

# Lasting drought in South Africa

Sentinel-2 MSI acquired on **23 November 2017** at 07:52:19 UTC  
Sentinel-2 MSI acquired on **21 April 2018** at 08:15:59 UTC  
Sentinel-2 MSI acquired on **23 November 2018** at 07:52:31 UTC  
Sentinel-2 MSI acquired on **28 November 2019** at 07:52:51 UTC  
Sentinel-2 MSI acquired on **17 December 2019** at 08:23:41 UTC

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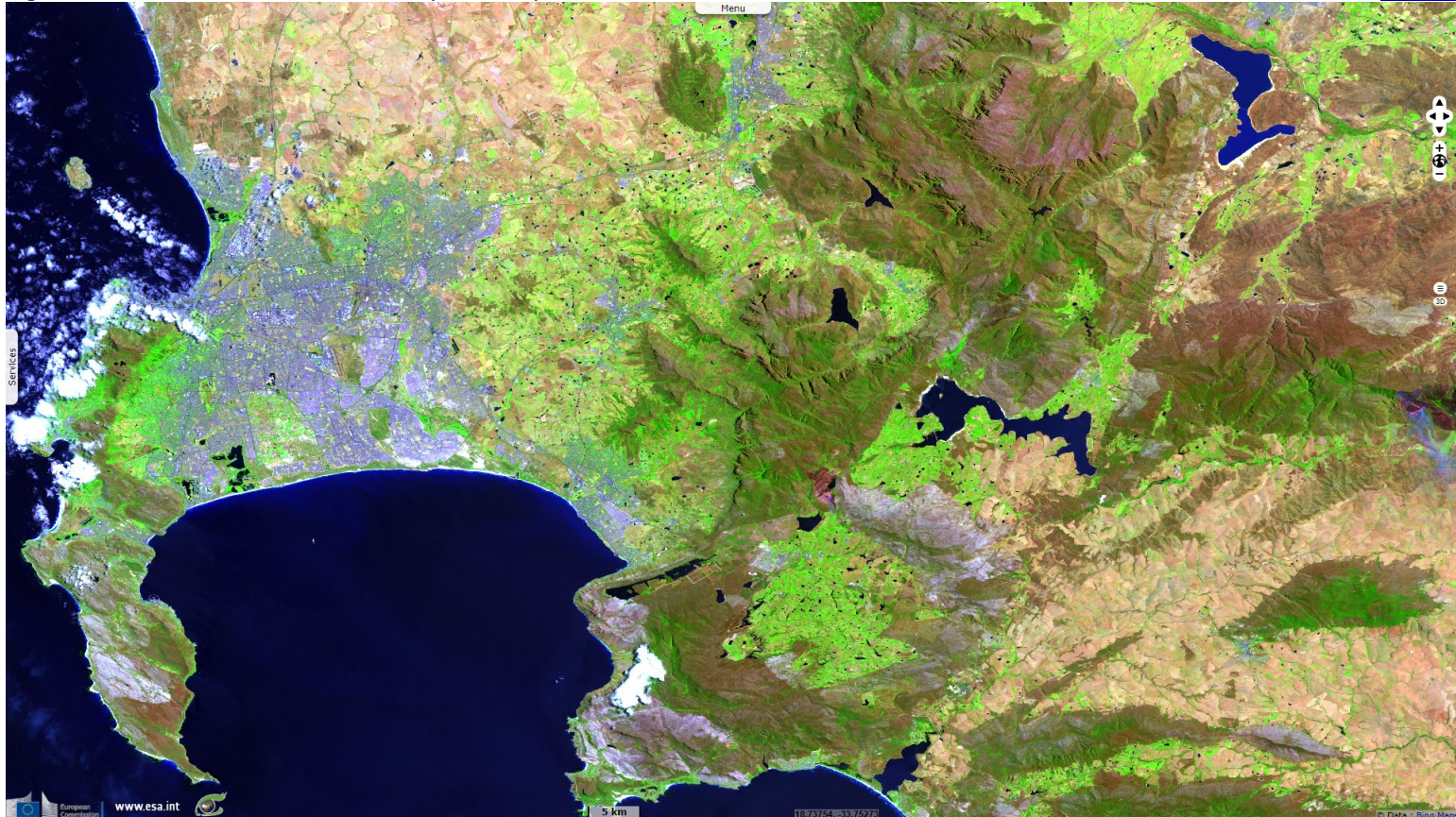
Keyword(s): Climate change, global warming, food security, agriculture, land, drought, precipitations, natural disaster, infrastructure, urban growth, reservoir lake.



[2D Layerstack](#)

Fig. 1 - S2 (17.12.2019) - 11,8,2 colour composite - Cape Town, South Africa, in December 2019

[2D view](#)



North-East Africa faced higher than usual rainfalls in 2019, resulting in numerous flood and landslides within sprawling cities. In contrast, "*An El Niño-triggered drought in 2016 hit agricultural production and economic growth throughout South Africa. Cape Town was particularly hard hit, and lack of good subsequent rains around the city has made its water shortage worse*", [wrote](#) Ed Stoddard for Reuters.

