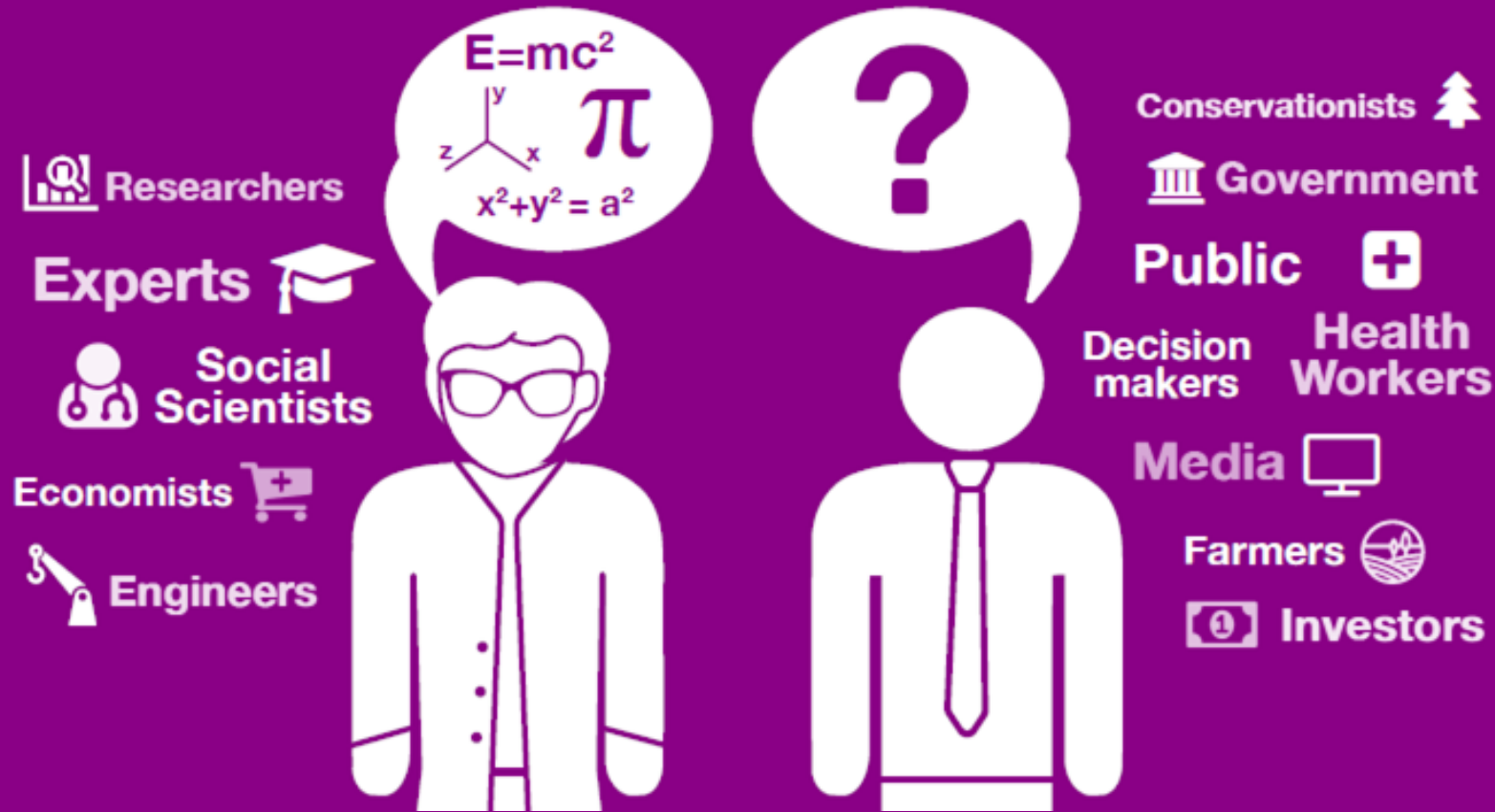


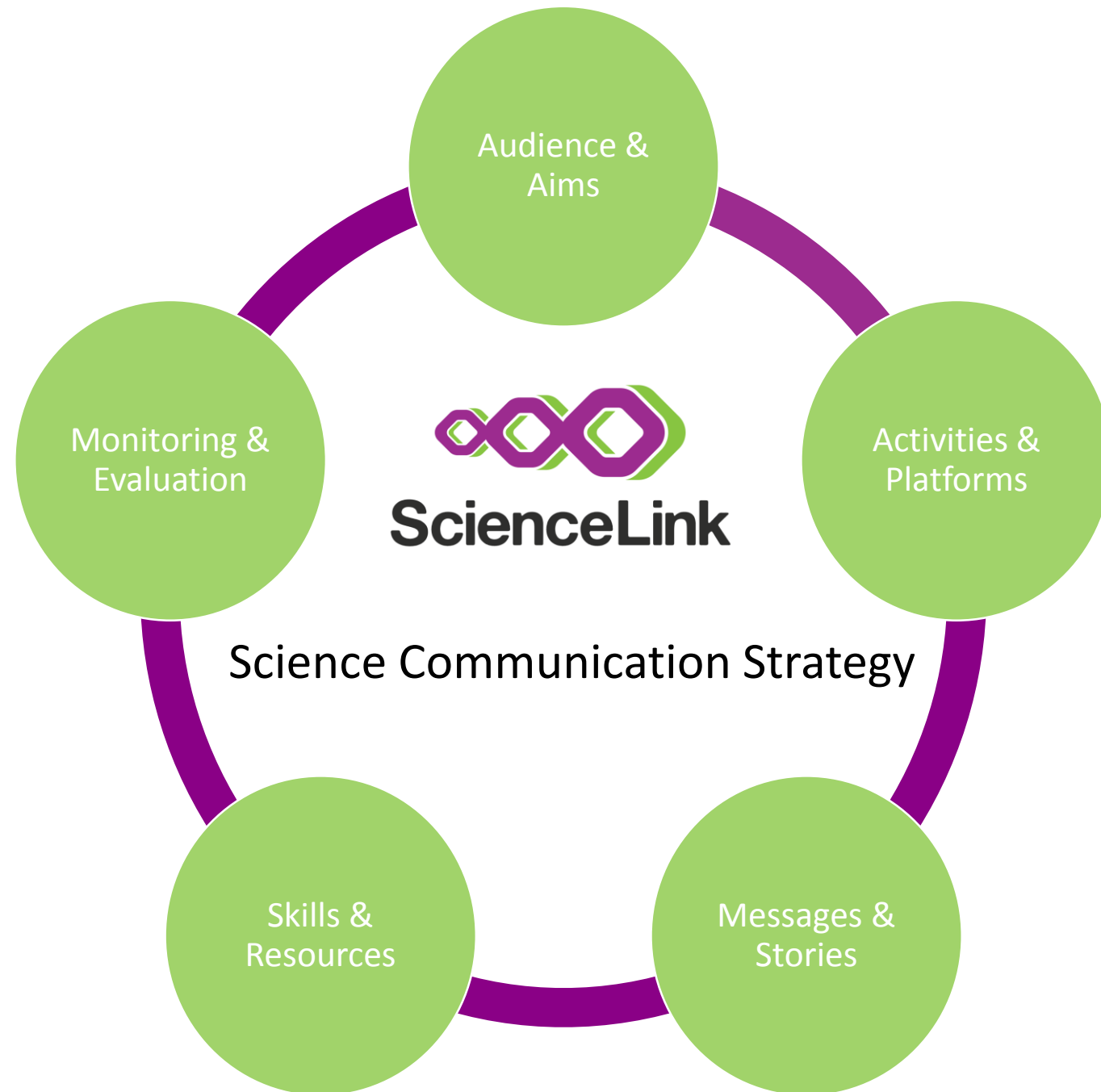
# 5 things #SciComm can do for space science

Anina Mumm | Sibusiso Biyela



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# 1. Technology uptake

## EYE ON FRUIT FARMS

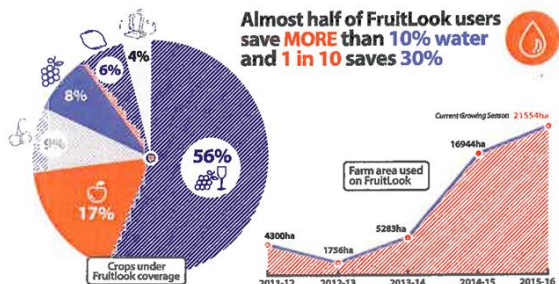
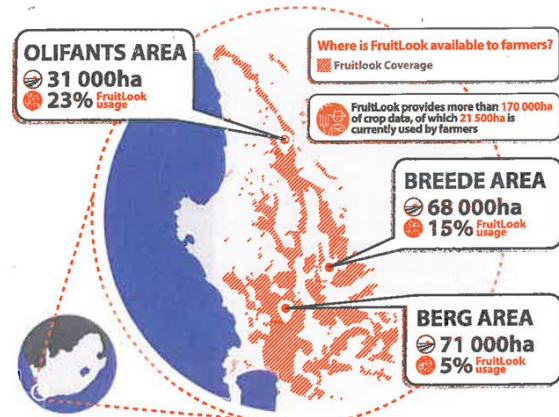
# FruitLook technology assists farmers

JORISNA  
BONTHUYS

*A couple of satellite eyes in the sky are casting a new look on the local fruit industry.*

**T**ogether this constellation of satellites  
- some orbit 800 km high up in the sky  
- allows producers to look at their farms  
and its management in a different light.

fruitlook.co.za is helping farmers optimise water use and improve productivity by providing timely information about crops, using satellite technology



This is thanks to remote sensing and satellite-based spatial data products used in innovative ways, channeling data through an open web portal called FruitLook. This tool - hailed as cutting edge internationally - provides a new generation of agricultural intelligence for the fruit sector.

