



IRRIGATION DECISION SUPPORT AND MANAGEMENT

Description:

ClearAg's Irrigation APIs enable localized, predictive irrigation analytics to help customers perform water budget calculations, establish more efficient irrigation management and improve crop and system performance without the requirement for additional hardware. Using precise meteorological data, proprietary soil information and plant-specific models, ClearAg Irrigation APIs are uniquely configured to meet the specific needs of irrigation solution providers:

- Irrigation-specific data set in a single endpoint reduce development time and deliver optimal decision support within your application
- Easy integration with existing dashboards or software applications quickly add value for your customers

- Iteris' proprietary ClearAg Focus* capabilities provide more precise predictive analytics and recommendations for cost-effective irrigation planning and management

EvapoSmart™ API:

Irrigation activities can be scheduled by utilizing water budget calculations to assess the moisture needs of growing crops and plant types. In the absence of calibrated crop growth models and detailed soil information, it is a straightforward method to estimate irrigation needs using crop coefficients. The EvapoSmart endpoint provides the necessary precipitation and crop-specific evapotranspiration data, utilizing crop coefficients, that are needed to complete the necessary water budget calculations in the absence of detailed soil and crop growth stage information.

EvapoSmart includes daily and hourly feeds of parameters such as reference evapotranspiration, time-dependent crop coefficients, crop potential evapotranspiration, precipitation, probability of precipitation, air temperature, dew point, relative humidity, wind speed and solar radiation.

This service provides data for any location in the world. Hourly conditions are available for any period beginning January 1 of the previous calendar year through nine days into the future. Daily values are available for any period beginning January 1, 1980 through nine days into the future. Note that daily values represent summaries of conditions spanning midnight to midnight local time for the requested location's timezone.

Endpoints include:

Basic Irrigation Hourly:

The Basic Irrigation Hourly endpoint returns hourly weather data useful for basic checkbook-method irrigation management for a field and metadata associated with the field. If an enumerated crop type is provided with the call, it will return crop-specific crop coefficients based on FAO-56.

Basic Irrigation Daily:

The Basic Irrigation Daily endpoint returns daily weather data useful for basic checkbook-method irrigation management for a field and metadata associated with the field. If an enumerated crop type is provided with the call, it will return crop-specific crop coefficients based on FAO-56.

Additionally, the **Accounts API** is required for defining the field location.

IMFocus API

Utilizing proprietary ClearAg Focus modeling capabilities, IMFocus tracks all sources and transitions of water for the plant root zone, including irrigation activity, and predicts when soil moisture values will reach limiting and critical levels in the crop root zone itself. It accomplishes this by taking into account soil texture class, plant root growth and field terrain information to come up with a holistic solution that optimizes irrigation decisions.

The IMFocus data feed includes evapotranspiration, root zone depth, root zone moisture, and other multi-depth parameters for more precise and predictive analytics based on field-specific conditions.

The IMFocus scheduler provides irrigation recommendations, energy expense, water expense, energy usage and water usage on a per irrigation event basis. For agriculture applications, ClearAg IMFocus currently supports eight different crops. Please refer to the IMFocus column in Appendix A for the current list.

This service provides data for any location in the world, for any period beginning January 1 of the previous calendar year through nine days into the future. Note that daily values represent summaries of conditions spanning midnight to midnight local time for the requested location's timezone.

Endpoints include:

Irrigation Conditions with Custom Analysis Hourly:

Through the Irrigation Conditions with Custom Analysis Hourly endpoint, users can obtain hourly soil temperature, moisture and irrigation data valid for a user-defined time range of a specified growth customized to their field, irrigation and crop specifications. Maximum range per request is a span of 240 hours.

Irrigation Conditions with Custom Analysis Daily:

Through the Irrigation Conditions with Custom Analysis Daily endpoint users can obtain daily soil temperature, moisture and irrigation data valid for a user-defined time range of a specified growth customized to their field, irrigation, and crop specifications.

Irrigation Recommendation with Custom Analysis Hourly.

Through the Irrigation Recommendations with Custom Analysis Hourly endpoint, users can obtain optimized recommendations for irrigation activities, including the amount to be applied and the best time to apply it per field. Additionally, energy and water usage per irrigation event is generated, provided the user has input the necessary irrigation system information. Maximum range per request is a span of 240 hours.

Irrigation Recommendations with Custom Analysis Daily:

Through the Irrigation Recommendations with Custom Analysis Daily endpoint, users can obtain optimized recommendations for irrigation activities, including the amount to be applied and the best time to apply it per field. Additionally, energy and water usage per irrigation event is generated, provided the user has input the necessary irrigation system information. Maximum range per request is a span of 240 hours.

Irrigation System Properties:

These endpoints allow a user to configure and modify irrigation system properties for a given field. By default, every field will contain un-configured irrigation system properties. These settings will affect custom soil modeling and related irrigation advisement products.

Irrigation Activity:

These endpoints allow the user to input irrigation events that allow the model to consider the system applied water in the soil moisture and temperature solution.

Additionally, the **Accounts API** is required for field and irrigation system setup. The Crop Growth APIs are required and included for crop information setup.