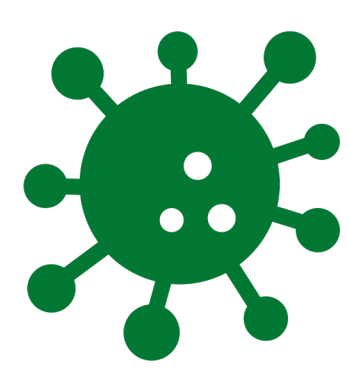


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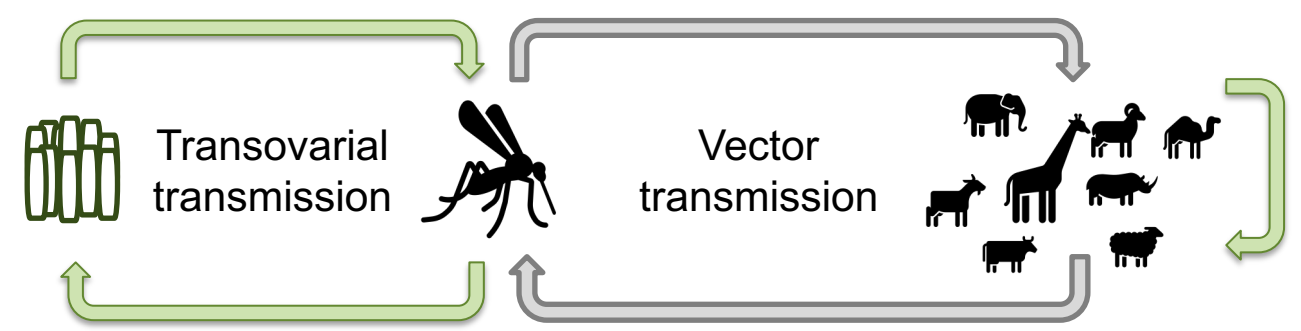
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## Rift Valley Fever (RVf)

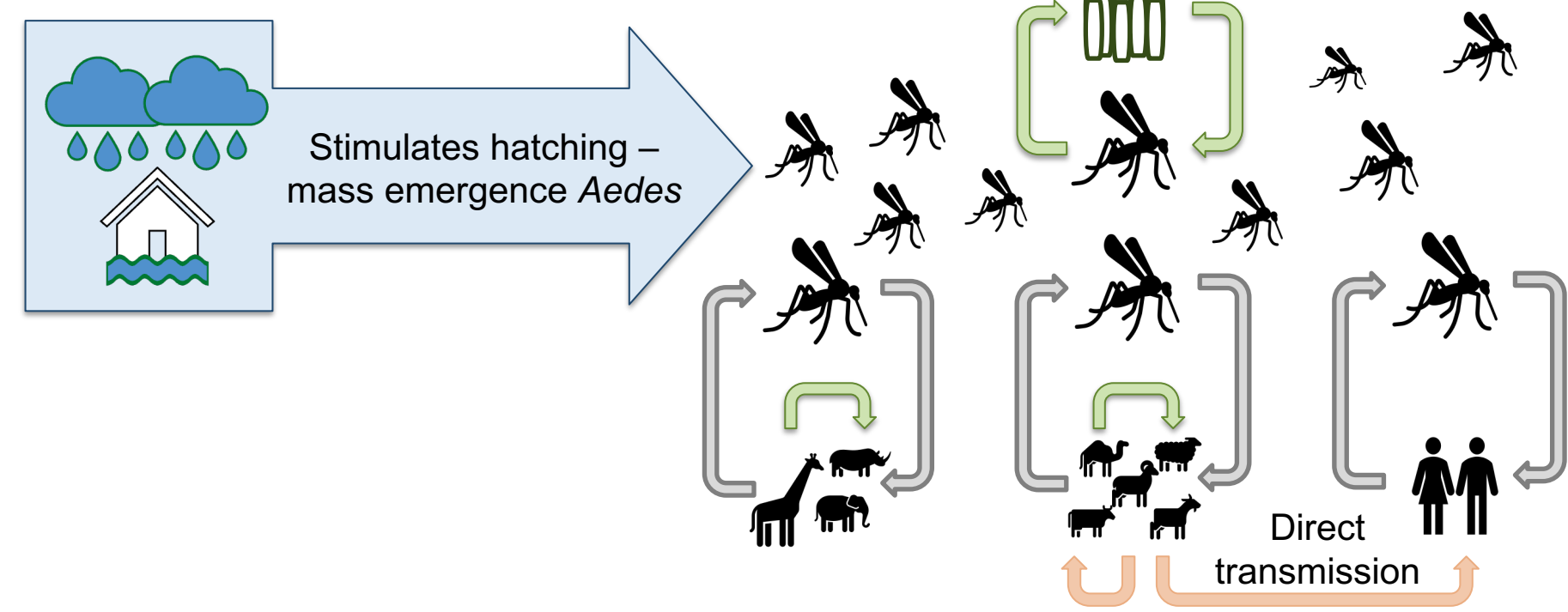


An acute viral hemorrhagic fever primarily affecting domesticated animals caused by the Rift Valley Fever virus (RVFV), which is also capable of infecting humans.

