1 Quantifying the trade-offs in re-operating dams for the environment

2 in the Lower Volta River

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9 **Supplementary material**
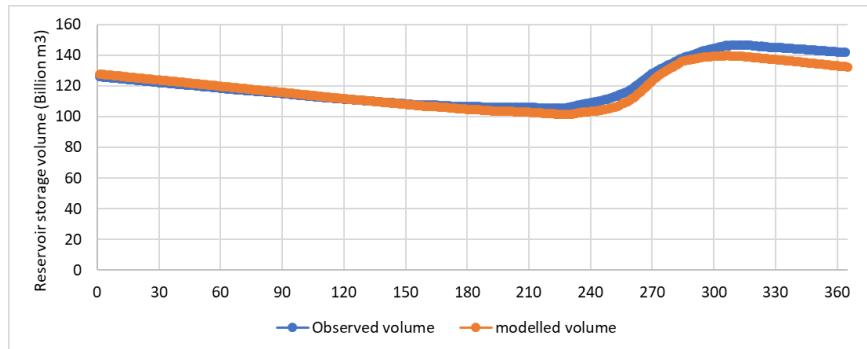
Figure S1: Observed volume as compared with modelled volume (2010, wet year)
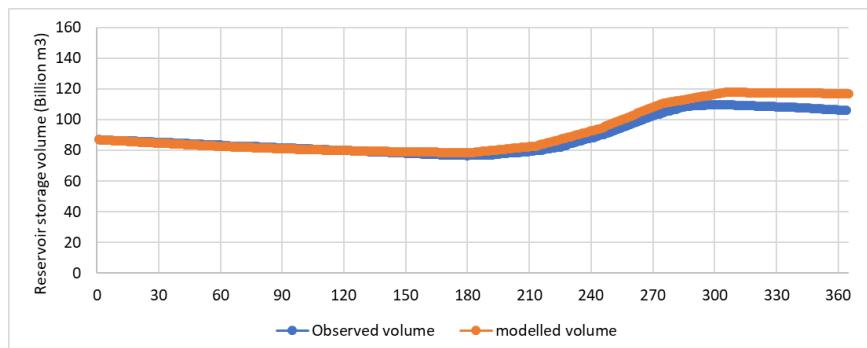
Figure S2: Observed volume as compared with modelled volume (1985, normal year)
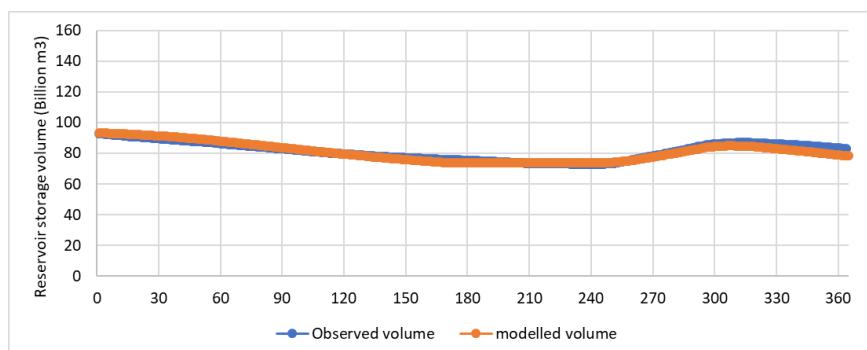
Figure S3: Observed volume as compared with modelled volume (2006, dry year)

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11 *Table S1: Papers on climate change effects on runoff in the Volta basin. The first four papers are as reviewed by Roudier et*
12 *al., 2014 with the exception of the summary of the predictions*

Reference	Time period	Climate model	Hydrological model	Scenarios	Predictions
Kunstmann and Jung, 2005	2030-2040	ECHAM4-MM6	OSU-LSM	IS92a	Monthly changes: increase: May-June & Aug-Nov (range 20-55%) decrease: July (10%); Feb-May and Dec (20%-75%) Annual trend: 18% increase in annual runoff
Aerts et al., 2006	2001-2099	ECBilt-CLIO-VECODE	STREAM	A2	Annual trend: 65% increase mean decadal runoff
Jung et al., 2012	2030-2039	ECHAM4-MM5	WaSIM	IS92a	Monthly changes: increase: Jun, Sept & Oct (range 15-30%) decrease: July & Aug (6-8%) Annual trend: 4% increase in annual runoff
McCartney et al., 2012	2071/2100 2021/2050, 1983/2012	ECHAM4-MM5 HadCM3	SWAT and WEAP	A1B	Annual trend: 45% decrease in annual runoff
Sood et al.,2013	2021-2050 2071-2100	ECHAM5	SWAT	A1B	Annual trend: Decrease by 13% in water yield in 2021-2015 Decrease of 40% in 2071-2100
Amisigo et al.,2015	2010-2050	NCAR_CCSM3_0 A2 CSIRO_MK3_0 A2 NCAR_PCM1 A1b IPSL_CM4 B1	WEAP	A2 A1b B1	Inconsistent results across scenarios
Jin et al., 2018	1951-2100	CNRM-CM5 HadGEM2-ES CanESM2	INCA	RCP 8.5	Monthly changes: increase: wet season flow: June to Sept (10-50%) decrease: dry season months
Abubakari, 2021	2011-2040 2041-2070 2071-2100	CFSR	SWAT	A1B	Monthly changes: increase: February to August decrease: September to January Annual trend: 12% increase in annual runoff

