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# Harnessing Satellite Data: Combating Rabies in Northern South Africa


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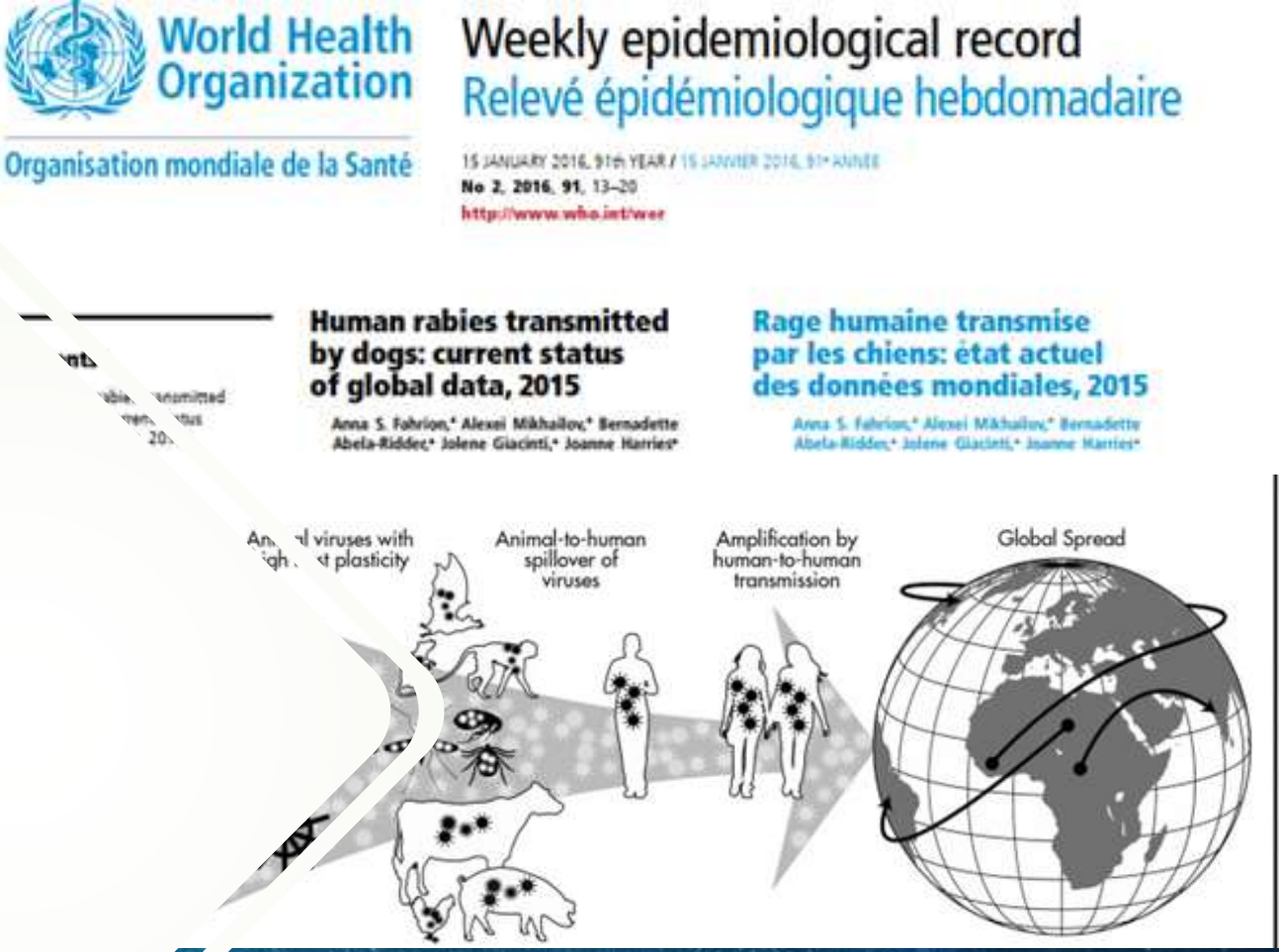
# Why Earth Observation Enhances Rabies Combat Strategies-Value

- Earth Observation provides real-time environmental data to track disease risk areas.
- Satellite data helps identify habitats conducive to rabies host species.
- Combining Earth Observation with AI approaches improves outbreak prediction accuracy.
- Supports targeted vaccination campaigns and resource allocation.
- EO data bridges gaps in surveillance, especially in remote and rural regions.



