally

Stimulate farmers to adopt new technologies
Promote efficient water resource management
Monitor and understand processes

Deliver advise to farmers on water use efficiency and on crop water, nutrient and growth management.

Current solutions: some examples

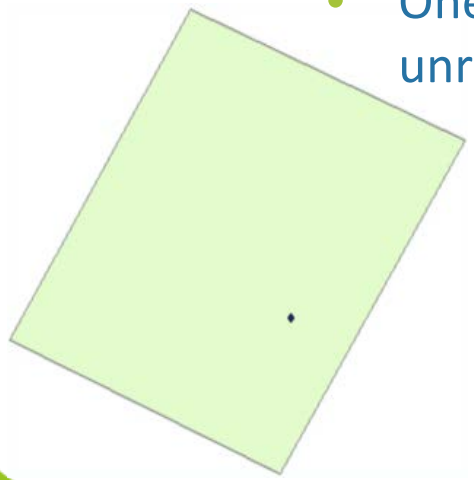


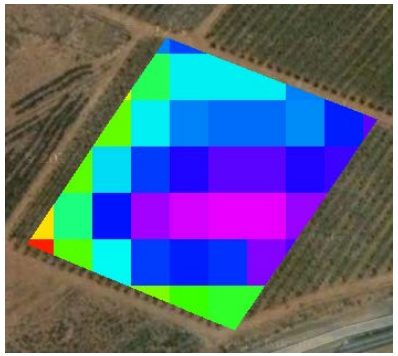
Soil moisture measurements:

- Updated every hour
- One point only which may be unrepresentative for block

Aerial photography

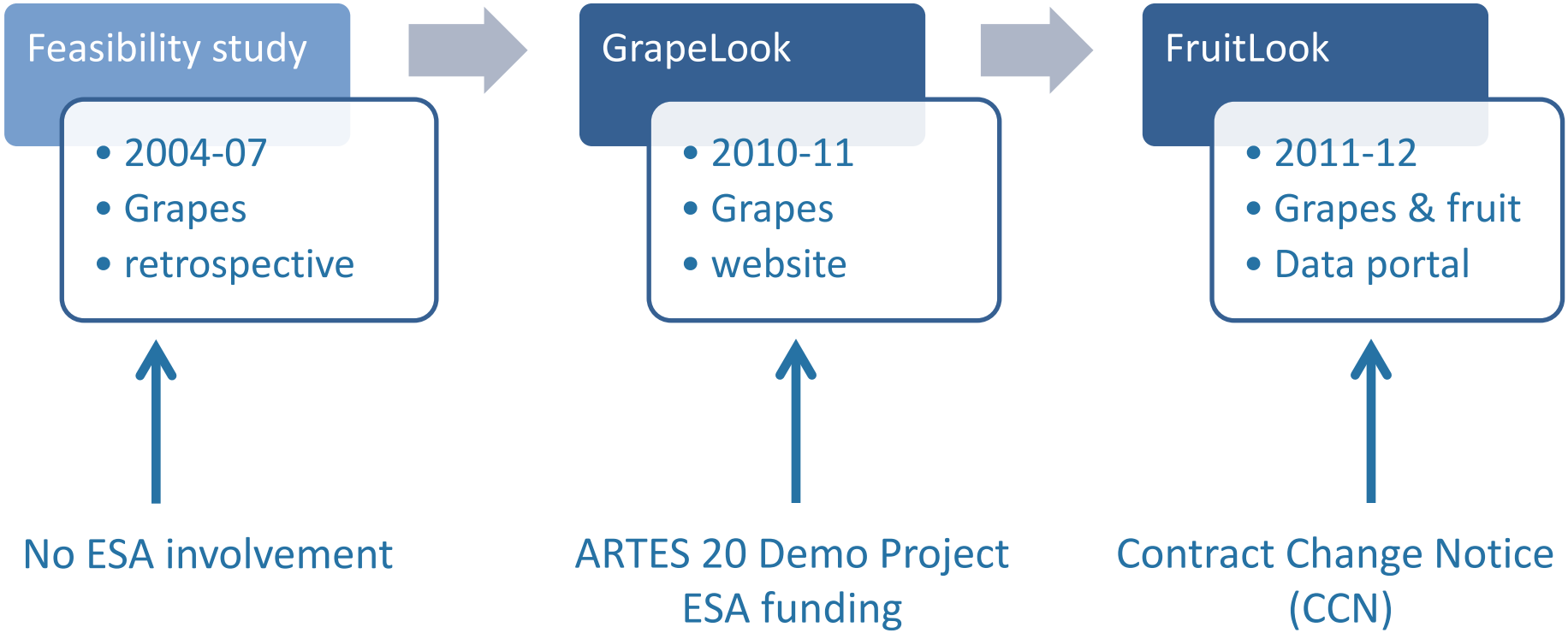
- High spatial detail
- Only once or twice during season





