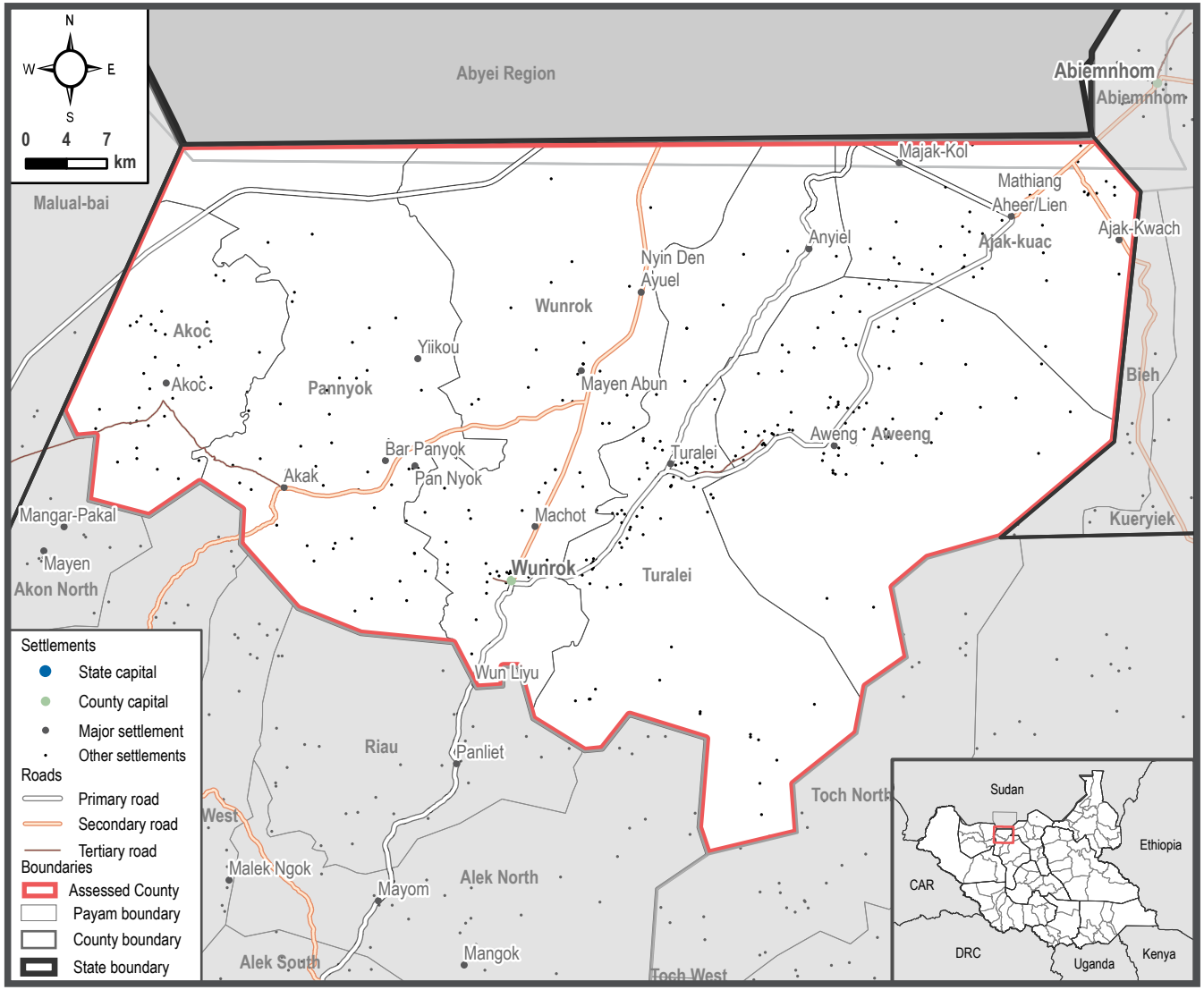
TWIC COUNTY - WARRAP STATE

Map 0.1: Location of Twic county within South Sudan indicating payam boundaries and key settlements



TWIC - KEY FACTS

- **Estimated population: 263,824**[1] (2022 OCHA estimates)**; 433,796**[2] (2023 NBS and UNFPA estimates)
  Note: Calculations using population figures in this county profile use the 2022 estimates
- **Area: 3,957 km²**
- **Population density: 67 persons per km²**
- **County capital: Wunrok**
- **Payams: Turalei, Aweng, Wunrok, Panyok, Akoc, Ajak Kuac**

Twic county is situated within Warrap State, bordered to the west by Aweil East and to the north by the Abyei administrative area. To the east, it shares boundaries with Abiemnhom and Mayom (Unity State), while to the south, it is adjacent to Gogrial East and Gogrial West. The county comprises six payams and covers an area of 3,957 square kilometers, accommodating approximately 263,824 residents.[3]

The county grapples with communal conflicts primarily driven by competition for resources. Nomadic communities from Warrap State, Unity State, and Abyei migrate during the dry season in pursuit of water in northeastern and eastern areas of Warrap State, leading to resource-related conflicts.[4] Notably, in 2013, the county played a role in the Gogrial Agreement, encompassing four counties: Aweil East, Twic, Gogrial West, and Aweil South.The 13-point agreement addressed conflicts related to grazing land, and water sources.[5]

With its lowland terrain and patches of wetlands, the county is susceptible to flooding caused by intense rainfall and riverbank overflow. This geographical vulnerability results in recurrent flooding, impacting approximately 29,044 individuals in 2022.[6]

About REACH

REACH is a leading humanitarian initiative that collects primary data and produces in-depth analysis to help aid actors make evidence-based decisions in support of crisis-affected people. With this in mind, our flagship research programmes aim to inform the prioritisation of aid according to levels of need - both crisis-level planning and targeted rapid response - as well as decisions around appropriate modalities of aid. Through our team of assessment, data, geospatial, and thematic specialists, we promote the design of people-centred research and set standards for collecting and analysing rigorous, high quality data in complex environments.
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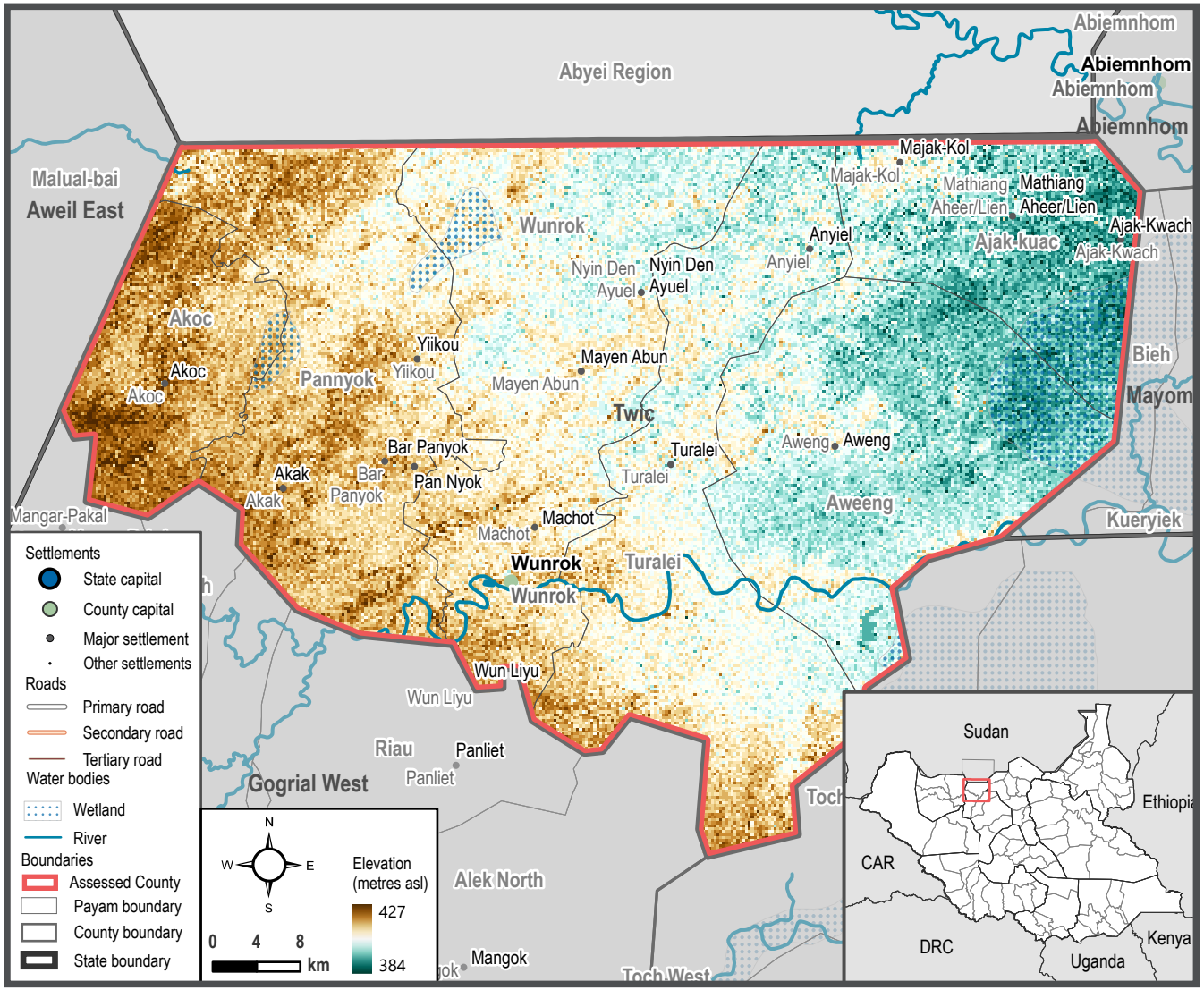
Map 1.1. Elevation and natural features including wetland areas, rivers and water bodies in Twic county

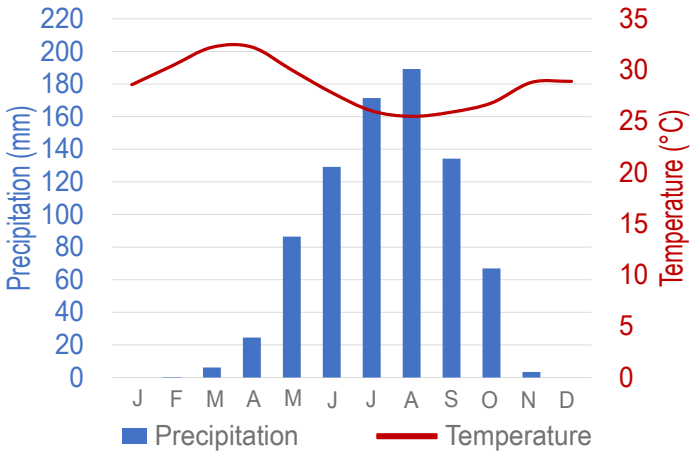


As depicted in map 1.1, Twic exhibits a predominantly flat topography, with an average elevation of 406 meters above sea level. Areas with highest elevations are located along the western border with Aweil East and the southwestern border shared with Gogrial West. Elevation in the county gradually diminishes as one moves northeastward into Ajak Kuac payam and the adjacent Abiemnhom and Mayom counties.

