

Climate health activities

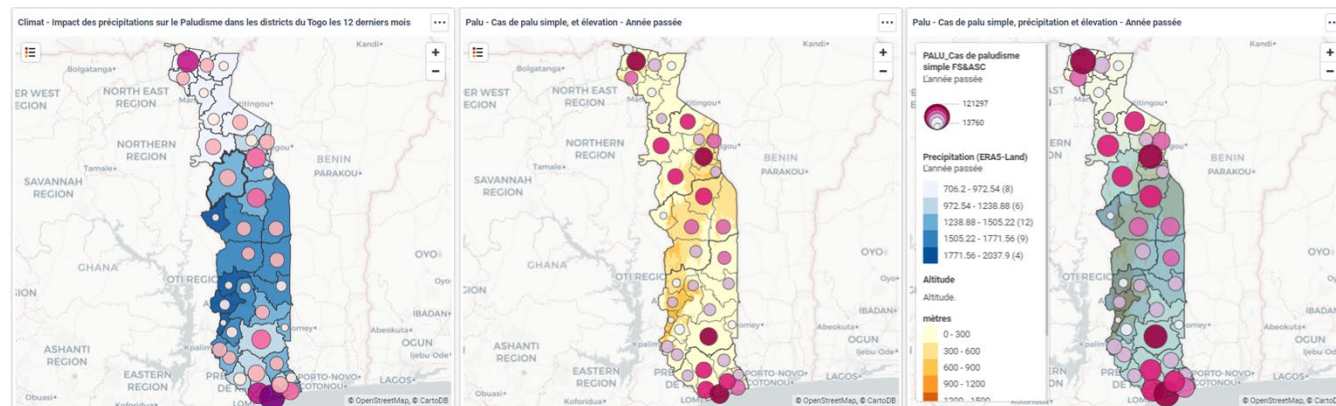
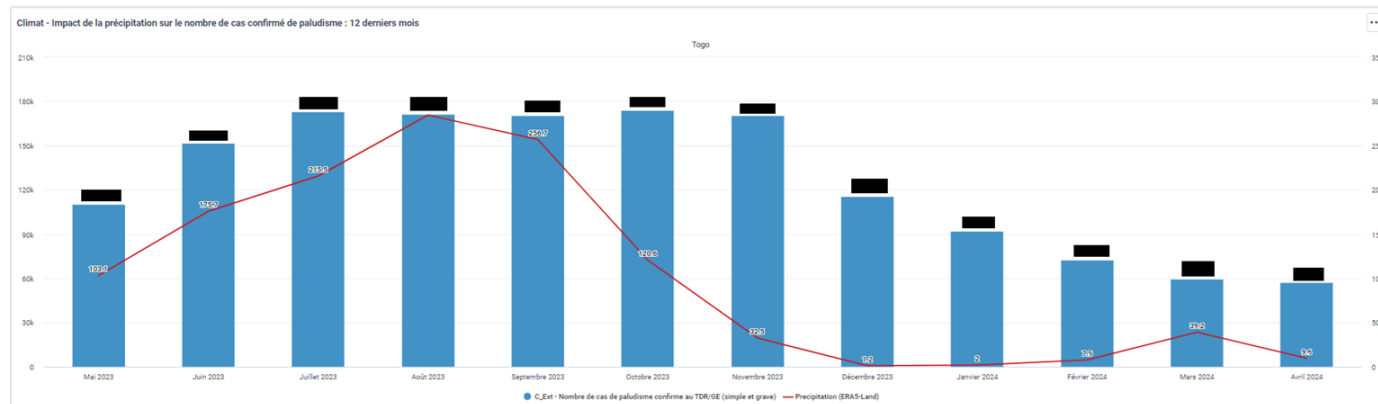
Togo, Senegal and Niger

Oslo, Norway, June 2026



Climate data integration

Integration of
Climate data into
the HMIS to enable
cross analysis of
health and climate
data



Some dashboards

Heat index and cardiovascular diseases (OPD)



