

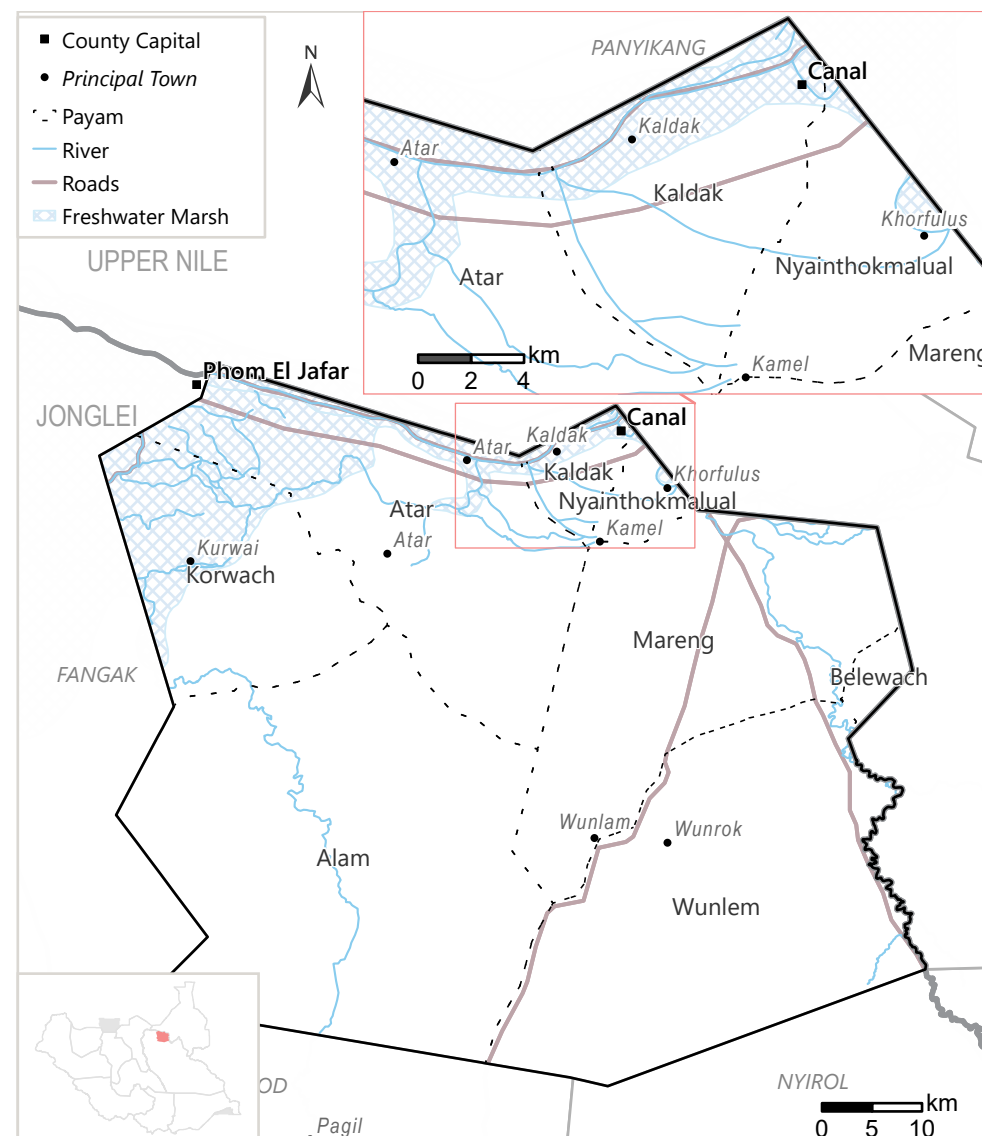


CANAL/PIGI COUNTY

SUMMARY OF FINDINGS

- **Canal/Pigi is a riverine county on the northern edge of Jonglei.** Its low-lying floodplains, wetlands, grasslands and trees provide land for cultivation, pasture, fishing grounds and building materials. The Nile and Sobat link settlements with Upper Nile and neighbouring counties. [\[1,2\]](#)
- **Farming and livestock underpin a varied livelihood system.** Sorghum, other crops, cattle, small livestock, fish and wild foods contribute to diets and income. The May–July lean season overlaps planting, when households need food before the new harvest becomes available. [\[2\]](#)
- **Flooding can disrupt livelihoods beyond a single rainy season.** Water remaining from 2020 restricted cultivation and livestock activities into 2021. Renewed flooding in 2025 displaced residents and submerged homes, schools, health centres and water points. [\[3,4,5\]](#)
- **Repeated displacement has reshaped where people live.** DTM recorded 27,665 IDPs in assessed locations during December 2024–February 2025, nearly 70% in Khorwach. Later floods and insecurity brought further movements within the county and towards Upper Nile, while returns were reported in June 2026. [\[4,6,7\]](#)
- **Boats and seasonal overland routes connect households with markets and services.** Market disruption, high food prices and non-functional health facilities constrained access to essentials in 2025–2026. [\[1,8,9\]](#)
- **Local cereal production covers only a small share of requirements.** The 2025 harvest was equivalent to about 6% of the estimated 2026 cereal requirement. IPC projected Emergency acute food insecurity for April–July 2026 and Critical acute malnutrition for April–June, amid continued disruption to livelihoods and services. [\[9,10\]](#)

Map 1.0: Canal/Pigi: boundaries, settlements and roads [\[11\]](#)



CANAL/PIGI – CONTEXT

- **Population:** 111,613 (OCHA, 2025); 29,720 (2021 PES, published 2023). [1,12]
- **Area:** approximately 4,439 km². [11]
- **Density:** about 25 people/km² using the OCHA 2025 estimate. [1,11]
- **Headquarters:** historically contested. [1]
- **Payams:** Alam, Atar, Belewach, Kaldak, Korwach, Mareng, Nyainthokmalual and Wunlem. [11]

Canal/Pigi occupies the northern edge of Jonglei, beside the Nile and Sobat rivers. It borders Fangak, Ayod and Nyirol, with river connections to Panyikang and other parts of Upper Nile. Farming, cattle movements, fishing and trade link communities across these boundaries. [1,2,11]

Construction of the Jonglei Canal began in 1978 to divert Nile water around the Sudd and increase flows downstream. Work stopped during the civil war before the canal was completed. [13]

The county is home to Dinka, Nuer and Shilluk communities. **Disputes over land, the county’s name and the location of its headquarters** are linked to successive periods of displacement and return. [1]

Conflict has repeatedly displaced residents and interrupted trade. Violence in Canal town in 2010 forced people from their homes and destroyed the market. Further insecurity followed the conflict that began in 2013. Fighting in 2022 affected Atar and other settlements, damaging civilian property and causing renewed displacement. [1,14]

Floods have also disrupted livelihoods over extended periods. Water remaining from 2020 restricted cultivation and livestock activities into 2021. Further flooding and conflict in 2025–2026 brought new movements and service disruption, alongside continuing food insecurity and malnutrition. [3,4,9]

The population estimates use different methods and reference years. Density is calculated using the OCHA 2025 estimate.

METHODOLOGY

This profile combines **desk research, remote sensing and Geographic Information Systems (GIS)** to describe Canal/Pigi’s environment, livelihoods, population and infrastructure. It draws on information available by July 2026, including secondary literature, humanitarian assessments and dated local reporting. Each finding retains its source period so that the historical record and recent developments can be read together. [1,2,3]

Environmental analysis used SRTM elevation, CHIRPS rainfall, ERA5 temperature, MODIS vegetation data and Sentinel-1 radar imagery. ERA5-Land monthly soil moisture provided additional information on seasonal conditions in the upper 7 cm of soil. The facility maps use a VIIRS flood layer, and DAHITI supplied river-level observations. GIS overlays combined these layers with land cover, modelled population, settlements, GHS-OBAT buildings and facilities. Spatial overlays estimate **potential exposure of mapped buildings** to detected floodwater. The maps and accompanying tables describe the distribution of resources, settlements and infrastructure across this landscape. [15,16,17,18,19,20,21,22,23,24]

Annual FAO/WFP cereal estimates, IPC analyses, IOM DTM mobility tracking and REACH Joint Market Monitoring Initiative (JMMI) observations informed the socioeconomic sections. Assessment dates and coverage are identified alongside the findings; crop estimates, mobility counts and market observations retain their original definitions. Facility inventories describe the network at their source dates. Disrupted sampling prevented reliable Canal/Pigi estimates in the 2025 Inter-Sectoral Needs Assessment (ISNA). The profile therefore draws on dated, location-specific assessments to describe household conditions. [6,8,9,10,25]

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. Visit www.reach-initiative.org.

