





IrriSAT v2 - User manual

Introduction

The purpose of this document is to provide a user guide for the IrriSAT v2 web app. Here you will find step-by-step instructions for all the basic functionalities.

Overview of IrriSAT

What is IrriSAT v2?

IrriSAT v2 is a weather-based irrigation scheduling service that is used to inform farmers how much water their crops have used and how much irrigation they need to apply. Information is produced daily and can work across large spatial scales.

What can I get with IrriSAT?

The IrriSAT v2 methodology uses satellite images to determine the Normalized Difference Vegetation Index (NDVI) for each field, from which the plant canopy size can be determined and a specific crop coefficient (Kc) can be estimated. By combining Kc with daily reference Evapotranspiration (ET0) observations from a nearby weather station, the crop water usage can be determined and advice can be provided regarding the amount of irrigation to be applied. More information about the irriSAT v2 methodology and models can be found at IrriSAT v2 Technical Reference

Who manages IrriSAT v2?

Deakin University is the custodian of IrriSAT v2, its source code, and its associated systems. These systems are administered by Deakin University staff in Griffith NSW.

Feedback

Your feedback is valuable for us! If you have any questions or comments about any aspect of IrriSAT v2, please email us at wifield.cerrf@gmail.com

System requirements

IrriSAT v2 is designed to operate on web browsers on a wide range of fixed and mobile devices, ranging from desktop PCs and laptops and tablets. However, older versions of web browsers can present instabilities for some IrriSAT functionalities. For best performance, we recommend the following Web browsers:

- Mozilla® Firefox®, version 48 or higher
- Google® Chrome®, version 51 or higher
- Apple® Safari®, version 17 or higher

However, specific browsers may provide different levels of functionality depending on the platform and operating system you are using. For that reason, we strongly recommend that you keep your Web browser up-to-date

Getting started

Step 1:

Open your web browsers and navigate to the IrriSAT app website https://irrisat.app you should see the following screen displayed. Turn off any pop-up blockers in your browser.



Step2:

Click on the google "Sign in with google" button on the right upper corner of the screen and log in with your google account. If you don't have a Google account then you can create a free account here: https://accounts.google.com/signup Once signed in you will see a guide note asking you to add

management units if none exist.



Step3:

The user can Logout any at any moment. To Logout just click on the arrow right as indicated in Figure bellow.



Visualizing map layers:

To visualize map layers just click on the box and drag the transparency slider across to the right as shown. Users with no registered account can choose to visualize the Landsat 7, Landsat 8, Landsat 9, Sentinel 2, Clouds, and NDVI options.



A Warning

To visualize Kc maps users must add management units first.

Editing default view:

IrriSAT uses as default view geolocation the coordinates of Latitude -29.49 and Longitude 149.15. The user can change the default geolocation by navigating on the map to the desired geolocation. When on the desired location just click on the arrow down and select the option Set current view as default as indicated in the Figure below. Once saved every time that the user Login IrriSAT will travel to the saved view.



Adding management units :

Step 1 :

Note

To be able to proceed with this step the user must be logged in

To add management units, which are simply areas you are interested in looking at crop coefficient and water use data from, click on + icon next to "My Fields" as shown on the Figure below.



Step 2

You will be presented with dialog to add a new field as shown. You can use the pan and zoom functions (Botton right of screen) to locate your management zone or your mouse wheel and hold and drag.



Once you locate your management zone click on the corners of your field to outline it as shown.



When finished click on the starting point and a polygon covering your field will be shown.



👌 Tip

Always make sure to close the polygon otherwise IrriSAT will present issues to perform the required calculations

Step 3

Add a field name and click the "Add" button



You will now see that a field has been added and the kc map is available, and also that the date selection drop-down is showing a date and is now operational. This will show how your crop coefficient changes over seasons and also the spatial patterns of crop growth across the fields. Satellite images from the Landsat platform go back until May 1999 in the IrriSAT interface at a 30m resolution. Sentinel Satellite images are available from Jan 2016 onwards and are at 10m resolution.



Using management zone for irrigation management

Note

To proceed with this step the user must have added a management zone

Step 1

Click on the new field you have added. This IrriSAT app will now calculate seasonal daily crop water use for the field. It will automatically retrieve the crop coefficient time series and link to the nearest IrriSAT weather station time series and automatically display crop water use information. This may take a few seconds as it's a lot of data to process "on the run". You should new get a screen showing crop coefficient charts and crop water use charts in the irrigation management panel as shown below.



The irrigation management panel has eight different tabs with different functionalities. The Table (1) below summarizes each tab's functionality.