PROPOSED SOLUTION

Project overview



Other funding:

- SA Department of Agriculture: Western Cape
- SA Department of Agriculture, Forestry and Fisheries
- Dutch Embassy
- HORTGRO (horticultural farmer organization)

Project goal & objectives

GOAL: to demonstrate an operational service providing crop water, nutrient and growth information to fruit and grape farmers in South Africa

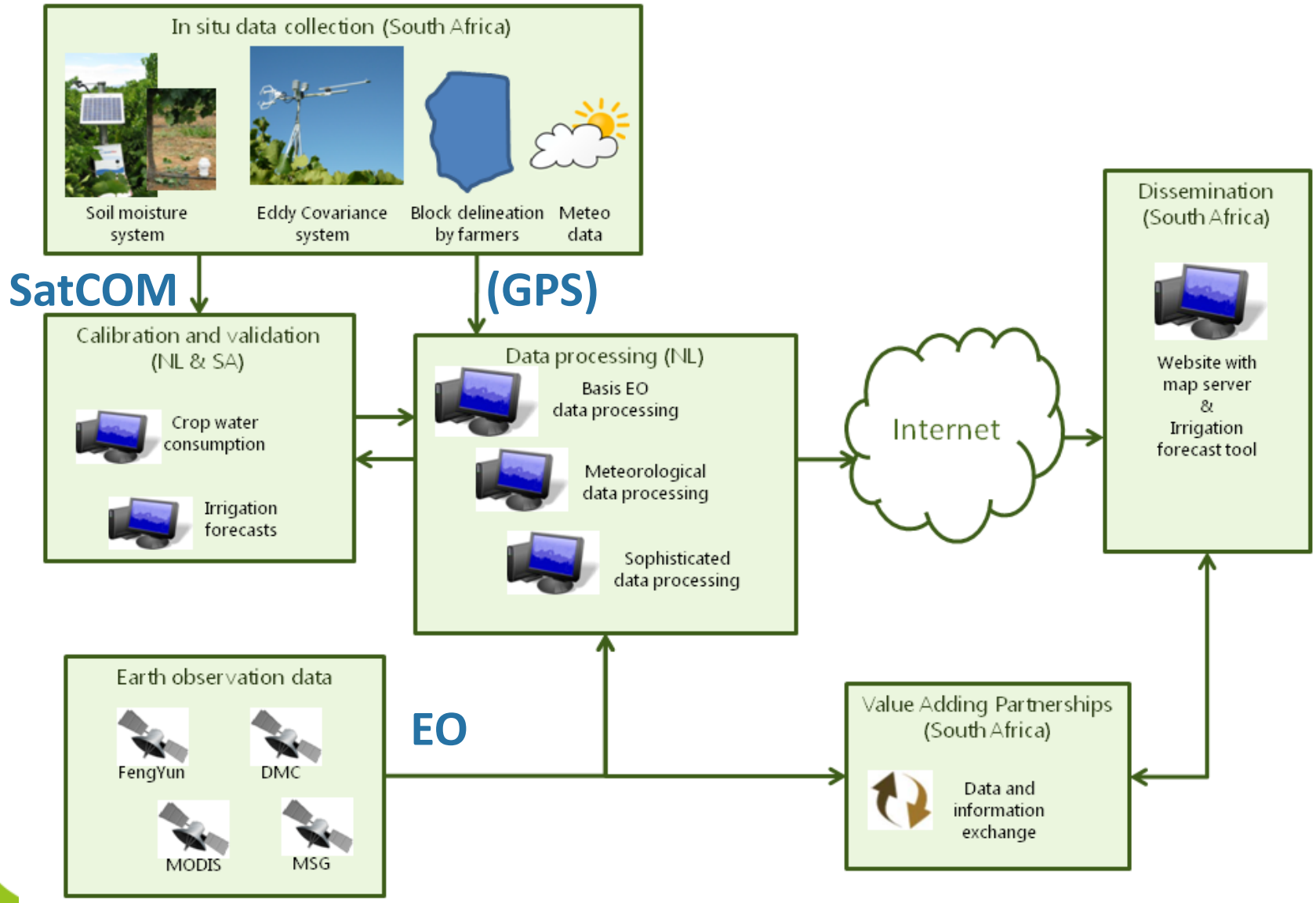
- to improve water use efficiency; and
- to reduce input costs.