Says André Roux, from the Western Cape Department of Agriculture, "FruitLook is basically an online tool that uses the latest satellite technology to help farmers precisely manage crop productivity, growth and water use. It has proved to be a useful tool to enhance sustainable farming practices."

What started out as research mainly to look at how grape farmers could increase their water use efficiency in 2007, has since expanded in scope. Roux, departmental director of sustainable resource management, says the technology can be applied on other crops and across climatic regions. "The satellites can for instance tell you how well your crop is growing, how much water it is using and also how effectively it is doing that," says Roux. "The system then enables you to identify areas with weak growth or even pinpoint the particular area in your orchard or vineyard with water shortages."

This can potentially save producers lots of money, especially on irrigation costs.

Currently FruitLook is only available to fruit and wine grape producers in the Western Cape. The area under satellite scrutiny stretches roughly from Lutzville (in the north) to the Hemel en Aarde Valley (in the south) and Robertson (in the east).

"FruitLook offers producers an innovative and up-to-date service that helps them understand what is happening on their farms on a weekly basis, throughout the growing season," says Dr







# fruitlook.co.za

fruitlook.co.za can help farmers identify over-irrigation in parts of their farm



"How should we irrigate this newly planted apple orchard?"  
-Nelius Kapp, SoilRoot Technologies



Nelius Kapp helped an apple farmer in Villiersdorp optimise his irrigation using FruitLook and soil moisture probes.

## fruitlook SAVES YOU MONEY

JORISNA BONTHTUYS

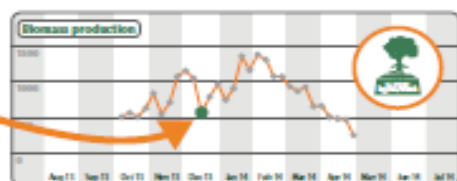
Images generated by satellites orbiting earth's atmosphere, so-called "eyes in the sky", have become really useful tools to keep watch over fruit crops and monitor orchard conditions.

"Although FruitLook cannot tell you what causes lower biomass production on your farm, it can give you a very good idea where to look for reasons for your problems."

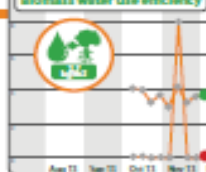
FruitLook, an online tool with satellite derived data that helps producers improve crop productivity and water use, could potentially save farmers thousands of Rand. This is because the satellites use information that is not visible to the naked eye. FruitLook provides producers with spatial data based on the latest satellite information to analyse crop growth and water status, over time and space, as well as in different seasons," explains independent researcher Dr Caron Jamsin. "As such it allows producers to identify

poor growth, crop stress and water shortages." This is possible thanks to the way FruitLook combines satellite derived data with complex algorithms as well as weather data. The tool then "translates" the information into user-friendly maps, which is available for free thanks to a subsidy from the Western Cape Department of Agriculture. FruitLook currently covers an area of 170 000 ha. FruitLook's datasets (growth, water and nutrient related) have proven valuable to many producers, according to Jamsin. Some use it to

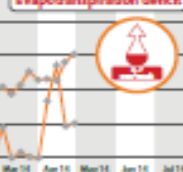
FruitLook data showed that biomass production increased as expected until December 2013, when it dropped substantially.



Biomass water use efficiency

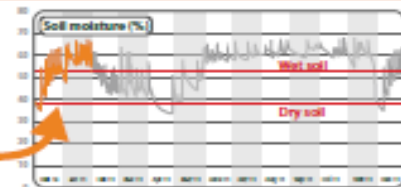


Evapotranspiration deficit



The biomass water use efficiency also decreased over this period, but the evapotranspiration deficit remained constant and close to 0. Taken together, the FruitLook data suggests the apple orchard was over-irrigated during this period.

Soil moisture data from probes confirmed over-irrigation, showing values associated with winter rainfall (high soil moisture) during this summer period.



