TANA AND ATHI RIVERS DEVELOPMENT AUTHORITY (TARDA)

TANA BASIN RIVER MONITORING

Between 14 and 29 November, 2024

OVERVIEW

This report analyzes the Tana Bridge water levels and cumulative rainfall distribution across the Tana River Basin between November 14 and November 29, 2024. Monitoring these parameters is critical to understanding the hydrological patterns influencing river dynamics and flood risks. The data, sourced from the Climate Hazards Resource Portal (CHRS) PDR Now platform, is instrumental in supporting TARDA's ongoing efforts to ensure effective flood management and safeguard downstream communities.

OBSERVATION AND ANALYSIS

Water Levels at Tana Bridge

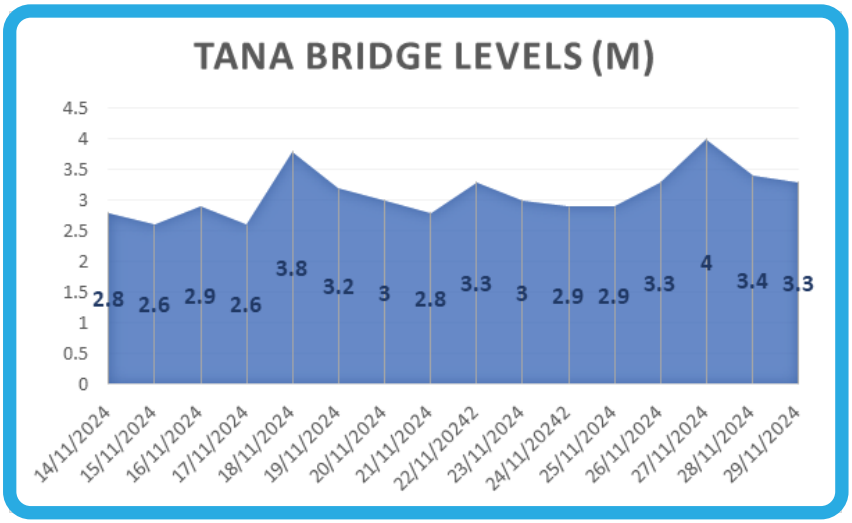

Fig. 1: Tana Bridge Water Level Measurement

The Tana Bridge water levels were recorded daily during the reporting period, showing dynamic changes influenced by upstream rainfall activity. The accompanying graph highlights key trends in water levels over time

KEY TRENDS

Initial Stability

From November 14–18, water levels ranged from 2.6m to 2.9m. This relatively stable period suggests minimal hydrological changes in upstream areas during these days.

Significant Increase

A sharp rise to 3.8m was observed on November 19, coinciding with a period of intense rainfall in Nyeri and Kirinyaga counties. This suggests a strong relationship between rainfall and river discharge.

Subsequent Fluctuations

Water levels between November 20–27 varied between 2.8m and 3.3m, indicating a gradual response to moderate and localized rainfall activity.

Peak Levels

The highest level of 4.0m was recorded on November 28, followed by a slight decline to 3.3m on November 29. This peak reflects the cumulative effect of consistent rainfall over the preceding days.

The periodic fluctuations observed in the graph suggest a delayed response of river levels to rainfall, highlighting the importance of upstream hydrological contributions to downstream water dynamics.

RAINFALL DISTRIBUTION ACROSS THE BASIN

From November 14–18, water levels ranged from 2.6m to 2.9m. This relatively stable period suggests minimal hydrological changes in upstream areas during these days.

HIGH-INTENSITY RAINFALL

Nyeri and Kirinyaga counties, located in the upper catchment of the Tana River, experienced significant rainfall exceeding 300mm. This directly contributed to increased river flow and rising water levels downstream.

Other areas, such as Taita Taveta, Kilifi, and Mandera counties, also recorded high rainfall, although these regions have less influence on the Tana Bridge levels.

MODERATE RAINFALL

Central counties, including Nakuru, Laikipia, and Machakos, recorded moderate rainfall levels between 100mm and 300mm. While not directly affecting the Tana River flow, these areas contribute to localized water accumulation and potential runoff.

