

Continuous observations of CO₂, H₂O and CH₄ exchange in an East-African rangeland

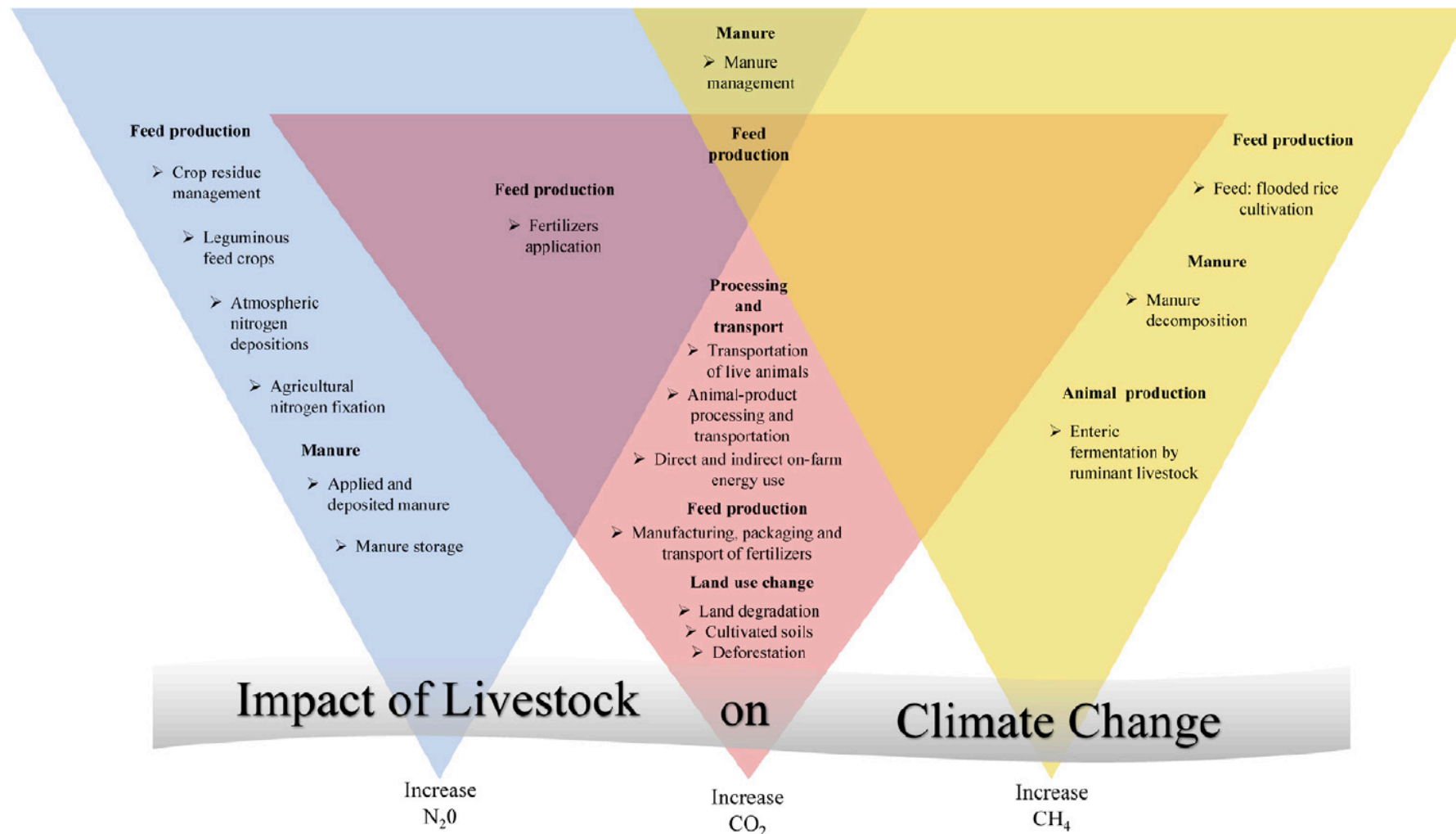
Lutz Merbold¹, Thomas Dowling², Sonja Leitner¹, Martin Wooster², Anton Vrieling³, Francesco Fava¹ Ilona Glücks¹

