



AOMSUC-15 2025 FYSUC

THE 15TH ASIA-OCEANIA METEOROLOGICAL SATELLITE USERS' CONFERENCE (AOMSUC-15)
2025 FENGYUN SATELLITE USER CONFERENCE (2025 FYSUC)

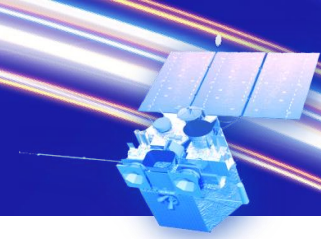
Climate Change Perception Among Fishermen and Residents of Flood-Prone Areas of The Gambia: Are their Perceptions accurate?

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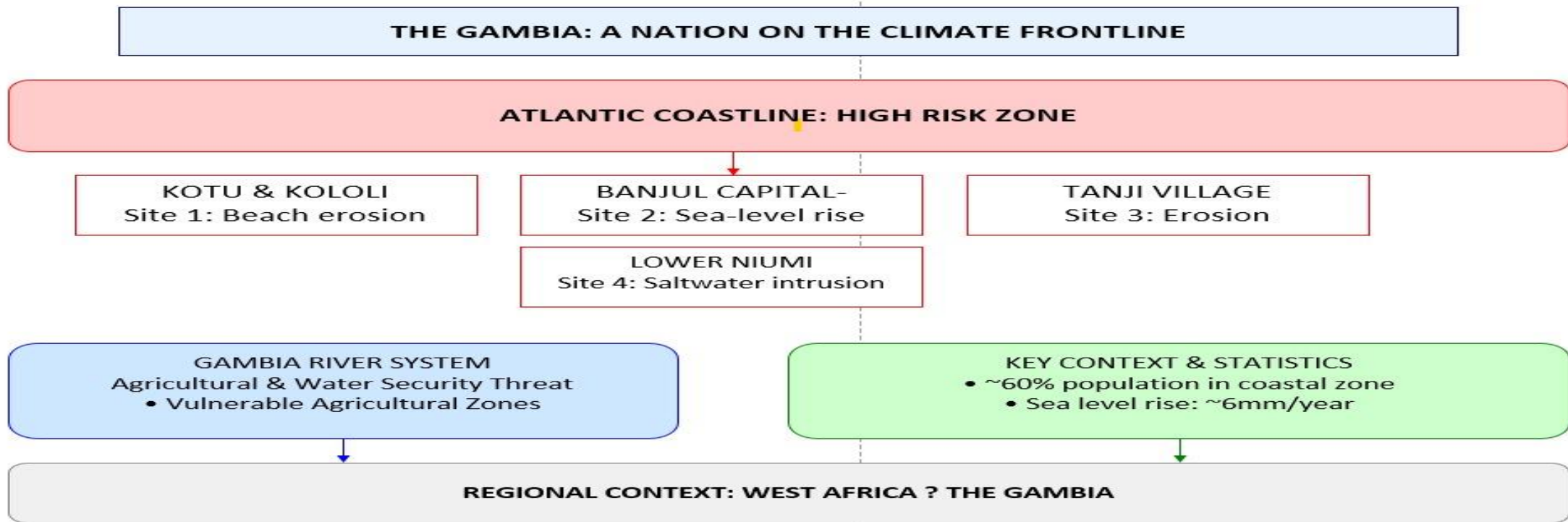


Flooding Site



Fishing Site





• :The Gambian Context

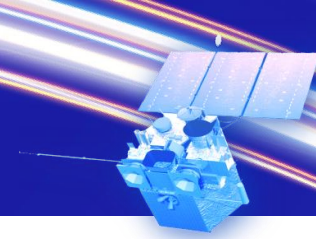
1. A low-lying coastal nation in West Africa.
2. Highly vulnerable to sea-level rise, coastal erosion, and flooding.
3. The fisheries sector is a critical source of livelihood and food security.

• Our Study Sites:

