

Republic of Kenya



KENYA METEOROLOGICAL DEPARTMENT

Republic of Kenya



MINISTRY OF HEALTH



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

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1. Summary

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

The weather observations indicate generally an increase in maximum temperature 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 September 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

The observed climate data for August 2023 indicates an increase in maximum temperature from 28.4°C in July 2023 to 29.3°C in August 2023. However, the maximum temperature anomaly in August 2023 was positive (3.2 above the mean of the month). Rainfall slightly decreased from 119.6mm in July 2023 to 118.1mm in August 2023. The additive model percentage risk in August 2023 was 40.9%.

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 September and October 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

The observed climate data for Kisii for August 2023 indicates an increase in maximum temperature from 25.8°C in July to 26.4°C August 2023. This observation in August 2023 was positive (1.5 above the mean of the month). Rainfall increased from 96.4mm in July 2023 to 137.8mm August 2023. The Model output risk is NIL.

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

Hence, there is low risk of malaria epidemic in Kisii in the month of September and October 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

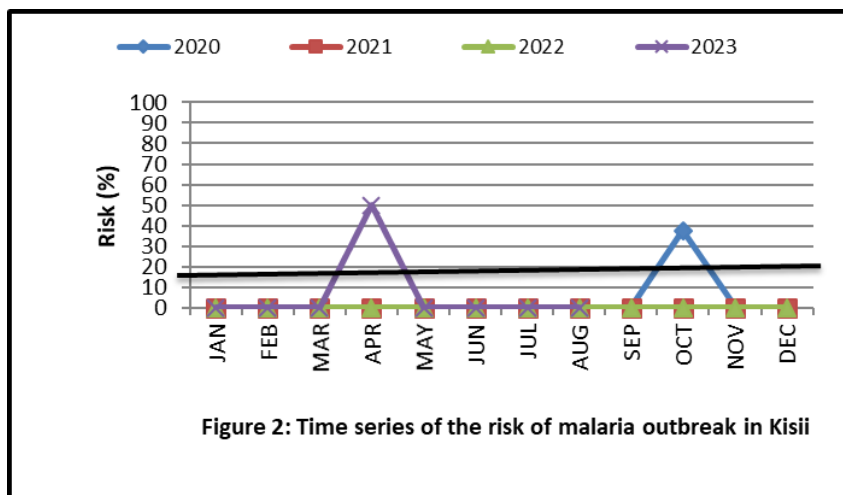
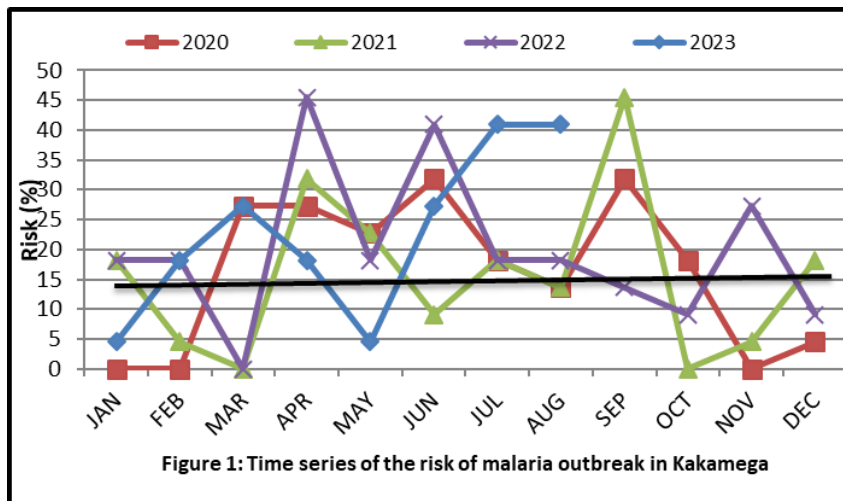
Yr	Mon	Tmax (°C)	Mean Tmax (°C)	Tmax Dev.	Tmin	Mean Tmin	Tmin Dev./anom	Total Temp Dev./Anom	R/fall (mm)	Temp Dev. Filters	R/fall Filters	Multiplicative Model
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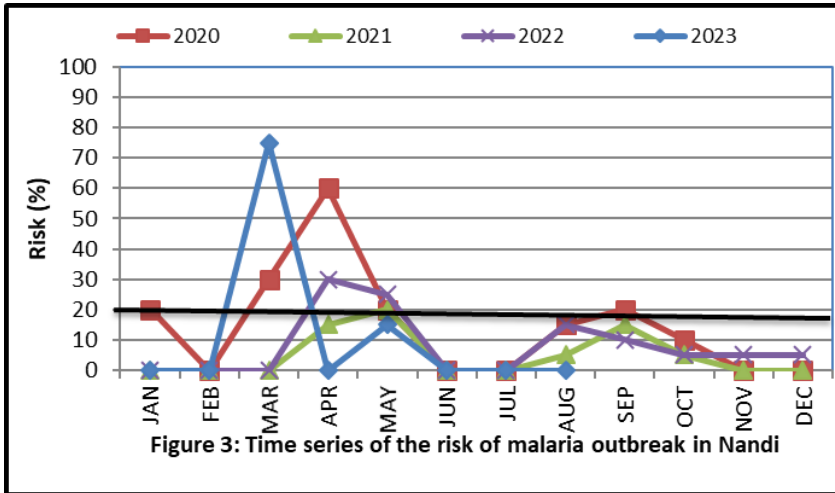
2022	12	24.3	24.7	0.6	11.8	10.8	1.0	1.6	167.1	2	0	0
2023	01	26.4	23.3	0.1	8.9	10.9	-2.0	2.1	17.8	5	0	0
2023	02	29.6	23.2	6.4	10.3	11.7	-1.4	5.0	13.2	5	0	0
2023	03	25.0	23.0	2.0	12.4	11.5	0.9	2.9	316.3	3	3	75.0
2023	04	24.7	22.8	1.9	11.9	11.2	0.7	2.6	182.4	3	0	0.0
2023	05	25.1	22.7	2.4	11.7	10.7	1.0	3.4	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

The maximum temperature in Nandi indicates a slight increase from 24.2°C in July 2023 to 25.0°C in August 2023. This observation in August 2023 for Nandi was positive (1.9°C above the mean of the month). Rainfall slightly decreased from 103.3mm in July 2023 to 103.5mm in August 2023. The August, 2023 multiplicative model percentage risk for malaria was NIL.

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

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





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