1. CLIMATE AND ENVIRONMENT

CANAL/PIGI COUNTY

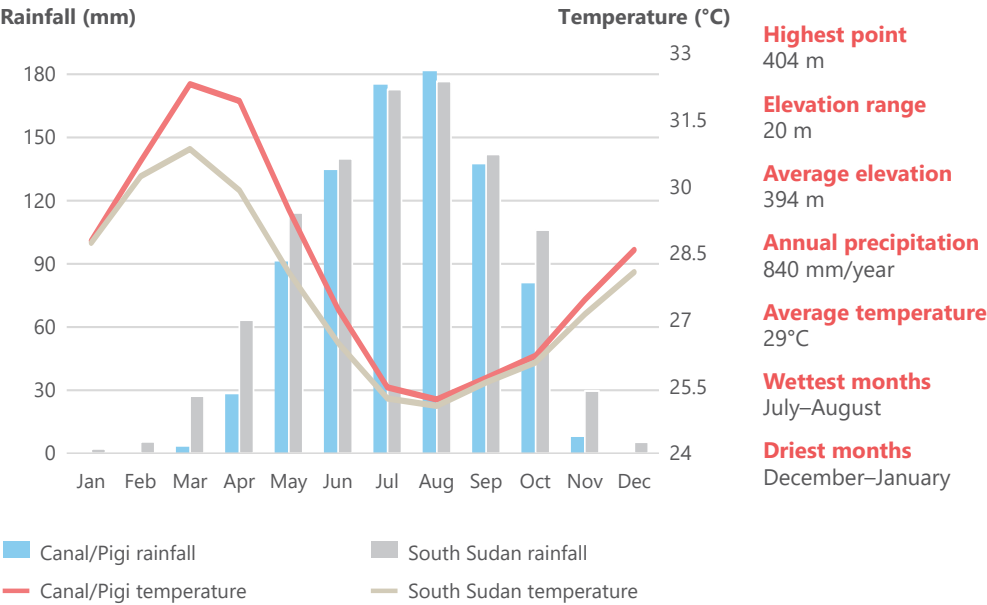
Canal/Pigi lies in a low-lying part of the Sudd's wetlands and floodplains. The Nile, Sobat, Atar and Fulus rivers connect settlements with neighbouring counties. Flat terrain allows floodwater to spread and drain slowly. [1,15]

These waterways support fishing and boat transport, while grasslands and seasonally flooded areas provide grazing. Prolonged inundation can keep fields, pasture and landing points inaccessible beyond the usual rainy season. [1,2,3]

Average annual rainfall in the 1981–2025 analysis was about **840 mm**. Rainfall peaks in July–August and is lowest in December–January. Temperatures are generally highest around March and lowest around August (Graph 1.1). [16,17]

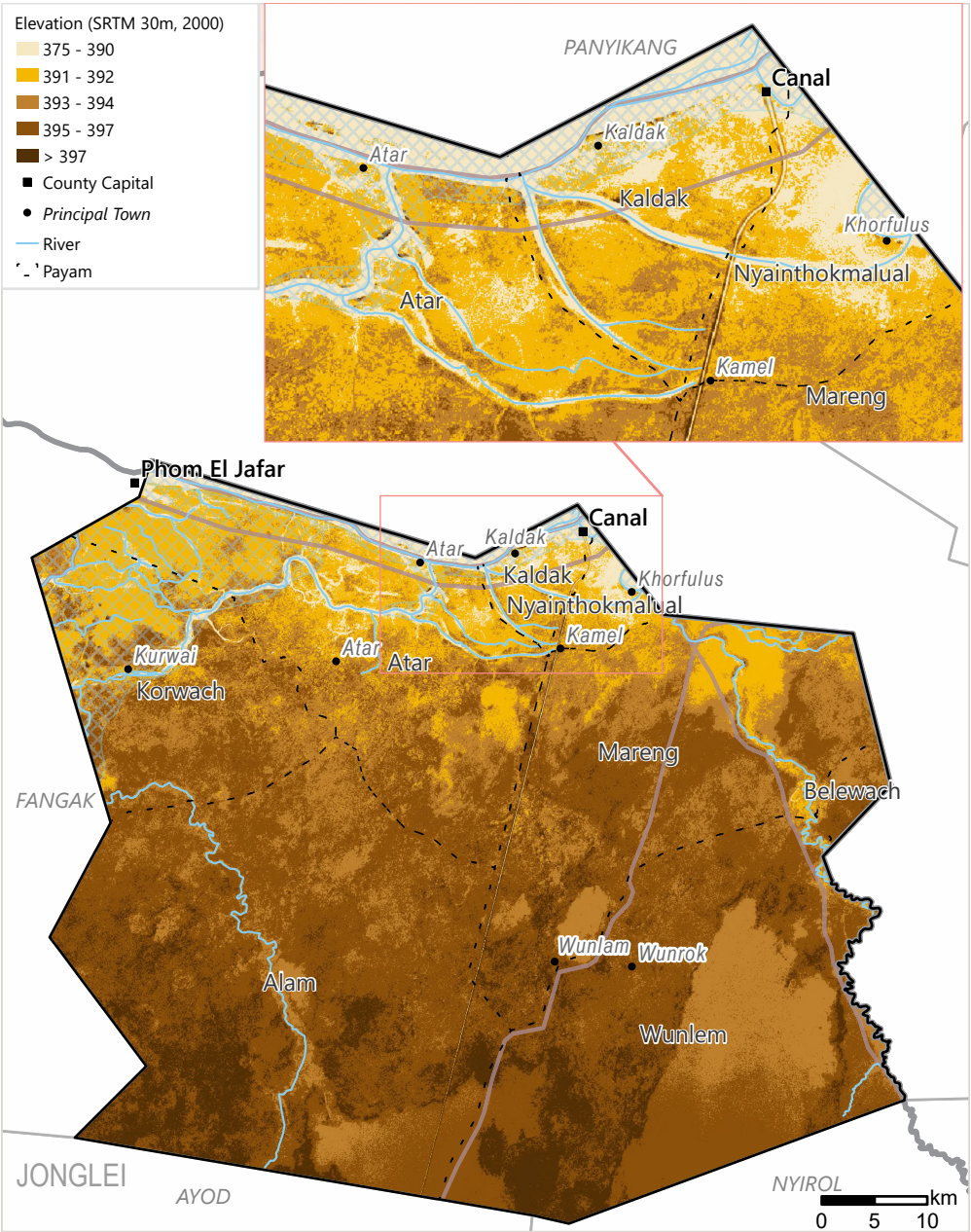
For the wider Jonglei area, climate projections indicate further warming in 2040–2059 under SSP1-1.9 (low emissions) and SSP3-7.0 (high emissions). Projected rainfall changes vary by season and are more uncertain. [26]

Graph 1.1: Mean monthly rainfall and temperature, 1981–2025 [16,17]



Monthly averages for the 1981–2025 reference period.

Map 1.1: Elevation and river network [15]



2. LAND COVER AND LAND USE

CANAL/PIGI COUNTY

Forest and grassland are the largest classes in the 2025 land-cover analysis, followed by flooded vegetation. Across the county, scattered trees, shrubs and grasses give way to papyrus and reeds in wetter areas. [1,21]

Vegetation supplies grazing, food and materials used in everyday life.

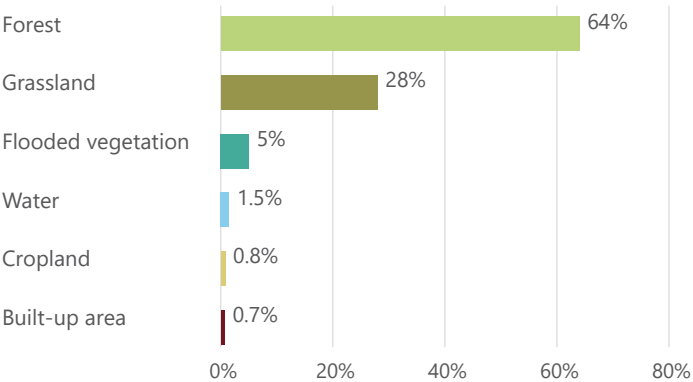
Households use trees and other plants for fencing, tukuls, livestock shelters, cooking fuel and traditional medicines. Wild edible plants complement crops and animal products. [1,2]

Boats travel along the Sobat, Nile, Atar and Fulus rivers, carrying people and goods between settlements. Fishing provides food and income, and households also use river water for livestock and domestic needs. [1]

Sorghum and maize are cultivated alongside vegetables and other crops. Access to fields changes with flood conditions: during the prolonged 2020–2021 inundation, planting was restricted and some land remained inaccessible. [1,3]

Canal, Khorfulus, Atar and other settlements contain markets, services and landing points. Their river connections allow people to obtain goods and reach facilities beyond their immediate settlement. [1]

Graph 2.1: Land-cover shares and areas, 2025 [21]