The county is in the "Northwestern flood plain sorghum and cattle" livelihoods zone, characterized by expansive flat grasslands. The natural terrain in this zone exhibits diverse vegetation, including grasslands, wetlands, bush scrubs and scattered tree cover.[7] This region's environmental composition influences livelihoods, particularly in crop cultivation and cattle rearing. In the eastern part of the county, a distinctive expanse of wetlands can be found in Ajak Kuac and Aweng payams, extending beyond county borders into Mayom county. Additionally, other patches of wetlands are situated in Akoc, Pannyok, and Wunrok payams, as depicted in map 1.1.

The county experiences an annual average rainfall of approximately 812 mm. As illustrated in graph 1.1, August has the highest precipitation, while January and December typically represent the driest periods. March and April consistently record the highest temperatures, contrasting with the lower temperatures observed in the rainy month of August. An examination of rainfall data spanning from 1981 to 2022 reveals a consistent pattern throughout these years.

Graph 1.1. Average monthly precipitation and temperature, Twic county (1981 - 2022)[89]



Highest point
427 m

Average elevation
406 m

Elevation range
43 m

Annual precipitation
812 mm/yr

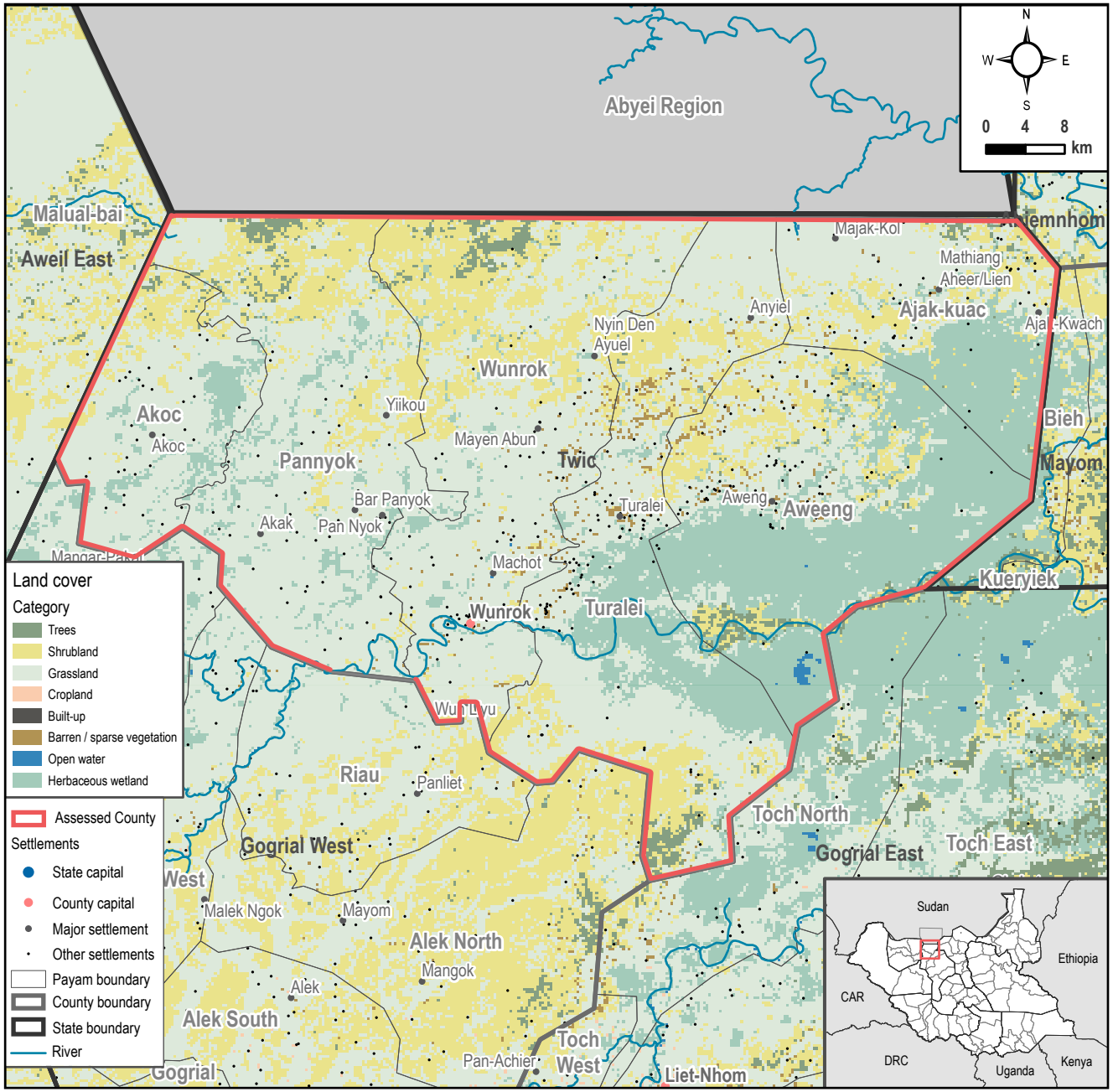
Average temperature
29°C

Wettest month
August

Driest month
January

2. LAND USE AND LAND COVER

Map 2.1. Land use and land cover map, Twic county[12]



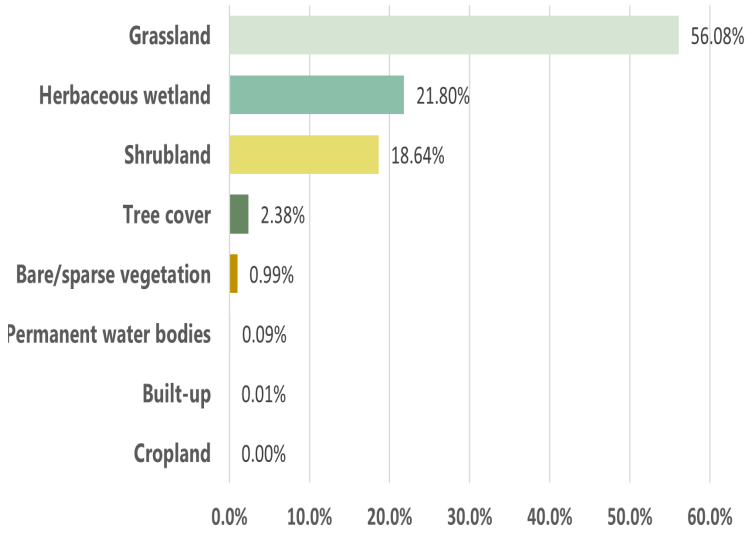
Twic's landscape is primarily extensive grasslands, making up 56% of total land cover. Despite the prevalence of grassland, herbaceous wetlands and shrubland occupy 22% and 19% of the land, respectively.

Tree cover, bare/sparse vegetation, and permanent water bodies collectively make up less than 4% of the county's land cover, emphasizing the dominant presence of grasslands, herbaceous wetlands and shrubland in the landscape composition of the county.[10]

For a comprehensive visualization of the spatial arrangement of these diverse land cover features, readers can refer to map 2.1. Additionally, graph 2.1 offers further elucidation, providing a detailed breakdown of the proportional representation of each land cover type. Together, these visual aids contribute to a deeper understanding of the patterns shaping Twic county's environmental makeup.[11]

105,614 identified buildings in Twic county[13]

Graph 2.1. Land cover as proportion of Twic county area



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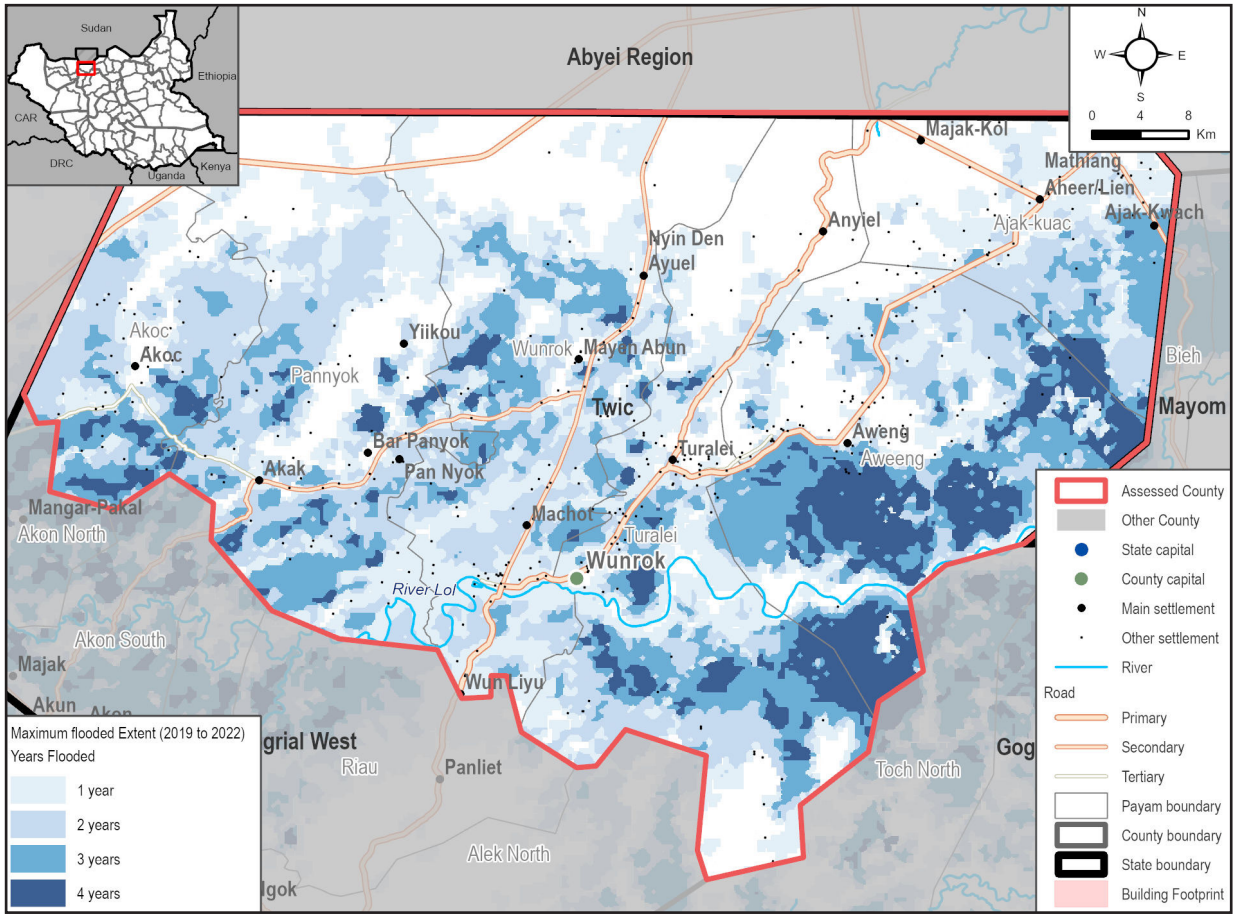
Map 3.1. Estimated maximum annual flood extent (2019-2022), affected settlements and key infrastructure[i]