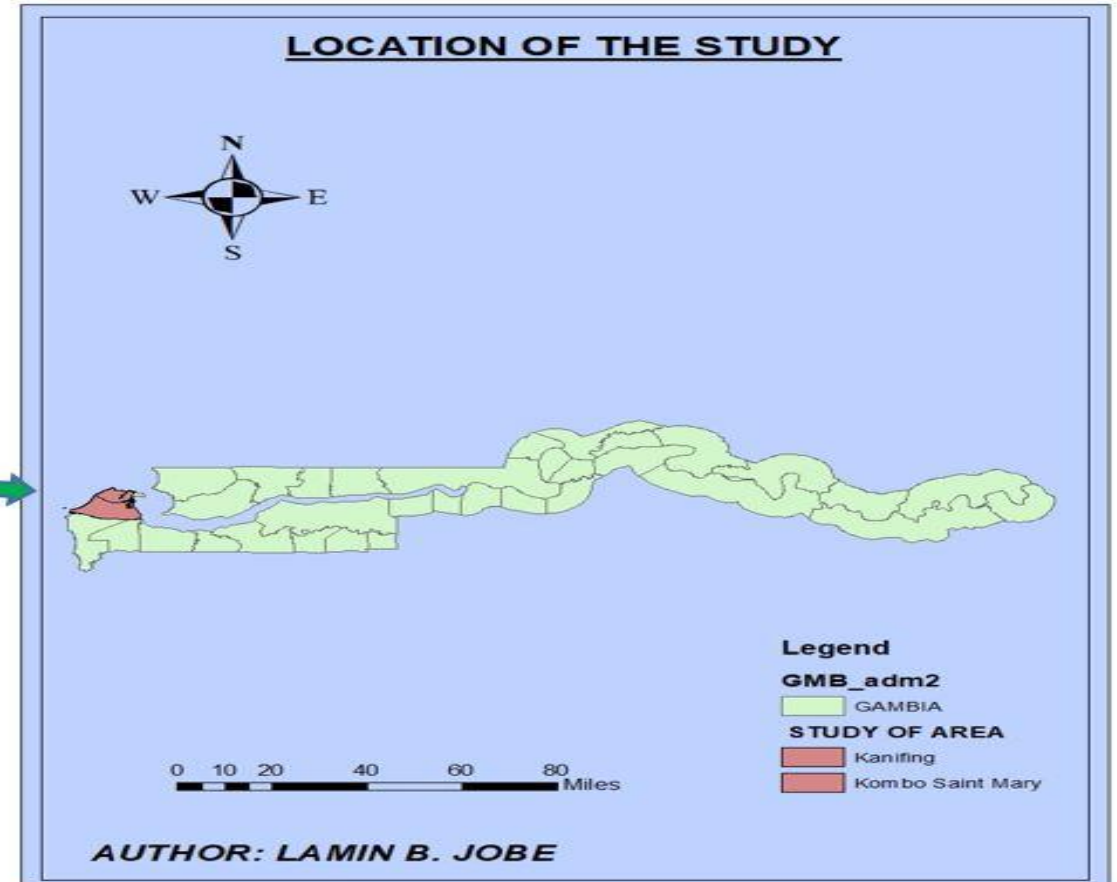
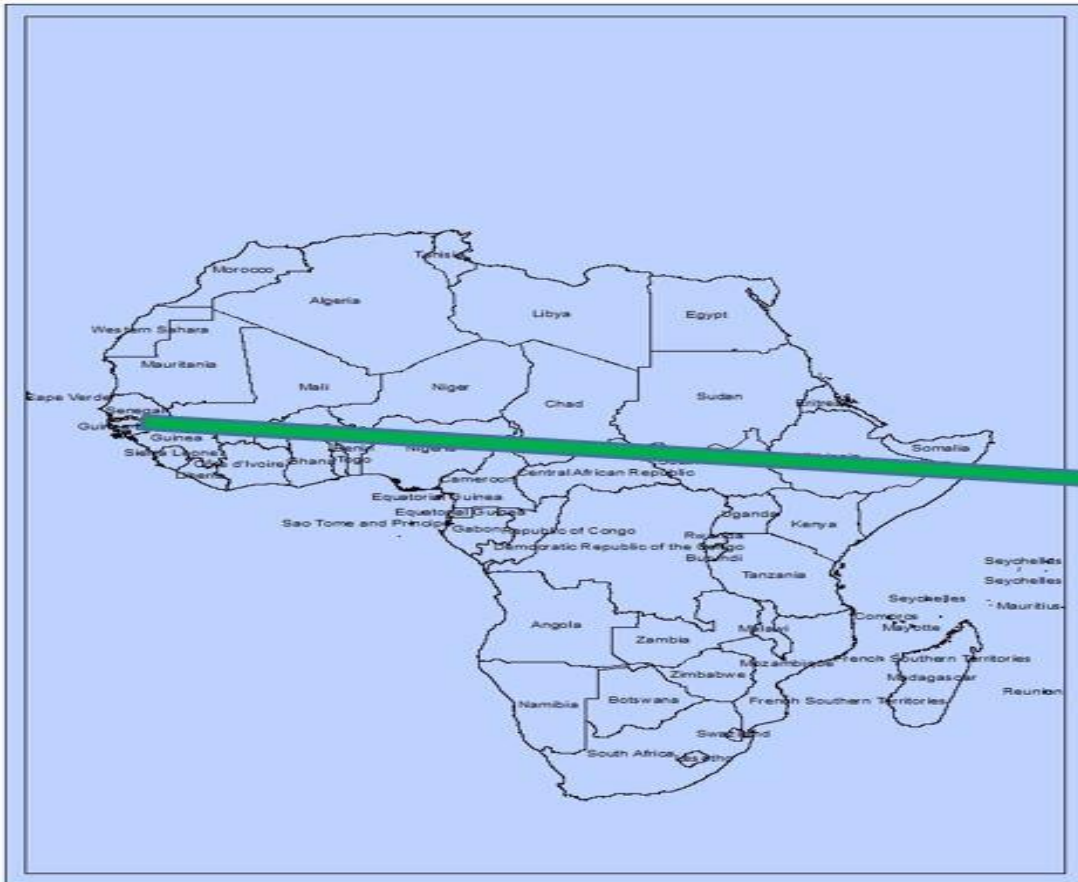
1. **Fishing Communities:** Bakau, Brufut, Tanji.
2. **Flood-Prone Urban Areas:** Kotu, Tallinding, Ebo Town.

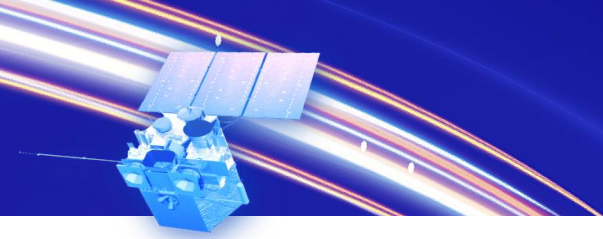
• The Central Paradox: Communities are experiencing climate-related stressors, but is their perception aligned with the physical climate reality?

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Study Area: Fishing sites (Bakau, Brufut, Tanji) and flooding sites (Kotu, Tallinding, Ebo Town) in The Gambia's West Coast Region.





1. **Awareness and Perception:** What is the level of climate change awareness among fishermen and residents in flood-prone zones?
1. **Data vs. Belief:** How do local perceptions of changing temperature, rainfall, and flooding compare with long-term climate data and high-resolution satellite observations?
1. **Attribution Challenge:** What are the *actual* primary drivers of flooding in these communities?
1. **The Way Forward:** How can advanced satellite data, specifically from FENGYUN, be operationalized to bridge the knowledge gap and enhance national resilience?

MULTI-METHODOLOGICAL APPROACH: A SYMPHONY OF DATA

Ensuring Scientific Rigor in Climate Vulnerability Assessment

LONG-TERM CLIMATE CONTEXT (120 YEARS)

- Data: CRU TS 0.5° gridded data
 - Period: 1901-2020
- Purpose: Historical baseline & long-term

HIGH-RESOLUTION SATELLITE VALIDATION

- Data: FENGYUN-3D MERSI-II & MWHS-II
 - Period: 2018-2022
- Purpose: Validate & enhance long-term

SOCIAL PERCEPTION GROUND-TRUTHING

- Data: 377 structured surveys
 - Sites: 6 study locations
- Analysis: Pivot Tables (Excel)

ADVANCED STATISTICAL CLIMATE ANALYSIS

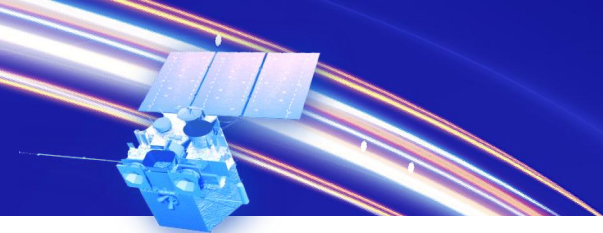
- Tool: Python/Jupyter Notebook
- Test: Mann-Kendall Trend Analysis
- Purpose: Detect significant trends