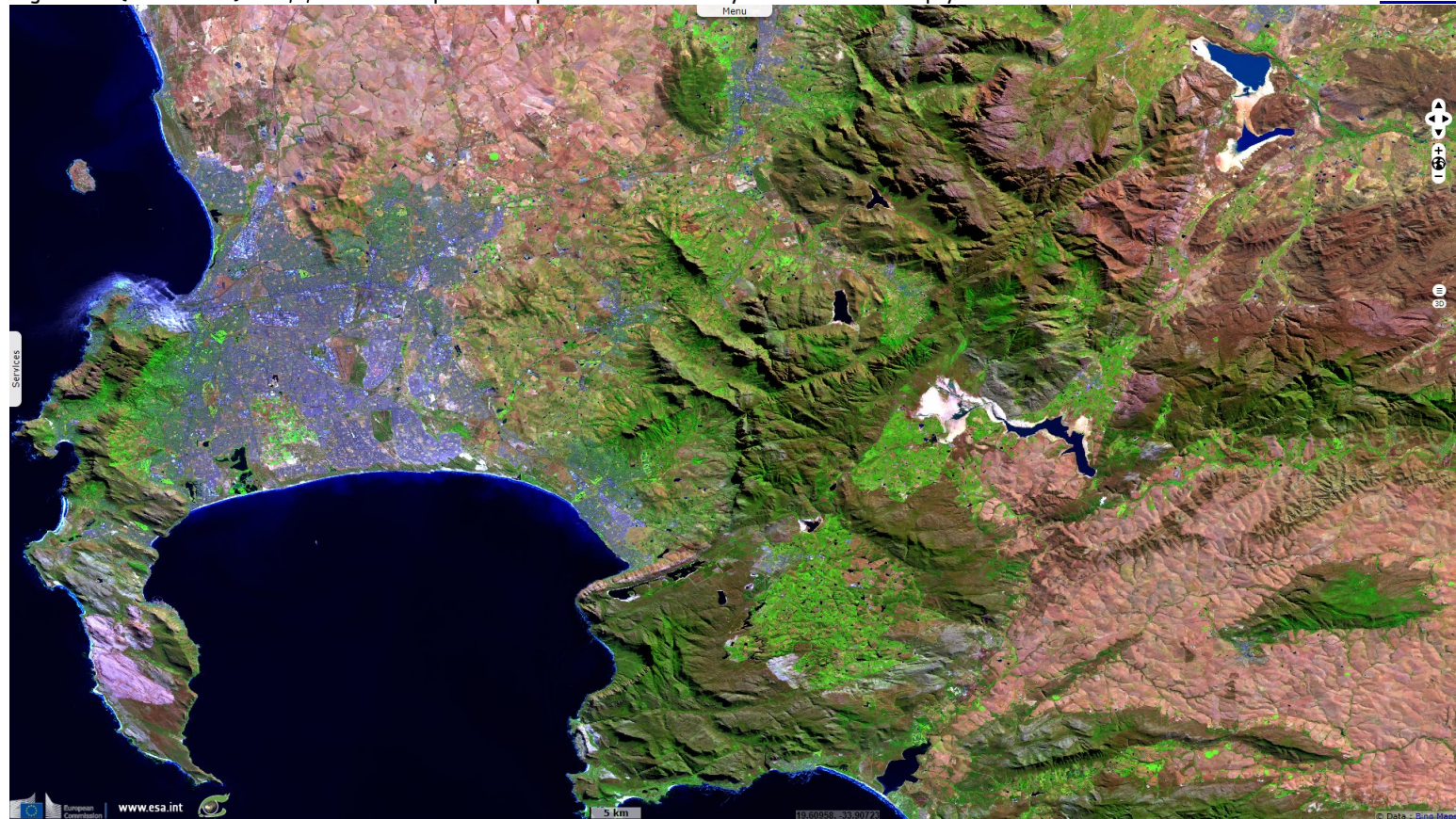
It is the consequence of a sustained below-average monthly rainfall since 2015, which intensified in wet season 2017. In spring 2018, an El Niño event disrupted Southern Africa's annual rainfall. The first effect of this disruption was a delayed sowing date, which was pushed back from late October to early November. In November 2018, a report by the United Nations Office for the Coordination of Humanitarian Affairs (OCHA) reported an 80% likelihood of the El Niño event continuing until December.

"*This development follows stark drought episodes in the broader Southern African region on the back of the 2014 El Niño, which has been recognized globally as the most severe drought in 20 years.*" [reminds](#) Dhesigen Naidoo, the South Africa-based Chief Executive Officer of the Water Research Commission of Brookings Institution.



