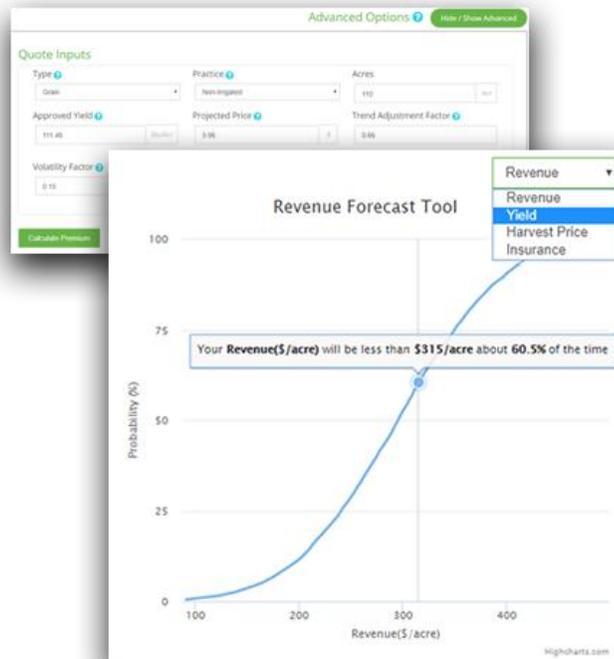


# Ag-Analytics

## Federal Crop Insurance Quoter API Documentation 2020

### Overview

The Federal Crop Insurance Quoter API is used to calculate insurance premiums for Yield Protection, Revenue Protection, and Revenue Protection with Harvest Price exclusion, along with their area coverage alternatives.



*Insurance Quoter used in FarmScope*

### API Specifications

**API URL:** <https://ag-analytics.developer.azure-api.net/api-details#api=federal-crop-insurance-quoter&operation=post-request-federal-crop-insurance-quoter>

**Request URL:** <https://ag-analytics.azure-api.net/FederalCropInsuranceQuoter/post>

#### Header Parameters

**Execute Type:** POST

**Ocp-Apim-Subscription-Key:** **Given upon purchase.**

*This key is necessary to access the API and should be passed as a Header.*

**IP Address Throttling:** The single client IP address is restricted to 5 calls every minute, with a total of 500 calls and 10,000 kilobytes of bandwidth per month.

**Response Parameters** - Data request format – json string ('key': value data type)

<b>Name</b>	<b>Type</b>	<b>Description</b>
<b>FIPS</b>	<b>int</b>	The FIPS code of a county (e.g. 17019).
<b>CropCode</b>	<b>int</b>	The code for a crop (e.g. corn's crop code is 41) from table A00420 of RMA ADM files.
<b>Type</b>	<b>int</b>	The code for the type of a crop (e.g. corn type grain is 16) from RMA ADM files.
<b>Practice</b>	<b>int</b>	The code for the practice type of a crop (e.g. non-irrigated is 3) from RMA ADM files.
<b>PreventedPlanning</b>	<b>int</b>	An integer in the range [0, 2]. 0 = Standard, 1 = Plus 5%, 2 = Plus 1.
<b>UseTAYield</b>	<b>int</b>	An integer in the range [0, 1]. 1 = Use Trend-Adjusted Yield, 0 = do not use TrendAdjusted Yield.
<b>SharePercentage</b>	<b>double</b>	A float indicating the insured share percent, in the range [0.001, 1].
<b>TrendAdjustedYield</b>	<b>double</b>	A double specifying the Trend-Adjusted Yield.
<b>Acres</b>	<b>double</b>	A double specifying the acreage.
<b>Year</b>	<b>int</b>	An integer specifying the year that the calculation should take place for.
<b>APHYield</b>	<b>double</b>	A double specifying the Actual Production History Yield.
<b>Price</b>	<b>double</b>	A double specifying the projected crop price.
<b>Volatility</b>	<b>double</b>	A double specifying the volatility of the crop.
<b>ReturnParameters</b>	<b>int</b>	If value is 1, parameters for the steps of the premium calculation are included in the response. If value is 0, parameters from the premium calculation are not included in the response.
<b>HighRiskCode</b>	<b>string</b>	Subcounty high risk code that the insured field is located in and is relevant to the specified crop, practice, and type (e.g. 'AAA').