¹ International Livestock Research Institute, ² Kings College London, ³ University of Twente

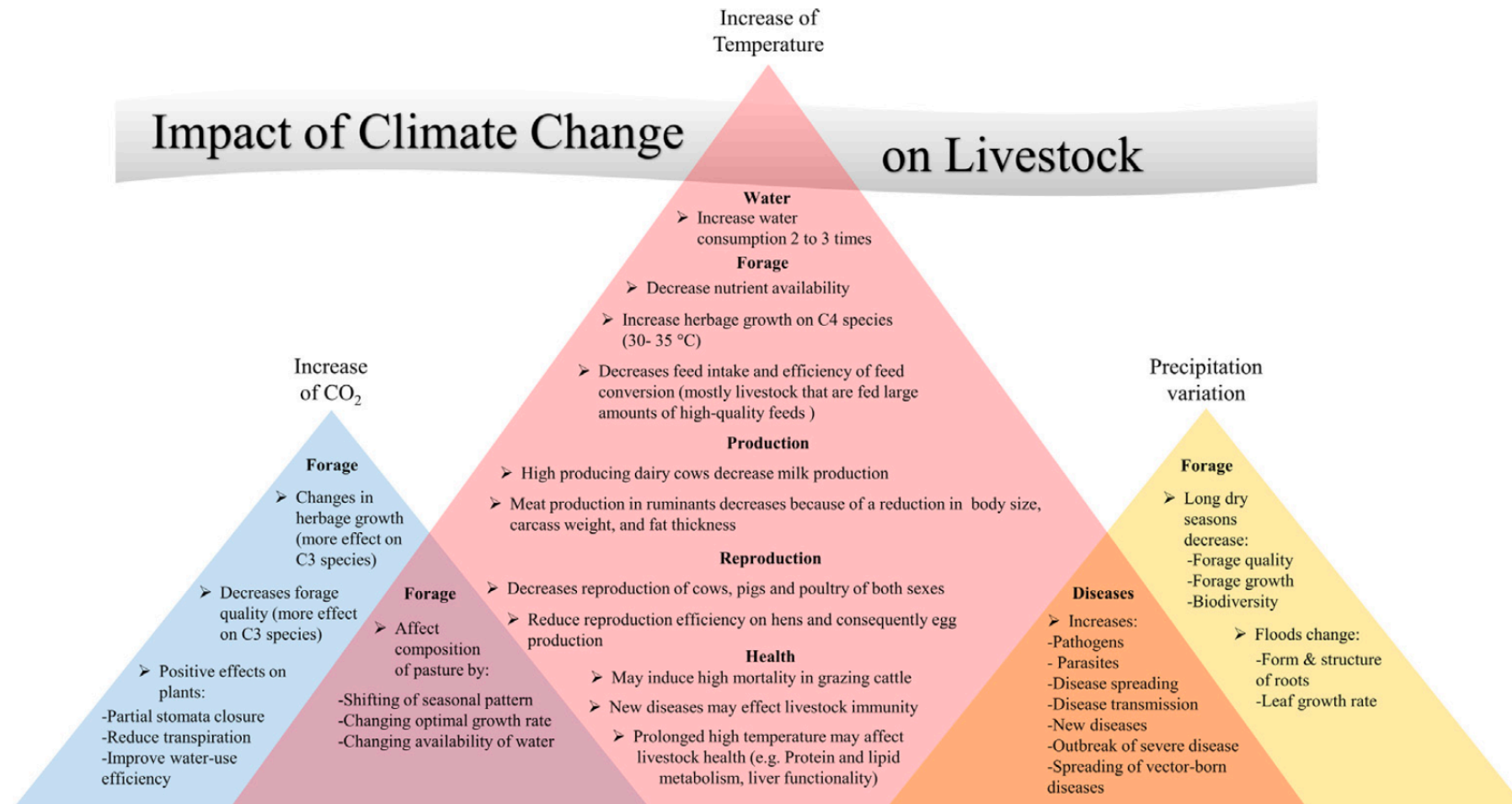
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Livestock Systems -> Climate Change



Climate Change -> Livestock Systems



Research question and approach

What is the greenhouse gas exchange (CO_2 , CH_4 , (N_2O)) of East African drylands/rangelands?

