



MALARIA EPIDEMIC EARLY WARNING PREDICTION SYSTEM FOR WESTERN KENYA HIGHLAND FOR DECEMBER 2023

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1. Summary

The model outputs for the malaria epidemic early prediction system for the western highlands of Kenya indicate a **high** risk of Malaria in all the three areas in the months of December 2023 and January 2024

The weather observations indicate generally a decrease in maximum temperatures in all the three areas.

2. Model Outputs

2.1 Malaria epidemic early prediction system for Kakamega

Table 1 below shows the malaria epidemic early prediction system for Kakamega for December, 2023.

Table 1: MALARIA EPIDEMIC EARLY PREDICTION SYSTEM: KAKAMEGA

Yr.	Month	Tmax	Mean Tmax	Tmax Deviation /anomaly	R/fall (mm)	R/fall Code	Tmax Deviation /anomaly Code	Additive % Risk
2022	12	27.6	27.5	0.1	166.0	1	1	9.1
2023	01	29.8	28.3	1.5	14.3	0	4	4.5
2023	02	28.6	29.2	-0.3	43.8	0	0	18.2
2023	03	29.0	29.1	-0.1	310.3	6	3	27.3
2023	04	28.4	27.3	1.1	247.1	4	1	18.2
2023	05	28.7	27.3	1.4	114.8	0	4	4.5
2023	06	28.3	25.8	2.5	195.7	2	9	27.3
2023	07	28.4	25.6	2.8	119.6	0	9	40.9
2023	08	29.3	26.1	3.2	118.1	0	16	40.9
2023	09	28.3	26.9	1.4	343.5	4	4	100
2023	10	28.7	27.0	1.7	306.8	6	4	45.5

2023	11	27.7	26.8	0.8	217.6	3	1	31.8
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The observed climate data for November 2023 indicates a decrease in maximum temperature from 28.7°C in October, 2023 to 27.7°C in November 2023. This observation in November, 2023 was positive (0.8 above the mean of the month). Rainfall decreased from 306.8mm in October to 217.6mm in November 2023. The additive model percentage risk in November, 2023 was **31.8%**.

Box 1:
For Kakamega, the epidemic threshold level is 30%.

Consequently, there is a risk of Malaria Epidemic in Kakamega in the month of December 2023 and January 2024(See Figure 1)

Table 2 below shows the malaria epidemic early prediction system for Kisii for December 2023.

Table 2: MALARIA EPIDEMIC EARLY PREDICTION SYSTEM: KISII

Yr	Mon	Tmax (°C)	Mean Tmax (°C)	Tmin (°C)	Mean Tmin (°C)	Tmax Dev./anom	Tmin Dev./anom	Total Temp Dev./Anom	Temp Dev./anom Code	R/fall (mm)	R/fall Code	Model Output
2022	12	25.0	25.4	15.4	15.4	-0.4	0.0	-0.4	0	152.8	0	0
2023	01	27.1	26.1	15.4	15.7	1.0	-0.3	0.7	0	23.0	0	0
2023	02	30.0	27.0	16.9	16.1	3.0	0.8	3.8	4	22.7	0	0
2023	03	26.1	27.0	15.8	15.9	-0.9	-0.1	-1.0	0	408.6	4	0
2023	04	25.2	25.5	15.7	15.8	-0.3	-0.1	-0.4	0	278.0	5	50
2023	05	26.5	25.1	15.9	15.6	1.4	0.3	1.7	2	292.8	2	0
2023	06	25.8	24.6	16.0	15.0	1.2	1.0	2.3	3	177.7	0	0
2023	07	25.8	24.5	15.5	14.5	1.3	1.0	2.3	3	96.4	0	0
2023	08	26.4	24.9	15.8	14.7	1.5	1.1	2.6	3	137.8	0	0
2023	09	26.4	26.0	15.7	15.1	0.4	0.6	0.9	0	330.1	3	56.3
2023	10	27.0	25.8	16.2	15.2	1.2	1.0	2.2	3	149.7	0	0
2023	11	25.0	25.1	16.0	15.2	-0.1	0.8	0.7	0	326.5	3	37.5

The observed climate data for Kisii for November, 2023 indicates a decrease in maximum temperature from 27.0°C in October, 2023 to 25.0°C in November, 2023. This observation in October, 2023 was negative (0.1°C below the mean of the month). Rainfall increased from 149.7mm in October, 2023 to 326.5 mm in November, 2023. The Model output risk is **37.5%**.

Box 2:
For Kisii, the epidemic threshold level is 20%.

Hence there is a high risk of malaria epidemic in Kisii in the month of December, 2023 and January, 2024. (See Figure 2).

2.2 Malaria epidemic early prediction system for Nandi

Table 3 below shows the malaria epidemic early prediction system for Nandi for December, 2023.