Fig. 2 - S2 (21.04.2018) - 11,8,2 colour composite - Cape Town close to Day Zero with near-empty reservoirs.

[2D view](#)

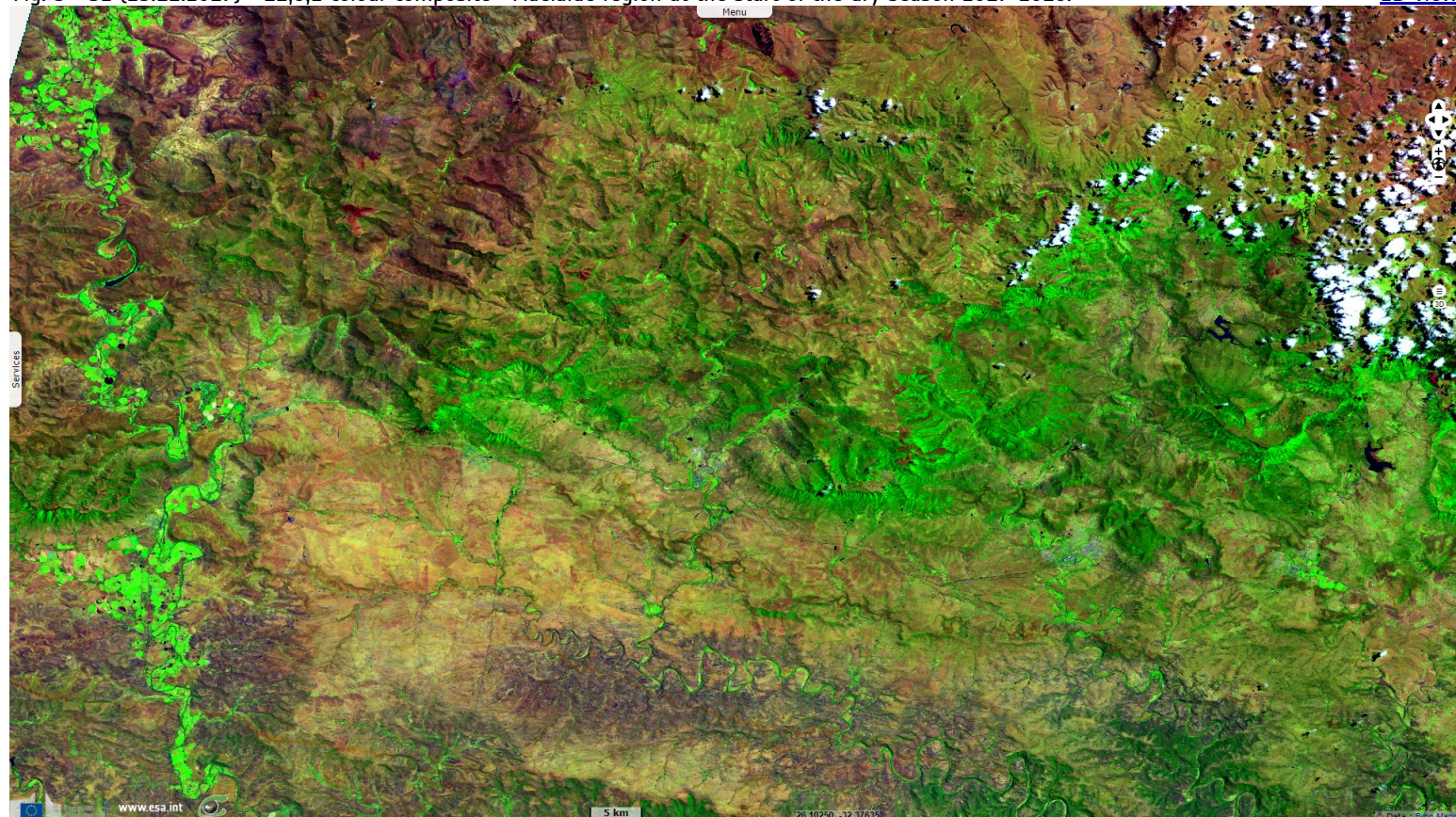


For Cape Town, the impact was very real: "Amid its worst drought since records began, the city — and the Western Cape province more broadly — is speeding towards a so-called Day Zero. This is when dam levels fall to 13.5 percent capacity, meaning that the taps must be turned off, forcing 4 million residents to instead queue for water.", Justina Crabtree [published](#) for CNBC.

Richard Pérez-Peña then [commented](#) for the New-York Times: "Though consumption is down sharply, most residents have not met the 50-liter restriction, a point of tension in a city that encompasses both luxurious homes with pools and gardens, and shanty towns with communal taps." It is to be compared with an average consumption above 300 litres a day for the average Canadians or American and the 420 litres Californians used daily when its drought dragged into the summer of 2016.

Fig. 3 - S2 (23.11.2017) - 11,8,2 colour composite - Adelaide region at the start of the dry season 2017-2018.

