

USDA/NASA Workshop Breakout Synthesis Report

Focus Area: Agriculture Competitiveness

Focus Area Moderator: Rich Allen, USDA-NASS

Synthesis Team:

1. Rich Allen
2. Jean Larsen
3. Gale Dunn
4. Rodney McKellip

Number of Breakout Groups: 2

Part 1 – Requirements Definition

Part 2 – Research & Data Relevance

Part 3 – Gap Identification

Part 4 – Collaborative Opportunities

Summary of potential collaborative opportunities:

1. Official USDA agricultural commodity forecasts
2. Conservation and environmental program administration
3. Information at appropriate scale (temporal and spatial) integrated for farm level, ranch level, and USDA program decision support
4. Understanding the variable capacity of the landscape to produce
5. Accessibility to present and future capability of products for global, regional, meso, & field scale applications

Title: Official USDA Agricultural Commodity Forecasts

Research:

LACIE, AgRISTARS, other Multisensor Aircraft Campaigns (MACs)
MODIS, AVHRR, SPOT
Landsat data continuity
NPP, and NPOES Data Continuity and Consistency
ASTER
HYDROS, SSMI, AMSR (soil moisture)

Gaps:

Timely Data Delivery (yesterday's data online today)

Agro-meteorological Factors:

- Precipitation
- Air Temp
- Snow Cover
- Wind Speed and Direction
- Soil Moisture
- Soil Temp
- ETP

Global operational Crop Models:

- Irrigated vs. rain fed
- Use of agro-meteorological factors as well as derived spectral information
- Sensors:
 - Cross calibration between sensors
 - Access to all global satellite imagery
 - Better than 8-day coverage for Landsat type imagery
- Data Integration
- Operational algorithms
 - Calibrated, atmospherically corrected, consistent, usable

Opportunities for USDA/NASA collaboration:

- Ongoing long-term research/applied research program (NASA/ARS) for decision support systems for FAS/WAOB/NASS
- Production of new products that quantify rather than qualify agro-meteorological factors.
- Validation of operational algorithms and models using the ARS experimental watershed for experimental infrastructure
- Development of better algorithms for operational requirements

Programs/Agency Aided:

“Ensure that the U.S. farm, forest and fishery sectors have timely and complete intelligence about emerging market opportunities. (USDA Mission)”

Forest Inventory & Analysis (USFS)
Estimates of World Agricultural Supply and Demand (FAS, WAOB)
Monitor and assess global food aid needs (FAS)
Monitor U.S. Crop Progress (NASS, FSA, WAOB)
Monitor World Food Production (FAS, WAOB)
Provide domestic and international food assistance (FAS)
Provide emergency and disaster assistance (FSA)
Commodity programs (FSA)
Cropland Data Layer (NASS)
Crop Insurance (RMA, FSA)
Dairy Export Incentive Program (DEIP)
Provide domestic and international food assistance (FAS/FSA)

Title: Conservation and Environmental Program Administration

Research:

MODIS

AVHRR

SPOT

Landsat, Landsat Data Continuity Mission (LDCM)

AVHRR, MODIS, NPP, and NPOES Data Continuity and Consistency

ASTER

HYDROS, SSMI, AMSR (soil moisture) Land use/land cover/ compliance

Sustainability

Environmental impact (including erosion, fate of chemicals, etc.)

GAPS:

- Resolution: Spatial, Spectral
- Soils & Soil nutrients
- Sub-meter topographical data
- Upscaling (integration of multi resolution imagery)
- Plant Identification
- Image analysis methodology
- Standards
- Decision support system to monitor the health and quality of environmental/conservation land

Collaborative Opportunities

- Change Detection (NASA/ARS/NRCS/NASS/FS/FSA...).
- Validation of industry datasets for compliance. (FSA)
- High volume data processing

Programs/Agency Aided:

Emergency Conservation Program (FSA)

Emergency Watershed Program (NRCS)

Wetland Reserve Program (NRCS)

Conservation Reserve Program (FSA)

Haying and Grazing of Acreage Enrolled in the Conservation Reserve Program (FSA)

Conservation Technical Assistance (NRCS)

Wildlife Habitat Incentive Program (NRCS)

Grassland Reserve Program (NRCS)

Resource Conservation & Development (NRCS)

Environmental Quality Incentives Program (NRCS)

Wetland Conservation Compliance (NRCS)

Title: Information at appropriate scale (temporal and spatial) integrated for farm level, ranch level, and USDA program decision support

Research:

Ag 2020

USDA addressing the factors limiting production

Crop Models (such as Univ. Wisc. PALMS)

NASA data visualization

ARS field variability

Gaps:

- Cost benefit and environmental benefits
- Technology adoption (the “curve”)
- Development of user-friendly decision support systems
- Identify yield/profit-limiting parameters due to site variability (right questions being asked?)
- Algorithm optimization
- Timeliness of remotely sensed products

Opportunities for USDA/NASA collaboration

- Collaborative development of user-friendly decision support systems
- Improve profit/yield
- Improve environmental quality and sustainability
- Decision Support System for Farm Operations
- Tech transfer Extension Service

Program:

Integrated Farming Systems (ARS)

Small farm programs (ARS)

Title: Understanding the variable capacity of the landscape to produce

Research:

Traditional agronomic, natural resources questions

Carbon

Agro-eco zones

Soil Survey

Gaps:

- Lack understanding of all parameters that impact plant growth
- Integrate various components of on-going ARS research (crops, pests, diseases, pathogens, etc.)

Opportunities for USDA/NASA collaboration

Systems approach of looking at the ecosystem.

Increasing scale from point measurements to larger scale

Development new technology to nondestructively measure plant stress, landscape factors (e.g. Fluouresence, wavelength, and radar)

Interpretation of NASA data (e.g. Using NASA data to expand DSSAT soils database)

Programs/Agency Aided:

RMA/FCIC/ARS/NRCS/FSA/APHIS

Title: Accessibility to Present and Future Capability of products for global, regional, meso, & field scale applications

Research:

REASON project

SEEDS

Multi-sensor “fusion” approaches (current level of effort is minimal but promising)

Gaps:

Knowledge of NASA’s products, models, and plans

Easy access to NASA’s products and models

Minimal research underway on integrating data from multiple sensors

Gap between NASA and user community

Lack of standard format for databases

Education packets and modules too large

No central ESE clearinghouse.

Opportunities for USDA/NASA collaboration:

Multi-sensor “fusion” approaches (ARS/NASA)

Education of users and feedback from users (CSREES/ARS/NASA)

Creation of a rich information exchange center with interaction and questions from producers (CSREES/ARS/NASA)

Including agricultural customers in pre-launch planning (NPOESS)

Pilot projects of future scenarios (“tomorrowland”)

High volume data processing

Product definition

Geospatial Extension Specialist

Development of more user friendly and widely applicable interfaces, programs, models, and functionality

Interoperable standards

Increased communication among individual USDA scientists/managers and NASA scientists/program managers

Note: Document and make data products available to the user community by cataloging and documenting current and future products.

Program:

Cross cutting solution.

Depends of what is made available.

Non Expanded Requirements:

Provide emergency and disaster assistance
ARS Technology Transfer Program
Commodity programs
Improve Range Management Decisions
Improve upon Technology of Natural resource data collection

Other:

What are USDA's policy and program needs that might be **facilitated** with remotely sensed information?

Parking Lot:

Table of NASA products currently delivered to USDA and other entities.