



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

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1. Summary

The model outputs for the malaria epidemic early prediction system for the western highlands of Kenya indicate **VERY high** risk of Malaria in Kakamega, **high** risk of malaria outbreak in Kisii and Nandi areas in October and November 2023

The weather observations indicate generally an increase in total monthly rainfall amounts 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 October, 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	343.4	6	4	100.0

The observed climate data for September 2023 indicates a slight decrease in maximum temperature from 29.3°C in August 2023 to 28.3°C in September 2023. This observation in September 2023 was positive (1.4 above the mean of the month) Rainfall increased from 118.1mm in August to 343.4mm in September 2023. The additive model percentage risk in September 2023 was **100%**.

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

Consequently, there is high risk of the Malaria Epidemic outbreak in Kakamega in the month of October and November 2023(See Figure 1)

Table 2 below shows the malaria epidemic early prediction system for Kisii for September 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	56.25

The observed climate data for Kisii for September 2023 indicates no change in maximum temperature at 26.4°C August and September. This observation in September 2023 was positive (0.4 above the mean of the month). Rainfall increased from 137.8 mm in August 2023 to 330.1mm in September 2023. The additive model percentage risk in September 2023 was **56.3%**.

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

Hence, there is high risk of malaria epidemic in Kisii in the month of October and November 2023. (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 September 2023.

Table 3: NANDI MALARIA EPIDEMIC EARLY PREDICTION SYSTEM

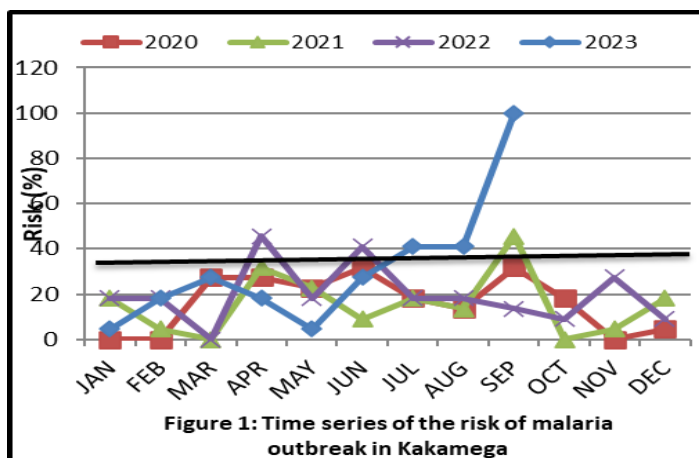
Yr	Mon	Tmax (°C)	Mean Tmax (°C)	Tmax Dev.	Tmin	Mean Tmin	Tmin Dev./anom	Total Temp Dev.	R/fall (mm)	Temp Dev. Filters	R/fall Filter s	Multiplicativ e
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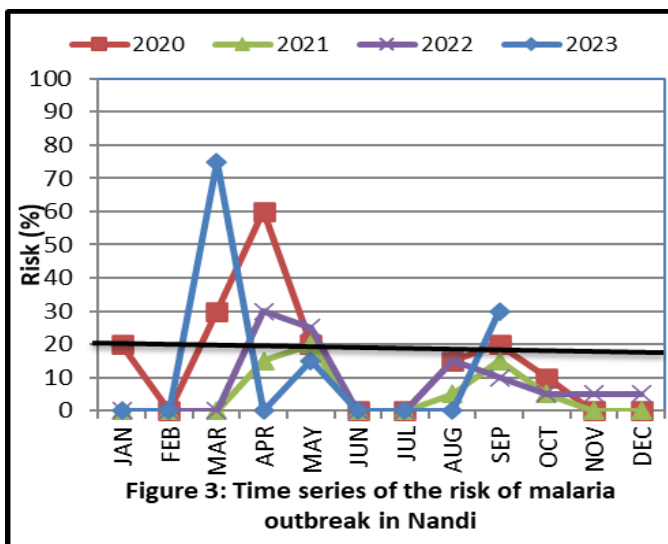
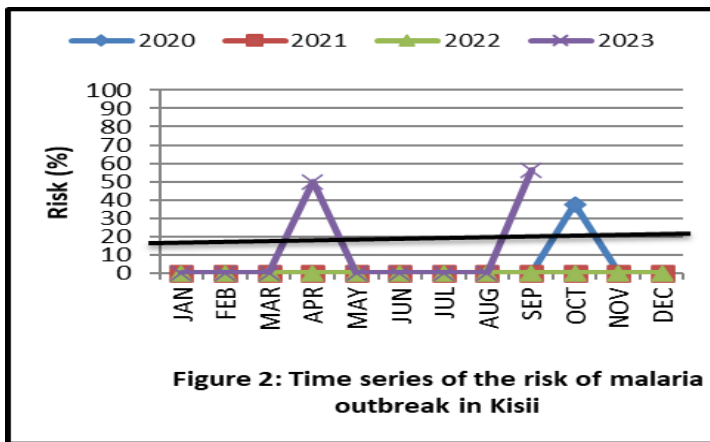
								/Anom				Model
2022	12	24.3	24.7	0.6	11.8	10.8	1.0	1.6	167.1	2	0	0
2023	01	26.4	23.3	0.1	8.9	10.9	-2.0	2.1	17.8	5	0	0
2023	02	29.6	23.2	6.4	10.3	11.7	-1.4	5.0	13.2	5	0	0
2023	03	25.0	23.0	2.0	12.4	11.5	0.9	2.9	316.3	3	3	75.0
2023	04	24.7	22.8	1.9	11.9	11.2	0.7	2.6	182.4	3	0	0.0
2023	05	25.1	22.7	2.4	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

The maximum temperature in Nandi indicates a slight decrease from 25.0°C in August 2023 to 24.8°C in September 2023. This observation in September 2023 for Nandi was positive (1.5°C above the mean of the month). Rainfall increased from 103.5mm in August 2023 to 291.3mm in September 2023. The additive model percentage risk in September 2023 was 30%.

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

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





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