[2D view](#)



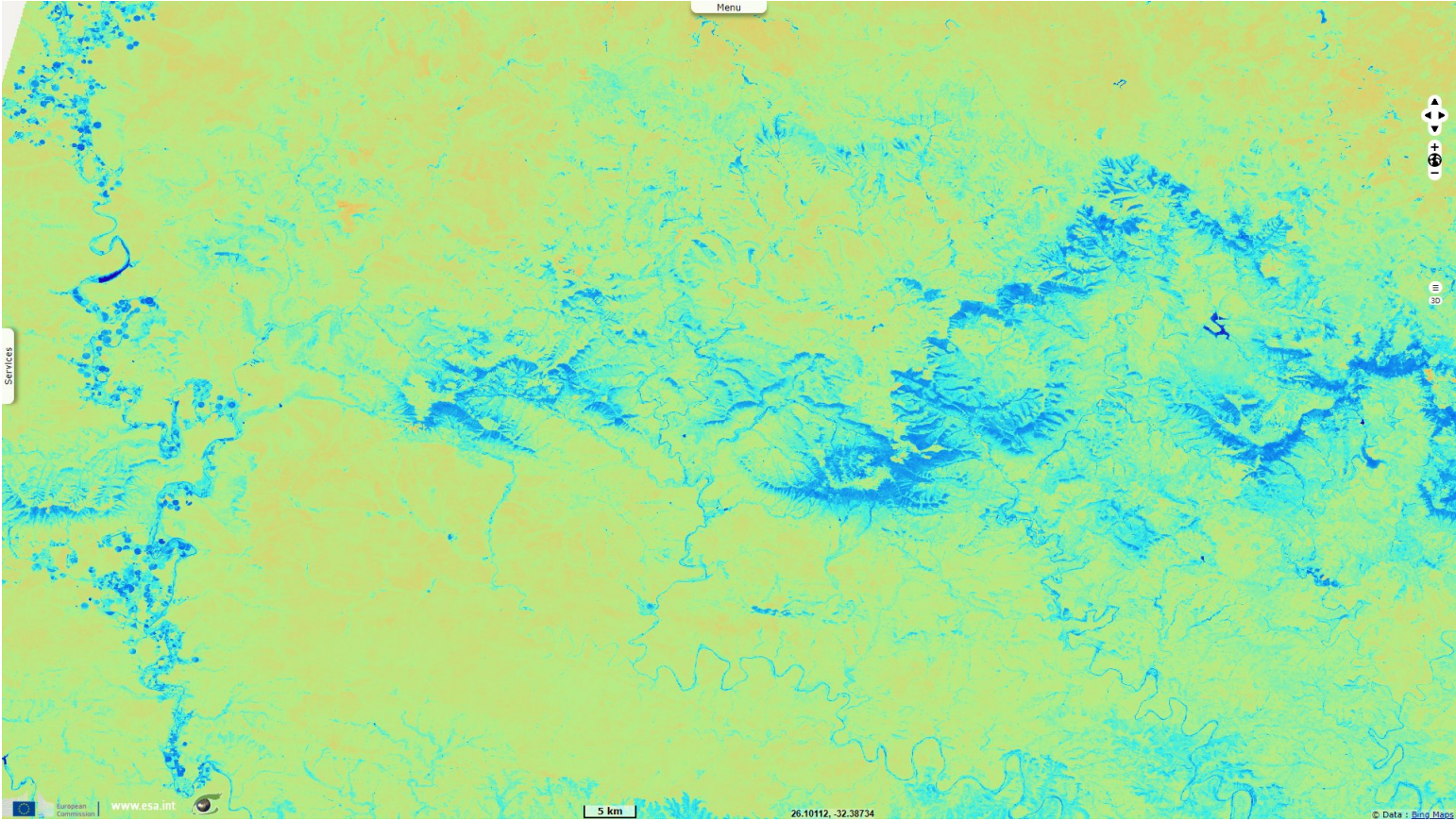
Cape Town finally avoided Day Zero. In February 2018, a statement by the City's Executive Deputy Mayor, Alderman Ian Neilson, [said](#): "This week's lower rate of consumption can be attributed to the Groenland water reaching Steenbras Upper Dam last week and slightly increasing the dam level, as well as to a further reduction in Cape Town's weekly average demand to 523 megalitres per day (MLD) compared to 1130MLD in 2014." He [added](#): "A total of 7.3 million cubic metres was released to Steenbras Upper Dam", equivalent to 1800 litres by person of 36 days worth of



restricted water consumption.

