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Supplement of

Mapping irrigation potential from renewable groundwater in Africa – a quantitative hydrological approach

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Supplementary material

Supplementary material presents two tables. Table 1 is the crop calendar. The calendar indicates the monthly crop group water demand. It also specifies the crops present in the group for each irrigation cropping pattern zone. Table 2 is the monthly crop water demand for each crop determined by disaggregating total (for one cropping season) crop water demand for that crop and knowledge of its crop calendar.

Table 1: Crop Calendar and Water Demand for Each Crop Group within the Irrigation Cropping Pattern Zones

Irrigation Cropping Pattern Zones	Crop Groups	Crop Type	Water demand (mm)												Total	
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
1	Cereals	Millet/Wheat	130	90									185	155	135	695
		Maize/Wheat				180	155	135	120	130	135					855
	Oil	Groundnut/Sunflower	105	170	205	210	130									820
		Soybean						150	160	120	120	150				700
	Roots	Potatoes		100	140	150	155	155								700
		Potatoes							100	140	150	155	155			700
	Pulses	Bean/Lentil	165	85	70	40								120	150	630
		None														0
	Vegetables	Pepper/Eggplant/Tomato					115	140	185	260	200					900
		Pepper/Eggplant/Tomato	185	260	200									115	140	900
Sugarcane	None														0	
2	Cereals	Millet/Wheat	135	135	90									185	155	700
		Maize/Wheat/Rice					180	180	130	120	130	135				875
	Oil	Soybean/Groundnut/Sunflower	150	170	205	210	150									885
		Groundnut/Sunflower						105	170	205	210	130				820
	Roots	Potatoes			100	140	150	155	155							700
		Potatoes	155								100	140	150	155	700	
	Pulses	Bean/Lentil	85	70	40								120	150	165	630
		None														0
Vegetables	Cucumber/Melon/Tomato	215	200	75								115	120	155	880	
	Cucumber/Melon/Tomato/Pepper				115	140	185	260	200	75					975	
Sugarcane	None														0	
3	Cereals	Rice/Millet/Maize	180	180	135	130	130	135								890
		Rice/Millet/Maize								180	180	135	130	130	135	890
	Oil	Groundnut/Soybean				150	160	150	170	145						775
		Sunflower	125								80	170	205	210	790	
	Roots	Potatoes					100	140	150	155	155					700
		Potatoes	150	155	155									100	140	700
Pulses	Lentil							120	150	165	85	70	40		630	

		None													0
	Vegetables	Eggplant/Tomato/Pepper/Onion		115	140	270	260	200							985
		Eggplant/Tomato/Pepper/Onion								115	140	270	260	200	985
	Sugarcane	Sugarcane	185	225	230	135	120	120	120	120	120	150	150	125	1800
4	Cereals	Wheat/Millet/ Maize		185	155	135	130	130	135	0	0	0	0	0	870
		Wheat/Millet/Maize	135							185	155	135	130	130	870
	Oil	Peanut/Soybean/Sunflower		150	170	205	210	150							885
		Peanut/Soybean/Sunflower	150								150	170	205	210	885
	Roots	Potatoes			100	140	150	155	155						700
		Potatoes	155	155								100	140	150	700
	Pulses	Lentil/Bean			120	150	165	85	70	40					630
		Lentil/Bean	70	40							120	150	165	85	630
	Vegetables	Pepper/Eggplant/Tomatoes	200								115	140	185	260	900
		Pepper/Eggplant/Tomatoes		115	140	185	260	200							900
	Sugarcane	Sugarcane	185	225	230	135	120	120	120	120	120	150	150	125	1800
5	Cereals	Maize/Wheat/Rice	180	135	125	130	135							180	885
		Millet/Maize/Rice						180	180	140	135	130	135		900
	Oil	Groundnut		105	130	155	170	130							690
		Groundnut							105	130	155	170	130		690
	Roots	Potatoes	150	155	155								100	140	700
		Potatoes					100	140	150	155	155				700
	Pulses	Bean						120	150	165	60				495
		Bean	165	60									120	150	495
	Vegetables	Melon/Eggplant/Tomato/Pepper			115	140	185	260	200						900
		Tomato	220	200								100	125	160	805
	Sugarcane	None												0	
6	Cereals	Maize/Rice			180	190	110	125	130	135					870
		Maize	130	135							90	105	110	125	695
	Oil	Groundnut/Soybean				150	160	150	170	145					775
		Groundnut/Soybean	145								150	160	150	170	775
	Roots	Potatoes					100	140	150	155	155				700
		Potatoes	155	155								100	140	150	700
	Pulses	Bean			0	120	150	165	60						495
		Bean	60									120	150	165	495
	Vegetables	Tomato/Pepper/Onion	260	200								100	140	270	970
		Cucumber/Eggplant/Tomato/Pepper				115	140	185	260	200					900
	Sugarcane	Sugarcane	185	225	230	135	120	120	120	120	120	150	150	125	1800
7	Cereals	Millet						135	155	170	155	90			705
		Sorghum	170	155	50								130	150	655
	Oil	Groundnut							105	130	155	170	130		690
		None													0
	Roots	Potatoes				100	140	150	155	155					700
		Potatoes	155	155								100	140	150	700
	Pulses	Lentil						120	150	165	85	70	40		630
		None													0
	Vegetables	Tomato/Cucumber	215	200								115	125	155	810
		Melon/Eggplant			110	140	175	200	135						760
	Sugarcane	None												0	
8	Cereals	Maize/Rice				175	185	110	120	130	135				855

