Investigate the relationship between hydro-climatic monitoring and health indicators in a context of chronic drought.

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Dr. Alan Ricardo Patlan Hernandez
Background

Southwest Madagascar susceptible to climate crises:

« Hot spot » susceptible to a greater impacts on nutrition, health and other environmental factors directly or indirectly affecting populations.

Despite this, climate monitoring is still scarce and there is a lack of evidence to better understand the relationship between acute malnutrition (AM) and climate.

Patz JA. Hotspots in climate change and human health. BMJ. 9 nov 2002

Timothy A et al. Madagascar Climate Change and Health Diagnostic: Risks and Opportunities for Climate-Smart Health and Nutrition Investment. Washington, D.C.: The World Bank; 2018
Objectives

Main objective

To assess the relationship of hydro-climatic monitoring data with nutritional and morbidity indicators in the District of Betioky-Atsimo.

Secondary objectives:

1. Identify the hydro-climatic indicators that have an association with nutritional and morbidity indicators.

2. Explore the baseline relationship and significant temporal associations.
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<thead>
<tr>
<th><strong>Type of study</strong></th>
<th>Retrospective observational study</th>
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<tbody>
<tr>
<td><strong>Study population</strong></td>
<td>Children aged from 6 to 59 months</td>
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<td><strong>Framework</strong></td>
<td>• Southwest Madagascar</td>
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<td>• January 2014 to March 2019</td>
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<td><strong>Data</strong></td>
<td>• Monthly pluviometry</td>
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<td>• Monthly piezometric index</td>
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<td>• Monthly Leaf Area Index (LAI)</td>
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<td></td>
<td>• Number of admissions to Centres for Outpatient Nutritional Rehabilitation for Severe Malnutrition (CRENAS)</td>
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<td>• Number of screened children with acute malnutrition</td>
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**Data analysis**

Assessment of the relationship between the hydro-climatic indicators and the prevalence of acute malnutrition:

1. Correlation coefficient
2. Regression model
3. Cross-correlation / Time Series Analyses
Preliminary results

Cumulative rainfall (mm/month)

Piezometric index

Number of monthly admissions in CRENAS

CRENAS: Centre for Outpatient Nutritional Rehabilitation for Severe Malnutrition
Preliminary results

Cross-correlation function

Cross-correlograms of the total admissions to CRENAS and the explanatory hydro-climatic variables. Lags are expressed in months.

Piezometric index & CRENAS admissions

2 months lag

\( \text{corr} = -0.38, p < 0.001 \)
• To our knowledge, this is the first study that aims to assess and characterize the **impacts of climate change on undernutrition** in Madagascar.

• Our preliminary results are consistent with previous evidence of lagged impacts of climate on health indicators. However, the **state of evidence** on climate and undernutrition is still **scarce**\(^1\)-\(^5\).

• **Addressing Groundwater Resilience under Climate Change**: **improve forecasting** describing the lag between low rainfall/recharge and its impacts on nutrition and health

• It exists a **negative association** between hydro-climatic indicators and acute malnutrition prevalence in the District of Betioky-Atsimo.

• Based on available data, a **lagged impact** of the hydro-climatic indicators on acute malnutrition has been identified.

• Preliminary results are consistent with previous studies assessing the associations of environmental indicators with health and nutritional status.

• More data and further analyses are needed.
Thank you!

Contact:
Dr. Alan Patlan - apatlanhernandez@actioncontrelafaim.org
Tom Heath - theath@actioncontrelafaim.org
Dr. Jean Lapegue - jlapague@actioncontrelafaim.org