DATA INTEGRATION & SYNTHESIS

Multi-temporal scale integration
Spatial & social data fusion

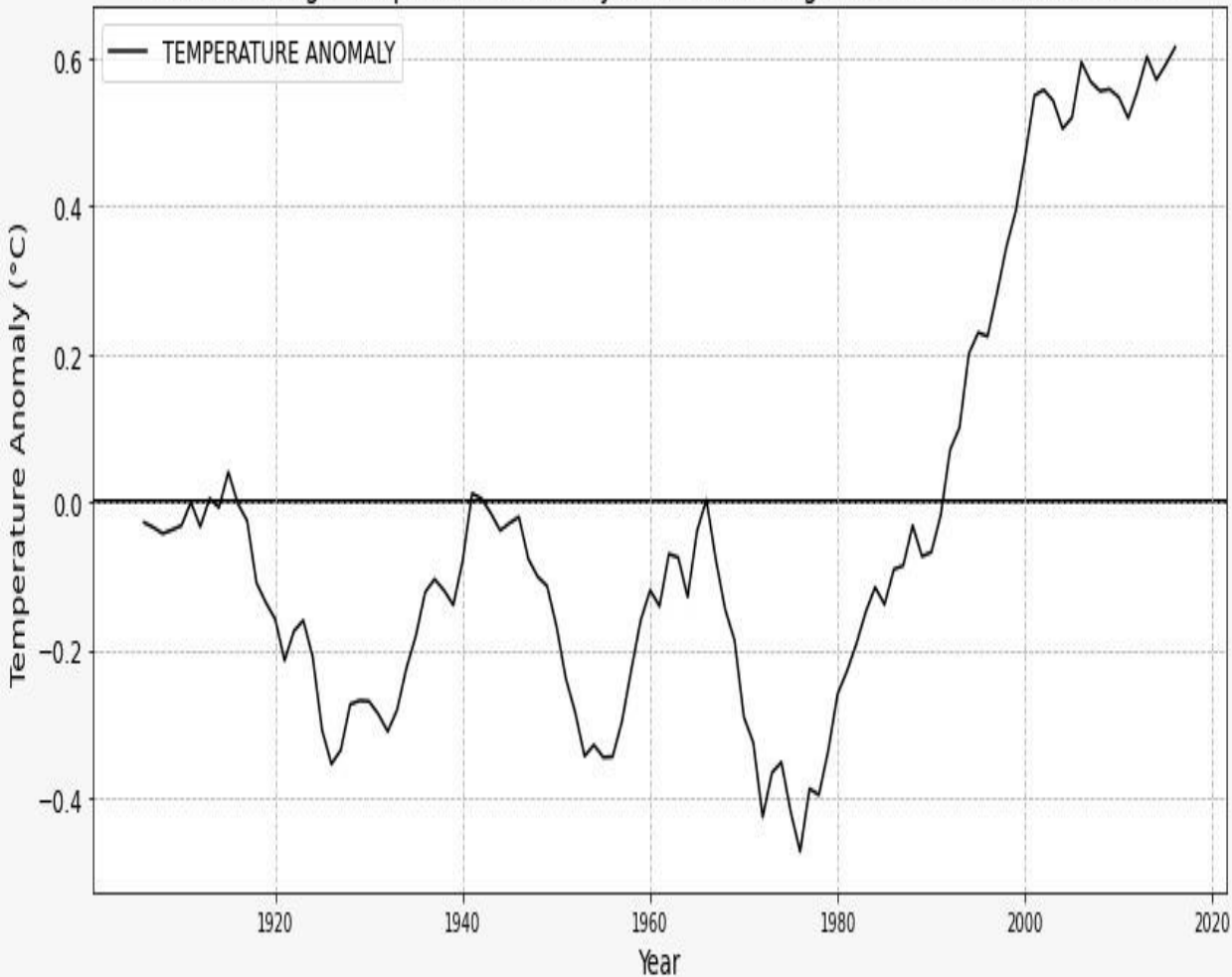
SCIENTIFIC RIGOR ASSURED

- ? Temporal comprehensiveness
- ? Spatial precision

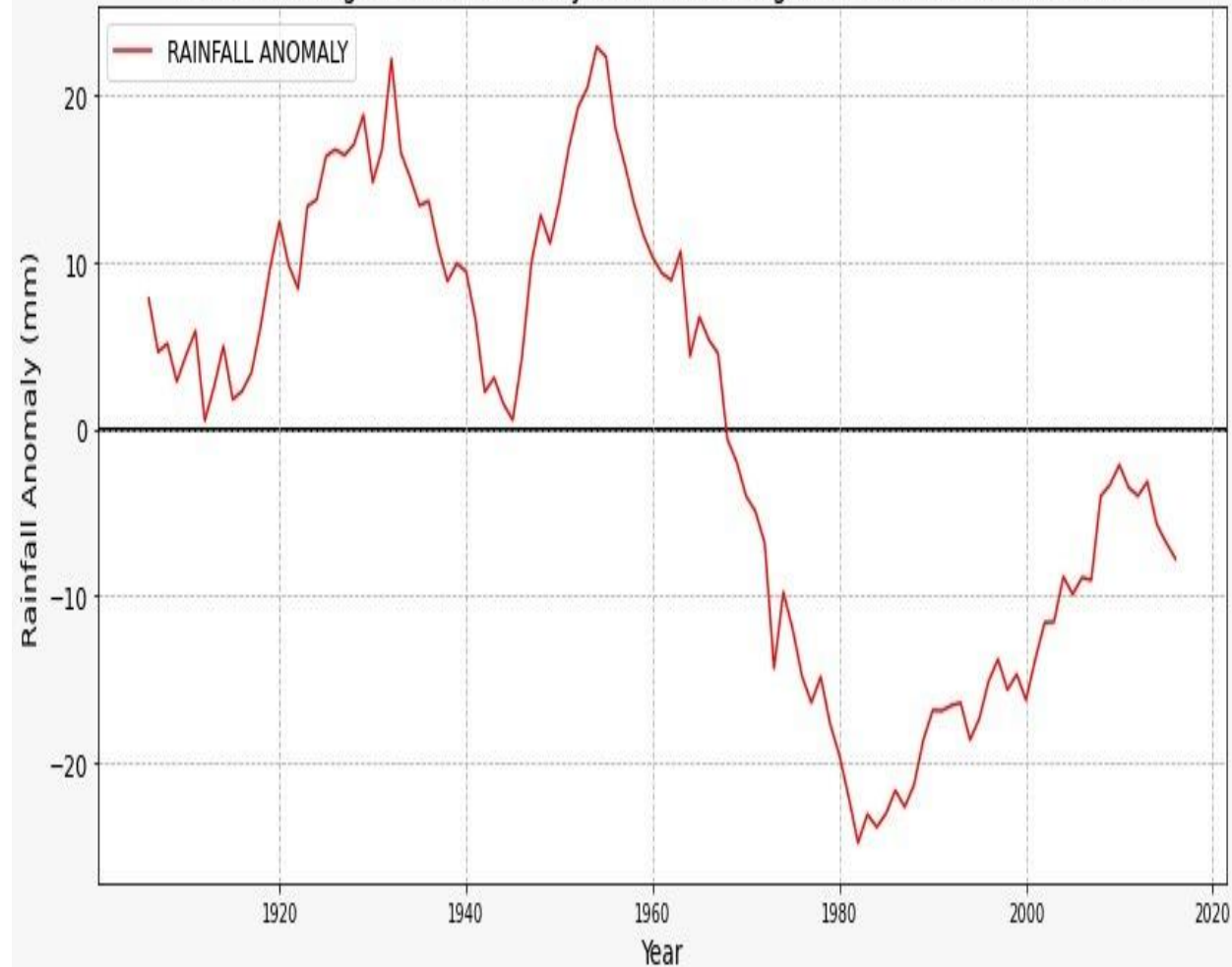


Analysis Part 1: The Climate Reality - What the Data Reveals

Annual Average Temperature Anomaly over the Fishing and Flood Site (1901 - 2020)



