

Exercise 1: Point time series in WaPOR portal

Example: Retrieve time-series evapotranspiration on selected point over agricultural area in Kirkurk area (Lat:35.378, Lon:43.747)

This exercise goes through all the basic tools of the WaPOR (https://wapor.apps.fao.org/home/WAPOR_2/1)

STEP ONE: click on the WaPOR level: CONTINENTAL (250m), NATIONAL (100m), SUB-NATIONAL (30m)



STEP TWO: click the **LAYERS** button and select the **THEME** Actual Evapotranspiration (Dekadal), so not Annual.

STEP THREE: Click the **ANALYSIS** button and

- Select the operation (**Point time Series**, so not Area Time Series or Area Water Productivity or Area Raster Download)
- Select the Point, either from SAVED POINTS or define New POINT (add a POINT COORDINATES: lat, lon)
- Select the TIME PERIOD: FROM (01/01/2009) TO (31/12/2020)
- Click on the **Run Operation** to get point time series of evapotranspiration from 01/01/2009 to 30/10/2020. You will get a graph similar to the one below (Figure 1 left). By repeating step 1 to 2 for the same layer but for different time period, e.g. from (1/01/2019) TO (31/12/2020), you will get a graph similar to the one in shown in Figure 1 right. If you are interested in keeping the graph you can Download as png or jpeg image. If you are interested in keeping the values you can download as CSV or XLS, and continue calculations in Excel. If you download as CSV you can convert the text to data using the 'Text to Columns' tool in Excel.

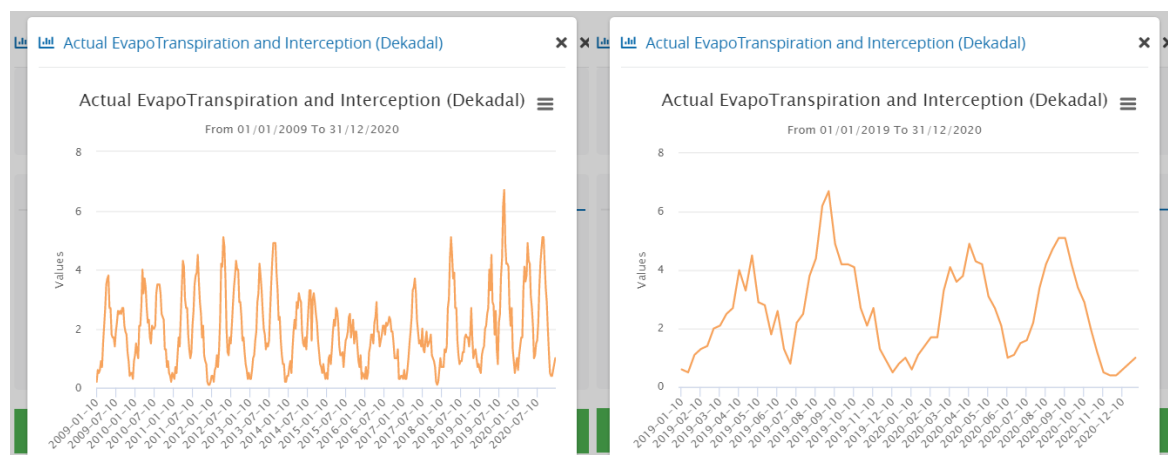


Figure 1. Time series of decadal actual evapotranspiration and interception from 01/01/2009-31/12/2020 (left) and from 01/01/2019-31/12/2020 (right).

Try to produce Figure 1, and report on the answer to the questions on the next page.

Question:

Report the answer for the following questions based on the point (Lat:35.378, Lon:43.747) that is assumed to represent a field in Kirkurk area:

- 1) Repeat step 1 to 3 above for annual precipitation, reference evapotranspiration, and actual evapotranspiration layers for a period of 2009 to 2020 and explain
 - a) why the annual actual evapotranspiration is varying,
 - b) what are the potential reasons for the discrepancy between annual actual evapotranspiration and annual precipitation.
- 2) Answer the following questions assuming irrigated wheat is grown during the dry season.
 - I. identify the start and end of the irrigated crop season by plotting the point timeseries of dekadal actual evapotranspiration, transpiration, reference evapotranspiration, precipitation for the period 01/01/2009 to 30/10/2020.
 - II. estimate seasonal actual evapotranspiration, crop yield, and water productivity (WP) for irrigated wheat that is sown in 2019. Optional [estimate seasonal crop water requirement (CWR), seasonal irrigation water requirement (IR)].

Upload your answer in short report on the [OCW](#) till 12 April

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Equations:

Seasonal value is the sum of values from the start of the cropping season to end of the cropping season: $seasonal X = \sum_{i=SOS}^{i=EOS} x_i$

$Biomass = AOT * f_c * \frac{NPP * 22.222}{(1-MC)}$ and, (ii) $Y = B * HI$

$WP = \frac{Yield}{ET}$

$CWR = \sum_{i=SOS}^{i=EOS} (kc_i * ET_0)$

$IR = CWR - effective\ precipitation\ (P_{ef}); P_{ef}=80\% \text{ of the precipitation}$

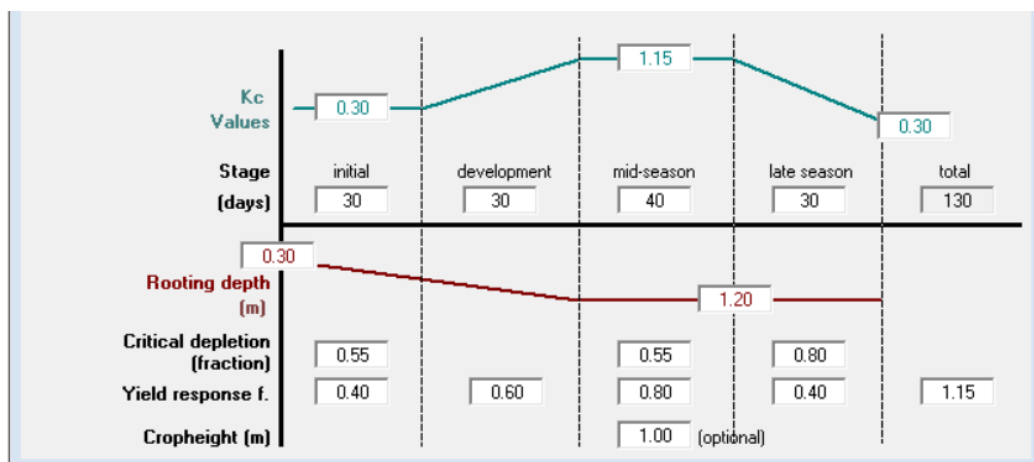


Figure 2. Crop coefficient curve of wheat