Supporting Information for

Global meta-analysis of water cycling response to plant mixture

Table S1 Reviewed references of the responses of water cycle processes to plant mixtures in this meta-analysis.

Reference	SWC	IR	RO	E	LT	Th	WUE
(Altinalmazis et al., 2020)	Yes						
(Ma et al., 2020)	Yes						
(Wang et al., 2020)	Yes						
(Nyawade et al., 2019)	Yes						Yes
(Ren et al., 2019)	Yes						
(Li et al., 2019)							
(Ma et al., 2019)	Yes						
(Khan & Mcvay, 2019)	Yes						
(Tetteh et al., 2019)	Yes	Yes					
(Nelson et al., 2018)	Yes						
(Collins et al., 2017)	Yes						
(Ouyang et al., 2017)			Yes				
(Rahman et al., 2017)	Yes			Yes		Yes	Yes
(Rahman & Ye et al., 2017)	Yes		Yes		Yes		Yes
(Chimonyo et al., 2016)							Yes
(Liu et al., 2013)	Yes						
(Mao et al., 2012)	Yes						
(Moore et al., 2011)	Yes						
(Gao et al., 2010)	Yes						
(Xu et al., 2008)							Yes
(Xu et al., 2008)	Yes						Yes
(Gathumbi et al., 2002)	Yes						
(Wang et al., 2017)					Yes		
(Fan et al., 2016)	Yes		Yes	Yes			
(Wang et al., 2015)		Yes					
(Sun et al., 2014)	Yes						

(Nagase & Dunnett, 2012)			Yes			
(Zhao et al., 2012)			Yes			
(Fox et al., 2011)			Yes			
(Forrester et al., 2010)	Yes					Yes
(Jahansooz et al., 2007)	Yes					Yes
(Ogindo & Walker, 2005)	Yes					
(Powell & Bork, 2004)	Yes					
(Schume et al., 2004)	Yes					
(Chirwa et al., 2003)		Yes				
(Liu et al., 2021)		Yes				
(Zhao et al., 2021)	Yes					
(Chen et al., 2020)		Yes				
(Fei et al., 2020)		Yes				
(Li et al., 2020)	Yes					Yes
(An et al., 2019)			Yes			
(Xu et al., 2019)				Yes		
(Zhou et al., 2019)	Yes					
(Chen & Zheng, 2018)				Yes		
(Ouyang et al., 2018)			Yes			
(Du et al., 2017)			Yes			
(Zhang et al., 2017)	Yes					
(Zheng & Chen, 2017)			Yes			Yes
(Chen et al., 2016)					Yes	
(Fan & Wu et al., 2016)	Yes					
(Wang & Wang, 2016)	Yes					
(Wang et al., 2016)			Yes			
(Xiong et al., 2016)					Yes	
(Zhao et al., 2016)	Yes					

(Chen et al., 2015)			Yes				
(Ding et al., 2015)			Yes			Yes	
(Wang & Chen, 2015)			Yes				
(Wu et al., 2015)			Yes				
(Ye et al., 2015)	Yes			Yes			Yes
(An et al., 2014)			Yes				
(Zhao et al., 2012)	Yes						
(Chai et al., 2011)				Yes			
(Wang et al., 2011)			Yes				
(Jie et al., 2008)	Yes		Yes		Yes		
(Gao et al., 2008)				Yes			
(Wang et al., 2008)		Yes					
(Jiang et al., 2007)			Yes				
(Zhang et al., 2005)		Yes					
(Luo et al., 2004)						Yes	
(Ning et al., 1999)		Yes					
(Machiwal et al., 2021)			Yes				
(Mbanyele et al., 2021)							Yes
(Franco et al., 2021)							Yes
(Pankou et al., 2021)							Yes
(Ren et al., 2021)	Yes						
(Thomas et al., 2021)	Yes						
(Khokhar et al., 2021)			Yes				
(Ghahremani et al., 2021)		Yes					
(Wan et al., 2021)					Yes		
(Singh et al., 2020)			Yes				
(St Aime et al., 2020)	Yes						Yes
(Chen et al., 2015)							Yes

(Jakhar et al., 2015)	Yes	Yes
(Mu et al., 2013)		
(Niu et al., 2018)		
(Wang et al., 2015)	Yes	Yes
(Gomes et al., 2014)		
(Mohsenabadi et al., 2008)		Yes

Note: SWC: soil water content (cm^3 m^{-3}); IR: steady infiltration rate (mm min^{-1}); RO: runoff (mm); E: soil evaporation (mm day^{-1}); LT: leaf transpiration (mmol m^{-2} s^{-1}); Th: throughall (mm): WUE: water use efficiency (g m^{-2} mm^{-1})

Table S2 Values of Akaike information criterion of stand age, and soil depth for each hydrology processes (see Materials and Methods).

