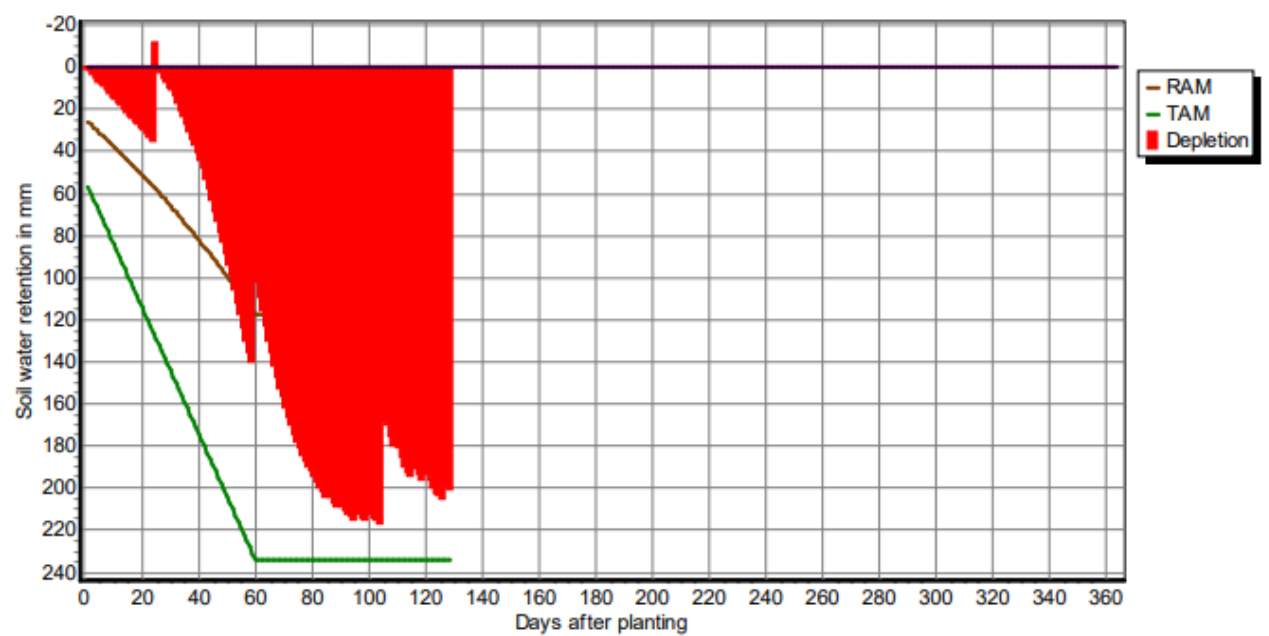
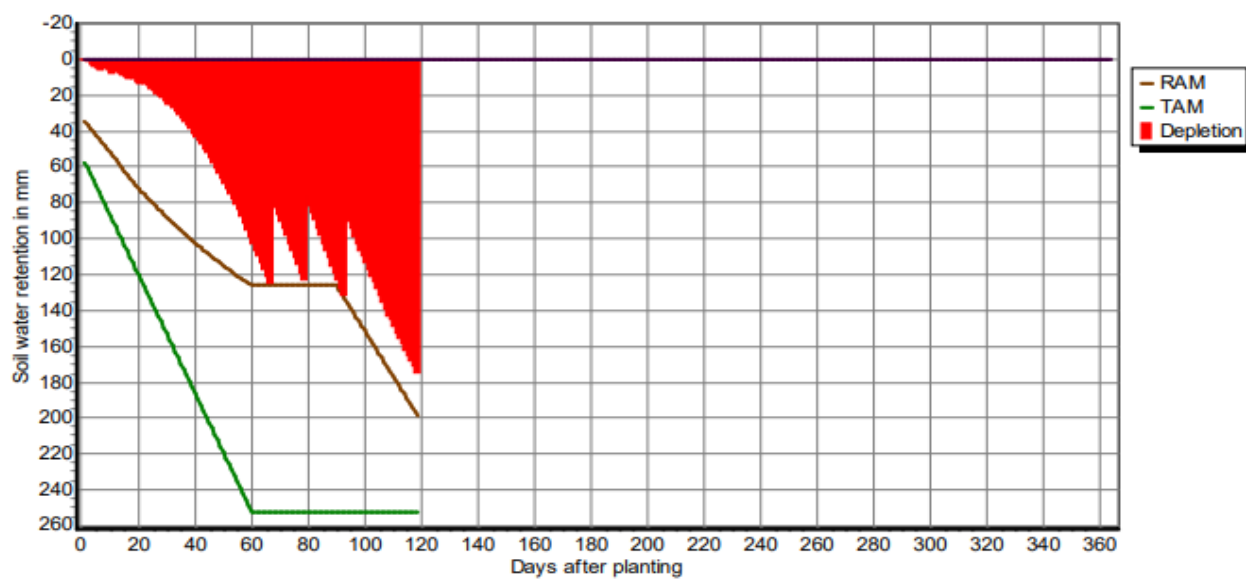


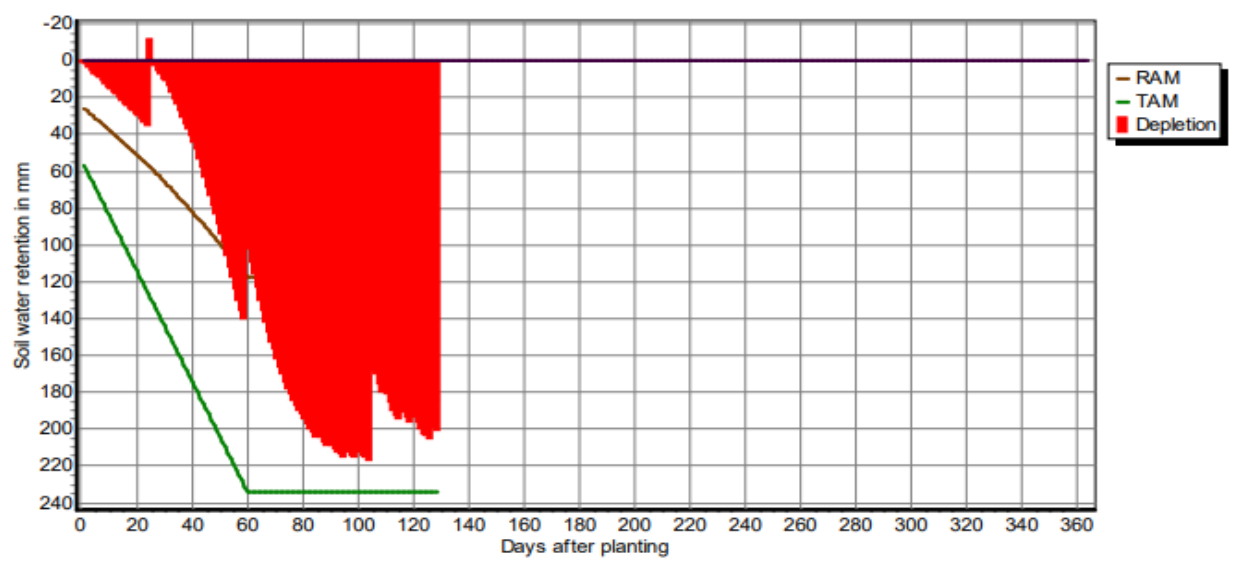
**Figure S1.** Soil water retention – growing length curve for sugarcane



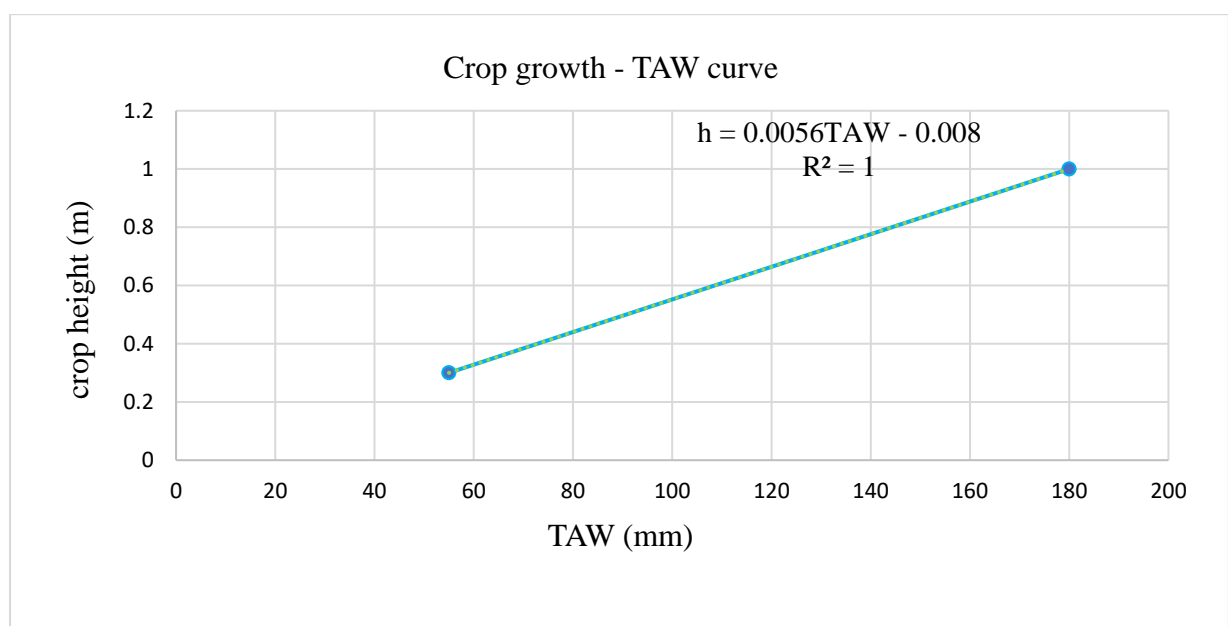
**Figure S2.** Soil water retention – growing length curve for maize