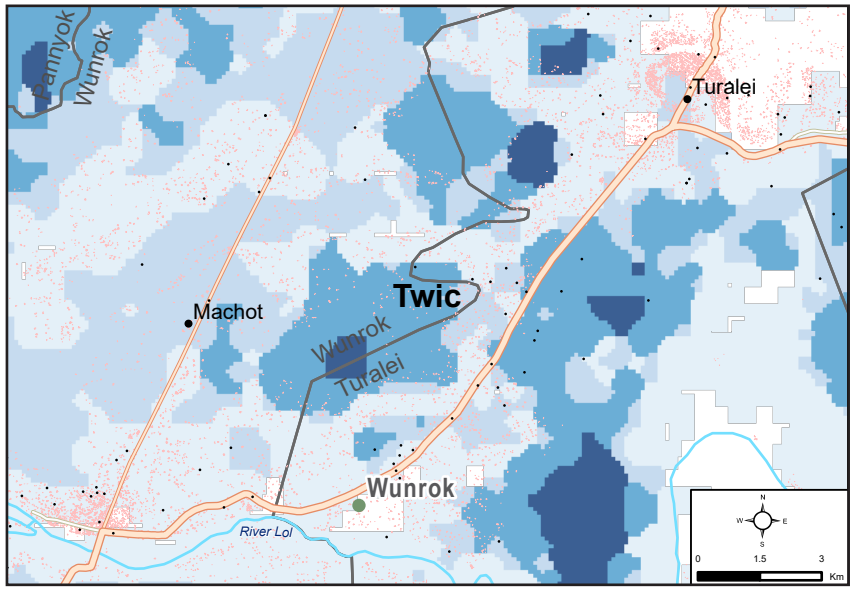
FLOODING

Twic grapples with annual flooding, rendering some areas completely inaccessible during the rainy season, with up to 70% of the county submerged.[14] This flooding is caused by a combination of rainfall and a flat terrain, as well as the overflow of River Lol. Graph 3.2 illustrates that 2021 marked the most severe flooding, lasting for 11 months. Notably, the water from the floods in 2019 and 2020 failed to recede in 2021.[15] The 2021 flooding occurred in two major episodes. In July, intense rainfall caused damage to crops such as groundnuts, sorghum, and sesame, which were below knee height.[16] The second occurrence took place in September, leading to the damage of early-planted sorghum.[17]

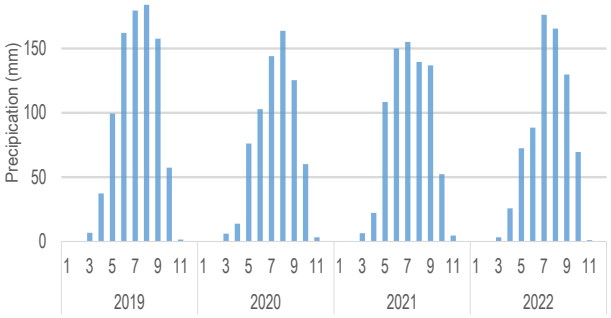
Although there was a decrease in flood extent in 2022, 29,044 people were still affected by the floods. The 2022 flooding results in the destruction of farmlands, reduced agricultural production, impaired accessibility of services due to damaged roads, and the destruction of shelters.[18] A four-year comparison (2019-2022) shows that floods usually commence in July and extend into the first months of the following year. An exception occurred when floods extended from 2020 into March 2021, and the floods of 2021 commenced in May, persisting throughout the entire year. Map 3.1 provides an overview of consistently affected regions over the four years, highlighting areas enduring recurring impacts. Map 3.2 shows flooding incidents in Wunrok being predominantly clustered in the eastern part, characterized by lower elevation and proximity to River Lol.

Graph 3.1 depicts a consistent pattern of rainfall distribution in Twic since 2019, maintaining a stable range between 695 mm/year and 891 mm/year. Among other factors, the surge in rainfall, from an average of 695 mm in 2020 to 775 mm in 2021, played a role in the heightened flooding. Graph 3.2 depicts flood extent and highlights the increased flooding in 2021 compared to other years.

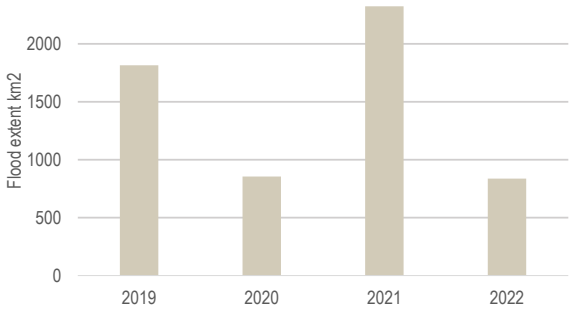
Map 3.2. Estimated maximum annual flood extent (2019-22), Wunrok & its environs



Graph 3.1. Rainfall from 2019 to 2022[19]

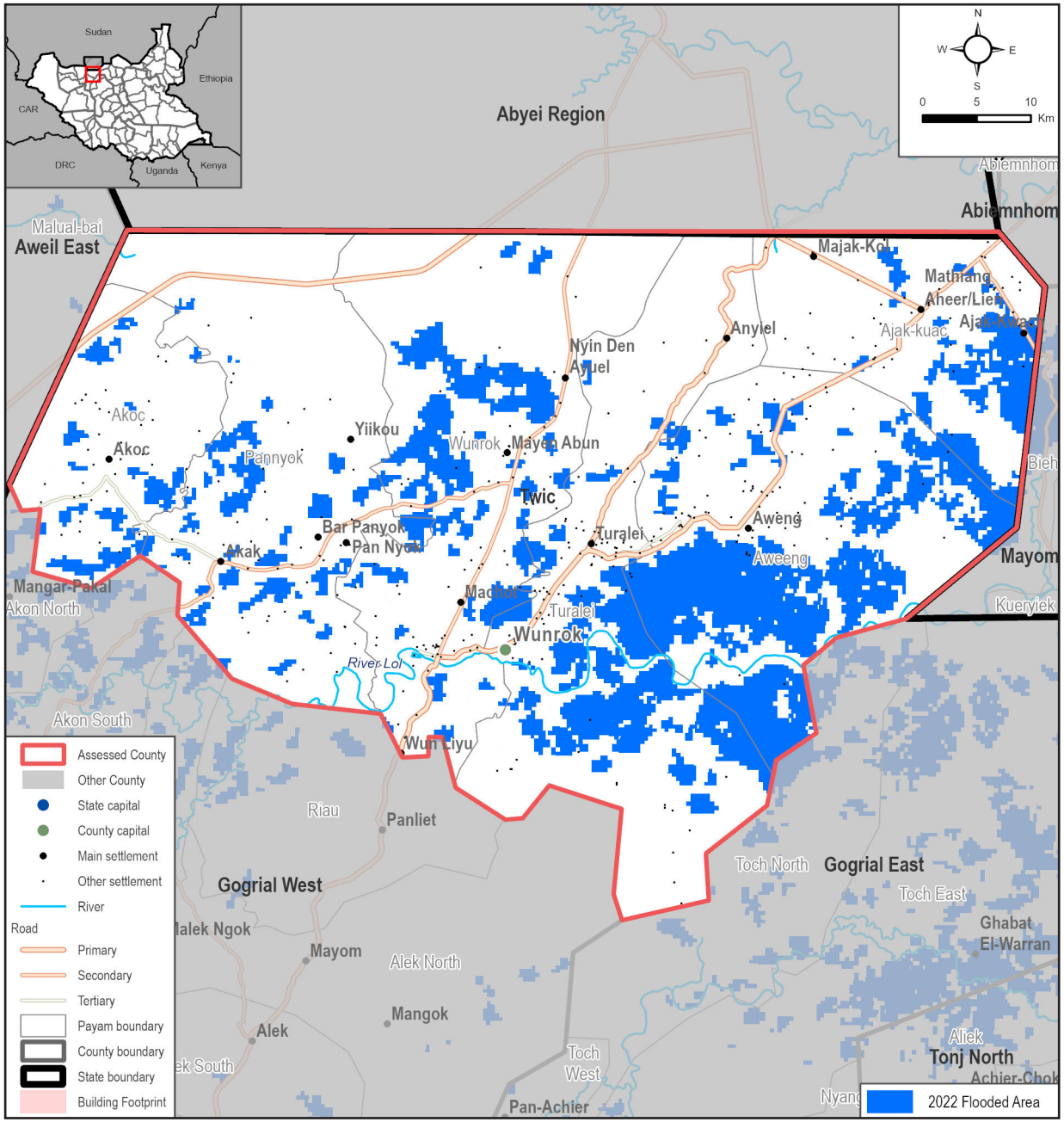


Graph 3.2. Maximum Flood extent from 2019 to 2022[i]



i Estimated flood extent calculated based on analysis of UNOSAT, NOAA-20/VIIRS. Data is indicative only and has not been validated in the field.