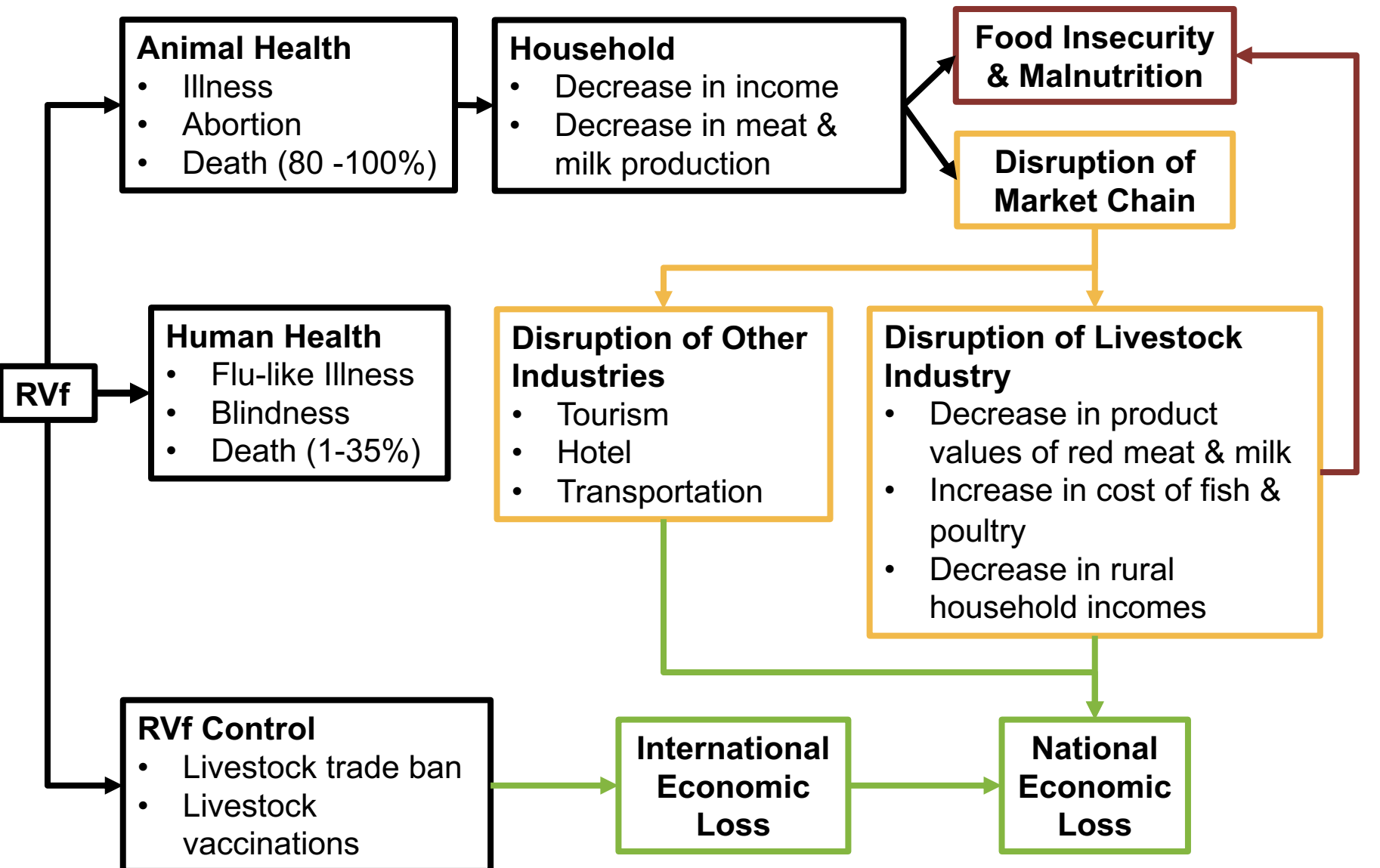
### Enzootic Cycle



### Epizootic-Epidemic Cycle



### Impact of RVf



Bio-weaponization attempts were made in the 1960's. As a cross-over pathogen, it is a public health concern affecting national and international security.