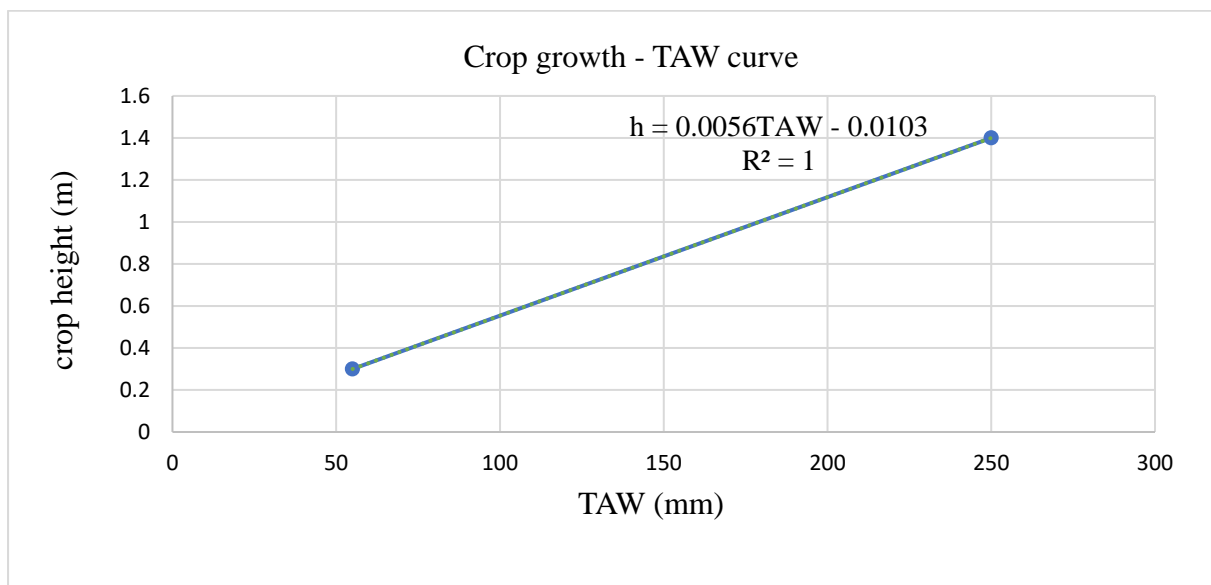
**Figure S3.** Soil water retention – growing length curve for sorghum



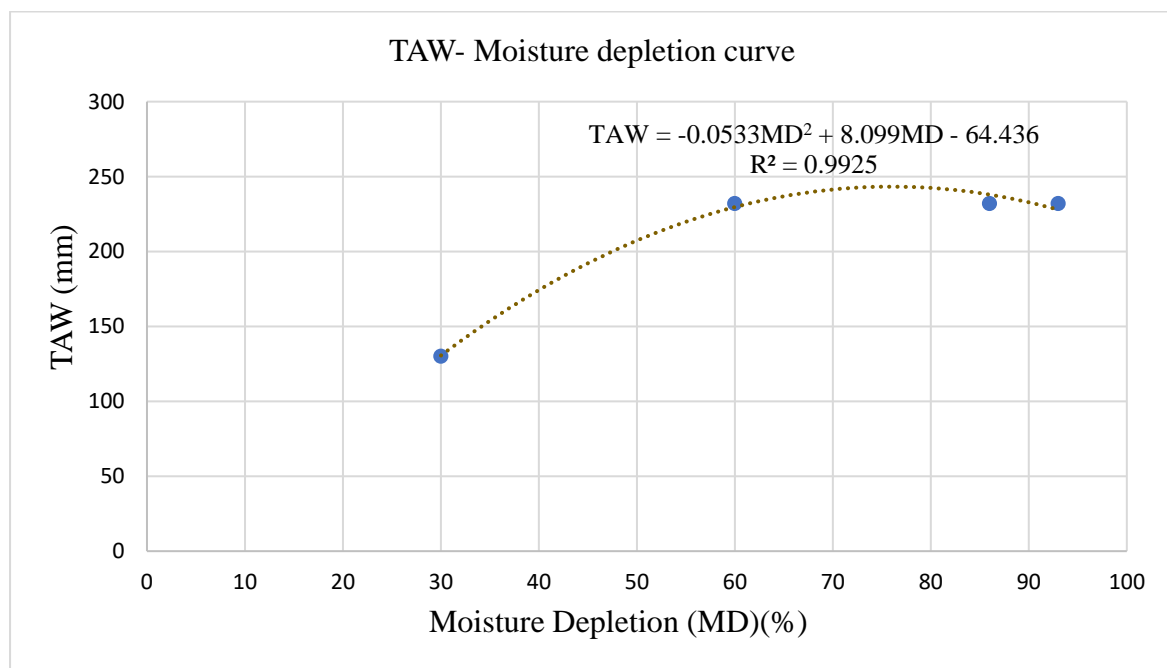
**Figure S4.** Soil water retention – growing length curve for sunflower



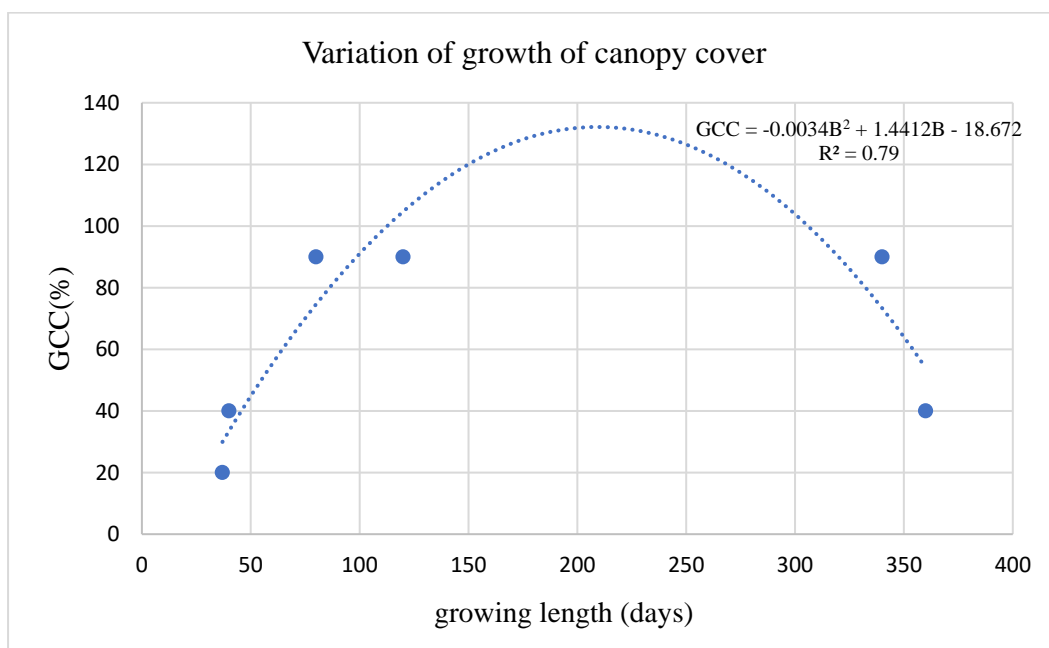
**Figure S5.** Variation of crop height with TAW for maize