Symbol	Title	Description
\$	Crop health	This panel plots the kc values over time as well Cumulative and Daily ET_c
~	Forecast	This panel shows a table with 7 day forecast for ET_o and $Rain$ chance, as well as plots the 7 day forecast for ET_c daily and cumulative.
٢	Apply water	This panel enables the input of applied irrigation and rainfall, as well as it plots the Soil Water balance, Crop water Use, Total water applied, Irrigation, and Rainfall.
0	Irrigation Schduler	This panel plots a gauge with the current soil water deficit, as well as plots the current and the 7 day forecast of soil water defict, irrigations and rainfall events.

Symbol	Title	Description
i≡	Season Report	This panel summarizes the Rainfall, irrigation, Total water applied, Crop water use, and FInal Soil Wtaer Devicit.
Ø	Season Crop Water Use	This panel shows a map with the crop season water use in ML/ha
٥	Field Settings	This panel enables the Field and Irrigation Settings.

A Warning

If the nearest meteorological station has no ET_c data or there is no meteorological station available on a 250 m radius the Crop Water Use graph will plot a flat line

Using the crop health tab

Hover your mouse to the chart area. When your mouse pointer is on this area you can use the mouse wheel to zoom and scroll through the dates to show smaller or larger time scales as shown below.



In the Data mode is also possible to edit kc values that have cloud interference. For that click on the Edit toggle in the right top of the Crop growth chart as indicated with arrow 1. Now the edit button switched to Done and a kc edition field appeared on the center bottom of the graph.

To change the kc values click on the desired point to change as shown on arrow 2. Use the <u>overriden</u> field to override the the kc as indicated by arrow 3. When finished click Apply to save the updates.



If you click on the Data tab you will switch the graph data to a tabular mode as shown below. On this mode is also possible to export the data to CSV format. For that just click on the button Download CSV.

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	Field Visibility (%)	Kc (Average)	Kc (Observed)	Kc (Override)	Kc (StdDev)	Kc (Min)	Kc (Q1)	(N
10/02/2023	100	0.01909	0.01909	-999	0.01543	-0.03822	0.0113	0.0
18/02/2023	100	0.06396	0.06396	-999	0.01581	0.03126	0.05572	0.0
26/02/2023	100	0.01957	0.01957	-999	0.02033	-0.00015	0.01267	0.0
06/03/2023	100	0.0625	0.0625	-999	0.04309	-0.00011	0.01847	0.0
14/03/2023	100	0.00605	0.00605	-999	0.01519	-0.01213	-0.00047	0.0
22/03/2023	73.91988	0.0417	0.0417	-999	0.01945	-0.01757	0.02911	0.0
30/03/2023	100	0.03522	0.03522	-999	0.01968	0.00943	0.02644	0.0
07/04/2023	78.00472	0.02942	0.02942	-999	0.06867	-0.086	0.0004	0.0
15/04/2022	100	0.04107	0.04107	-000	0 03434	-0.01027	0 02025	01

Graph Data

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	ETc Cumulative (mm)	ETc Daily (mm)	ET0 Daily (mm)
16/02/2023	0.18897	0.18897	9.9
17/02/2023	0.38366	0.19469	10.2
18/02/2023	0.99763	0.61397	9.6
19/02/2023	1.54765	0.55002	8.6
20/02/2023	2.16163	0.61397	9.6
21/02/2023	2.73723	0.5756	9
22/02/2023	3.26806	0.53083	8.3
23/02/2023	3.7925	0.52444	8.2
24/02/2023	4.31693	0.52444	8.2
25/02/2023	4.86695	0.55002	8.6
26/02/2023	5.01179	0.14484	7.4

Using the Forecast tab

On this tab, the user can visualize the forecast for 7 days in advance as well as the plot of ET_c daily and cumulative estimated with the forecast data. If the user clicks on the Data tab on the left bottom of the chart you will switch the graph data to a tabular mode as shown below. On this mode is also possible to export the data to CSV format. For that just click on the button Download CSV.



Using the Apply Water tab

A Warning

To use this tab the user must have added a meteorological station to retrieve data for the Evapotranspiration estimation. Refer to the "Using the settings tab",and "Configuring the Reference ET " sections for more information

On this tab, you can visualize and edit irrigation and rainfall data, as well as you can visualize the Soil water deficit, Crop water use, total water applied, irrigation, and rainfall data.

To edit the Irrigation or rainfall data just click on the editing space, as pointed by arrows 1 and 2, and type the desired data. When it is done click Apply to save the updates. You will note that after your updates are applied IrriSAT will recalculate the indexes with the new data.