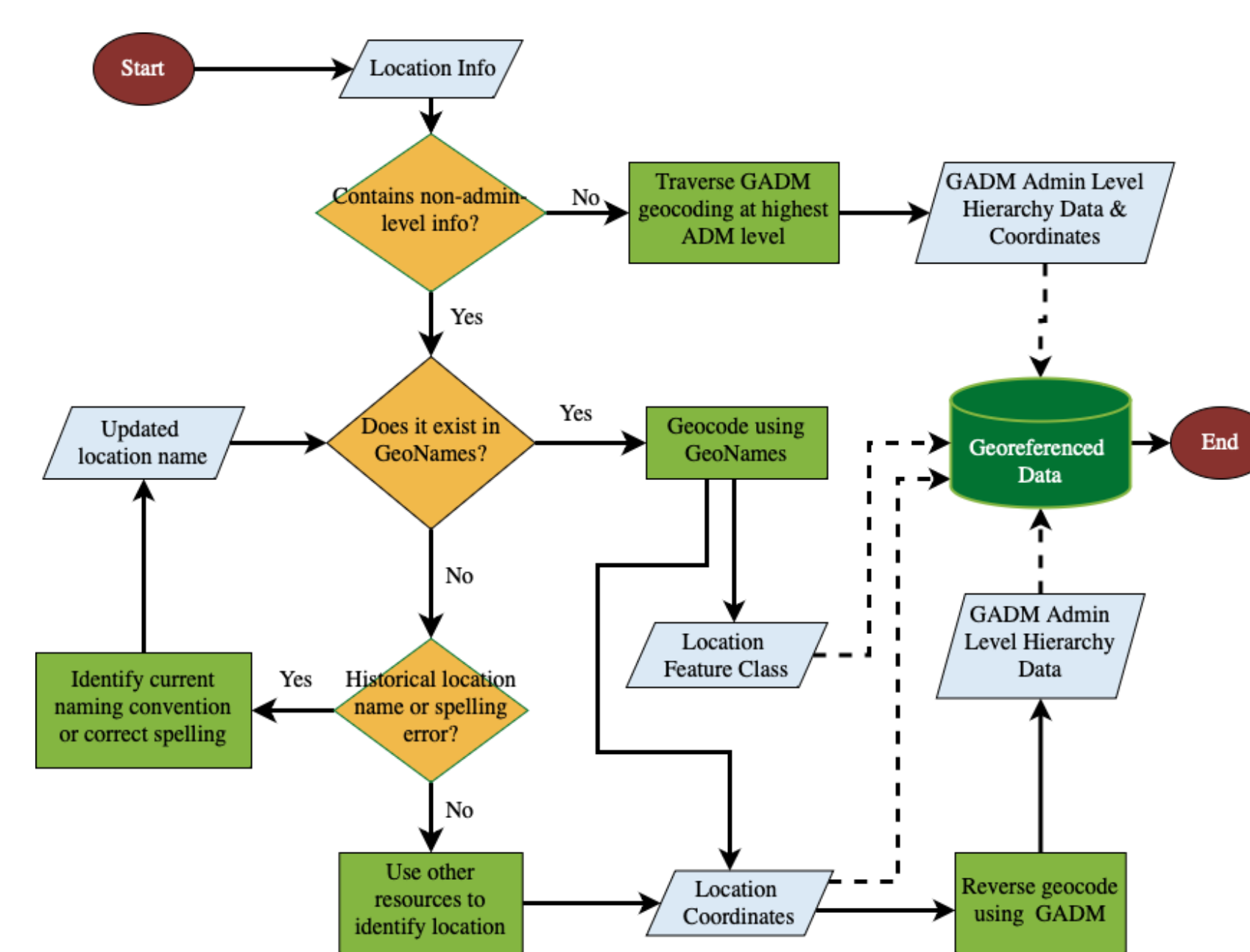
An animal vaccine exists but is cost-prohibitive to small-scale farmers. A human vaccine also exists, but it is not licensed or commercially available.



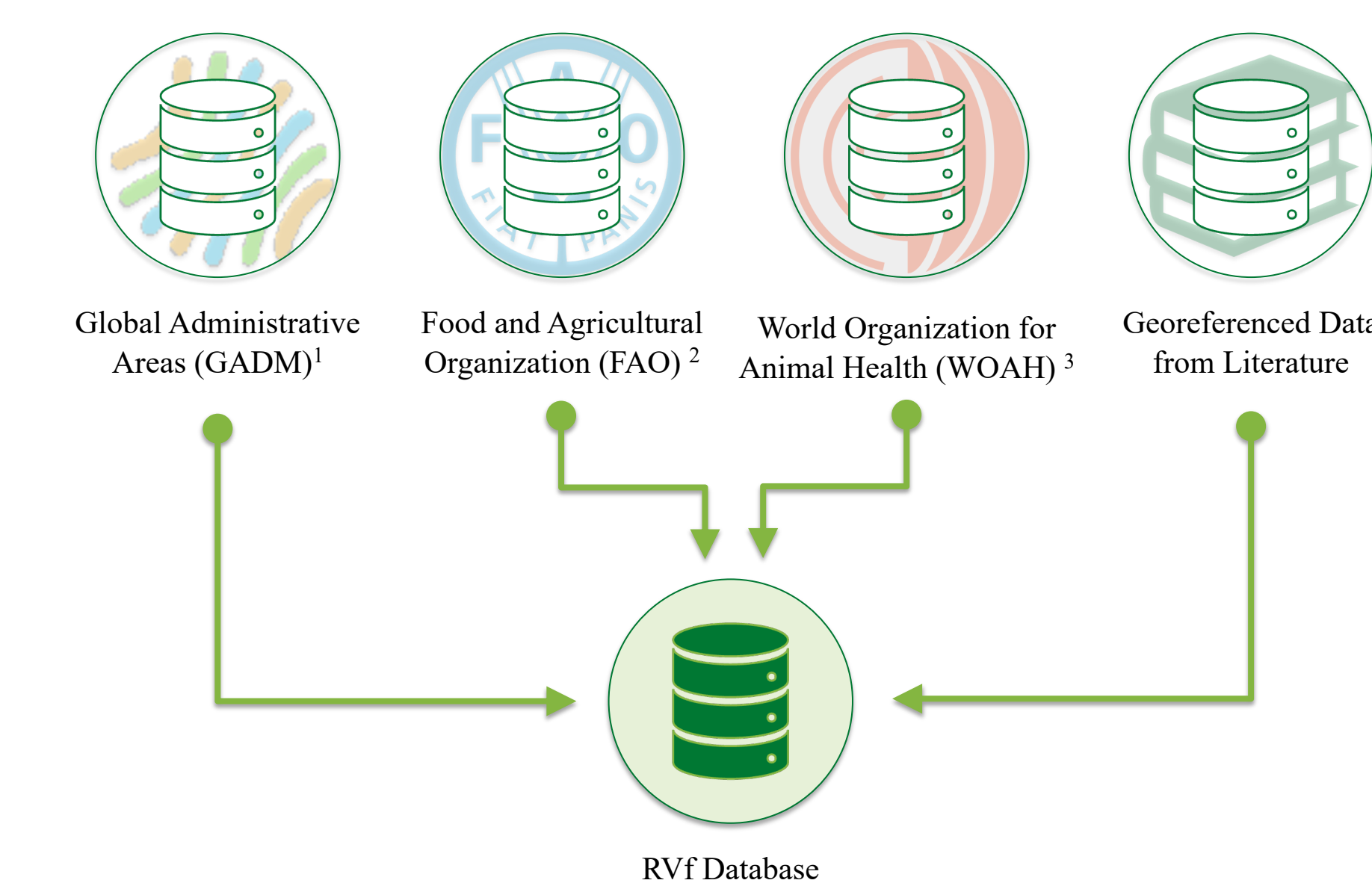
No licensed virus-killing drug is available for human use. Ribavirin and favipiravir have been used experimentally, but more work is needed to determine their efficacy.