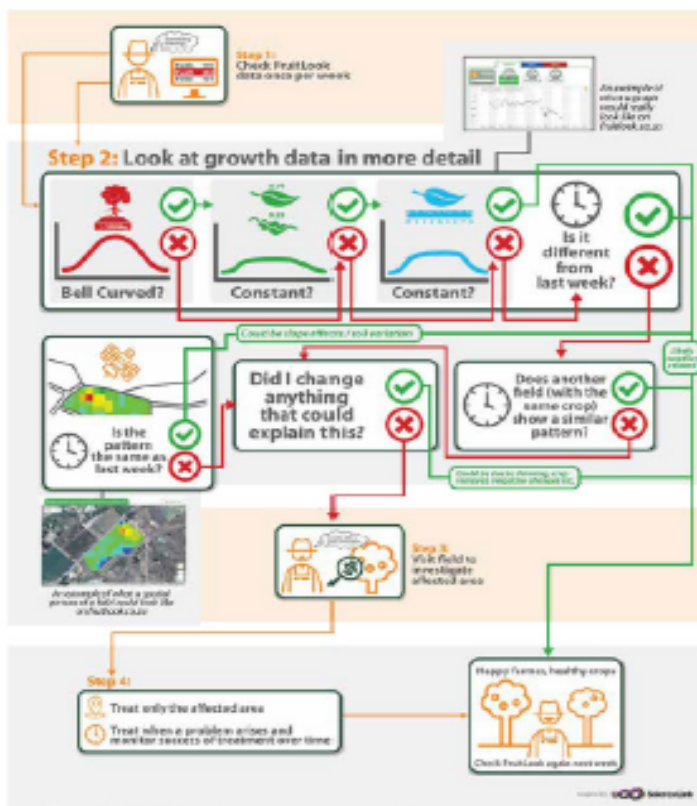
Nelius' analysis helped the farmer better understand his apple orchard's water requirements. The data suggested that less irrigation was required during summer, and possibly more in autumn.



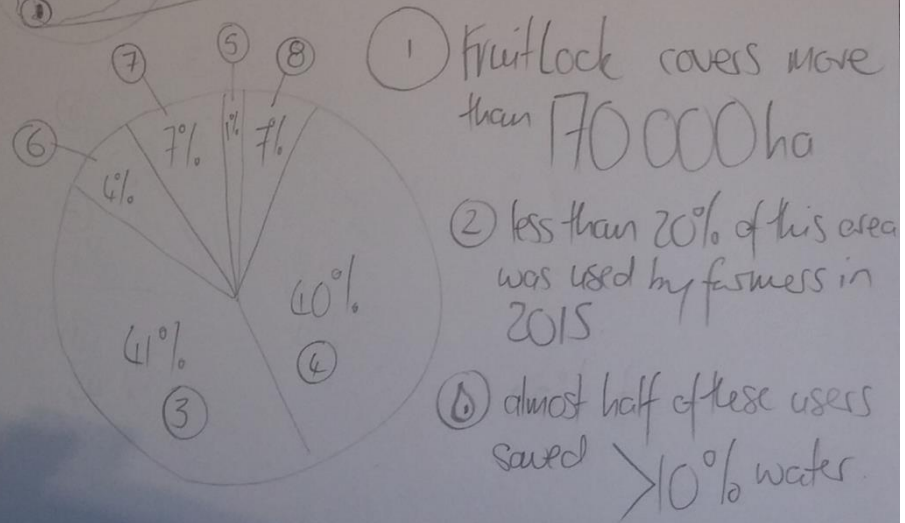
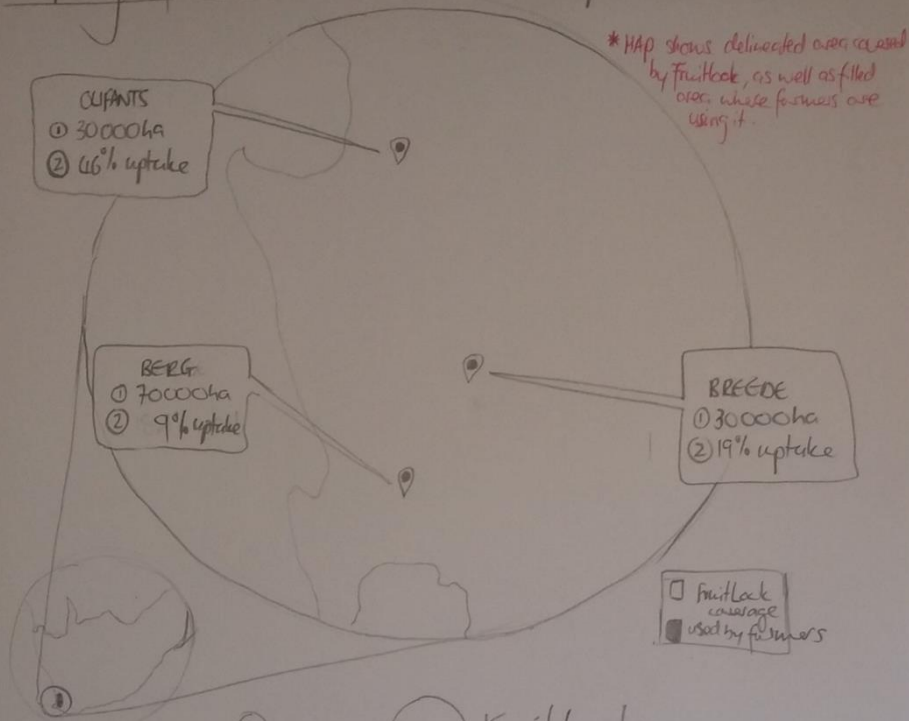
FruitLook data, combined with soil moisture data, helped Nelius optimise irrigation for this orchard, thus preventing water wastage.