Some dashboards

Integration: climate, campaign and routine malaria data

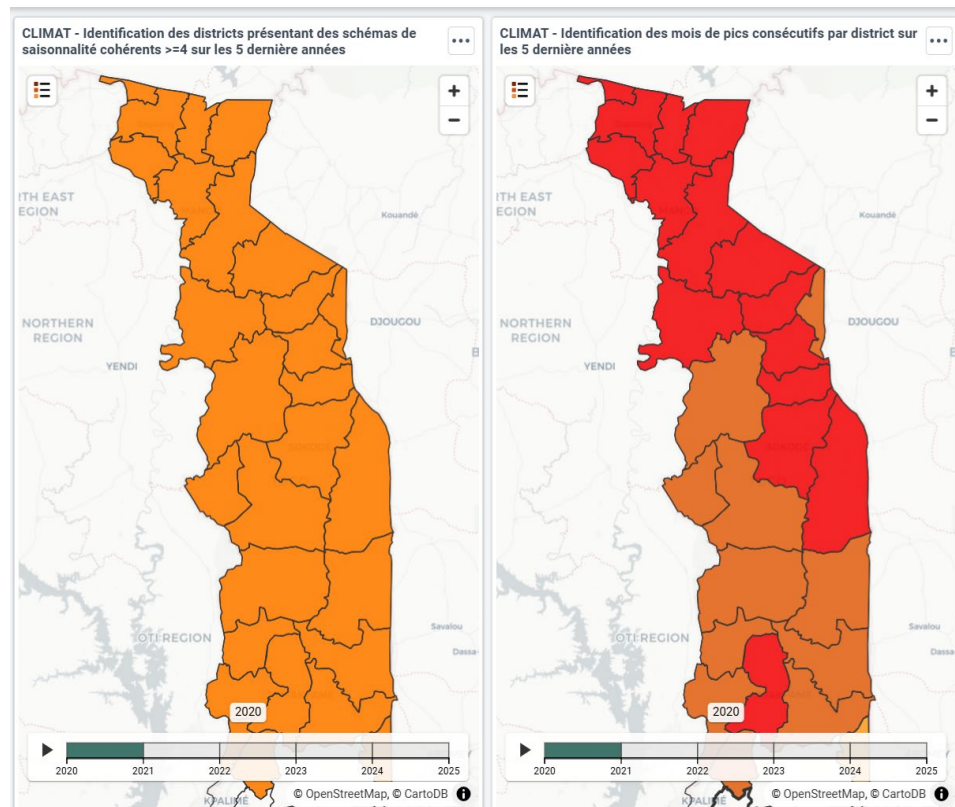


Eligible district for the SMC

Developed an app to identify seasonality peaks using rainfall data: Seasonal health districts and peak duration:

A) Districts eligible for SMC based on rainfall, cases peak analysis;

B) Duration of consecutive peak months. Based on rainfall analysis to determine the number of cycles.

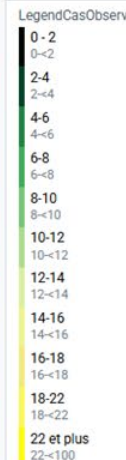


SMC Calendar

% of confirmed cases : Number of confirmed case of the month/ total number of confirmed case of the year