## Data & Methods

### Georeferencing Data from Literature

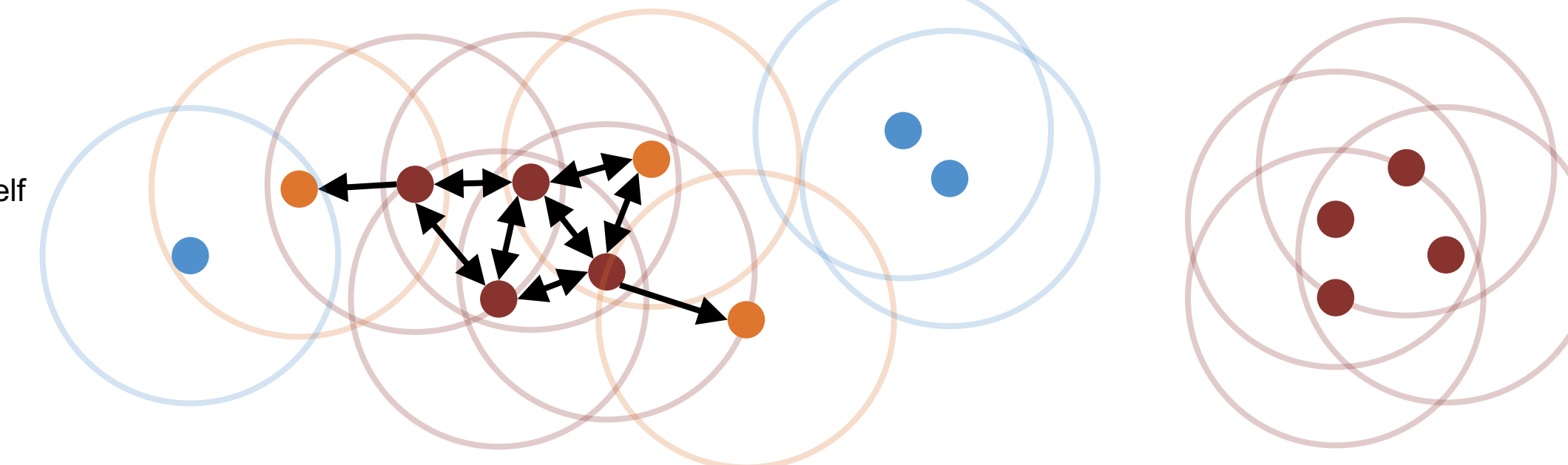


### Curating RVf Database



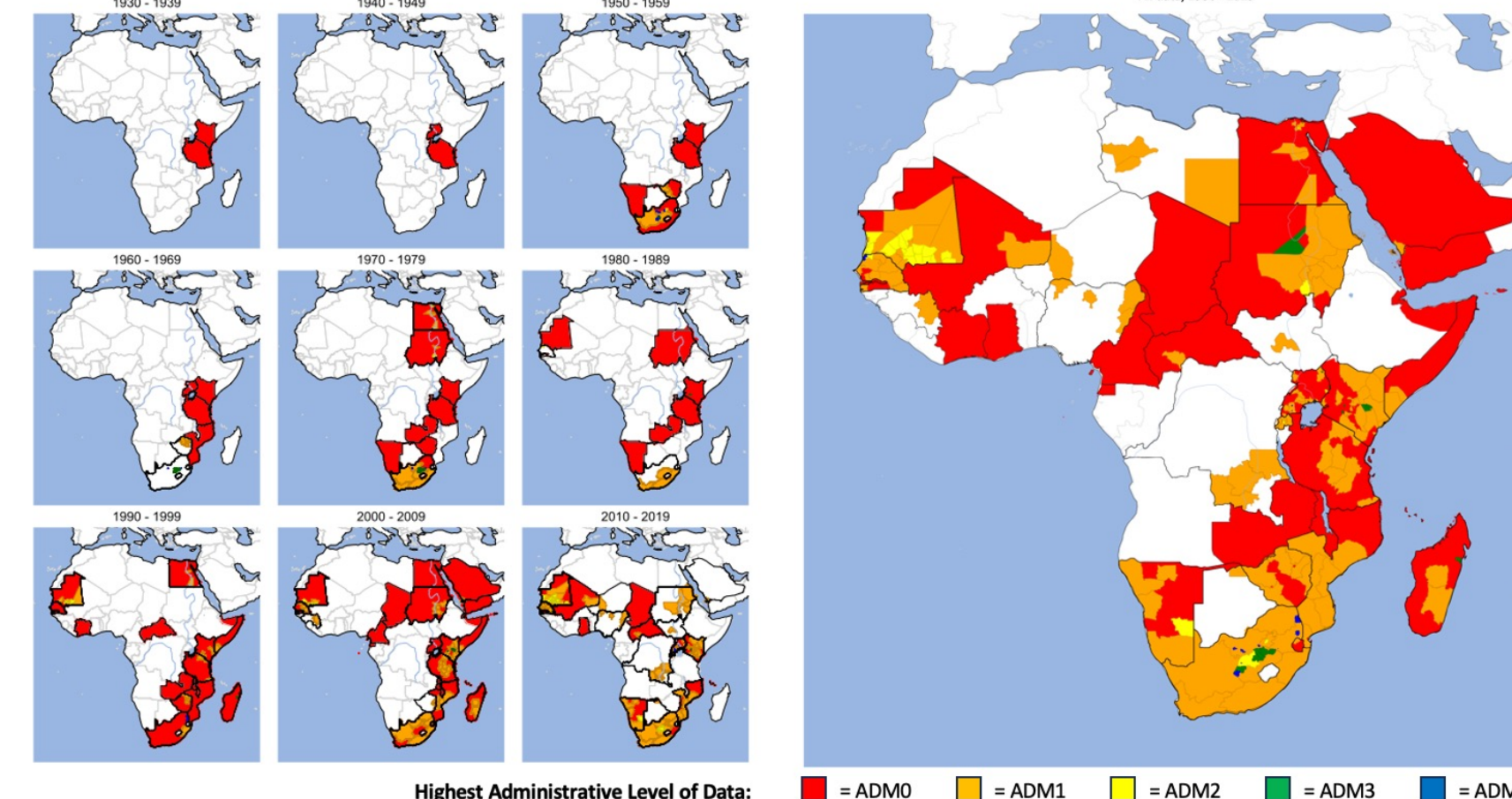
### Density-based spatial clustering of applications with noise (DBSCAN)<sup>4</sup> - $\theta \in \{minPts, \epsilon\}$

Let  $minPts = 4$ ,  $\epsilon = 1^\circ$   
 ● = core – point that contains at least  $minPts$  points within distance of  $\epsilon$   
 ○ = border – point within distance of  $\epsilon$  from a core point, but not a core point itself  
 ● = noise – point that is neither a core point or border point  
 $\{ \bigcirc \} \cup \{ \bullet \} = \text{Cluster}, C_i \text{ wrt. } \theta$