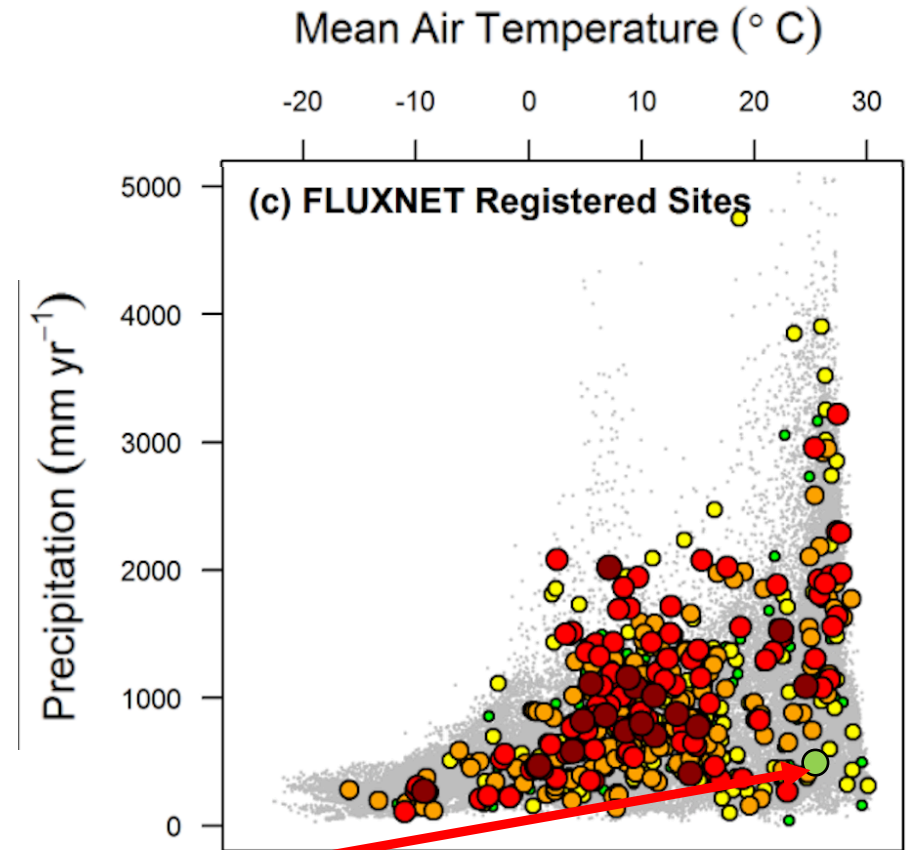
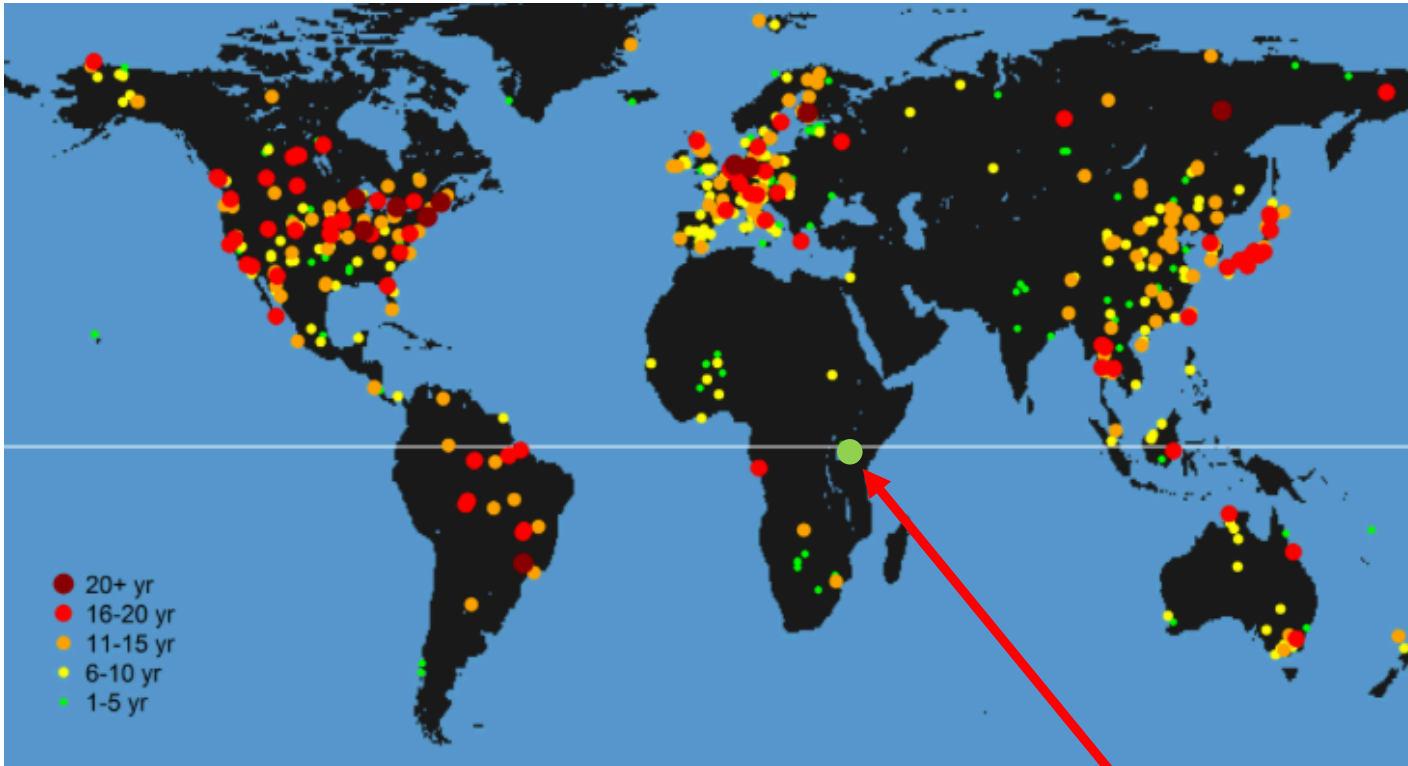
- Kapiti Research Station as a benchmark compared to many other (often degraded) rangelands
- Ecosystem scale measurements of CO_2 , CH_4 to also include fauna and link to remote sensing/satellite products

