C

BLANK WORKSHEETS

The table below lists which worksheets are used for sprinkler systems and which ones are for trickle systems. The blank versions of these worksheets are provided in this appendix.

Worksheet	Sprinkler	Trickle	Example
1(a) Information from Farm Plan – Sprinkler	✓		Page 16
1(b) Information from Farm Plan – Trickle		✓	Page 19
2(a) Irrigation System Audit – Sprinkler	 ✓ 		Page 22
2(b) Irrigation System Audit – Trickle		✓	Page 22
3(a) Total Irrigated Area Using System Information	✓		Page 26
3(b) Total Irrigated Area Using Field Dimension	✓	✓	Page 27
4(a) Irrigation System Peak Flow Rate Check – Sprinkler	✓		Page 31
4(b) Irrigation System Peak Flow Rate Check – Trickle		✓	Page 32
5(a) Annual Water Use Check – Sprinkler	✓		Page 39
5(b) Annual Water Use Check – Trickle		✓	Page 41
6 Water Diversion and Conveyance Loss Checks	✓	✓	Page 47
7 Intake Screen Area Check	✓	✓	Page 52
8 Irrigation Water Quality Check	✓	✓	Page 56
9 Irrigation System Uniformity Check	✓	✓	Page 60
10 Sprinkler Irrigation Scheduling Using Water Budget Method	✓		Page 73
11 Trickle Irrigation Scheduling Using Plant Water Requirement Method		✓	Page 75
12 Trickle Irrigation Scheduling Using Water Budget Method		✓	Page 76

Worksheet 1(a) Information from Farm Plan – SPRINKLER



INFORMATION	Value and Box No.	Unit	Source
Worksheet 3(a) Total Irrigated Area Using System Inforn	nation		
Irrigation interval per pass	1	days/pass	Farm info
Irrigation sets per day	2	sets	Farm info
Sprinkler spacing	3	ft	Farm info
Number of sprinklers	4	sprinklers	Farm info
Distance moved per set		ft	Farm info
			r ann inio
Worksheet 3(b) Total Irrigated Area Using Field Dimensi	on		
Field width	1	ft	Farm info
Field length	2	ft	Farm info
		l it	
Worksheet 4(a) Irrigation System Peak Flow Rate Check			
Calculated Irrigation System Peak Flow Rate			
Peak flow rate on water licence or provided by			Water
irrigation district or water purveyor	2	US gpm	licence or
		ee gp	purveyor
Peak evapotranspiration (ET) in	_	in/d	Table 2.1
Estimated peak flow rate requirement per acre	3	US gpm/acre	Table 2.2 or
		ee gpiilleie	2.3
Actual Invigation System Flow Pate			
<u>Actual Irrigation System Flow Rate</u>			Motor or
Flow rate metered or provided by district	5	US gpm	Meter or district
Dump Specifications:			uistrict
Pump Specifications:			Etal ale a ale
Model number	-	in Die	Field check
Impellor size		in Dia.	Pump
Revolution per minute (rpm)		rpm	name plate
Flow rate	6	US gpm	Pump curve
Nozzle Specifications:			
Size	_	in x in	Field check
Operating pressure		psi	Field check
Flow rate	7	US gpm	Farm plan
Number of nozzles	8	nozzles	Farm plan
Worksheet 5(a) Annual Water Use Check			
<u>Calculated Annual Water Use Requirement</u> Annual water withdrawal stated on water licence		ac ft	W/ator
Annual water withorawar stated on water licence	2	ac-ft	Water licence
Estimated annual crop water requirement	3	in	Table 2.4
Application efficiency of irrigation system	4	%	Table 3.2
Motor Information			
Meter Information			W/otor
Meter reading at start of year	6	US gal	Water
Meter reading at end of year	7	US gal	purveyor

Pump Specifications		
Pump horsepower	hp	Pump
	ΠP	name plate
Energy consumption for entire year 10	KWh	Hydro bill
Refer to Worksheet 4(a) for the rest of the information regarding pump		
Irrigation Specifications	_	
Irrigation interval	days	Farm plan
Number of irrigations per year 17		Farm plan
Worksheet 6 Water Diversion and Conveyance Loss Checks		
Conveyance channel flow rate at/near diversion 1	US gpm	Site
Overflow in channel 2	US gpm	Site
Number of operating days per season	days	Site
Amount of water licensed 4	ac-ft	Water
	•	licence
Conveyance channel flow rate at/near intake	US gpm	Site
	0 0 9 p	0.10
Worksheet 7 Intake Screen Area Check		
Screen mesh size	mesh	Site
Percent open area of mesh size	%	Table 3.4
	/0	
For flat screen.		
	4	Site
	ft	
Length of screen	ft	Site
Width of screen	ft	Site
For cylindrical screen,		
Diameter of screen	ft	Site
Length of screen	ft	Site
Worksheet 8 Irrigation Water Quality Check		
Sodium adsorption ratio (SAR) 1		Laboratory
Electrical conductivity (EC) of water	dS/m	Table 3.5
E. coli count	cfu/100 ml	Laboratory
Fecal coliform count	cfu/100 ml	Laboratory
		,