OBJECTIVES:

1. Provide weekly updated parameters (maps) on crop water, nutrient and growth status for individual blocks and farms using satellite technology;
2. Forecast soil moisture change;
3. Disseminate this information through a website (www.FruitLook.co.za); and
4. Collaborate with Value Adding Partners to develop applications / create advice.

MAIN ACHIEVEMENTS

FruitLook system

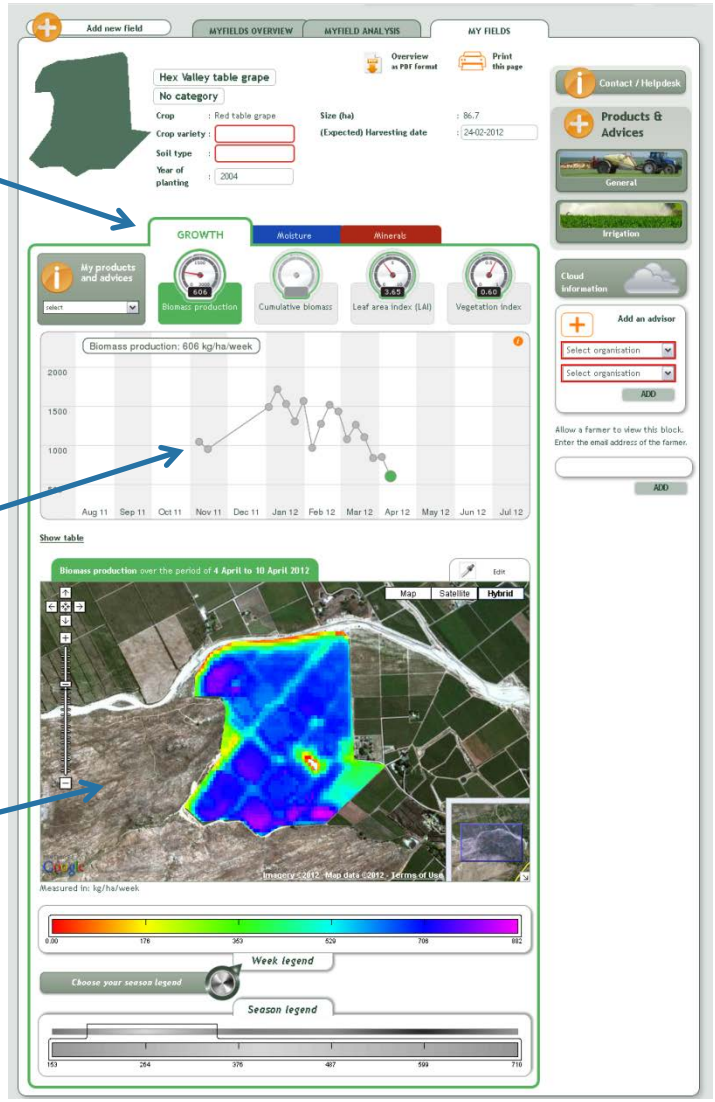


FruitLook data portal

8 parameters

Change over time

Change in space



Parameters (weekly updated):

- Actual evapotranspiration
- Evapotranspiration deficit
- Crop factor
- Biomass production
- Biomass water use efficiency
- Leaf Area Index
- Nitrogen content (plant)
- Nitrogen content (top leaf)

Forecasts:

- Soil moisture content

Parameter data is created without any input from the farmer!