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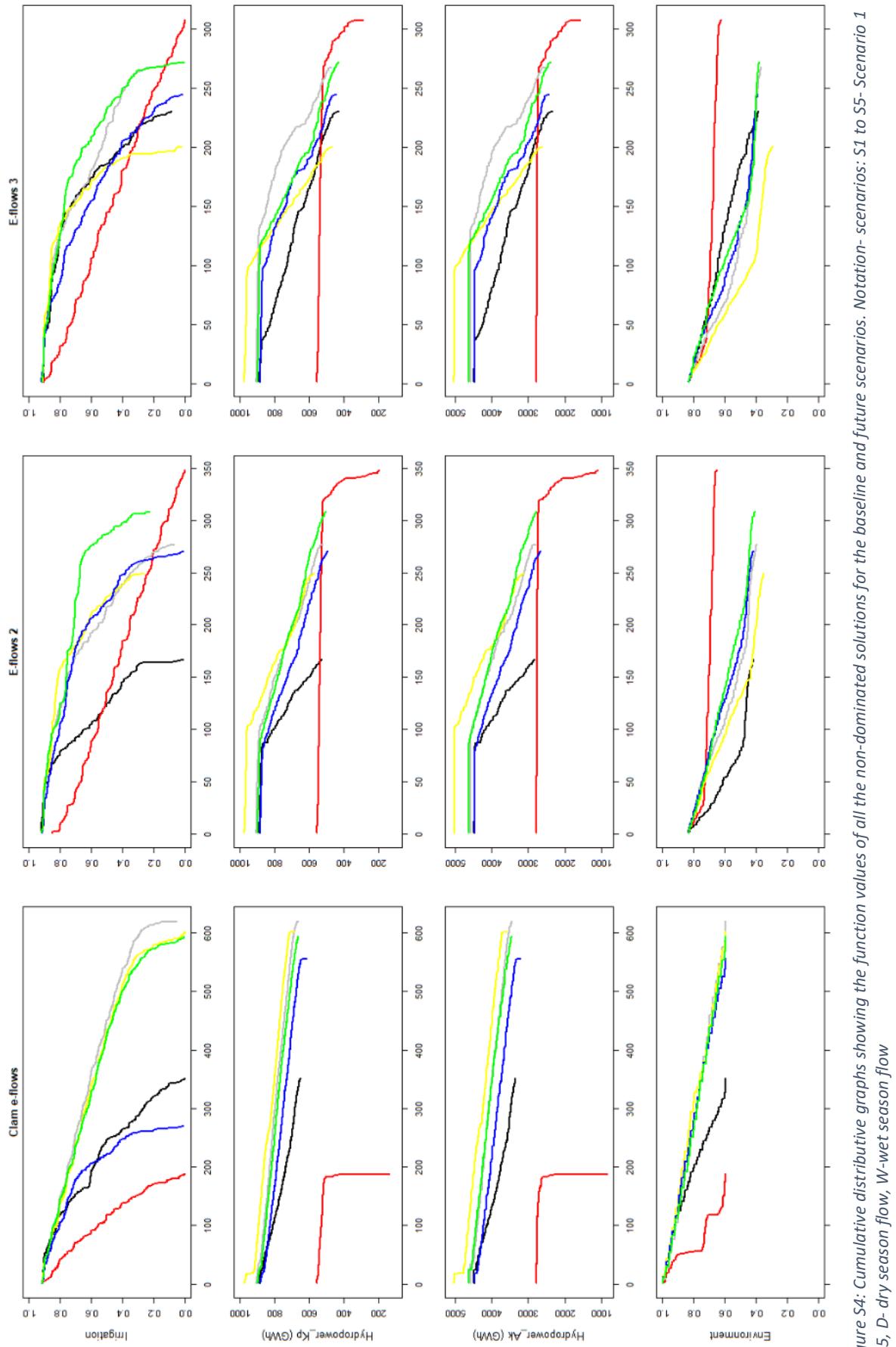
Figure S4: Cumulative distributive graphs showing the function values of all the non-dominated solutions for the baseline and future scenarios. Notation- scenarios: S1 to S5- Scenario 1 to 5, D- dry season flow, W-wet season flow