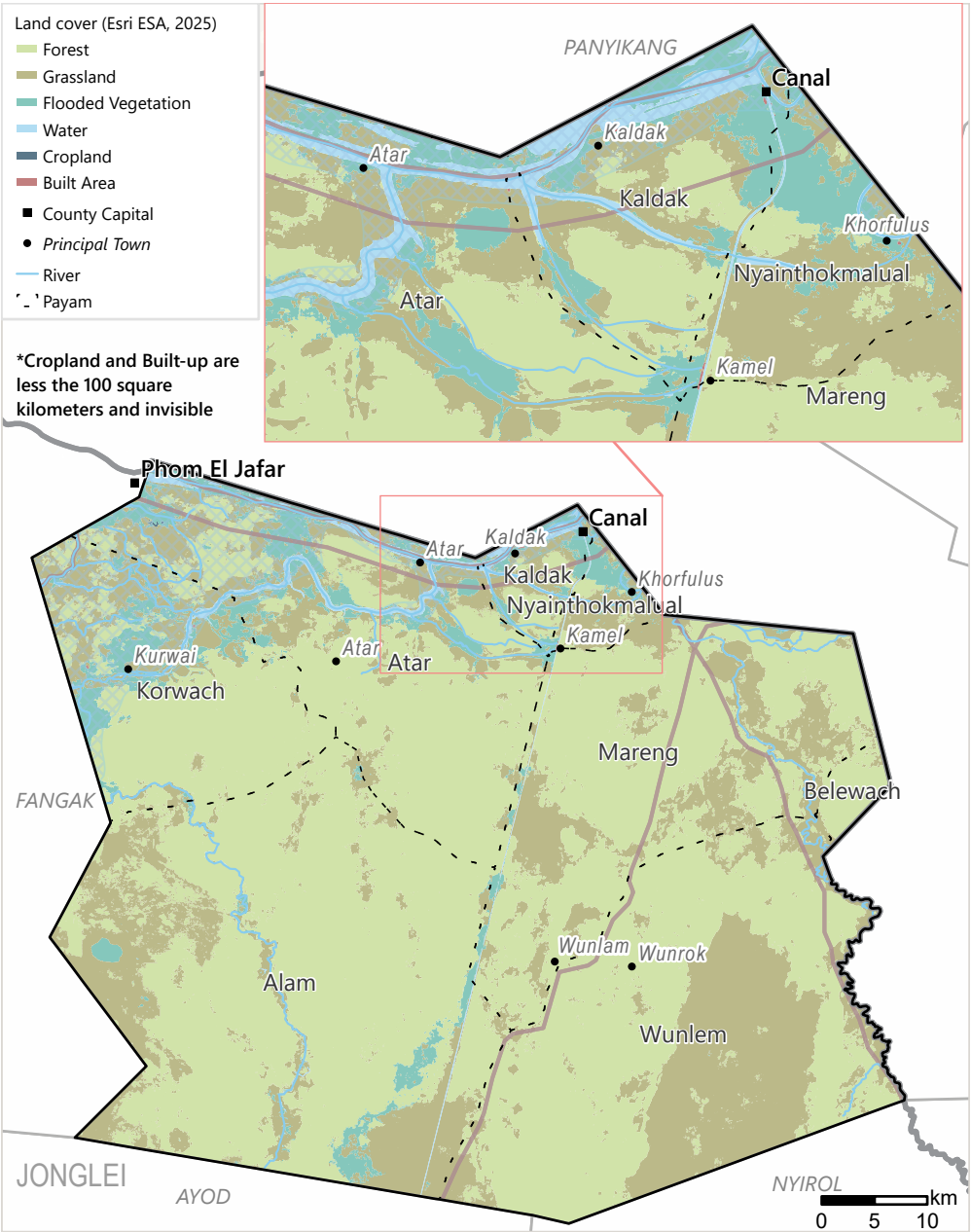


Land cover	km²
Forest	2,840
Grassland	1,243
Flooded vegetation	222
Water	67
Cropland	36
Built-up area	31

The “Forest” class includes woodland with more open, spaced trees and bushland dominated by shrubs and smaller woody plants. Shares and areas are rounded.



Map 2.1: Land cover and land use, 2025 [21]



Recurrent flooding affects both settled areas and land used for livelihoods. The 2015–2025 satellite record shows repeated inundation across Canal/Pigi’s floodplain. Its consequences depend on when water arrives, how long it remains and whether households can reach fields, grazing areas and services. [1,19]

In October 2021, REACH documented flooding that had persisted from the previous year. **Planting remained restricted and livestock activities were severely disrupted.** With their own production reduced, households depended more heavily on fishing and wild foods. Prolonged inundation therefore interrupted several sources of food and income at once, extending the disruption beyond a single rainy season. [3]

Atar had the highest mapped building–flood overlap in 2019–2021. Values fell sharply in several northern payams in 2022–2024, then rose in 2025. That year, overlap ranged from 29% in Wunlem to 72% in Korwach. Alam remained more consistently exposed across the series, with annual values of 34–65%. [19,23]

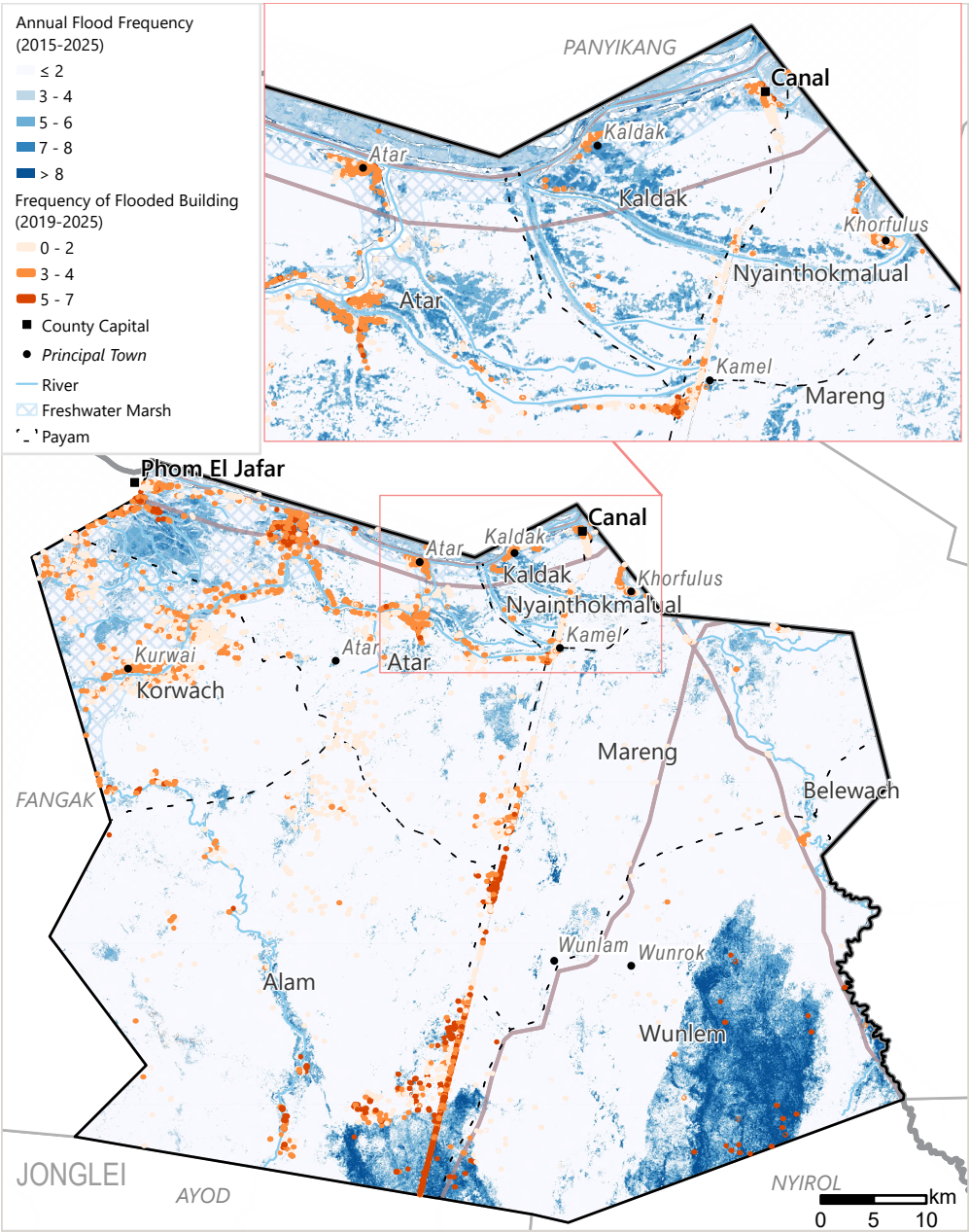
The 2025 increase was widespread across the assessed payams. Overlap rose from 3% to 72% in Korwach, from 13% to 60% in Mareng and from 0% to 46% in Nyainthokmalual. **At least half of the mapped building inventory overlapped the detected flood extent in four of the seven payams** included in Table 3.1. These local differences show how exposure can change markedly from one year to the next within the same floodplain. [19,23]

Table 3.1: Mapped building exposure, July–October 2019–2025 (%) [19]

Payam	2019	2020	2021	2022	2023	2024	2025
Alam	34%	34%	45%	64%	46%	65%	62%
Atar	89%	87%	71%	0%	8%	0%	54%
Kaldak	59%	56%	46%	0%	3%	0%	40%
Korwach	74%	66%	35%	2%	6%	3%	72%
Mareng	43%	52%	47%	15%	18%	13%	60%
Nyainthokmalual	49%	45%	33%	0%	0%	0%	46%
Wunlem	51%	49%	28%	18%	11%	15%	29%

Each year’s flood extent is overlaid with the same GHS-OBAT building inventory. Percentages describe mapped exposure; occupancy and damage were not measured. Belewach is excluded from the table. [23]

Map 3.1: Flood recurrence, 2015–2025; building overlap, 2019–2025 [19]



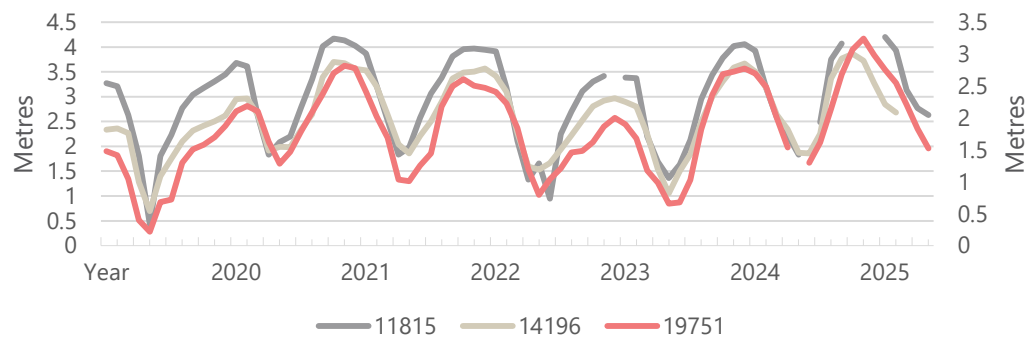
Flooding from August 2025 forced residents to leave their homes and disrupted fields and services. On 1 September, the local Relief and Rehabilitation Commission reported about 18,000 people displaced within Canal/Pigi. Other residents had moved to Panyikang and areas near Malakal. [4]