Map 3.3. Estimated maximum annual flood extent in 2022, affected settlements and key infrastructure



FLOODING 2022

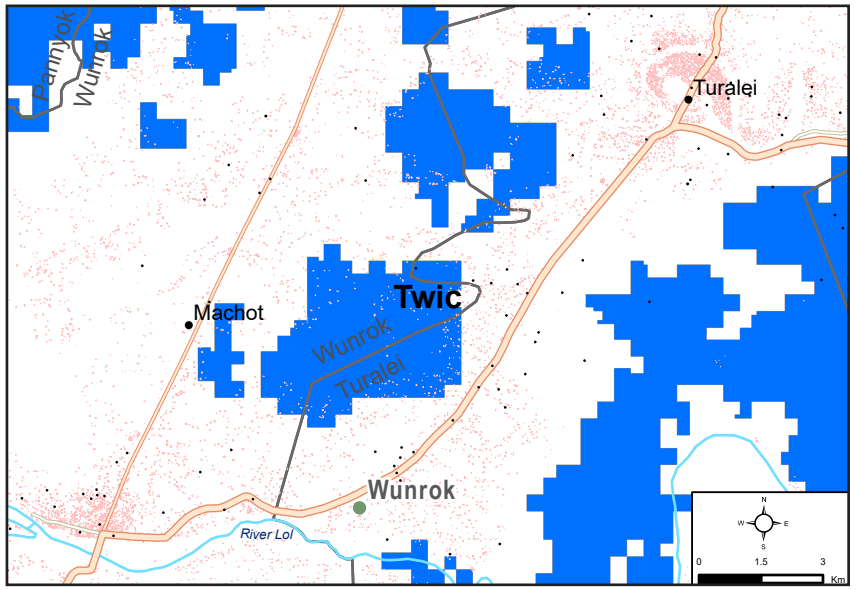
In 2021, Twic faced its most severe flooding, reaching a level almost twice as high as the previous years, as depicted in graph 3.2. In 2022, the flooding levels eventually decreased, but still impacted at least 29,044 individuals.[20] The onset of rainfall in late February 2022, intensifying from July to September, led to the destruction of farmlands, internally displaced persons (IDP) sites, and Water, Sanitation, and Hygiene (WASH) facilities.[21] The first flooding episode, triggered by torrential rains in July-September, was followed by river overflows in October-November.[22]

The floods of 2022 disproportionately affected specific regions, with particular emphasis on Aweng, Turalei, and Ajak-Kuac payams. These areas, characterized by low elevation and proximity to rivers Lol and a patch of wetland, experienced heightened incidents. The flooding pattern in 2022 mirrored previous years, affecting regions near rivers or situated in lowlands, as illustrated in map 3.3.

Floods extensively damaged farmlands, resulting in very low crop production and reduced household food stocks. The long-term impact on crop production was further confirmed by an FAO report, indicating a serious disruption of cropping activities in the county.[23] In August 2022, 90% of IDP shelters in the county were affected by floods, with some shelters collapsing, forcing residents to live in makeshift structures made of cloth and paper bags. Others sought refuge with relatives in congested tukuls. Additionally, 10 out of the existing 25 health facilities were inaccessible due to flooding and poor road conditions. Access to water was compromised in assessed payams, with 284 hand pumps reported as out-of-order and 242 pumps submerged, out of 611 assessed hand pumps.[24]

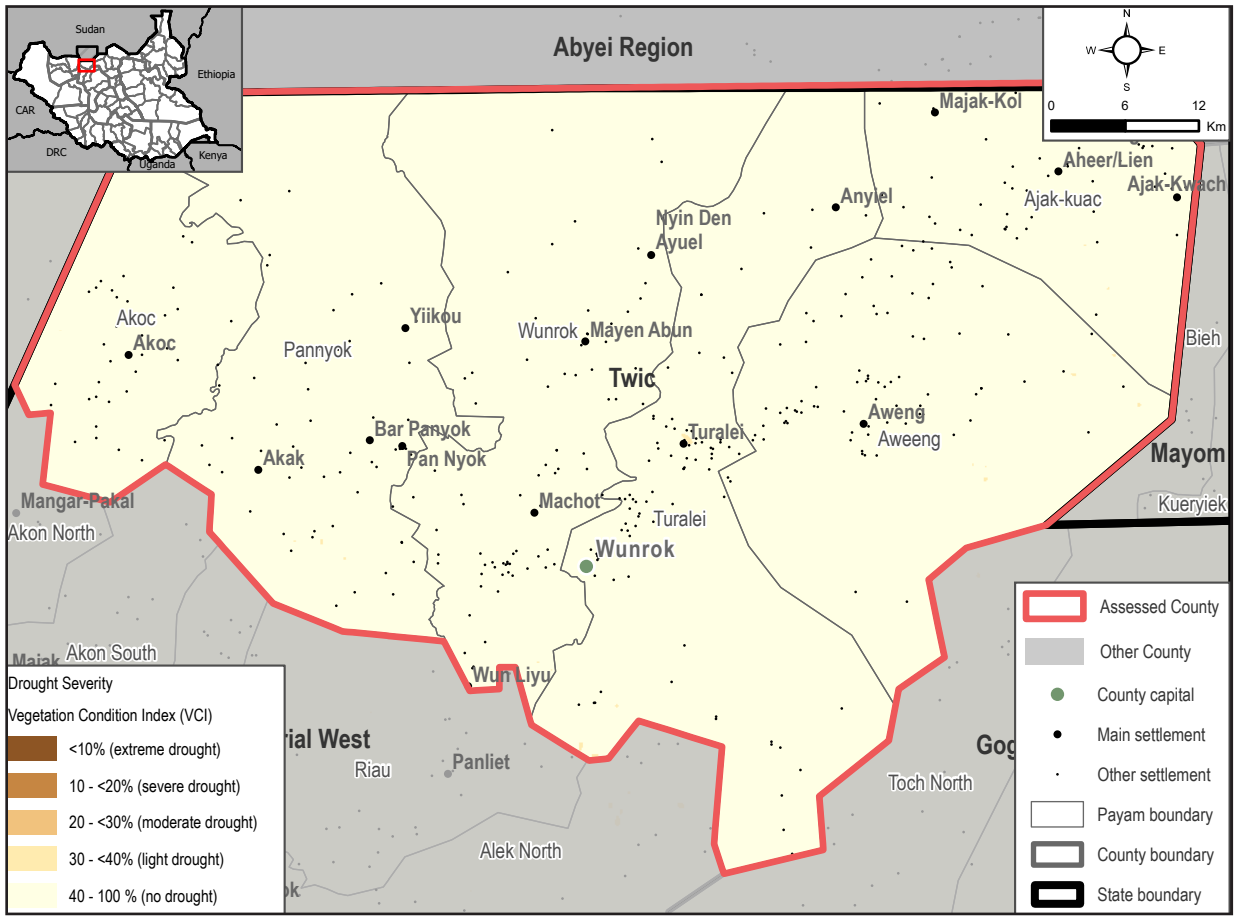
Flood Impact 29,044 individuals in 2022

Map 3.4. Estimated maximum flood extent in 2022, Wunrok & its surrounding settlements



4. HYDROMETEOROLOGICAL HAZARDS - DROUGHT AND DRY SPELLS

Map 4.1. Vegetation condition index (VCI), indicator of drought severity, in July to September 2022, no drought[i]



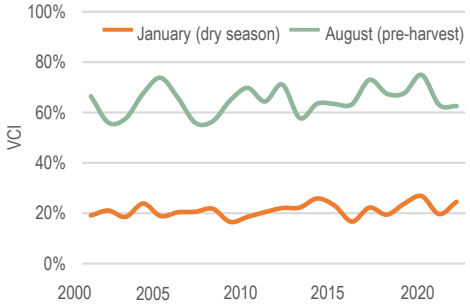
DROUGHT

The county does not undergo drought, but it does have a dry season extending from December to January as indicated in Graph 3.1. Graph 4.1 shows the lowest Vegetation Condition Index (VCI) values in January, which is the driest month of the year. Even though January experiences no rainfall, there are minimal floods spilling over from December.

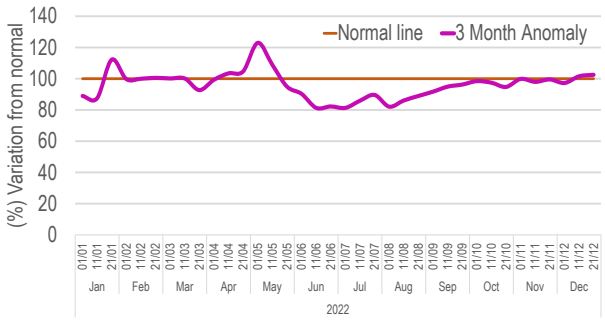
Contrasting the wet season to the dry season, an analysis of the VCI reveals the lowest VCI values in January (poor vegetation health) and the highest values in August (high vegetation health). Graph 4.1, spanning from the year 2000 onwards, consistently portrays a pattern of elevated vegetation health conditions during the wet season and diminished conditions during the dry season. This trend underscores the cyclical nature of vegetation health in Twic county, emphasizing the importance of seasonal fluctuations in understanding the environmental dynamics of the county.

Graph 4.2 depicts the 2022 rainfall anomaly, with April and May receiving above-average rainfall, a dip in June to September, and other months staying close to normal. Graph 4.3 reveals long-term climatic trends, indicating almost stable precipitation and temperature levels from the year 2000 to 2022. Notably, there has been a slight decrease (3 mm) in average precipitation levels and a slight increase (1°C) in temperatures within the same period.