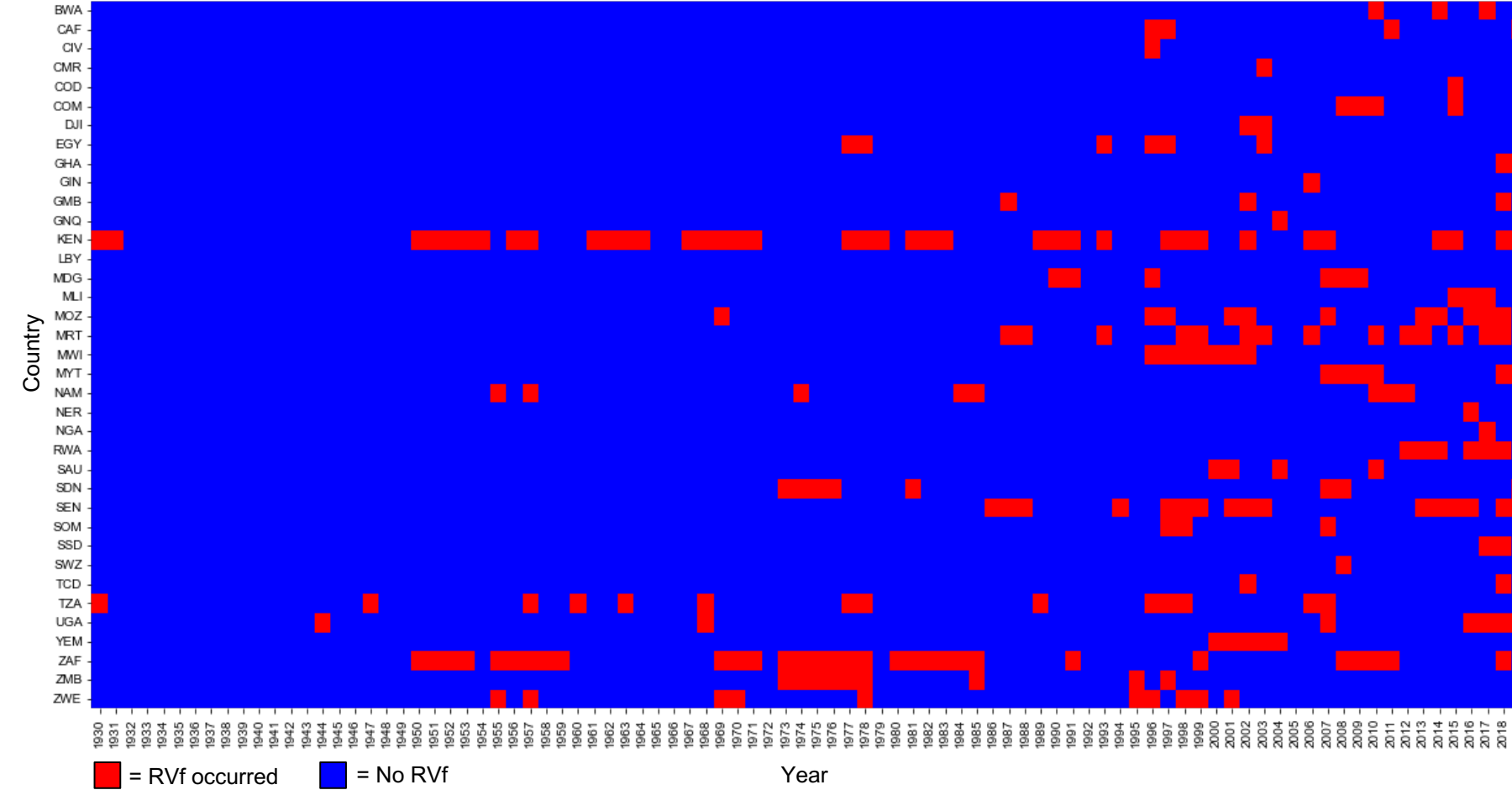


## Results

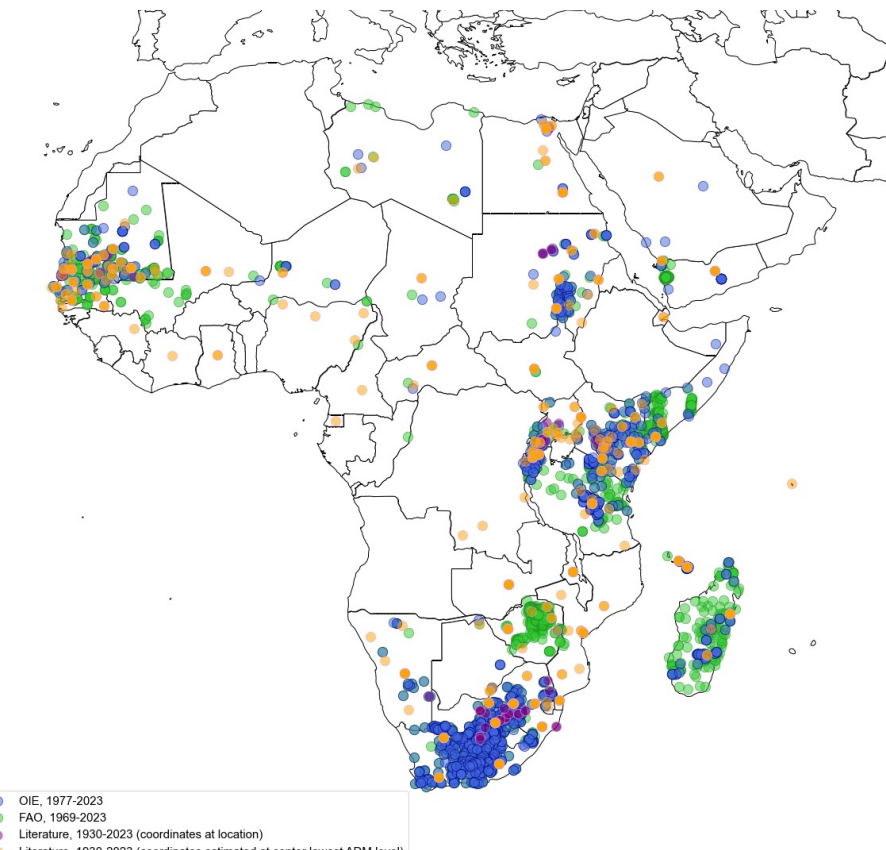