**Figure S6.** Variation of crop height with TAW for sorghum

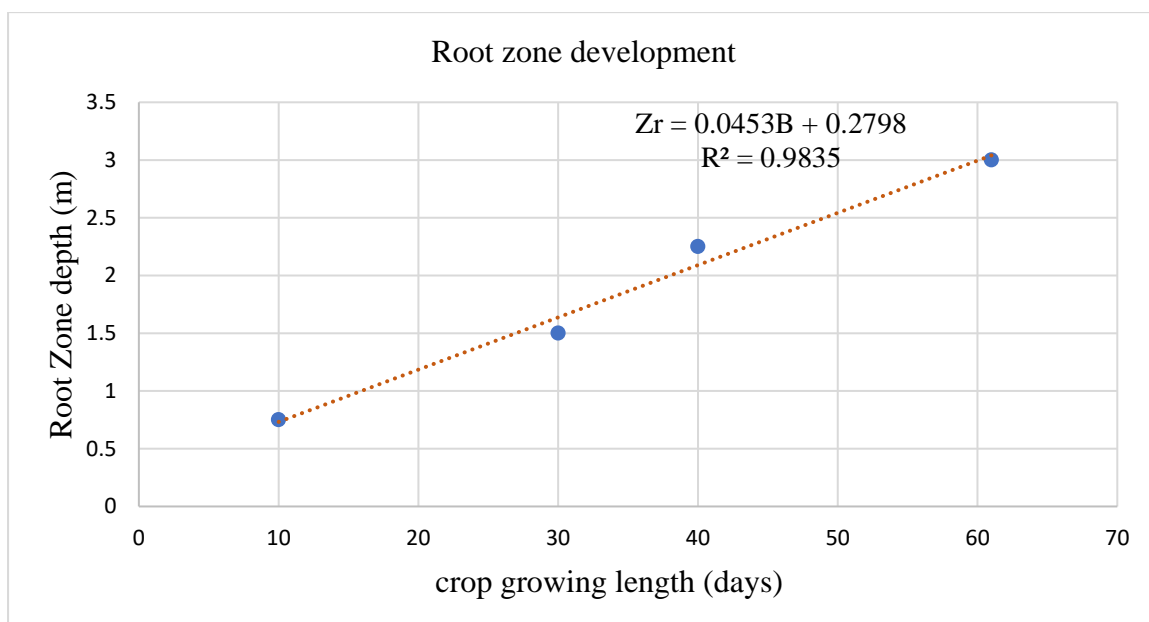


**Figure S7.** Variation of TAW with moisture depletion for sunflower

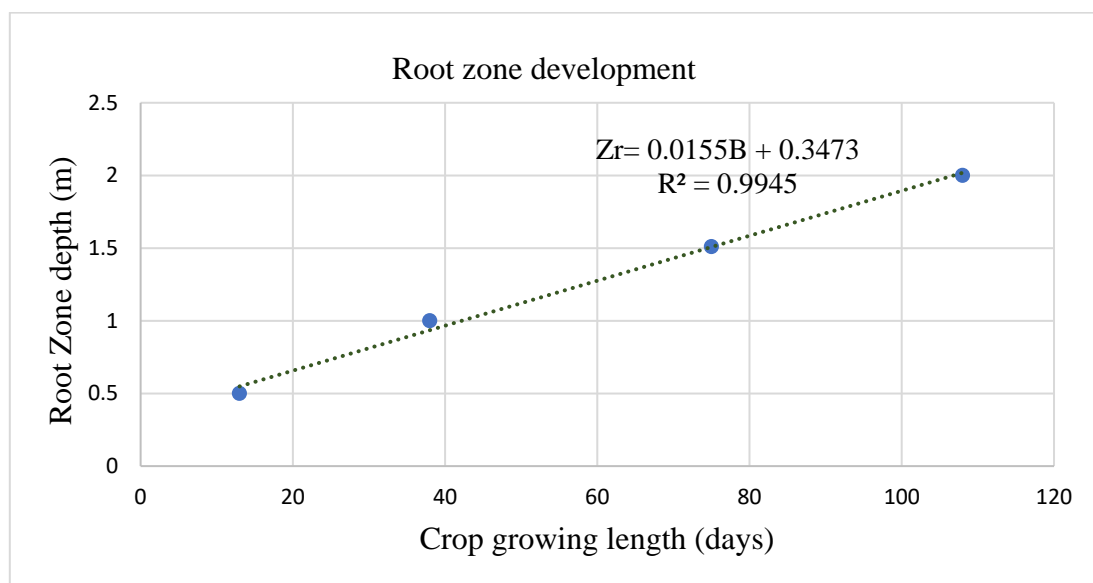


**Figure S8.** Variation of growth of canopy cover with crop growing length for sugarcane

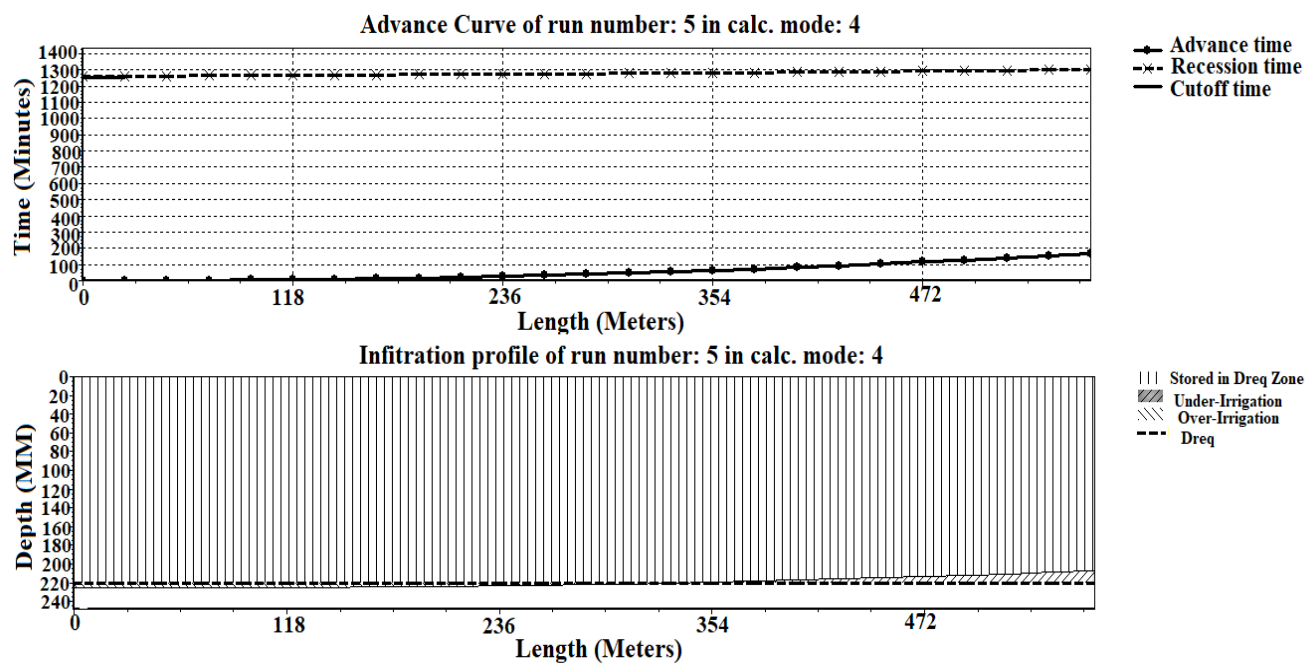




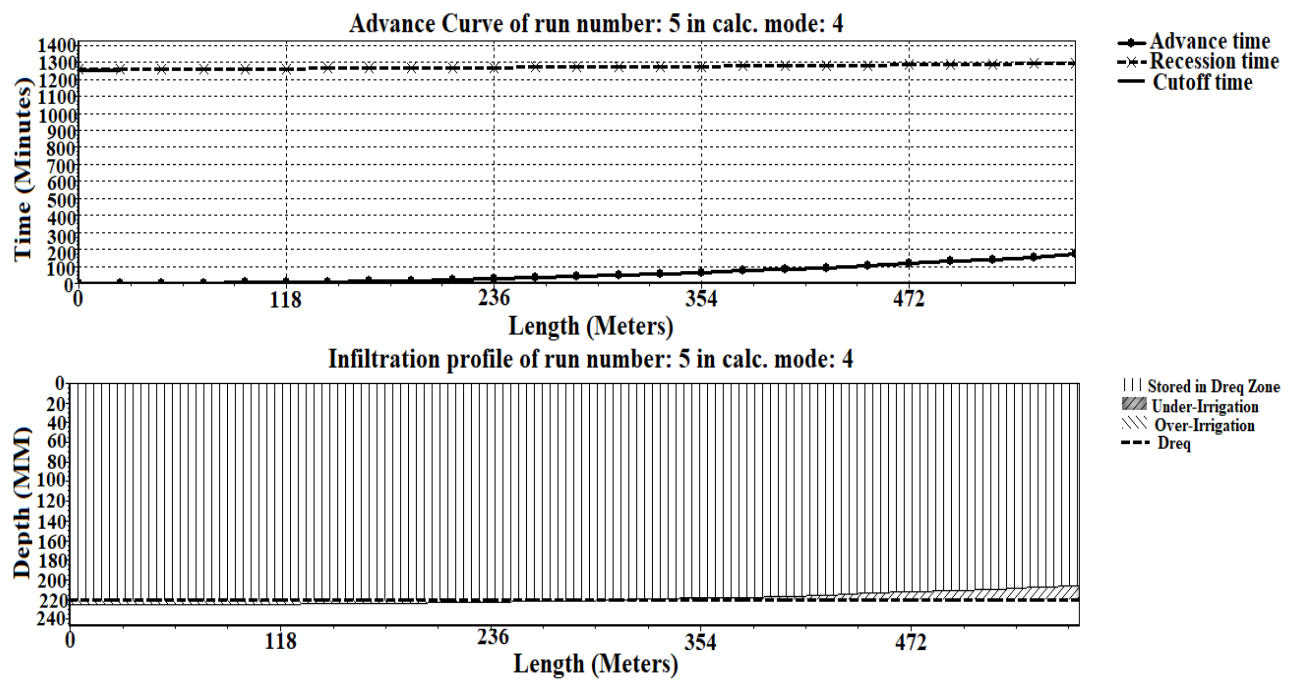
**Figure S9.** Variation of root development with crop growing length for sugarcane



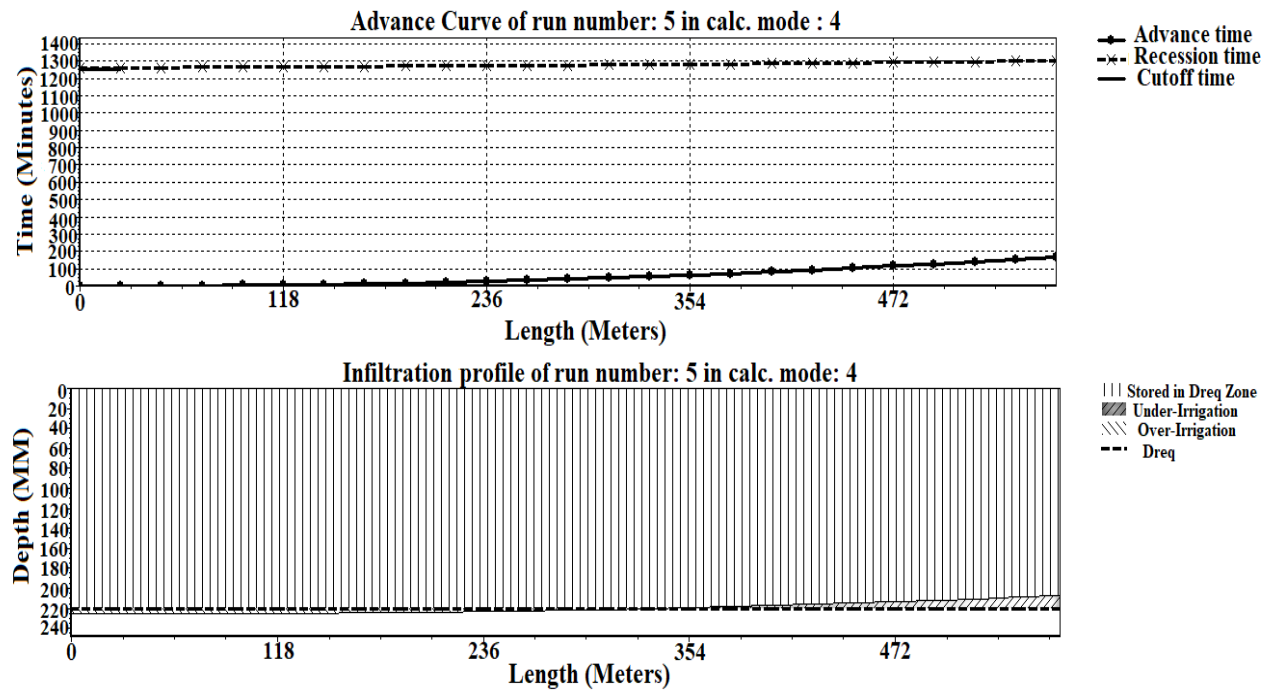
**Figure S10.** Variation of root development with crop growing length for maize