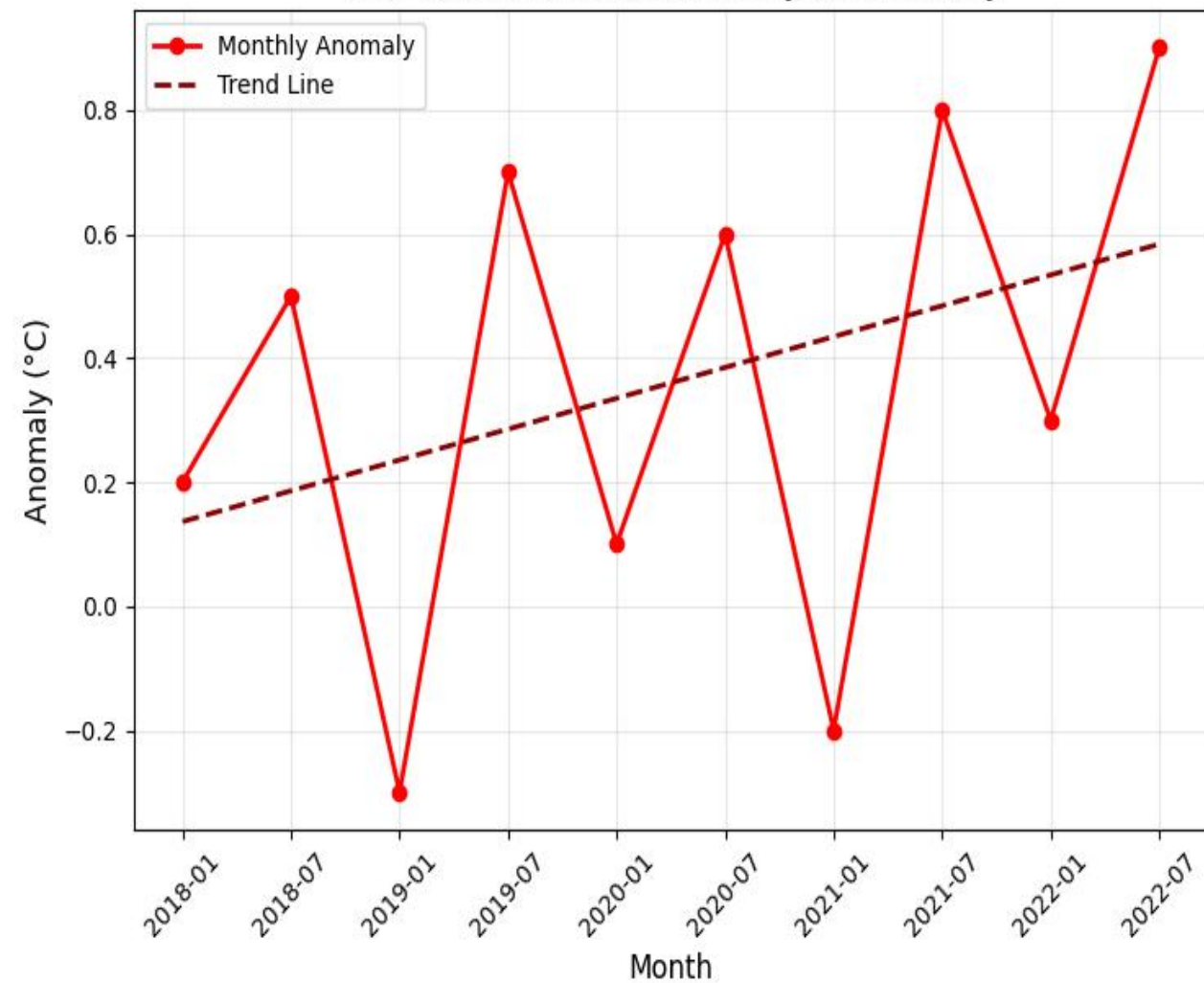
Annual Average Rainfall Anomaly over the Fishing and Flood Site (1901 - 2020)



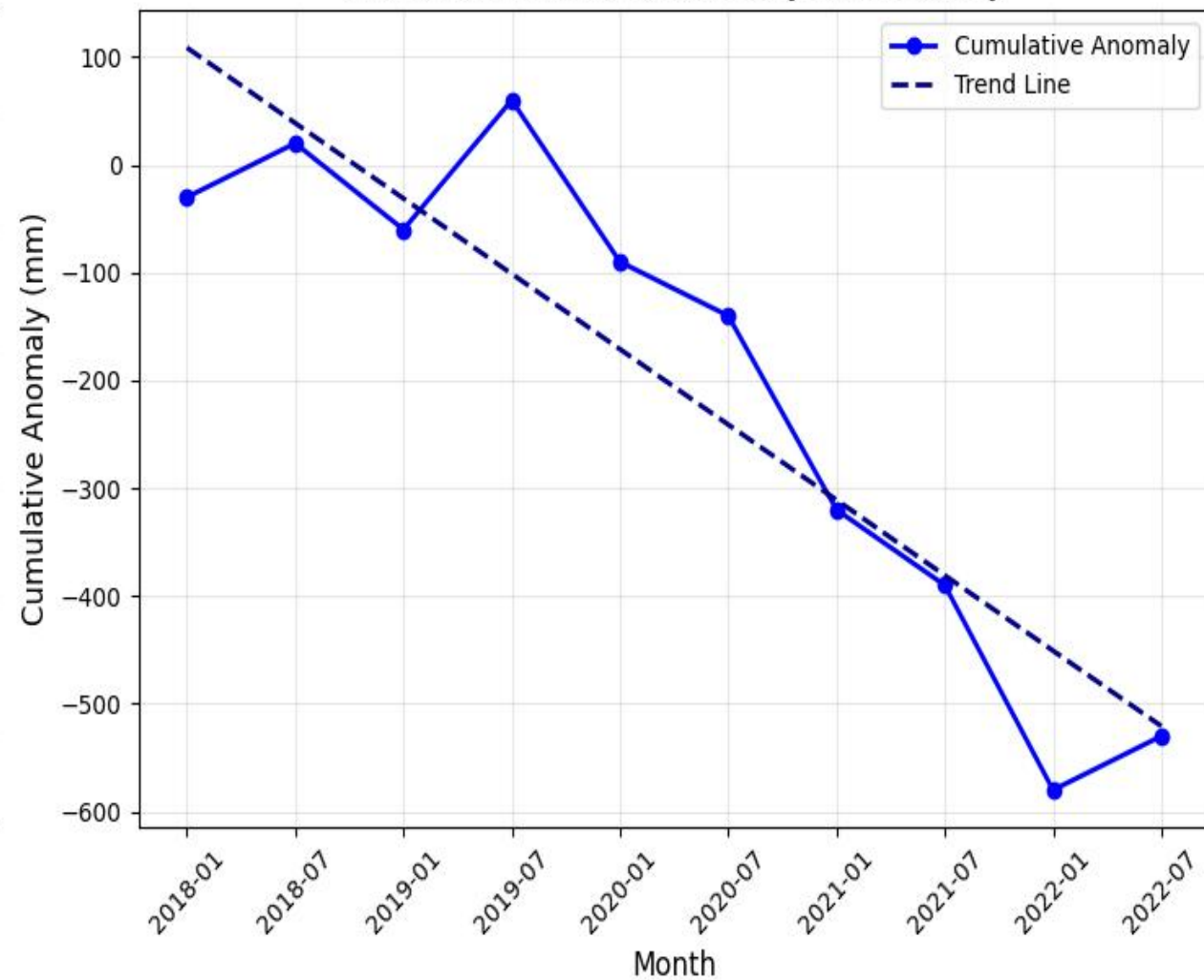
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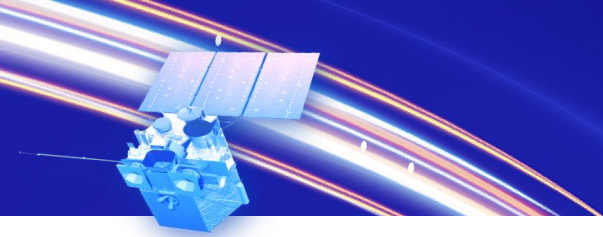
**Monthly Sea Surface Temperature (SST) Anomaly
The Gambia West Coast (2018-2022)**



