Dams and Violence in Africa

Li Han [1] Jiaqi Ren [2] Yabin Yin [1]

[1]Hong Kong University of Science and Technology
[2]Pennsylvania State University

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Clashes over Grand Ethiopian Renaissance Dam on Nile

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Egypt accuses Ethiopia of violating law over controversial dam

6 July 2021

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While for Ethiopia, the dam, pictured here in 2019, is vital, Egypt sees it is as a threat to its existence

Egypt has accused Ethiopia of violating international law after it received a notice saying that Ethiopia's dam upstream on the Nile is now filling up with water for a second year.

The hydroelectric dam has long been a source of tension in the region.

Egypt, which relies almost entirely on the Nile for its water, sees it as a possible existential threat. Ethiopia says it is vital for its development.

Decade-long negotiations over the dam have failed to reach a final agreement.

Egyptian Protesters

Disputes over Hydropower Dams

Hydropower dams are controversial.

- On one hand, dams are pivot water infrastructure for agricultural intensification and electrification.
- On the other hand, the construction and operation of these dams involve
  - large-scale relocation;
  - adverse environmental effect in the downstream regions, e.g., water cycle, temperature, biodiversity, etc.

- Likely evoke conflicts in the downstream.
  - $\Rightarrow$ Domestic water scarcity — Fight for diminishing water access.
  - $\Rightarrow$ Economic loss — reduced agricultural production due to $\downarrow$ irrigation water & soil quality.
  - $\Rightarrow$ Higher temperature?
    - Loss in biodiversity.
    - Forced displacement.

Research Question

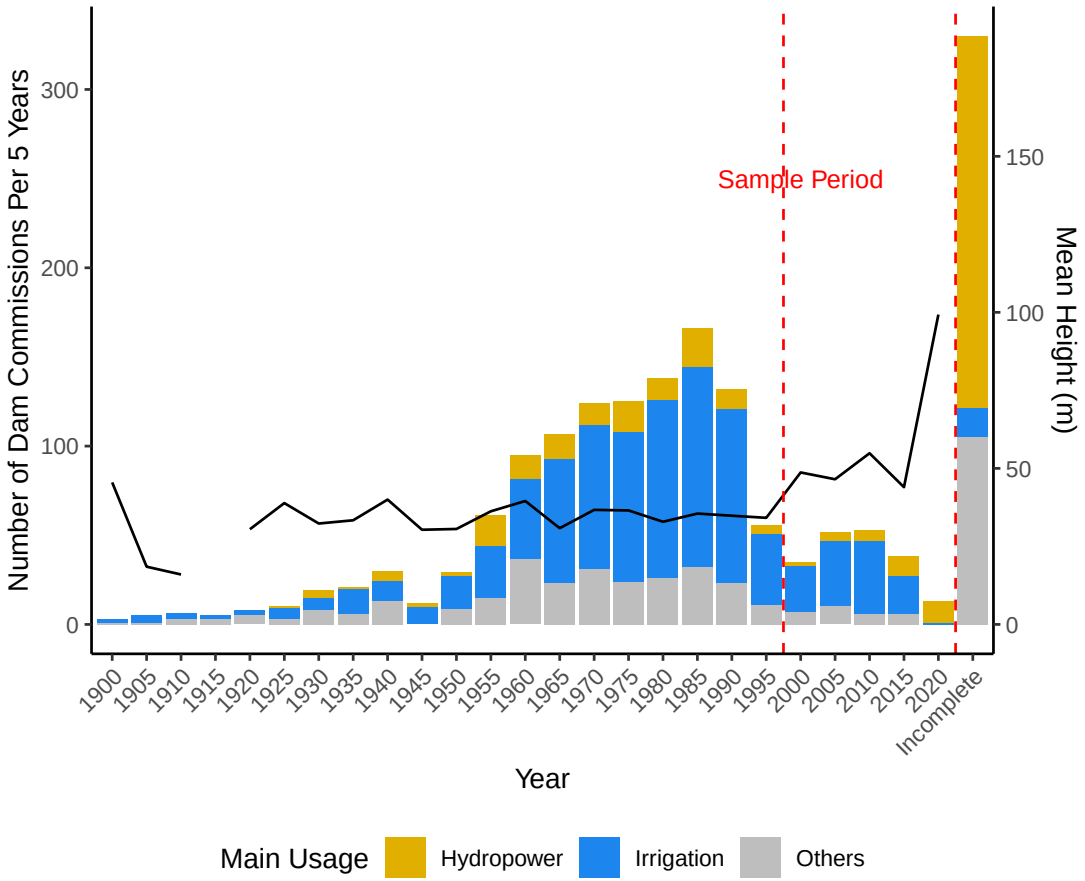
- Did hydropower dams increase the incidence of conflicts in Africa?

- Why focus on hydropower dams?
  - Larger hydrological impact than irrigation dams due to greater size and height.
  - Rapid proliferation amid Africa's ongoing electrification.

- Potential Mechanisms:
  - Competition over domestic-used water resources? (✓)
  - Dams ↑ downstream temperature?
  - Reduced agricultural production ↓ opportunity costs of participating in conflicts?

More/Taller Dams in Africa

- A sharp rise of dams constructions in Africa since 1950 (ICOLD WRD, 2020)
- Dams become taller.
- More hydropower dams in the future.



# of Dams by Year of Commission

Dam and Water

- Dams provide stable irrigation water.
  - Hold water in rainy seasons and release in dry seasons (Ando and Lei 2023).
- On the other hand, dams have been argued to adversely affect the river ecology, especially in the downstream area.
- Water deficit (occurs when water demand exceeds supply) $\uparrow \Rightarrow$ drought severity $\uparrow$
  - Water temperature changes: Released water is often warmer than natural river water, increasing evaporation rates.
  - Water surface exposure: Dam-regulated flows can create wider, shallower channels that expose more water surface area.
  - Flow Pattern Changes: Altered flow could be more constant, creating permanent shallow pools and backwaters; water in these areas moves slowly and has more time to evaporate.

Dam and Water (Con't)

- Dams likely reduce groundwater storage in the downstream regions.
  - Reduction of recharges: Dams truncate natural river flow — surface water discharges ↓ — recharges to shallow groundwater aquifer ↓
  - Over-extraction: Associated irrigation system over-pumped water from aquifer.
- Poor management of dams exacerbates adverse effects.
  - Imprecise forecasts of rainy/dry seasons.
  - Hydroelectric dams tend to hold more water in dry seasons for electricity generating.

Preview

- Estimate the effects of hydropower dams on the incidence of conflicts separately for downstream and upstream regions on:
  - Dep Var.: Monthly # of conflict; conflict dummy (monthly).
- DID: Areas near to Dam-Affected vs. -Unaffected river branches (in the same basin with the dam); Pre vs. Post Period of dam commissions.
- Mainly focus on downstream regions, while using upstream regions as placebo tests.
- We find that:
  - Downstream: monthly # of conflicts $\uparrow$ 0.01 piece (91% of the mean) in the Affected vs. Unaffected.
  - Upstream: No significant effect.
  - Larger effect in arid areas and areas with lower groundwater storage.
  - Induce more conflicts in area with high ethnicity fractionalization.
- Mechanisms:
  - Competition for water resource: water deficit (+), drought severity (+), groundwater storage (-), household time use in water collection (+).
  - Temperature: max. temperature (+), but incidence of high temperature weather ($>$ 86 F) not change.
  - Agricultural output (+).

Literature Review

- The effect of dams:
  - Distributional effect on agriculture output in India and Africa (Duflo & Pande 2007; Strobl & Strobl 2011).
  - Increased infant mortality through drinking water pollution in South Africa (Mettetal 2019).
  - Enlarged gender inequality in education since dams reduced groundwater storage and prolonged females' time use in water collection (Han, Lam & Yin 2024).
  - The Three Gorges Dam led to less rainfall downstream, thereby widening income inequality among downstream rural families (Chen et al. 2021).
  - Hydropower dams intensify downstream drought if upstream experience drought, too (Ando & Lei 2023).
  - Hydropower dams were associated with reduced economic production, population, and greenness in nearby areas in the Global South (Fan et al. 2022).

