



Presentation to the CFTC

April 11, 2019

Gro - A Single Data Platform



Wide range of sources



Clean & translate



Normalized through ontology



A single data platform and API

Applications of Gro

Application Programming Interface (API)

- Solve an enterprise problem with large, hard to manage agricultural datasets
- Combine Gro data with client data for a unique client product
- Forecast long term supply and demand for business planning purposes
- Consolidate and efficiently manage many sources and types of agricultural data

Web Application

- Get a Global view on Agricultural supply and demand
- Stay on top of data, countries, and crops of interest
- Collaborate with colleagues, customers

Users of Gro

- Seed companies
- Nutrient companies
- Food companies
- Processing companies
- Cooperatives
- Farmers
- Universities/Academics
- Commodity Trading Advisors (CTA)/Technical Traders
- Physical Merchants
- Banks
- Insurance Companies



Global Agricultural Data Coverage

- <https://app.gro-intelligence.com/#/docs/user-manual#source-master-list>
- 100+ Sources
- Climate, production, consumption, trade, demographic, price data
- Grains, Oilseeds, Softs, Fruits, Vegetables, Livestock, Dairy data

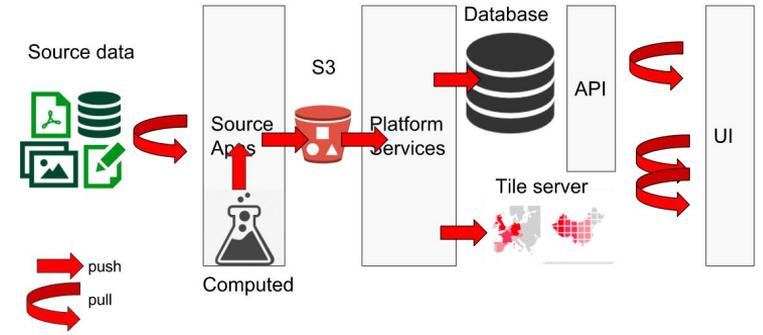
Agricultural Data Issues

Agricultural Data Issues:

- Hard to maintain spreadsheets, legacy files, and processes
- Disparate datasets that are difficult to combine and analyze
- Data in different units, languages, frequencies
- Data updating, quality, and integrity requirements
- Large scale and scope of agricultural data across many crop-country pairs

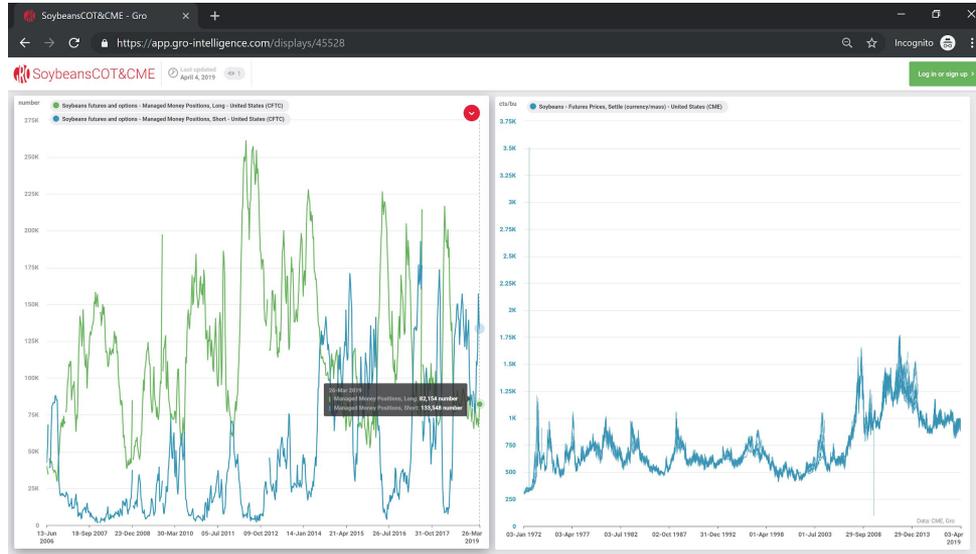
Data Identification, Mapping, Integration

- Identification and documentation
- Code written to automate data harvest (what Gro calls a 'source app')
- Source's data structure is researched and converted, or 'mapped', to conform with Gro's proprietary Ontology. Architecture: information flow
- Code written to automate data translation (second half of the 'source app')
- Source app is rigorously tested to ensure data quality and proper functionality



Combination of Data Sources/Sets

CFTC COT & CME Price Example



- CFTC Commitments of Traders (COT) data (Legacy, Disaggregated, Index Traders reports)
- CME Futures data
- <https://app.gro-intelligence.com/displays/45528>

