CROP GROWTH & HEALTH

ClearAg offers a variety of bundles that are crop specific. These bundles provide agronomic advisory information for a specific field, given the field location, crop and plant date. ClearAg supports several crops and continues expand the list. Note that not all crop-specific services are supported for all crops. The Table A shows the current list of supported crops and supported features. The potential features are: Crop Growth Models, Crop Growth Model Feedback, Crop Harvest Modeling, Crop Nutrient Modeling, Focus Custom Field Soil Conditions and IMFocus(™) Irrigation Decision Support. When considering any of those services (all listed in other portions of this document), refer to the table in Appendix A, Supported Crops to see if the crop of interest is supported.

Crop Growth Models

Description:

ClearAg's crop growth models combine user-provided information with the ClearAg field weather and soil data to provide past, current and projected plant growth stage information specific to a particular crop planted on a specific field. Many field and crop management decisions and risk assessments are highly dependent on knowing the growth stage, and this service is designed to provide this information without the need for visual scouting. However, if observations of growth stage are made, most of the crop growth models allow user feedback, which recalibrates the projections. Refer to Appendix A, Supported Crops and Features to see which crops are supported.

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Endpoints Include:

Crop Growth Model:

historical, forecast, and climatological growing degree days and stages of growth for a specific crop.

Crop Growth Feedback:

allow adding, modifying and deleting feedback on observed crop growth stage. Note that this capability is not supported for all crops that have growth models. Refer to the "Growth Feedback" column in Table A.

Crop Growth with GDD Envelopes.

This endpoint provides an an envelope, or range, of possible GDD accumulation based on variability of the past 10 years of weather data at the location.
This bundle requires the **Accounts API** for setting up users and fields.

Crop Harvest Modeling

Description:

Delivers precise and relevant data and modeling to improve the management of harvest activities and grain drydown costs. Specifically, ClearAg harvest modeling estimates grain drydown rates using field-level analysis of weather conditions and user-supplied measurements of grain crop conditions, and estimates mechanical drydown cost through robust modeling. Please refer to the Crop Nutrient column in Appendix A to see the list of supported crops.

Endpoints include:

In-Field Drydown:

Drawing from the ClearAg Field Weather API and crop-specific growth model, the In-Field Drydown endpoint simulates the drying process of crop grain in the field after the crop achieves full maturity and provides daily grain moisture estimates during the drydown period. Any available moisture measurements are used to improve model results if supplied through the User-supplied Field Conditions and Activities.

Mechanical Drydown:

The Mechanical Drying endpoint simulates the drydown process of the crop using either fan-powered low-temperature drying or burner-driven high-temperature drying facilities to provide drying statistics and cost projections. The mechanical drying process is simulated using up to 10 future days of grain moisture estimates. Results from the in-field drying model are also returned for comparison. Note that a field, crop growth and drying facility are required to utilize this feature. Any available grain moisture measurements are used to improve model results.

Drydown Feature:

Required to define and manage the characteristics of low and/or high-temperature drying facilities for use in the mechanical drydown endpoint.

This bundle requires the **Accounts API** and the **Growth Model APIs**.

Crop Nutrient (Nitrogen) Decision Support

Description:

The ClearAg Nitrogen Advisor simulates the various processes of the nitrogen cycle that impact the availability of nitrogen to the crops. The model is based on a combination of proven algorithms from several industry models for simulating the nitrogen cycle. It allows for the provision of several types of field-level activities, including fertilizer treatments and soil sample results, containing information such

as soil nitrate and organic matter levels, as well as soil pH. Crop growth and the corresponding crop parameters of importance are simulated based on user-specified location, relative maturity and planting date via the Crop Growth Models. Weather and soil information required by the Clear-N model are provided by the ClearAg Field Weather and Soil Conditions APIs. Please see the Nutrient Modeling column of Appendix A for the list of supported crops.

Endpoints include:

Nitrogen Advisor:

The endpoint used to obtain the results of the model for the specific crop.

Field Soil Sample:

Allows the user to provide soil sample results, including things like organic matter content, nitrate level and pH.

Fertilizer Treatment:

Allows the user to record a fertilizer treatment performed on the field.

This bundle requires the **Accounts API** and the **Crop Growth API.**