Nitrogen Management for Carbon Credits-
Data Flow Analysis

C-AGG Denver
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Jim Pollock, Prassack Advisors
Sara Kroopf, Environmental Defense Fund
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Agenda

• CIG Context
• Data Flow Analysis
• Barriers to Agricultural Data Collection
• Key Findings
• Next Steps
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Nitrogen Management CIG- Goals

Infrastructure

reduce barriers for growers to participate in carbon markets by refining and improving existing nitrogen fertilizer management protocols and quantification tools
Nitrogen Management CIG- Methods

**Infrastructure**

develop or enhance market infrastructure which streamlines data collection, management and processing so that the data is connected from farm to quantification model to protocol
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Data Flow Analysis Hypothesis

Significant efficiencies can be realized through the use of data collection software that gathers the information needed for nitrous oxide quantification methodologies.
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Jim Pollock, Partner, Prassack Advisors, LLC
Director Technology & Product Design

- BSEE – MIT
- HP & 6 Startups
- Software Solutions
- aWhere
  - HiRez Global Weather Data
  - APIs for FMS in Dev Countries
  - SMS data for Africa/S Asia
- Farmer Wannabe
Challenges in Ag Data – 1/4

• Large number of *farm activities* contributing to *GHG* emissions
  – How to measure and represent them
Challenges in Ag Data – 2/4

• **Volume** and **complexity** of farm data
  – Gigabytes for a single pass of a tractor, combine or drone
Challenges in Ag Data – 3/4

• The varied, inconsistent and complex ecosystems of data collection that continues to evolve in the farming community
Challenges in Ag Data – 4/4

• “Tension” between **difficulty** and **motivation** or **incentive** for the farmer to capture quality data
Connected Future Farm
Agenda

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What were the results? Dominant Data Ecosystems

**Input Companies**
- Monsanto
- The Climate Corporation
- Blue River Technology
- FieldScripts
- Vital Fields
- HydroBio
- yield pop
- SOLUM
- syngenta
- SST® Software
- AgConnections
- Agrible
- AgriEdge
- Excelsior
- Land
- db

**Equipment/Independents**
- Trimble
- Agri-Data Solution
- Harvest Mark
- Precision HQ
- Connected Farm
- SST® Software
-adapt-N
- Drone Deploy
- Raven
- Environex
- Sirrus
- JOHN DEERE
- DN2K
- Precision Planting
- Sage Insights™
- MyJohnDeere

**Retailers**
- United Suppliers
- DTN Connect
- AgSync
- AgX
- SST® Software
- AgVeritas
- EZ-Erpy
- ADVISOR
- LAND O’LAKES, INC.
- R7 Tool
- GEOSYS
- TAVANT
- MAVRX
- Agworld
- ESRI
- AGRIUM
- AGRIAN
- adapt-N
- echelon
- Sage Insights™
- JOHN DEERE
What were the results?
Data Captured, API and Export Capabilities

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<th>Type</th>
<th>Agronomy</th>
<th>Data Coop</th>
<th>Finance</th>
<th>Equipt</th>
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3 Candidate Software Architectures

Analysis of the Data Flow

Our Grower

Farm Mgmt Software
Finance
Operations
Agronomics
Sales

Carbon Credit Registry

Carbon Model
Easy
Candidate Software Architectures

1. Carbon Model Pulls

Our Grower

Farm Mgmt Software
- Finance
- Operations
- Agronomics
- Sales

Carbon Credit Registry

Carbon Model

Another UI Element

Academic Software
Candidate Software Architectures

1. Carbon Model Pulls

- Carbon Credit Registry
- Our Grower
- Farm Mgmt Software
  - Finance
  - Operations
  - Agronomics
  - Sales
- Hard
- Another UI Element
- Academic Software

Carbon Model
Candidate Software Architectures

2. Intermediary Pulls & Pushes

- Another UI Element
- Intermediary
- Carbon Credit Xchg
- Our Grower
- Farm Mgmt Software
  - Finance
  - Operations
  - Agronomics
  - Sales

Carbon Model
Candidate Software Architectures

2. Intermediary Pulls & Pushes

- Our Grower
- Another UI Element
- Intermediary
- Carbon Credit Xchg
- DB
- Farm Mgmt Software
  - Finance
  - Operations
  - Agronomics
  - Sales
  - Carbon Model

Hard
Candidate Software Architectures

3. FMS Pushes

Our Grower

$ Carbon Credit Xchg

Farm Mgmt Software

Financial Operations
Agronomics
Sales

API

Carbon Model
Candidate Software Architectures

3. FMS Pushes

Our Grower

Farm Mgmt Software
- Financial Operations
- Agronomics
- Sales

Easy

Carbon Credit Xchg

Carbon Model

API
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Next Steps

• Investigate interest of Farm Management Software (FMS) companies to integrate with Carbon Models

• Share results with Carbon Model partners
  – If possible, assist them with publishing APIs

• Facilitate introductions between various data flow players

• Use results of the data flow analysis with growers enrolled in the pilot project