API Data Combination & Analysis

Weekly COT & CME Price Example

```
gro [C:\Users\jamesgro - .\COT&CME.py [gro] - PyCharm
File Edit View Navigate Code Refactor Run Tools VCS Window Help
gro COT&CME.py F5G5Chart
COT&CME.py
***
Created on Thu Apr 4 13:22:27 2019
@author: jamegro
***
import os
import calendar
import pandas as pd
import api_client.lib
api_host = "api.gro-intelligence.com"
token = os.environ["GRO_API_TOKEN"]
client = api_client.Client(api_host, token)
def contract_month_history(market, contract_month):
    pts = client.get_data_points(**{"market": "S0820085",
                                   "time": "pts",
                                   "region": "US",
                                   "frequency": "M",
                                   "show_revisions": "True"})
    df_pts = pd.DataFrame(pts)
    df_pts["end_date"] = pd.to_datetime(df_pts["end_date"])
    df_pts = df_pts[df_pts["end_date"].dt.month == contract_month]
    df_pts = df_pts.groupby("end_date")
    opt_list = []
    for opt_data in df_pts:
```

date	long	short	net	price
6/20/2006	3168	9584	-12752	0.00803
6/27/2006	-2200	15860	-18060	-0.01975
7/11/2006	10537	-28944	39481	0.03993
7/18/2006	-3940	213	-4153	-0.01525
7/25/2006	1137	9253	-8116	-0.0242
8/1/2006	1054	20637	-19583	-0.01124
8/8/2006	-1311	11785	-13096	-0.01271
8/15/2006	-4188	784	-4972	-0.03117
8/22/2006	-411	1530	-1941	-0.01608
8/29/2006	-3737	-209	-1534	0.00782
9/5/2006	1442	-83	1525	0.00824
9/12/2006	-387	5038	-5425	-0.01445
9/19/2006	-1449	-527	-922	0.001466
9/26/2006	-4116	-2667	-1449	0.005488
10/3/2006	-1501	244	-1745	0.00582
10/10/2006	6851	-19711	26562	0.032577
10/17/2006	9272	-19226	28498	0.036512
10/24/2006	2767	-17932	20699	0.047196
10/31/2006	9929	-6395	16324	0.036099
11/7/2006	5352	-1817	7169	0.026127
11/14/2006	5453	1041	4412	0.029858

- Gro API code
- Sample Outputs (Plots, CSVs)
- <https://github.com/gro-intelligence/api-client>



Potential Applications of Gro

- Replacing spreadsheets, combining multiple sources of data, automating processes for:
- Deliverable Supply calculations
- Physical and Futures Price Convergence calculations
- Futures Delivery calculations
- Enumerated Agricultural Commodities