Literature Review

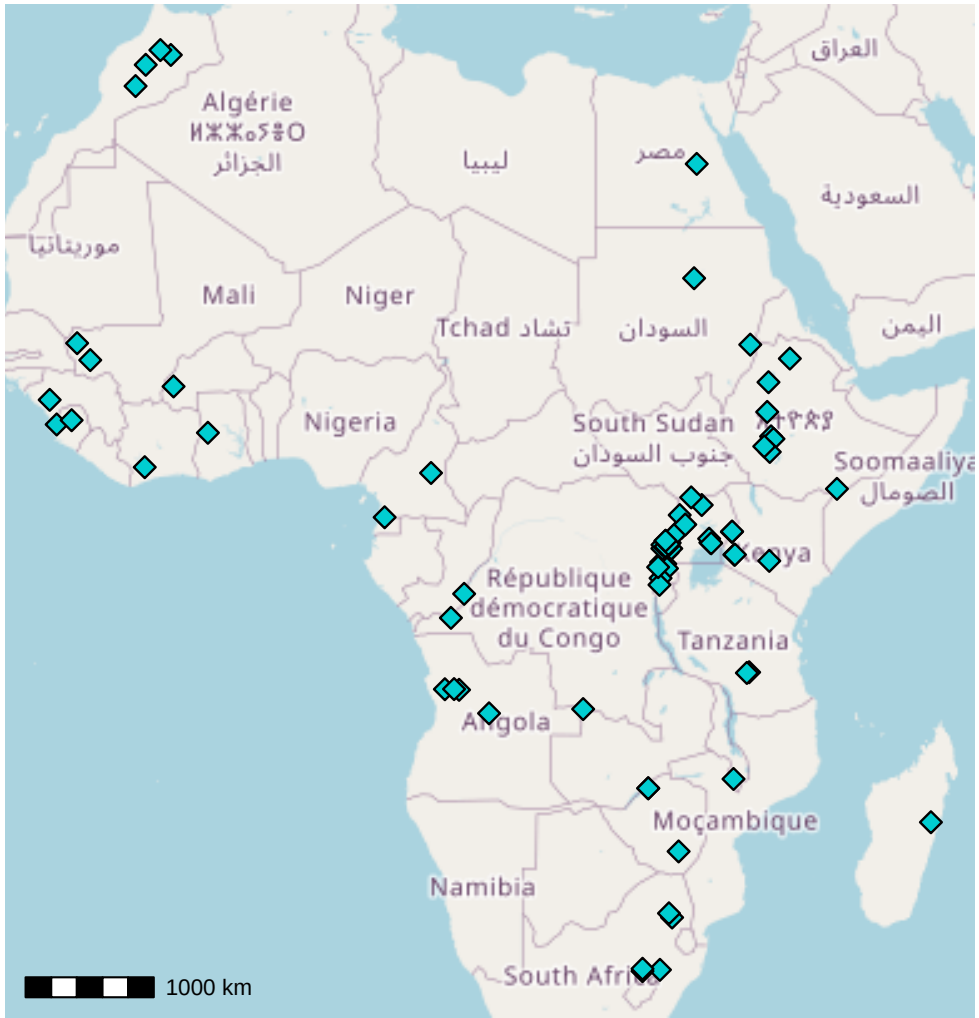
- Conflict
  - Climate-derived conflicts, e.g., high temperature, precipitation, flood, drought, etc. (Hsiang, Burke & Miguel 2013; Dell, Jones & Olken 2014; Burke et al. 2015; Sarsons 2015; Harari & La Ferrara 2018).
  - Global commodity price and conflicts: export price (Besley & Persson 2008; Brückner & Ciccone 2010); oil price (Collier & Hoeffler 2005; Koubi et al. 2014; Ross 2015); mineral price (Berman et al. 2017); crop price shock (McGuirk & Burke 2020).

- Water access and human well-being:
  - Students lacking access to piped water are associated with worse educational outcomes (Choudhuri & Desai 2021; Halmet et al. 2021).
  - Clean water supply improved individual health outcomes (Frempong et al. 2021; Kremer et al. 2011).
  - Having access to piped water increases people's happiness (Devoto et al. 2012).

Data on Dams

- We compile a comprehensive database on hydropower dams in Africa from:
  - Reservoir and Dam (GRanD v1.03) database provided by NASA;
  - AQUASTAT dams database collected by FAO;
  - Africa Dams Briefing (2015) collected by International Rivers;
  - Manually validate with Wikipedia.
- The database contains information on
  - Longitude and latitude;
  - Year and month of commission;
  - Other dams characteristics such as heights, reservoir capacities (though with missing values)

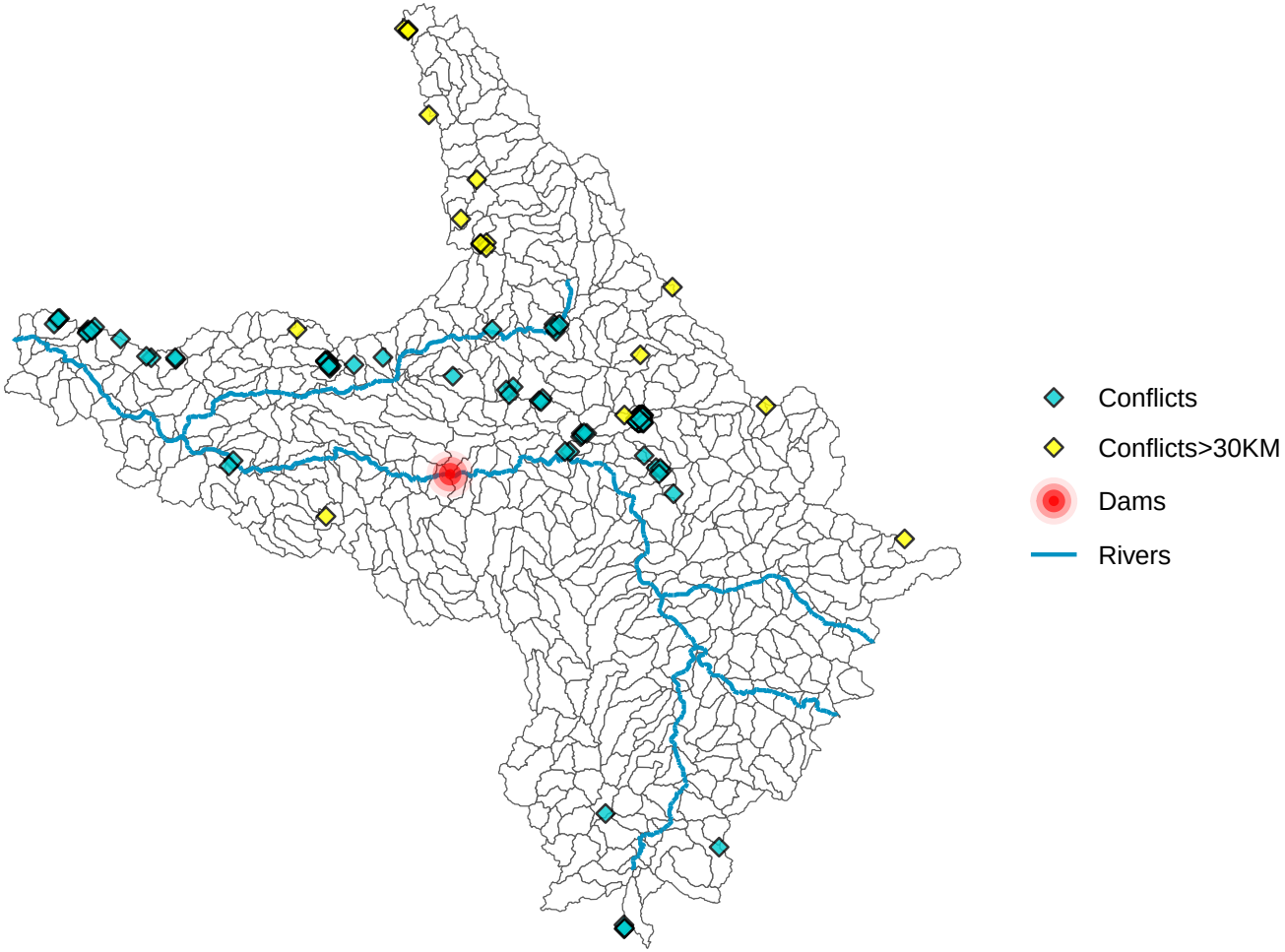
Dam Sample Includes 77 Hydropower Dams (2000-2020)