Hydrology process	A			D		
	X	X+X^2	Log(X)	X	X+X^2	Log(X)
SWC	-1313.3	-1307.2	**-1314.6**	-1314.2	-1310.6	**-1321.2**
E	**-153.7**	-150.5	-151.4			
IR	**51.5**	53.8	51.6			
RO	**289.4**	292.9	290.2			
Th	-2.0	-2.0	**-4.6**			
LT	5.1	5.1	**4.2**			
WUE	71.3	74.5	**68.2**			

Note: A and D are stand age or experimental age, and soil depth, respectively. An exponential function was not included since the dependent variable contained negative values. Abbreviations for hydrology process are the same as in Table S1.

Table S3 Values of Akaike information criterion of stand age, and soil depth for each hydrology processes in crop mixtures(see Materials and Methods).

Hydrology process	A			D		
	X	X+X^2	Log(X)	X	X+X^2	Log(X)
SWC	**-1241.2**	-1235.5	-1235.6	-1242.8	-1236.6	**-1248.2**
E	**-186.8**	-181.5	-186.1			
IR						
RO	158.2	160.5	**157.7**			
Th						
LT	10.1	10.1	**9.4**			
WUE	35.4	38.3	**34.2**			

Note: Abbreviation for water cycle processes are the same as in Table S2.

Table S4 Models forms of different water cycle process.

Hydrology Process	Full Ecosystem type model		Crop model	
	Random	Terms	AIC	Terms
SWC	ID+SR	ln(A) + ln(D)	ID+SR	A + ln(D)
E	ID+SR	A	ID	A
IR	ID	A		
RO	ID+SR	A	ID	A
Th	ID	ln(A)		
LT	ID+SR	ln(A)	ID	ln(A)
WUE	ID+SR	ln(A)	ID+SR	ln(A)

Note: Abbreviation for water cycle processes are the same as in Table S2.

Table S5 Proportion of articles and observations on crop mixtures in the database among all ecosystem types.

Hydrology Process	Observations			Publications		
	Full	Crop	Ratio	Full	Crop	Ratio
SWC	951	658	69%	41	22	54%
E	226	151	67%	9	8	89%
IR	42			10		
RO	208	108	52%	21	14	67%
Th	30			3		
LT	28	10	36%	7	2	29%
WUE	123	102	83%	22	17	77%