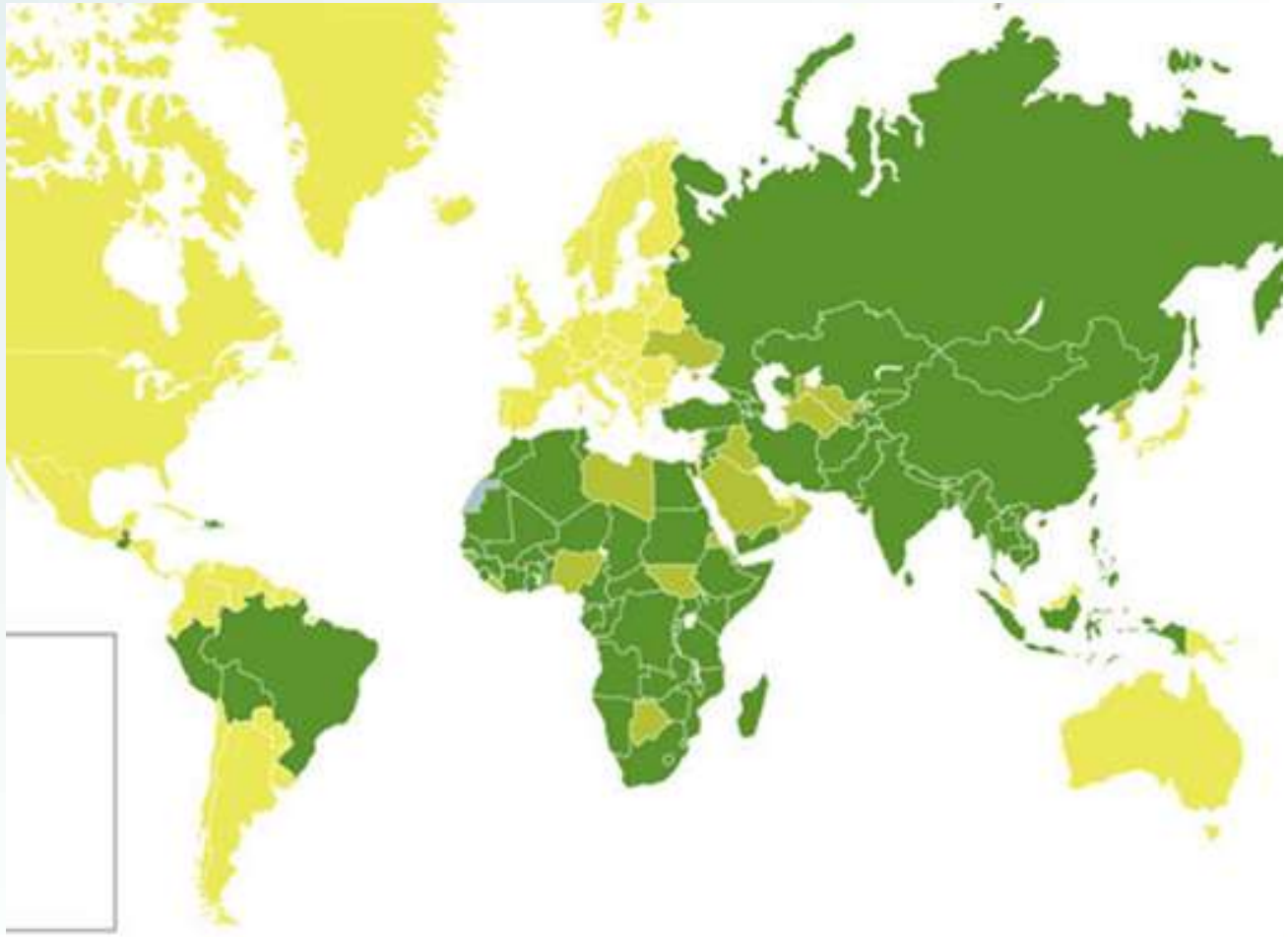

# What do we know?

Rabies is a zoonotic infectious disease affects all mammals (*Rhabdoviridae* family).