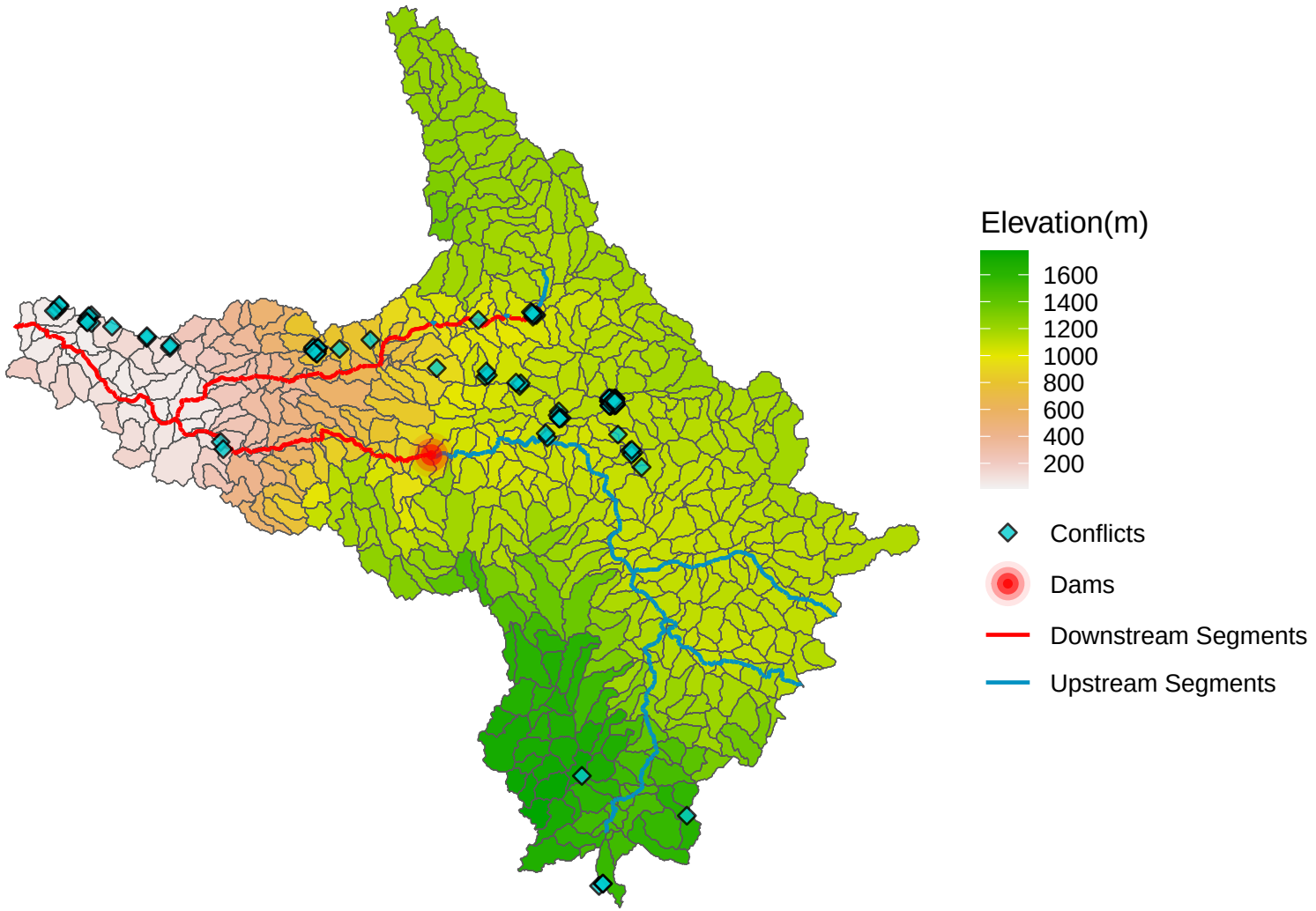
Conflicts Data

- We draw conflicts data from the Armed Conflict Location and Event Dataset (ACLED), which provides detailed information of conflicts worldwide from 1997, mainly sourced from news reports:
  - Geo-location of the conflicts;
  - Occurrence date;
  - Types of conflicts;
  - groups of the conflicts.
  - A short sentence stating the reason of the conflicts.
- Subtypes of conflicts.
  - Abduction, Attack, Armed Clash, Looting, Mob Violence, Peaceful Protest, Protest with Intervention, Excessive Forces against Protesters, Demonstration, Sexual Violence, Government Regains Territory, Nonstate Actor Overtakes Territory, Conflicts related to Water.
- Our conflict sample is at the dam-cell-yearmonth level.
  - Period: 2000-2020.
  - Located within 50 KM to a dam in the same river basin, and within 30 KM to the nearest stem river.
  - Count the monthly # within a 10KM*10KM grid cell.

Match Dams with Conflicts Data (Capanda Dam in Angola: Kwanza River Basin)

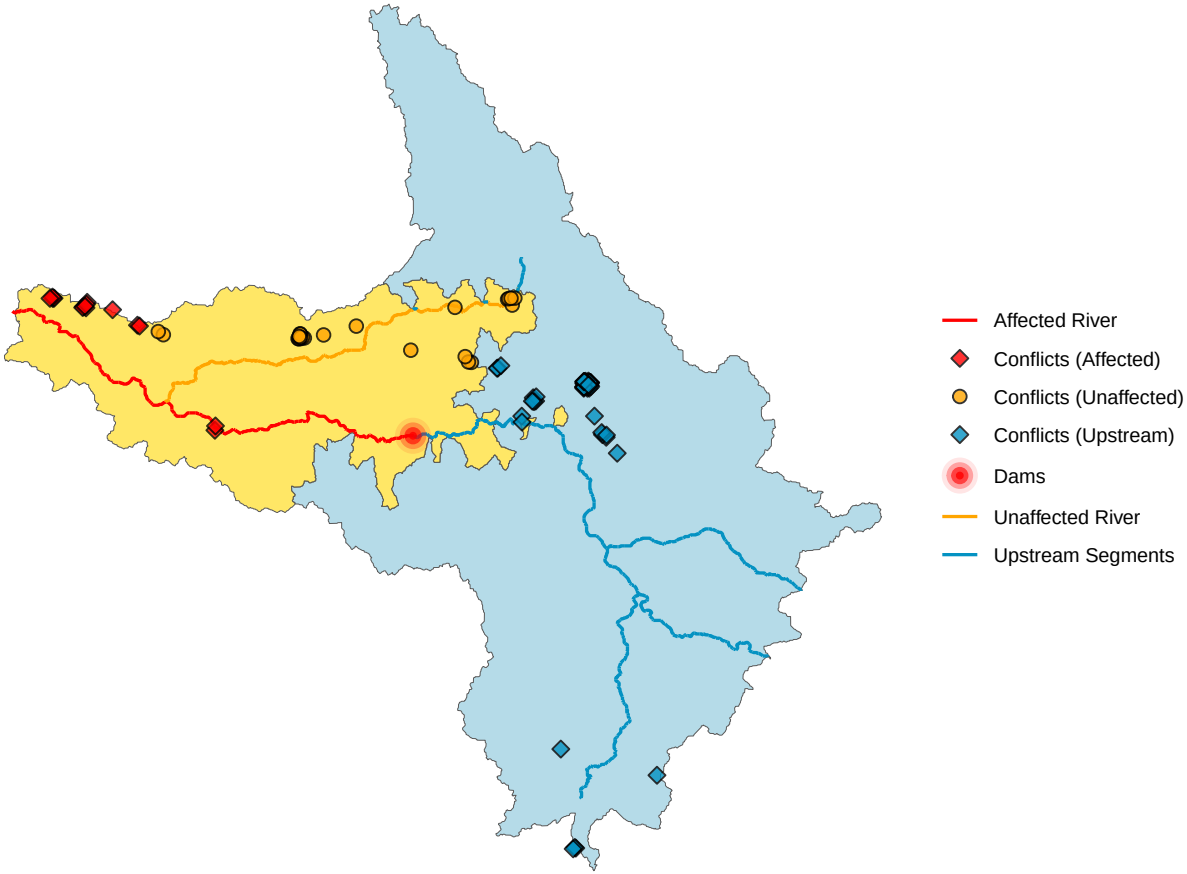


Delineate Downstream & Upstream

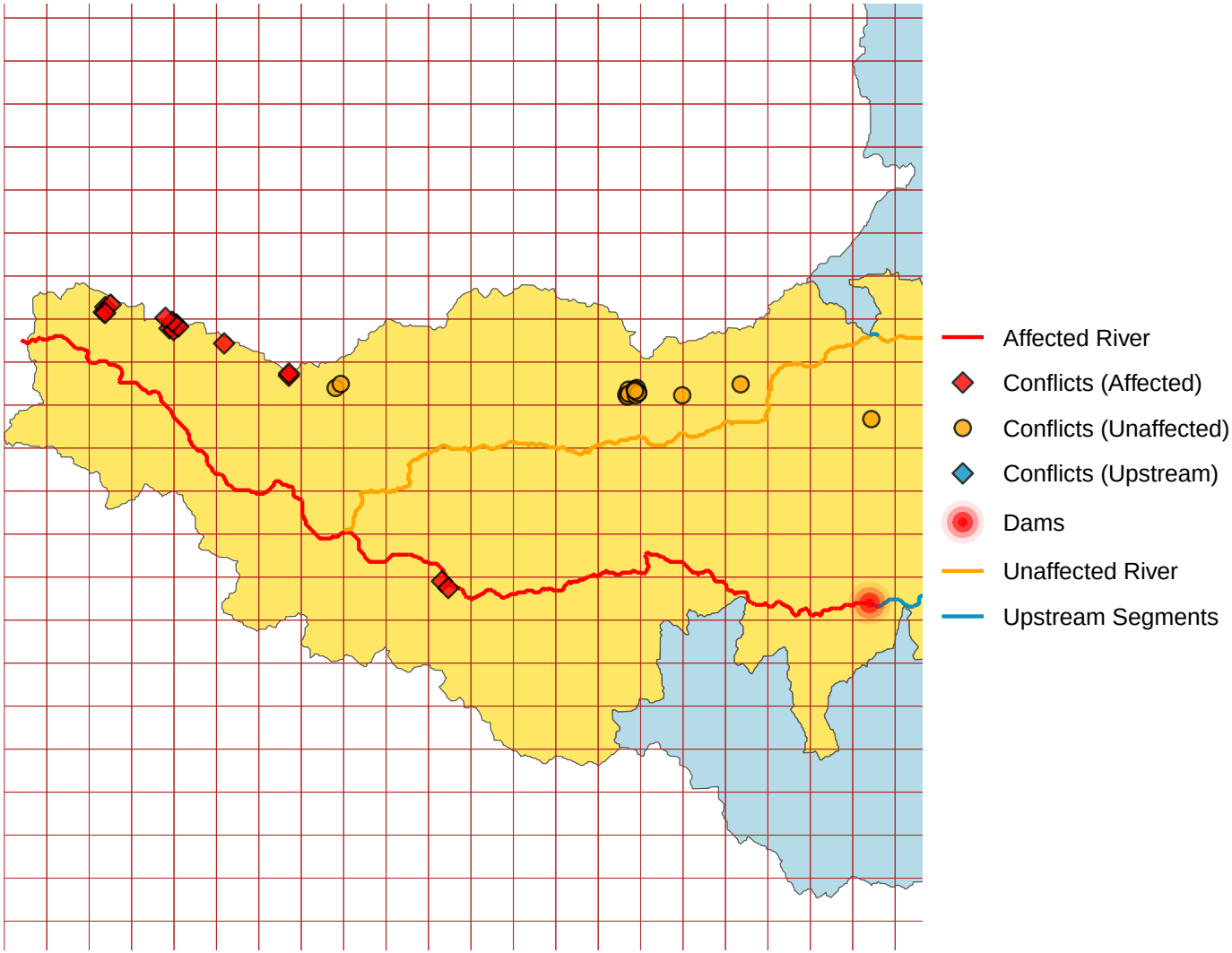


The DID Design

- 1st difference: Areas located within 30km of Affected (pass from dams) vs. Unaffected (not pass from dams) river branches.
- 2nd difference: Pre vs. Post period of dam commission.