If you don't have irrigation data, another option is to use the **Fill** button. This button will get the current soil water deficit and place it on the irrigation field. When it is done click **Apply** to save the updates. You will note that after your updates are applied IrriSAT will recalculate the indexes with the new data.



Using the Irrigation Scheduler tab

A Warning

To use this tab the user must have set a refill point. Refer to the "Using the Settings tab", and "Configuring the Refill Point" sections for more information.

On this tab, the user will see a gauge with the daily state of the soil water deficit. This gauge is calibrated to vary between the user sat Refil Point and the field capacity (soil water deficit = 0). Also, this tab plots the history as well as the 7-day soil water deficit.



The user can change the size of the visualization window. To that you can click on the options on the plot left top as indicated on arrow 1. The options 1w, 1m, 3m, and 6m represent 1 week, 1 month, 3 months, and 6 months respectively.

To resize the visualization window to a custom size, the user can use the window handler as indicated by arrow 2.



Using the Season Report tab

On this tab, you can visualize a summary for indexes of Rainfall, Irrigation, Total water applied, Crop water use, and soil water deficit.



Using the Season Crop Water Use tab

On this tab, you can visualize the management unit water use map from the crop planting date to the harvest/current date.

Using the settings tab

On this tab, the user can edit and configure your management unit. The settings are divided into two sections, the first one is the Field Settings which comprises general configurations like Category, Field Name, Meteorological stations for Evapotranspiration estimation, the meteorological station for Rainfall data, Crop planting date, Crop Harvest date, and user sharing.

The second Tab is the Irrigation settings. on this tab, the user can configure the Initial Soil Water Deficit (I.S.W.D), and the desired Refill point.

Configuring the Category

On this field the user can add a category name for the management zone. To do data just click on the editing space and type the desired category name. when it is done click Apply to save the updates.

🜢 Tip

The best practice on the Category name is to put an irrigation practice name as well as the crop being cultivated.

Configuring the Field name

On this tab the user can edit the Field name for the management zone. To do data just click on the editing space and type the desired category name. when it is done click Apply to save the updates.

Configuring the Reference ET

On this tab, the user can edit the management zone weather data source for Evapotranspiration estimation. To edit the data source just click on the arrow down and choose the SILO option. when it is done click Apply to save the updates.

Configuring the Rainfall

On this tab, the user can edit the management zone weather data source for Rainfall estimation. To edit the data source just click on the arrow down and choose the SILO option. when it is done click Apply to save the updates.

Configuring the Planting Date

On this tab, the user can set the crop planting date for the management zone. To do data just click on the editing space and choose the desired date on the calendar. when it is done click Apply to save the updates.

IrriSAT Owner: wifield.cerrf@gmail.com

Info

Note that when the Date is changed IrriSAT will change all the plots in all the tabs to match the configured date.

Configuring the Harvest Date

On this tab, the user can set the crop harvest date for the management zone. To do data just click on the editing space and choose the desired date on the calendar. when it is done click Apply to save the updates.

🜢 Tip

If your crop still growing leave this field as the default.

Sharing management unit with another user

On this tab, the user can the management zone with other users. To do data just click on the editing space and type the email of the user you want to share. when it is done click Add to save the updates. Note that the counter on the right side of the button will increase.

Info

If the user is not registered on the platform an pop-up will appear saying that the user is undefined

You can also click on the arrow down on the counter to change the sharing of user privileges. You can use the toggle to change from Edit to View mode as well as delete the sharing by clicking on the bin icon.

Field Settings

Field Name:	test		Apply	
Reference ET:	None selected	•	Apply	
Rainfall:	None selected	•	Apply	
Planting Date:	10-08-2023		Apply	
Harvest Date:	Undefined		Apply	
Share With:	IrriSAT v2 Users E-Mai	Address	Add 1	•
<u>(</u> @	gmail.com		🗾 🖍 Edit	D
I.S.W.D. (mm):	0	~	Apply	
			Apply	

Configuring the Initial Soil Water Deficit (I.S.W.D)

On this field the user can configure the initial Soil Water Defict (I.S.W.D) for the management zone. To do data just click on the editing space and type the initial I.S.D.W.. Anther option is to use the arrows up or down to set the desired number. When it is done click Apply to save the updates.

Configuring the Refill Point

On this field, the user can configure the management zone refill point. Just click on the editing space and type the refill point. Another option is to use the arrows up or down to set the desired number. When it is done click Apply to save the updates.