Worksheet 1(b) Information from Farm Plan – *TRICKLE*

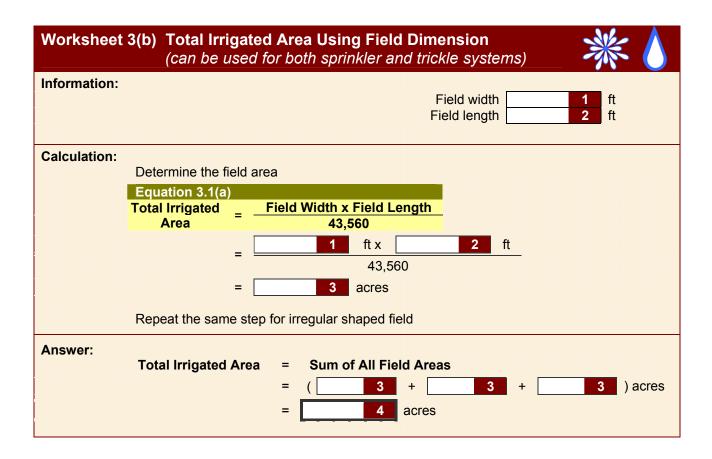
INFORMATION	Value and Box No.	Unit	Source
Vorksheet 3(b) Total Irrigated Area			
		a.	Correction for
Field width	2	ft ft	Farm info Farm info
	2	it.	Fannino
Vorksheet 4(b) Irrigation System Peak Flow Rate Check	ĸ		
Calculated Irrigation System Peak Flow Rate			
Peak flow rate on water licence or provided by			Water
irrigation district or water purveyor	2	US gpm	licence or purveyor
Peak evapotranspiration (ET) in	-	in/d	Table 2.1
Estimated peak flow rate requirement per acre	3	US gpm/acre	Table 2.2 2.3
Actual Irrigation System Flow Rate			
Flow rate metered or provided by district	5	US gpm	Meter or district
Pump Specifications:			
Model number	-		Field che
Impellor size	-		Pump
Revolution per minute (rpm) Flow rate	6	rpm US gpm	name pla Pump cui
Emitter Specifications:			
Size	-	in I.D.	Field che
Operating pressure	_	psi	Field che
Flow rate (zone 4)		gph	Farm plai
Number of emitters (zone 4)	8	emitters	Farm plai
Vorksheet 5(b) Annual Water Use Check			
Calculated Annual Water Use Requirement			
Water withdrawal amount on water licence	2	ac-ft	Water licence
Estimated annual crop water requirement	3	in	Table 2.4
Crop adjustment factor	4		Table 3.3
Application efficiency of irrigation system	5	%	Table 3.2
Meter Information			
Meter reading at start of year	6	US gal	Water
Meter reading at end of year	7	US gal	purveyor
Pump Specifications			
Pump horsepower	10	hp	Pump
			name pla
Energy consumption for entire year	regarding pump	KWh	Hydro bill

