



Interactions between Climate Change and Infrastructure Projects in Changing Water Resources: An Ethnobiological Perspective from the Daasanach, Kenya

André Braga Junqueira, Álvaro Fernández-Llamazares,
Miquel Torrents-Ticó, Paul Lokono Haira, Job Guol Nasak,
Daniel Burgas, Sara Fraixedas, Mar Cabeza,
and Victoria Reyes-García

Supplementary information

Supplementary Table 1. Observations of environmental change reported by the Daasanach. Each change mentioned in the interviews (“Cit”) was grouped into “observations of change” (OC) and categorized based on the “system” (e.g., climatic) and “subsystem” (e.g., air masses) in which they were observed. Based on the local understanding of changes and their connections, drivers of change are categorized into “climatic” (“Clim”), “demographic” (“Dem”) and “infrastructure” (“Infr”), and OC are identified as “water-related” when directly observed in hydrological processes (“Obs”) or when caused by changes in hydrological processes (“Caus”). Cells show the number of citations or OC.

System / Subsystem / Change	Driver			Water-related			
	OC	Cit	Clim	Dem	Infr	Obs	Caus
Climatic system	13	41	13			9	
Air masses	3	8	3				
Changes in wind direction	1	1	1				
Changes in wind strength or speed	2	7	2				
Precipitation	8	26	8			8	
Changes in mean rainfall	1	3	1			1	
Changes in temporal distribution of rainfall	1	4	1			1	
Changes in the amount of rainfall in a given season	1	2	1			1	
Changes in the frequency of drought events	1	2	1			1	
Changes in the intensity / strength of drought	1	11	1			1	
Changes in the length / duration of drought	1	2	1			1	
Changes in the length / duration of rainfall events	1	1	1			1	
Changes in the predictability of rainfall	1	1	1			1	

Supplementary Table 1. *Continued*.

System / Subsystem / Change	Driver					Water-related	
	OC	Cit	Clim	Dem	Infr	Obs	Caus
Seasons	1	3	1			1	
Changes in the length / duration / disappearance of seasons	1	3	1			1	
Temperature	1	4	1				
Changes in mean temperature	1	4	1				
Physical system	12	23	11		4	8	2
Freshwater physical systems (continental waters)	8	14	7		4	8	
Changes in freshwater salinity	1	5	1		1	1	
Changes in level of lake / pond water	1	3	1			1	
Changes in river / stream water flow, volume, level and / or depth	1	1			1	1	
Changes in the extension of the area flooded by rivers	1	1	1		1	1	
Changes in the frequency of river / lake floods	2	2	2		1	2	
Changes in the intensity of river or pond sedimentation	1	1	1			1	
Changes in the phreatic level	1	1	1			1	
Terrestrial physical systems (Soil & Land)	4	9	4				2
Changes in soil fertility	1	1	1				
Changes in soil moisture / humidity	1	2	1				1
Changes in soil water infiltration	1	2	1				1
Changes in wind-induced soil erosion and soil loss	1	4	1				
Biological system	25	64	20	10	11		22
Freshwater Biological system	11	31	9	4	9		10
Change in the species composition of freshwater animal and plant species	1	2	1	1	1		1
Changes in freshwater animal species migration areas and routes	1	1			1		1

Supplementary Table 1. *Continued).*

System / Subsystem / Change	Driver					Water-related	
	OC	Cit	Clim	Dem	Infr	Obs	Caus
Changes in the abundance of freshwater animal species, excluding fish	2	6	1		2		2
Changes in the abundance of freshwater fish	2	9	2	2	2		2
Changes in the abundance of freshwater plant species	1	3	1				1
Changes in the abundance or occurrence of freshwater animal and plant species stated as invasive	1	3	1		1		1
Changes in the behaviour of freshwater animals	1	4	1		1		1
Changes in the frequency of diseases in freshwater animal and plant species	1	1	1				
Changes in the size of freshwater animal and plant species	1	2	1	1	1		1
Land cover change & land degradation	1	1		1			
Changes in land cover (not further specified)	1	1		1			
Terrestrial Wild Fauna	7	17	5	4	2		6
Changes in terrestrial fauna migration areas and routes	1	3	1		1		1
Changes in the abundance of terrestrial fauna	2	9	2	2			2
Changes in the behaviour of insects	1	1	1				1
Changes in the distribution of terrestrial fauna	1	1		1			
Changes in the mortality of terrestrial fauna	1	1			1		1
Changes in the occurrence of unusual behaviour of terrestrial fauna	1	2	1	1			1
Terrestrial Wild Flora	6	15	6	1			6
Change in the productivity of wild plant or fungi species	1	2	1				1
Changes in the abundance or density of wild plant or fungi species	1	2	1	1			1

Supplementary Table 1. *Continued*.

System / Subsystem / Change	Driver					Water-related	
	OC	Cit	Clim	Dem	Infr	Obs	Caus
Changes in the size of plant parts of wild plant species	1	2	1				1
Changes in wild plant or fungi species fruiting time	1	2	1				1
Changes in wild plant or fungi species mortality	1	6	1				1
Changes in wild plant species flowering time	1	1	1				1
Human system	23	66	20	11	4		15
Cultivated plant spp. (crops, orchards)	3	7	3		1		3
Changes in crop suitable cultivation areas	1	4	1				1
Changes in the availability of crop seeds or propagules	1	1	1		1		1
Changes in the frequency of successful cropping seasons	1	2	1				1
Demography	1	4		1			
Change in population density	1	4		1			
Human health	5	8	4	3	2		4
Changes in cultural-identity-spiritual values	1	2	1				1
Changes in the frequency of conflicts over natural resources	1	2	1	1			1
Changes in the frequency of famine / food shortage episodes	1	1	1	1	1		1
Changes in the incidence of human-wildlife conflicts	1	2	1		1		1
Changes in the incidence of human diseases (flu, allergies, etc.)	1	1		1			
Livestock	6	23	5	3	1		3
Change in livestock abundance	1	9		1			
Change in livestock species composition	1	1	1	1			
Changes in livestock / raised animals behaviour	1	4	1	1			1

Supplementary Table 1. *Continued*).

System / Subsystem / Change	Driver					Water-related	
	OC	Cit	Clim	Dem	Infr	Obs	Caus
Changes in livestock / raised animals mortality	1	1	1				
Changes in livestock / raised animals productivity	1	3	1		1		1
Changes in the frequency of livestock / raised animals diseases	1	5	1				1
Other	1	1	1				
Changes in solar movement	1	1	1				
Pastures and grasslands	7	23	7	4			5
Changes in pasture mortality rates	1	2	1				1
Changes in pasture productivity	1	5	1	1			1
Changes in pasture seed availability	1	1	1				
Changes in the abundance of specific pasture species	2	11	2	2			2
Changes in the frequency of "pests" in pasture species	1	2	1				
Changes in the species composition of pastures	1	2	1	1			1