Site overview



Kapiti Research Station Flux site (hopefully soon to be in Fluxnet)

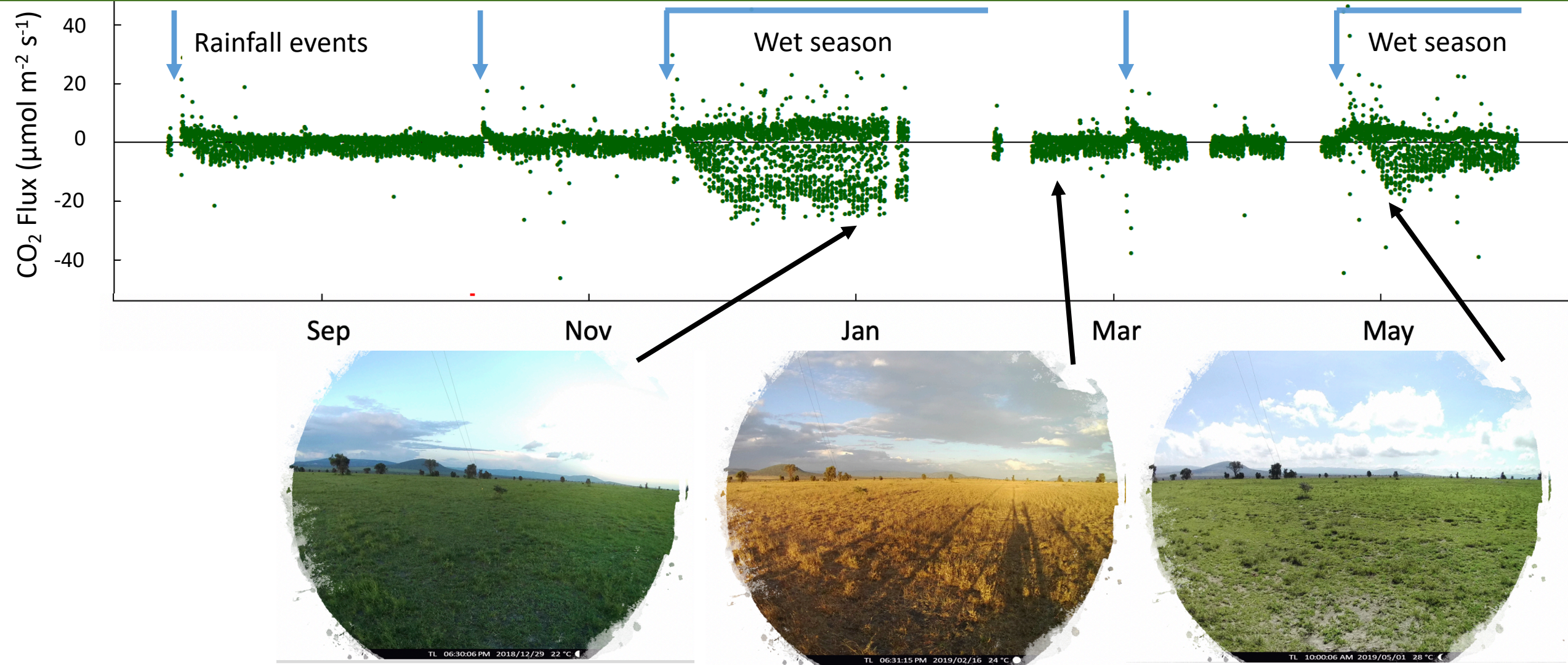
The Fluxnet network in 2016 (www.fluxnet.org)