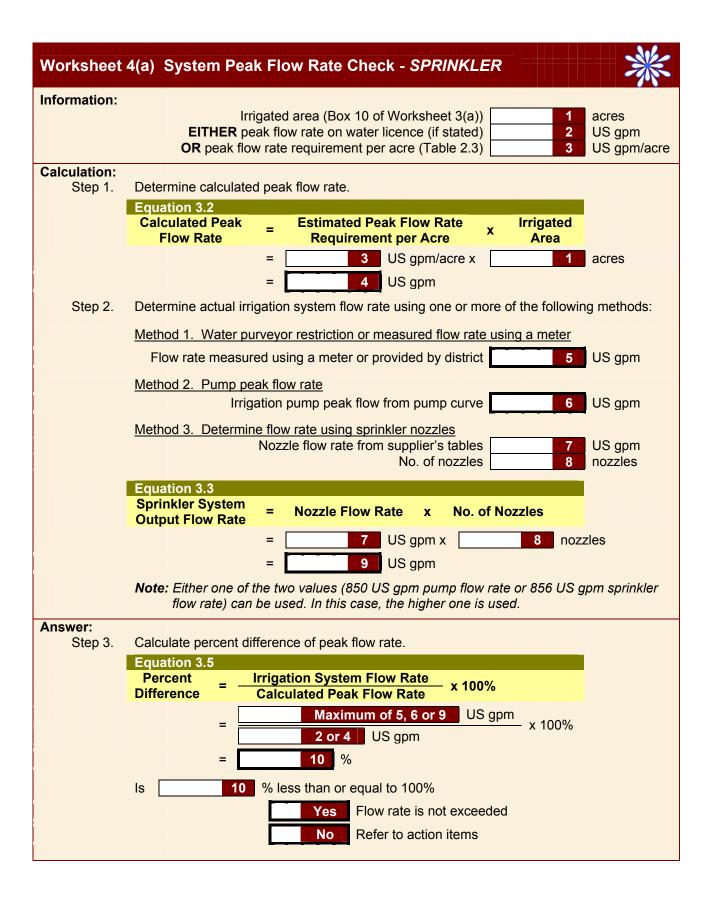
Irrigation Specifications (based on emitter specifications)		
Number of zones 17	zones	Farm plan
Operating hours per zone per day 18	hr/zone/d	Farm plan
Number of operating days per year 19	days	Farm plan
Worksheet 6 Water Diversion and Conveyance Loss Checks	_	
Conveyance channel flow rate at/near diversion 1	US gpm	Site
Overflow in channel 2	US gpm	Site
Number of operating days per season 3	days	Site
Amount of water licensed 4	ac-ft	Water licence
Conveyance channel flow rate at/near intake 5	US gpm	Site
Worksheet 7 Intake Screen Area Check Screen mesh size Percent open area of mesh size 3	mesh %	Site Table 3.4
For flat screen,		
Number of screened surfaces 5	ft	Site
Length of screen	ft	Site
Width of screen 7	ft	Site
For cylindrical screen.		
Diameter of screen	ft	Site
Length of screen 10	ft	Site
Worksheet 8 Irrigation Water Quality Check		
Adjusted sodium adsorption ratio (SAR _{adj}) 2		Laboratory
Electrical conductivity (EC) of water	dS/m	Table 3.5
E. coli count	cfu/100 ml	Laboratory
Fecal coliform count	cfu/100 ml	Laboratory

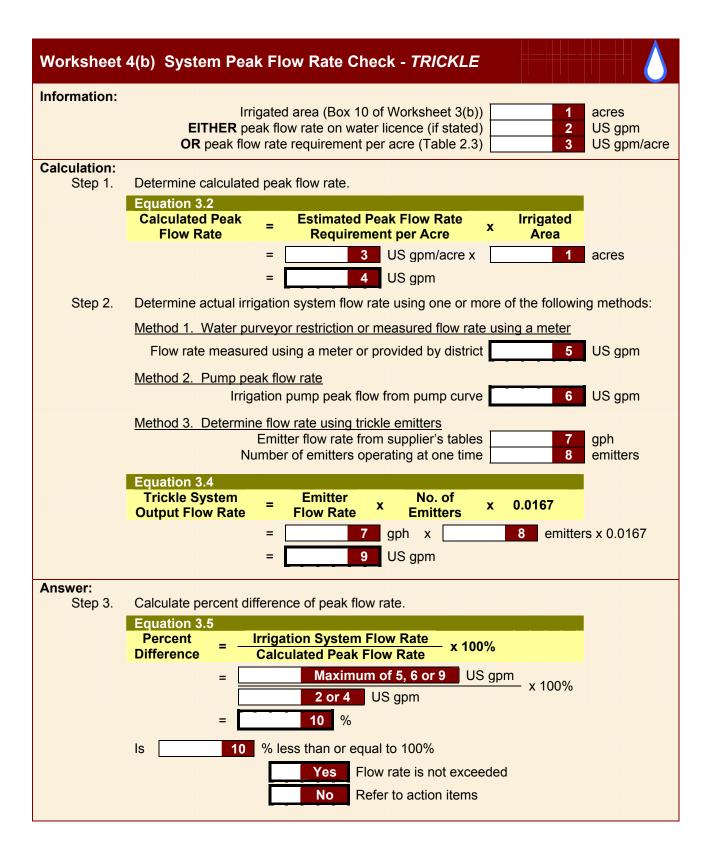
Workshee	et 2(a) Irrigation System Audit – SPRINKLER		業
Checklist:		Yes	No
	1. Are all sprinklers of the same model?		
	2. Are all nozzles of the same size?		
	 Are all sprinkler and lateral spacing uniform (50 – 60% wetted diameter)? Is the operating pressure in the best range? Is pressure differential minimal? 		
Answer:	Do the system conditions meet all the minimum standards?		