fruitlook.co.za provides farmers with data to make better decisions about their farms

Goal: Cut costs and reduce losses by addressing problems **WHERE** and **WHEN** needed  
How? Use FruitLook to pinpoint problems in exact locations and time frames!

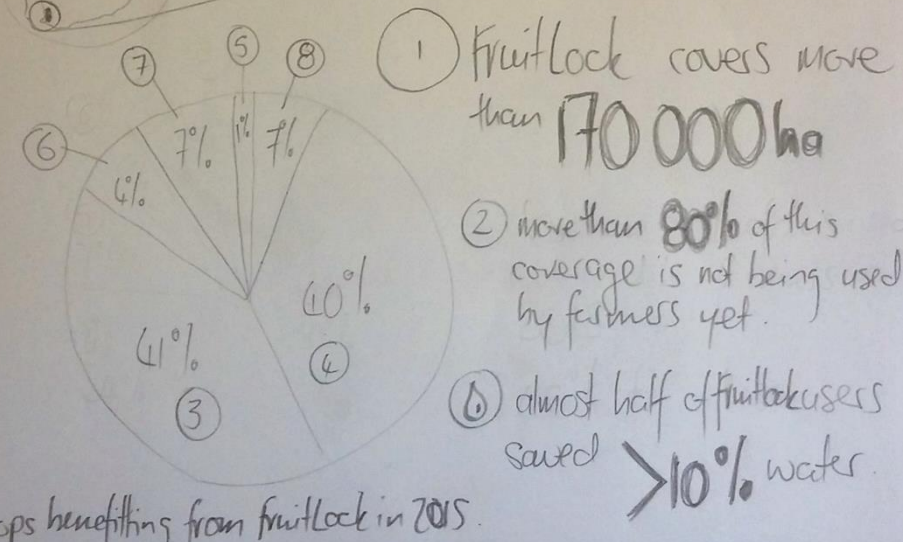
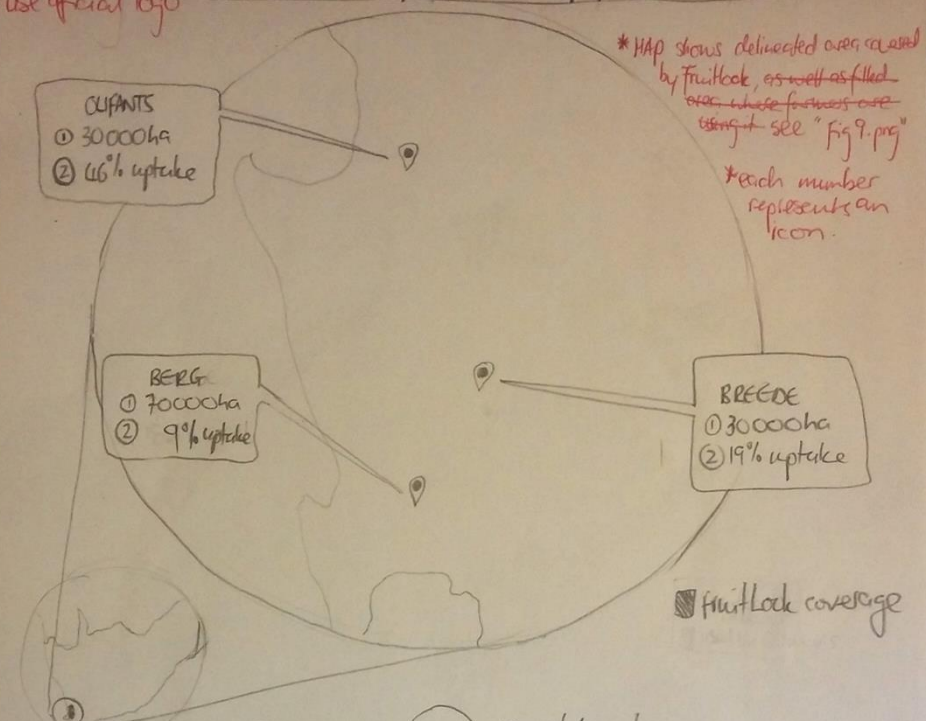