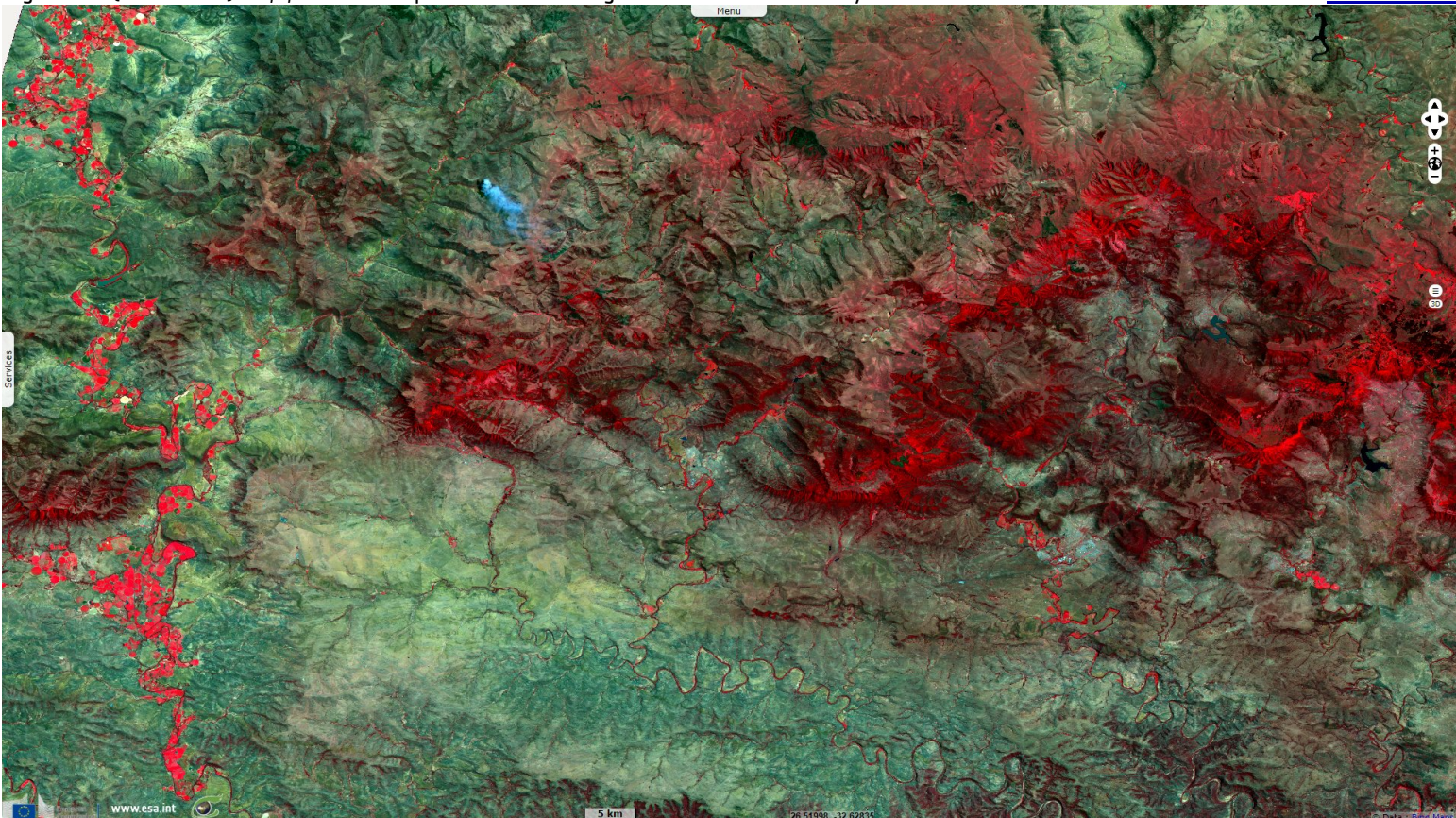
The challenge of durably avoiding Day Zero is a difficult one as the city's population has grown almost 40% in the last 20 years. Krista Mahr [lists](#) several approaches leading to long-term solutions: "By then, however, the city hopes to boost the city's water supply through methods that don't rely on rainfall, like repairing water delivery infrastructure, drilling boreholes to access groundwater, desalination, and water re-use." "By clearing non-native plants that are sucking up 38 million cubic metres of precious water each year, Cape Town could be getting 7% more water annually."

Fig. 4 - S2 (23.11.2017) - NDI(8,11) with colour map - The Normalized Difference Water Index is sensitive to the water content of leaves. [2D view](#)



South African president Ramaphosa, who succeeded Jacob Zuma - impeached after several corruption scandals - declared: "*Serious accountability and governance issues persist, whether it is in the building of infrastructure or at a municipal level, where water losses are mounting as a result of billing errors, unauthorised usage and outright theft. 'Just a week ago, the Special Investigating Unit raided Lepelle Northern Water in connection with alleged corruption at the Giyani Water Project. The amount allegedly involved – R2 billion [125 million euros] – is staggering, but unfortunately symptomatic of wide scale tender corruption in these mega projects'.*"

Fig. 5 - S2 (23.11.2018) - 8,4,3 colour composite - Adelaide region at the start of the dry season 2018-2019. [2D animation](#)



