

FASHODA COUNTY - UPPER NILE STATE

Map 0.1. Location of Fashoda County within South Sudan indicating payams, boma boundaries and key settlements



FASHODA COUNTY - KEY FACTS

- Estimated population: 223,000¹
- Area: 7,655 km²
- Population density: 21 persons per km²
- County headquarters: Kodok
- Payams: Dethok, Kodok, Kodok Town, Lul

Fashoda county is located in the west of Upper Nile state, bordered by Sudan to the northwest and the White Nile to the southeast. The population is concentrated along the eastern border, close to the White Nile river. Seasonal wetlands surrounding the White Nile and patches further north flood seasonally. However, more extensive flooding occurred in 2017 and 2019-21, leading to largescale short-term displacement to higher ground in 2021.²

Fashoda county has been a hotspot for intercommunal violence for several decades, with frequent conflict on both sides of the White Nile. Insecurity is mainly driven by land and border disputes, tensions over access to water and grazing land, as well as high youth unemployment leading to cattle raids.³ Infrastructure, markets and community services remain limited, with much of the population forced to travel long distances to reach key services.

About REACH Initiative

REACH Initiative facilitates the development of information tools and products that enhance the capacity of aid actors to make evidencebased decisions in emergency, recovery and development contexts. The methodologies used by REACH include primary data collection and in-depth analysis, and all activities are conducted through inter-agency aid coordination mechanisms. REACH is a joint initiative of IMPACT Initiatives, ACTED and the United Nations Institute for Training and Research -Operational Satellite Applications Programme (UNITAR-UNOSAT).

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1. CLIMATE AND ENVIRONMENT

Map 1.1. Natural features including wetland areas, rivers and water bodies in Fashoda County



FASHODA COUNTY

The topography of **Fashoda county is relatively flat, with an average elevation of 425 metres above sea level and limited elevation range.** The lowest elevations are in the east and northeast of the county around the Nile Basin, with a band of marginally higher ground running through the centre of the county. The highest elevations are found towards the border of Sudan, reaching a maximum of 407 metres.⁴

As Map 1.1. indicates, the White Nile river forms the eastern boundary of the county and is flanked by a **distinct riverine zone characterised by seasonally flooded wetlands.** The landscape across the county is predominantly open savannah and grasslands, dominated by hardy trees and shrubs. Soils are relatively fertile sandy loams.⁵

As with other parts of South Sudan, the county receives a large amount of rainfall, totaling 809 mm/year on average (Graph 1.1), although atypically high rainfall has been recorded in recent years, particularly in 2019 and 2021.⁶ There are two distinct seasons, with the rainy season generally lasting between May and October. August is the wettest month, whilst December to February are the driest months, receiving almost no rainfall on average.⁷









2. LAND USE AND LAND COVER

FASHODA COUNTY

Map 2.1. Land use and land cover map, Fashoda County¹⁰



Around two thirds of the land cover in Fashoda county is grassland (Chart 2.1), with large areas of shrubland, particularly towards the north of the county. Herbaceous wetland predominates around the banks of the White Nile to the south of the county. Most of the population is concentrated in this southern and eastern area, as indicated by the large number of buildings located here (Map 2.1).

Whilst lying downstream from the Sudd, the largest wetland system in Africa, the **wetlands around the White Nile in Fashoda also experience seasonal expansion driven by higher water flows from upstream.** This usually takes place between July and November each year, leading to flooding on an annual basis. However, exceptional flooding can occur as explained in section 4.



17,854 identified buildings in Fashoda county¹¹

Chart 2.1. Land cover as proportion of Fashoda county area





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3. HYDROMETEOROLOGICAL HAZARDS - FLOODING

FASHODA COUNTY

Map 3.1. Estimated maximum annual flood extent (2017-2021), affected settlements and key infrastructure



Graph 3.1. Area of flood extent vs rainfall (2017-21)¹⁴



i Estimated flood extent calculated based on analysis of Sentinel 1 data in Google Earth Engine. Data is indicative only and has not been validated in the field. ii. Water level change calculated from DAHITI altimetry data for Lake Albert (ref. 85) and Victoria Nile (ref. 2264). Shows change in water level in metres from first year of data availability



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2000

2005

2010

3

2

0

hange in water level (m)

Lake Albert

Victoria Nile

2015

4

2020

FLOODING

Over the past five years, flooding in Fashoda has been concentrated towards the north of the county, particularly in and around the wetland areas to the west indicated in Map 1.1, and around the White Nile. Map 3.1 and 3.2 show the maximum estimated flood extent in the past five years in the county and around Kodok area respectively. Around Kodok, some flooding has occurred in this time period but has been concentrated on the east side of the White Nile in Baliet county.

