SOIL SURVEY GEOGRAPHIC DATABASE

API Documentation 2020

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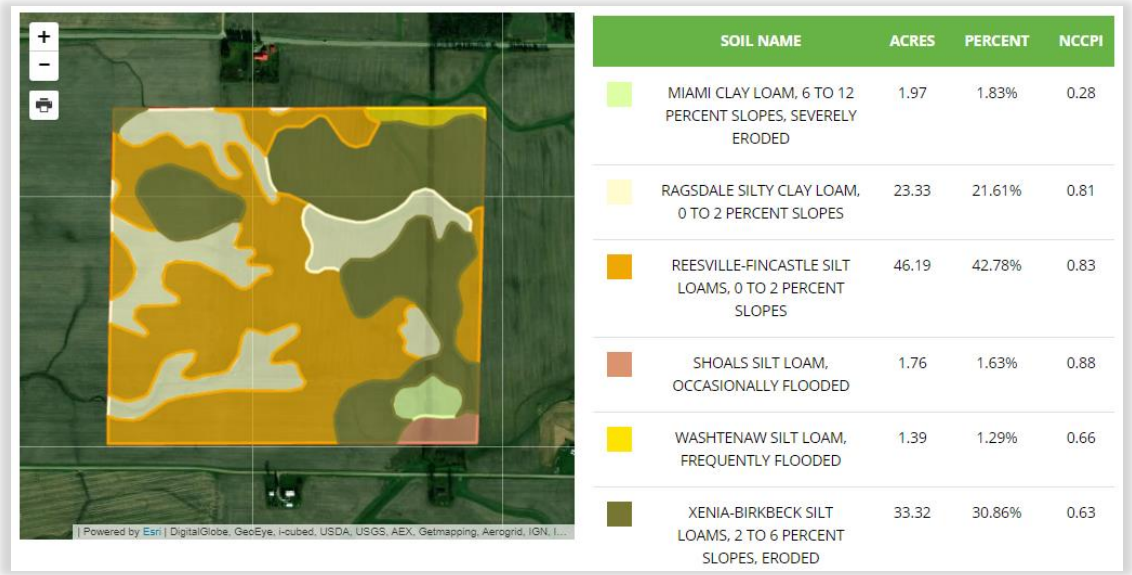
Service Overview

The Soil Survey Geographic Database (SSURGO) Soils API provides soil type and soil type attribute averages (e.g., NCCPI) by field for a shape entered. This API uses GET request with a subscription key, but we can also provide POST request endpoint. Soil Type data is derived from NRCS USDA; average soil type attribute data are available for processing for the continental USA. It uses data provided by the USDA NRCS, which can be downloaded from http://sdmdataaccess.nrcs.usda.gov. Those soil type attributes contain both numerical data type and categorical (ordinal) data type, which can be found from the links in the reference.

This API is utilized to drive the Ag-Analytics FarmScope panel below, for illustration. Area calculations from the API are provided in square meters and can be easily converted to acres on the front-end. The API Response contains shapes/features in ESRI JSON format, as well as the calculated metric (e.g., National Commodity Crop Productivity Index) and areas of each shape, the soil type name, the area for the sums of each soil type across all features for display in the table, metadata related to projection and other information. This API can be easily called and mapped using any standard front-end JavaScript mapping library (e.g., Leaflet).



SSURGO API in FarmScope

POST Request

POST Request Example – Raster Product - application/x-www-form-urlencoded

```
{'AOI': '{"geometryType": "esriGeometryPolygon", "features": [{"geometry":
{"rings": [[[-85.179, 42.74], [-85.17858886748223, 42.74188232450973], [-
85.17529296909521, 42.74847412128372], [-85.17590332008211, 42.74829101571788], [-
85.17749023408697, 42.74792480458609], [-85.17761230446422, 42.7470703128447], [-
85.1782836915391, 42.746704101712965], [-85.18072509728535, 42.746704101712965],
[-85.179, 42.74]]], "spatialReference": {"wkid": 4326}}}]}',
'Soil_Parameter': 'nccpi2all',
'Projection': 'EPSG:4326',
'Resolution': 0.0001,
'Product' : 'raster'
}
```

Header Parameters

content-type: "application/x-www-form-urlencoded"

Ocp-Apim-Subscription-Key: Subscription keys are given upon purchase Purchase APIs

POST Request Parameters

Parameter	Data Type	Required?	Default	Options	Description
AOI	String	Yes (otherwise pass file)	--	Geojson or esriGeometry Type	If no spatial specification was provided, the result raster will use the Ag-Analytics default spatial reference: WGS 84, resolution at 0.0001 degree
File	GeoTIFF or ShapeFile in a zip	Yes (otherwise pass AOI)	-	-	A GeoTiff (.TIFF,.Tif, .etc) or a Shapefile in Zip (must include shp, shx, dbf, but others files such as .prj, .xml, .cpg are recommended for better processing)
Projection	String	No	"EPSG:4326"	ex:"EPSG:4326"	Output projection of result GeoTIFF.
Resolution	String	No	0.0001	ex: "0.0001"	Output resolution of result GeoTIFF.

