

















Figure S8. Sensitivity analysis results of painted water (MCM) in Sudan's territory for estimated parameters 5 and 6 (Within four confidence bounds)

<i>Table S1. Exogenous variables used in the model</i>	
Variable Name	Assumptions
Ethiopia's FDI(Billion\$/Year)	Getting from the IFs model for each scenario, see FigureA1
Ethiopia's FA(Billion\$/Year)	Getting from the IFs model for each scenario, see FigureA1
Ethiopia's PBSB (%/Year)	Getting from the IFs model for each scenario, see FigureA1
Ethiopia's GDP (Billion\$/Year)	Getting from the IFs model for each scenario, see FigureA1
Ethiopia's WD (MCM/Year)	Getting from the IFs model for each scenario, see FigureA1
Ethiopia's CUDC (Million\$/MCM)	One million \$ for one MCM of water. The constant was assumed by averaging the total budget spent for constructing and maintaining a big dam.
Ethiopia's DP	Each upstream's water dependency on the Blue Nile river was estimated by the portion of each upstream's AW from the Blue Nile river to its total AW (50 percent for Ethiopia, see (Pascual-Ferrer et al., 2014))
Ethiopia's percent of FDI dedicated for water capturing	It was assumed equal to Ethiopia's DP (50 percent)
Sudan's FDI(Billion\$/Year)	Getting from the IFs model for each scenario, see FigureA2
Sudan's FA(Billion\$/Year)	Getting from the IFs model for each scenario, see FigureA2
Sudan's PBSB (%/Year)	Getting from the IFs model for each scenario, see FigureA2
Sudan's GDP (Billion\$/Year)	Getting from the IFs model for each scenario, see FigureA2
Sudan's WD	Getting from the IFs model for each scenario, see FigureA2
Sudan's DP	Each upstream's water dependency on the Blue Nile river was estimated by the portion of each upstream's AW from the Blue Nile river to its total AW (40 percent for Sudan, see (Elnour, 2019))
Sudan's CUDC (Million\$/MCM)	One million \$ for one MCM of water. The constant was assumed by averaging total budget spending for constructing and maintaining a large dam
Sudan's percent of FDI dedicated for water capturing	It was assumed to equal Sudan's DP (40 percent)

Table S2. Equations used in the model for endogenous variables

Variable Name	Equation
Ethiopia's TSD (Billion\$/Year)	"Ethiopia's FDI (Billion\$/Year)"*Ethiopia's percent of FDI dedicated for water capturing +("Ethiopia's GDP (Billion\$/Year)"+"Ethiopia's FA(Billion\$/Year)")*Ethiopia's PBSO (%/Year)" *Ethiopia's DP
Ethiopia's WCC for each year	"TSD(Billion\$/Year)"/"Ethiopia's CUDC (Million\$/MCM)"*1000
Total Ethiopia's WCC (MCM/Year)	$\sum_{t=2020}^{t=2100} \text{Ethiopia's WCC for each year}$
Ethiopia's WD (MCM/Year)	Ethiopia's WD*Ethiopia's DP
Ethiopia's Red Water (MCM/Year)	MIN(MIN("Ethiopia's AW (MCM/Year)", "Total Ethiopia's WCC (MCM/Year)"), "Ethiopia's WD (MCM/Year)")
Ethiopia's Green Water (MCM/Year)	MAX("Ethiopia's AW (MCM/Year)"-"Total Ethiopia's WCC (MCM/Year)", 0)
Ethiopia's Yellow Water (MCM/Year)	MAX(MIN("Ethiopia's AW (MCM/Year)", "Total Ethiopia's WCC (MCM/Year)")-"Ethiopia's WD (MCM/Year)", 0)
Sudan's TSD (Billion\$/Year)	"Sudan's FDI(Billion\$/Year)"*Sudan's percent of FDI dedicated for water capturing+("Sudan's GDP (Billion\$/Year)"+"Sudan's FA(Billion\$/Year)")*Sudan's PBSO (%/Year)"*Sudan's DP
Sudan's WCC (MCM/Year)	"Sudan's TSD (Billion\$/Year)"/"Sudan's CUDC (Million\$/MCM)"*1000
Total Sudan's WCC (MCM/Year)	$\sum_{t=2020}^{t=2100} \text{Sudan's WCC for each year}$
Sudan's AW (MCM/Year)	"Sudan's ND (MCM/Year)" + "Ethiopia's Green Water (MCM/Year)"+"Ethiopia's Yellow Water (MCM/Year)"
Sudan's WD (MCM/Year)	Sudan's WD*Sudan's water dependency
Sudan's Red Water (MCM/Year)	MIN(MIN("Sudan's AW (MCM/Year)", "Total Sudan's WCC (MCM/Year)"), "Sudan's WD (MCM/Year)")
Sudan's Green Water (MCM/Year)	MAX("Sudan's AW (MCM/Year)"-"Total Sudan's WCC (MCM/Year)", 0)
Sudan's Yellow Water (MCM/Year)	MAX(MIN("Sudan's AW (MCM/Year)", "Total Sudan's WCC (MCM/Year)")-"Sudan's WD (MCM/Year)", 0)