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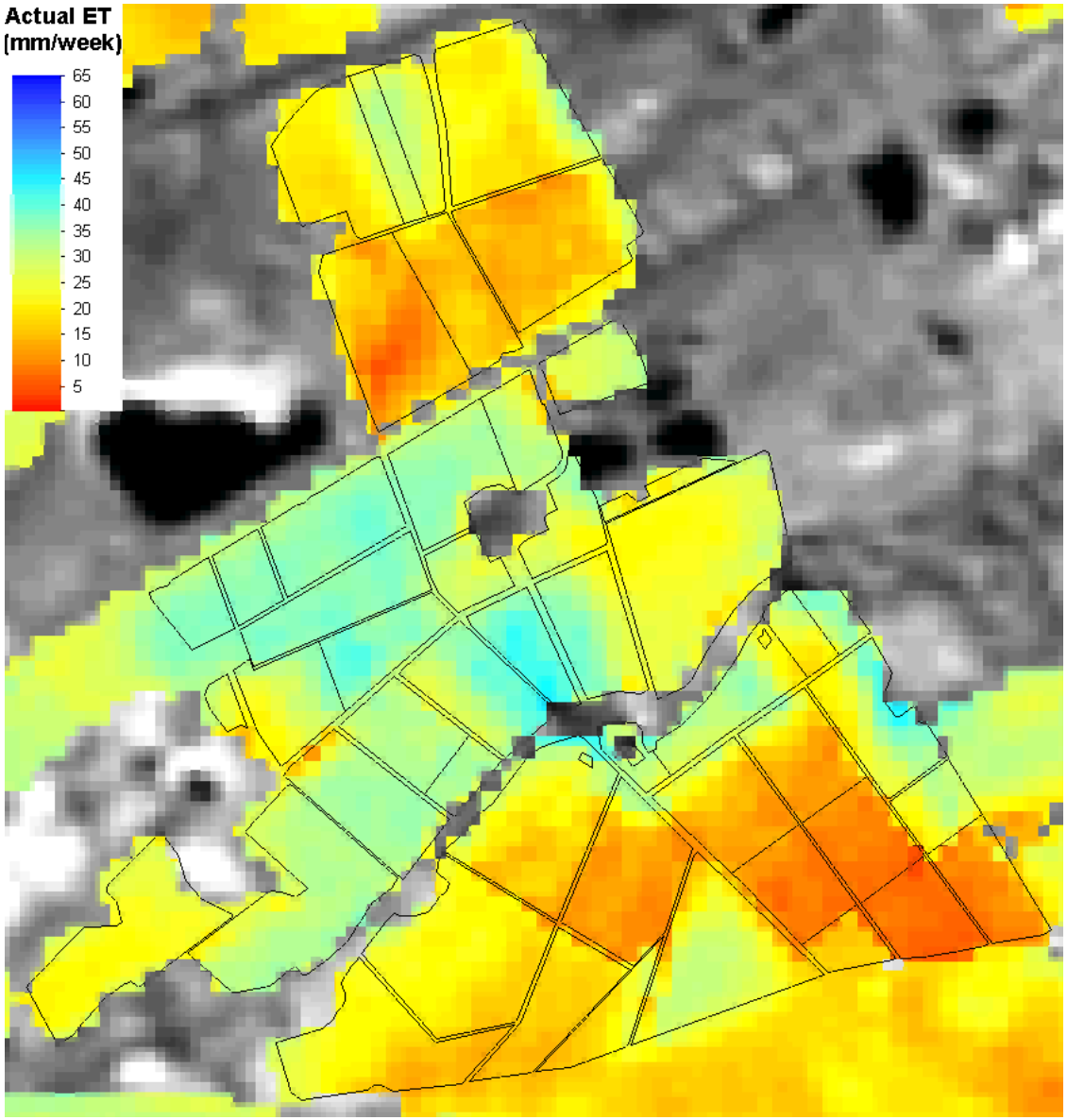
