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A system dynamic model to quantify the impacts of water resources allocation on water–energy–food–society (WEFS) nexus

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Table S1 Characteristics of the seventeen reservoirs (million m^3).

No.	Name	Total storage	Storage at normal water level	Dead storage	Storage at flood limiting water level
R1	Sanliping	510.0	211.0	261.0	389.0/468.5
R2	Siping	269.0	247.0	10.2	127.0
R3	Danjiangkou	33,910.0	29,050.0	12,690.0	22,910.0/25,790.0
R4	Mengqiaochuan	110.3	88.2	2.7	90.9
R5	Huayanghe	107.0	70.8	1.4	72.2
R6	Xionghe	195.9	115.9	20.0	135.9
R7	Xipaizihe	220.4	122.0	2.2	124.2
R8	Hongshuihe	103.6	58.9	5.4	64.3
R9	Shimenji	154.0	114.7	1.9	99.0
R10	Sandaohe	154.6	127.4	0.0	127.4
R11	Yuntaishan	123.0	89.0	5.0	89.0
R12	Yinghe	121.6	76.3	3.6	79.9
R13	Huangpi	125.6	70.3	10.1	63.6
R14	Wenxiakou	520.0	269.0	176.0	388.0
R15	Shimen	159.1	68.6	13.0	81.6
R16	Gaoguan	201.1	154.3	30.9	145.9
R17	Huiting	313.4	173.5	32.50	206.0

Table S2 Calibrated parameters for the WEFS model.

Notation	Description	Unit	Value

κ_P, φ_P	Auxiliary parameters for population evolution	[-]	1.0, 0.0856
κ_G, φ_G	Auxiliary parameters for GDP evolution	[-]	3.3, 0.0856
κ_{CA}, φ_{CA}	Auxiliary parameters for crop area evolution	[-]	6.0, 0.0856
κ_{qwu}, φ_{qwu}	Auxiliary parameters for water use quota simulation	[-]	3.8, 0.0856
κ_e, φ_e	Auxiliary parameters for energy use quota evolution	[-]	15.0, 0.0856
κ_{pro}, φ_{pro}	Auxiliary parameters for crop yield evolution	[-]	24.5, 0.0856
η_W	Perception factors describing the community's ability to identify the threats of degradation in water system	[-]	450
η_E	Perception factors describing the community's ability to identify the threats of degradation in energy system	[-]	50
η_F	Perception factors describing the community's ability to identify the threats of degradation in food system	[-]	120
θ_W	Accumulation factor for water shortage awareness	[-]	0.0856
θ_E	Accumulation factor for energy shortage awareness	[-]	0.0856
θ_F	Accumulation factor for food shortage awareness	[-]	0.0856
ω_W	Lapse factor for water shortage awareness	[-]	0.1
ω_E	Lapse factor for energy shortage awareness	[-]	0.1
ω_F	Lapse factor for food shortage awareness	[-]	0.1
WSRcrit	Critical water shortage rate	[-]	0.07
ESRcrit	Critical energy shortage rate	[-]	0.05
FSRcrit	Critical food shortage rate	[-]	0.05
FA_{crit}	Critical food shortage awareness	[-]	1.5

E_{crit}	Critical environmental awareness	[-]	8
ζ_1	Auxiliary factors for feedback on population	[-]	0.0856
ζ_2	Auxiliary factors for feedback on GDP	[-]	0.0856
ζ_3^E	Auxiliary factors for feedback on crop area by E	[-]	0.0856
ζ_3^F	Auxiliary factors for feedback on crop area by FA	[-]	0.0856
δ_{rp}^E	Factor describing feedback capability of environmental awareness to population	[-]	0.005
δ_{rg}^E	Factor describing feedback capability of environmental awareness to GDP	[-]	0.05
δ_{ra}^E	Factors describing feedback capability of environmental awareness to crop area	[-]	0.03
δ_{ra}^F	Factors describing feedback capability of food shortage awareness to crop area	[-]	0.1