Estimated 59 000 human deaths annually (average 20 cases in South Africa).

The majority-deaths are dog-mediated and occur  rural areas (Africa & Asian).

Safe and efficacious anti-rabies vaccine are available.



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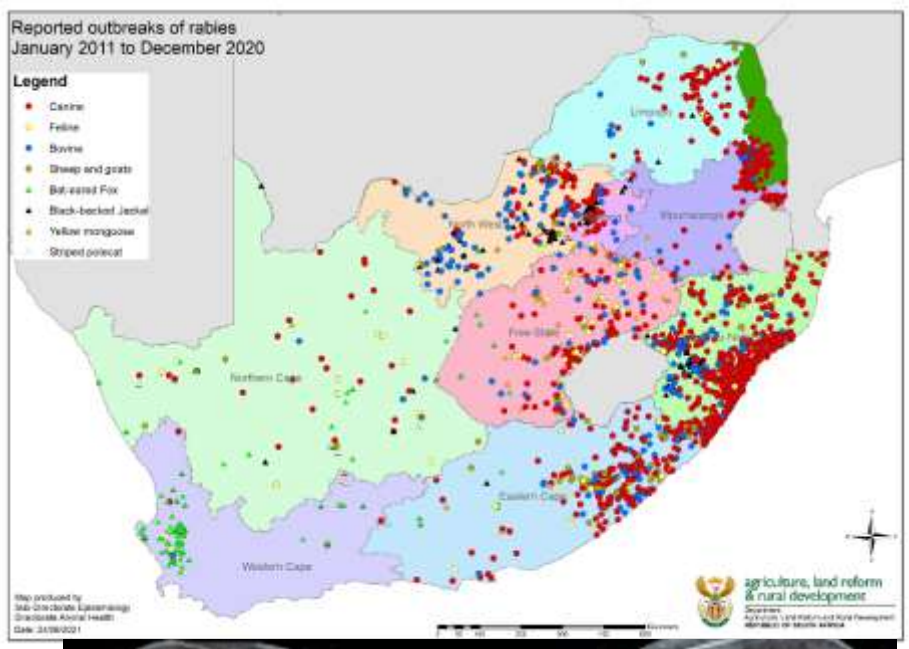
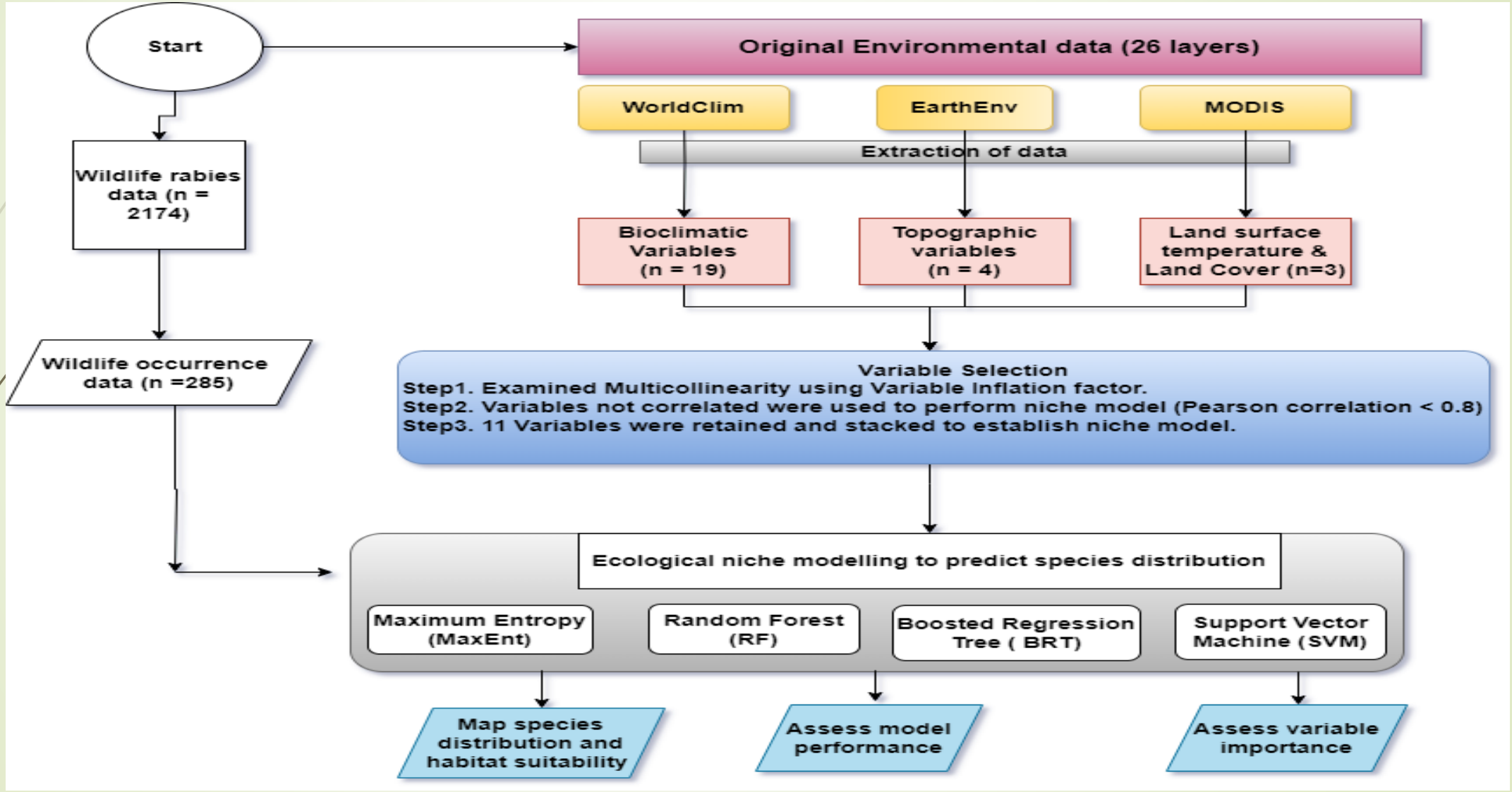
# What do we know for SA?

