Table 1: Bio-physical Risk Factor Coefficients from GLM model

Variable	*Levels*	*Generalised linear model*	
		Coefficients (β)	Standard Deviation (SE) of (β)
Soil type	Vertisols	0.66	0.31
	Solonertz	1.19	0.44
	Luvisols	1.21	0.58
	Others	0.00	-
Elevation	0 -1000	2.74	0.38
	>1000-<2000	0.00	-
	>2000	-1.99	0.48

From the results, solonetz, vertisols and luvisols covered half of the study while the other soil types cover the rest of the district. Areas that had solonetz and altitutedes of less than 1000m were areas of highest risk, while regions with vertisols and luvisols followed in decreasing risk respectively. Specifically, areas with other soil types in the district have a lower risk, see Figure 2. Four focused group discussions (FGD1–4) were successfully held in Ijara District, two at both high risk locations (Sangailu and Kotile) and at low risk locations (Hajmahamad and Galmatha; also known as Falmata) divisions, see Figure 2.. The local communities' perception in both high risk and low risk of RVF outbreak areas agreed with our analysis.

Coping strategies are considered as those initiatives taken by households prior to the onset of a season as to reduce risk of livestock loss. Our results indicate that mechanisms for all four groups are closely related. These ranged from in order of separation of infected animals, prayer, early treatment of sickly animals, vaccination, early deworming, and splitting or sharing livestock to friends and family in other areas to reduce impact. Barriers that impeded households or a community from devising coping strategies were identified as lack of the requisite knowledge to diagnose early symptoms of disease outbreak and inaccessibility to veterinary services. In some instances, as reported from FGD2, some drugs seem to no longer work or are ineffective when administered to the livestock. For example, FGD3 reported that animals had developed immunity against some drugs used in the treatment of trypanasomiasis. The spread of RVF after the outbreak was also too fast as mentioned in FGD4 to allow for adequate diagnosis and treatment.

From the FGDs it was observed that actions taken by communities in the high risk areas were strategic as they took actions like vaccination, controlled animal movement with awareness to changing climate and disease incidence. Those in low risk areas used reactive, ad hoc coping strategies like treatment of sick animals' as opposed to vaccination. It was thus observed that those communities in the high risk areas would cope better with adverse climate variability and extended disease burden compared to those communities in the low risk areas who lack knowledge of some of those strategies.

5. Conclusion and Recommendation

The study intended to establish whether there was a difference in exercise of strategies by communities in subsequent RVF outbreaks. This study has demonstrated how geospatial techniques and tools can be used to characterize and understand coping strategies exercised by communities in Ijara district against RVF outbreaks. Through the identification of bio-physical factors that are most significant to the outbreak of RVF and geo-statistical analysis, a generalized linear model (glm) was used to differentiate the RVF risk index across Ijara district.

The type of soils dominant is a region was identified as significant factor occur in most of the flat areas. During periods of extended rainfall, the solonetz, vertisols and luvisols soil type have the capacity retain water for long creating a conducive environment for mosquitoes to breed. these potential hotspots for RVF. The correlation coefficient of these soil types to occurrence of RVF is 2.74 in the high risk areas as opposed to the of -1.99 for low risk areas.The high and low RVF risk areas were approximately split halfway across the whole district, northwards and southwards respectively.

Further, our results show that communities in the high risk areas have strategic measures such as vaccination, controlled animal movement with awareness to changing climate and disease incidence. Those in low risk areas used reactive, ad hoc coping strategies like treatment of sick animals as opposed to vaccination. Thus communities in the high risk areas are more likely to cope better with adverse climate variability and extended disease burden compared to those communities in the low risk areas who lack knowledge of some of those strategies.

The rainfall data used in this research was of moderate resolution. Higher resolution rainfall data over a longer time period would greatly assist in corroborating these results. Other geo-statistical models that are able to consider dynamic factors like NDVI (at a low resolution approx. 5km or less) should be explored. This will make it possible to refine the RVF risk map as outbreaks especially those sporadic can be factored into the model.

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