### Georeferenced Data



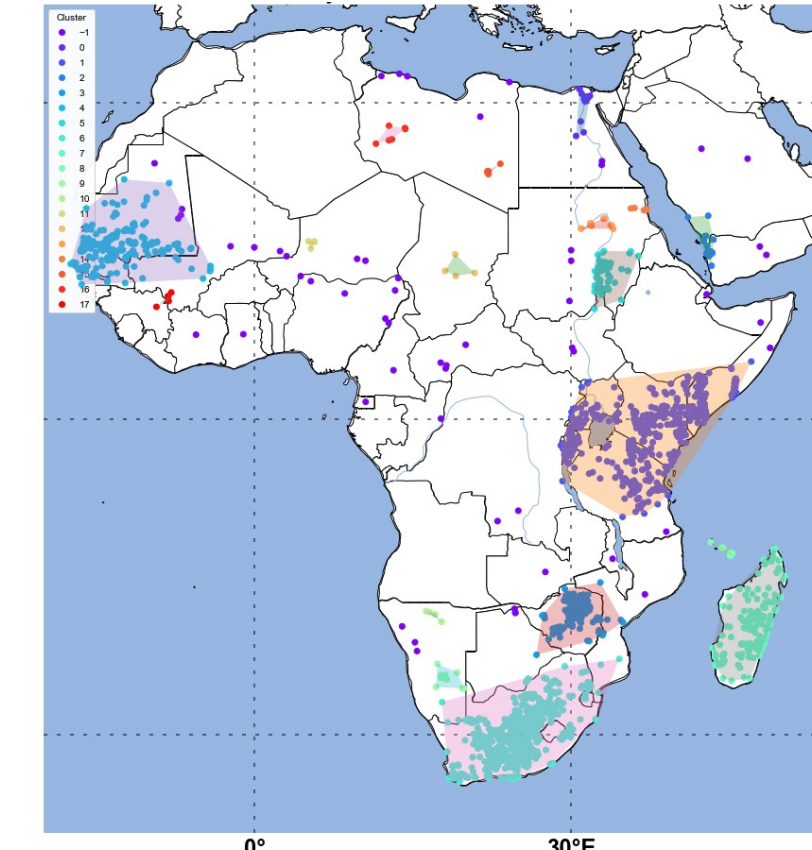
### Spatial and Temporal Distribution of RVf