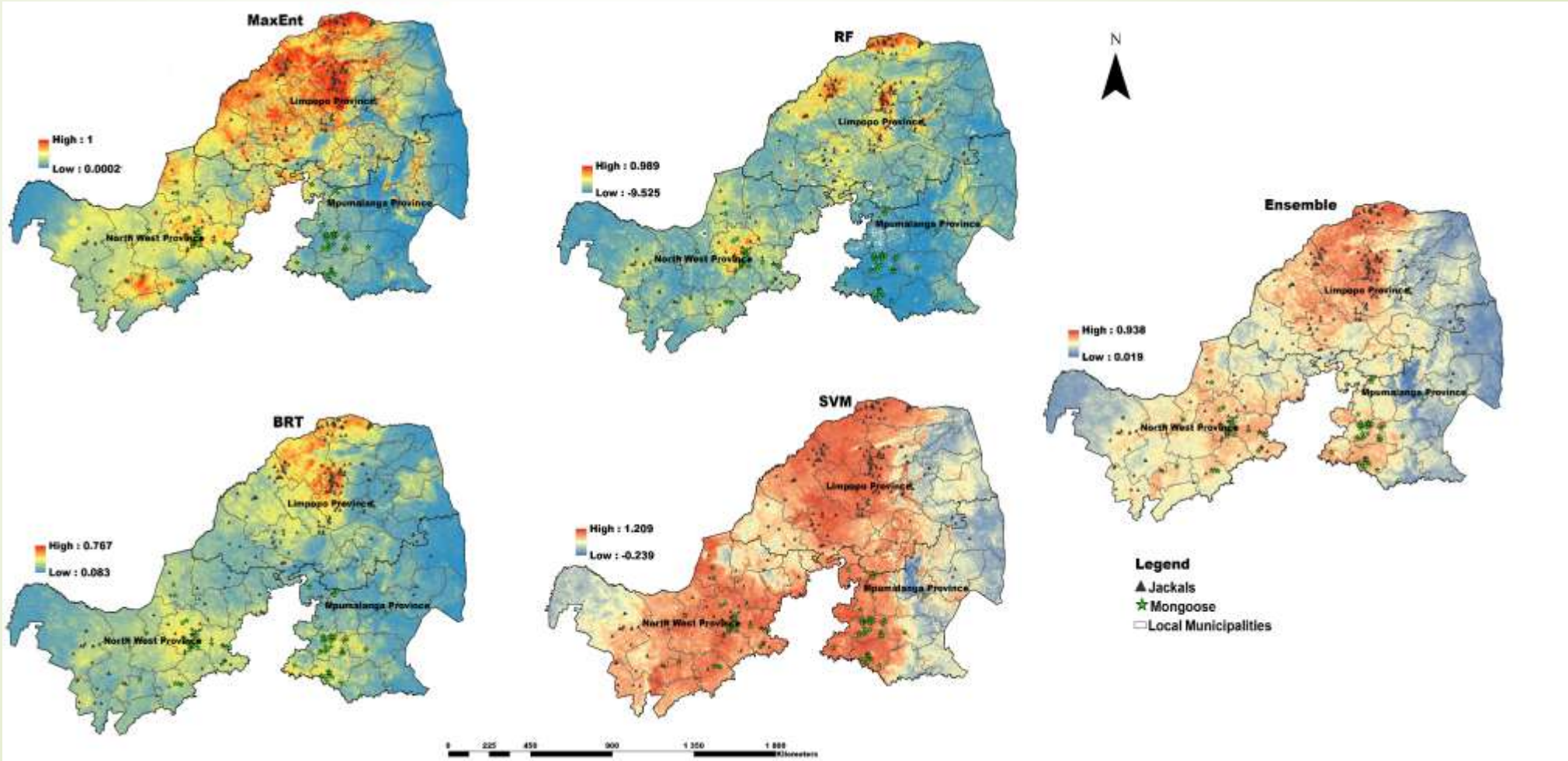
- Rabies cycles are maintained in both domestic dogs and wildlife species (black-backed jackals, bat eared foxes and the yellow mongooses).
- Several outbreaks linked to black-backed jackals have occurred:
  - Limpopo – 1993/4, 1998, and 2006.
  - Mpumalanga – 2000–2002 & 2005-2007, 2008-2010
  - North West – 1997/8, 2003 and 2016/17
  - Gauteng – 2010/2011 and 2016 (outside the study area).
- EO data & Rabies data are available but under utilized for these purposes