# Helping farmers in the Western Cape save water



# ① fruitlock.co.za is a tool to help farmers <sup>improve</sup> crop productivity / <sup>improve</sup> water use

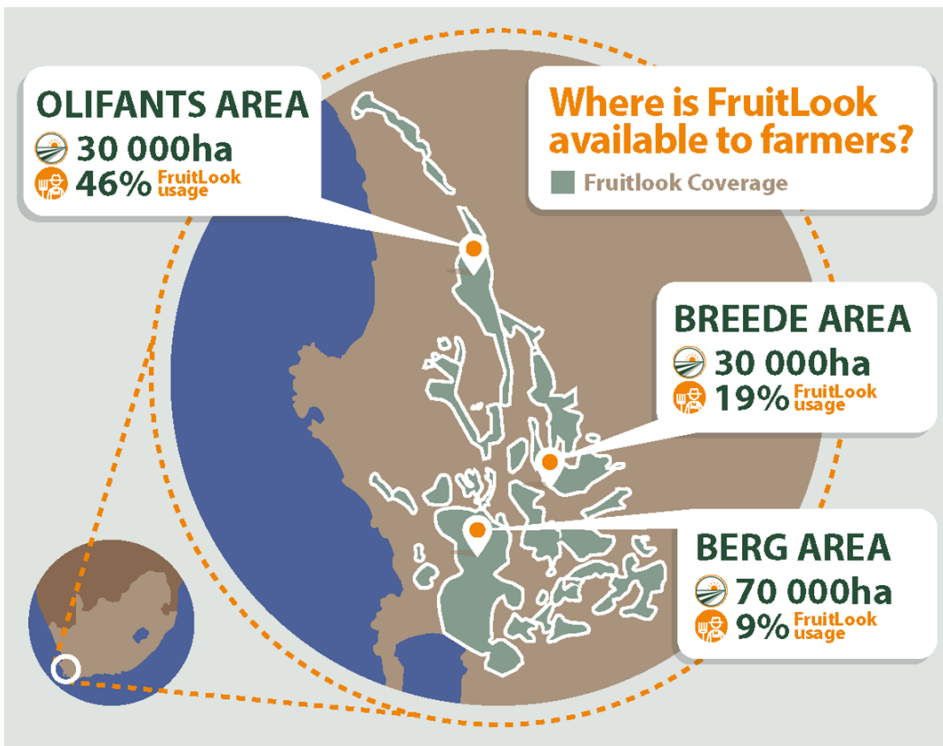
\* use official logo



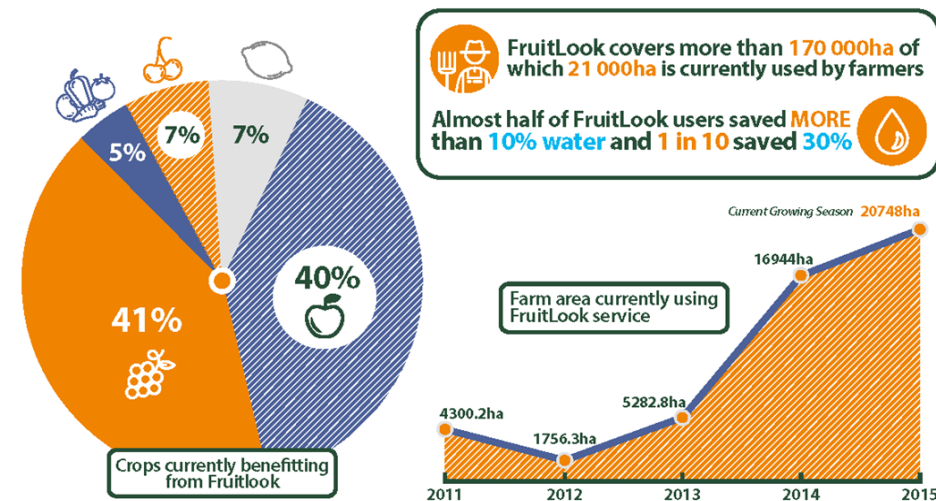
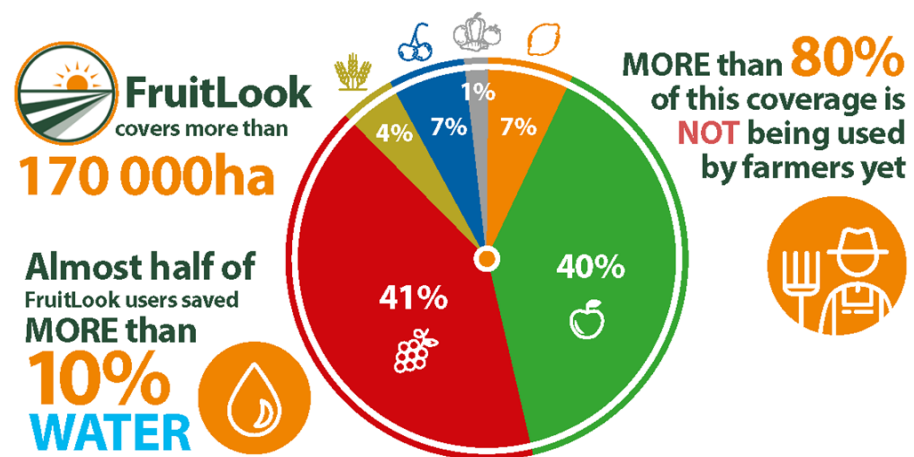
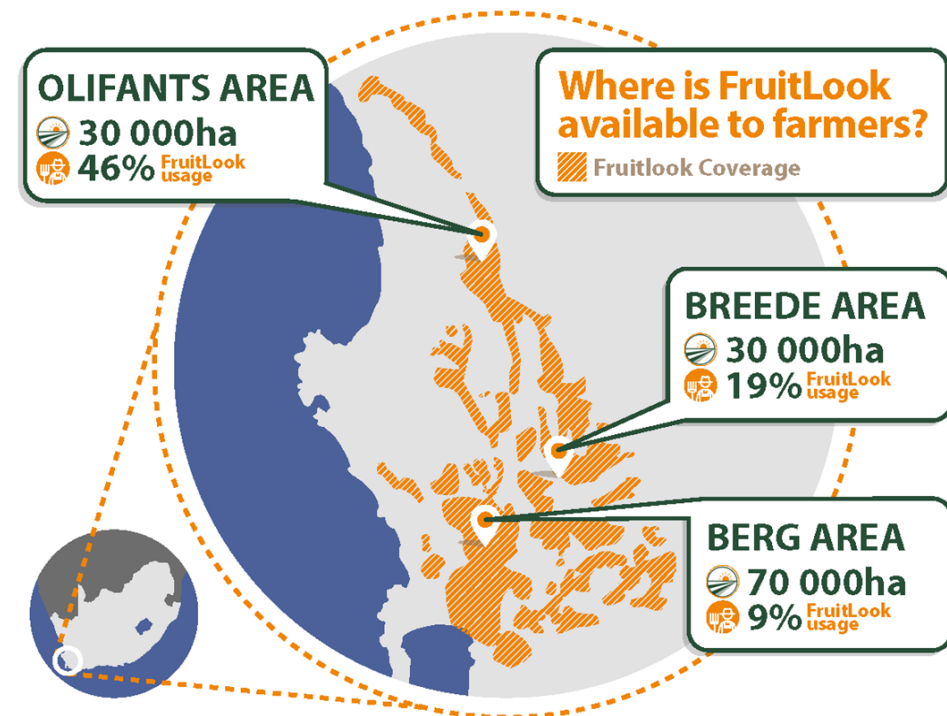
Crops benefitting from FruitLock in 2015.



fruitlook.co.za is helping farmers reduce water use and improve productivity by providing timely information about crops, using satellite technology



fruitlook.co.za is helping farmers reduce water use and improve productivity by providing timely information about crops, using satellite technology



## 2. Build understanding



# 3. Build trust

# Translating your stories

## Atmospheric Dispersion Modelling of Air Emissions from the Shongweni Waste Site

**Ucwaningo Olubheka Ukuhamba Komoya  
Endaweni Yokubeka Imfucuza  
eShongweni**

**Dr Lucian W. Burger**

**7 kuNhlangulana**

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**e 2017**

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4. Empower youth



## 5. Build networks

## Local Climate Solutions for Africa 2017: Water & Climate



### LoCS4Africa 2017

Day One Digest - 22 March 2017 - City of Ekurhuleni



The first day of the LoCS4Africa 2017 Congress saw mayors, dignitaries, experts and researchers from around Africa gather to discuss the challenge of water for cities in the face of an uncertain climate. Mayors endorse the Ekurhuleni Declaration on Water and Sanitation for Cities, the Africa-EU Innovation Alliance for Water and Climate (Afrialliance) initiative was launched, and delegates shared stories of successful water and climate adaptation initiatives. Read more about the day below.