**Cumulative Rainfall Anomaly
The Gambia West Coast (2018-2022)**

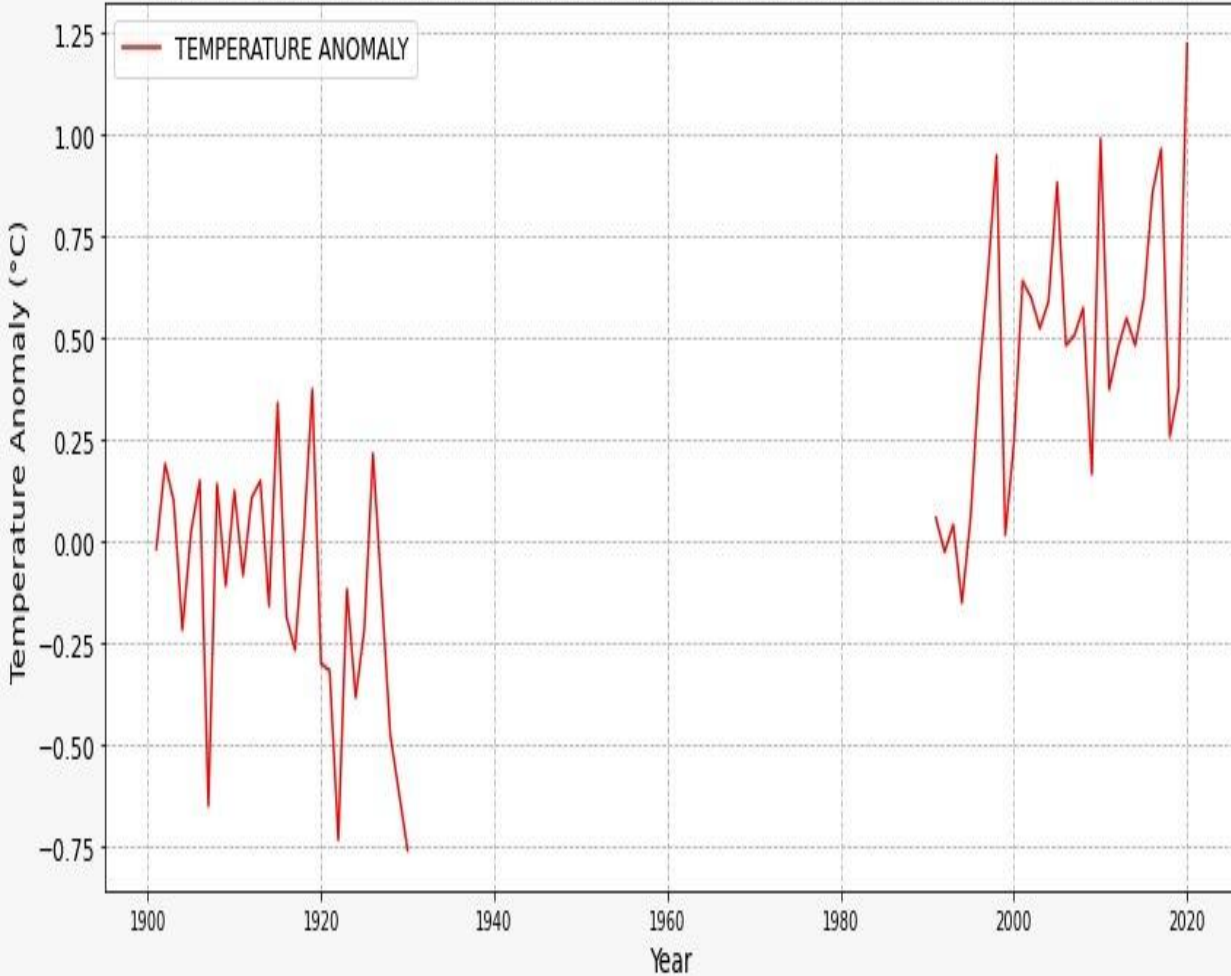


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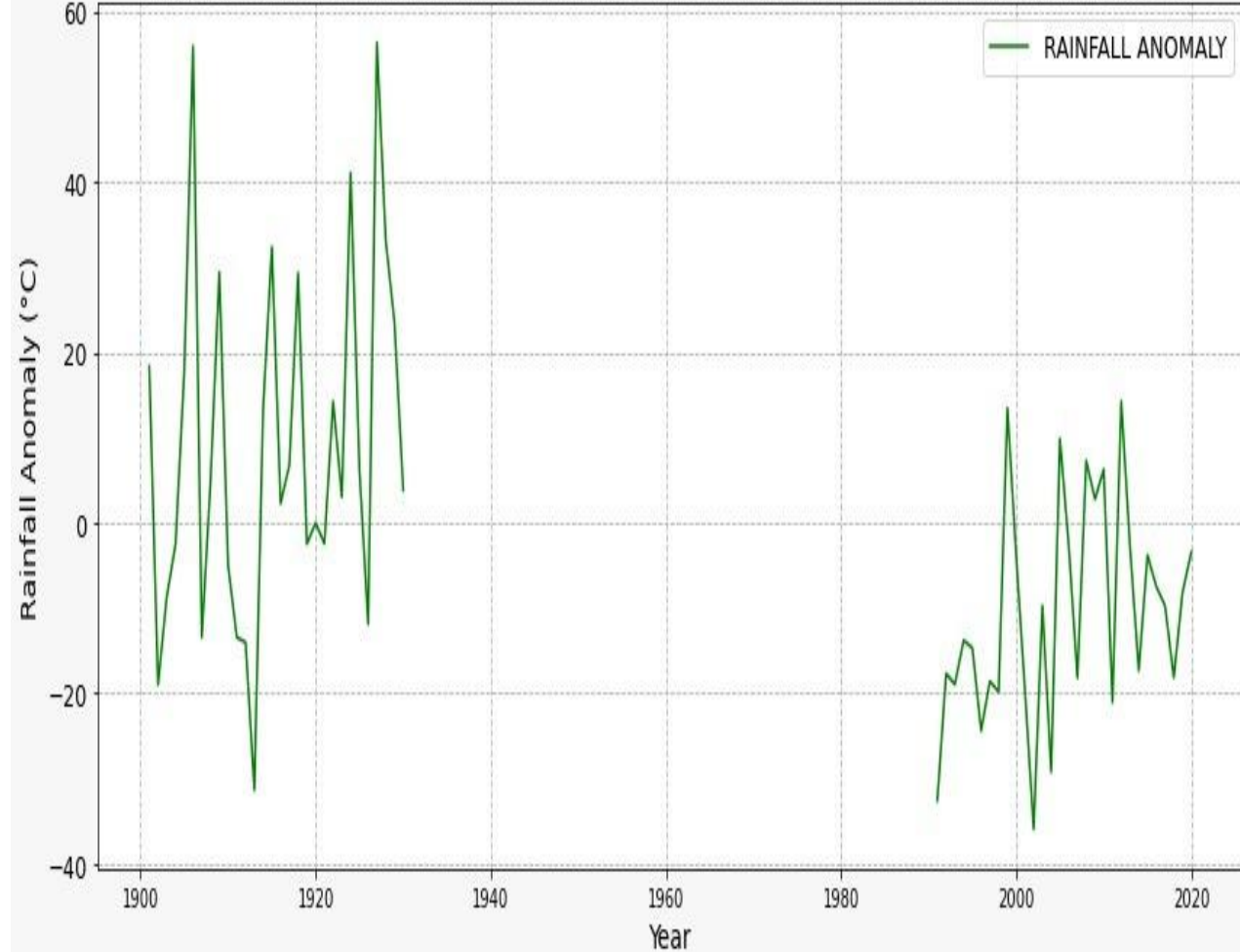


Climate change Detection at the fishing and flooding site using two climatic cycle (Pre-industrial and Industrial era).

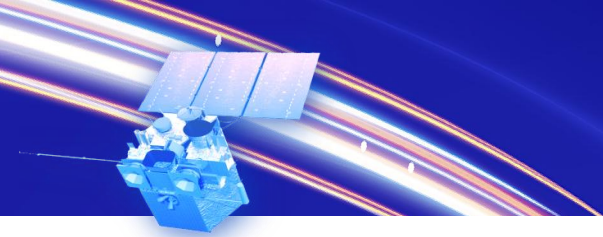
Climate Change Detection of Study Area: Past(Pre-industrial Era) & Present(Industrial Era)



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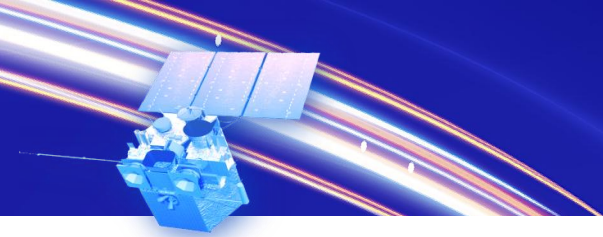
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Our analysis of 120 years of data, augmented by FY-3D, presents a nuanced picture:

- **Temperature Trend:** A minimal warming trend of **+0.02°C** over the study period.
 - *Key Insight:* This is **substantially below** the IPCC's 1.5°C warming threshold and unlikely to be the dominant driver of *current* experienced changes.
- **Rainfall Trend:** A slight increase in cumulative rainfall of approximately **+19 mm**.
 - *Key Insight:* While present, this increase is modest and does not, on its own, explain the severe flooding reported.

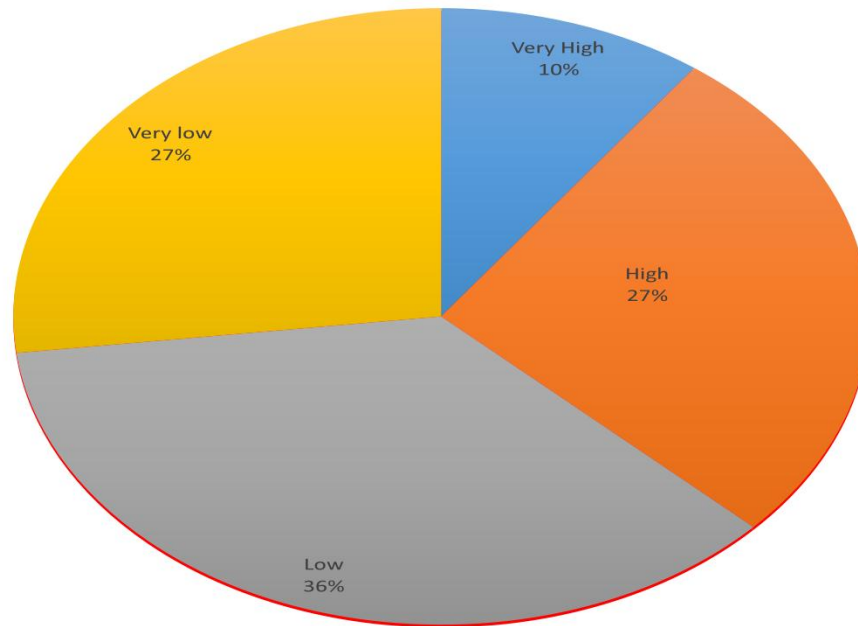
Conclusion: The **signal of anthropogenic climate change in the local temperature and rainfall records is weak**. This is our first critical finding.