May - Nov

	CLIMAT - Palu Confirme TDR/GE < 5 ans (%)																										LegendCasObserv
	Mai 2018	Juin 2018	Juillet 2018	Août 2018	Septembre 2018	Octobre 2018	Novembre 2018	Décembre 2018	Janvier 2019	Février 2019	Mars 2019	Avril 2019	Mai 2019	Juin 2019	Juillet 2019	Août 2019	Septembre 2019	Octobre 2019	Novembre 2019	Décembre 2019	Janvier 2020	Février 2020	Mars 2020	Avril 2020	Mai 2020		
/ Kara / Dankpen	2.47	7.36	18.71	10.91	9.94	12.06	15.42	12.67	3.14	2.8	1.51	1.31	1.48	10.88	4.59	18.99	15.02	13.22	15.69	11.36	6.63	5.16	2.51	1.86	2.56	0-2	
/ Savanes / Oti Sud	0.97	5.04	24.57	11.65	10.75	15.91	15.27	5.79	5.63	3.66	2.15	1.49	1.69	5.78	17.98	18.5	18.66	8.9	8.45	7.09	6.87	4.84	3.18	2.32	2.24	2-4	
/ Kara / Keran	2.21	13.4	21.96	8.18	7.26	10.84	15.13	10.01	4.73	3.93	2.74	1.8	2.21	9.27	21.07	18.63	10.03	8.33	9.71	7.57	6	3.47	3.17	2.68	2.66	4-6	
/ Kara / Bessar	4.34	9.33	16.03	12.3	6.1	14.79	15.83	9.57	4.66	3.43	2.1	1.96	2.82	11.79	13.58	14.41	12.2	12.51	11.55	8.98	7.06	3.95	2.3	1.79	4.15	4-6	
/ Kara / Kozah	6.15	11.3	15.66	8.6	6.91	9.37	11.23	8.51	5.79	6.3	4.83	3.17	4.88	11.07	12.54	13.34	8.74	9.09	12.56	7.68	7.7	6.52	5.5	3.84	6.06	6-8	
/ Kara	4.81	10.82	17.04	9.49	7.52	11.09	13.09	9.97	5.17	4.53	3.51	2.48	3.62	11.78	12.69	15.02	10.31	10.31	11.63	8.96	7.44	5.43	4.01	2.8	4.42	6-8	
/ Kara / Assoli	8.86	14.69	13.91	7.11	8.67	6.31	9.21	10.37	8.01	5.47	5.17	4.1	8.21	15.14	12.82	10.8	8.7	7.17	6.37	8.03	9.47	7.81	5	3.86	6.63	8-10	
/ Plateaux / Anie	8.84	9.44	11.49	10.43	10.81	11.47	13.41	7.71	6.01	4.31	3.18	2.8	4.83	8.82	10.54	12.56	11.92	12.16	12.05	10.83	7.64	4.24	2.48	2.48	5.36	8-10	
/ Centrale / Mo	7.19	9.87	13.9	9.9	9	12.27	12.2	11.71	5.04	7.32	3.21	1.82	6.77	10.31	10.97	12.88	8.45	9.38	11.29	12.54	9.49	4.5	2.46	2.76	4.13	10-12	
/ Centrale / Tchamba	10.69	13.41	12.77	8.13	7.08	8.54	10.69	9.56	5.17	4.46	3.47	2.92	7.69	15.69	14.36	11.91	7.57	6.89	9.76	10.1	9.63	6.49	3.81	4.59	10.72	10-12	
/ Centrale / Tohaoudjo	9.57	12.14	10.58	8.77	9.48	9.26	9.42	8.76	5.68	5.06	4.07	3.47	7.52	11.89	11.16	13.38	9.29	9.2	10.4	8.89	8.56	6.33	3.52	3.27	9.5	12-14	
/ Savanes / Kpendjal Ouest	1.81	2.11	18.09	13.24	9.99	18.01	15.15	4.49	6.14	6.84	8.08	2.73	1.62	1.75	6.32	16.31	19.7	12.76	12	5.75	7.74	8.25	8.11	3.52	1.77	14-16	
/ Kara / Doufelgou	5.14	13.48	19.37	8.05	6.23	8.07	10.39	10.89	5.98	5.27	6.38	3.67	3.8	13.15	15.75	13.4	6.17	8.45	8.29	9.68	7.68	5.17	5.74	3	4.97	14-16	
/ Plateaux / Ogou	10.13	9.9	11.75	10	10.41	10.61	10.1	7.47	6.07	4.13	3.27	3.81	6.27	9.7	10.36	13.16	12.01	12.32	10.81	8.08	9.85	6.25	4.89	3.92	6.42	16-18	
/ Plateaux / Moyen Mono	8.21	11	9.03	11.08	9.64	11.18	11.4	8.53	5.94	4.38	2.75	3.6	5.67	9.63	10.92	14.08	12.64	11.03	13.05	6.31	8.8	6.55	5.24	4.76	10.27	18-22	
/ Centrale	9.82	13.57	12.01	7.81	7.27	7.74	9.65	10.37	6.28	5.27	4.13	3.54	8.16	13.44	12.39	12.51	7.4	7.53	9.22	10.12	9.95	7.12	4.29	5.14	10.03	18-22	
/ Kara / Binah	4.53	10.28	16.58	8.45	8.49	12.74	12.57	9.39	6.05	4.73	3.58	2.33	4.02	14.07	14.58	14.21	7.08	9.43	10.88	9.05	9.59	7.64	5.92	3.44	4.59	22 et plus	
/ Centrale / Sotoubous	9.72	16.31	12.25	6.61	6.11	6.04	9.19	12.39	7.2	5.47	3.69	2.83	8.17	13.47	13.33	13.87	6.22	6.7	7.72	11.33	12.17	8.63	4.95	5.64	10.06	22<100	



Understand **when SMC cycles should start and end** across the country based on trends in the percentage of confirmed cases per month compared to the 12-month total for the year, in SMC-eligible districts.

This table translates to:

- **Start** = month when the green color is lighter or turns yellow during the year
- **End** = month when the color turns dark during the year

Optimal periods for SMC per districts

CLIMAT - Nombre de pics saisonier par District

	CLIM...
	2024 ▾
igo / Centrale / Blitta	5
igo / Centrale / Mo	5
igo / Centrale / Sotoubous	5
igo / Centrale / Tchamba	6
igo / Centrale / Tchaoudjo	6

CLIMAT - Mediane des % Cas confirme de paludisme (fenêtre de 4mois) sur les 4 dernières années

	Mai 2023 ▾	Juin 2023 ▾	Juillet 2023 ▾	Août 2023 ▾
Togo / Centrale / Blitta	39.19	31.9	26.08	27.98
Togo / Centrale / Mo	37.54	40.55	39.83	41.63
Togo / Centrale / Sotoubous	39.07	34.83	27.25	30.51
Togo / Centrale / Tchamba	42.7	39.14	33.15	32.55
Togo / Centrale / Tchaoudjo	41.27	39.23	35.65	35.22