# Rabies distribution



# Spatial distribution of wildlife rabies host



# Key Messages from EO applications to Rabies Control

- **Strategic Vaccination Planning Requires Accurate Host Mapping**
  Spatial distribution-essential to guide effective vaccination efforts and resource allocation.

- **Embrace Advanced Predictive Tools**
  Incorporate **neural networks** and other machine learning methods to enhance accuracy in disease forecasting.

- **Understand Ecological Niches to Improve Targeting**
  Precise intervention strategies.

- **Target Hotspots and Optimize Efforts**
  Disease hotspots-ensure equitable and efficient distribution of control efforts.

- **Evaluate Impact of Vaccination Campaigns**
  Determine whether vaccine campaigns are reducing transmission effectively.
- Is vaccine campaigns making a difference?

# Policy Implications

- **Enhanced Surveillance and Monitoring**

Policies should support the integration of EO data with existing surveillance systems to enhance the accuracy and timeliness of outbreak predictions

- **Targeted Vaccination Campaigns**: Policies should prioritize the use of EO data to identify and target vaccination efforts in high-risk areas, ensuring efficient use of resources and better control of rabies outbreaks.
- **Continuous Monitoring and Evaluation**: The need for continuous monitoring and evaluation of vaccination campaigns to determine their effectiveness is emphasized.
- **Interdisciplinary Collaboration**: The project involves collaboration between various departments to leverage the expertise of different sectors
- Leveraging the power of satellite data and advanced predictive tools.

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