Zoom in (10KM*10KM)

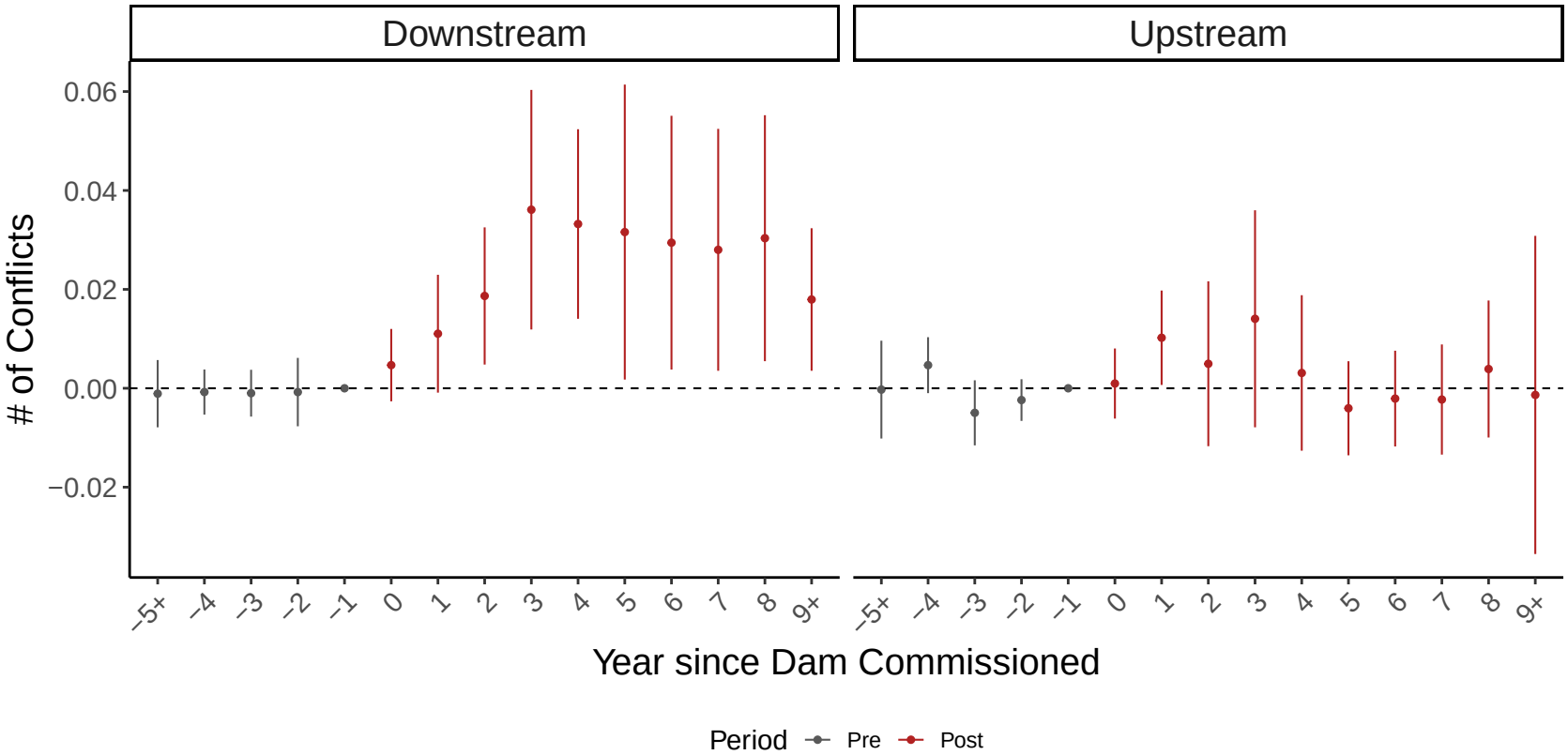


Baseline DID Specification

$$Y_{ijdt} = \beta_1 Post_{td} + \beta_2 Affected_{jd} \times Post_{td} + X_i t\boldsymbol{\gamma} + \kappa_i + \delta_d + \mu_{ct} + \epsilon_{ijdt}$$

- i, j, d, t represent cell i along river j near dam d in year-month t.
- Y_{ijdk} denotes monthly # of conflicts, or conflict dummy at month level.
- $Affected_{jd}$ is an indicator for cells within 30 km of affected river j which flows from dam d.
- $Post_{td}$: $= 1$ for post-period of dam commission.
- $X_i t$: geographical/climate/hydrological characteristics of cell i.
- κ_i, δ_d, μ_{ct}: cell, dam, country-year, country-month, and year-month fixed effects, respectively.
- ϵ_{ijdt}: standard errors are clustered at the cell level.

Baseline Result: Monthly # of Conflicts



Baseline Table

	Monthly # of conflicts					
	Downstream			Upstream		
	(1)	(2)	(3)	(4)	(5)	(6)
Post	-0.016***	-0.015**	-0.005	-0.021***	-0.006	-0.002
	(0.004)	(0.006)	(0.007)	(0.007)	(0.007)	(0.006)
Affected_Riv × Post	0.038***	0.025***	0.016***	0.031***	0.005	0.004
	(0.009)	(0.008)	(0.006)	(0.008)	(0.007)	(0.007)
Mean of Dep. Var.	0.018	0.018	0.018	0.012	0.012	0.012
Observations	404,340	404,340	404,340	313,752	313,752	313,752
R^2	0.144	0.169	0.179	0.084	0.116	0.141
Covariates	Y	Y	Y	Y	Y	Y
Covariates*Year			Y			Y
Dam fixed effects	✓	✓	✓	✓	✓	✓
Cell fixed effects	✓	✓	✓	✓	✓	✓
Year fixed effects	✓			✓		
Month fixed effects	✓			✓		
Country-Year fixed effects		✓	✓		✓	✓
Country-Month fixed effects		✓	✓		✓	✓
Year-Month fixed effects		✓	✓		✓	✓

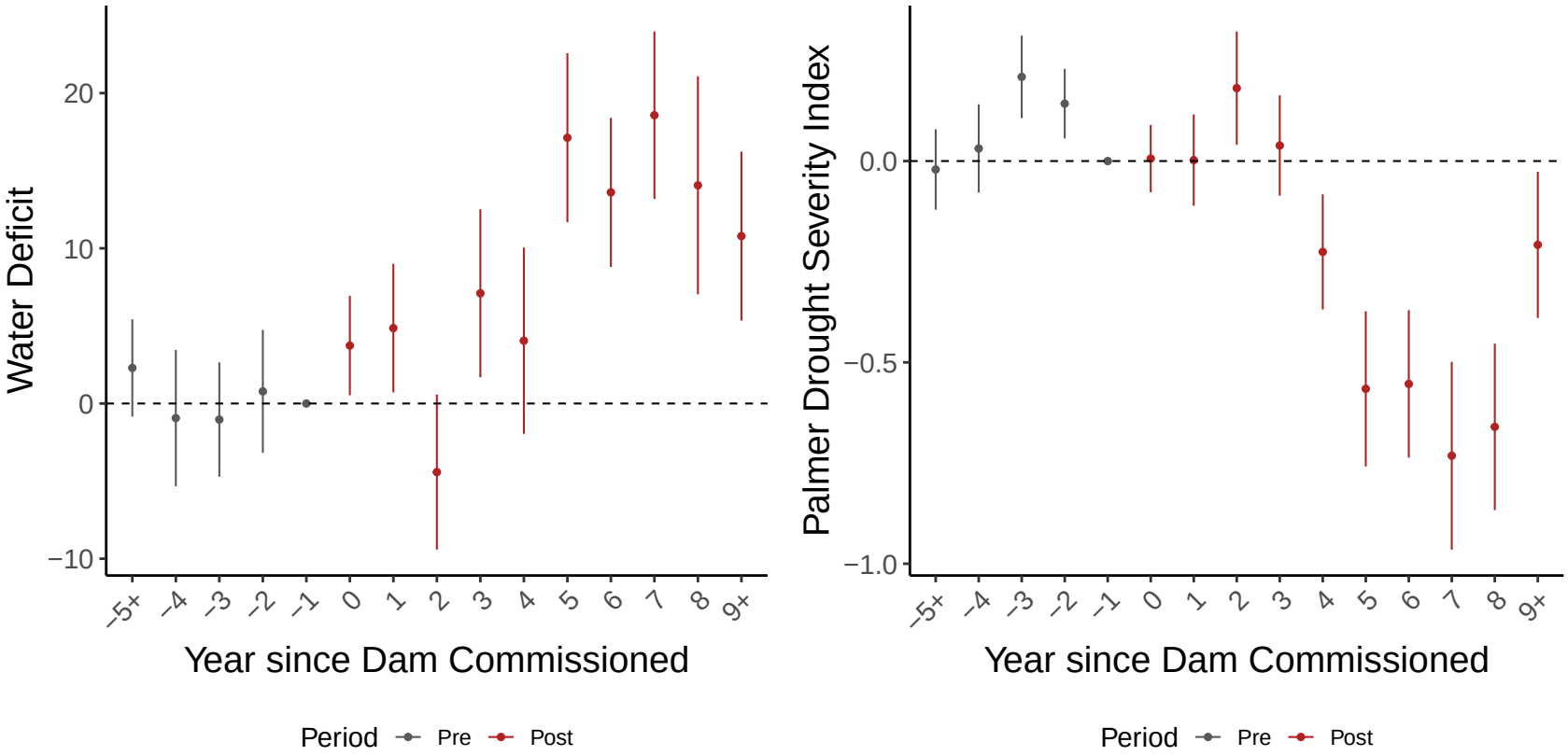
Robustness & Additional Results

- Our baseline results are robust to alternative conflict measurement (conflict dummy) and different samples (distances to dams/rivers, periods). fig tab
- All types of conflicts near affected river ↑ vs. unaffected river (downstream). fig

  Attack, Armed clash, Abduction, Protests, violent demonstration, mob violence, looting, etc.
- Larger effect in arid areas and areas with lower average groundwater storage. tab
- Induce more conflicts in area with high ethnicity fractionalization. tab

Water Cycle

- Downstream area near dam-affected rivers have became drier: water deficit ↑, Palmer Drought Severity Index ↓.