## Example Request/Response

### Request

```
POST https://ag-analytics.azure-api.net/FederalCropInsuranceQuoter/post/
CalculateGet?req{'FIPS':17081, 'CropCode':41, 'Type':16, 'Practice':3,
'PreventedPlanting':0, 'UseTAYield':1, 'UsePerAcre':1, 'SharePercentage':1.00,
'TrendAdjustedYield':129.88, 'Acres':44.56999969, 'Year':2019, 'APHYield':129.88,
'Price':4.00, 'Volatility':0.15, 'IncludeAdminFee':0.0}
```

### Responses

Name	Type	Description
<b>Premium</b>	<b>double[8, 9]</b>	The eight arrays are for coverage levels 50% - 85%, index corresponding the ascending coverage. Within each array, index values are as shown: double[* , 0] → RP Optional double[* , 1] → RP Basic double[* , 2] → RP Enterprise double[* , 3] → RPHPE Optional double[* , 4] → RPHPE Basic double[* , 5] → RPHPE Enterprise double[* , 6] → YP Optional double[* , 7] → YP Basic double[* , 8] → YP Enterprise
<b>PremiumAllAcres</b>	<b>double[8, 9]</b>	The premium per acre from the 'Premium' value multiplied by the acreage. Has same index structure as 'Premium'.
<b>Subsidy</b>	<b>double[8, 2]</b>	The eight arrays are for coverage levels 50% - 85%, index corresponding the ascending coverage. Within each array, index arrays are as follows: double[* , 0] → Subsidy rate for Basic/Optional units double[* , 1] → Subsidy rate for Enterprise units.
<b>Liability</b>	<b>double[8, 1]</b>	The eight arrays are for coverage levels 50% - 85%, index corresponding the ascending coverage. Each value is the liability at that coverage level.
<b>TotalPremium</b>	<b>double[8, 9]</b>	Same structure as 'Premium'. Values are the premiums before the subtracting the subsidy.
<b>TotalPremiumAllAcres</b>	<b>double[8, 9]</b>	The total premium per acre from 'TotalPremium' multiplied by the acreage amount. Has same index structure as 'Premium'.
<b>SubsidyAmount</b>	<b>double[8, 9]</b>	Same index structure as 'Premium'. Values are the dollar amount per acre that are subtracted from the 'TotalPremium' to give you the 'Premium'.
<b>SubsidyAmountAllAcres</b>	<b>double[8, 9]</b>	The subsidy amount per acre from 'SubsidyAmountAllAcres' multiplied by acreage amount. Has same index structure as 'Premium'.

<b>Guarantee</b>	<b>double[8, 3]</b>	The eight arrays are for 50-85% coverage levels with index corresponding to ascending coverage level. The values in each array are as follows: double[* , 0] → Minimum Revenue Guarantee double[* , 1] → Revenue guarantee double[* , 2] → Yield guarantee
<b>CountyLevelPrem</b>	<b>double[5, 9]</b>	The five arrays are for coverage levels index corresponding the ascending coverage. The values in each list match the index structure in 'Premium'.
<b>CountyLevelGuarantee</b>	<b>double[5, 3]</b>	The five arrays are for coverage levels index corresponding the ascending coverage. The values in each array are as follows: double[* , 0] → Minimum Revenue Guarantee double[* , 1] → Revenue guarantee double[* , 2] → Yield guarantee
<b>CountyDataAvailable</b>	<b>bool</b>	Indicates whether county level data is available for the input given.
<b>Plans</b>	<b>Int[]</b>	Array of unspecified length, indicating what insurance plans are available for the inputs given.
<b>Parameters</b>	<b>string</b>	Array of unspecified length, indicating what insurance plans are available for the inputs given. Coverage levels (e.g. '50%') Policy ('rp', 'yp', 'rphpe') Unit ('Basic', 'Optional', 'Enterprise') Parameters (Parameters of the equation)

## Details on API Validation Documents

Accompanying this documentation are two additional files.

generateAllPremiums.py

PremCalcResults.csv

PremCalcResults.csv is a file produced by the programmatic calling of Ag-Analytics' crop insurance API. The python script generateAllPremiums.py is the program that makes the API calls.