Note: Abbreviation for water cycle processes are the same as in Table S2.
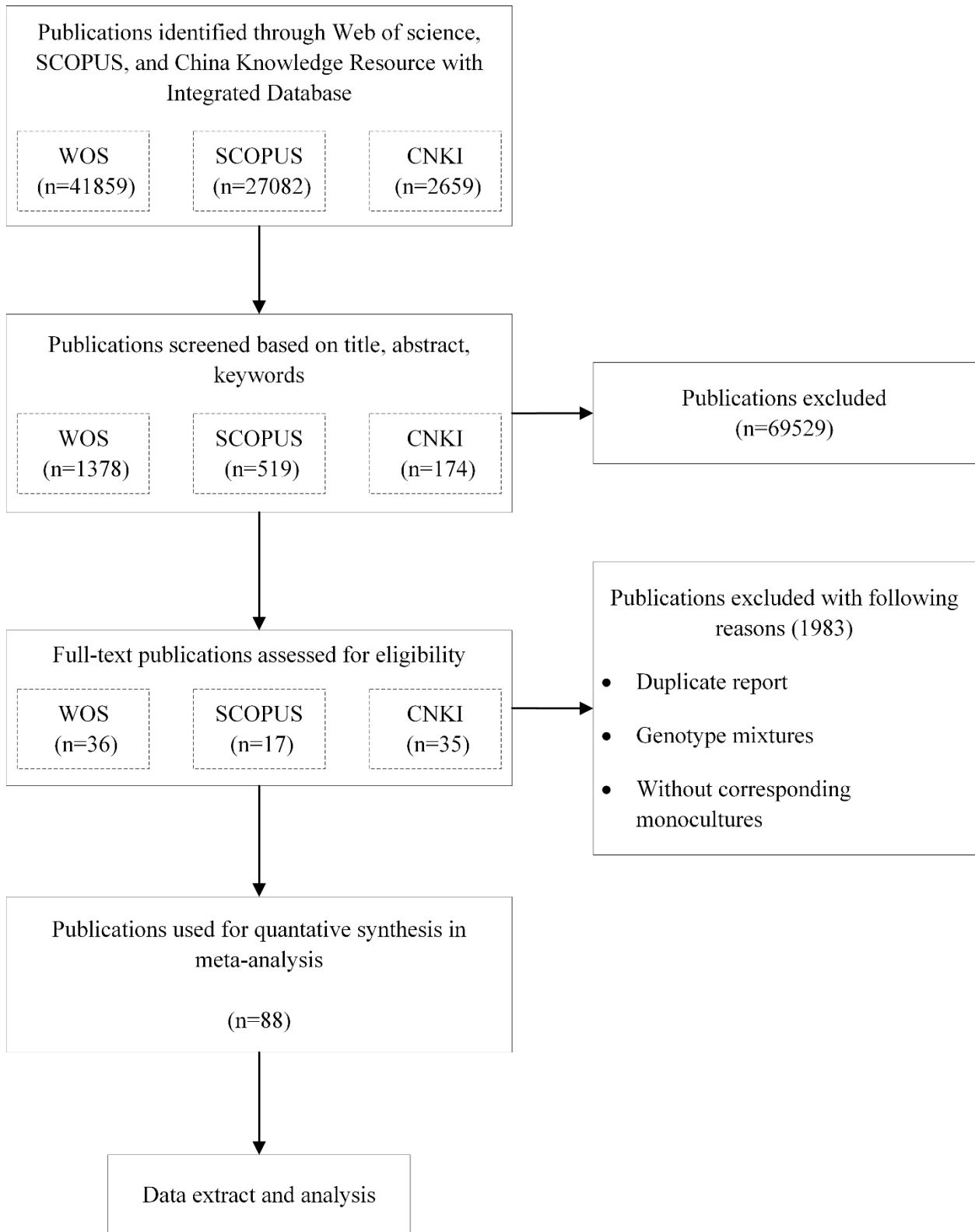
Figure S1 Flow diagram of document selection
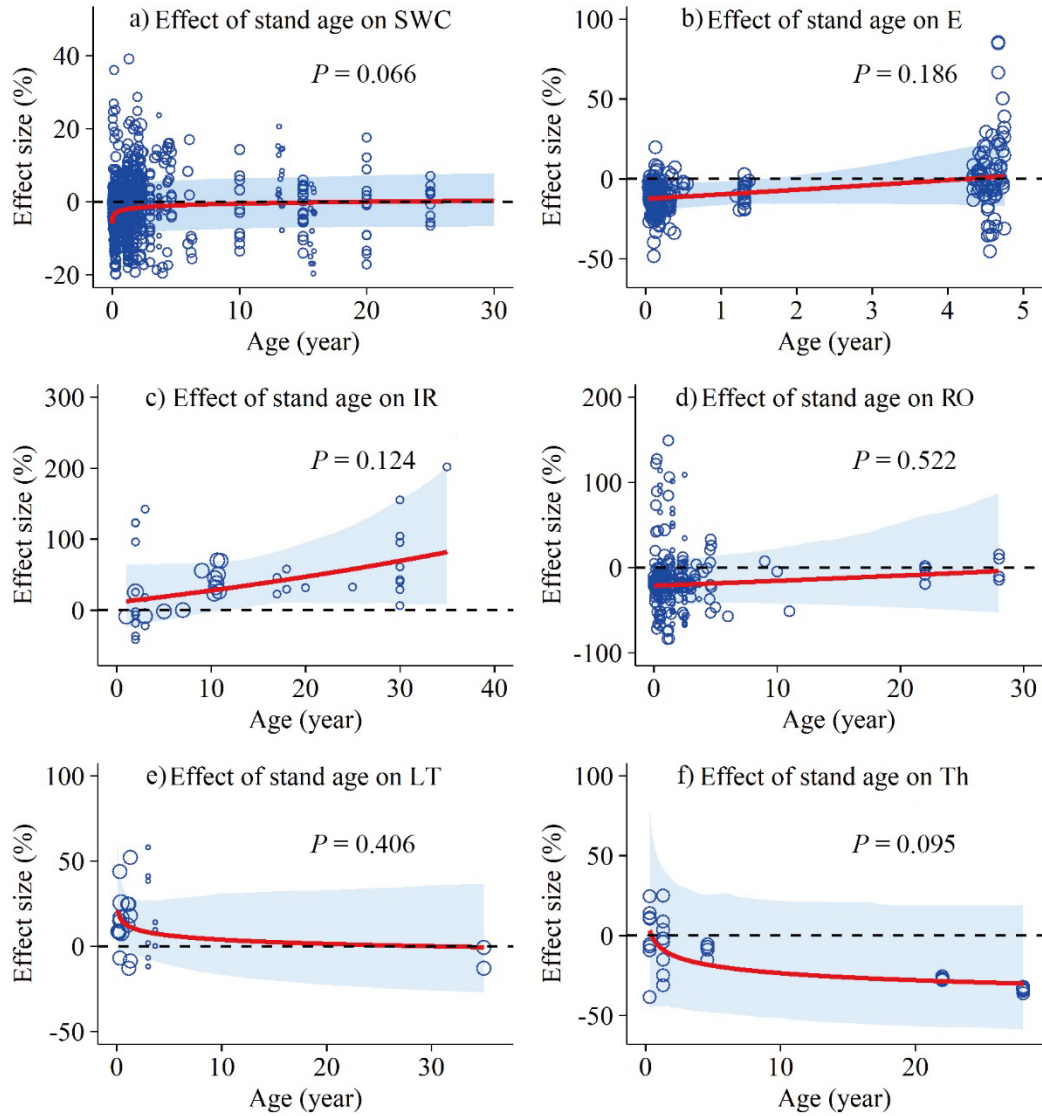
Figure S2 Plant mixture effect on water cycle processes in terms of stand age. (a) soil water content, (b) soil