Whilst seasonal flooding is normal across many parts of the Nile Basin in South Sudan between July and November, exceptional flooding in terms of extent was observed in 2021, resulting in significant displacement to higher ground. A humanitarian hub was recently established in Kodok to facilitate the response efforts.¹²

Kls in 55% of settlements assessed in Fashoda county through REACH's Area of Knowledge (AoK) assessment in October 2021 reported that people had left the settlement in the month prior to data collection. In these settlements, flooding was the most reported reason for their departure.¹³ See page 7 for more details on recent flood-induced displacement in Fashoda county.

Graph 3.1 indicates that in the past five years, flooding in Fashoda county was most extensive in 2017 and 2019-21, with the most prolonged flooding occurring in 2021. In addition to heavy rainfall, water levels increased significantly upstream on the Nile between 2020 and 2021, leading to a greater influx of water into the Sudd wetlands and greater Nile Basin. This was likely a major contributing factor to the flooding during these years.







4. HYDROMETEOROLOGICAL HAZARDS - DROUGHT AND DRY SPELLS

FASHODA COUNTY



Map 4.1. Vegetation condition index (VCI), indicator of drought severity, in August 2009 - a detected drought periodi

Graph 4.1. VCI (2000-2021) - drought index



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

Graph 4.2. Percentage rainfall anomaly in 2008-9¹⁹



Much of South Sudan is exposed to droughts and dry spells driven by erratic rainfall and climate change. Graph 4.1 shows the vegetation condition index (VCI) in January (dry season peak) and in August (pre-harvest) in Fashoda county. VCI indicates vegetation health compared to the long-term mean, with values <40% generally indicating drought conditions. Whilst the dry season values are low, they remain relatively consistent, indicating these are normal conditions in January. However, several troughs are clear in the graph, which could indicate more exceptionally dry conditions, such as in 2009.

Map 4.1 shows the VCI in August 2009, clearly showing areas affected by severe and extreme drought. Unfortunately, data on drought impacts in Fashoda is limited and further research of its impact on livelihoods and agriculture is required. However, **crop harvests**, **and wild food and surface water availibility were likely affected**. This drought appears to have been driven by a **major rainfall deficit in 2008-9** (Graph 4.2), where rainfall was 20 -100% less than normal in all months between August 2008 and August 2009.

As Graph 4.3 indicates, **temperatures have been steadily increasing in Fashoda county in recent decades.** Precipitation, on the other hand, appears to have been relatively erratic with a notable drop in the early 2000s. If these patterns continue, droughts could become more common in the future due to reduced moisture availability. Future climate projections (based on the Shared Socioeconomic Pathway 370 emissions scenarioⁱⁱ), suggest that precipitation in the wettest month across Fashoda county will increase by 42mm per month by 2060, whilst temperatures in the warmest month could increase by 2.2°C.¹⁶ These increases in extreme conditions will likely lead to more **intense and frequent climatic shocks, including droughts and floods, in the future.**

CLIMATE CHANGE



ii. Middle-estimate greenhouse gas emission scenario based on various socioeconomic assumptions.



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5. LIVELIHOODS AND SOCIOECONOMIC CONDITIONS

FASHODA COUNTY

Map 5.1. Livelihood zones and major cattle migration routes in Fashoda County



According to the Famine Early Warning Systems Network (FEWSNET),²¹ Fashoda falls within the Northern Sorghum and Livestock livelihood zone (Map 5.1), which is predominantly a semi-arid zone mostly dominated by subsistence agro-pastoral production, and supplemented by fishing, labour migration, and petty trade. Map 5.1 visualises the usual cattle migration routes, which appear relatively limited in terms of grazing rotations and are concentrated to the northeast of Kodok town.²²

The livelihoods zone is mostly characterised by a cereal deficit, although some areas with mechanised farming near the river have provided some cereal surplus. Net cereal production is shown in Graph 5.1, indicating a fall in production in 2015 and a significant rise in 2019, continuing to rise at a lower rate between 2020 and 2021.