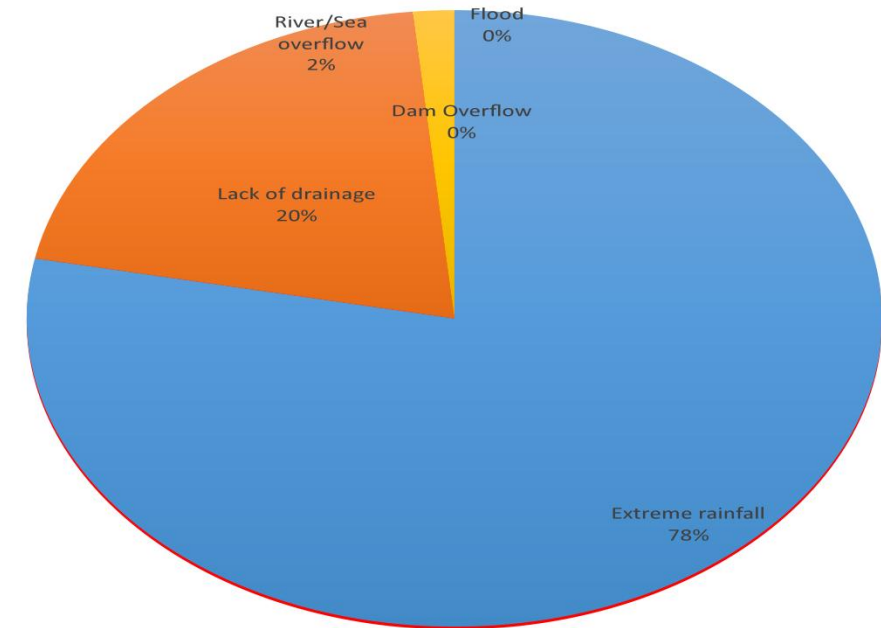
Analysis Part 2: The Perception Reality - What the People Report

RESULT AND DISCUSION

Perception of respondent at flooding site

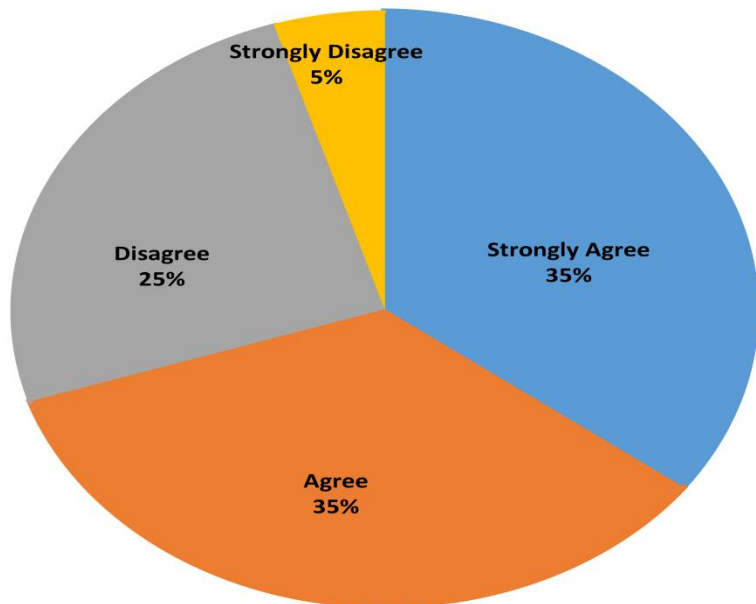


Awareness of respondents at flooding site

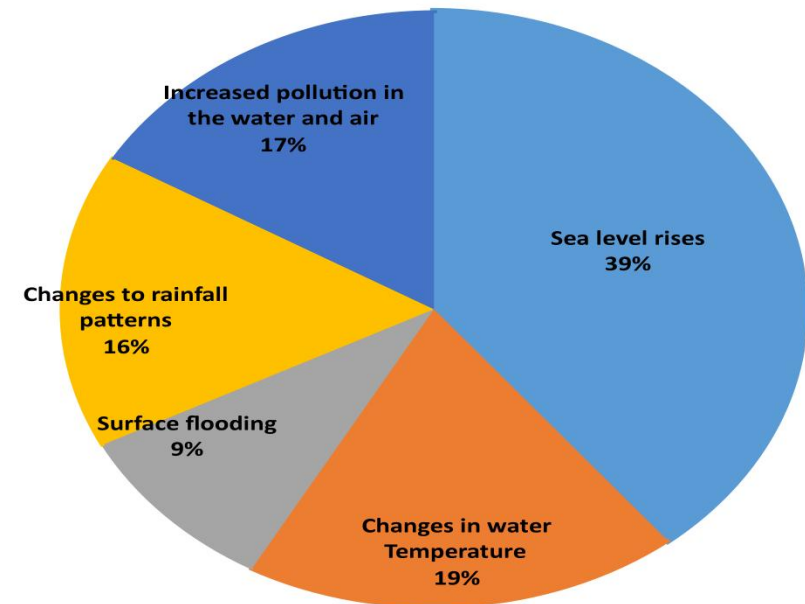


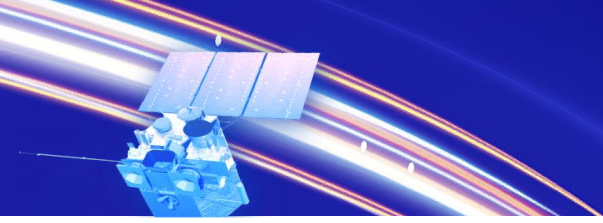
RESULT AND DISCUSSION

PERCEPTION OF RESPONDENTS AT FISHING SITE



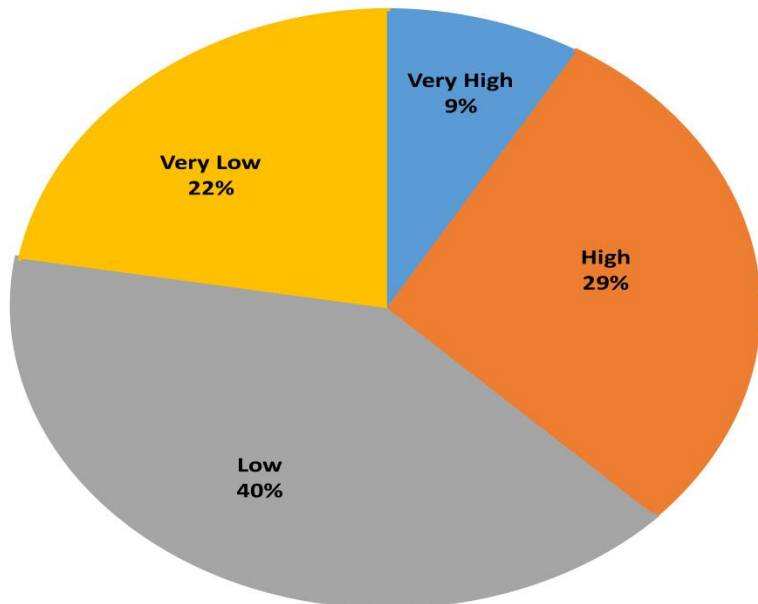
AWARENESS OF RESPONDENTS AT FISHING SITE