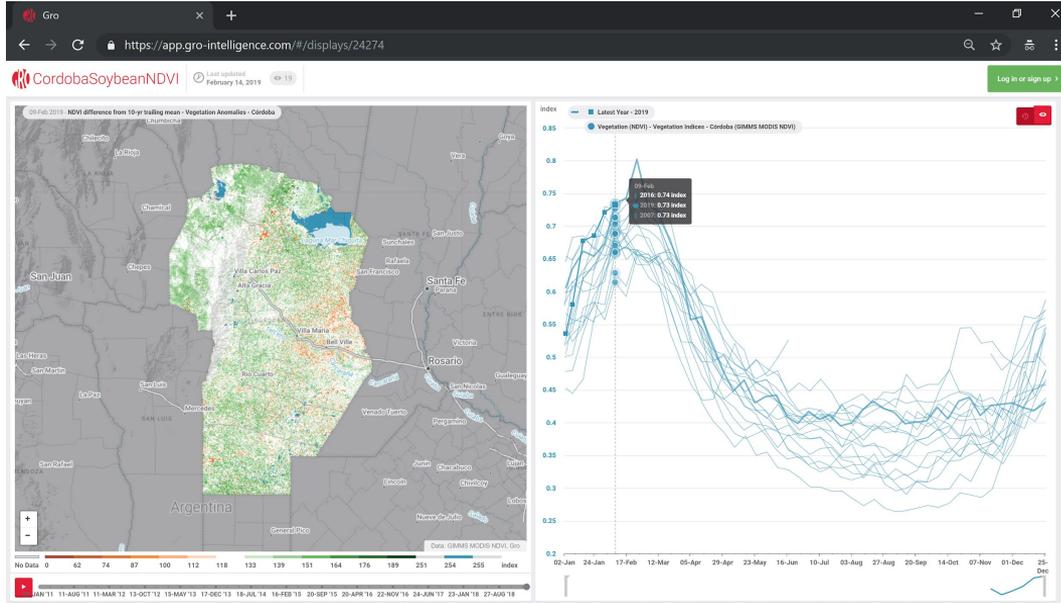
Appendix



Key Crops & Countries

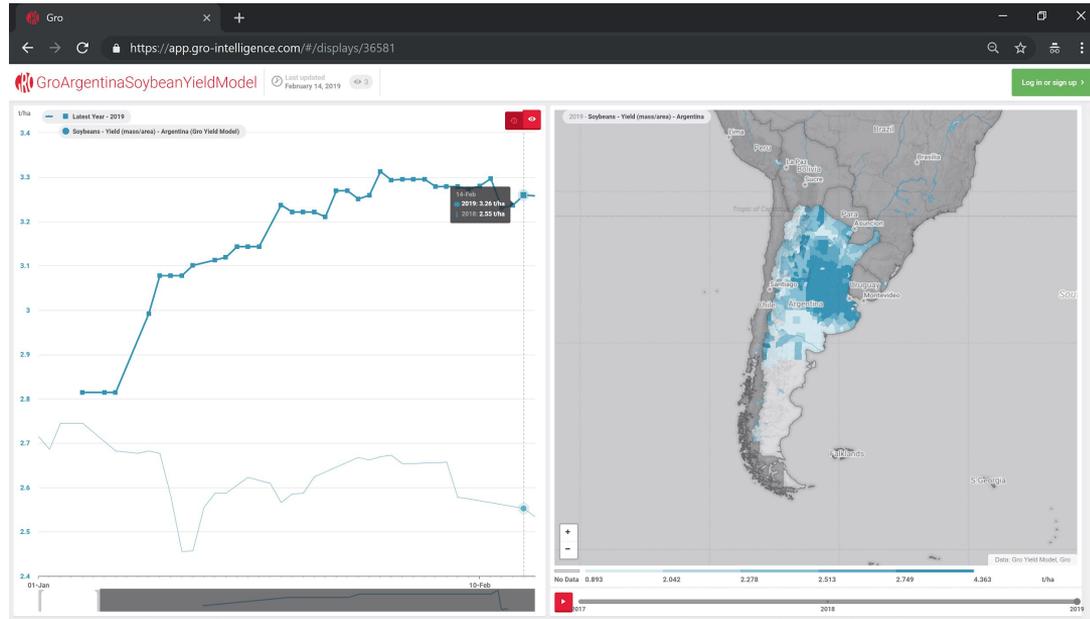
Corn	<u>https://app.gro-intelligence.com/#/displays/40051</u>
Soybeans	<u>https://app.gro-intelligence.com/#/displays/40050</u>
Wheat	<u>https://app.gro-intelligence.com/#/displays/32074</u>
US	<u>https://app.gro-intelligence.com/#/displays/32106</u>
Brazil	<u>https://app.gro-intelligence.com/#/displays/31068</u>
Black Sea	<u>https://app.gro-intelligence.com/#/displays/40052</u>
China	<u>https://app.gro-intelligence.com/#/displays/45506</u>

Geospatial/Climatological Data



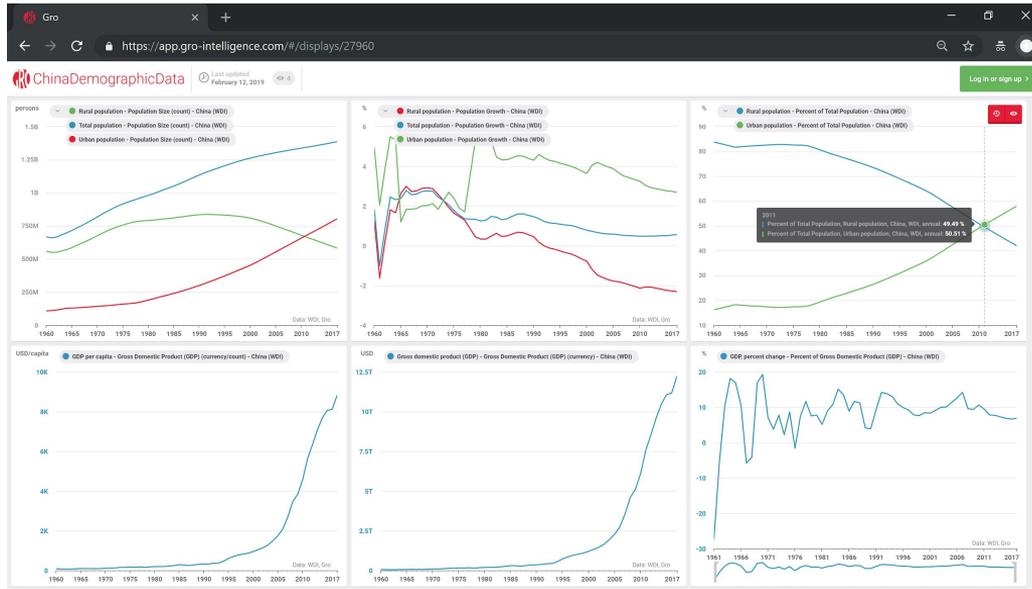
- <https://app.gro-intelligence.com/#/displays/24274>
- NDVI, Evapotranspiration, Soil Moisture, Rainfall, Temperature, Drought Indicator, Anomalies
- Global data consistently updated in Time Series and Maps