(a) Water Deficit

(b) PDSI

Water Cycle

- Groundwater storage in area near dam-affected rivers ↓
- However, the incidence of severe drought (PDSI<-4) does not increase.

				log(Groundwater Storage)		
	Water Deficit	PDSI	Severe Drought	All	Non-Cropland	Cropland
	(1)	(2)	(3)	(4)	(5)	(6)
Post	-29.7***	0.251***	0.014*	-0.002	-0.001	0.011
	(4.52)	(0.079)	(0.008)	(0.003)	(0.003)	(0.012)
Affected_Riv × Post	5.68***	-0.188***	0.001	-0.004*	-0.004**	-0.014
	(1.36)	(0.045)	(0.004)	(0.002)	(0.002)	(0.012)
Mean of Dep. Var.	517.4	-0.789	0.184	6.99	6.96	7.09
Observations	458,328	458,328	458,328	344,638	266,298	78,340
R^2	0.927	0.806	0.659	0.995	0.996	0.995
Covariates*Year	Y	Y	Y	Y	Y	Y
Cell fixed effects	✓	✓	✓	✓	✓	✓
Dam-Year fixed effects	✓	✓	✓	✓	✓	✓
Dam-Month fixed effects	✓	✓	✓	✓	✓	✓
Year-Month fixed effects	✓	✓	✓	✓	✓	✓

Alternative Mechanisms

- Temperature (probably): tab
  - Monthly temperature max. and min. ↑
  - However, the incidence of severe high temperature weather ($>$ 86 F or 30°C) does not increase.

- Agricultural production (not likely):
  - Food consuming area has not seen significant increase in conflicts. tab
  - Cropland did not decrease. tab
  - Soil moisture and grain output in food consuming area did not decrease.
  - Survey data (DHS) shows local residents' land ownership ↑, and adults' agricultural labor participation rate ↑

Inequality? Uneven Distributional Effect?

	Land ownership	Land hectares	Wealth (1-5)		Electricity	Refrigerator	Radio	Television	Bicycle
			Land_Own=0	Land_Own=1					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Post	-0.195**	-110.2***	1.11**	0.303	-0.155	-0.119***	-0.011	-0.124	-0.026
	(0.099)	(39.9)	(0.455)	(0.389)	(0.121)	(0.045)	(0.063)	(0.091)	(0.114)
Post × Affected_Riv	0.246**	115.0***	-0.985**	-0.399	0.148	0.119***	0.021	0.125	0.038
	(0.099)	(39.9)	(0.447)	(0.390)	(0.121)	(0.044)	(0.063)	(0.091)	(0.113)
Mean of Dep. Var.	0.655	26.1	2.81	3.48	0.275	0.041	0.567	0.152	0.136
Observations	31,406	30,738	10,085	21,321	40,967	40,956	40,975	40,939	40,968
R^2	0.248	0.244	0.431	0.205	0.532	0.222	0.295	0.421	0.141
Covariates	Y	Y	Y	Y	Y	Y	Y	Y	Y
Dam fixed effects	✓	✓	✓	✓	✓	✓	✓	✓	✓
factor(cells) fixed effects	✓	✓	✓	✓	✓	✓	✓	✓	✓
Country-factor(time) fixed effects	✓	✓	✓	✓	✓	✓	✓	✓	✓

Labor Participation

	Downstream				Upstream			
	All	Agricultural	Non-Agricultural	Domestic Work	All	Agricultural	Non-Agricultural	Domestic Work
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Post	0.083	-0.158***	0.228***	0.013	-0.028	-0.020	-0.030	0.017
	(0.072)	(0.038)	(0.038)	(0.021)	(0.042)	(0.043)	(0.035)	(0.015)
Affected_Riv × Post	-0.128*	0.108***	-0.226***	-0.011	0.017	0.012	0.018	-0.010
	(0.070)	(0.034)	(0.039)	(0.021)	(0.026)	(0.026)	(0.021)	(0.009)
Mean of Dep. Var.	0.537	0.285	0.229	0.021	0.522	0.316	0.187	0.017
Observations	11,265	11,265	11,265	11,265	3,191	3,191	3,191	3,191
R^2	0.235	0.340	0.190	0.093	0.347	0.473	0.260	0.064
Covariates	Y	Y	Y	Y	Y	Y	Y	Y
Dam fixed effects	✓	✓	✓	✓	✓	✓	✓	✓
Cell fixed effects	✓	✓	✓	✓	✓	✓	✓	✓
Country-Year fixed effects	✓	✓	✓	✓	✓	✓	✓	✓

Conclusion

- We find that in Africa
  - Recent hydropower dams increased all types of conflicts alongside dam-affected rivers in the downstream.
  - The effects are not significant for upstream regions.
  - A potential mechanism: competition for water resources.
- This study highlights the social impacts of water scarcity in developing countries and shows that dams could exacerbate the problem.
- The water and energy management needs to take into consideration this water-related social cost.

Next Step

- Develop the theoretical framework of water conflicts.
- Dig more into the mechanisms:
  - Agricultural production, labor participation and opportunity costs.
  - Shocks on fishery? Loss in biodiversity?
  - Link with attitude surveys (Afrobarometer).
- Loads of robustness checks...

What Causes Rising Water Conflicts?

- Climate change intensifies water uncertainty.
  - Droughts, floods, and water-related disasters create severe water stress;
  - and drive significant economic damage, population displacements, and social distress.
- Construction and operation of water infrastructures on shared waterways.
  - Distributional impacts: Dams alter river flow and affect water uses in the downstream regions.
  - Recent example: clashes over Grand Ethiopian Renaissance Dam (GERD) on between Ethiopia (upstream) and Egypt/Sudan (downstream).
  - Can amplify climate change impacts.

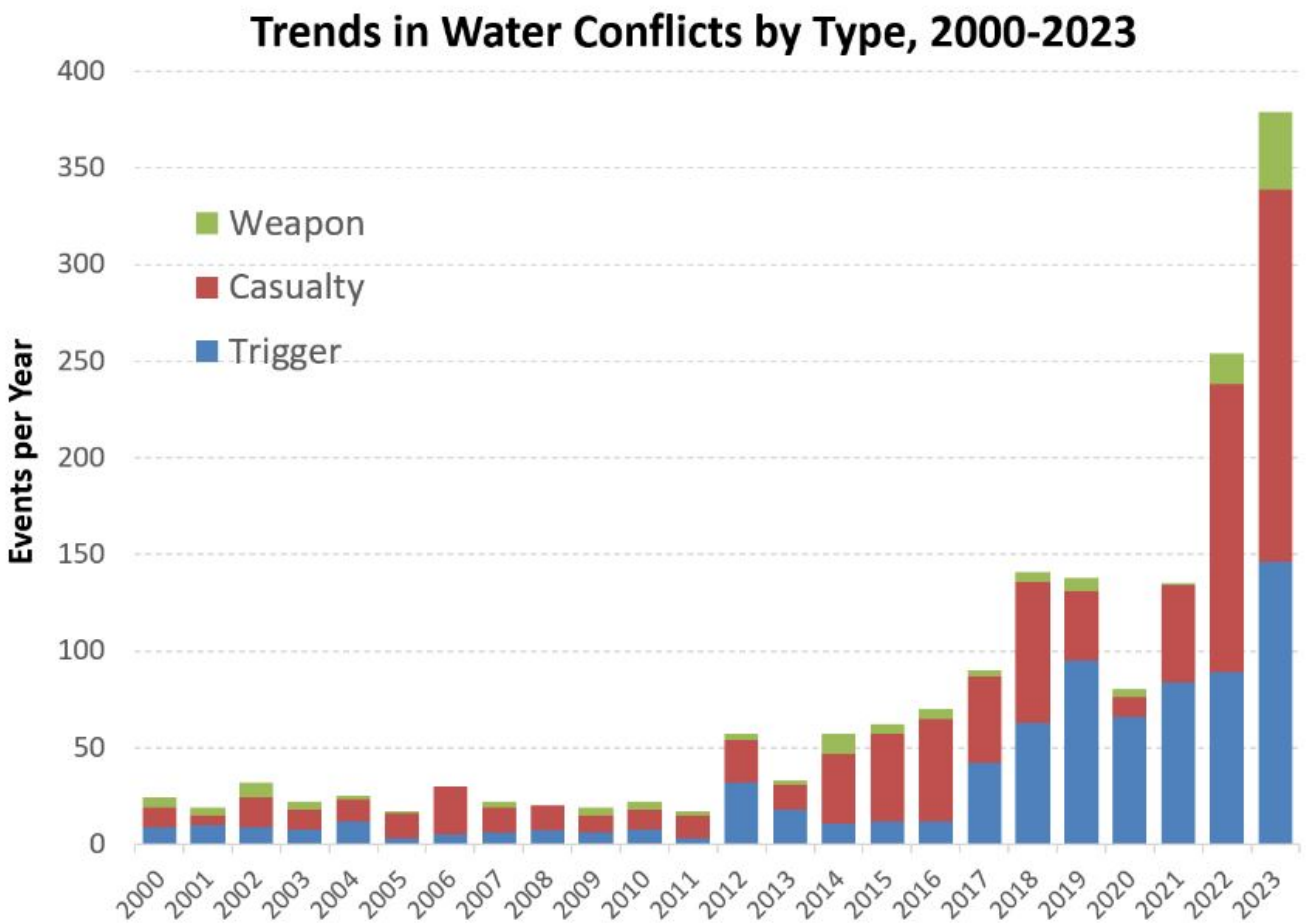
Economic Origins of Conflict

Factor conflicts: conflicts over the control of territory, essential resources or factors of production.

Output conflicts: conflicts over the distribution or appropriation of the finished product or surplus generated from those resources once they are produced.

According to McGuirk and Burke (2020),

- In food-producing areas, rising domestically-produced crop prices will
  - disable attacking from being a dominant strategy, factor conflict ↓
  - ↑ output conflict, as consumers respond by appropriation of output.
- In food-consuming cells, rising consumer crop prices
  - induce some consumers to switch from low wage agriculture to higher wage soldiering, which lower the relative cost of factor conflict (↑).
  - ↑ output conflict, as consumers respond by appropriation of output.