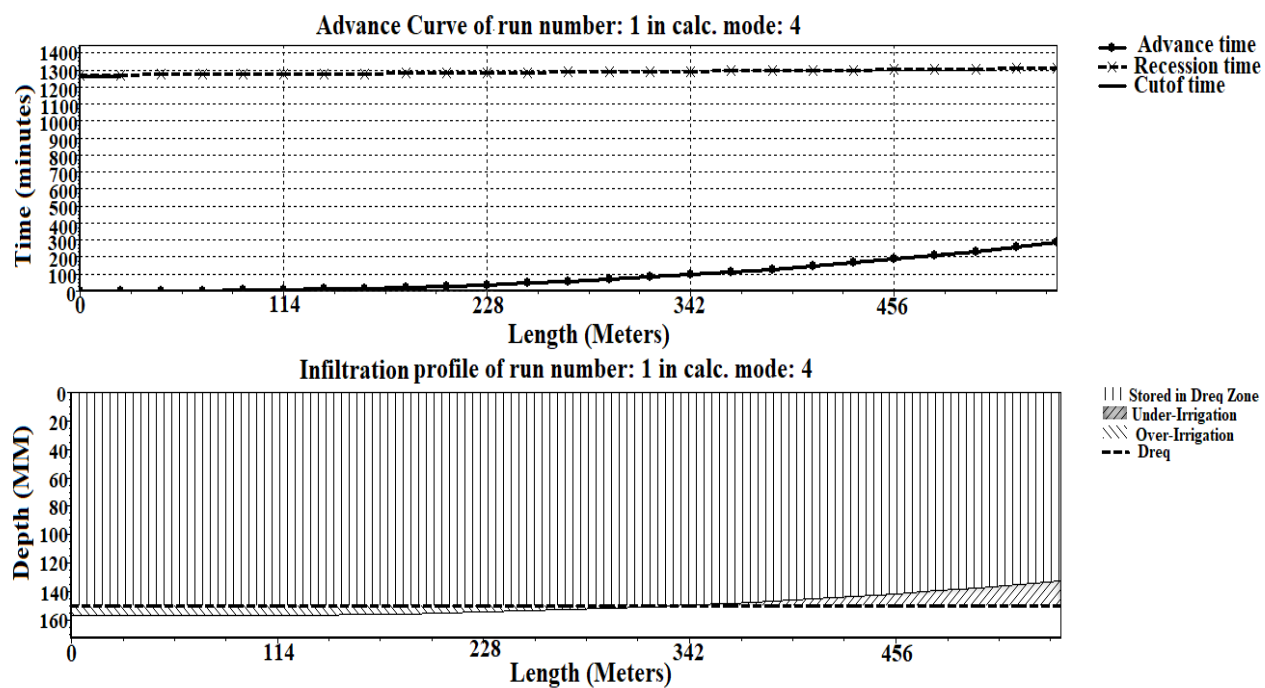
**Figure S11.** Advance curve & Irrigation profile for maize in fixed flow method