		Rice/Maize	120	130	135							175	185	110	855		
	Oil	Groundnut/Soybean			150	160	150	170	145						775		
		Groundnut/Soybean	170	145								150	160	150	775		
	Roots	Potatoes		100	140	150	155	155							700		
		Potatoes									100	140	150	155	155	700	
	Pulses	Bean	165	60										120	150	495	
		Bean					120	150	165	60							495
	Vegetables	Tomato/Onion/Cucumber/Melon		115	120	270	215	200	75							995	
		Tomato/Onion/Cucumber/Melon	75								115	120	270	215	200	995	
	Sugarcane	None														0	
9	Cereals	Maize/Rice	110	120	130	135								175	185	855	
		Wheat					185	160	135	110	60					650	
	Oil	Groundnut/Soybean	150	160	150	170	145										775
		Groundnut/Soybean						150	160	150	170	145					775
	Roots	Potatoes			100	140	150	155	155								700
		Potatoes	155	155								100	140	150	155	700	
	Pulses	Bean				120	150	165	60								495
		Bean	165	60											120	150	495
Vegetables	Tomato/Onion		95	120	270	215	200									900	
	Tomato/Onion									95	120	270	215	200	900		
	Sugarcane	None														0	
10	Cereals	Rice/Maize/Sorghum					180	185	160	150	130	135				940	
		Wheat/barley/Sorghum/Rice	160	150	130	135								180	185	940	
	Oil	Groundnut					150	170	205	210	150						885
		Soybean/Groundnut/Sunflower	210	150									150	170	205	885	
	Roots	Potatoes	0	100	140	150	155	155									700
		Potatoes	155									100	140	150	155	700	
	Pulses	Lentil	85	70	40								100	115	85	495	
		Bean				120	150	165	60								495
Vegetables	Onion Tomato Melon	200	75								95	120	270	215	975		
	Melon Onion Tomato Pepper			100	140	270	260	200	75							1045	
	Sugarcane	None														0	
11	Cereals	Maize/Sorghum/Wheat				180	155	160	150	130	135					910	
		Maize/Sorghum/Rice	150	130	135							175	185	160	935		
	Oil	Soybean/Groundnut/Sunflower					150	170	205	210	150						885
		Soybean/Groundnut/Sunflower	205	210	150									150	170	885	
	Roots	Potatoes				100	140	150	155	155							700
		Potatoes	155	155									100	140	150	700	
	Pulses	Lentil/Bean			120	150	165	85	70	40							630
		Lentil/Bean	70	40								120	150	165	85	630	
Vegetables	Cucumber/Melon/Onion/Tomato/Pepper	115	140	270	260	200	75									1060	
	Eggplant/Melon/Onion/Tomato/Pepper							115	140	270	260	200	75	1060			
	Sugarcane	Sugarcane	185	225	230	135	120	120	120	120	120	150	150	125	1800		
12	Cereals	Wheat					130	150	160	150	130	135				855	
		Maize/Sorghum/Millet	135	110	60									185	160	650	
	Oil	Groundnut						105	130	155	170	130					690
		None	NA														0
	Roots	Potatoes	150	155	155									100	140	700	