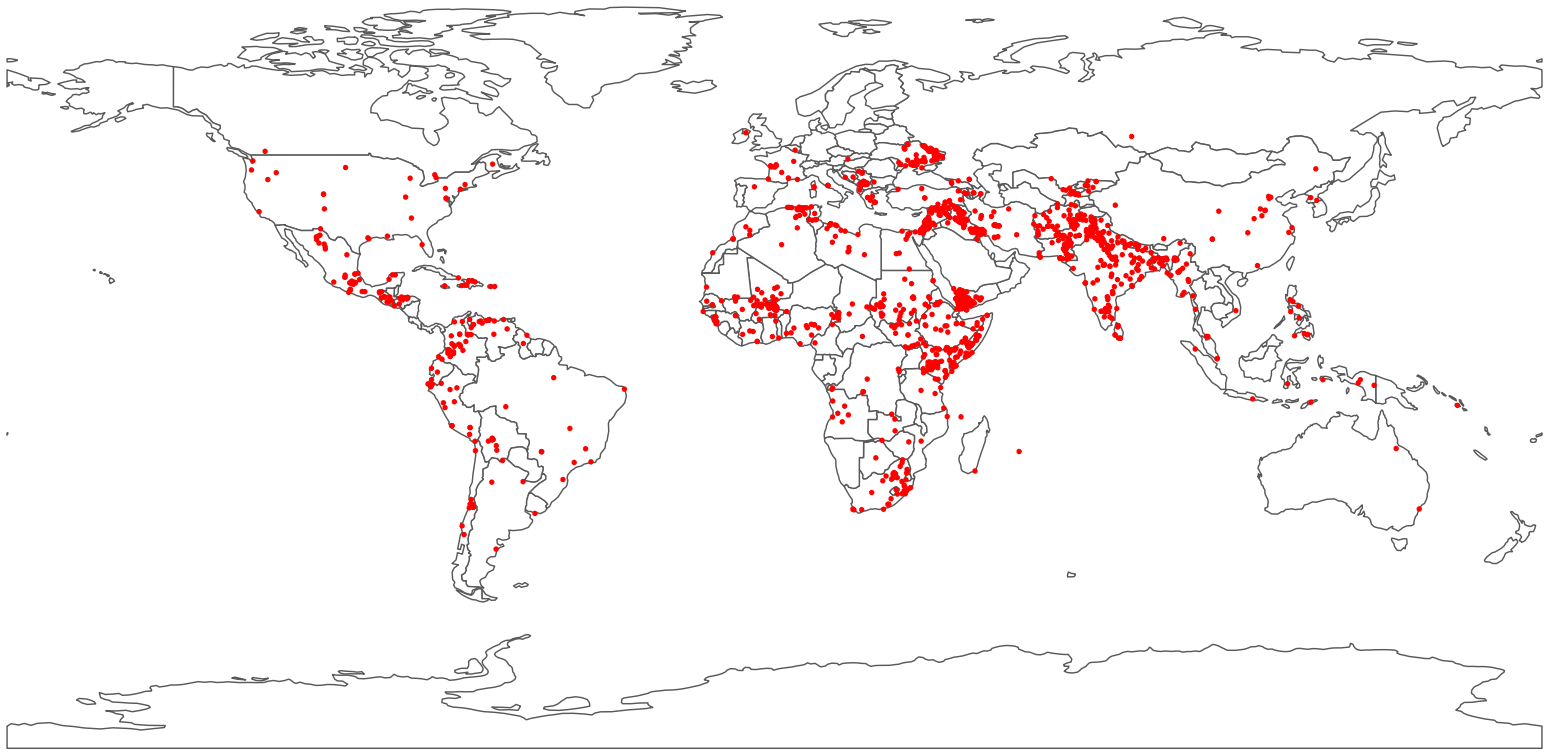


Data source: Water Conflict Chronology Update (August 22, 2024)

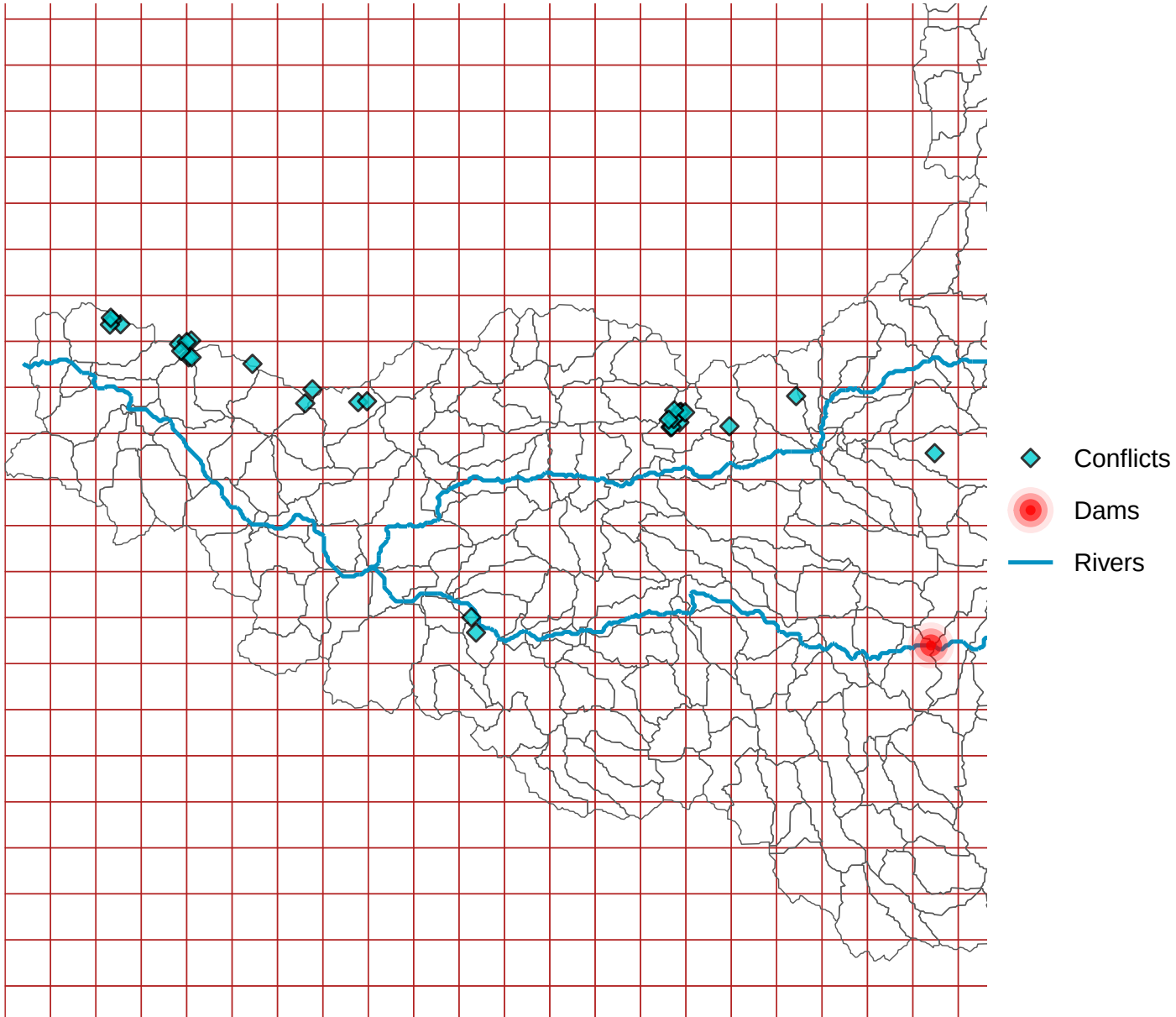
- The period 2012–2021 witnessed roughly four times more conflicts than the years 2000–2011.
- Increasing trend of water being a trigger of conflicts — people compete for water resources.

Distribution of Water Conflicts (1990-Now)

- Most concentrated in Africa and East Asia.