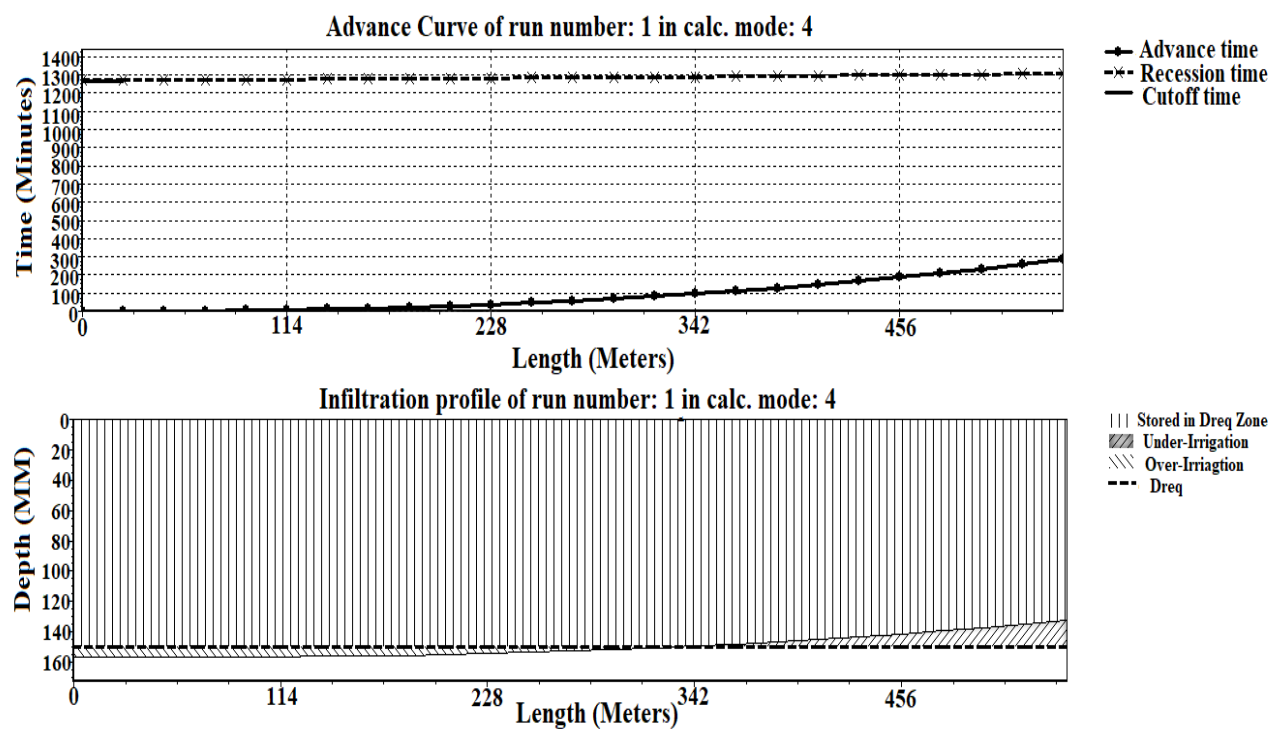


**Figure S12.** Advance curve & Irrigation profile for maize in cutback flow method

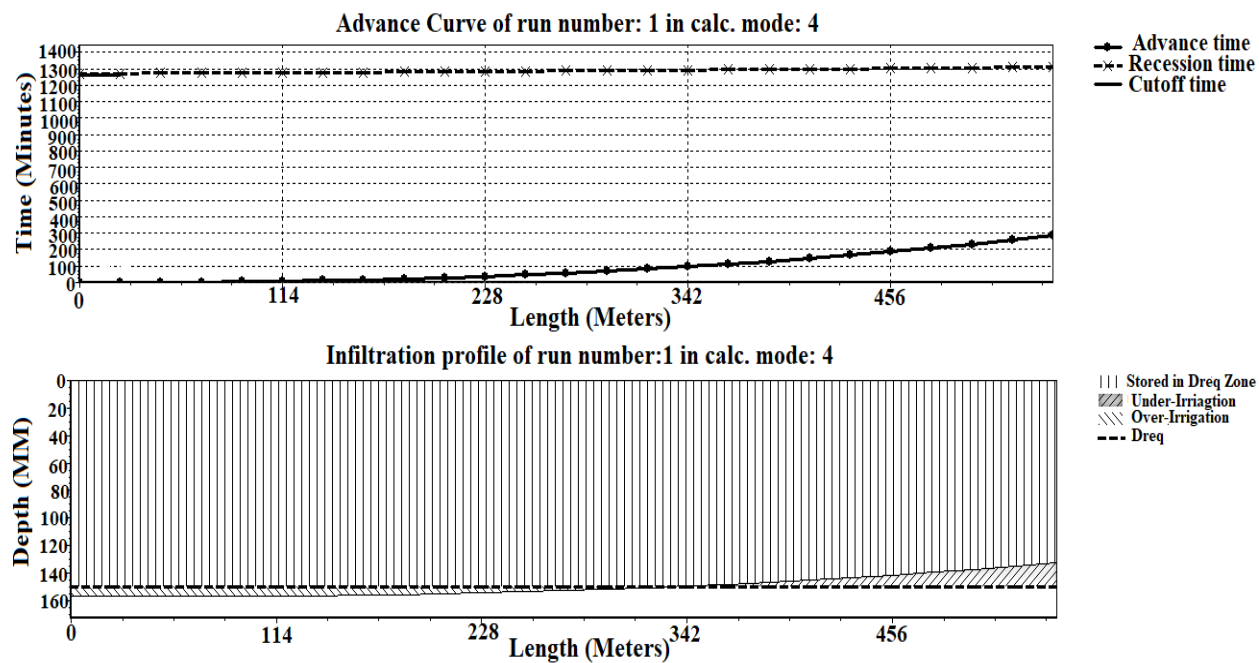


**Figure S13.** Advance curve & Irrigation profile for maize in tailwater reuse method



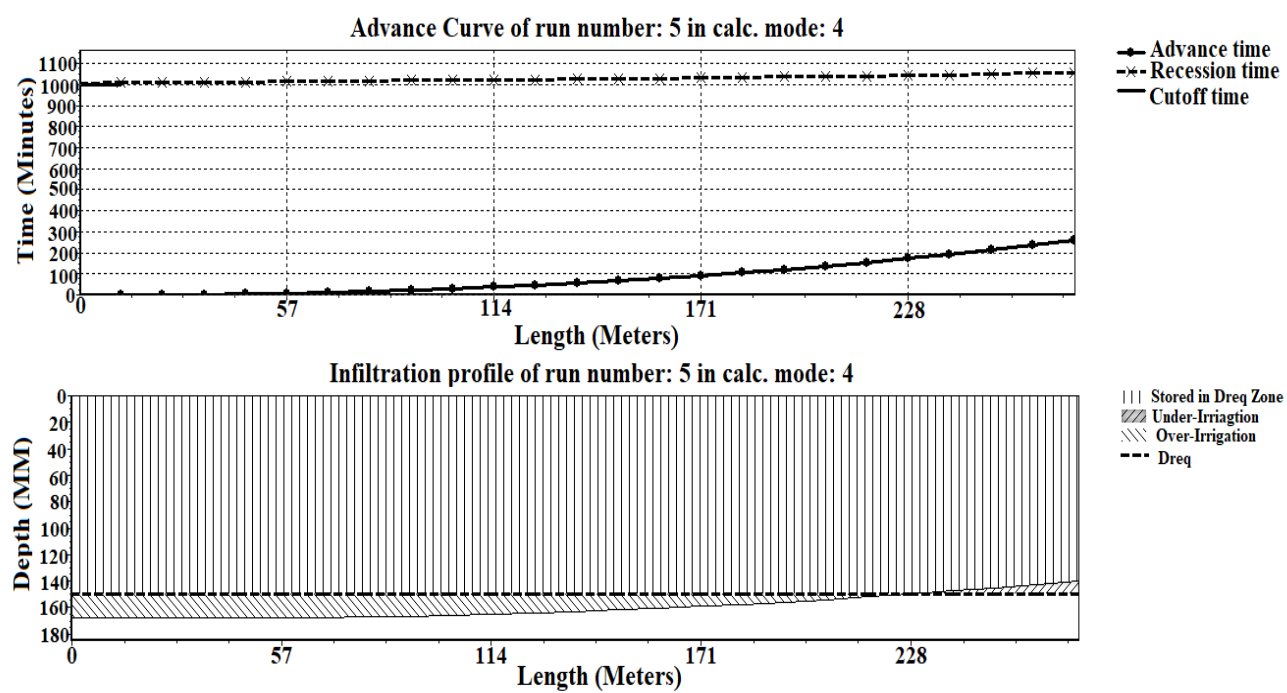


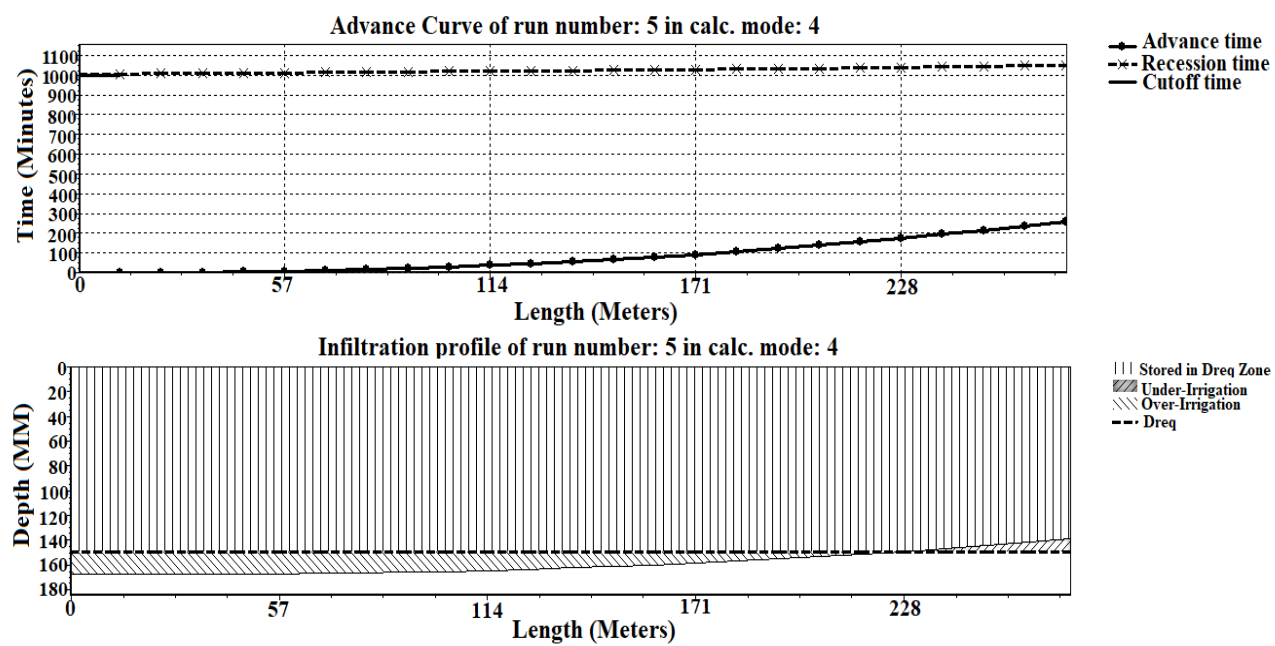
**Figure S15.** Advance curve & Irrigation profile for sorghum in cutback flow method



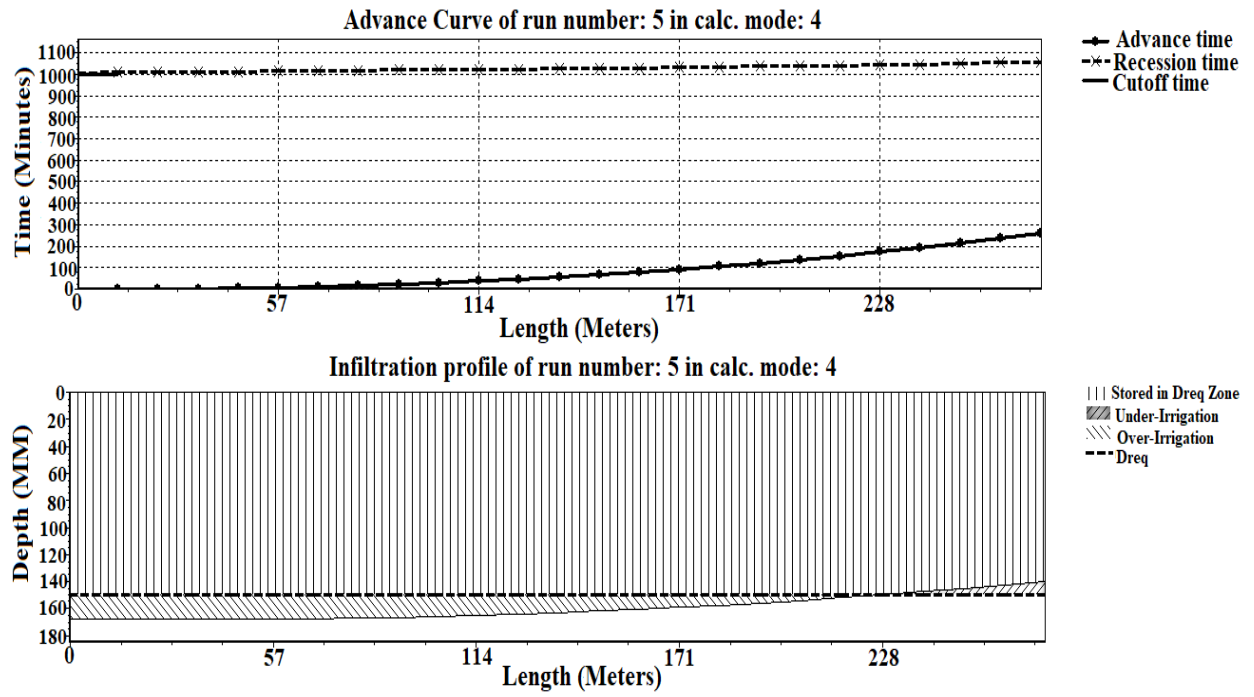
**Figure S16.** Advance curve & Irrigation profile for sorghum in tailwater reuse method