evaporation, (c) Infiltration rate, (d) Runoff, (e) Leaf transpiration, (f) Throughfall. The read lines are fitted effect sizes, with bootstrapped 95% confidence intervals shaded in blue. The size of circles represents the relative weights of corresponding observations.
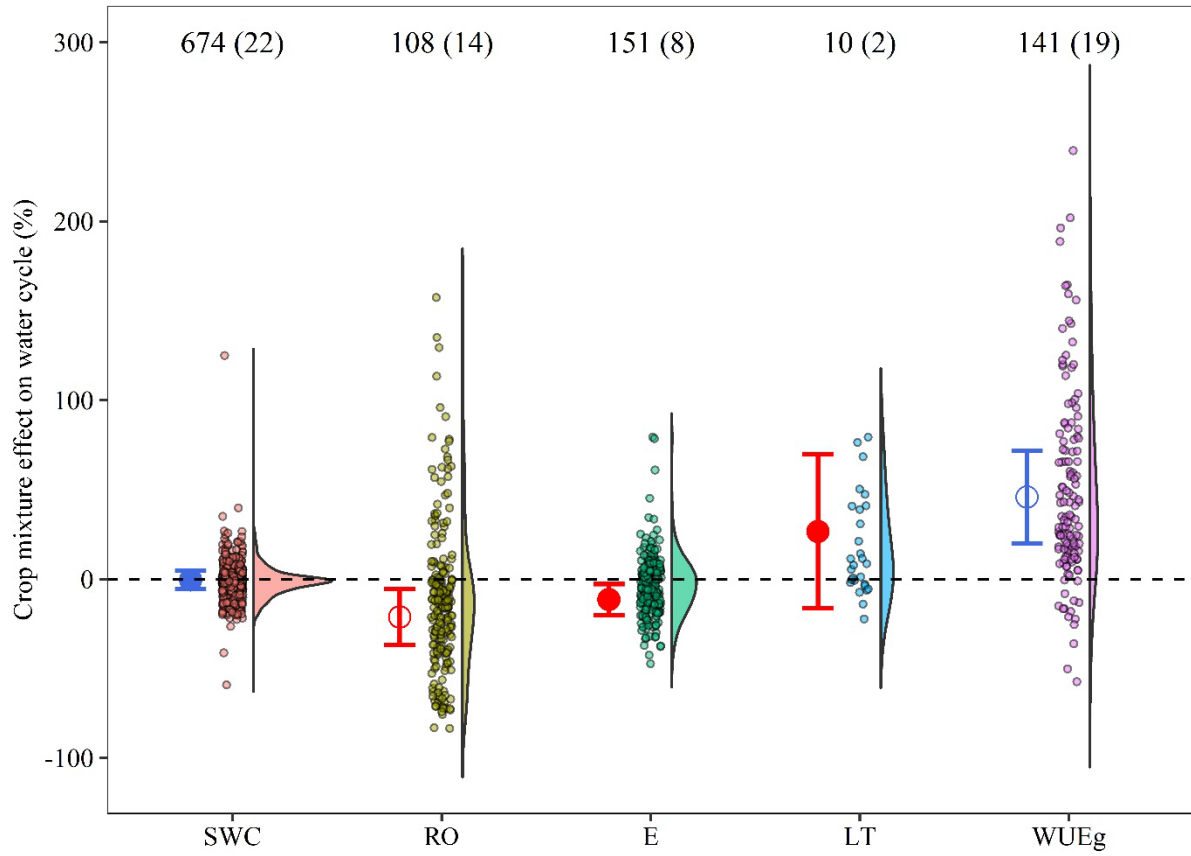