Supply Side - Yield Models



- <https://app.gro-intelligence.com/#/displays/36581>
- 20 year backtested, district/county, state/province, national model estimates
- Crop mask weighted inputs (NDVI, Evapotranspiration, Rainfall, Temperature, Soil Moisture)

Demand Side - Demographic Data



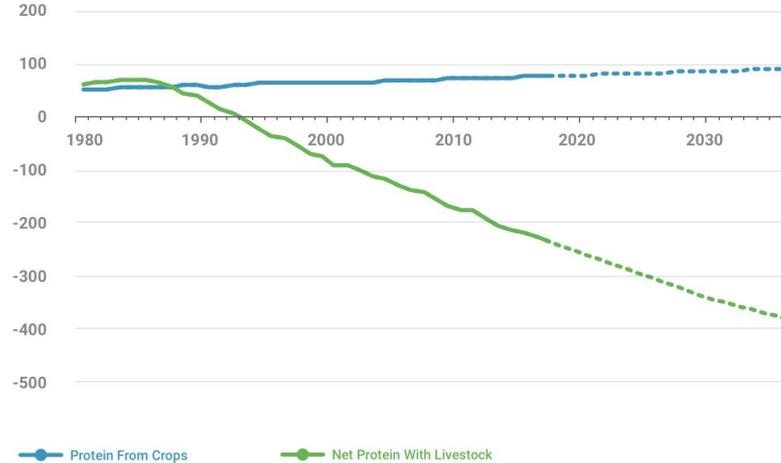
- <https://app.gro-intelligence.com/#/displays/27960>
- Population, Income, Urbanization data that drives demand

Demand Forecasts - Protein Consumption

China



Grams of Protein/Person/Day



Data: World Bank, FAO, USDA PS&D, Gro Intelligence

www.gro-intelligence.com

- Long Term Chinese Protein demand driven by demographics, meat demand, livestock feeding



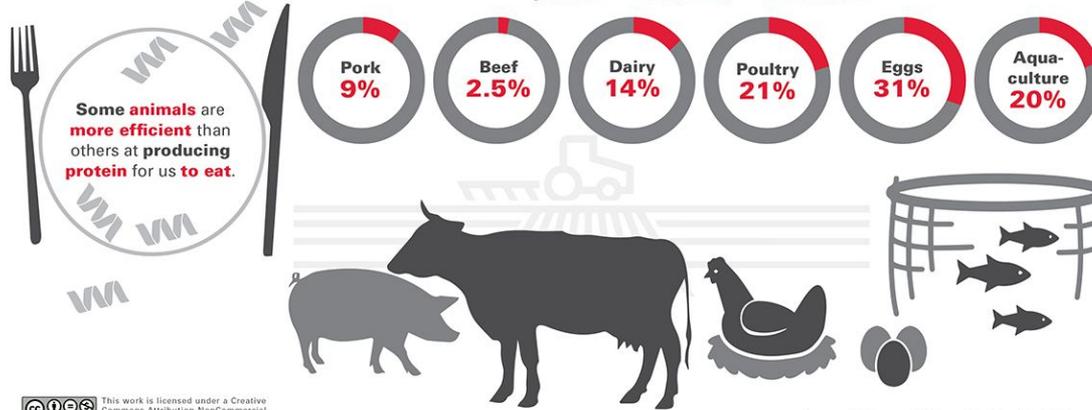
Content



Follow @GroIntel
www.gro-intelligence.com

More Protein in Than Out

Here are some rates at which different **animals convert mostly plant-based protein** into **meat, milk, and other foods**.



This work is licensed under a Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License.

Sources: Environmental Research Letters, Gro Intelligence

- https://gro-intelligence.com/insights/which_countries_have_a_protein_shortage





Copyright © 2018 Gro Intelligence Inc. All rights reserved.

This document contains sensitive, confidential and trade secret information; and no part of it shall be disclosed to third parties or reproduced in any form or by any electronic or mechanical means, including without limitation information storage and retrieval systems, without the express prior written consent of Gro Intelligence Inc.