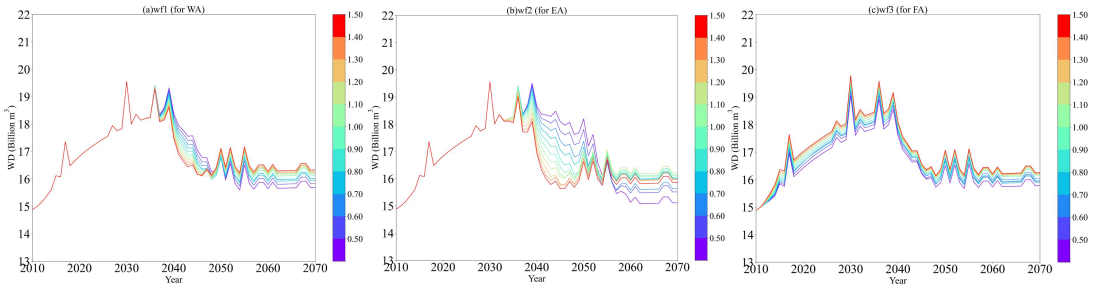

Figure S1. Trajectories of water demand with varied shortage awareness weight factors.

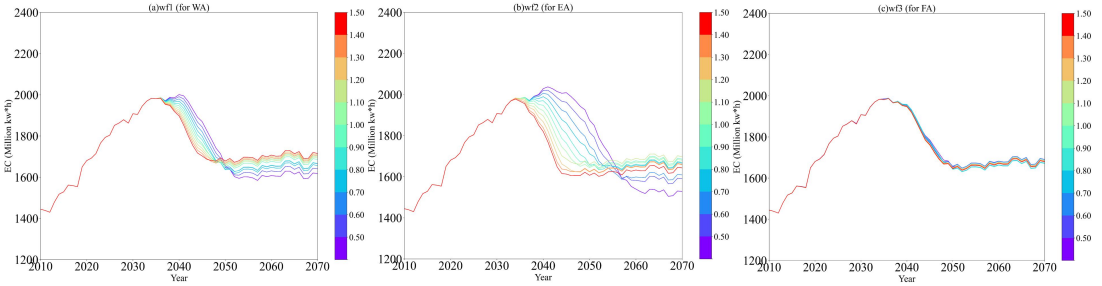

Figure S2. Trajectories of energy consumption with varied shortage awareness weight factors.

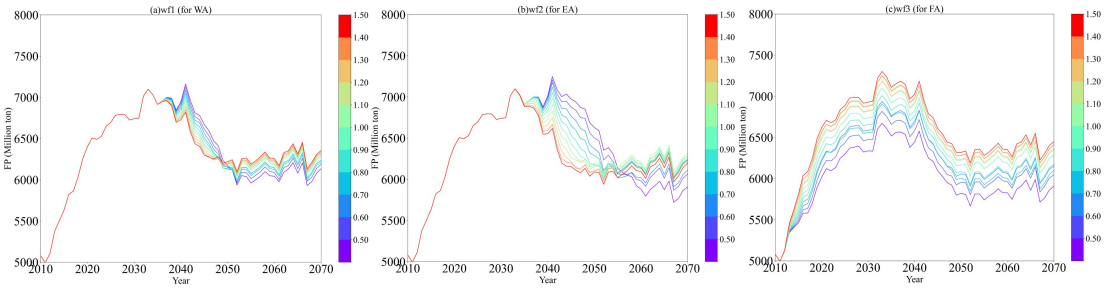

Figure S3. Trajectories of food production with varied shortage awareness weight factors.

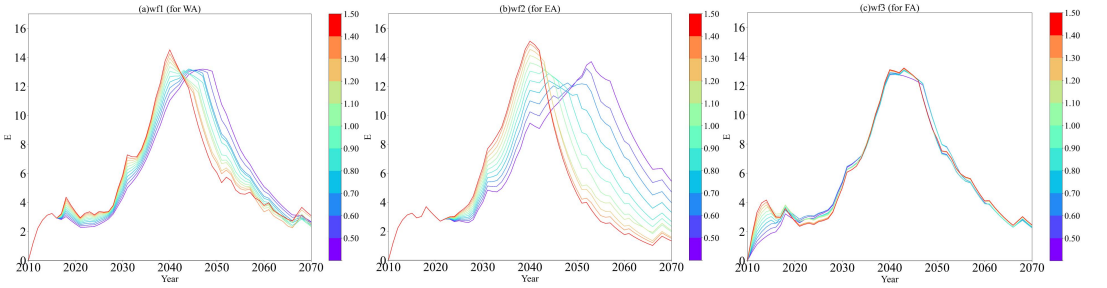

Figure S4. Trajectories of environmental awareness with varied shortage awareness weight factors.