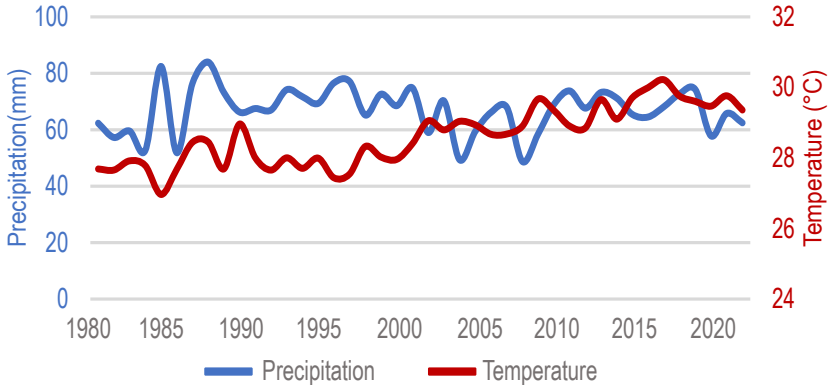
Graph 4.1. VCI (2000-2022) - drought index



Graph 4.2. Percentage rainfall anomaly in 2022[ii] [26]



Graph 4.3. Long-term climatic trends (1981-2022), Twic county[25]



Projected climatic trends by 2060 based on SSP3-7.0 scenario,[iii] Warrap State

Projected change in precipitation in wettest month by 2060	Projected change in max temperature in warmest month by 2060
+11.54mm	+1.95°C

i. Vegetation condition index calculated in Google Earth Engine based on MODIS EVI data

ii. 100% is defined as the average value for the same month between 1981 and 2023

iii. 2060 projected climatic trends from 1995 - 2014 baseline with high green house gas emissions scenorio based on Share Socio-economic Pathways (SSP) 3-7.0

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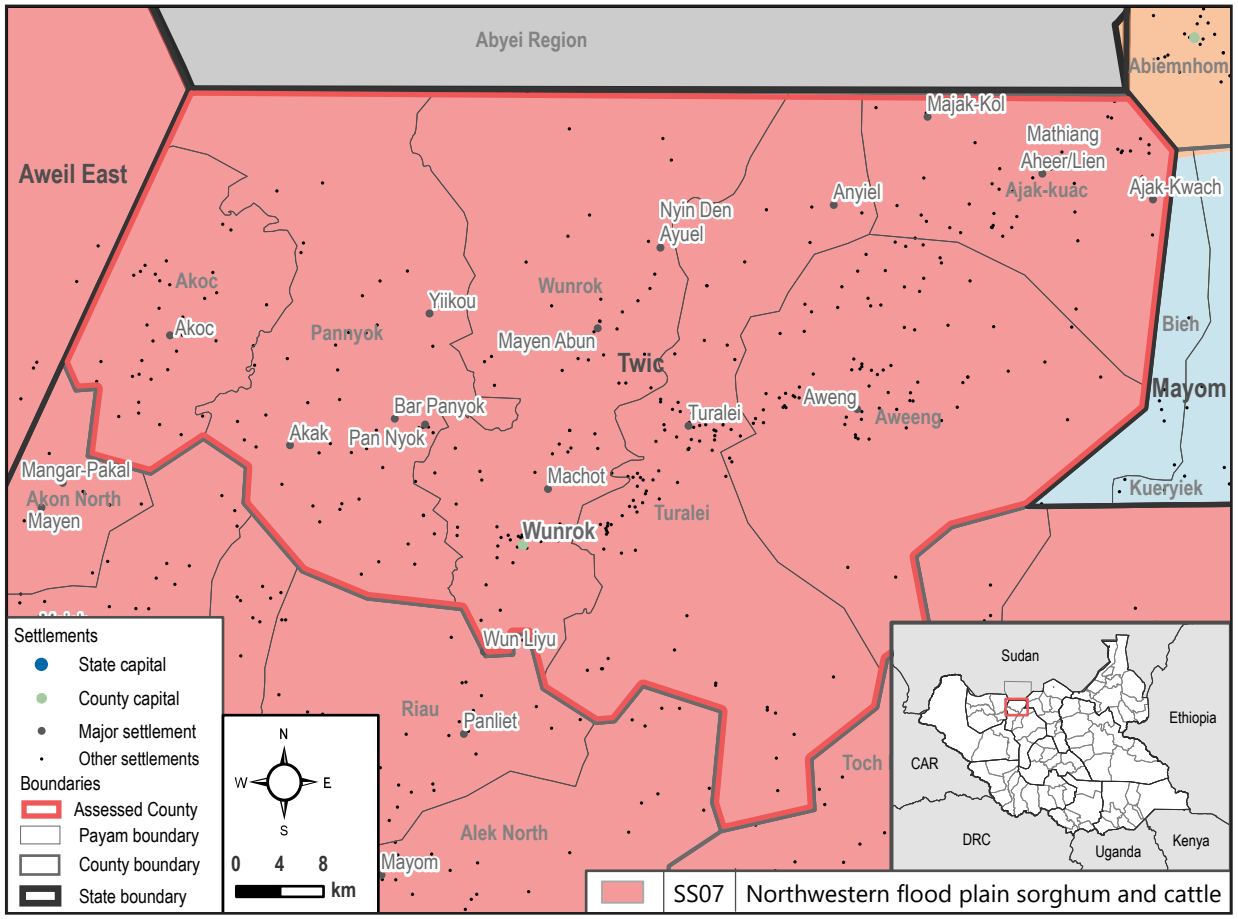
Map 5.1. Livelihood zones in Twic county



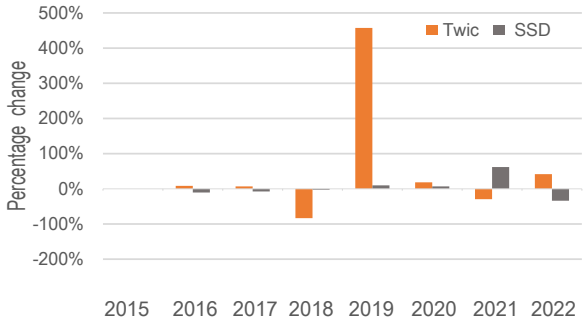
Twic is located in the "Northwestern flood plain sorghum and cattle" livelihoods zone.[27] The area features a traditional mixed agro-pastoral production system, where households engage in both crop farming and pastoralism. This dual approach plays a pivotal role in meeting the food and cash income requirements of the county's households. Additionally, community members in the area are involved in fishing and commercial trade.[28] Collectively, these varied practices constitute the cornerstone of the multifaceted livelihood strategies adopted by populations at the county level.[29]

Agricultural activities rely heavily on rainfall, with major crop production including sorghum, maize, groundnuts, simsim (sesame), vegetables, millet, and cassava.[30] In 2022, approximately 41,786 hectares were dedicated to cereal cultivation, involving an estimated 52,233 households.[31] Livestock, such as cattle, goats, and sheep, are also one of the main livelihood activities. Notably, in Warrap State and Abyei, pastoralists migrate during the dry season, crossing through Twic, in search of water within the northeastern and eastern parts of the region. This leads to periodic conflicts that disrupt livelihoods in the area.[32]

Graph 5.1 illustrates the year-on-year fluctuations in net cereal production between 2015 and 2022, highlighting a generally consistent trend throughout the period, except for the notable deviations in 2018 and 2019. The production of net cereals decreased significantly in 2018. However, 2019 was a particularly good season, with the net cereal production surpassing that of 2018 by over 400%. This could have been influenced by several factors, including the size of cultivated land for cereals increasing by 28%, from 32,767 Ha in 2021 to 41,786 Ha in 2022.[33]

The trends in the graph provide insights into the dynamic nature of cereal production and its vulnerability to external factors. Notably, the 2022 floods had a serious impact on cropping activities in the county, affecting production, especially for crops planted in lowlands.[34] Due to the low production levels, the county was projected to experience a deficit in its 2023 cereal demand by about 11,302 tonnes.[35]

Graph 5.1. Year on year change relative to previous year in net cereal production (CFSAM)[36]



IPC Scores - 2023/24[38]