### generateAllPremiums.py

This file uses the ADM files downloaded from the RMA to programmatically generate premium quote request parameters. The full query can be seen in the python script. If running the script, the user will need to sign up for an Ag-Analytics' API account, because the script will exceed the number of queries allow for an unregistered user, [ag-analytics.org/AgRiskManagement/Login](https://ag-analytics.org/AgRiskManagement/Login).

The following parameter combinations are used.

Counties – All counties

Commodities – Corn (41) and Soybeans (81)

Type – For Corn, Grain (16); No Type Specified (997).

For Soybeans, Commodity (91); No Type Specified (997).

Practice – For Corn, Non-Irrigated (3).

For Soybeans, Fac (Non-Irrigated)(OT)(725); Non-Irrigated (3); Fac (Non-Irrigated) (43);

Non-Conventional (Non-Irrigated) (155); Fac (Non-Irrigated)(OC)(726);

Year – 2017

To cover a range of acreage scenarios, a random acreage in the range [100 , 1000] is used for each query.

The APH Yield is set to the T-yield for that year.

Each set of parameters is used to calculate premiums with Trend Adjustment and without Trend adjustment.

When the calculation uses Trend Adjustment, we assume a scenario where the user has 10 years of historical data, and calculate the Rate Yield as APH Yield + (5.5 \* Trend Adjustment Factor).

When the calculation does not use Trend Adjustment, we set the Rate Yield equal to the APH Yield.

Projected Price is kept consistent with what is queried from the ADM Files.

Prevented Planting is always set to 0.

Volatility Factor is set to the value queried from the ADM files.

Share Percentage is always set equal to 1.

**PremCalcResults.csv**

Each row of the results csv is formatted in the order seen below:

Insurance Plan	The insurance plan and unit option for the row.
Insurance Option Code	The code of the insurance plan (e.g. YP is 1).
Unit Option	The unit type of the query.
Year	The year the calculation was calculated for.
FIPS	The county FIPS code used in the query.
CropCode	The commodity for the query.

Acres	The randomly generated acreage amount.
Type	The commodity type used in the equation.
Practice	The practice code used for the query.
Price	The projected price for the query.
APHYield	The Actual Production Historic Yield used in the calculation.
TrendAdjustedYield	The Trend Adjusted Yield (Rate Yield) used in the query.
PreventedPlanting	Prevented Planting option used in the query.
SharePercentage	Share percentage used in the query.
UseTAYield	Indicates if Trend Adjustment was used in the calculation or not.
Volatility	The price volatility factor used in the query.
50 – 85%	The premium (total premium – subsidy amount) for the parameters, for all acres.



## Citation

Users who use these CLU data in their Applications must use the button provided below.



Users who use in publications or data analysis must cite us in your publications as

"Federal Crop Insurance Quoter obtained via Ag-Analytics.Org (Woodard,2016a; Woodard, 2016b)" or similar with the following references:

- 1.) Woodard, J.D., "Big data and Ag-Analytics: an open source, open data platform for agricultural & environmental finance, insurance, and risk," Agricultural Finance Review, (2016) 76(1):15-26.
- 2.) Woodard, J.D., "Data Science and Management for Large Scale Empirical Applications in Agricultural and Applied Economics Research," Applied Economic Perspectives and Policy, (2016) 38(3): 373-388.

Each county zip file contains a shapefile, with format clu\_public\_a\_SSFFF where SS is the State abbreviation and FFF is the 3 digit county fips code (e.g., clu\_public\_a\_il001 is Adams County, IL)

**Format:**

vector polygon - Arc shapefiles

**Spatial Reference Information:**

Universal Transverse Mercator (UTM) Dominant Zone, North American Datum 1983

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