Kansched for Potato Irrigation Scheduling

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Profitable potato growing is very dependent on good irrigation management. Too little water causes poor yields and quality, while too much water encourages diseases, rinses important nutrients from the soil, and results in high water and power costs. It is important to have data-based estimates of when, and how much to irrigate. A relatively simple way to do this is to use Kansched. Kansched runs on your computer and comes in either an Excel spreadsheet (Kansched), or a compiled (Kansched2) program form and helps a grower do "checkbook" style irrigation scheduling. Reference evapotranspiration (alfalfa crop water use), and rainfall are taken from AgWeatherNet (http://weather.wsu.edu) and included in the model for that day. Irrigation amounts are also included. Kansched does a daily soil water balance (keeps track of inflows and outflows) and shows an estimate of the daily soil water content. The soil water deficit (amount of additional water the soil could hold in the root zone), and the percent of available water are given. These modeled soil water contents can be corrected with measured soil water contents as necessary.



Figure 1. Soil water content chart produced automatically by Kansched (MS Excel version).

KANSCHED.xlsx - Microsoft Excel												
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15		INPUT	Calculated	INPUT	INPUT	INPUT		Available	Root Zone			
16		Prev Day	Prev Day	Previous	Previous	Measured	Calculated	Soil Water	Water			
17		Reference	Сгор	Day	Day Net	Soil Water	Soil Water	Content	Deficit			
18		ET	ETc	Rain	Irrigation	Availability	Availability	Above PWP				
19		[ETref]	[ETcrop]	[Rain]	[Irrig]	[%Avail]	[%Avail]	[Avail SWC]				
20	Day	(in/day)	(in/day)	(in)	(in)	(%)	(%)	(in)	(in)		-	
132	6/19	0.15	0.14				55.9%	3.18	2.52			
133	6/20	0.13	0.12				53.7%	3.06	2.64			
134	6/21	0.18	0.17				50.7%	2.89	2.81			
135	6/22	0.22	0.21		1.00		64.6%	3.68	2.02			
136	6/23	0.20	0.19				O 61.3%	3.49	2.21			
137	6/24	0.23	0.22				o 57.4%	3.27	2.43			
138	6/25	0.21	0.20				o 53.9%	3.07	2.63			
139	6/26	0.25	0.23				49.8%	2.84	2.86			
140	6/27	0.25	0.24		1.00		63.2%	3.60	2.10			
141	6/28	0.26	0.25				58.9%	3.36	2.34			
142	6/29	0.23	0.22		1.00		72.6%	4.14	1.56			
143	6/30	0.20	0.19				69.3%	3.95	1.75			
144	7/1	0.18	0.17				66.3%	3.78	1.92			
145	7/2	0.18	0.17		1.00		80.8%	4.61	1.09			
146	7/3	0.20	0.19				77.5%	4.42	1.28			
147	7/4	0.23	0.22				73.6%	4.20	1.50			
148	7/5	0.21	0.20				0 70.1%	4.00	1.70		Ŧ	
14	► ► I	nput Budget	Mgmt Chart	Water Char	t 🖌 ET Char	t / Irrig. / (Crop Coeff 📈 S	oils 🖉				
Ready 🔚 🛄 100% 💬 – 🛡 🛒												

Figure 2. Daily budget sheet in Kasched (MS Excel version). The grey columns are input by the grower and the white columns are calculated.

Kansched and Kansched2 were developed in Kansas and are available for free online. If entered into Google, it will be the top return. There are also user manuals available. The model needs an estimate of your soil's water holding capacity. There are defaults by soil texture available in the program, but a more accurate estimate for your particular field is available from the NRCS web soil survey (http://websoilsurvey.nrcs.usda.gov). Crop coefficients are multiplied by the daily reference alfalfa evapotranspiration (ETr) to account for the different growth stages of potatoes. Good initial estimates for the initial, maximum, and final crop coefficient are 0.4, 1.0, and 0.6 respectively. Season dates for your area will also have to be included in the model. Consult the manual for additional information. AgWeatherNet can be set up to email, or text you the daily ETr and rainfall amounts. This email or text is a good daily reminder to update this model and look at where the field is at.

Irrigation scheduling tools such as Kansched can help growers make better informed decisions on when water is required, and when soil moisture is adequate and pivots can be left off for a while. Feel free to call, or email with any questions you may have. Troy Peters, 509-786-9247, troy_peters@wsu.edu.



Figure 3. Soil water content chart produced automatically by Kansched2 (compiled program version).

1.	KanSched2											_ 0
E	Field Collection Optio	ns Field Options StarTrapRanch Monday, December 13	Tools Abo	out								
				Create N	ew Field	🔆 ET Gro	oups 😽 F	Rain Groups	West Pasture 💌			
S	eason: 2009 💌	West Pasture b	suager s	neet - Gr	d55 Pd51	ure						محو امو ار او او
	Field Setup			Export to MS Excel								
	📝 Daily Budget	Day	Ref ET (in./day)	Crop ET (in./day)	Rain (inches)	Gross Irrig (inches)	Measured Soil Water Avail.(%)	Calculated Soil Water Avail.(%)	Calculated Available Soil Water (inches)	Root Zone Water Deficit (inches)	Effective Rain (inches)	Total Cost (\$)
	Soil Water Chart	10/04/09	0.19	0.21				67.9%	4.08	1.92	0.00	
		10/05/09	0.12	0.13		1.00		82.4%	4.94	1.06	0.00	\$338.08
1	Forecast	10/06/09	0.10	0.11				80.6%	4.83	1.17	0.00	
۲		10/07/09	0.10	0.11				78.7%	4.72	1.28	0.00	
	Season Summary	10/08/09	0.08	0.09		1.00		93.9%	5.64	0.36	0.00	\$349.85
		10/09/09	0.07	0.08				92.7%	5.56	0.44	0.00	
	Irrigation System	10/10/09	0.07	0.08				91.4%	5.48	0.52	0.00	
		10/11/09	0.06	0.07				90.3%	5.42	0.58	0.00	
C	Water Information	10/12/09	0.06	0.07				89.2%	5.35	0.65	0.00	
		10/13/09	0.02	0.02	0.23			91%	5.46	0.54	0.13	
		10/14/09	0.06	0.07	0.08			89.9%	5.39	0.61	0.00	
		10/15/09	0.04	0.04				89.1%	5.35	0.65	0.00	
		10/16/09	0.05	0.06				88.2%	5.29	0.71	0.00	
		10/17/09	0.07	0.08	0.16			87.9%	5.28	0.72	0.06	
		10/18/09	0.05	0.06				87%	5.22	0.78	0.00	
		10/19/09	0.04	0.04				86.3%	5.18	0.82	0.00	
		10/20/09	0.05	0.06				85.4%	5.12	0.88	0.00	
		10/21/09	0.04	0.04	0.05			84.6%	5.08	0.92	0.00	
		10/22/09	0.04	0.04				83.9%	5.03	0.97	0.00	
		10/23/09	0.05	0.06	0.07			83%	4.98	1.02	0.00	
		10/24/09	0.07	0.08				81.7%	4.90	1.10	0.00	
		10/25/09	0.04	0.04				81%	4.86	1.14	0.00	
		10/26/09	0.06	0.07	0.05			79.9%	4.79	1.21	0.00	-
		10/27/09	0.04	0.04				79.1%	4.75	1.25	0.00	

Figure 4. Daily budget sheet in Kasched2 (compiled program version). The white columns are input by the grower and the light blue columns are calculated.