On 8 October, **the overflow of the Nile submerged health centres, schools and water points in Khorwac Town.** Residents moved to higher ground as communities and humanitarian partners began building a protective dyke. The flooding affected several basic services in the same settlement while also forcing people from nearby homes. [5]

By 30 October, the county commissioner estimated that **nearly 40,000 people had been displaced by the flood crisis**, sheltering along the canal and on higher ground in the county and Upper Nile. The September and October estimates describe successive stages of the same flood crisis, with disruption continuing through several months of the rainy season. [4,27]

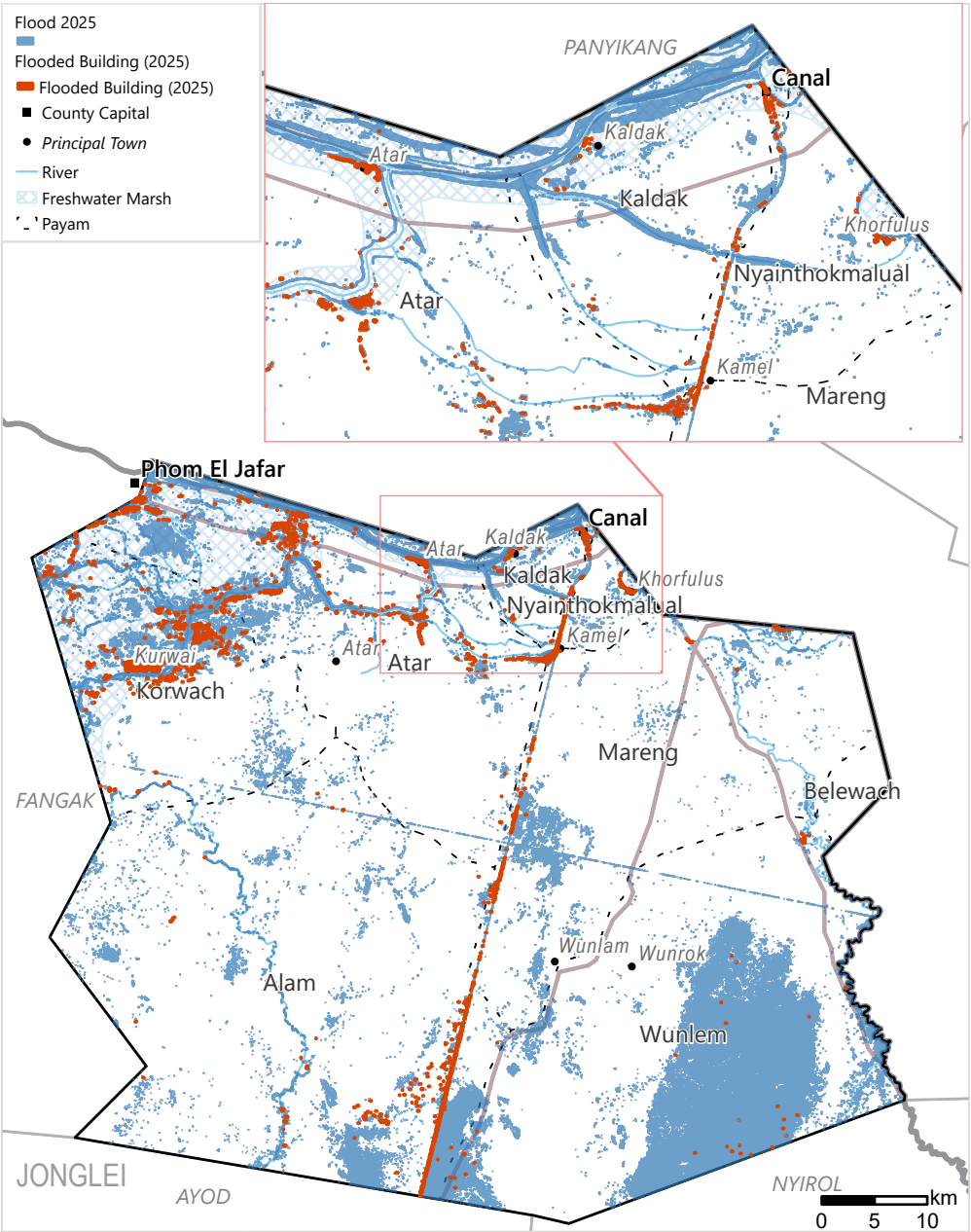
The 2025 flood map shows water extending across low-lying areas and intersecting mapped buildings. Read alongside the reports from September and October, it places the documented displacement and service disruption within the wider flood-affected landscape. River levels, local rainfall and slow drainage influence the extent and duration of inundation. Graph 3.1 provides water-level observations on the Sobat and White Nile. [1,4,5,15,19,20,27]

Graph 3.1: Water-level observations on the Sobat and White Nile, 2020–2025 (m) [20]



Observation series: 11815, Sobat; 19751, White Nile before Malakal; 14196, White Nile after Malakal.

Map 3.2: Detected flood extent and mapped building overlap, 2025 [19]



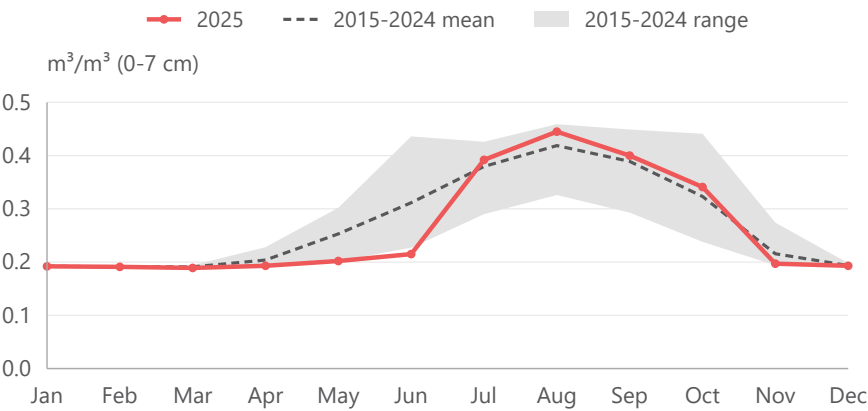
Most mapped crop and rangeland pixels fall in the “No drought” class for June–August 2025. Smaller pockets of lower vegetation condition in the north-west suggest that stress was relatively localised. This period spans late planting and the first harvests, when crops and pasture depend on seasonal moisture. [2,18,28]

Surface soils were unusually dry early in the growing season. County-average moisture in the upper 7 cm was about 20% below the 2015–2024 May average and 31% below the June average. June was also below every June value in that comparison. Such conditions could have constrained crop establishment and pasture regrowth, delaying food production and grazing availability. [2,24]

Moisture rose sharply in July–August to 3% and 6% above the monthly averages, while remaining within the historical range. This suggests that **the earlier moisture deficit had eased at county level.** Additional moisture can support growth where water drains, while prolonged inundation can submerge vegetation and restrict access to fields and grazing. [3,24]