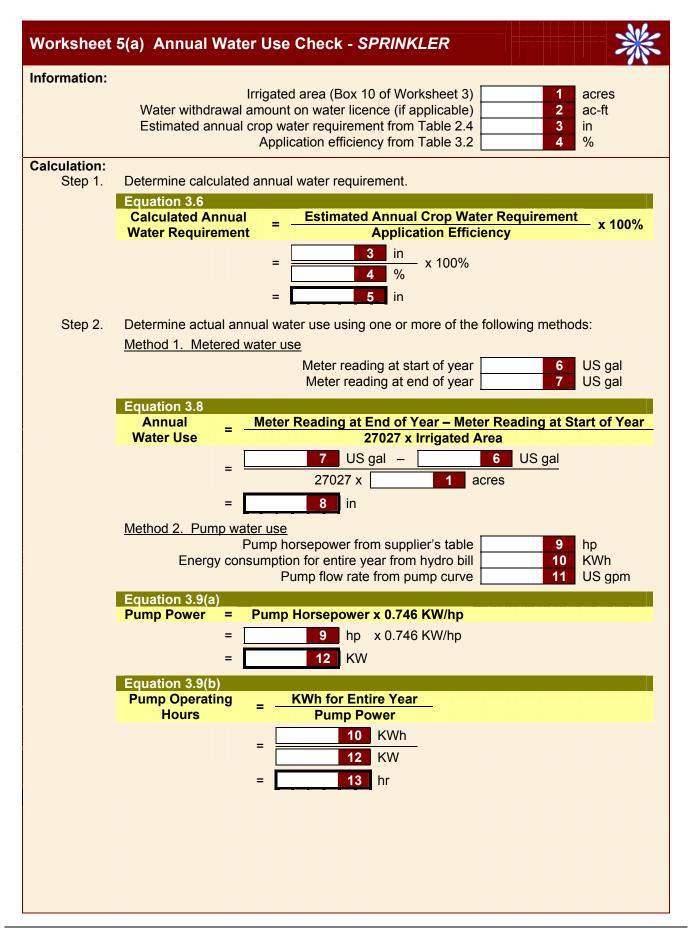
Checklist:		
		lo
	For each zone,	
	1. Are all emitters of the same model throughout the zone?	
	2. Are all emitters of the same size throughout the zone?	
	3. Are all emitter spacing uniform throughout the zone?	
	4. Is pressure differential minimal?	
	5. Is the same crop or same plant size grown in the zone?	
	6. Is the soil type uniform throughout the zone?	
Answer:	Do the system conditions meet all the minimum standards?	
	Yes - OK No - See action items.	

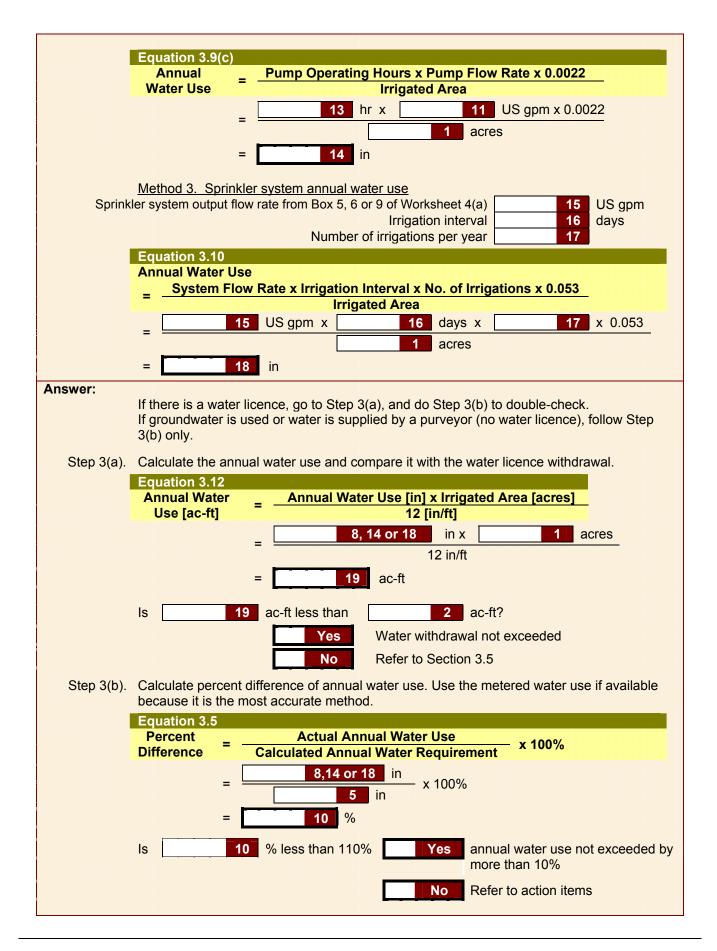
	3(a) Total Irrigated Area Using System Information
Information:	Irrigation interval per pass1days/passIrrigation sets per day2setsSprinkler spacing3ftNumber of sprinklers4sprinklersDistance moved per set5ft
Calculation: Step 1.	Calculate the number of sets per pass
	No. of Sets per Pass = Irrigation Interval per pass x Irrigation Sets per Day = 1 days x 2 = 6 sets
Step 2.	Calculate the field width Field Width = Sprinkler Spacing x No. of Sprinklers = 3 ft x 6 = 7 ft
Step 3.	Calculate the field length Field Length = Distance Moved per Set x No. of Sets = 5 ft x 6 = 8 ft
Step 4.	Determine the field area
	Total Irrigated Area=Field Width x Field Length 43,560=7ft x8ft x43,560=9acres
	Repeat the same step for irregular shaped field.
Answer:	Total Irrigated Area = Sum of All Field Areas = (9 + 9 + 9) acres = 10 acres