10KM*10KM Grid Cell



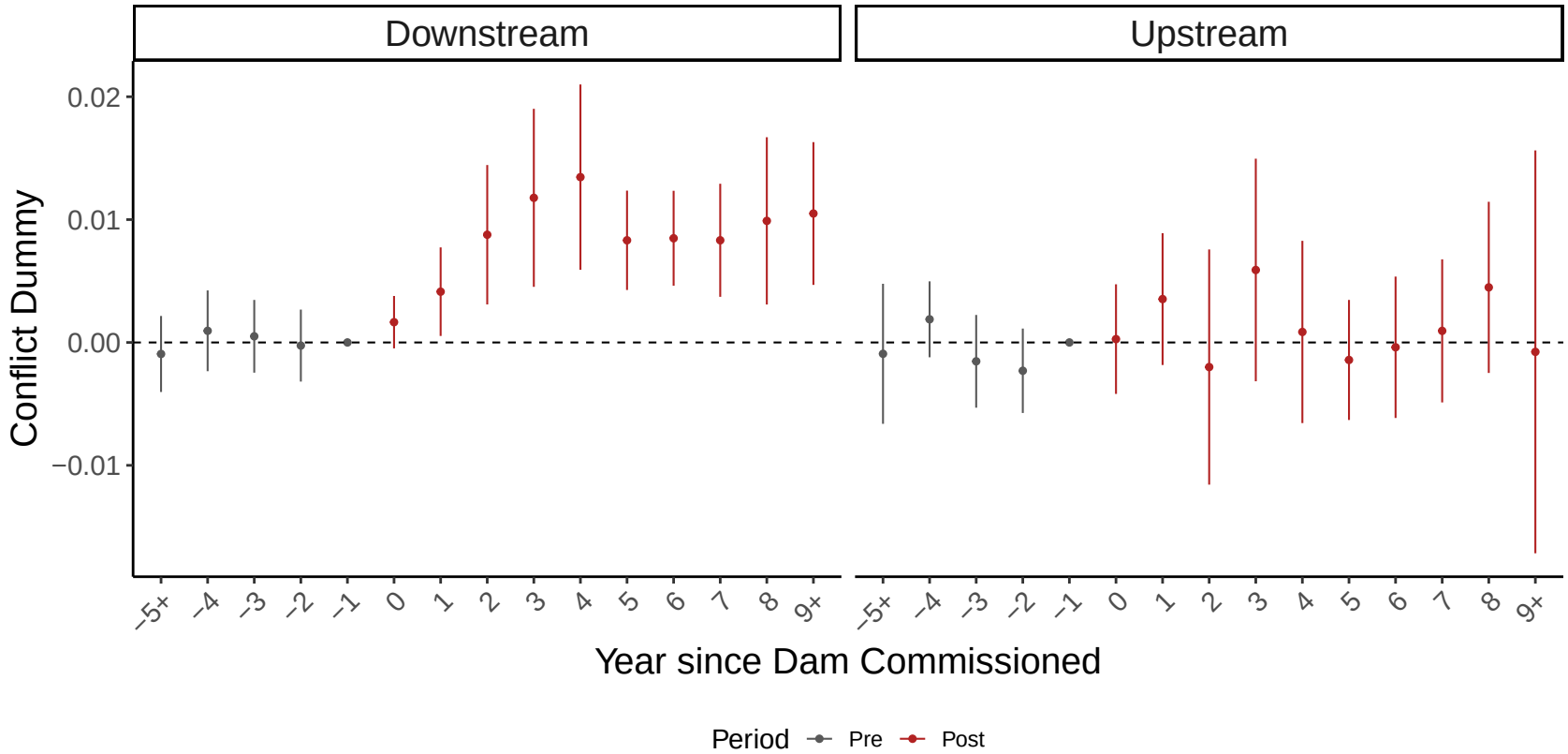
Delineate Downstream & Upstream

We trace the river flow and its direction from HydroRiver dataset.

- Rivers passing by the dam (Affected)
  - Downstream segments: flow from the dam-nearest river segment.
  - Upstream segments: flow to the dam-nearest river segment.
- Rivers not passing by the dam (Unaffected)
  - Downstream segments: located at sub-basins that are lower than the dam-situated sub-basin.
  - Upstream segments: located at sub-basins that are higher than the dam-situated sub-basin.

Alternative Measurement: Conflict Dummy

back

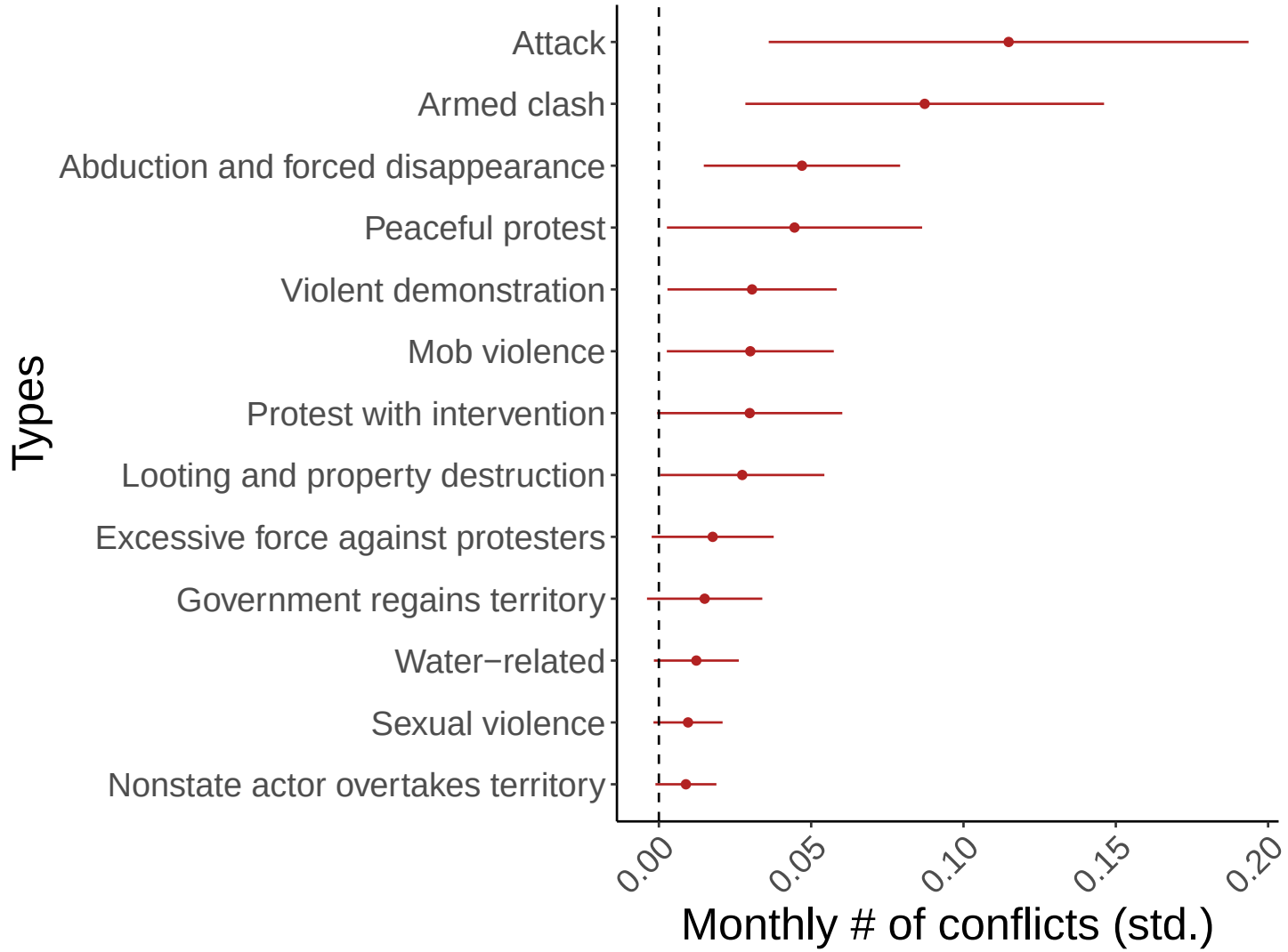


Alternative Measurement: Conflict Dummy

back

	Conflict Dummy					
	Downstream			Upstream		
	(1)	(2)	(3)	(4)	(5)	(6)
Post	-0.010***	-0.007***	-0.005**	-0.012***	-0.003	-0.002
	(0.002)	(0.002)	(0.002)	(0.003)	(0.003)	(0.003)
Affected_Riv × Post	0.017***	0.010***	0.007***	0.015***	0.002	0.002
	(0.003)	(0.003)	(0.002)	(0.004)	(0.003)	(0.003)
Mean of Dep. Var.	0.009	0.009	0.009	0.007	0.007	0.007
Observations	404,340	404,340	404,340	313,752	313,752	313,752
R^2	0.132	0.169	0.184	0.116	0.154	0.179
Covariates	Y	Y	Y	Y	Y	Y
Covariates*Year			Y			Y
Dam fixed effects	✓	✓	✓	✓	✓	✓
Cell fixed effects	✓	✓	✓	✓	✓	✓
Year fixed effects	✓			✓		
Month fixed effects	✓			✓		
Country-Year fixed effects		✓	✓		✓	✓
Country-Month fixed effects		✓	✓		✓	✓
Year-Month fixed effects		✓	✓		✓	✓

Which Types of Conflicts Increased? back



Heterogeneity by Climate Types and Groundwater Storage

back

	Monthly # of Conflicts			
	Climate		Groundwater Storage	
	Arid	Non-arid	Low	Normal
	(1)	(2)	(3)	(4)
Post	-0.010**	0.007**	-0.016**	-0.006
	(0.003)	(0.003)	(0.007)	(0.004)
Affected_Riv × Post	0.014**	0.003*	0.022**	0.010**
	(0.006)	(0.002)	(0.009)	(0.004)
Mean of Dep. Var.	0.008	0.017	0.012	0.009
Observations	319,800	154,440	343,200	131,040
R^2	0.153	0.137	0.158	0.089
Dam fixed effects	✓	✓	✓	✓
Cell fixed effects	✓	✓	✓	✓
Country-Year fixed effects	✓	✓	✓	✓
Country-Month fixed effects	✓	✓	✓	✓
Year-Month fixed effects	✓	✓	✓	✓