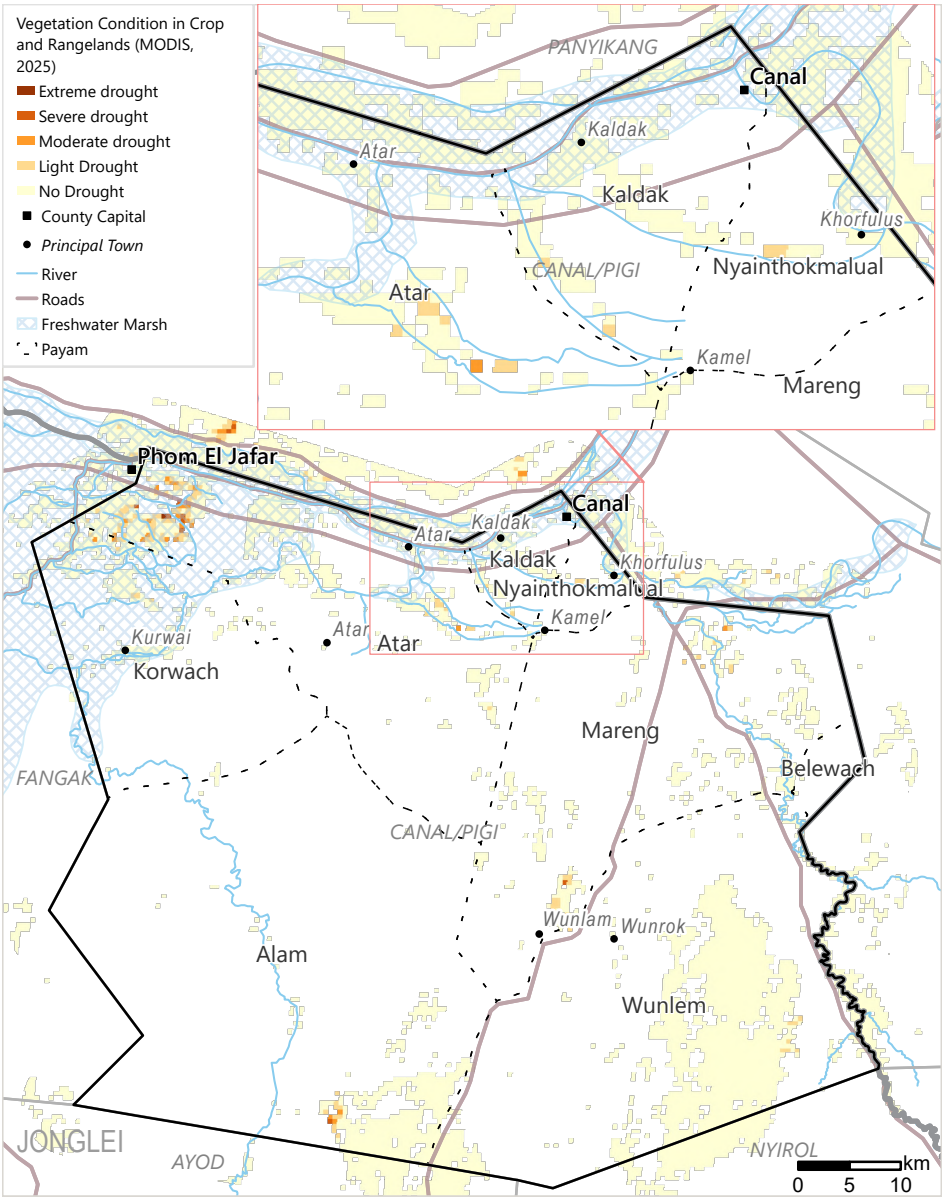
The seasonal vegetation average can therefore conceal an early dry phase even where the map shows “No drought”. VCI compares MODIS vegetation greenness with its 2001–2024 range. Dryness and inundation can both lower it, while the county soil-moisture average masks local differences. These indicators alone cannot establish which process affected individual fields. [18,19,24]

Graph 4.1: Surface soil moisture, 2025 and the 2015–2024 comparison [24]



ERA5-Land county means, 0–7 cm; approximately 11 km analysis scale. Shading shows the 2015–2024 monthly range. [24]

Map 4.1: Vegetation-condition classes, June–August 2025 [18]



Most of Canal/Pigi lies within the **Eastern Plains Sorghum and Cattle livelihood zone**. Rainfed cultivation and livestock rearing are the main activities, supplemented by fishing and wild-food collection. Sorghum is the principal staple; maize, vegetables and other crops add to production. [1,2]

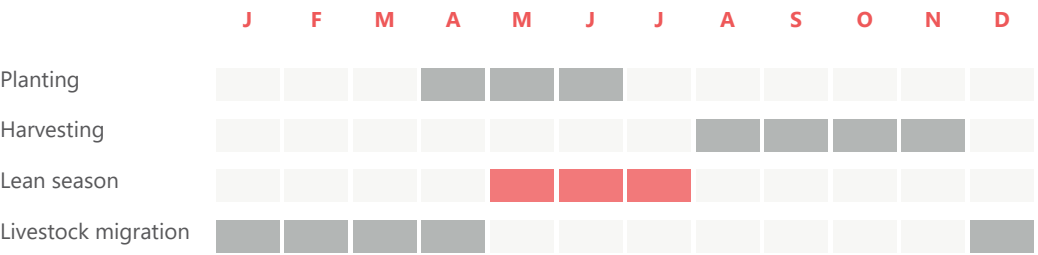
Cattle, goats, sheep and poultry contribute food, income and household assets. Cattle move seasonally in search of pasture and water. Fishing is particularly important near rivers, where catches can be consumed or sold. [1,2]

Poorer households in the wider zone earn income through agricultural labour, brewing and sales of natural products or small livestock. Better-off households have greater access to crop surpluses, cattle and milk, and can hire cultivation labour. These differences influence how households obtain food when their own stocks run low. [2]

The **May–July lean season overlaps planting and the early rains**. Households may need to buy food while investing labour in the next harvest. Flooding or insecurity during this period can disrupt both immediate food access and cultivation. The seasonal calendar shows the usual timing of these activities across the zone. [2]

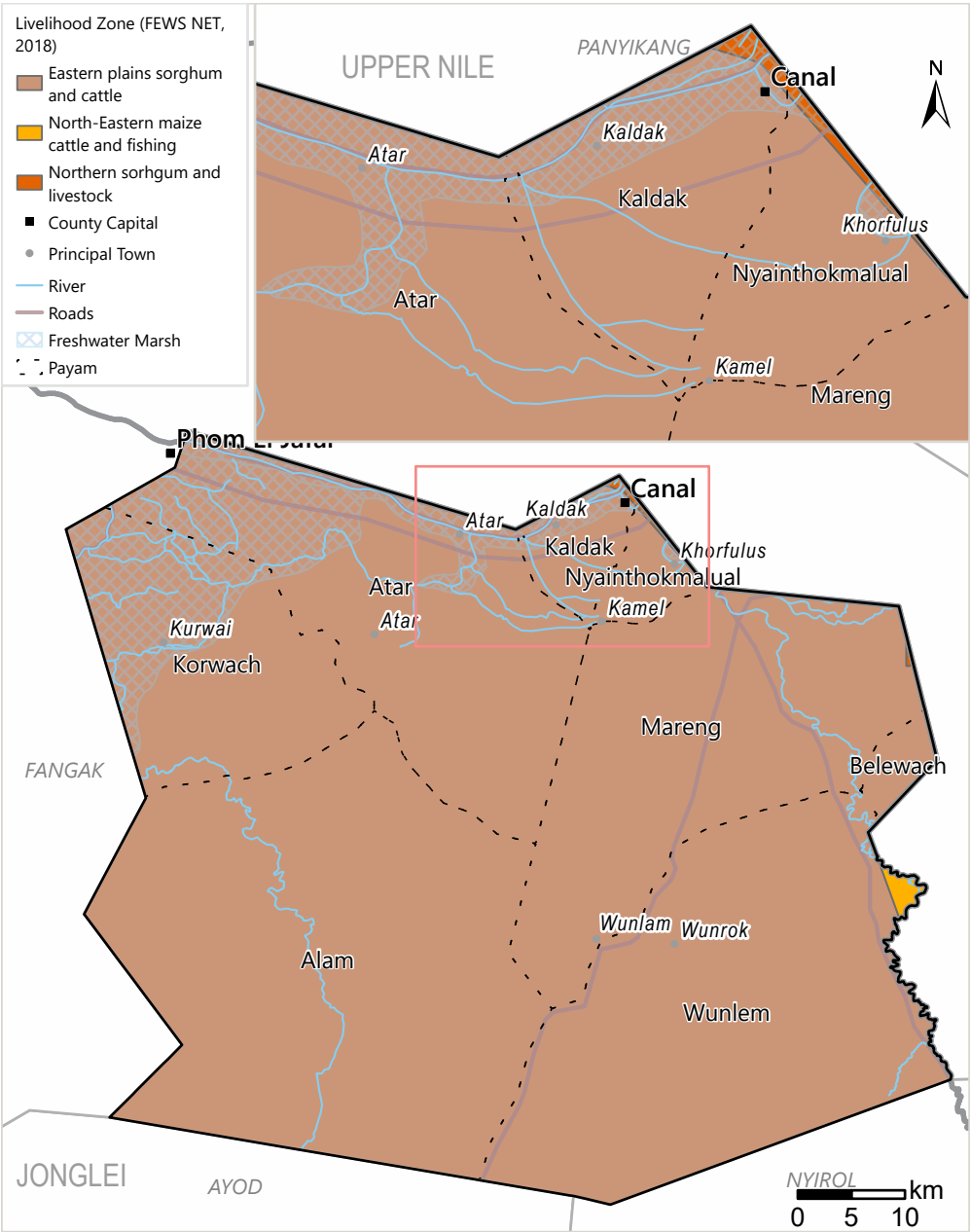
Fish and wild foods are part of ordinary diets and livelihoods. Their importance can increase sharply during prolonged flooding, as documented in Canal/Pigi in 2021 when cultivation and livestock activities were disrupted. [2,3]

Figure 5.1: Seasonal activities in the Eastern Plains Sorghum and Cattle zone [2]



Typical zone seasonality, adapted from the FEWS NET narrative (2018). The harvest period covers all crops; local timing varies.