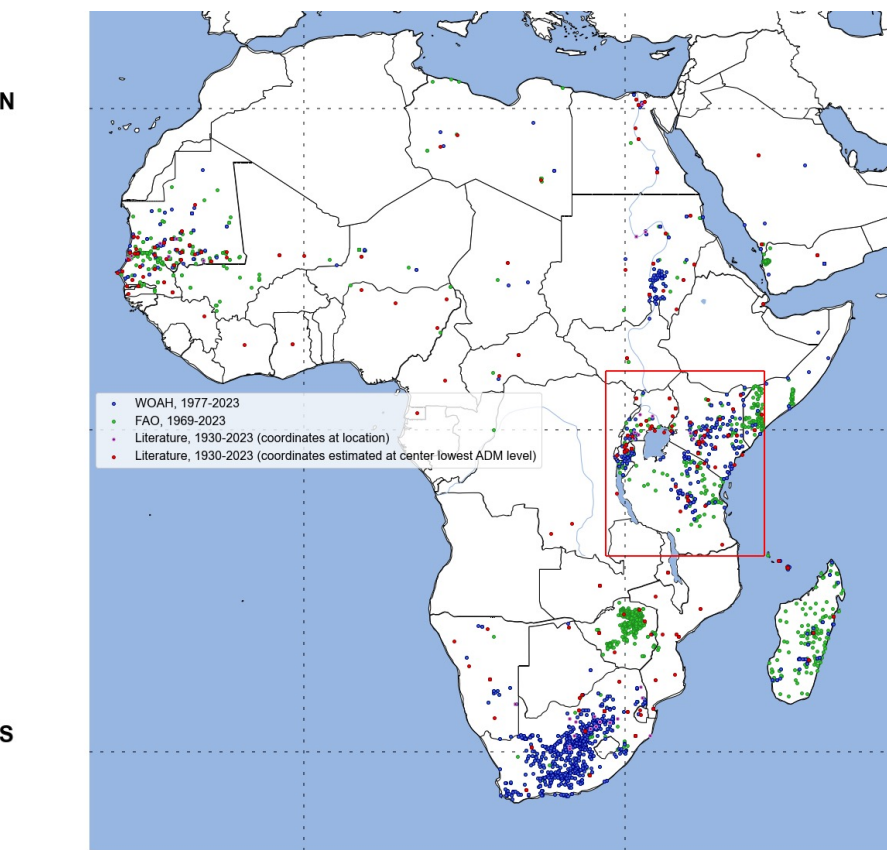
### RVf Historical Reports



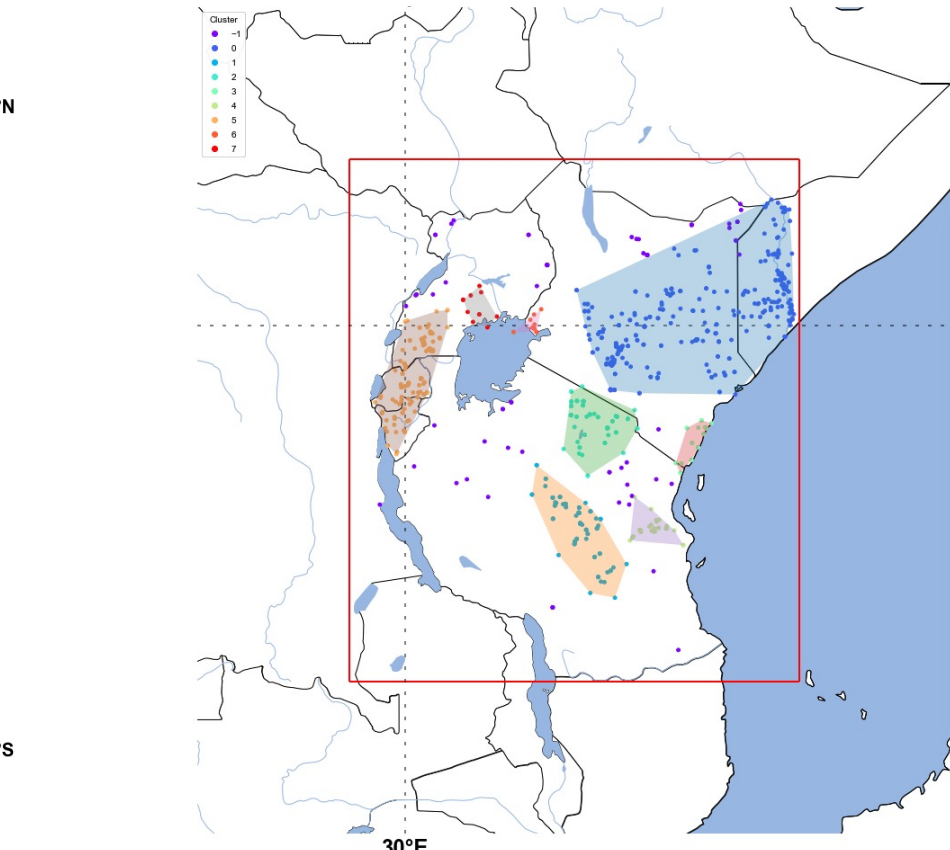
### RVf Outbreak Zones



### RVf in Eastern Africa

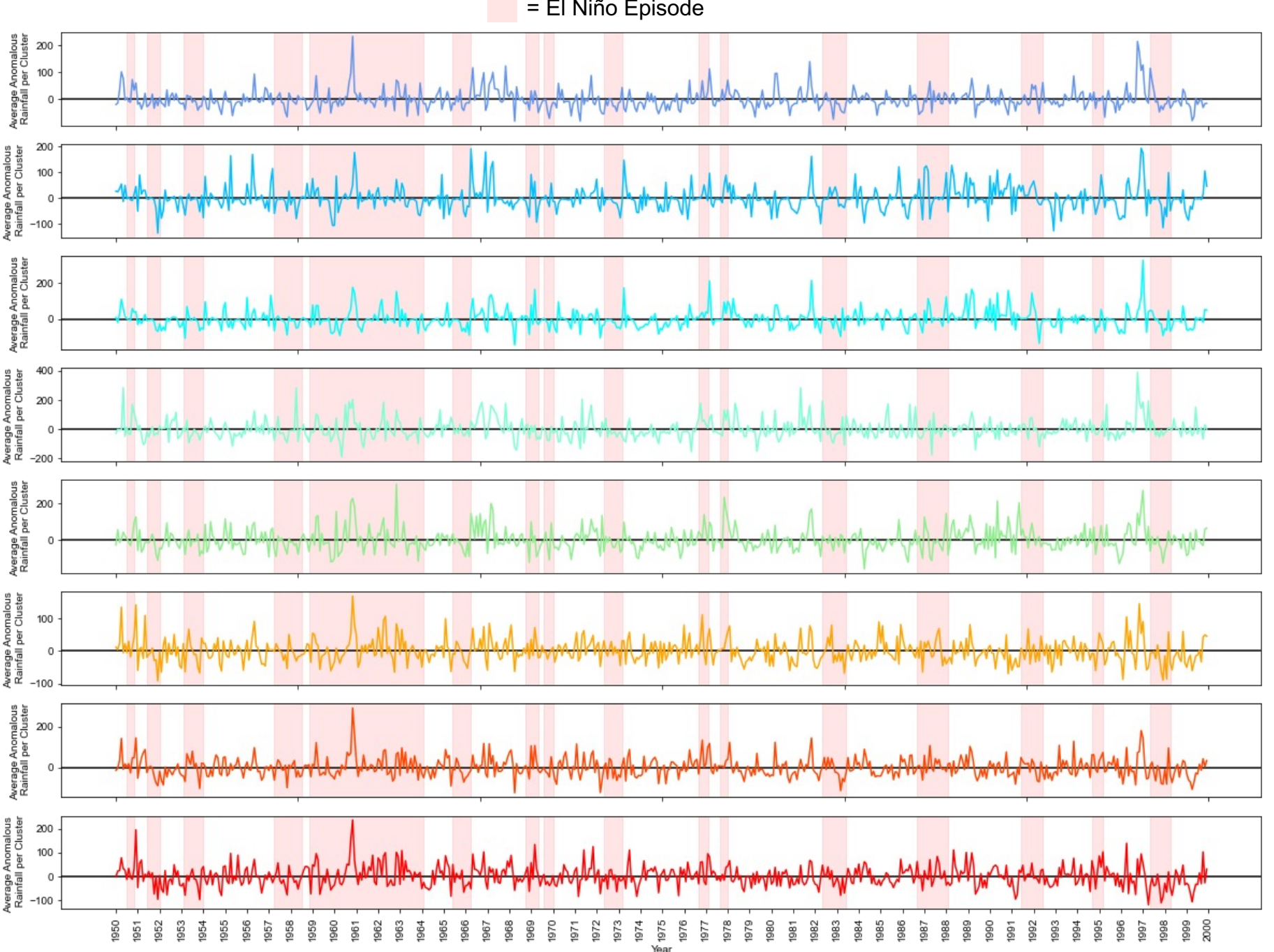


### Eastern Africa Outbreak Zones



## Conclusions

### Historical Anomalous Rainfall per Cluster – East Africa



## Acknowledgements

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4. Ester, M., Kriegel, H. P., Sander, J., & Xu, X. (1996). A density-based algorithm for discovering clusters in large spatial databases with noise.