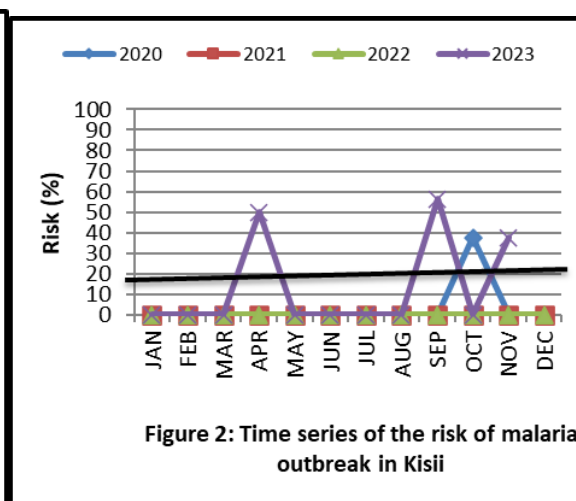
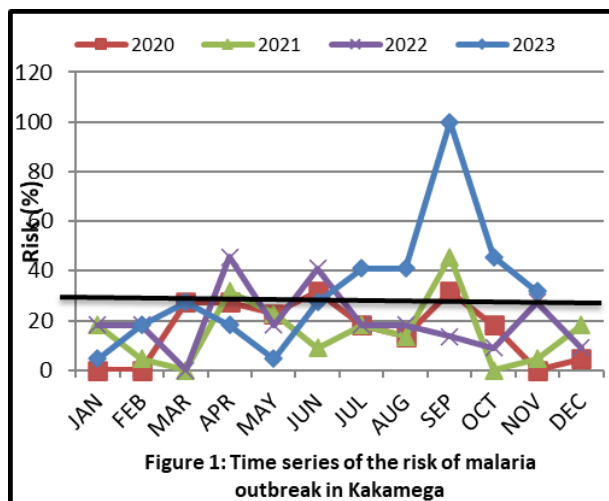
Table 3: NANDI MALARIA EPIDEMIC EARLY PREDICTION SYSTEM

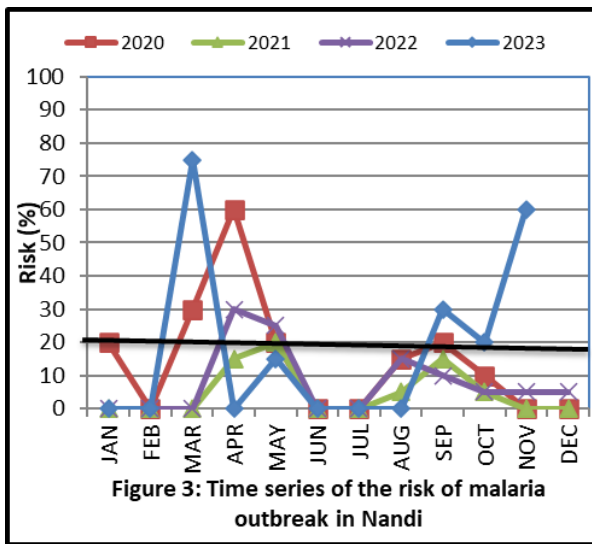
Yr	Mon	Tmax (°C)	Mean Tmax (°C)	Tmax Dev.	Tmin	Mean Tmin	Tmin Dev. /anom	Total Temp Dev. /Anom	R/fall (mm)	Temp Dev. Filters	R/fall Filter s	Multip licativ e Model
2022	12	24.3	24.7	0.6	11.8	10.8	1.0	1.6	167.1	2	0	0
2023	01	26.4	23.3	0.1	8.9	10.9	-2.0	2.1	17.8	5	0	0
2023	02	29.6	23.2	6.4	10.3	11.7	-1.4	5.0	13.2	5	0	0
2023	03	25.0	23.0	2.0	12.4	11.5	0.9	2.9	316.3	3	3	75.0
2023	04	24.7	22.8	1.9	11.9	11.2	0.7	2.6	182.4	3	0	0.0
2023	05	25.1	22.7	2.4	11.7	10.7	1.0	3.4	236.0	4	1	15.0
2023	06	24.0	22.7	1.3	12.4	10.9	1.5	2.8	137.6	3	0	0.0
2023	07	24.2	22.8	1.4	12.0	10.6	1.4	2.8	103.3	3	0	0.0
2023	08	25.0	23.1	1.9	12.4	10.8	1.6	3.6	103.5	4	0	0.0
2023	09	24.8	23.3	1.5	12.6	11.1	1.5	3.0	291.3	4	2	30.0
2023	10	25.4	23.3	2.1	11.2	10.7	0.5	2.5	222.8	3	1	20.0
2023	11	23.7	23.3	0.4	16.8	10.8	6.0	6.3	353.0	5	4	60.0

The maximum temperature in Nandi indicates a decrease from 25.4°C in October, 2023 to 23.7°C in November 2023. This observation in November, 2023 for Nandi was positive (0.4°C above the mean of the month). Rainfall increased from 222.8mm in October, 2023 to 353.0mm in November, 2023. The additive model percentage risk in November, 2023 was 60%.

Box 3:
For Nandi, epidemic threshold level is 20%.

Hence, there is high risk of malaria epidemic in Nandi in the month of December, 2023 and January, 2024. (See Figure 3)





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