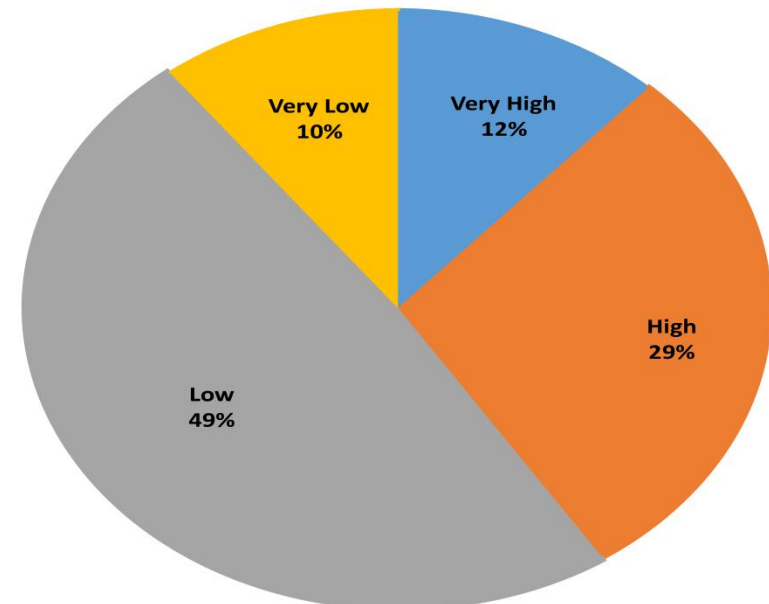


RESULT AND DISCUSSIONS

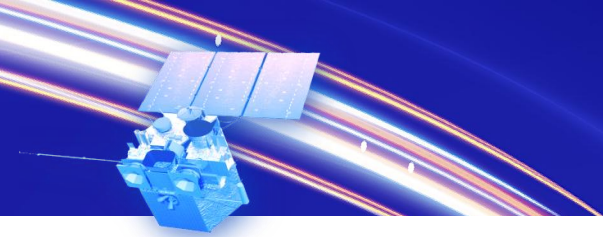
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AWARENESS OF RESPONDENTS AT FISHING SITE



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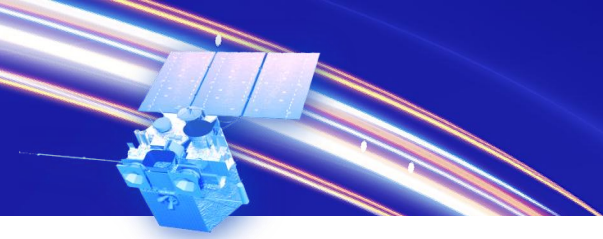
The survey data reveals a significant perceptual landscape:

- **Flood Attribution:**
 - **78%** of respondents in flood zones directly blame "**heavy rainfall**" for flooding events.
- **Climate Knowledge Gap:**
 - **63%** of flood-area respondents demonstrated a lack of fundamental climate knowledge.
 - **59%** of fishing-site respondents showed the same knowledge gap.

A. Local Perceptions (Survey)

- **63%** of respondents had low knowledge of climate change.
- **78%** believed extreme rainfall was the primary cause of flooding.
- **70%** of fishers perceived fishing areas were becoming warmer.

Conclusion: There is a **pervasive attribution of local environmental problems directly to climate change**, coupled with a **critical gap in foundational climate science understanding**.

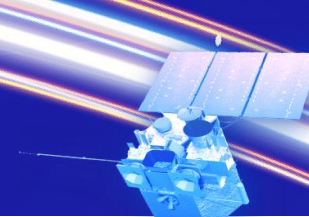


This misattribution is symptomatic of a larger problem.

- ❖ **The high percentage of respondents with low climate knowledge (63% in flood zones, 59% in fishing sites) is alarming.**
- ❖ **This gap hinders effective adaptation because:**
 - 1. It leads to misdiagnosis of problems (such as blaming climate for infrastructure failures).**
 - 1. It creates vulnerability to misinformation.**
 - 1. It impedes community buy-in for scientifically-grounded adaptation measures.**

This is not just a data problem; it is a communication and education emergency.

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FENGYUN Satellite Data Application Framework for The Gambia



FENGYUN Satellite Data Sources

Sea Surface Temperature (SST)

Precipitation (Rain Rate/Accumulation)

Land Surface Temperature (LST)

Data Processing & Integration

Data Acquisition & Validation with Ground Truth

Spatial & Temporal Analysis

Integration with Local Data (Topography, Land Use)

Key Application Areas for West Coast Gambia

Fisheries & Marine Ecosystem

Agriculture & Water Resource Management

Urban Planning & Public Health

Disaster Preparedness & Coastal Management

Climate Change Studies

End Users & Outcomes

Fishermen & Dept. of Fisheries

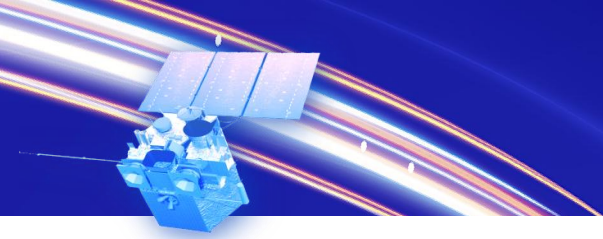
Farmers & Dept. of Agriculture

City Councils & Public Health Officials

NDMA & Dept. of Water Resources

Research & Academic Institutions

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Proposed FENGYUN Applications:

FY-3 LST Data: Finer spatial resolution to detect urban heat islands or localized warming hotspots.

FY-4 Rainfall Estimates: Better capture of intensity/distribution of extreme rainfall causing flash floods.

FY-3/4 SST & Ocean Data: Analysis of upwelling and sea-state changes to validate fishermen's observations.

5. Conclusion & Recommendations

1. Awareness: The Gambian government should initiate targeted climate change education programs.

2. Infrastructure: Invest in drainage systems to mitigate flooding in urban areas.

3. Data Integration: Adopt FENGYUN satellite data products for enhanced, localized climate monitoring, validation, and early warning systems in West Africa.

4. Future Research: Replicate this study using high-resolution FENGYUN data to provide definitive evidence on micro-climatic changes.

Acknowledgments

Data: Climate Research Unit (CRU), University of East Anglia and the respondents in The Gambia for their time and insights.

Satellite Data Proposal: FENGYUN Satellite Series, National Satellite Meteorological Center, China.

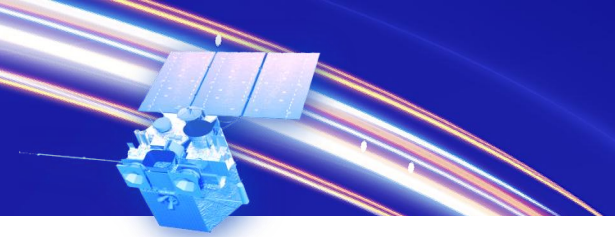
Acknowledgements: World Meteorological Organization (WMO), China Meteorological Administration.

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Thank you for your attention!