		Potatoes				100	140	150	155	155					700	
	Pulses	Lentil/Bean	70	40							100	115	85	85	495	
		Bean				0	120	150	165	60					495	
	Vegetables	Cucumber/Tomato/Eggplant		115	140	185	260	200							900	
		Pepper/Onion/Melon/Cucumber	75							115	140	270	260	135	995	
	Sugarcane	None													0	
13	Cereals	Maize/Sorghum/Rice					175	185	165	150	125	135			935	
		Rice/Sorghum	165	150	80	95							175	185	850	
	Oil	Sunflower	210	125								80	170	205	790	
		Sunflower				80	170	205	210	125					790	
	Roots	Potatoes	155	155								100	140	150	700	
		Potatoes				100	140	150	155	155					700	
	Pulses	Bean				120	150	165	60						495	
		Bean								120	150	165	60		495	
	Vegetables	Onion/Pepper/Tomato/Eggplant				115	140	270	260	200					985	
		Onion/Pepper/Tomato	260	200								95	140	270	965	
	Sugarcane	None												0		
14	Cereals	Maize/Rice	125	125	135							175	185	110	855	
		Rice/Millet/Maize/Sorghum				175	185	165	150	125	135				935	
	Oil	Soybean/Groundnut/Sunflower			150	170	205	210	150						885	
		Soybean/Groundnut/Sunflower	150								150	170	205	210	885	
	Roots	Potatoes	155									100	140	150	700	
		Potatoes		100	140	150	155	155							700	
	Pulses	Bean	60									120	150	165	495	
		Bean			120	150	165	60							495	
	Vegetables	Onion/Tomato/Pepper/Eggplant				110	140	270	260	200					980	
		Onion/Tomato/Pepper/Eggplant	260	200								110	140	270	980	
	Sugarcane	None												0		
15	Cereals	Maize/Rice/Sorghum				175	185	165	150	125	135				935	
		Maize/Rice/Sorghum	150	125	135							175	185	165	935	
	Oil	Sunflower/Groundnut/Soybean	150									150	170	205	210	885
		Sunflower/Groundnut/Soybean			150	170	205	210	150						885	
	Roots	Potatoes			100	140	150	155	155						700	
		Potatoes	155								100	140	150	155	700	
	Pulses	Bean	60									120	150	165	495	
		Bean			120	150	165	60							495	
	Vegetables	Onion/Tomato/Eggplant/Cucumber				115	140	270	260	200					985	
		Onion/Tomato/Eggplant								115	140	270	260	200	985	
	Sugarcane	185	225	230	135	120	120	120	120	120	150	150	125	1800		
16	Cereals	Wheat/Maize/Millet/Rice	130	125	140							185	185	135	900	
		Wheat/Maize/Millet/Rice				185	185	135	130	125	140				900	
	Oil	Sunflower/Groundnut/Soybean			150	170	205	210	150						885	
		Sunflower/Groundnut/Soybean	210	150								150	170	205	885	
	Roots	Potatoes			100	140	150	155	155						700	
		Potatoes	155	155								100	140	150	700	
	Pulses	Bean	60									120	150	165	495	
		Bean		0	120	150	165	60							495	
		Vegetables	Pepper/Onion/Melon/Cucumber/Eggplant/Tomato		115	140	270	260	200	75					1060	