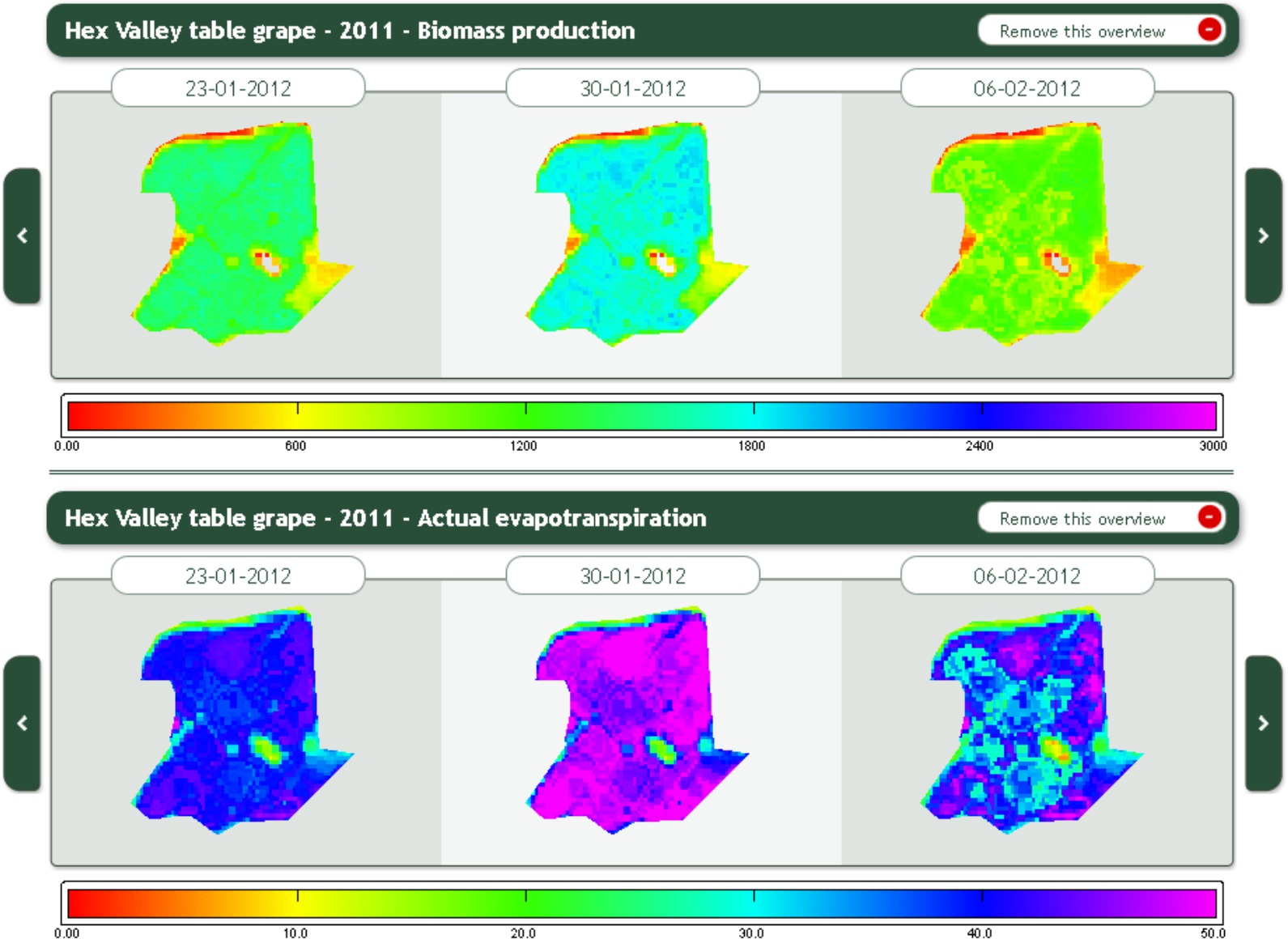
Weekly updated ETact