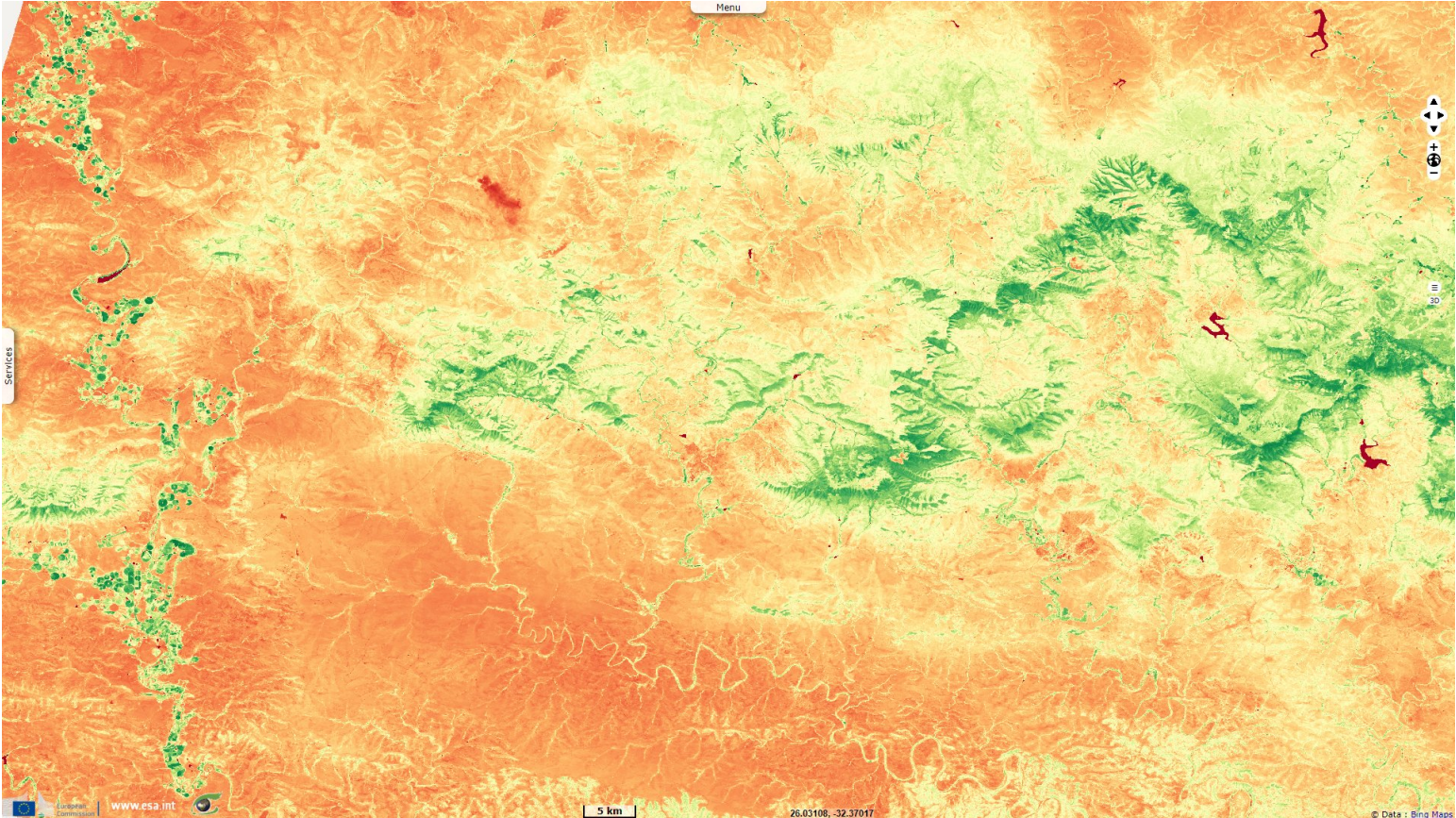


While Cape Town finally received rainfalls in 2019, most of Southern Africa still suffered from a drought in 2019: The Food and Agriculture Organization of the United Nations [alerted](#) in January 2019: *"Since the start of the 2018/19 cropping season in October, anomalous dry conditions have developed across parts of Southern Africa, with more intense moisture deficits registered in Botswana, Namibia and South Africa, in addition to the western parts of Madagascar. In South Africa, the largest rainfall deficits were recorded in western provinces of Northern Cape and Western Cape, where cumulative rains between October and December were more than 50 percent below average."*

It later [completed](#): *"The October 2018 to March 2019 rainy season in Southern Africa started nearly a month late, and rainfall totals to date are significantly below average across much of the region"*

Fig. 6 - S2 (23.11.2018) - NDI(8,4) - The Normalized Difference Vegetation Index is sensitive to the chlorophyll content of leaves.