Soil_Parameter	String	No	"nccpi2all"	Full NRCS List	The soil metric to return, see the NRCS variables PDF for full list with descriptions
Product	String	No	'GeoJSON'	'GeoJSON', 'raster'	Result data type. GeoJSON or Raster with legends

POST Response

Raster Product Response


```
{ "attributes": {
    "CellSize": [0.0001, -0.0001],
    "CoordinateSystem": "GEOGCS[\"WGS 84\",DATUM[\"WGS_1984\",SPHEROID[\"WGS
84\",6378137,298.257223563,AUTHORITY[\"EPSG\",\"7030\"]],AUTHORITY[\"EPSG\",\"6326
\"]],PRIMEM[\"Greenwich\",0],UNIT[\"degree\",0.0174532925199433],AUTHORITY[\"EPSG\
",\"4326\"]]",
    "Extent": "-85.18072509728535, 42.73997412128372, -85.17332509728534,
42.74847412128372",
    "Legend": [
      {
        "Acres": 311.26838986575603,
        "Area": "100.0 %",
        "Count": 8,
        "CountAllPixels": 3554,
        "Soil_Type": "Udorthents and Udipsamments, 0 to 6 percent slopes",
        "Soil_Value": 0.0,
        "Value": 186064.0,
        "color": "#5dfb50"
      }],
    "Soil_Parameter": "nccpi2all",
    "Weighted_Average": 0.15045275981822384,
    "pngb64": " iVBORw0KGgoAAAANSUhEUgAAAEoAAABVCAYAAADuUHI
/7j44uH9zdal2TkBQVAr6JAU0ZdVmTiQbUWNpon6GS+vpwXa3XnkrP82bj8F1orxIApyL8oRbUZ7SBBwQ5
WHd500S4DhRHGY1j+KmSXtm7uptFo+Snj"
  },
  "filename": "result_ssurgo_raster_proj_4326_res_0.0001_20200709192551017948.tif"
}
```

GeoJSON Product Response


```
{
  "attributes": {
    "GeoJSON": {
      "crs": {
        "properties": { "name": "urn:ogc:def:crs:OGC:1.3:CRS84" },
        "type": "name"
      },
      "features": [{
          "geometry": {
            "coordinates": [[[-85.17364994099194, 42.74739381697111], [-
85.17377913220116, 42.74742650822685], [-85.17387346748649, 42.747493420485],[-
85.17387584382337, 42.74749755861743],[-85.17348729857176, 42.74749755874103],[-
85.1734504165035, 42.747386498288336],[-85.17364994099194, 42.74739381697111]]],
            "type": "Polygon"
          },
          "properties": {
            "Soil_Type": "Udorthents and Udipsamments, 0 to 6 percent slopes",
            "area": 311.26838986575603,
            "mukey": 186064,
            "nccpi2all": 0,
            "w_nccpi2al": 0
          },
          "type": "Feature"
        },
        ...
      ],
      "name": "SSURGOshapefile_dissolved_nccpi2all_20200717150356157700",
      "type": "FeatureCollection"
    },
    "Soil_Parameter": "nccpi2all",
    "Weighted_Average": 0.15045275981822384
}}
```


Request Handling – Default Projections and Resolutions

AOI Type	Projection Specified?	Resolution Specified?	Output Projection	Output Resolution
Any	Yes	Yes	Request projection	Request resolution
GeoTIFF	Yes	No	Request projection	GeoTIFF resolution
GeoTIFF	No	Yes	GeoTIFF projection	Request resolution
GeoTIFF	No	No	GeoTIFF projection	GeoTIFF resolution
Shapefile	Yes	No	Request projection	Default resolution
Shapefile	No	Yes	Shapefile projection	Request resolution
Shapefile	No	No	Shapefile projection	Default resolution
GeoJSON	Yes	No	Request projection	Default resolution
GeoJSON	No	Yes	GeoJSON projection	Request resolution
GeoJSON	No	No	GeoJSON projection	Default resolution

POST Response Parameters – Raster Product

Parameter	Type	Description
CellSize	List	Cell size/ Resolution of result raster
CoordinateSystem	String	Coordinate System of result raster
Extent	String	Corner coordinates of result raster
Soil_Parameter	String	Soil metric/parameter
Weighted_Average	Float	Weighted average soil matrix value
pngb64	String	Base 64 png string.
Legend	List	**Legend gives the following details for each range of values:** 1. **color:** Hex color used for the crop type 2. **Area:** Area of Soil Type (see Soil_Type) covered in percentage 3. **Count:** Number of pixels from the result raster of certain Soil_Type 4. **CountAllPixels:** Total number of pixels in the result raster 5. **Soil_Type:** Soil type in String 6. **Value:** Soil Type in index, mukey value 7. **Soil_Value:** Value of requested soil matrix on current soil type

POST Response Parameters – GeoJSON Product

Parameter	Type	Description
GeoJSON	GeoJSON	Return the results as a FeatureCollection. The properties are also attached to each GeoJSON object.
Soil_Parameter	String	Request soil matrix/parameter
Weighted_Average	Float	Weighted average soil matrix/parameter by area
Properties.SoilType	String	Soil type name in string
Properties.area	Float	Area in acreage of current soil type
Properties.mukey	Integer	Soil type key as integer

Properties.Request SoilParameter	Float	RequestSoilParameter will be based on the parameter in request. This parameter gives back the soil matrix/parameter value of current soil type. ex: Properties.nccpi2all

GET Request

Request Example

The GET request to retrieve the image using the 'filename' from the POST response.

URL:

```
https://ag-analytics.azure-api.net/ssurgo-v2?filename=result_ssurgo_raster_proj_4326_res_0.0001_20200709192551017948.tif
```

JSON:

```
{"filename": "result_ssurgo_raster_proj_4326_res_0.0001_20200709192551017948.tif"}
```

Request Parameters

Parameter	Data Type	Required?	Default	Options	Description
filename	text	Yes	--	.tif file	file name returned by POST request

Response Parameters

Parameter	Data Type	Description
file	.tif	Tiff file will be download to the computer of the caller with the name that was used to call the API.

Please see citations below for full response parameters

Citations:

- USGS SSURGO Information
- USGS SSURGO Metadata (Tables and Columns)
- USGS SSURGO Metadata (Tables Column Descriptions)
- UDSDA NRCS Input Field Variables and Descriptions
- Esri – esriGeometryType Information and Constants
- WKID List

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