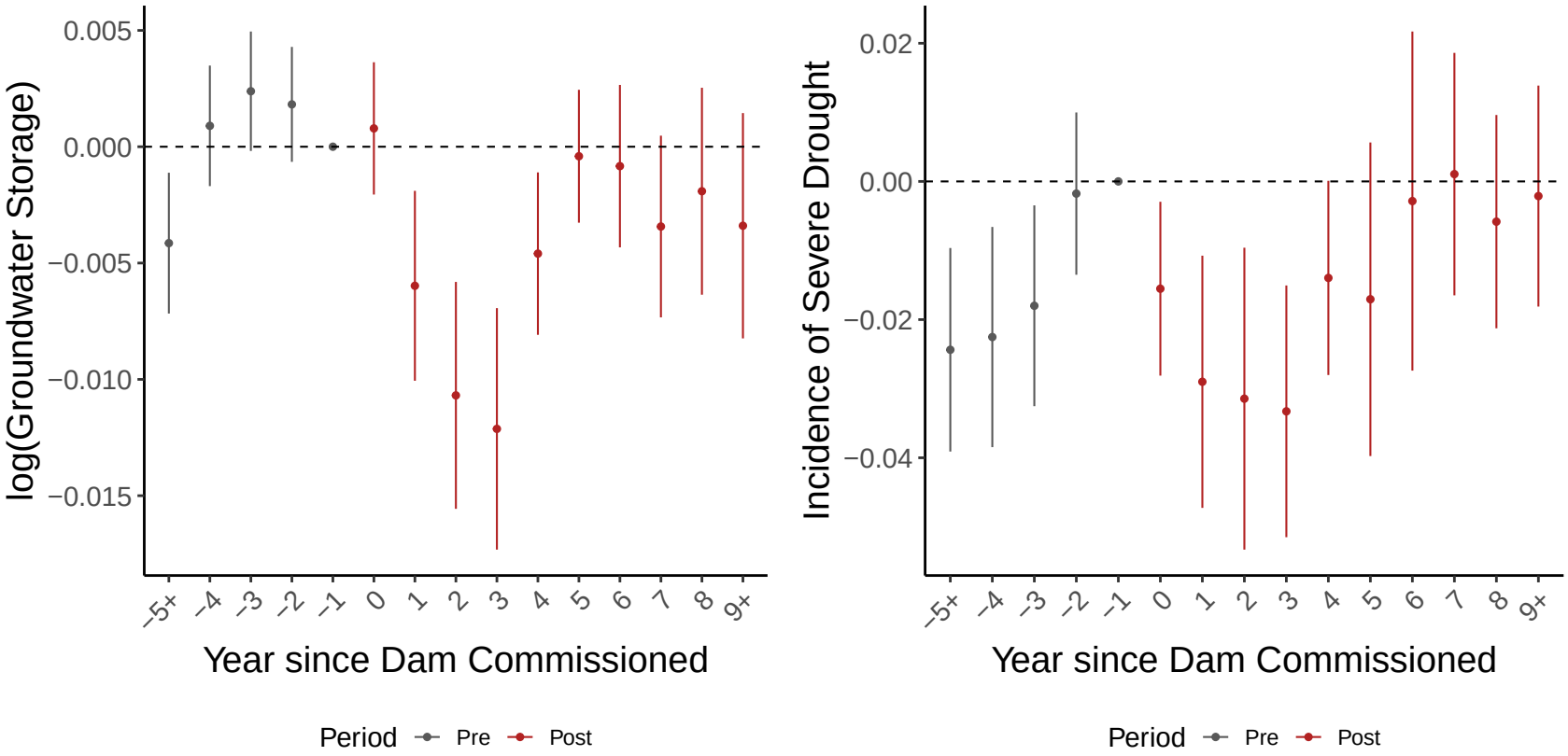
Heterogeneity by Ethnic Fractionalization

back

	Monthly # of Conflicts					
	Downstream			Upstream		
	High	Low	All	High	Low	All
	(1)	(2)	(3)	(4)	(5)	(6)
Post	-0.002	0.003	0.007*	-0.0005	0.007	0.011
	(0.002)	(0.003)	(0.004)	(0.001)	(0.006)	(0.008)
Affected_Riv × Post	0.003	0.003*	0.006**	0.003**	-0.008	-0.005
	(0.003)	(0.002)	(0.002)	(0.001)	(0.008)	(0.009)
HighEthnicFrac_Dam × Post			-0.039***			-0.025**
			(0.013)			(0.011)
Affected_Riv × HighEthnicFrac_Dam × Post			0.021***			0.014
			(0.008)			(0.011)
Mean of Dep. Var.	0.003	0.015	0.011	0.005	0.009	0.008
Observations	175,344	298,896	474,240	156,312	213,720	370,032
R^2	0.050	0.154	0.143	0.141	0.111	0.110
Dam fixed effects	✓	✓	✓	✓	✓	✓
Cell fixed effects	✓	✓	✓	✓	✓	✓
Country-Year fixed effects	✓	✓	✓	✓	✓	✓
Country-Month fixed effects	✓	✓	✓	✓	✓	✓
Year-Month fixed effects	✓	✓	✓	✓	✓	✓

Water Cycle

- Groundwater storage in area near dam-affected rivers ↓
- However, the incidence of severe drought (PDSI<-4) does not increase.



(a) log(1+Groundwater Storage)

(b) Has Severe Drought

Temperature

back

	TempMax (1)	TempMin (2)	hightemp (3)	lowtemp (4)	severetemp (5)
Post	-0.176***	-0.144***	0.013**	-0.009*	0.010*
	(0.024)	(0.016)	(0.005)	(0.006)	(0.005)
Affected_Riv × Post	0.023***	0.007*	0.0006	-0.0003	0.0009
	(0.005)	(0.004)	(0.003)	(0.003)	(0.004)
Mean of Dep. Var.	29.9	17.1	0.444	0.541	0.869
Observations	458,328	458,328	458,328	458,328	458,328
R^2	0.979	0.980	0.748	0.814	0.592
Covariates*Year	Y	Y	Y	Y	Y
Dam-Year fixed effects	✓	✓	✓	✓	✓
Dam-Month fixed effects	✓	✓	✓	✓	✓
Cell fixed effects	✓	✓	✓	✓	✓
Country-Year fixed effects	✓	✓	✓	✓	✓
Country-Month fixed effects	✓	✓	✓	✓	✓
Year-Month fixed effects	✓	✓	✓	✓	✓

Agriculture

back

	Monthly # of conflicts			
	Downstream		Upstream	
	(1)	(2)	(3)	(4)
Post	0.0008	-0.012	-0.002	0.034
	(0.008)	(0.011)	(0.005)	(0.026)
Affected_Riv × Post	0.013**	0.011	0.003	-0.034
	(0.005)	(0.011)	(0.005)	(0.029)
Affected_Riv	17.4	163.2	4.39	1.83
	(4,718.1)	(12,883.8)	(745.2)	(100,688.2)
Mean of Dep. Var.	0.019	0.013	0.011	0.020
Observations	313,344	90,996	261,696	52,056
R^2	0.196	0.121	0.146	0.255
Covariates	Y	Y	Y	Y
Dam fixed effects	✓	✓	✓	✓
Cell fixed effects	✓	✓	✓	✓
Country-Year fixed effects	✓	✓	✓	✓
Country-Month fixed effects	✓	✓	✓	✓
Year-Month fixed effects	✓	✓	✓	✓

Agriculture

back

	Cropland	Soil Moisture			Net Primary Production		
	All	All	Non-Cropland	Cropland	All	Non-Cropland	Cropland
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Post	0.021**	17.8**	32.1***	39.6*	174.8***	162.1***	-68.3
	(0.010)	(7.57)	(8.13)	(20.3)	(46.5)	(43.9)	(175.3)
Affected_Riv × Post	-0.005	-5.59*	-7.38**	-2.62	-281.1***	-308.8***	63.1
	(0.009)	(3.31)	(3.62)	(9.41)	(50.8)	(52.5)	(178.0)
Mean of Dep. Var.	0.221	633.5	651.9	556.6	8,740.2	8,691.8	8,902.3
Observations	99,682	458,328	354,984	103,344	96,052	73,969	22,083
R^2	0.888	0.920	0.931	0.833	0.973	0.988	0.991
Covariates*Year	Y	Y	Y	Y	Y	Y	Y
Dam fixed effects	✓				✓	✓	✓
Cell fixed effects	✓	✓	✓	✓	✓	✓	✓
Country-Year fixed effects	✓						
Dam-Year fixed effects		✓	✓	✓			
Dam-Month fixed effects		✓	✓	✓			
Year-Month fixed effects		✓	✓	✓			
Year fixed effects					✓	✓	✓

Which Types of Conflicts Increased? back

	Monthly std. # of conflicts by types:		
	Peaceful Protest	Protest with Intervention	Excessive Force against Protesters
	(1)	(2)	(3)
Post	-0.017	-0.022**	-0.009
	(0.019)	(0.010)	(0.008)
Affected_Riv × Post	0.044**	0.030*	0.018*
	(0.021)	(0.015)	(0.010)
Mean of Dep. Var.	0.012	0.007	0.007
Observations	404,340	404,340	404,340
R^2	0.082	0.048	0.018
Covariates	Y	Y	Y

Which Types of Conflicts Increased? (Con't) back

	Monthly std. # of conflicts by types:		
	Violent Demonstration	Armed clash	Government Regains Territory
	(4)	(5)	(6)
Post	-0.006	-0.043*	-0.001
	(0.009)	(0.025)	(0.010)
Affected_Riv × Post	0.031**	0.087***	0.015
	(0.014)	(0.030)	(0.010)
Mean of Dep. Var.	0.014	0.030	0.013
Observations	404,340	404,340	404,340
R^2	0.057	0.091	0.018
Covariates	Y	Y	Y

Which Types of Conflicts Increased? (Con't) back

	Monthly std. # of conflicts by types:		
	Nonstate Actor Overtakes Territory	Sexual Violence	Abduction and Forced Disappearance
	(7)	(8)	(9)
Post	0.010	-0.019**	-0.021
	(0.007)	(0.009)	(0.013)
Affected_Riv × Post	0.009*	0.010*	0.047***
	(0.005)	(0.006)	(0.016)
Mean of Dep. Var.	-0.003	-0.001	0.005
Observations	404,340	404,340	404,340
R^2	0.012	0.017	0.047
Covariates	Y	Y	Y

Which Types of Conflicts Increased? (Con't)

back

	Monthly std. # of conflicts by types:			
	Mob Violence	Attack	Looting and Property Destruction	Water-related
	(10)	(11)	(12)	(13)
Post	-0.025**	-0.092***	-0.017	-0.010
	(0.011)	(0.034)	(0.012)	(0.008)
Affected_Riv × Post	0.030**	0.115***	0.027**	0.012*
	(0.014)	(0.040)	(0.014)	(0.007)
Mean of Dep. Var.	0.009	0.038	0.004	0.006
Observations	404,340	404,340	404,340	404,340
R^2	0.050	0.106	0.028	0.018
Covariates	Y	Y	Y	Y