Map 5.1: Livelihood zones, FEWS NET 2018 [2]



In 2025, an estimated 1,953 hectares produced 781 tonnes of cereals after deductions for seed use and post-harvest losses. **Harvested area increased by about 22% from 1,599 hectares in 2024, while net output rose by only 2%, from 768 tonnes.** [10,25]

Net cereal output per harvested hectare fell by about 17%. The county estimates imply 0.40 tonnes per hectare in 2025, compared with 0.48 in 2024, after seed and post-harvest deductions. The additional 354 harvested hectares were accompanied by just 13 tonnes more cereals. The expansion in harvested area therefore brought only a small increase in the local food supply. [10,25]

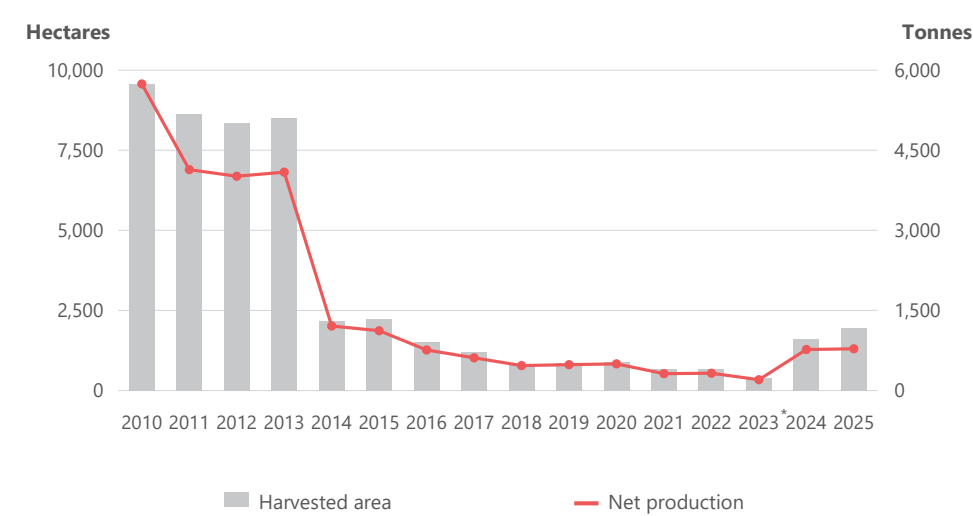
That harvest covered about 6% of the estimated cereal requirement for 2026. Against a requirement of 12,816 tonnes, the production shortfall was 12,035 tonnes. Access to cereals brought into the county through trade or assistance is consequently important. Livestock products, fish and wild foods also contribute to diets alongside grain. [2,10]

The shortfall is longstanding. **Every annual crop assessment in the 2010–2025 series estimated local production below requirements.** Net output fell from 4,090 tonnes in 2013 to below 1,300 tonnes in every year from 2014 to 2025, while harvested area also remained well below the early years of the series (Graph 5.1). For the 2018–2022 harvests, net output ranged from 315 to 499 tonnes against following-year requirements of roughly 11,200–12,700 tonnes. [10,25]

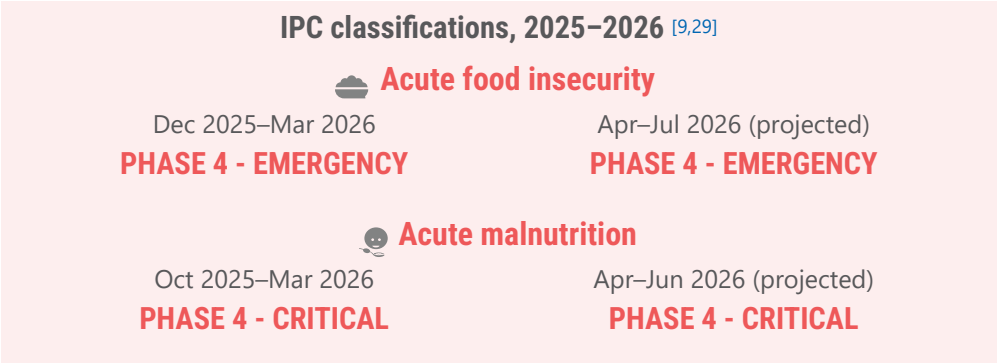
For poorer households, **disruption to cultivation affects both production and earnings.** Families with small grain stocks and fewer livestock rely more on purchases and agricultural labour. When fields are inaccessible, opportunities for paid farm work can fall alongside their own harvests, making it harder to buy food. Reduced earnings can therefore deepen a food shortfall even when goods remain available in markets. [2,3]

REACH’s October 2021 assessment showed that access to alternative food sources was also uneven. High water and strong currents meant that few households could fish, and those who did needed canoes and nets. **Wild foods became the main food source for households unable to fish.** Meanwhile, flooding and insecurity delayed assistance and restricted access to distribution points. The same floods that interrupted farming also limited households’ ability to replace lost crops and livestock products with other food sources. [3]

Graph 5.1: Estimated cereal area and net production, 2010–2025 [25]



Annual FAO/WFP estimates. The 2023 harvest estimate (*) uses a markedly lower population input than adjacent editions. Net production excludes seed use and post-harvest losses. [10,25]



The revised IPC projection placed **80% of the analysed population in Crisis or worse for April–July 2026**: 40% in Crisis and 40% in Emergency, about 90,500 people combined. The projection covers the lean season, when household stocks are low and dependence on purchased food is greater. [2,9]

Acute malnutrition was projected at Critical for April–June 2026, with conditions expected to deteriorate within that phase. [9]

6A. POPULATION AND SETTLEMENT

Canal/Pigi's settlements are closely connected to its rivers. Canal, Khorfulus, Kurwai and Atar lie along waterways and connecting routes, with fishing grounds, landing points, markets and services nearby. The modelled 2023 population layer provides a spatial picture of these settled areas (Map 6.1). ^[1,22]

Living near navigable water helps people reach food, goods and services, but also places some settlements beside flood-prone ground. During the prolonged 2020–2021 floods, access to homes and livelihood resources was interrupted for extended periods. Later reports again described residents moving along the canal and onto higher ground. ^[3,27]

DTM recorded **27,665 IDPs, 5,611 returnees and 1,345 relocated people** in 13 assessed locations across six payams during December 2024–February 2025. These groups were living in the county before the subsequent movements documented in 2025–2026 (Table 6.1). ^[6]

Hosting was concentrated in a few locations. Khorwach accounted for about 70% of recorded IDPs, with 19,250 people. Nyinthok and Mareng recorded the next largest numbers, at 3,102 and 1,800. Together, **these three payams accounted for approximately 87% of recorded IDPs and 95% of returnees in the assessed locations.** Relocated people were recorded in Nyinthok, Atar and Wunlith. ^[6]

This concentration places much of the demand associated with displacement in a small number of receiving areas. Shelter, water and healthcare are needed alongside access to food and income. Families leaving flooded or insecure areas may lose access to fields and livestock, while the settlements receiving them can also face flooding and disrupted services. **River connections and areas of higher ground remain important to movement and access across this landscape.** ^[3,5,6,27]

CANAL/PIGI COUNTY

Map 6.1: Modelled population distribution, 2023 (people per hexagon) ^[22]

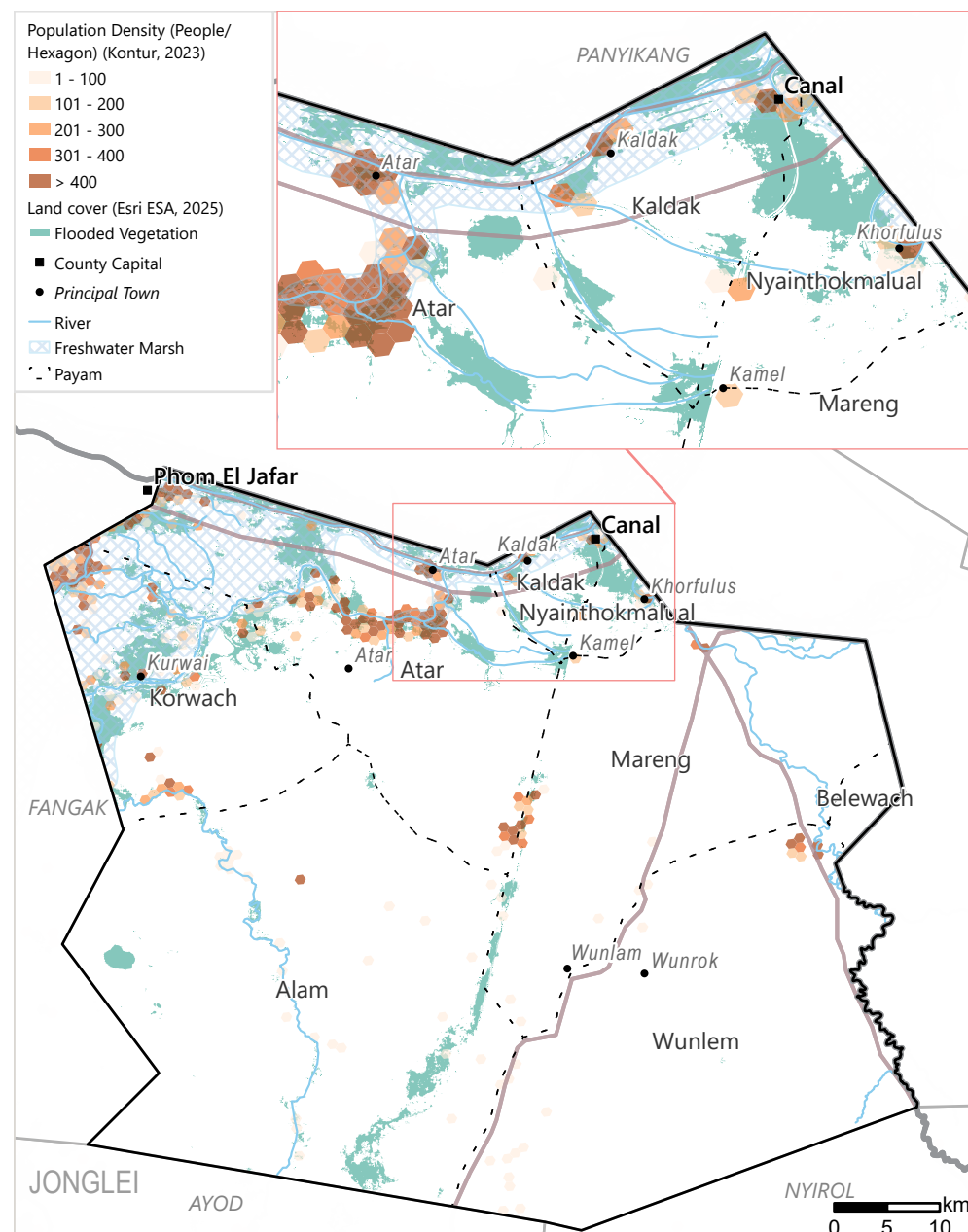


Table 6.1: DTM Round 16 population categories, December 2024–February 2025 [6]