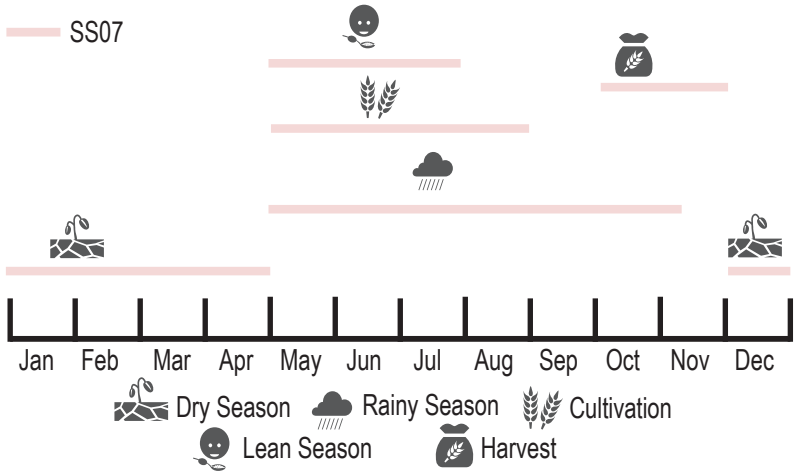
Acute malnutrition

Jul - Sept 2023	Oct 2023- Mar 2024 (Projected)
PHASE 4	PHASE 4

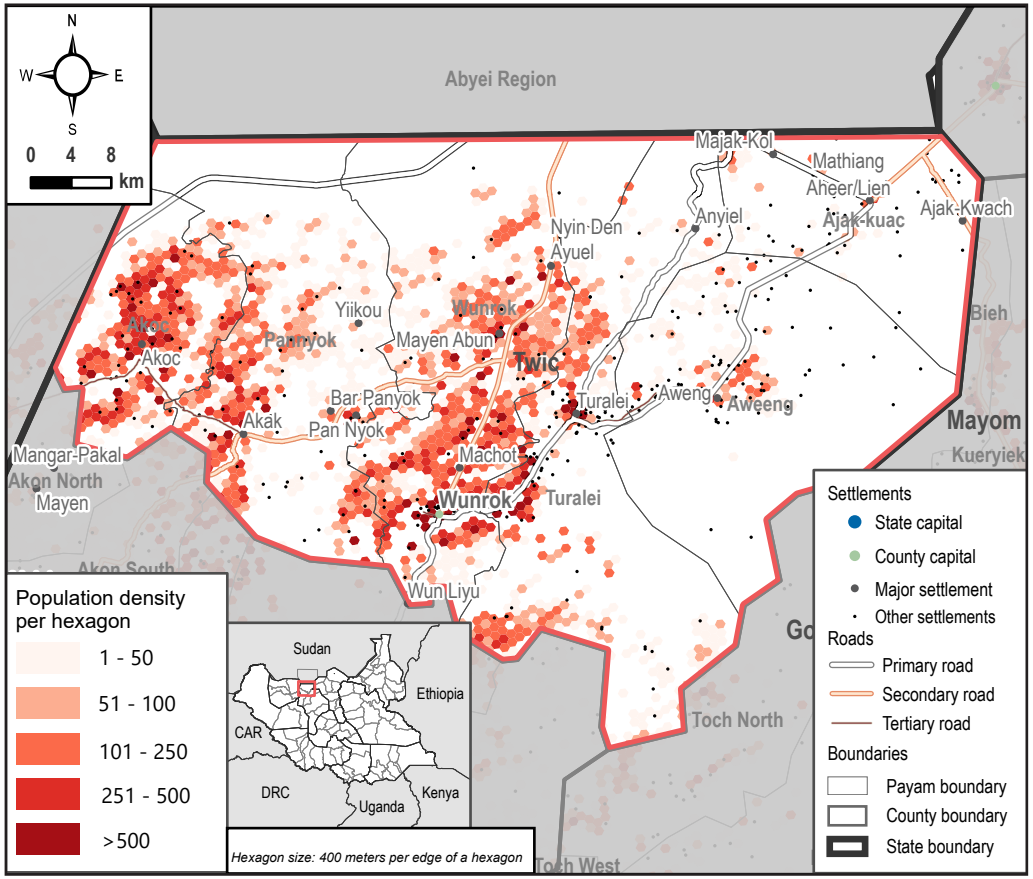
Acute food insecurity

Sept - Nov 2023	Dec 2023- Mar 2024 (Projected)
PHASE 3	PHASE 4

Figure 5.1. Cultivation calendar for livelihood zone SS07[37]



Map 6.1. Population density across Twic county (2023)[43]



Map 6.2. Population movements in Twic county over a five year period (2019-23)[44]

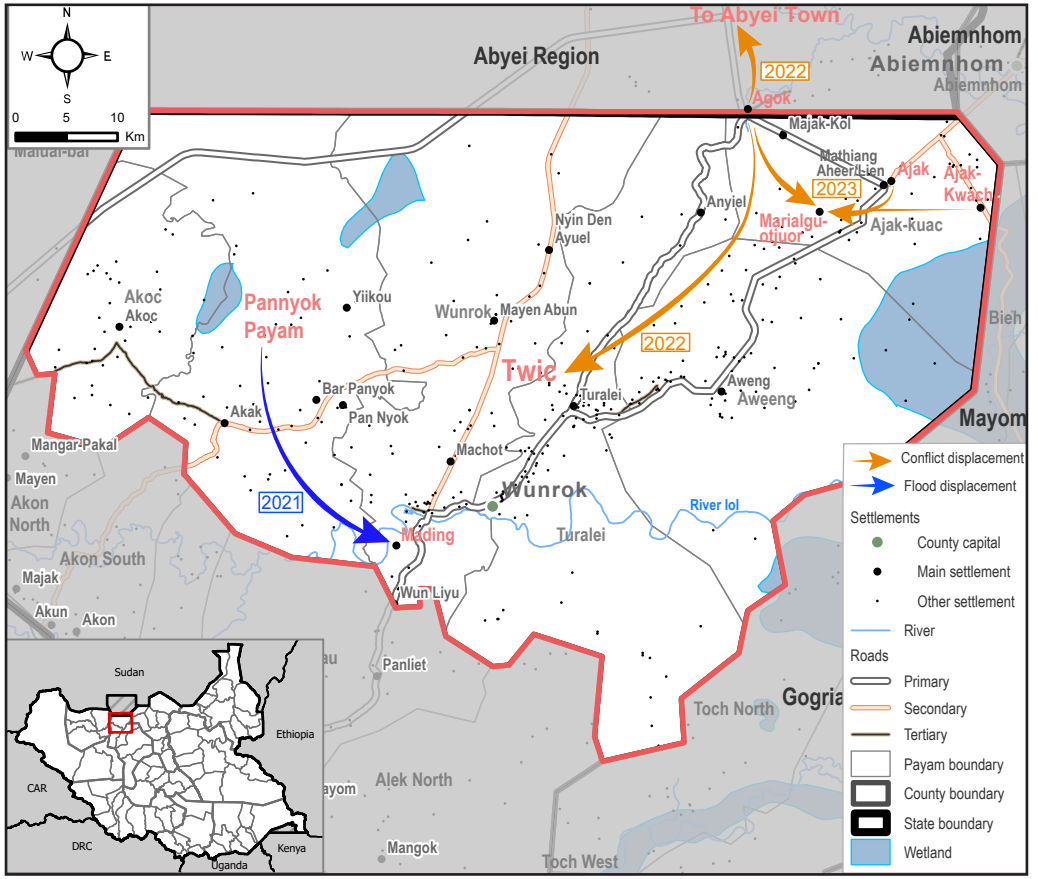


Table 6.1. Est. number of displaced persons by payam (2023)[42]

Payam	IDPs	Returnees	Relocated	Total
Ajak Kuac	3,228	3,912	-	7,140
Akoc	2,529	15,040	294	17,863
Aweng	19,017	19,301	102	38,420
Panyok	4,935	23,393	533	28,861
Turalei	14,716	11,112	-	25,828
Wunrok	24,329	16,100	31	40,460
County total	**68,754**	**88,858**	**960**	**158,572**

The population distribution in the county shows a scattered pattern, with higher population density in and around towns like Wunrok, Turalei, and Aweng, particularly along the primary road, as shown in map 6.1. Similarly, towns located along secondary roads also have higher population density compared to other areas of the county. On the other hand, the area bordering Mayom and Gogrial East counties is the least populated area. These areas, with the lowest elevation in the county, are highly susceptible to flooding. This distribution shows how geographical features and infrastructure influence population settlement patterns in the county.

As of September 2023,[39] the county recorded a total of 68,754 Internally Displaced Persons (IDPs), 88,858 returnees, and 960 individuals who had relocated, as outlined in Table 6.1. Wunrok payam hosts a larger proportion of the IDPs (35%), while Aweng and Turalei host 28% and 21%, respectively. Ajak Kuac has the lowest proportion of registered IDPs (5%), as of September 2023. Floods played a substantial role in causing displacement in the county, affecting at least 29,044 individuals in 2022.[40] The 2022 county-wide IRNA indicated that populations displaced by floods sought refuge in schools, disrupting education services.[41]

The distribution of returnees was more evenly spread across the payams, with the highest proportions residing in Panyok (26%) and Aweng (22%). The proportion of populations relocated within the county was minimal compared to IDPs and returnees. Almost all (97%) of the population that relocated within the county were situated in Panyok, Akoca, and Aweng payams.