ETact:
Actual evapotranspiration
or
Real water consumption

Shows the water lost from the system

Block analysis



EXPECTED BENEFITS

Use case

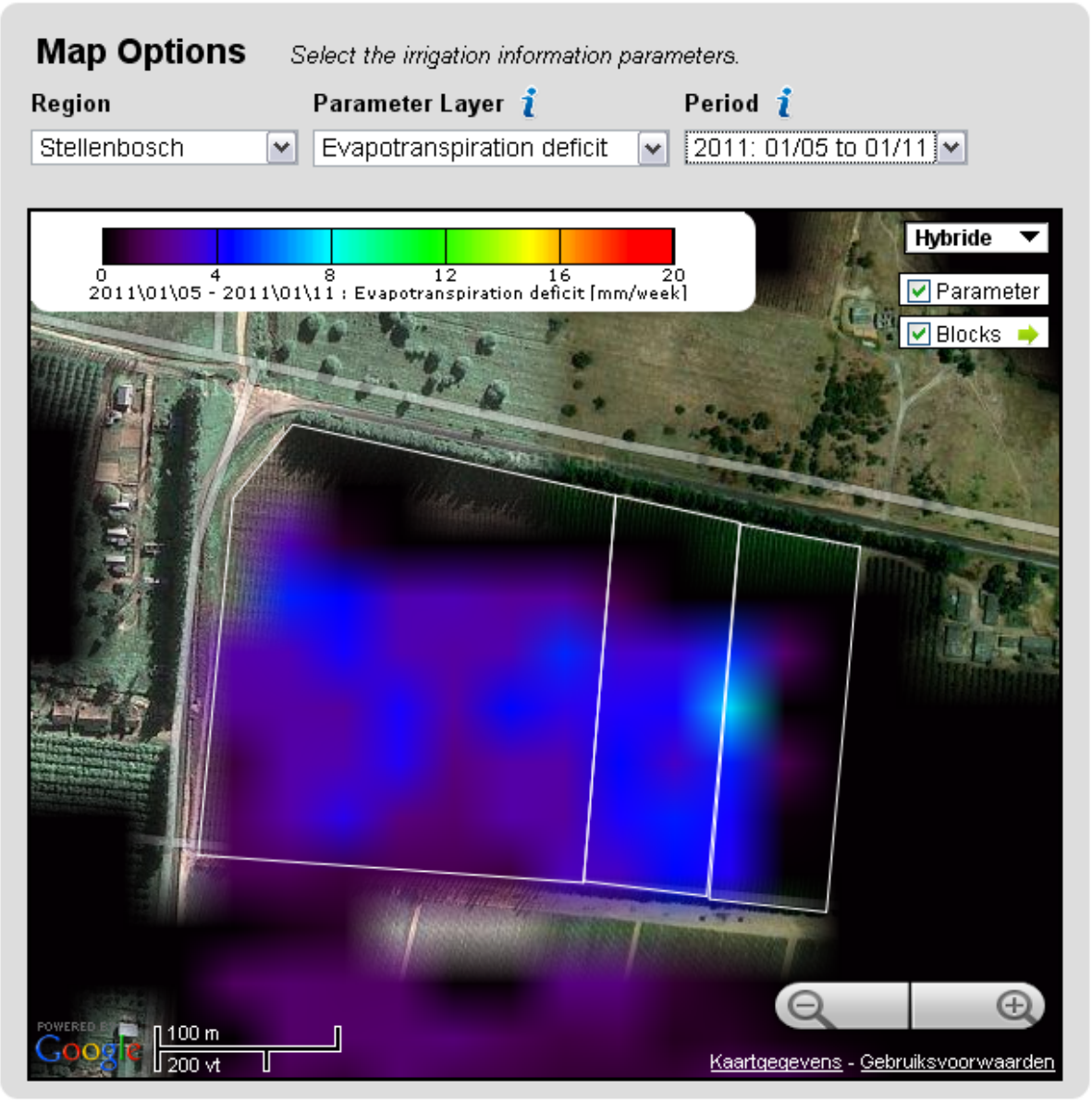


Table grapes
(one week before harvest)

Evapotranspiration deficit

Stones :
-> lower water holding capacity
-> more water stress
-> smaller berries
-> lower yield