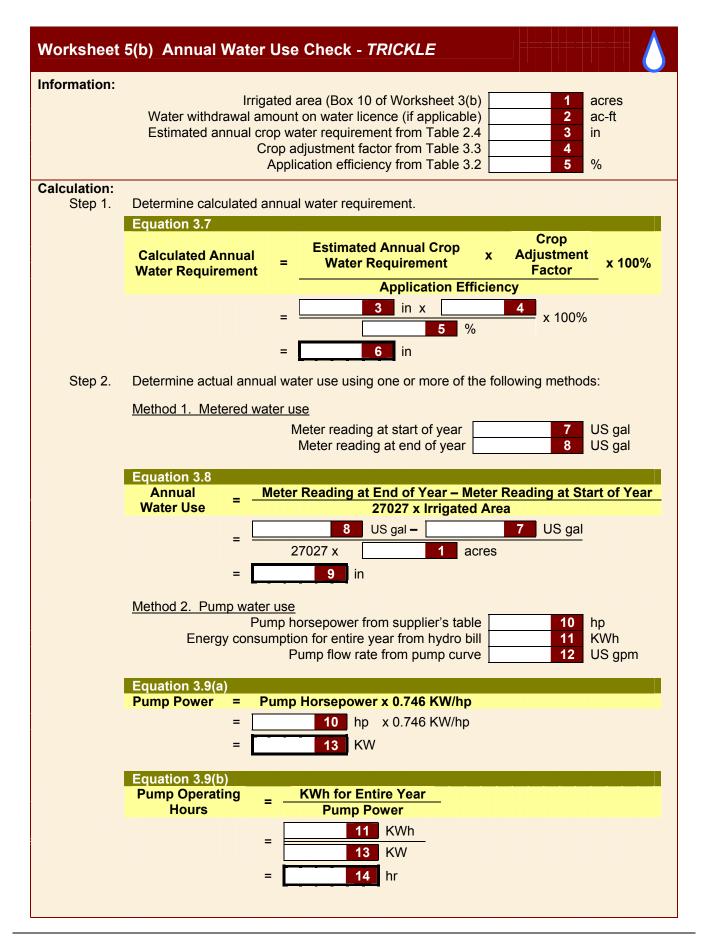


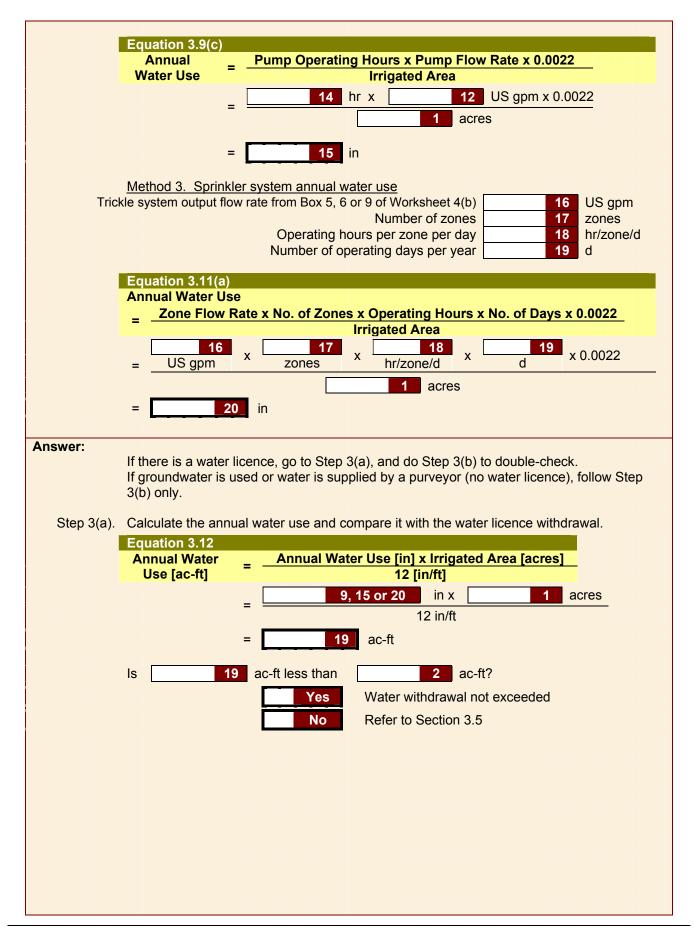


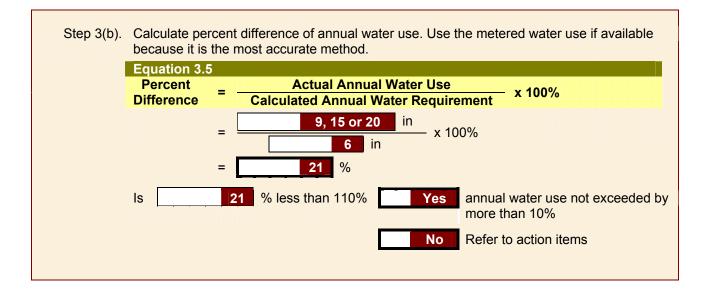


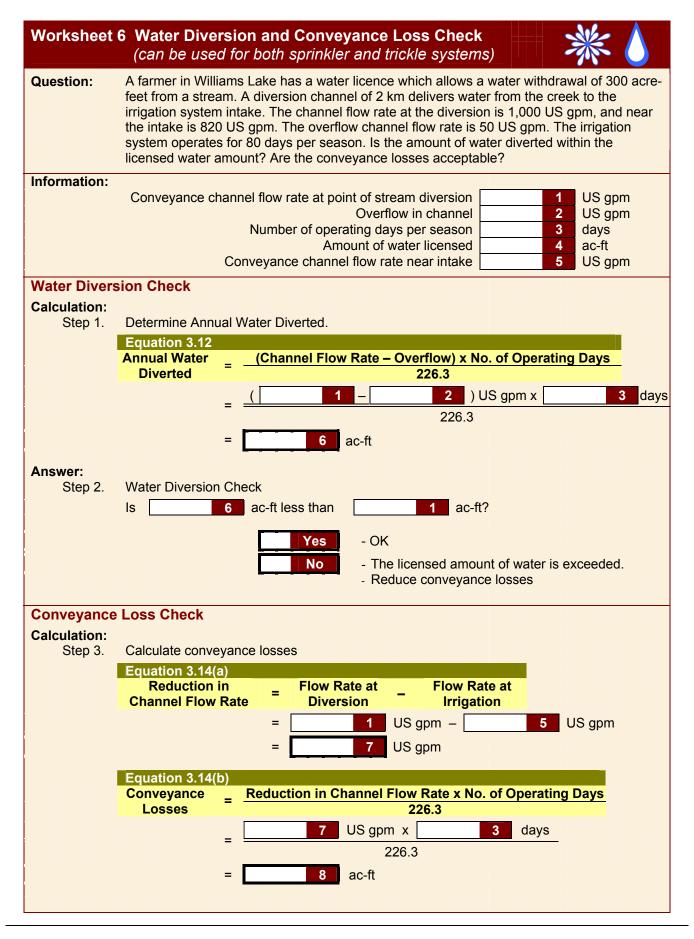


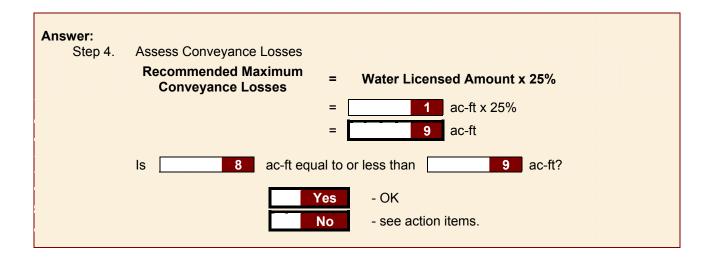


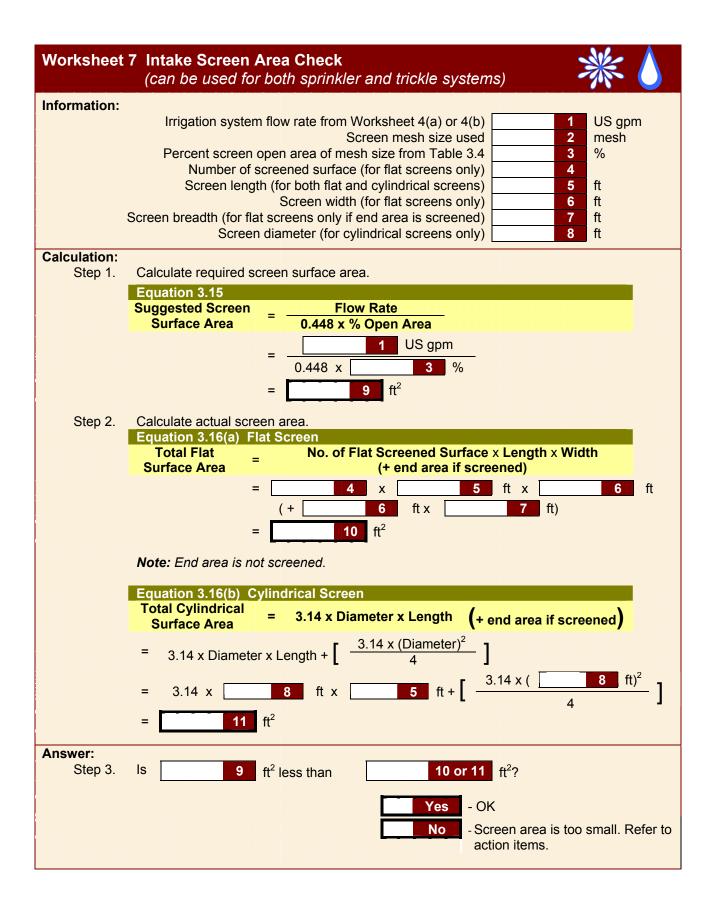




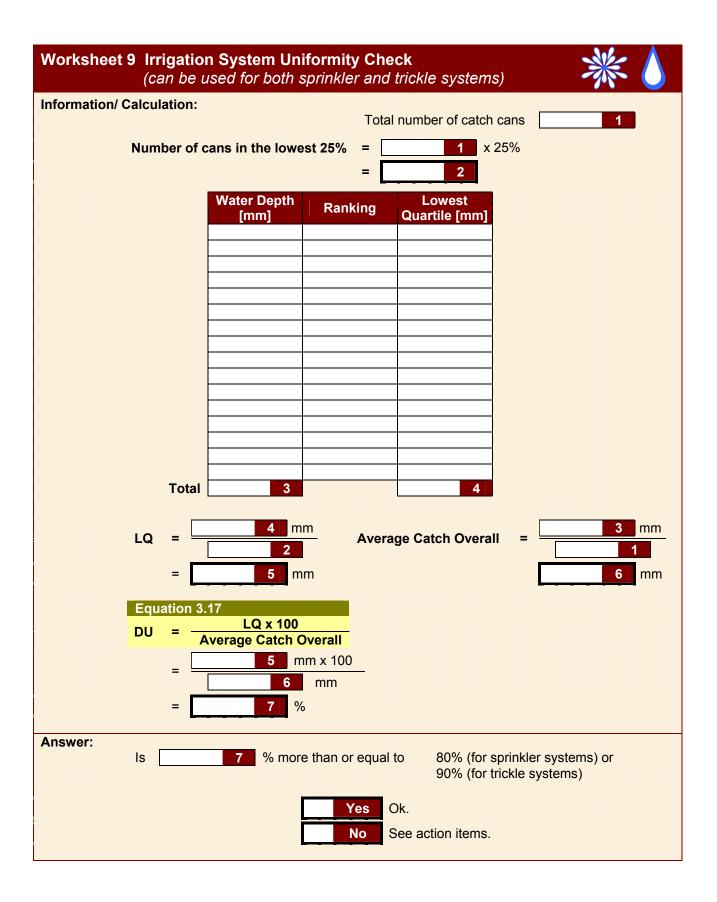




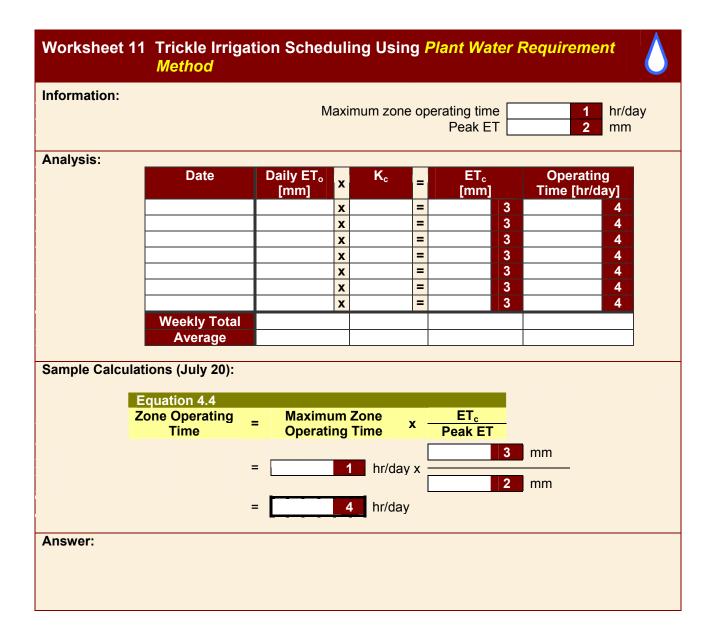




Worl	ksheet 8			Quality Check oth sprinkler and tri	ckle systems)	₩ 💧
Calcu	lation:						
\$	Step 1.	SAR or	SAR _{adi} Check				
				SAR for sprin	· · ·	1	
				SAR _{adi} for tri	· · ·	2	
				ectrical conductivity (EC		3	dS/m
			Restriction	on water use from Tab	ble 3.5 or 3.6	4	