		Pepper/Onion/Melon/Cucumber/Eggplant/Tomato	75								115	140	270	260	200	1060	
	Sugarcane	Sugarcane	185	225	230	135	120	120	120	120	120	150	150	125	1800		
17	Cereals	Maize/Rice/Wheat/Millet/Sorghum					185	185	165	150	125	135				945	
		Maize/Rice/Wheat/Millet/Sorghum	150	125	135									185	185	780	
	Oil	Sunflower/Groundnut/Soybean			150	170	205	210	150								885
		Sunflower/Groundnut/Soybean								150	170	205	210	150		885	
	Roots	Potatoes				100	140	150	155	155							700
		Potatoes	155	155									100	140	150	700	
	Pulses	Bean				120	150	165	60								495
		Bean	60										120	150	165	495	
	Vegetables	Pepper/Onion/Melon/Cucumber/Eggplant/Tomato				115	140	270	260	200	75						1060
		Pepper/Onion/Melon/Cucumber/Eggplant/Tomato	260	200	75								115	140	270	1060	
Sugarcane	Sugarcane	185	225	230	135	120	120	120	120	120	150	150	125	1800			
18	Cereals	Maize/Wheat/Rice/Millet				185	185	135	130	125	135					895	
		Maize/Wheat/Rice/Sorghum	150	125	135								185	185	165	945	
	Oil	Groundnut/Soybean			150	160	150	170	145								775
		Groundnut/Soybean	170	145									150	160	150	775	
	Roots	Potatoes			100	140	150	155	155								700
		Potatoes	155	155									100	140	150	700	
	Pulses	Bean				120	150	165	60								495
		Bean	60										120	150	165	495	
	Vegetables	Pepper/Onion/Melon/Cucumber/Eggplant/Tomato			115	140	270	260	200	75							1060
		Pepper/Onion/Melon/Cucumber/Eggplant/Tomato	200	75									115	140	270	1060	
Sugarcane	Sugarcane	120	120	120	120	120	150	150	125	185	225	230	135	1800			
19	Cereals	Maize	125	130	135							85	105	110	690		
		Millet/Sorghum/Wheat				185	155	165	150	85						740	
	Oil	Sunflower/Groundnut	105	170	205	210	130										820
		Sunflower/Groundnut						105	170	205	210	130					820
	Roots	Potatoes	100	140	150	155	155										700
		Potatoes						100	140	150	155	155					700
	Pulses	Bean		120	150	165	60										495
		None															0
	Vegetables	Onion/Tomato/Melon		95	120	270	215	200	75								975
		Melon	75							95	100	100	90	140	600		
Sugarcane	None															0	
20	Cereals	Rice/Millet/Sorghum	165	150	85	95								175	185	855	
		Maize/Wheat						185	160	135	125	125	135			865	
	Oil	Groundnut/Sunflower/Soybean	170	205	210	150									150	885	
		Groundnut/Soybean					150	160	150	170	145					775	
	Roots	Potatoes	150	155	155									100	140	700	
		Potatoes				100	140	150	155	155						700	
	Pulses	Bean	120	150	165	60											495
		None															0
	Vegetables	Onion/Tomato/Eggplant/Cucumber/Melon			115	140	270	215	200	75							1015
		Onion/Tomato/Eggplant	200									110	140	270	215	935	
Sugarcane	Sugarcane	185	225	230	135	120	120	120	120	120	150	150	125	1800			
21	Cereals	Wheat/Millet/Sorghum					185	155	165	150	85					740	
		Wheat/Millet/Sorghum/Maize	165	150	125	135								185	155	915	
	Oil	Groundnut/Sunflower/Soybean	170	205	210	150									150	885	