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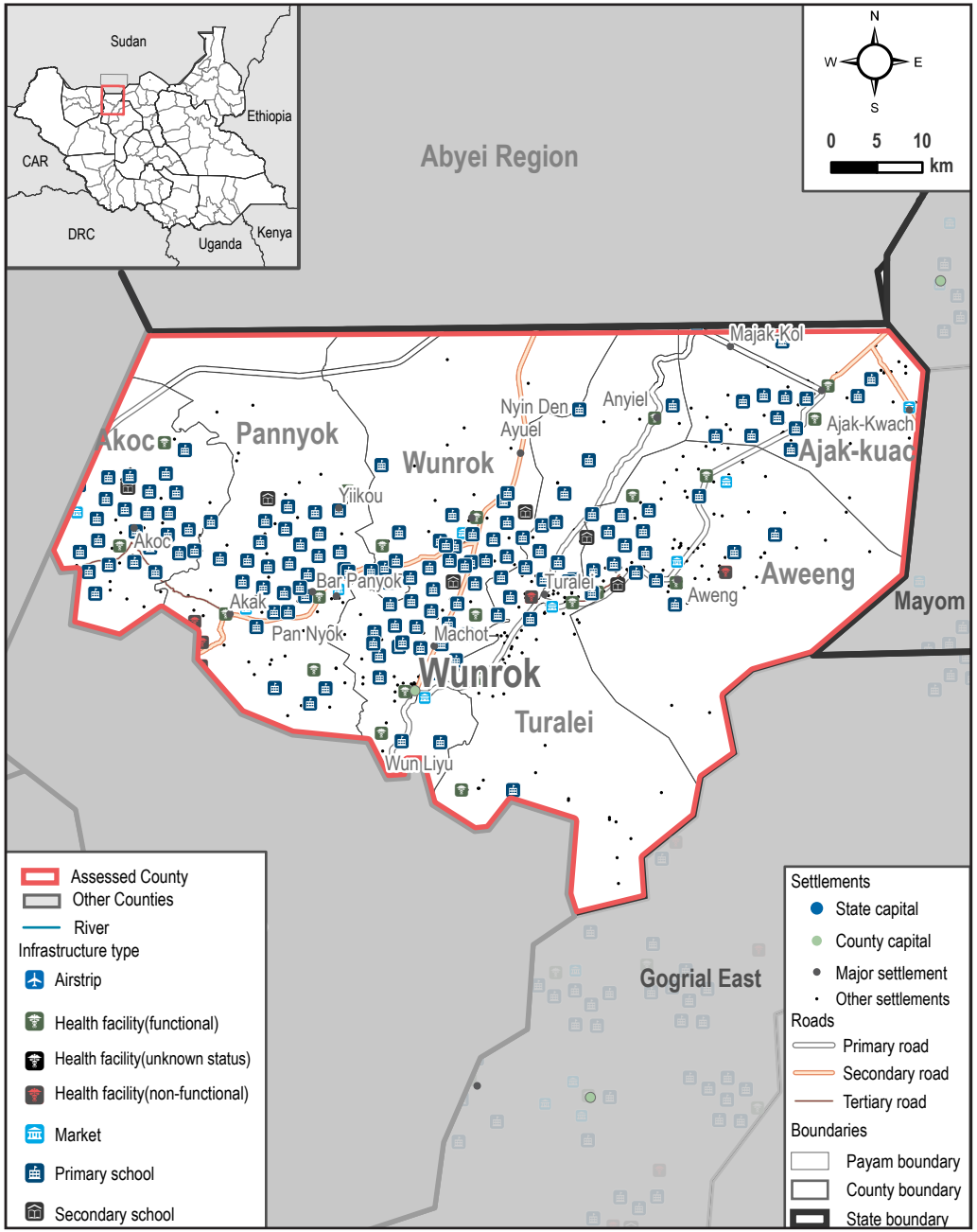
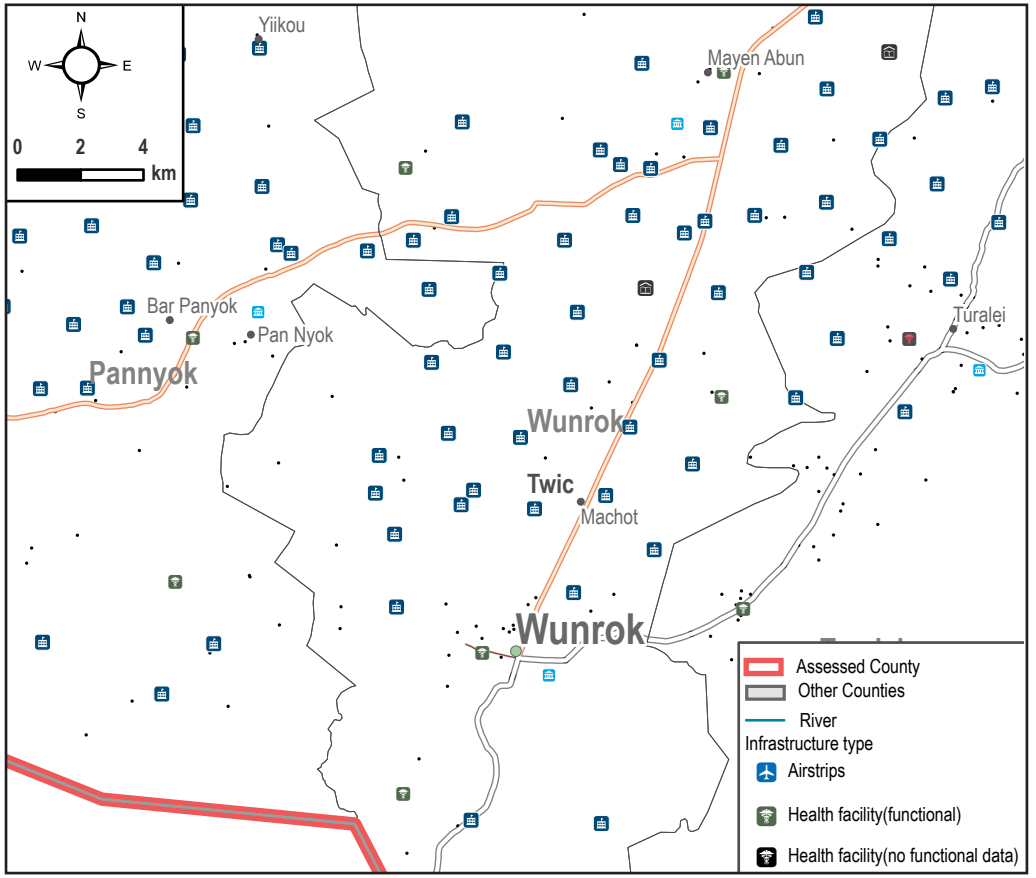
Map 7.1. Key infrastructure in Twic county[45] [46]



Map 7.2. Community infrastructure in Wunrok Town and its environs



EDUCATION AND HEALTH INFRASTRUCTURE

Twic county has a total of 153 educational institutions, with three designated as secondary schools and the remaining serving as primary schools.[47] Similarly to other infrastructure, schools in the area face disruptions caused by floods. In 2022, some schools served as shelters for IDPs due to flooding, and waterlogging led to the damage or collapse of WASH facilities in certain schools.[48] According to the 2023 ISNA, 39% of school-aged children (5 to 17 years old) in Twic were not enrolled or registered in formal education, for the 2022-2023 school year.[49]

As of December 2023, a database of all health facilities in South Sudan indicates the existence of 25 health facilities in Twic county.[50] These comprised of 15 Primary Health Care Units, nine Primary Health Care Centers, and one hospital. In 2023, 35% of households experienced difficulties accessing healthcare services. The main barrier was long distance to facilities, which was exacerbated by flooding.[51]

WASH indicators[52]

47% of households take <30 minutes to fetch drinking water

87% of households practice open defecation

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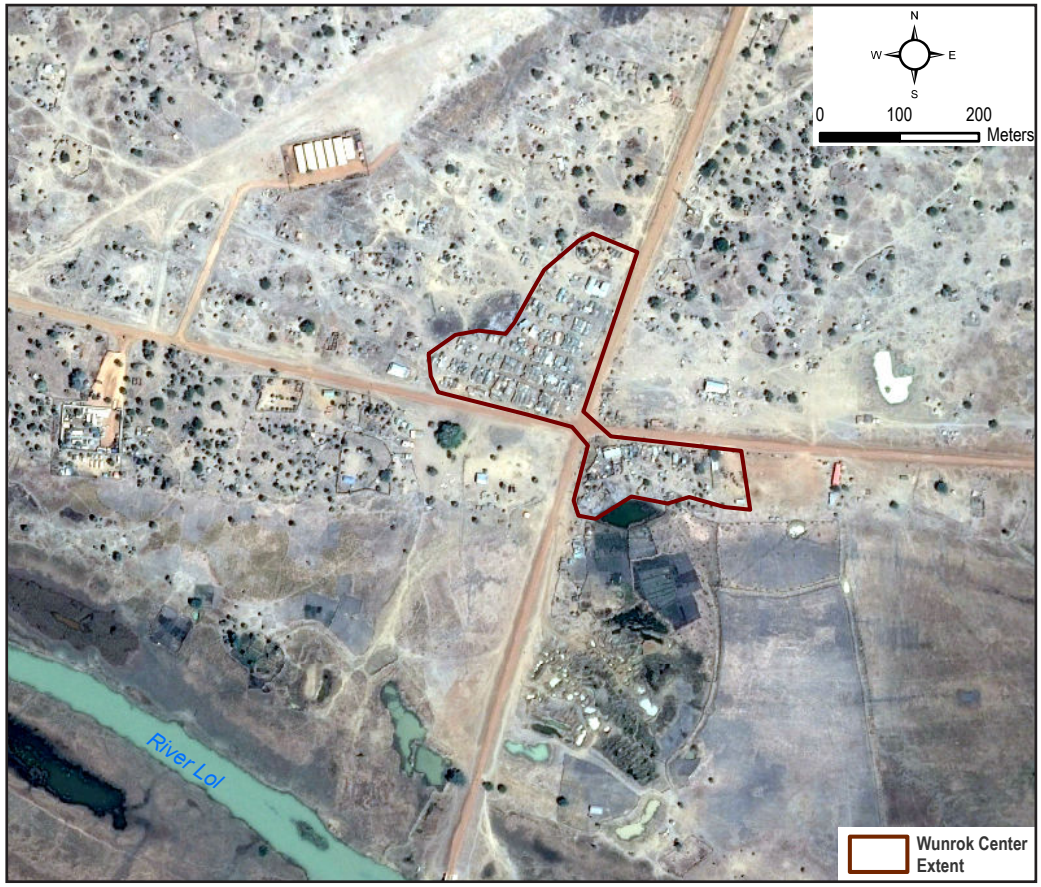
Figure 8.1. Satellite images showing change in built-up area in Wunrok town and its environs between 2013 and 2021.

Wunrok, January 2013 (Google Earth Image)



Wunrok, June 2021 (Google Earth Image)

SETTLEMENT STRUCTURE

The administrative center of Twic county is located in Turalei payam,[53] while the county's capital is Wunrok town, which is situated in Wunrok payam. Wunrok and Turalei towns, depicted as the most densely populated areas in the county in map 6.1, also serve as the main markets, catering to large parts of the county.

As per the 2023 ISNA data, tukuls emerged as the predominant shelter type in the county, with 79% of the surveyed population living in them, followed by rakoobas, in which 21% reportedly live.[54] Concerning structural integrity, a portion of shelters (49%) were reported as partially damaged, but indicating no immediate structural risk and considered habitable. Additionally, 48% were partially damaged and posed some structural risk but still deemed livable, while 3% of shelters were reported as completely damaged. The primary cause of shelter damage was floods and rain (33%).[55]

SETTLEMENT CHANGE

As depicted in Figure 8.1, in the span of 11 years there has been an increase in the density of Wunrok Town Center. This can be seen when juxtaposing the 2011 satellite imagery with imagery from 2022, where an increase in the number of buildings with corrugated iron sheets is visible. An increase in the population could be attributed to flooding in the lower southern part of the county (see sections 3A and 3B), or due to conflict in other parts of the county or neighbouring counties.