Payam	IDPs	Returnees	Relocated	Total
Khorwach	19,250	1,925	0	21,175
Nyinthok	3,102	1,737	913	5,752
Mareng	1,800	1,675	0	3,475
Atar	1,625	274	156	2,055
Wunlith	1,376	0	276	1,652
Kaldak	512	0	0	512
Total	27,665	5,611	1,345	34,621

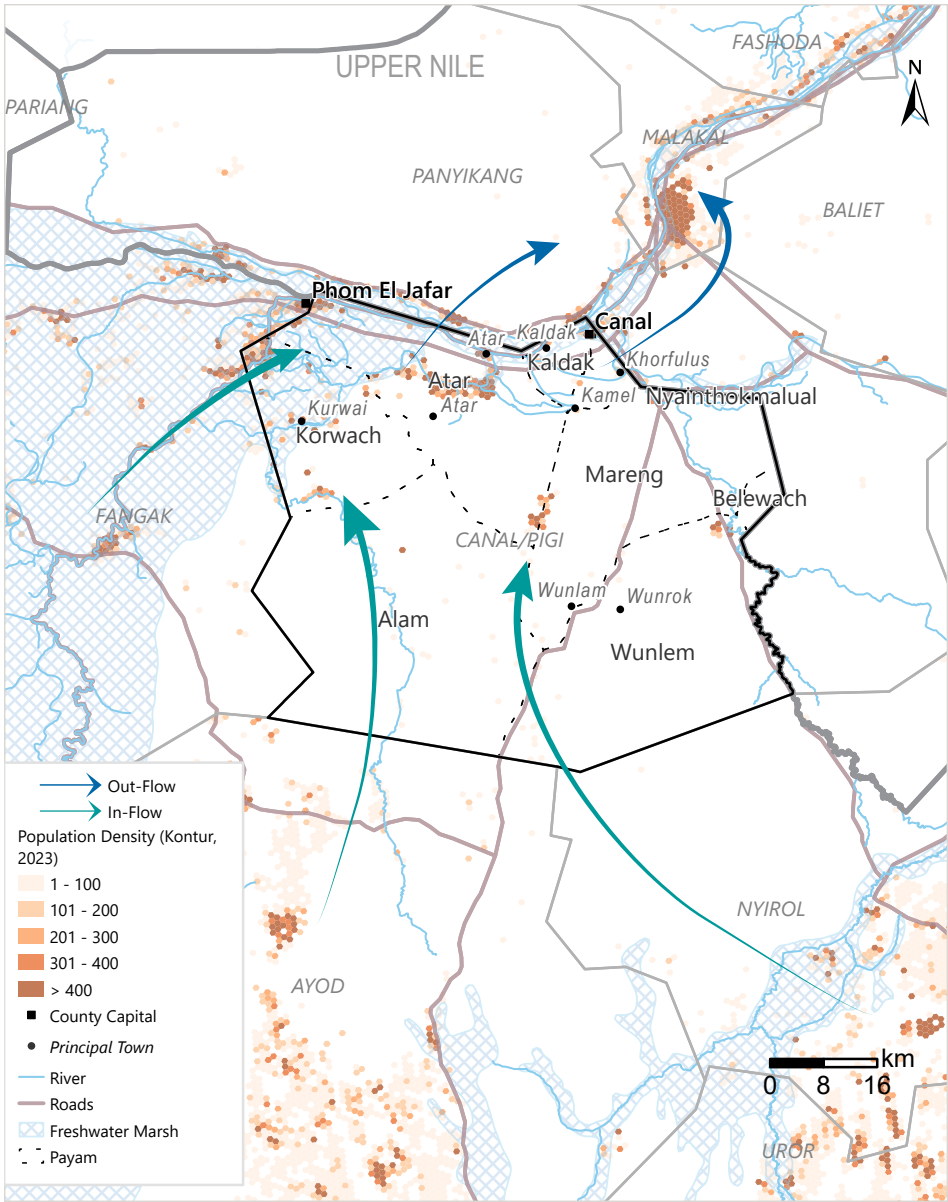
Round 16 covered 13 locations in six payams. IDPs were displaced within South Sudan; returnees had returned home after displacement; relocated people had voluntarily settled elsewhere without intending to return. Payam names follow the DTM source. [6]

Flood displacement has sometimes lasted for months. In June 2022, families from Pigi, Fangak and Nyirol were reported sheltering in Canal after floods had forced them from their homes earlier that year. [30]

Further movements followed in 2025. IOM recorded 654 people from Canal/Pigi arriving in Malakal Town on 24 July amid insecurity and food shortages. Flooding then displaced residents within the county and towards Upper Nile: the September estimate of about 18,000 people displaced within Canal/Pigi was followed by the county commissioner’s estimate of nearly 40,000 displaced by the same flood crisis in October. [4,27,31]

In late January 2026, UNICEF reported about 18,000 arrivals across Ulang and parts of Canal/Pigi following violence in Nyirol. By 26 June, authorities were requesting support for people returning to Atar, Wunekirr, Wunlueth, Mat, Khorwach and Allele 3; numbers remained under verification. OCHA reported that continuing clashes restricted humanitarian access and caused further displacement. [7,32]

Map 6.2: Selected population-movement routes (REACH/IOM DTM)



Population: people per hexagon [22]. Arrows show indicative movement routes.

Health

The April 2026 IPC update reported **at least 12 non-functional health facilities** in Canal/Pigi, indicating severe disruption to health and nutrition services. An April 2025 public inventory had recorded 17 facility locations. [9,33]

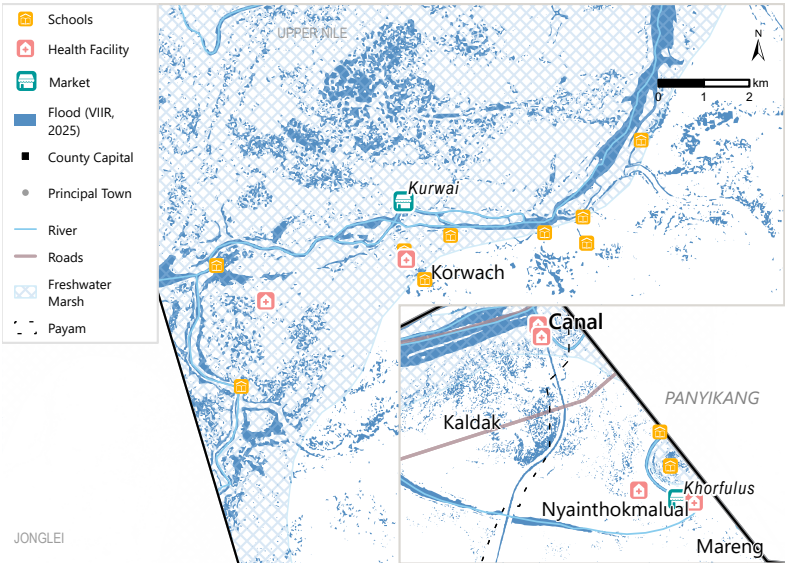
Education

CSRF’s undated inventory lists one early childhood centre, ten primary schools and one secondary school. [1] Mapped school locations draw on SSSAMS (2024) and HOT/ OpenStreetMap data through HDX, and cluster around settlements (Maps 7.1 and 7.2). [34]