#### African leaders talk water for cities at LoCS4Africa 2017

The LoCS4Africa 2017 congress kicked off on a high note on World Water Day, 22 March. With over 400 registered delegates, 40 Mayors and 100 city representatives from 40 different countries, the congress aims to stimulate engagement and strategic discussions around solutions to water challenges in African cities and climate uncertainties.

[Read more](#)

#### Inspiring innovation in infrastructure development

UWATSAW - The Lake Victoria Region Water and Sanitation Initiative was implemented in small towns around Lake Victoria in Kenya, Uganda and Tanzania. Capacity building of utility managers was found to work best in conjunction with infrastructure improvement.

[Read more](#)



“Africa is the continent most vulnerable to impacts of climate change, and water is the main vehicle through which people experience climate change, be it through drought, flooding or less direct effects.”

— Mxandile Masina, Executive Mayor of Ekurhuleni Municipality



New innovation partnership ‘Afrialliance’ to link water needs and climate solutions in Africa

World Water Day, also Day 1 of the LoCS4Africa 2017 Congress, saw the:

[Read more](#)

#### What are leaders in climate change solutions doing right?

We have good policies, so now the question is how we move from policy to action... Prof Matthew Glasco, Centre for Urban Law and Finance...

[Read more](#)



Partnerships and lessons expected to be key outcomes of LoCS4Africa 2017

Mayors from around Africa uphold ICLEI's Local Climate Solutions for Africa 2017: Water & Climate Congress (LoCS4Africa) as an...

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## Sightings in Space Science



### Biggest solar flare in a decade threatens communication

Our life-giving star, the Sun put on an unforgettable show this September when it erupted in two massive flares, the second of which was the strongest in over a decade.

[READ MORE](#)



#### Keeping an eye on space weather

The recent solar flare might have made world news, but it was just another day at the office for Mpho Tshisaphungo.

[READ MORE](#)



#### Navigating to greater safety for the Air Force

SANSA is helping SAAF keep safe through compass calibration training.

[READ MORE](#)



#### How Sir William Hoy's love for Hermanus made it a town of scientific importance

Sir William Hoy is probably the most loved icon to have ever set foot in the sleepy seaside town of Hermanus in the Western Cape.

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#### New theoretical model describes unusual waves observed in Earth's magnetosphere

SANSA researchers have made an unusual discovery in their quest to better understand Earth's magnetosphere.

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## What's Hot in space science?

### Biggest solar flare in a decade threatens communication

[Back to SANSA November 2017 Newsletter](#)



Our life-giving star, the Sun put on an unforgettable show this September when it erupted in two massive flares, the second of which was the strongest in over a decade. Keeping a close eye on the Sun's activity, SANSA sent out warnings about the coming geomagnetic storm that threatened high frequency (HF) radio and satellite communication such as satellite TV and GPS across large parts of Africa.



SANSA Space Science in Hermanus predicts and monitors solar events, helping South African companies protect themselves against risks and damages associated with these storms.

On the 8th of September, the Sun let out a solar flare weighing in at X2.2, from active region 2673. Just as engineers were getting excited, the same region erupted 3 hours later with a whopping X9.3 flare, so powerful that space scientists at the South African National Space Agency (SANSA), and the rest of the world scrambled to put the word out about this powerful disturbance. The intensity of the radiation caused HF radio blackouts across the daytime side of the Earth that affected communications over Africa, Europe and the Atlantic Ocean.

#### Communications at risk

Solar flares are giant explosions on the surface of the Sun that occur when twisted magnetic field lines suddenly snap, releasing massive amounts of electromagnetic energy into the solar system. This energy can wreak havoc on the electronic systems the world has become dependent on for global communications and navigation, from the simple phone call to the life-saving Global Positioning System (GPS). This poses a particular threat to commercial aircraft navigation systems.



Different view of the X2.2 flare from Sept 8, 2017. On the left, it flashes in a band of full and F11 emission light. On the right, it shows up in both visible and ultraviolet extreme ultraviolet light. The image on the left shows the flare on the Sun's surface and the flare in the solar atmosphere. Credit: NASA/ESA.

Both flares on the day clocked in at the highest of five categories (A, B, C, M, and X) used to rank solar flares, based on their intensity. In this way, the X2.2 being closely followed by the X9.3 was a major event in this cycle of the Sun, which has an 11-year cycle with periods of low and high solar activity.

Beautiful as these events can be (see video below) they carry a sting – high energy charged particles that spew out into space are also associated with solar flare events. These are called Coronal Mass Ejections (CMEs), named after the hot region on the surface of the Sun that they are ejected from.

# 5 things #SciComm can do for space science

Anina Mumm | Sibusiso Biyela

1. Technology uptake
2. Build society's understanding
3. Build society's trust
4. Empower our youth
5. Build networks and collaborations

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