9. MARKETS, TRANSPORT AND ACCESSIBILITY

Map 9.1 Markets in Twic county, indicating supply routes

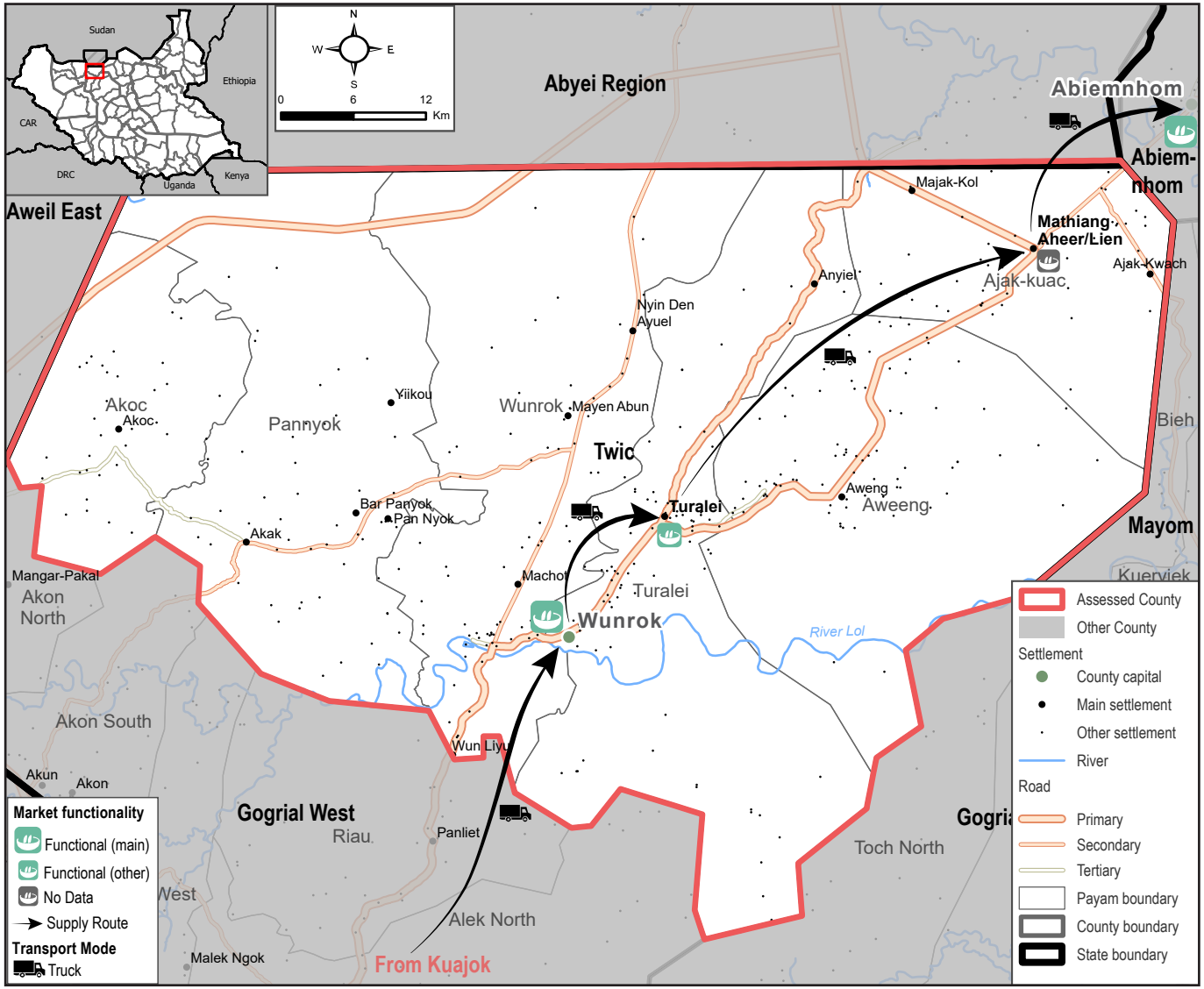


Table 9.1. Key market supply routes, Twic county (2023)

Market Name	Primary Supply route
Wunrok	From Kujok Town (by Road)
Turalei	From Wunrok (by Road)

Sorghum price per Kg (Oct 2023)
9% higher than South Sudan median

MSSMEB price (Oct 2023)
Equivalent to South Sudan median

MARKETS

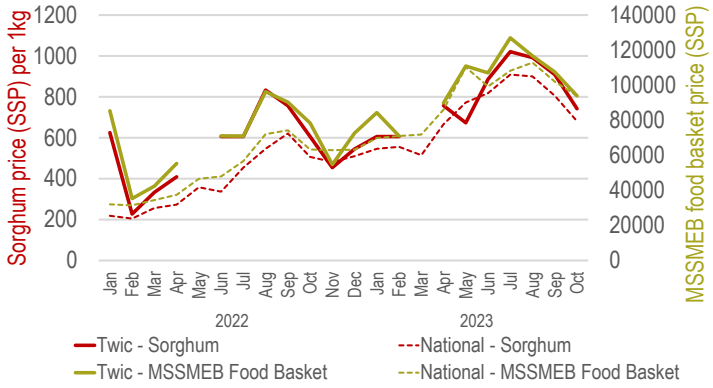
The primary markets in the county, namely Wunrok and Turalei, are consistently fully-functional, and according to Joint Market Monitoring Initiative (JMMI) analysis from REACH, both were fully operational as of October 2023.[56] This suggests that these markets were accessible, had basic items available, and their infrastructure were operational at that time.

As of October 2023, the county's sorghum cost per kilogram was 9% higher than the national median, while the Multi-Sectoral Survival Minimum Expenditure Basket (MSSMEB) was equivalent to the national median for the same period.[57] This implies that, within that specific timeframe, while sorghum prices were high, the prices of other components in the MSSMEB were relatively lower in the county. Notably, sorghum prices in the county exhibit greater volatility compared to the national level, as depicted in graph 9.1. The period from September to November is recognized as the harvest season in the county, and as shown in graph 9.1, prices during this season typically decrease, though rarely below the national average. This pattern may be influenced by the county's inability to produce enough cereal to meet its needs.[58]

TRANSPORT

Twic has a well-defined road network, comprising two primary roads and one secondary road, complemented by a grid of tertiary roads. One of the primary roads originates from Gogrial West county, enters Twic county, passes through the capital, Wunrok, and diverges in Turalei town. The split roads later reunite in Ajak-kuac payam and links the county to Abyei. This road was closed during the rainy season but opened during the dry season in 2019, according to the Logistics Cluster.[59] This road infrastructure plays a crucial role in facilitating transportation and connectivity within the county, fostering economic activities, and improving accessibility. However, the condition of roads in the county is generally poor during the flooding season, leading to parts of the county becoming inaccessible.[60]

Graph 9.1. Market price trends for sorghum and Multi-Sector Survival Minimum Expenditure Food Basket (MSSMEB)



GFDRR Global Facility for Disaster Reduction and Recovery
This county profile has been made possible by the generous support of the Global Facility for Disaster Risk Reduction and Recovery (GFDRR)

REACH Informing more effective humanitarian action

ENDNOTES

1 HDX/UN OCHA. 2022 South Sudan admin level 2 population figure estimates based on the 2008 census and annual natural growth and attrition rates with displacement adjusted estimates. 2022.

2 HDX/UN OCHA. 2023 South Sudan Population Estimation Survey: admin level 2 population figure estimates by the National Bureau of Statistics (NBS) and UNFPA. 2023.

3 HDX/UN OCHA. 2022 South Sudan admin level 2 population figure estimates based on the 2008 census and annual natural growth and attrition rates with displacement adjusted estimates. 2022.

4 CSRF. Twic County profile. 2023

5 Peace Agreements Database. Gogrial Agreement (between Twic, Aweil East, Aweil South and Gogrial West Counties). 2013.

6 UN OCHA. Flood data. 2022.

7 Famine Early Warning Systems Network (FEWSNET). Livelihood Zone Map and Descriptions for the Republic of South Sudan Issued August 2018.

8 Google Earth Engine. CHIRPS Daily Rainfall Data. 1981-2022.

9 Google Earth Engine. ERA5-Land Monthly Average Dataset. February 2022.

10 Google Earth Engine. ESA WorldCover v100. 2020.

11 Ibid

12 Google Earth Engine. ESA WorldCover v100. 2020.

13 Digitize Africa. Building footprints. 2017

14 CSRF. Twic County profile. 2023

15 FAO. Flood impact Report. 2021

16 Ibid.

17 Ibid.

18 Initial Rapid Assessment (IRNA) Report on flood affected communities Twic County. 2022.

19 DAHITI. Altimetry data. 2002-2022.

20 UN OCHA. Flood data. 2022.

21 Initial Rapid Assessment (IRNA) Report on flood affected communities Twic County. 2022.

22 Ibid

23 Ibid

24 Ibid

25 Google Earth Engine. CHIRPS Daily Rainfall Data. 1981-2022.

26 WFP VAM.Climate Explorer. 2022

27 Famine Early Warning Systems Network (FEWSNET). Livelihood Zone Map and Descriptions for the Republic of South Sudan Issued August 2018.

28 Initial Rapid Assessment (IRNA) Report on flood affected communities Twic County. 2022.

29 Famine Early Warning Systems Network (FEWSNET). Livelihood Zone Map and Descriptions for the Republic of South Sudan Issued August 2018.

30 CSRF. Twic County profile. 2023

31 FAO/WFP. 2021 Crop and Food Security Assessment Mission (CFSAM) to the Republic of South Sudan. June 2022.

32 CSRF. Twic County profile. 2023

33 South Sudan Cereal data. 2021 and 2022.

34 FAO/WFP. 2021 Crop and Food Security Assessment Mission (CFSAM) to the Republic of South Sudan. June 2022.

35 Ibid

36 Ibid

37 Famine Early Warning Systems Network (FEWSNET). Livelihood Zone Map and Descriptions for the Republic of South Sudan Issued August 2018.

38 Integrated Food Security Phase Classification (IPC). South Sudan Acute Food Insecurity and Acute Malnutrition Analysis. Nov 2023.

39 IOM. DTM Baseline dataset. 2023.

40 UN OCHA. Flood data. 2021/ UN OCHA. Flood data. 2022.

41 Initial Rapid Assessment (IRNA) Report on flood affected communities Twic County. 2022.

42 IOM. DTM Baseline dataset. 2023.

43 HDX.South Sudan: Population Density for 400m H3 Hexagons. October 2023

44 MSF: South Sudan: More than 33,000 people displaced in Twic County, 25th April 2022.

45 IOM. Education facilities in South Sudan. 2021.

46 WHO. Health facilities. 2021.

47 IOM. Village Assessment - Education Facilities dataset. 2020.

48 Initial Rapid Assessment (IRNA) Report on flood affected communities Twic County. 2022.

49 IOM. Inter-Sector Needs Assessment (ISNA). 2023.

50 Global Healthsites Mapping Project dataset. 2023

51 IOM. Inter-Sector Needs Assessment (ISNA). 2023.

52 IOM. Inter-Sector Needs Assessment (ISNA). 2023.

53 CSRF. Twic County profile. 2023

54 IOM. Inter-Sector Needs Assessment (ISNA). 2023.

55 Ibid

56 Ibid

57 Ibid

58 FAO/WFP. 2021 Crop and Food Security Assessment Mission (CFSAM) to the Republic of South Sudan. June 2022.

59 CSRF. Twic County profile. 2023

60 Initial Rapid Assessment (IRNA) Report on flood affected communities Twic County. 2022.