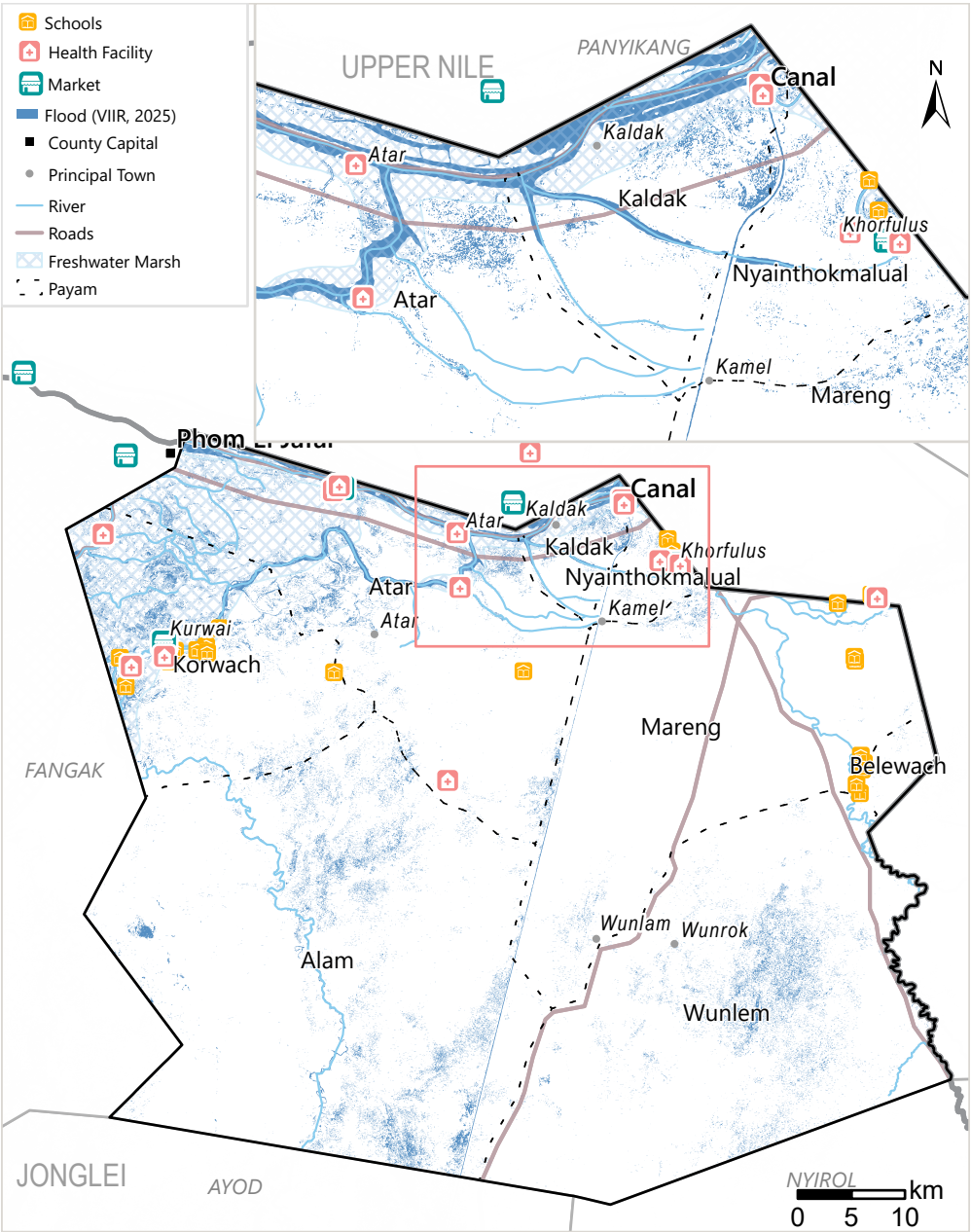
Flooding and access

In Khorwac Town on 8 October 2025, floodwater submerged health centres, schools and water points, and residents moved to higher ground. The inundation coincided with displacement from nearby homes, disrupting several basic services in the same area. [3,5]

Map 7.2: Facilities around key settlements (REACH)



Map 7.1: Facilities and 2025 VIIRS flood layer (REACH)



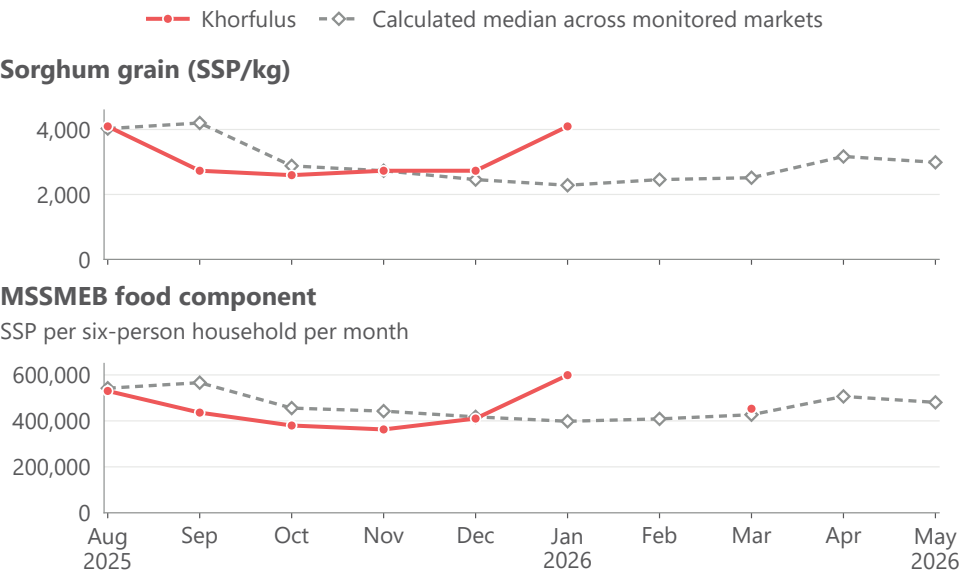
River trade links Canal/Pigi with Malakal and wider supply routes. Boats carry goods through the Nile system, with seasonal roads and paths connecting surrounding settlements. Flooding and insecurity interrupt deliveries and market access. [1]

Khorfulus market functionality was rated limited in August and December 2025 and January 2026, and poor in September–November. Graph 8.1 shows JMMI observations for Khorfulus, monitored separately from Kurwai. [8,35]

Sorghum prices in Khorfulus rose by half from December to January, from SSP 2,730 to SSP 4,095/kg. Over the same period, the calculated median across monitored markets fell from SSP 2,457 to SSP 2,283. At January’s local price, the same amount of cash bought one third less sorghum than in December. [8]

The food component of the monthly basket for a six-person household cost SSP 598,977 in January and SSP 452,908 in March. The recorded food-basket cost fell by about 24% between these observations. [8,36]

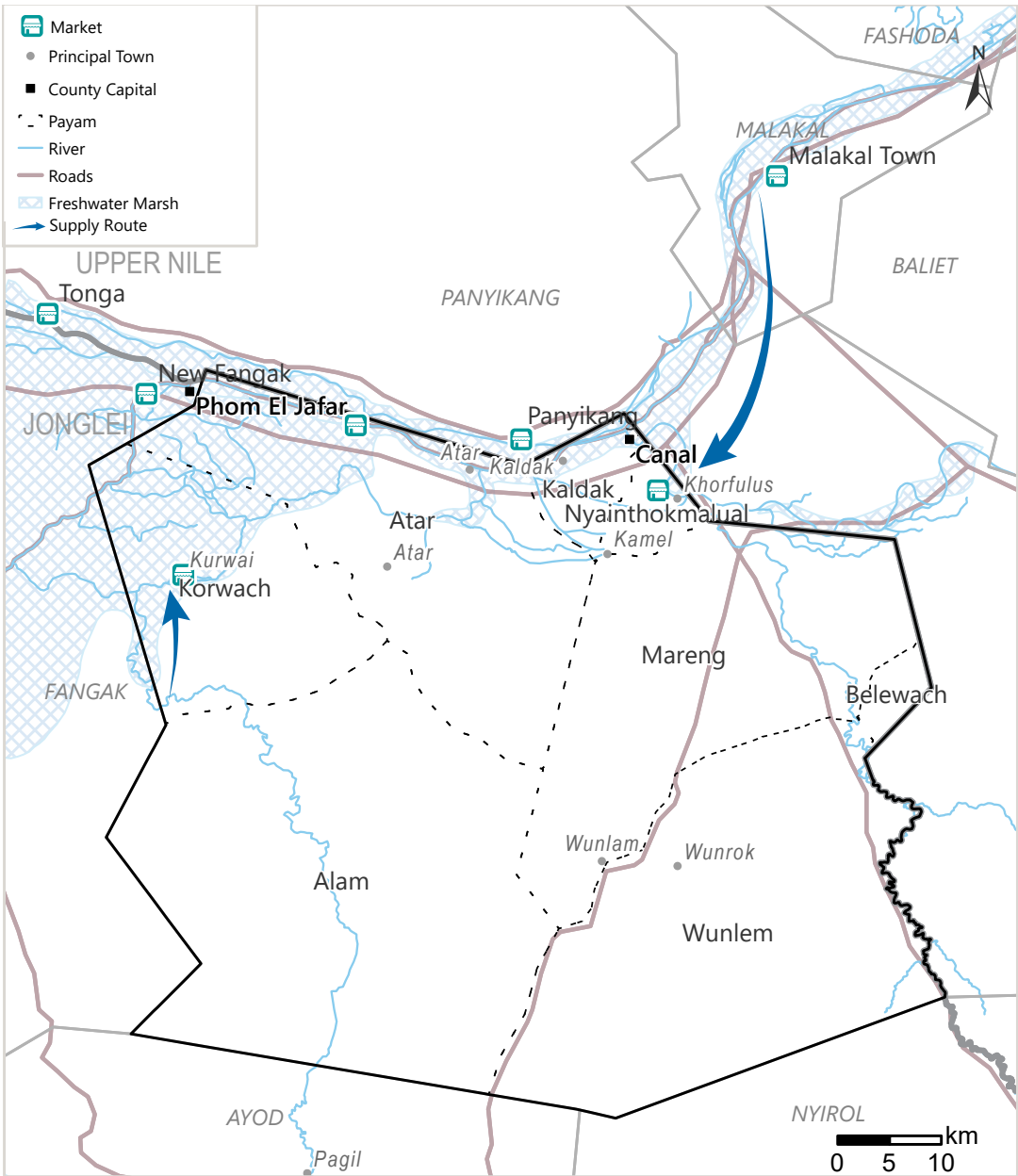
Graph 8.1: Khorfulus prices and monitored-market medians [8]



Monthly observations; gaps indicate unavailable prices. The comparison median uses markets monitored in each month.



Map 8.1: Markets and supply routes [1]



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