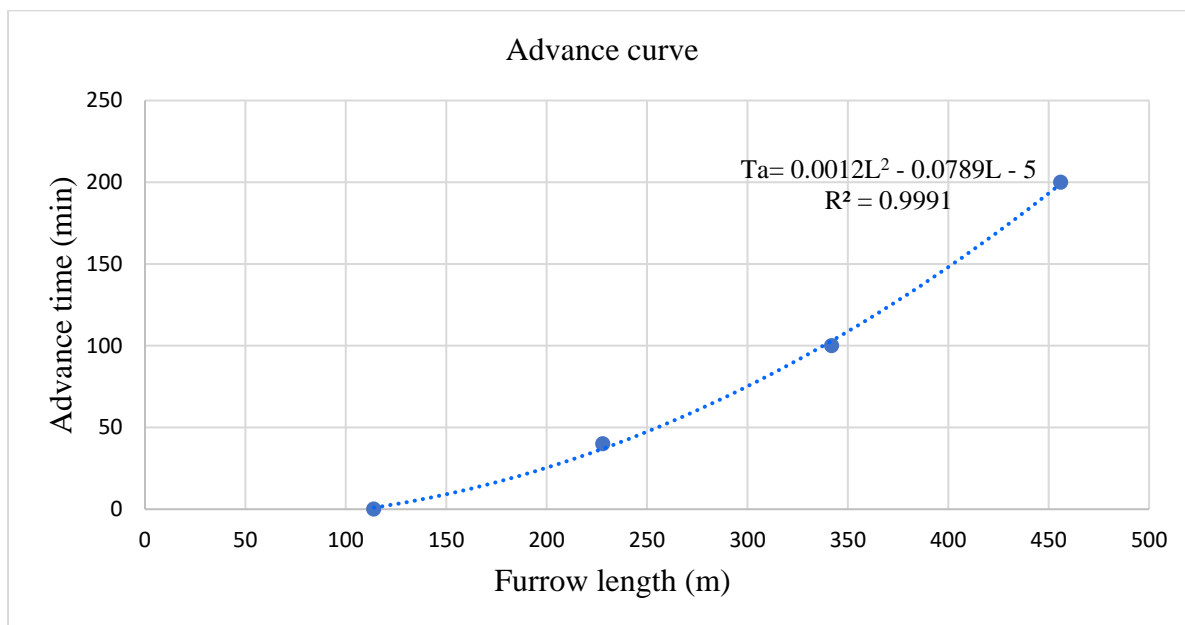




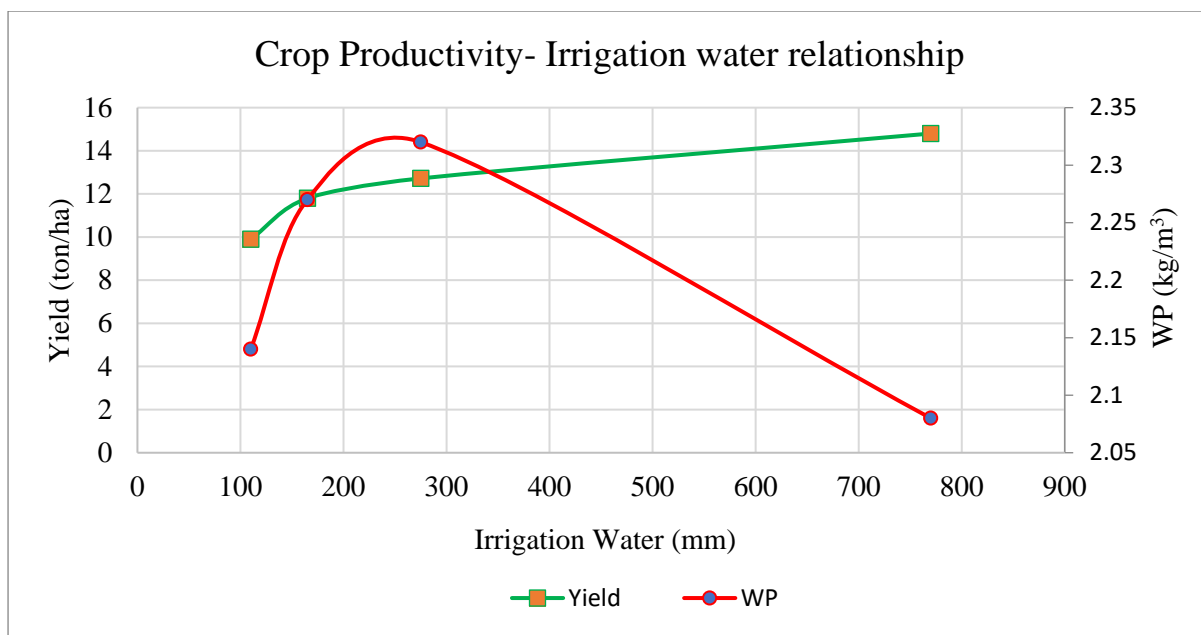
**Figure S18.** Advance curve & Irrigation profile for sunflower in cutback flow method



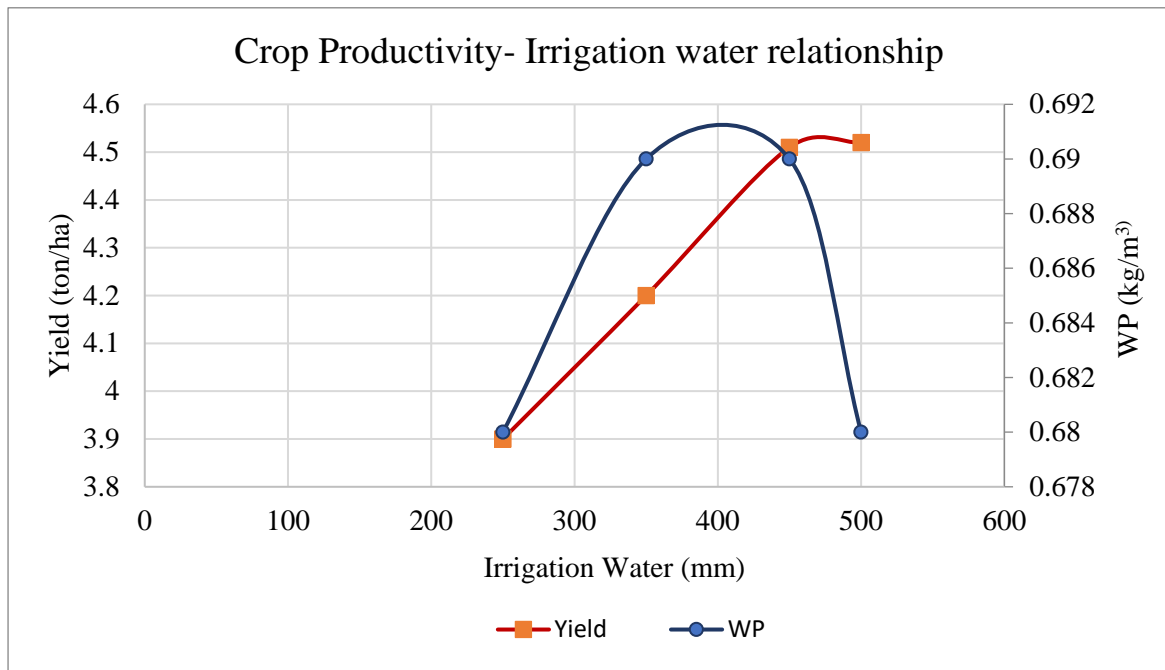
**Figure S19.** Advance curve & Irrigation profile for sunflower in tailwater reuse method



**Figure S20.** Variation of advance time with furrow length for sorghum



**Figure S21.** Crop productivity -irrigation water relationship for maize



**Figure S22.** Crop productivity -irrigation water relationship for sunflower

**Table S1** Crop Water Requirement for Sugarcane

<b>Month</b>	<b>Decade</b>	<b>Stage</b>	<b>Kc</b>	<b>ETc</b>	<b>ETc</b>	<b>Eff rain</b>	<b>Irr. Req.</b>
			coeff	mm/day	mm/dec	mm/dec	mm/dec
<b>Sep</b>	2	Init	0.77	3.7	22.2	21.6	0.0
<b>Sep</b>	3	Init	0.40	1.9	19.0	32.8	0.0
<b>Oct</b>	1	Init	0.40	1.9	18.7	30.1	0.0
<b>Oct</b>	2	Deve	0.43	2.0	19.7	28.1	0.0
<b>Oct</b>	3	Deve	0.57	2.4	26.8	21.0	5.8
<b>Nov</b>	1	Deve	0.71	2.9	28.7	12.2	16.5
<b>Nov</b>	2	Deve	0.85	3.2	31.9	5.1	26.8
<b>Nov</b>	3	Deve	0.99	3.6	36.0	3.6	32.4
<b>Dec</b>	1	Deve	1.13	3.9	39.0	1.7	37.3
<b>Dec</b>	2	Mid	1.23	4.1	40.7	0.0	40.7
<b>Dec</b>	3	Mid	1.24	4.4	48.1	0.0	48.0
<b>Jan</b>	1	Mid	1.24	4.7	47.0	0.0	46.9
<b>Jan</b>	2	Mid	1.24	4.9	49.4	0.0	49.4
<b>Jan</b>	3	Mid	1.24	5.3	58.5	0.1	58.4
<b>Feb</b>	1	Mid	1.24	5.7	56.9	1.1	55.9
<b>Feb</b>	2	Mid	1.24	6.1	60.7	1.6	59.1
<b>Feb</b>	3	Mid	1.24	6.5	51.9	1.2	50.7
<b>Mar</b>	1	Mid	1.24	6.9	69.2	0.5	68.7
<b>Mar</b>	2	Mid	1.24	7.4	73.5	0.1	73.4
<b>Mar</b>	3	Mid	1.24	7.7	84.1	1.1	83.1
<b>Apr</b>	1	Mid	1.24	8.0	79.5	1.4	78.0
<b>Apr</b>	2	Mid	1.24	8.3	82.5	1.9	80.6
<b>Apr</b>	3	Mid	1.24	8.8	87.8	5.6	82.1
<b>May</b>	1	Mid	1.24	9.5	94.7	9.9	84.8
<b>May</b>	2	Mid	1.24	10.1	100.8	13.3	87.5
<b>May</b>	3	Mid	1.24	9.7	106.6	15.9	90.7
<b>Jun</b>	1	Mid	1.24	9.2	92.1	18.5	73.6
<b>Jun</b>	2	Late	1.22	8.7	87.4	21.2	66.2
<b>Jun</b>	3	Late	1.16	7.8	78.2	23.5	54.6
<b>Jul</b>	1	Late	1.11	6.9	68.7	26.4	42.2
<b>Jul</b>	2	Late	1.06	6.0	60.1	29.1	31.0
<b>Jul</b>	3	Late	1.01	5.7	62.2	29.1	33.1
<b>Aug</b>	1	Late	0.96	5.3	53.4	28.4	24.9
<b>Aug</b>	2	Late	0.91	5.0	49.8	28.5	21.2
<b>Aug</b>	3	Late	0.86	4.5	49.5	30.4	19.1
<b>Sep</b>	1	Late	0.80	4.1	40.5	33.6	6.9
<b>Sep</b>	2	Late	0.77	3.7	14.8	14.4	0.0
<b>Total</b>					2090.2	492.9	1629.7

**Table S2** Irrigation Schedule for Sugarcane for Refill Soil at field capacity and irrigation at critical depletion

<b>Date</b>	<b>Day</b>	<b>Stage</b>	<b>Rain</b>	<b>Ks</b>	<b>Eta</b>	<b>Depl</b>	<b>Net Irr</b>	<b>Deficit</b>	<b>Loss</b>	<b>Gr. Irr</b>	<b>Flow</b>
			mm	fract.	%	%	mm	mm	mm	mm	l/s/ha
<b>16 Jan</b>	124	Mid	0.0	1.00	100	65	284.8	0.0	0.0	406.9	0.38
<b>6 Mar</b>	173	Mid	0.0	1.00	100	65	284.0	0.0	0.0	405.7	0.96
<b>13 Apr</b>	211	Mid	1.2	1.00	100	66	285.2	0.0	0.0	407.4	1.24
<b>18 May</b>	246	Mid	0.0	1.00	100	65	283.7	0.0	0.0	405.2	1.34
<b>30 Jun</b>	289	End	0.0	1.00	100	66	285.5	0.0	0.0	407.9	1.10
<b>14 Sep</b>	End	End	0.0	1.00	0	27					