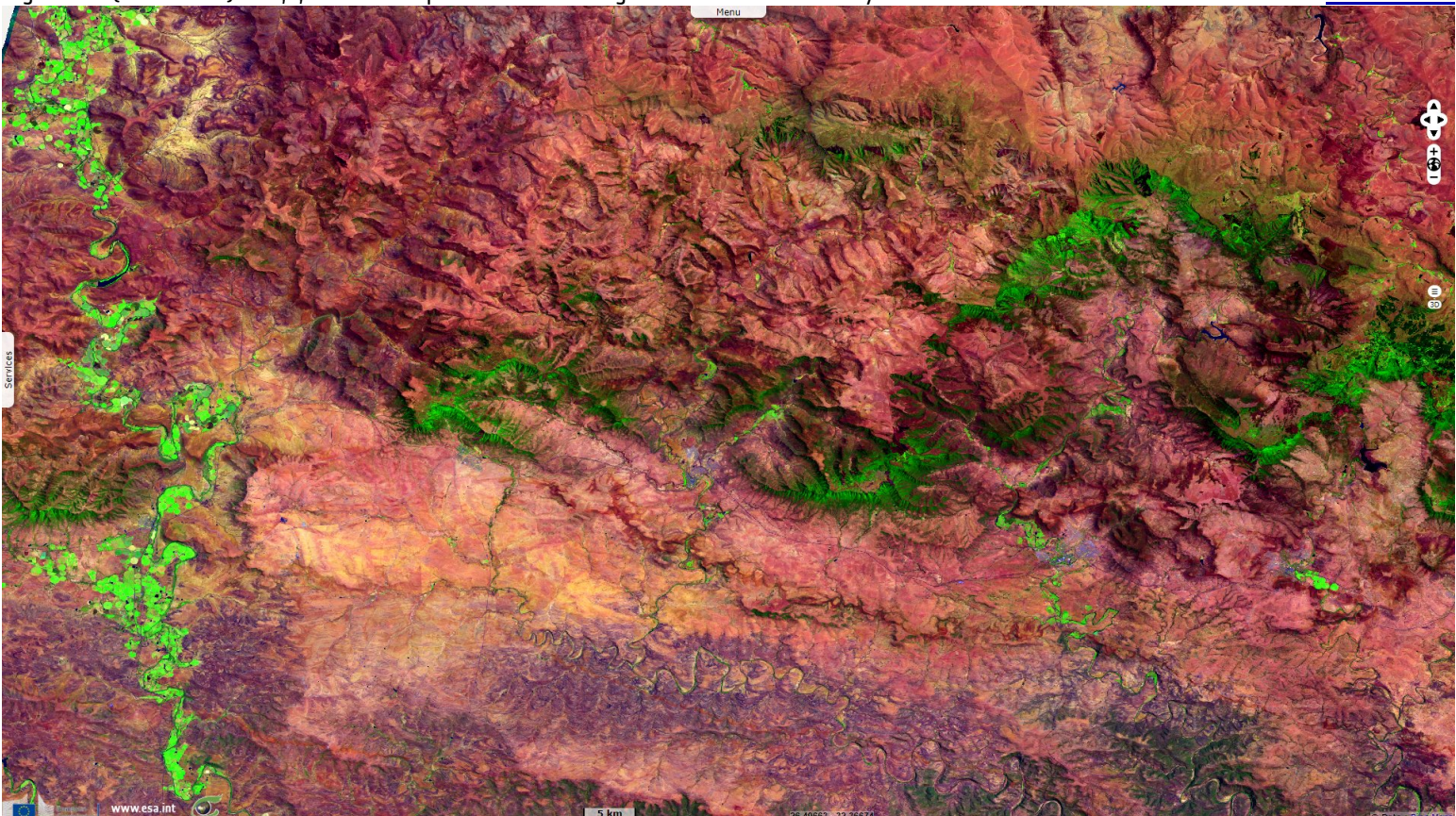
[2D animation](#)



A report published on 19 December 2019 by the UN OCHA [announced](#): *"More than a quarter of the population in Lesotho - over half a million people - are facing severe food insecurity as the country approaches the peak of the 2019/2020 lean season in the grip of a devastating drought."*

Fig. 7 - S2 (28.11.2019) - 11,8,2 colour composite - Adelaide region at the start of the dry season 2019-2020.