		None														0
	Roots	Potatoes				100	140	150	155	155						700
		Potatoes	150	155	155									100	140	700
	Pulses	Bean	165	60										120	150	495
		Bean			120	150	165	60								
	Vegetables	Onion/Tomato/Eggplant/Pepper/Cucumber		115	140	270	260	200								985
		Onion/Tomato/Eggplant/Pepper								115	140	270	260	200		985
	Sugarcane	Sugarcane	185	225	230	135	120	120	120	120	120	150	150	125	1800	
22	Cereals	Sorghum/Wheat/Maize/Millet				185	155	165	150	125	135					915
		Sorghum/Wheat/Maize/Millet	150	125	135								185	155	165	915
	Oil	Sunflower/Groundnut	170	205	210	130									105	820
		None														0
	Roots	Potatoes	155									100	140	150	155	700
		Potatoes	0	100	140	150	155	155								700
	Pulses	Bean		120	150	165	60									495
		Bean							120	150	165	60				495
	Vegetables	Onion/Tomato/Pepper			100	140	270	260	200							970
		Tomato/Pepper	200									95	140	185	260	880
	Sugarcane	Sugarcane	185	225	230	135	120	120	120	120	120	150	150	125	1800	
23	Cereals	Maize	125	125	135							85	105	110	685	
		Sorghum					125	150	165	150	50					640
	Oil	None														0
		None														0
	Roots	Potatoes	100	140	150	155	155									700
		Potatoes						100	140	150	155	155				700
	Pulses	None														0
		None														
	Vegetables	Cucumber/Onion/Tomato/Pepper			115	140	270	260	200							985
		None														0
	Sugarcane	Sugarcane	185	225	230	135	120	120	120	120	120	150	150	125	1800	

Table 2: Monthly Crop Water Demand

Crop Group	Crop Type	Seasonal Water Demand (mm)		Water Need per Growing Period (mm)				Monthly Water Need (mm)					
				Initial	Develop.	Middle	Late	1	2	3	4	5	6
Cereals	Wheat	650	Period (days)	15	30	65	40	185	160	135	110	60	
			Kc	0.35	0.7	1.1	0.3						
	Millet	655	Period (days)	20	30	55	35	135	155	140	135	90	
			Kc	0.35	0.7	1.1	0.7						
	Maize	695	Period (days)	30	50	60	40	90	105	110	125	130	135
			Kc	0.4	0.8	1.15	0.9						
	Sorghum	655	Period (days)	20	35	45	30	130	150	170	155	50	
			Kc	0.35	0.8	1.1	0.7						
	Rice	700	Period (days)	30	30	80	40	180	190	75	75	85	95
			Kc	1.05	1.1	1.2	0.8						
Oils	Soybean	700	Period (days)	20	30	70	30	150	160	120	120	150	
			Kc	0.35	0.8	1.1	0.6						
	Groundnut	690	Period (days)	30	40	45	25	105	130	155	170	130	
			Kc	0.45	0.8	1.05	0.7						
	Sunflower	790	Period (days)	25	35	45	25	80	170	205	210	125	
			Kc	0.35	0.8	1.15	0.6						
Roots	Potato	700	Period (days)	30	35	50	30	100	140	150	155	155	
			Kc	0.45	0.8	1.15	0.9						
Pulses	Bean	495	Period (days)	20	30	40	20	120	150	165	60		
			Kc	0.35	0.7	1.1	0.3						
	Lentil	495	Period (days)	25	35	70	40	100	115	85	85	70	40
			Kc	0.45	0.8	1.1	0.5						
Vegetables	Tomato	800	Period (days)	35	45	40	25	95	125	160	220	200	
			Kc	0.45	0.8	1.15	0.8						
	Pepper	800	Period (days)	30	40	40	20	95	140	185	260	120	
			Kc	0.35	0.7	1.05	0.9						
	Eggplant	800	Period (days)	30	40	45	25	115	145	175	200	165	
			Kc	0.45	0.8	1.15	0.8						
	Cucumber	600	Period (days)	25	35	50	20	115	130	115	160	80	
			Kc	0.45	0.7	0.9	0.8						
	Melon	600	Period (days)	30	45	65	20	90	100	100	95	140	75
			Kc	0.45	0.8	1	0.8						
Onion	550	Period (days)	25	40	20	10	95	95	275	85			
		Kc	0.5	0.8	1.05	1							
Sugarcane ¹	Sugarcane	1800	Period (days)	35	70	180	80	185	225	230	135	120	120
			Kc	0.4	1	1.25	0.8	120	120	120	150	150	125

¹ Sugarcane is an all-year crop and irrigation is done on a 12 month basis.