**Table S3.** Crop Water Requirement for Maize

<b>Month</b>	<b>Decade</b>	<b>Stage</b>	<b>Kc</b>	<b>ETc</b>	<b>ETc</b>	<b>Eff rain</b>	<b>Irr. Req.</b>
			coeff	mm/day	mm/dec	mm/dec	mm/dec
<b>May</b>	1	Init	0.30	2.3	9.2	3.9	4.3
<b>May</b>	2	Init	0.30	2.4	24.4	13.3	11.1
<b>May</b>	3	Deve	0.34	2.6	28.9	15.9	13.0
<b>Jun</b>	1	Deve	0.58	4.3	42.8	18.5	24.4
<b>Jun</b>	2	Deve	0.84	6.0	60.2	21.2	39.1
<b>Jun</b>	3	Deve	1.10	7.4	73.8	23.5	50.3
<b>Jul</b>	1	Mid	1.22	7.5	75.1	26.4	48.6
<b>Jul</b>	2	Mid	1.22	6.9	68.8	29.1	39.7
<b>Jul</b>	3	Mid	1.22	6.8	74.9	29.1	45.8
<b>Aug</b>	1	Late	1.22	6.8	67.6	28.4	39.2
<b>Aug</b>	2	Late	1.03	5.6	56.4	28.5	27.9
<b>Aug</b>	3	Late	0.73	3.8	42.0	30.4	11.6
<b>Sep</b>	1	Late	0.45	2.3	18.2	26.9	0.0
<b>Total</b>					642.4	295.2	354.9

**TableS4** Irrigation Schedule for Maize at Fixed application Depth of 55 mm and irrigation is at critical depletion

<b>Date</b>	<b>Day</b>	<b>Stage</b>	<b>Rain</b>	<b>Ks</b>	<b>Eta</b>	<b>Depl</b>	<b>Net Irr</b>	<b>Deficit</b>	<b>Loss</b>	<b>Gr. Irr</b>	<b>Flow</b>
			mm	fract.	%	%	mm	mm	mm	mm	l/s/ha
<b>22 Jun</b>	47	Dev	0.0	1.00	100	58	55.0	39.3	0.0	78.6	0.19
<b>9 Jul</b>	64	Mid	0.0	1.00	100	57	55.0	48.4	0.0	78.6	0.53
<b>22 Jul</b>	77	Mid	0.0	1.00	100	57	55.0	46.9	0.0	78.6	0.70
<b>10 Aug</b>	96	End	0.0	1.00	100	58	55.0	48.9	0.0	78.6	0.48
<b>8 Sep</b>	End	End	0.0	1.00	100	26					

**Table S5** Crop Water Requirement for Sorghum

<b>Month</b>	<b>Decade</b>	<b>Stage</b>	<b>Kc</b> coeff	<b>ETc</b> mm/day	<b>ETc</b> mm/dec	<b>Eff rain</b> mm/dec	<b>Irr. Req.</b> mm/dec
<b>Nov</b>	2	Init	0.30	1.1	11.2	5.1	6.1
<b>Nov</b>	3	Deve	0.33	1.2	11.8	3.6	8.2
<b>Dec</b>	1	Deve	0.48	1.7	16.5	1.7	14.8
<b>Dec</b>	2	Deve	0.65	2.1	21.4	0.0	21.4
<b>Dec</b>	3	Deve	0.83	2.9	32.2	0.0	32.2
<b>Jan</b>	1	Mid	0.97	3.7	36.9	0.0	36.9
<b>Jan</b>	2	Mid	0.98	3.9	39.3	0.0	39.3
<b>Jan</b>	3	Mid	0.98	4.2	46.5	0.1	46.4
<b>Feb</b>	1	Late	0.94	4.3	43.3	1.1	42.2
<b>Feb</b>	2	Late	0.80	3.9	39.1	1.6	37.5
<b>Feb</b>	3	Late	0.66	3.5	27.9	1.2	26.7
<b>Mar</b>	1	Late	0.57	3.2	15.9	0.3	15.6
<b>Total</b>					348.0	20.7	327.4

**TableS6** Irrigation Schedule for Sorghum at Fixed application Depth of 50 mm and irrigation is at critical depletion

<b>Date</b>	<b>Day</b>	<b>Stage</b>	<b>Rain</b>	<b>Ks</b>	<b>Eta</b>	<b>Depl</b>	<b>Net Irr</b>	<b>Deficit</b>	<b>Loss</b>	<b>Gr. Irr</b>	<b>Flow</b>
			mm	fract.	%	%	mm	mm	mm	mm	l/s/ha
<b>12 Jan</b>	68	Mid	0.0	1.00	100	51	50.0	79.7	0.0	71.4	0.12
<b>24 Jan</b>	80	Mid	0.0	1.00	100	51	50.0	78.0	0.0	71.4	0.69
<b>7 Feb</b>	94	End	0.7	1.00	100	54	50.0	86.5	0.0	71.4	0.59
<b>5 Mar</b>	End	End	21.0	1.00	100	70					

**TableS7** Crop Water Requirement for Sunflower

<b>Month</b>	<b>Decade</b>	<b>Stage</b>	<b>Kc</b>	<b>ETc</b>	<b>ETc</b>	<b>Eff rain</b>	<b>Irr. Req.</b>
			coeff	mm/day	mm/dec	mm/dec	mm/dec
<b>Jan</b>	3	Init	0.35	1.5	6.0	0.0	6.0
<b>Feb</b>	1	Init	0.35	1.6	16.1	1.1	15.0
<b>Feb</b>	2	Init	0.35	1.7	17.2	1.6	15.6
<b>Feb</b>	3	Deve	0.43	2.3	18.0	1.2	16.8
<b>Mar</b>	1	Deve	0.63	3.5	35.3	0.5	34.7
<b>Mar</b>	2	Deve	0.86	5.1	50.8	0.1	50.7
<b>Mar</b>	3	Mid	1.08	6.7	73.4	1.1	72.3
<b>Apr</b>	1	Mid	1.14	7.3	73.0	1.4	71.5
<b>Apr</b>	2	Mid	1.14	7.6	75.7	1.9	73.8
<b>Apr</b>	3	Mid	1.14	8.1	80.6	5.6	75.0
<b>May</b>	1	Mid	1.14	8.7	86.9	9.9	77.1
<b>May</b>	2	Late	1.02	8.3	83.3	13.3	70.0
<b>May</b>	3	Late	0.70	5.5	59.9	15.9	44.0
<b>Jun</b>	1	Late	0.43	3.2	19.1	11.1	9.9
<b>Total</b>					695.3	64.7	632.4

**TableS8** Irrigation Schedule for Sunflower at Fixed application Depth of 50 mm and irrigation is fixed interval per stage

<b>Date</b>	<b>Day</b>	<b>Stage</b>	<b>Rain</b>	<b>Ks</b>	<b>Eta</b>	<b>Depl</b>	<b>Net Irr</b>	<b>Deficit</b>	<b>Loss</b>	<b>Gr. Irr</b>	<b>Flow</b>
			mm	fract.	%	%	mm	mm	mm	mm	l/s/ha
<b>21 Feb</b>	25	Init	0.0	1.00	100	30	50.0	0.0	11.9	71.4	<b>0.33</b>
<b>28 Mar</b>	60	Dev	0.0	0.79	97	63	50.0	96.4	0.0	71.4	<b>0.24</b>
<b>12 May</b>	105	Mid	0.0	0.14	41	93	50.0	168.8	0.0	71.4	<b>0.18</b>
<b>6 Jun</b>	End	End	0.0	0.70	0	86					

**Table S9: Crop Characteristics for Maize**

Crop Characteristics	Parameter	Unit	Observation/Value/Remark
Canopy Cover	Growth of Initial Canopy	[-]	Very High Canopy Cover
	Initial Canopy Cover (CC <sub>0</sub> )	[-]	1.00
Type of Planting Method: Transplantation	Canopy Size	[cm <sup>2</sup> /plant]	15.0
	Plant Density	[Plants/ha]	66,667
Canopy Development	Canopy Expansion	[-]	Fast Expansion
	Maximum Canopy Cover (CC <sub>x</sub> )	[%]	90
	Canopy Decline	[-]	Slow decline
Time to reach at different growth stages from sowing	Recovered	[days]	6
	Maximum canopy	[days]	54
	Senescence	[days]	107
	Maturity	[days]	125
Flowering and Yield Formation	Length Building up HI	[days]	54
	Duration of Flowering	[days]	13
Time to reach at flowering, maturity and potential vegetative growth from sowing	Flowering	[days]	66
	Maturity	[days]	125
	Potential Vegetative growth	[days]	72
Root Deepening: Deep Rooted Crop	Maximum effective rooting depth	[m]	2.0
	Average root zone expansion	[cm/day]	1.70
	From day 1 after sowing to maximum depth	[days]	108
Crop Production (No Water, Fertility or Salinity Stress)	Type of Crop	[-]	C4
	WP*	[Ton/ha]	0.337
	Reference Harvest Index (HI)	[%]	48
	Biomass	[Ton/ha]	28.128
	Dry Yield	[Ton/ha]	13.586
	ET water Productivity	[Kg/m <sup>3</sup> ]	2.41
	HI adjusted	[%]	48.3

**Table S10: Crop Characteristics for Sorghum**

Crop Characteristics	Parameter	Unit	Observation/Value/Remark
Canopy Cover	Growth of Initial Canopy	[-]	Very High Canopy Cover
	Initial Canopy Cover (CC <sub>o</sub> )	[-]	0.89
Type of Planting Method: Direct sowing	Canopy Size	[cm <sup>2</sup> /plant]	6.0
	Plant Density	[Plants/ha]	1,48,148
Canopy Development	Canopy Expansion	[-]	Fast Expansion
	Maximum Canopy Cover (CC <sub>x</sub> )	[%]	90
	Canopy Decline	[-]	Slow decline
Time to reach at different growth stages from sowing	Emergence	[days]	13
	Maximum canopy	[days]	60
	Senescence	[days]	91
	Maturity	[days]	102
Flowering and Yield Formation	Length Building up HI	[days]	37
	Duration of Flowering	[days]	20
Time to reach at flowering, maturity and potential vegetative growth from sowing	Flowering	[days]	65
	Maturity	[days]	102
	Potential Vegetative growth	[days]	75
Root Deepening: medium-Deep Rooted Crop	Maximum effective rooting depth	[m]	1.50
	Average root zone expansion	[cm/day]	1.40
	From day 1 after sowing to maximum depth	[days]	96
Crop Production (No Water, Fertility or Salinity Stress)	Type of Crop	[-]	C4
	WP*	[Ton/ha]	0.337
	Reference Harvest Index (HI)	[%]	45
	Biomass	[Ton/ha]	6.571
	Dry Yield	[Ton/ha]	0
	ET water Productivity	[Kg/m <sup>3</sup> ]	0
	HI adjusted	[%]	0