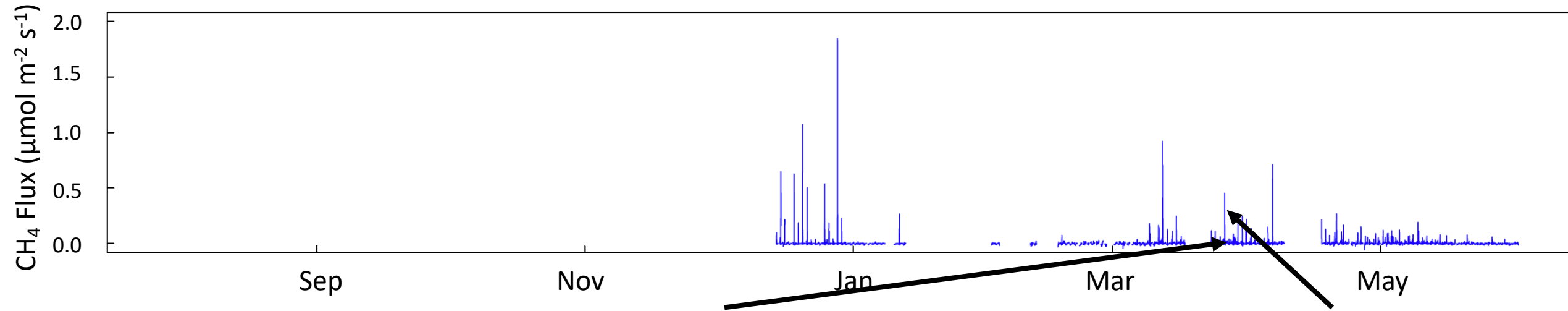
Climatic regions covered by fluxtowers

Kapiti Research Station (not yet registered)

Effects of moisture on vegetation -> CO₂



Methane emissions depend on livestock presence



Best guess “carbon budget” of the site

Average net CO₂-C exchange: -0.5 g C m⁻² d⁻¹

CO₂-C Accumulation over 365 days: -182.5 g C m⁻²

Average net CH₄-C exchange: 0.005 g C m⁻² d⁻¹ (this does account for livestock emissions at night when in enclosures – thus underestimated!)

CH₄-C Accumulation over 365 days: 1.85 g C m⁻²

Global Warming Potential (CO₂-eq.):

-139 g CO₂-C eq. m⁻² yr⁻¹

Next steps...

delay in analysis due to COVID-19 and urgent contingency planning

- Data analysis for >1.5 years
- How to extrapolate CH₄ emissions from livestock to whole day and account for exclosures?
- Link to remote sensing products (wildlife & phenocameras)
- Assess the effects of irregular seasonality

-> the site is currently not accessible