The Integrated Phase Classification (IPC) March 2022 analysis²³ indicated the county was in **Phase 4 for acute food insecurity and acute malnutrition between February and March 2022, with these same scores projected through to July 2022.** Food insecurity across Upper Nile state is likely driven by flooding, localised conflict, high food prices, as well as outbreaks of crop and livestock diseases and pests²⁴.

In the January 2022 REACH AoK assessment, flooding was the most reported shock impacting agriculture, reported in 78% of assessed settlements where agricultural shocks had been reported $(95\%)^{25}$

The most recent Water, Sanitation, and Hygiene (WASH) Severity Classification analysis (May 2021) classified Fashoda in Phase 4 (Critical), whilst open defecation was reportedly to be widely practised.²⁶ KIs in 73% of assessed settlements reported most people took over 30 minutes to fetch water according to the REACH AoK in April 2022.²⁷

Figure 5.1. Cultivation calendar for Northern sorghum and livestock livelihood zone²⁹



i REACH AoK AoK data is collected at settlement-level and is based on reports by KIs. The methodology provides indicative data on the humanitarian situation including in hard-to-reach settlements. Only counties with 5% ccoverage of settlements are reported on.

WASH indicators



2016

2018

2014

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2022

2020



6. POPULATION AND DISPLACEMENT

FASHODA COUNTY

Map 6.1. Population density³⁴ across Fashoda County (2020)



Table of the Estimation of displaced persons by payall (2022)						
Payam	IDPs	Returnees	Relocated	Total		
Dethok	9,446	2,974	240	12,660		
Kodok	2,024	3,474	214	5,712		
Kodok Town	1,830	14,005	192	16,027		
Lul	5,076	7,166	325	12,567		
County total	18,376	27,619	971	46,966		

able 6.1. Est. number of displaced persons by payam (2022)³³

Population in Fashoda county is concentrated in the east of the county, predominantly around the White Nile (Map 6.1). The most densely populated areas lie around the towns of Kodok and Aburoc. Table 6.1 shows that, according to a 2022 IOM-DTM Baseline Survey, the majority of internally displaced persons (IDPs) are concentrated in Dethok payam, whilst the highest number of returnees is found in Kodok Town.

Map 6.2. Significant population movements in Fashoda county over the past five years (2017-21)

Map 6.2 indicates the major population movements observed in the past five years in Fashoda county. These primarialy occurred in 2017 and 2021. **Insecurity in 2017 caused the displacement of large numbers of people from Wau to Kodok**, the county capital of Fashoda, with further displacement from Kodok to Aburoc, as well as to camps in Nile State (Sudan) via Manyo county.³⁵ Furthermore, many people fleeing to Aburoc from Tonga and nearby villages in Panyikang County in 2017 were reportedly undertaking long and treacherous journeys.³⁶

Flooding in 2021 reportedly displaced a further 8172 individuals (1392 households) from Lul and Dethok payams, and Hai El Salaam district of Kodok Town, to higher ground within these areas, as well as to Aburoc IDP Site in Fashoda county.³⁷



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7. COMMUNITY INFRASTRUCTURE AND SERVICES

FASHODA COUNTY

Map 7.1. Key infrastructure in Fashoda County (2021)^{38,39}

Map 7.2. Community infrastructure in Kodok, Fashoda County (2021)





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8. SETTLEMENT CHANGE

FASHODA COUNTY

Figure 8.1. Satellite images showing change in built-up area in Kodok town. The Nile river and wetlands can be seen to the south. More details of some of the changes are outlined on page 10.

Kodok, 2010 (6 January 2010, QuickBird image)



Satellite imagery: QuickBird from 6 January 2010. Copyright: ©2010 DigitalGlobe. Source: US Department of State, Humanitarian Information Unit, NextView License

Kodok, 2021 (24 January 2021, WorldView 2 image)



Satellite imagery: WorldView 2 from 24 January 2021. Copyright: ©2021 DigitalGlobe. Source: US Department of State, Humanitarian Information Unit, NextView License



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9. COMMUNITY INFRASTRUCTURE AND SETTLEMENT CHANGE

FASHODA COUNTY

SETTLEMENT STRUCTURE

The **county headquarters of Fashoda are located in Kodok Town**, which sits on the west bank of the White Nile in the south of the county. Other key settlements in the county include Aburoc and Oriny.