			swer in Box 4 is be restricted.	slight to moderate or s	severe, water us	se from this so	urce may
	o. o						
5	Step 2.	Pathoge	en Check				- (100 m)
				F	E.Coli	5 6	cfu/100 ml cfu/100 ml
				F	ecal coliform	6	
Answ	er:	Use Tab	ble 3.5 to detern	nine if the values are w	thin acceptable	parameters.	



formation:			М		um soil water	(SWS) capacit deficit (MSWD coefficient (K _c) mn
nalysis:	<u>Nomenclatu</u>	<u>re:</u> PSWS = EP = IRR = ET₀ = K₀ = CSWS =	Effectiv Net Dep Referer Crop Co	s Soil Water Stor e Precipitation oth of Irrigation W ice Evapotranspin pefficient Soil Water Stora	ater Applied ation		
	All units a Date	re in millim		n) except for D		T <mark>o x</mark> K	c = CSWS
	Dale		+	+		T _o X K	
			+	+		X	=
			+	+	_	x	=
			+	+		X	=
			+	+		x	=
			+	+	-	x	=
			+	+	-	x	=
			+	+	-	x	=
			+	+	-	x	=
			+	+	-	X	=



ormation:						
		Maximur		Emitter sp Row sp storage (SWS Emitter Flow pplication effici	acing (S ₂)) capacity / Rate (Q)	1 m 2 m 3 mr 4 L/r 5 %
Iculation:						
(a)	The maximum soi	I water deficit	(MSWD) fo	r trickle system	ns is 25% of th	ne SWS; therefore
	MSWD =	3	mm x 25%)		
	=	6	mm			
	= N			ater Applied (IRR)	
(b)	Irrigation should	-	-		,	
(U)		Start when t	mm –	feaches.	mm	
			_	U		
	=	7	mm			
(c)	Determine opera	ting time				
	Equation 4.5					
	$T = \frac{S_1 \times S_2}{S_1 \times S_2}$	G₂ x IRR x 100 Q x AE	<u>)%</u>			
				2 m x	4 m	ım x 100%
	=		4 L	/hr x	5 %	
			4		5 70	
	= L	8 hr				
(d)						
	<u>Nomenclature:</u> PSWS	= Previous	Soil Water Sto	orage		
	EP	= Effective	Precipitation	-		
	IRR ET。	= Reference	h of Irrigation \ e Evapotransp			
	K. CSWS	= Crop Coe = Current S		ade		
	All units are in mil	limetres (mm)) except for	Date and K_{c} .		
	Date PS	NS <mark>+</mark> E	P +	IRR <mark>–</mark> E	T _o x K	CSWS
		+	+		X	=
		+	+		x	
		+	+		X	=
		+	+	-	X	=
		+	+		X	=
		+	+		X X	=
		+	+	-	X	=
		+ + +	+ + +		x x x	= = =