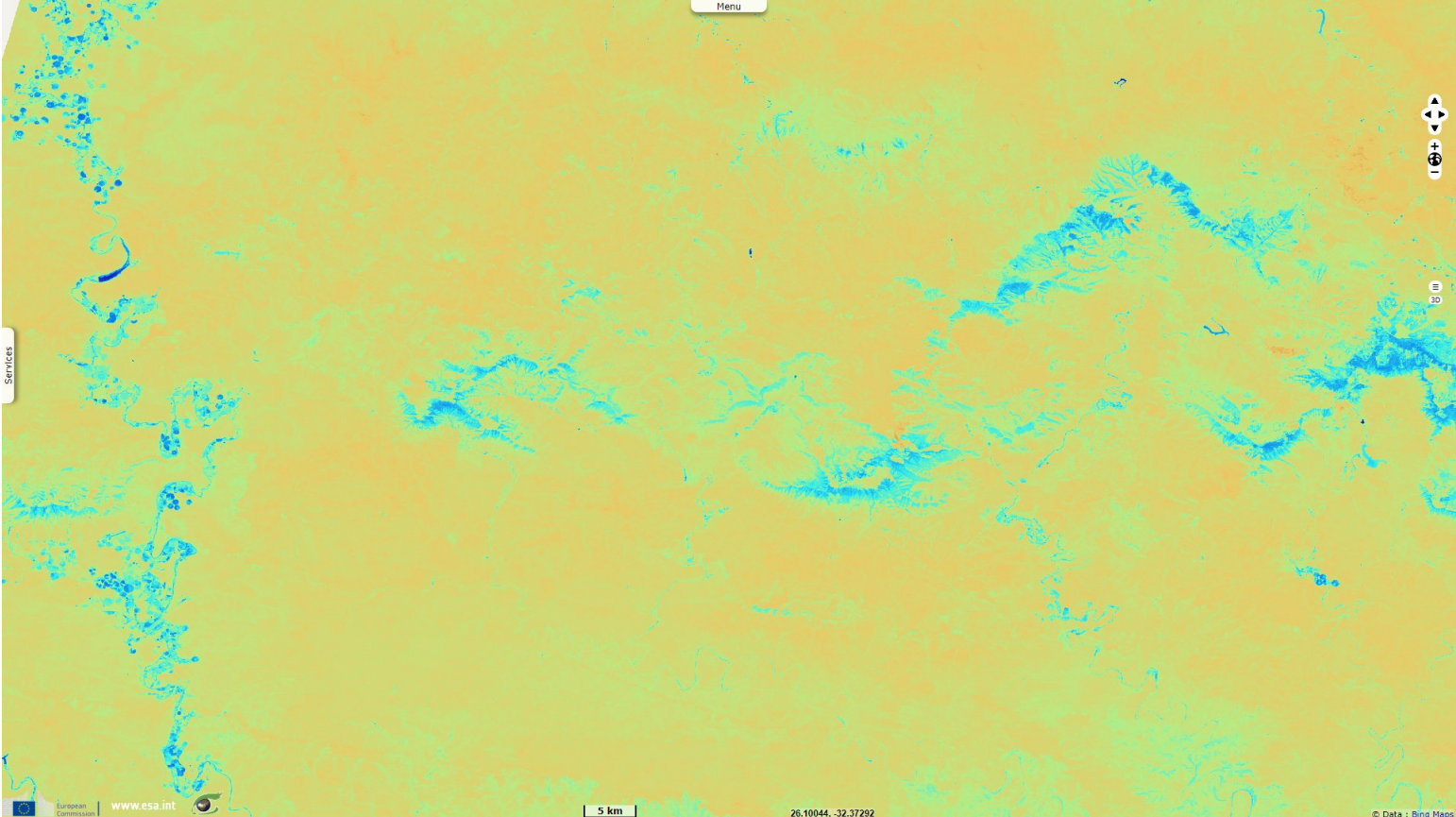
[2D animation](#)





On 14.12.2019, Agence France Presse (AFP) [related](#) whole areas in Eastern Cape province have not received any significant rainfall for the past five or six years at least. Facing its worst drought in 35 years, Southern Africa is warming twice faster than the rest of the planet. Within Adelaide township, there is no water to drinking, cooking, going to the toilet or washing according to the school principal. For some, NGO Gift of the Givers supplying is the only source of water, yet still insufficient for washing. Crop productivity is greatly reduced, farmers are forced to sell part of their cattle at discounted price or see them starve to death.

Fig. 8 - S2 (28.11.2019) - NDI(8,11) - The vegetation is already much drier than usual while the austral summer has just started. [2D animation](#)















Dhesigen Naidoo [analyses](#) the big picture: *"Core to every analysis of these drought episodes, and extreme weather events in general, is the phenomenon of a change in Southern African climate on the back of global climate change. There is a growing political acceptance of the concept of a "new normal"— a term that has found resonance in platforms like the African Union (AU) African Ministers Council on Water.*

*This "new normal" has precipitated changes that have had a profound impact economically, with direct and dramatic losses in earnings at many levels experienced by individuals, as well as countries' GDPs and growth rates.*

*The second impact of the new normal is social. Climate change events are directly reducing livelihood opportunities, with citizens eking out a living from a rapidly degrading environment in the short-term."*

*The views expressed herein can in no way be taken to reflect the official opinion of the European Space Agency or the European Union.  
Contains modified Copernicus Sentinel data 2019, processed by VisioTerra.*

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