The tukul was the main reported shelter type in all settlements assessed in REACH's April 2022 AoK assessment.⁴¹ Findings suggest **the 2021 floods have had a significant impact on shelter needs, but that shelters have been repaired and/or reconstructed in many settlements since the rainy season.** Whilst KIs in 42% of assessed settlements had reported more than half of all shelters had been destroyed due to flooding in November 2021 (at the end of the rainy season), by April 2022, some level of shelter destruction due to flooding had been reported by KIs in only 18% of assessed settlements.⁴²

Shelter indicators -REACH AoK*43

KIs in 86% of assessed settlements reported the main shelter type used by local communities was a tukul (April 2022)

KIs in 42% of assessed settlements reported that more than half of shelters were destroyed (and not yet repaired) in the past month due to flooding (Nov 2021)

TRANSPORT

The main trade route from Malakal to Renk runs through Fashoda county, passing through the county capital of Kodok and roughly following the White Nile.⁵⁰ Another road runs parallel to this further to the north, passing through the settlements of Oriny and Aburok, before heading towards the northwest into Sudan.

Due to **limited road transport and access issues during the rainy season, transportation is mainly undertaken via waterways and air.** Barges and riverine traffic are able to travel along the White Nile through the county from Malakal and Renk (Map 10.1). Map 7.2 indicates the location of Kodok airstrip serving the county of Fashoda.

*REACH AoK AoK data collected at settlement-level and based on reports by KIs. The methodology provides indicative data on thumanitarian situation including in hard-to-reach settlements. Only counties with 5% ccoverage of settlements are reported on.

INFRASTRUCTURE

As of 2021, 12 health centres⁴⁴ and 16 schools (15 primary and 1 secondary)⁴⁵ are spread throughout Fashoda county. All health centres are located towards the east of the county, whilst schools are concentrated in the east of Lul and Kodok payams. The only secondary school in the county is located in Kodok. Health and education infrastructure is absent from the west of the county.

There is limited information on the functionality of these facilities. Table 9.1. indicate the key settlements in Fashoda county located the furthest from a functioning health facility (as indicated by available data). According to the REACH AoK survey in April 2022, KIs in all assessed settlements reported that people were able to access either a functioning Primary Health Care Centre (PHCC) or Primary Healthcare Unit (PHCU).⁴⁶ However, in 75% of assessed settlements, KIs estimated that it took **between 1 hour and a half a day to reach the nearest health** facility on foot,⁴⁷ indicating large distances from many settlements.

In terms of access to education services, KIs in 27% of assessed settlements in the June 2022 REACH AoK reported that there were no functional education services available within walking distance.⁴⁸

According to the latest data on cellular network coverage (June 2020), communication capacity was relatively good in Fashoda county, with **KIs in over 75% of settlements reporting to have access to a functional cellular network**.⁴⁹

Table 9.1. Key settlements located the furthest from afunctioning health centre in Fashoda county (2021)

Settlement	Distance (km)
Nyingaro	5.4
Aburoc	2.6
Oriny	1.0
Kodok	0.6

URBAN CHANGE

From the satellite imagery on page 9, it can be observed that Kodok Town has seen **significant expansion between 2010 and 2021, with development of new roads clearly visible.** Figure 9.1 shows largescale images of the northwest part of Kodok Town in these two years. There are many new buildings and roads which are not visible in the earlier image. Also note the encroachment into the surrounding bush in the top left of the image.

Figure 9.1. Expansion of Kodok Town between 2010 and 2021









10. MARKETS, TRANSPORT AND ACCESSIBILITY

FASHODA COUNTY

Map 10.1 Markets in Fashoda County, indicating funcationality, as well as market supply routes



Table 10.1. Key market supply routes, Fashoda (Jan 2020)

Market name	Primary supply route	
Kodok	From Malakal and Renk (by boat)	
Aburoc	From Kodok (by boat) and from Sudan (by road)	
Oriny	From Kodok (by road and by foot)	

Sorghum price (Aug 2022) 14% below South Sudan median

MSSMEB price (Aug 2022) 6% below South Sudan median

The primary markets in the county are located in Kodok, Aburoc and Oriny. Kodok market is supplied by boat along the Nile from Renk and Malakal. Oriny market is served by road and on foot from Kodok Town, whilst Aburoc is served by boat from Kodok and by road from Sudan.⁵¹ Smaller satellite markets may also be served from these primary markets.