Action:
Increase irrigation on stony parts of block with 1 mm/day until harvest

Benefits for the users

Expected benefits by

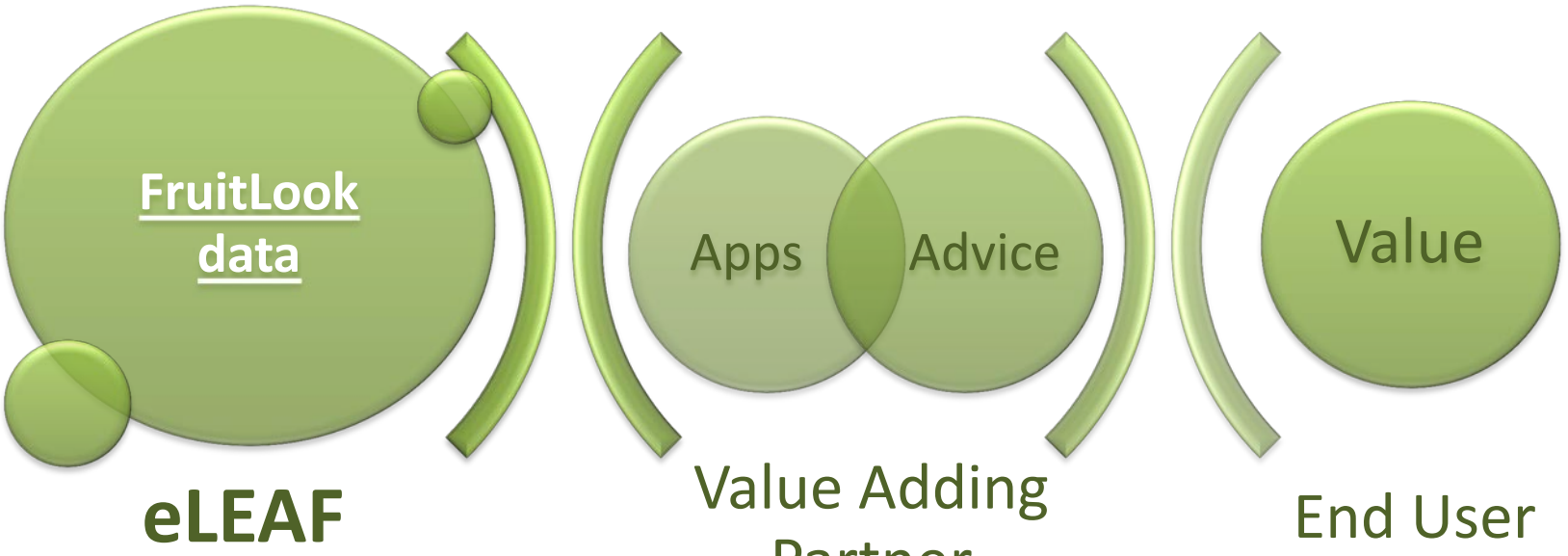
1) increasing revenues with 10% (yield); and

2) decreasing costs (water, fuel, fertilizer and chemicals) with 10 %:

Wine grapes:	413 EUR/ha
Table grapes:	2,359 EUR/ha
Deciduous fruit trees:	2,516 EUR/ha

Future purchasing cost of FruitLook: 15 EUR/ha

Business model



- Early adaptors that understand new technology
- Existing network & contacts
- Local expertise
- Fill the gap between FruitLook data and user

Worldwide media attention

- Article on Earthzine.org
- Article in magazine of the South African Irrigation Institute SABI
- Article in farmer magazine of South Africa Landbouweekblad
- Radio broadcast : Radio RSG, July 1, 2011
- TV interview: The KykNet channel, June 21, 2011
- Paper and presentation at IAF Congress in CapeTown
- ESA web article: “Satellites can help to grow the perfect grape”:
- International Business Times : “And Now, Satellites Help Vineyard Irrigation”
- Innovaticias (Spanish): “Los satélites de la ESA ayudan a obtener la mejor cosecha de uva”
- Inovação Tecnológica (Portuguese): “Uvas vigiadas do espaço produzem melhores vinhos”
- VinoVinoVino (Japanese): “衛星とGoogle Mapsをつかった畑の水分管理予測システム
- Centre of Earth Observation and Digital Earth (Chinese): “欧空局卫星观测信息辅助葡萄农艺生

CONCLUSION

Conclusion

- Service quality relies on EO Satellite data:
  - reliability, delivery time and costs
- Commercial interest from Portugal, Mexico, Argentina, France and Spain in similar services for vineyards
- Farmers are slow adaptors, they:
  - like easy to use & understand dissemination tools
  - need several years of cost benefit analysis

Department of Agriculture: Western Cape expects to fund 3 additional years of service (institutional funding)

  - could be supported by Value Adding Partners

New business opportunity

Please visit www.FruitLook.co.za
Register for free!

THANK YOU!

ANY QUESTIONS?