**Table S11: Crop Characteristics for Sugarcane**

Crop Characteristics	Parameter	Unit	Observation/Value/Remark
Canopy Cover	Growth of Initial Canopy	[-]	Very High Canopy Cover
	Initial Canopy Cover (CC <sub>o</sub> )	[-]	0.74
Type of Planting Method: Transplantation	Canopy Size	[cm <sup>2</sup> /plant]	20
	Plant Density	[Plants/ha]	37,037
Canopy Development	Canopy Expansion	[-]	Fast Expansion
	Maximum Canopy Cover (CC <sub>x</sub> )	[%]	90
	Canopy Decline	[-]	Very Slow decline
Time to reach at different growth stages from sowing	Recovered	[days]	7
	Maximum canopy	[days]	64
	Senescence	[days]	330
	Maturity	[days]	365
Flowering and Yield Formation	Length Building up HI	[days]	NA
	Duration of Flowering	[days]	NA
Time to reach at flowering, maturity and potential vegetative growth from sowing	Flowering	[days]	65
	Maturity	[days]	102
	Potential Vegetative growth	[days]	75
Root Deepening: Very Deep-Rooted Crop	Maximum effective rooting depth	[m]	3.00
	Average root zone expansion	[cm/day]	4.9
	From day 1 after sowing to maximum depth	[days]	61
Crop Production (No Water, Fertility or Salinity Stress)	Type of Crop	[-]	C4
	WP*	[Ton/ha]	0.30
	Reference Harvest Index (HI)	[%]	35
	Biomass	[Ton/ha]	21.608
	Dry Yield	[Ton/ha]	7.563
	ET water Productivity	[Kg/m <sup>3</sup> ]	2.29
	HI adjusted	[%]	NA

**Table S12: Crop Characteristics for Sunflower**

Crop Characteristics	Parameter	Unit	Observation/Value/Remark
Canopy Cover	Growth of Initial Canopy	[-]	Good Canopy Cover
	Initial Canopy Cover (CC <sub>o</sub> )	[-]	0.43
Type of Planting Method: Direct sowing	Canopy Size	[cm <sup>2</sup> /plant]	6.0
	Plant Density	[Plants/ha]	71,429
Canopy Development	Canopy Expansion	[-]	Very Fast Expansion
	Maximum Canopy Cover (CC <sub>x</sub> )	[%]	98
	Canopy Decline	[-]	Moderate decline
Time to reach at different growth stages from sowing	Emergence	[days]	18
	Maximum canopy	[days]	56
	Senescence	[days]	105
	Maturity	[days]	127
Flowering and Yield Formation	Length Building up HI	[days]	47
	Duration of Flowering	[days]	16
Time to reach at flowering, maturity and potential vegetative growth from sowing	Flowering	[days]	78
	Maturity	[days]	127
	Potential Vegetative growth	[days]	85
Root Deepening: Deep-Rooted Crop	Maximum effective rooting depth	[m]	2.00
	Average root zone expansion	[cm/day]	2
	From day 1 after sowing to maximum depth	[days]	100
Crop Production (No Water, Fertility or Salinity Stress)	Type of Crop	[-]	C3
	WP*	[Ton/ha]	0.18
	Reference Harvest Index (HI)	[%]	35
	Biomass	[Ton/ha]	10.933
	Dry Yield	[Ton/ha]	3.560
	ET water Productivity	[Kg/m <sup>3</sup> ]	0.66
	HI adjusted	[%]	32.6

**Table S13** Furrow Irrigation Design Parameters for Maize

<b>Furrow Irrigation Design Parameters</b>				
<b>Infiltration Method: Modified SCS Families</b>				
<b>Operation Mode</b>		Fixed Flow	Cutback Flow	Tailwater Reuse
Input parameters	Units			
Flow rate	[l/s]	1.9	1.9	1.9
Length	[m]	590	590	590
Cutoff time	[min]	1185	1254	1254
Cut-back ratio	[-]		0.67	
Recovery ratio	[-]			0.85
Required depth	[mm]	220	220	220
Flow resistance	[s/m <sup>1/3</sup> ]	0.03	0.03	0.03
Slope	[m/m]	0.02	0.02	0.02
Spacing	[m]	0.75	0.75	0.75
Maximum Velocity	[m/min]	12.6	12.6	12.6
Side Slope	[m/m]	1.2	1.0	1.0
Bed Width	[m]	0.2	0.2	0.2
SCS #		0.6	0.6	0.6
Output parameters	Units			
Cutback flow	[l/s]		1.27	
Advance ratio	[-]		0.14	
Application efficiency	[%]	71.8	94.1	94.5
Storage efficiency	[%]	99.7	98.7	98.9
Uniformity coefficient	[%]	96.8	97.7	97.8
Distribution uniformity	[%]	91.3	94	94.2
Deep percolation ratio	[%]	3.9	1	0.7
Runoff Ratio	[%]	24.2	5	31.9
Average applied depth	[mm]	231	219	220
Minimum infiltrated depth	[mm]	211	206	207
Maximum infiltrated depth	[mm]	239	225	225
Surface runoff	[mm]	74	11	103
Over irrigation depth	[mm]	14	4	4
Under irrigation depth	[mm]	4	6	6
Over irrigation length	[m]	492	320	344
Under irrigation length	[m]	98	270	246
Advance time	[min]	235	170	170
Depletion time	[min]	1192	1258	1260
Recession time	[min]	1254	1297	1303
Opportunity time	[min]	1019	1127	1133
No. of furrows		2	2	2

**Table S14** Furrow Irrigation Design Parameters for Sorghum

<b>Furrow Irrigation Design Parameters</b>				
<b>Infiltration Method: Modified SCS Families</b>				
<b>Operation Mode</b>		Fixed Flow	Cutback Flow	Tailwater Reuse
Input parameters	Units			
Flow rate	[l/s]	1.4	1.4	1.4
Length	[m]	570	570	570
Cutoff time	[min]	1265	1265	1265
Cut-back ratio	[-]		0.8	
Recovery ratio	[-]			0.85
Required depth	[mm]	150	150	150
Flow resistance	[s/m <sup>1/3</sup> ]	0.03	0.03	0.03
Slope	[m/m]	0.02	0.02	0.02
Spacing	[m]	0.75	0.75	0.75
Maximum Velocity	[m/min]	12.6	12.6	12.6
Side Slope	[m/m]	1.5	1.5	1.5
Bed Width	[m]	0.2	0.2	0.2
SCS #		0.6	0.6	0.6
Output parameters	Units			
Cutback flow	[l/s]		1.12	
Advance ratio	[-]		0.23	
Application efficiency	[%]	78.9	93.3	95.5
Storage efficiency	[%]	98.1	98	98.1
Uniformity coefficient	[%]	95.8	95.7	95.8
Distribution uniformity	[%]	88.4	88.3	88.4
Deep percolation ratio	[%]	1.6	1.8	1.6
Runoff Ratio	[%]	19.5	4.9	19.5
Average applied depth	[mm]	150	150	150
Minimum infiltrated depth	[mm]	133	132	133
Maximum infiltrated depth	[mm]	157	157	157
Surface runoff	[mm]	36	8	36
Over irrigation depth	[mm]	5	5	5
Under irrigation depth	[mm]	7	8	7
Over irrigation length	[m]	333	333	333
Under irrigation length	[m]	238	238	238
Advance time	[min]	286	286	286
Depletion time	[min]	1271	1270	1271
Recession time	[min]	1314	1310	1314
Opportunity time	[min]	1028	1024	1028
No. of Furrows		2	2	2

**Table S15** Furrow Irrigation Design Parameters for Sunflower

<b>Furrow Irrigation Design Parameters</b>				
<b>Infiltration Method: Modified SCS Families</b>				
<b>Operation Mode</b>		<b>Fixed Flow</b>	<b>Cutback Flow</b>	<b>Tailwater Reuse</b>
Input parameters	Units			
Flow rate	[l/s]	0.75	0.75	0.75
Length	[m]	285	285	285
Cutoff time	[min]	1000	1000	1000
Cut-back ratio	[-]		0.75	
Recovery ratio	[-]			0.85
Required depth	[mm]	150	150	150
Flow resistance	[s/m <sup>1/3</sup> ]	0.04	0.04	0.04
Slope	[m/m]	0.005	0.005	0.005
Spacing	[m]	0.75	0.75	0.75
Maximum Velocity	[m/min]	13.8	13.8	13.8
Side Slope	[m/m]	1	1	1
Bed Width	[m]	0.2	0.2	0.2
SCS #		0.6	0.6	0.6
Output parameters	Units			
Cutback flow	[l/s]		0.56	
Advance ratio	[-]		0.26	
Application efficiency	[%]	75.5	92.5	91.6
Storage efficiency	[%]	99.3	99.2	99.3
Uniformity coefficient	[%]	95.4	95.3	95.4
Distribution uniformity	[%]	87.6	87.3	87.6
Deep percolation ratio	[%]	5.4	6.6	5.5
Runoff Ratio	[%]	19	0.9	19
Average applied depth	[mm]	160	159	160
Minimum infiltrated depth	[mm]	140	139	140
Maximum infiltrated depth	[mm]	168	168	168
Surface runoff	[mm]	38	1	38
Over irrigation depth	[mm]	13	13	13
Under irrigation depth	[mm]	4	5	4
Over irrigation length	[m]	226	226	226
Under irrigation length	[m]	59	59	59
Advance time	[min]	261	261	261
Depletion time	[min]	1007	1006	1007
Recession time	[min]	1057	1051	1057
Opportunity time	[min]	796	790	796
No. of Furrows		1	1	1