In August 2022, REACH Joint Market Monitoring Initiative (JMMI) data indicated that Aburoc market was running with reduced functionality, meaning that many food and/or non-food items were not available. This could for example be due to access restrictions or barriers in supply routes.52

Graph 10.1 below shows prices of sorghum and the Multi-Sector Survival Minimum Expenditure (MSSMEB) Food Basket in the county, plus national median prices. Whilst prices have recently increased significantly in response to high levels of inflation⁵³, they are currently close to the national median in Aburoc and have not shown major deviations from the national median based on available data over the past two years.54

Graph 10.1. Market price trends for sorghum and Multi-Sector Survival Minimum Expenditure Food Basket (MSSMEB).55

(SSP)

price (







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ENDNOTES

1	IOM. County Population data. 2022.	34	Google Earth Engine. WorldPop Global Project Population Data. 2021.
2	IOM-DTM Preliminary information for NAWG partners: 29 March – 11 April 2021	35	Doctors without borders. South Sudan: Urgent humanitarian assistance needed for thousands of people
3	Conflict Sensitivity Resource Facility (CSRF). Fashoda county profile.		who fled fighting in Wau Shilluk. <u>News article.</u> 2017.
4	Google Earth Engine. NASA SRTM Digital Elevation Model. 2000	36	UNOCHA. South Sudan Flash Update on Upper Nile. 27 April 2017
5	Early Warning Systems Network (FEWSNET) Livelihood Zone Map and Descriptions for the Republic of South Sudan		IOM-DTM Preliminary information for NAWG partners: 29 March – 11 April 2021
	Issued August 2018.	38	IOM. Education facilities. 2021.
6	World Food Programme (WFP) Vulnerability Analysis and Mapping (VAM). CHIRPS Rainfall data. 2022.	39	WHO. Health facilities. 2021.
7	Google Earth Engine. <u>CHIRPS Daily Rainfall Data</u> . 1981-2022.	40	Pesaresi M., Politis P. (2022): GHS built-up surface grid, derived from Sentinel2 composite and Landsat,
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9	Google Earth Engine. ERA5-Land Monthly Average Dataset. February 2022.	41	REACH Area of Knowledge (AoK). humanitarian situation monitoring. April 2022.
10	Google Earth Engine. <u>ESA WorldCover v100. 2020.</u>	42	ibid.
11	Digitize Africa. Building footprints. 2017.	43	ibid.
12	United Nations Office of Humanitarian Affairs (UNOCHA). South Sudan: Flooding Snapshot (As of 30 September 2021).	44	WHO. Health facilities. 2021.
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14	REACH. South Sudan Shocks Monitoring Index (SMI). 2017-22.	46	REACH Area of Knowledge (AoK). humanitarian situation monitoring. April 2022.
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21	Famine Early Warning Systems Network (FEWSNET). Livelihood Zone Map and Descriptions for the Republic of South Sudan.	52	
	Issued August 2018.	53	Trading Economics. South Sudan inflation. August 2022.
22	REACH Seasonal cattle grazing areas and migration map. 2020.	54	REACH. Joint Market Monitoring Initiative (JMMI)
23	Integrated Food Security Phase Classification (IPC). South Sudan Acute Food Insecurity and Acute Malnutrition Analysis. Feb - July 2022.	55	ibid.
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25	REACH Area of Knowledge (AoK) humanitarian situation monitoring. January 2022.		
26	REACH. South Sudan WASH Severity Classification. April 2021.		
27	REACH Area of Knowledge (AoK) humanitarian situation monitoring. April 2022.		
28	FAO/WFP. 2021 Crop and Food Security Assessment Mission (CFSAM) to the Republic of South Sudan. June 2022.		
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30	Integrated Food Security Phase Classification (IPC). South Sudan Acute Food Insecurity and Acute Malnutrition Analysis. Feb - July 2022.		
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- 32 REACH Area of Knowledge (AoK) humanitarian situation monitoring. April 2022.
- 33 IOM DTM <u>Baseline Survey</u> 2022.