CLIMAT - Mediane des % Cas confirme de paludisme (fenêtre de 5mois) sur les 4 dernières années

	Mai 2023 ▾	Juin 2023 ▾	Juillet 2023 ▾
e / Blitta	44.87	37.64	35.71
e / Mo	47.04	51.53	51.28
e / Sotoubous	45.2	41.03	37.59
e / Tchamba	49.63	46.18	44.42
e / Tchaoudjo	48.93	47.37	45.59

CLIMAT - Periode favorable District

Mauvais
 0<30
 Acceptable
 30<40
 Excellent

- For each district a percentage of reported confirmed malaria cases of ≤ 5 years children was calculated and the median of these percentages over the past 4 years was calculated.
- The window with the highest median determines the start, length and end period of the campaign in each district

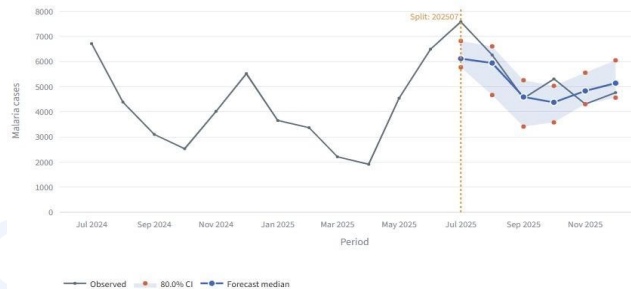
Knowing districts that are eligible for SMC and for each district, when to start and for how many months(cycles)

CHAP and modelling

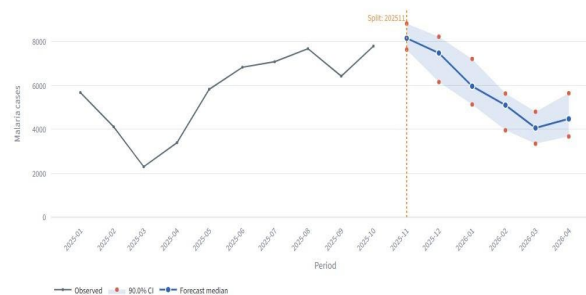
Achievements

- Running malaria cases prediction models through CHAP CORE
- Smart AR Residual Bootstrap RF model is giving promising result
- Integration of predicted cases into malaria dashboard in the context of NMDR

VO — forecasts from split 202507



HAHO — forecasts from split 202511



Overall Forecast Performance

Point forecast = median of the posterior predictive samples. Metrics are computed across all valid (location, period, horizon) triples. Nans are ignored.

Mean Bias (F-O)

-163

Average signed error — positive means over-prediction, negative means under-prediction.

MAE

621

Mean Absolute Error: average magnitude of errors, in the same unit as case counts.

RMSE

954

Root Mean Squared Error: like MAE but penalises large errors more heavily.

MAPE

21.9 %

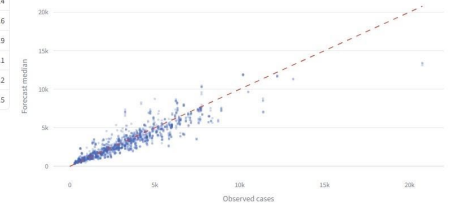
Mean Absolute Percentage Error: average relative error as a percentage of observed values.

By horizon distance

Horizon	N pairs	Bias	MAE	RMSE	MAPE (%)
0	273	+64.5	414.5	620.8	20.4
1	273	-2.7	465.8	690.0	21.6
2	273	-71.7	510.3	741.4	21.9
3	273	-320.9	715.4	1087.1	23.1
4	273	-347.1	786.0	1164.6	22.2
5	273	-302.7	853.3	1227.1	22.5

Forecast vs Observed

Each point represents one forecast — unique combination of a district, a calendar month, and a horizon distance.



C&H activities in Senegal

Achievements

- Stakeholder consultation
- Workplan validated
- DHIS2 upgraded
- Data integration started with climate health data app configured
- Some climate health dashboards created

Next steps

- Integrate ENACT data from ANACIM
- Malaria SMC campaign planning decision support tool
- Malaria cases prediction with CHAP
- Develop local capacity to use and maintain the system
- Develop a Sustainability and scale-up plan

C&H activities in Niger

Achievements

- Stakeholder consultation
- Workplan validated
- Data integration started with climate health data app configured
- Some dashboard combining climate and health data created

Next steps

- Malaria SMC campaign planning decision support tool
- Collaborate with the TA3 provider to integrate output for early warning system for disease surveillance into DHIS2 dashboard
- Develop local capacities
- Develop a Sustainability and scale-up plan

Thanks