CUMULATIVE RAINFALL BETWEEN 14/11/24 - 29/11/24

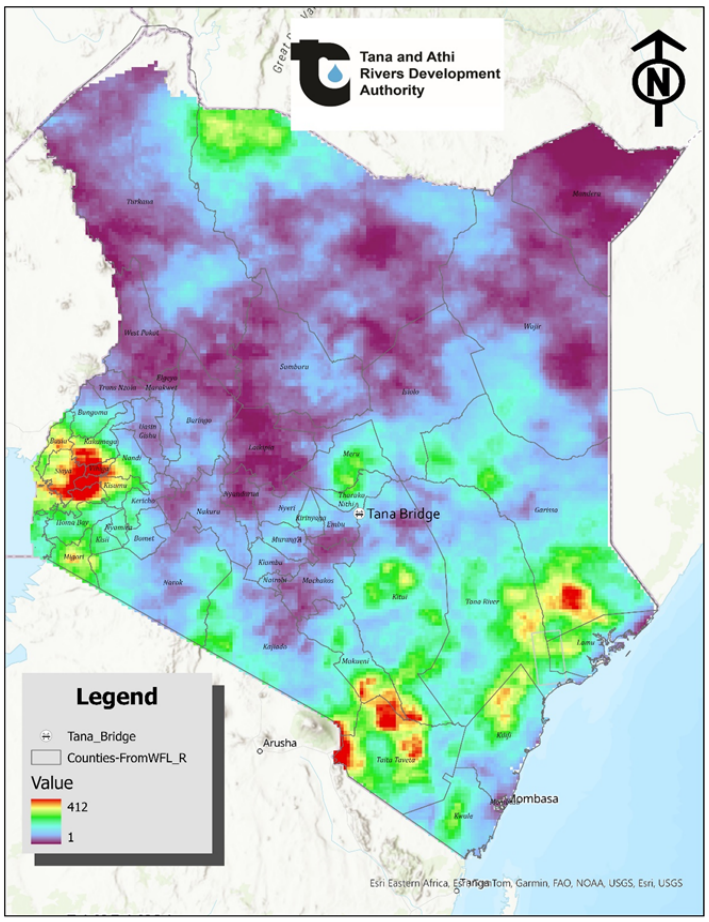

Fig. 2: Cumulative Rainfall Distribution Across the Country

The rainfall patterns highlight the variability in precipitation intensity across the basin, with upstream regions playing a critical role in determining downstream hydrology.

INTERPRETATION

The gradual rise in Tana Bridge water levels aligns with the spatial rainfall distribution, particularly in upstream regions such as Nyeri and Kirinyaga counties. The significant rainfall in these areas is the primary driver of increased river discharge, which culminates in higher water levels downstream.

This underscores the interconnected nature of upstream rainfall and downstream flooding risks. It also emphasizes the need for continuous and real-time monitoring to anticipate changes in water levels and implement timely mitigation strategies.

FLOOD MONITORING MITIGATION MEASURES

TARDA recognizes the critical role of proactive measures in mitigating the impacts of flooding. As part of its ongoing efforts, the following steps are being implemented:

ENHANCED MONITORING SYSTEMS

Deployment of real-time river-level monitoring stations to capture live data and provide early warnings to at-risk communities.

COMMUNITY AWARENESS CAMPAIGNS

Educating downstream communities on flood risks and response strategies through workshops, brochures, and media campaigns

SENSOR TECHNOLOGY INSTALLATION

Placement of advanced river-level and rainfall monitoring sensors at strategic locations across the basin to enhance data collection and improve predictive capabilities

COLLABORATION WITH STAKEHOLDERS

Partnering with meteorological departments, county governments, and disaster management authorities to streamline response efforts

CONCLUSION

The observed rise in Tana Bridge water levels during November 14–29, 2024, highlights the direct influence of rainfall in upstream catchments on downstream hydrological conditions. The rainfall in Nyeri and Kirinyaga counties, coupled with TARDA's real-time monitoring efforts, provides valuable insights for flood risk management.

Through the implementation of advanced monitoring systems, community engagement, and sensor technology, TARDA is committed to ensuring the safety and resilience of communities within the Tana River Basin.

DATA SOURCE

Rainfall and hydrological data were obtained from the CHRS PDR Now platform, with spatial visualizations created using TARDA's GIS resources.