Figure S3 Comparison of water cycle in crop mixture and monocultures. Each part represents the same meaning as Figure 1.
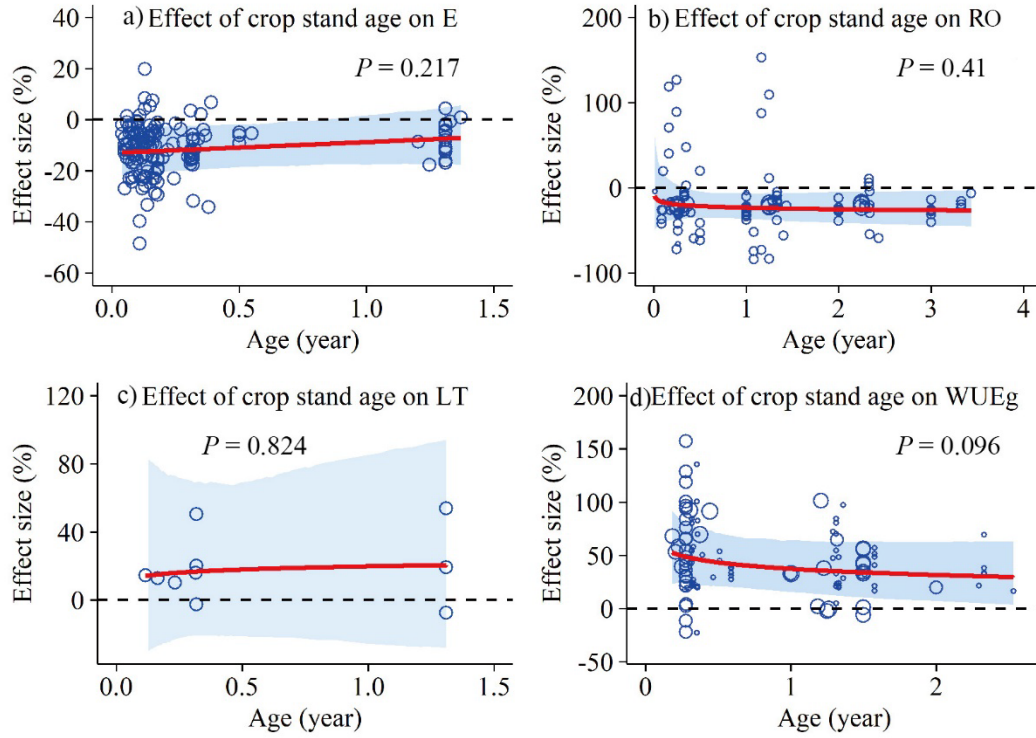
Figure S4 Crop mixture effect on water cycle in terms of stand age. Each part represents the same meaning as Figure 2.

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