AgWG Ag Data Input Concerns

April 15, 2021

CAST-21 Workplan (Working Draft)

Approved data and method changes need to be finalized through the WQGIT by Sept. 1, 2021

Questions/ Comments?

KEY ACTION	STATUS
Task 1: Updates to data & methods that typically occur every 2 years.	• On-going • CAST Data Update Frequency • May AgWG update: on-going ag data collecting projects
Task 2: Investigate alternative forecasting methods for ag land uses & animals ✓	• Nov 19 AgWG: CBPO presentation on 4 methods of forecasting • Feb AgWG; See Mar AgWG decision
Task 3: Investigate 2012-2017 Ag Census change for fallow/idle acres ✓	• AgWG Sept 17; NASS consulted; no new information; No further action; See Jan AgWG decision
Task 4: Investigate use of latest landcover & LiDAR imagery to better define changes in total ag (& other land use) acres	• Oct AgWG; Jan AgWG; Feb AgWG; Apr AgWG; decision pending updated landcover & LiDAR imagery for 14 prototype counties May AgWG
Task 5: Investigate alternatives for double-crop acre estimates	• Oct 15 AgWG; NASS consulted- no new information; No further action; no recommended change to methodology; May for decision (associated with Task 4 change to ag acre calculations)
Task 6: Consider supplemental NM for soybeans	• In process • Dec Ad Hoc; Jan Ad Hoc; Mar Ad Hoc; Apr-May AgWG
Task 7: QA/QC'd historic & current layer pop. data for Hillandale Farms (PA)	• In process • Feb Ad Hoc- general discussion; May AgWG
Task 8: Build-in Verification Ad Hoc Team products	• In process

TODAY

TODAY

TODAY

Reminder - CAST 21 Schedule:

- Sept 1, 2021 - All data and methods approved
- Nov 1, 2021 - CAST-21 Beta release
- Jan 1, 2022 - Final CAST-21 release

https://www.chesapeakebay.net/channel_files/41834/cast21workplan_022221.pdf

Task 2: Investigate alternative forecasting methods for ag land uses & animals

March 18 Decision:

- The AgWG approved a path forward regarding CAST-21 Workplan Task 2: *Investigate alternatives to the current methods for forecasting agricultural land uses and animals and propose options for partnership consideration.*
- The AgWG achieved consensus to continue using the current projection method (Double Exponential Smoothing: Alpha = 0.8).

Task 6: Consider additions to current methods for "crediting" Nutrient Management on soybeans and propose options

Participating Entities: Agriculture Workgroup, Watershed Technical Workgroup, WQGIT, CBPO technical staff

Timeline* – Findings Presented to **Lead** Participating Entity for Decision: May 2021

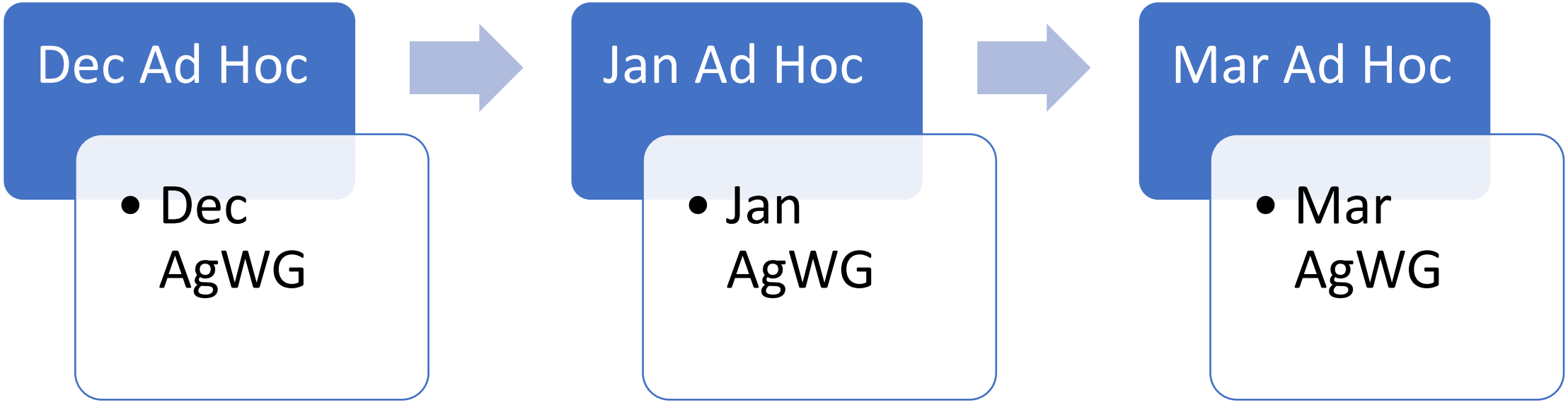
AgWG Ad Hoc: Approx. 7 hours discussion + outside communications with EP members, CBPO staff, stakeholders

Resulting Ask (PA): Change Nutrient Management Expert Panel Recommendations

- Apply Non-Zero Reduction Efficiency Value for Supplemental Nitrogen Nutrient Management BMP on Full-Season Soybean Load Source (Rate, Timing, and/or Placement).

AgWG CAST Concerns Ad Hoc

Jurisdictional reps reviewing submitted concerns
Monthly updates to the AgWG



Ad Hoc November Recommendation: Create a tracking mechanism for jurisdictions' wish list for 2-year CAST updates & the next model phase.

Nitrogen Core Nutrient Management

Land-Grant University Recommendations for N Applications @ Field Level

Manure Analysis & Volume

- Test or Book Values to Determine N Content

Calibration of Spreader/Applicator

Yield Estimates & Cropping Plan @ Field Level

Cropping & Manure Application History @ Field Level

BMP Quick Guide

Crop Application Goal on Major Crops

Crop Application Goal

*lbs of N/Year = State-Supplied lbs of N/Application Goal Yield Unit/Year X Yield/Year X 1.1**

Crop	DoubleCrop	Nutrient	Yield Unit	DE_1	MD_1	NY_1	PA_1	VA_1	WV_1
Alfalfa Hay Harvested Area	N	TN	dry tons	1	1	1	1	1	1
Alfalfa Hay Harvested Area	N	TP	dry tons	5	5	5	6	5	5
Corn for Grain Harvested Area	N	TN	bushels	0.92	0.92	0.92	0.92	0.92	0.92
Corn for Grain Harvested Area	N	TP	bushels	0.12	0.12	0.12	0.12	0.12	0.12
Corn for Grain Harvested Area	Y	TN	bushels	0.92	0.92	0.92	0.92	0.92	0.92
Corn for Grain Harvested Area	Y	TP	bushels	0.12	0.12	0.12	0.12	0.12	0.12
Wheat for Grain Harvested Area	N	TP	bushels	0.31	0.31	0.31	0.31	0.31	0.31
Wheat for Grain Harvested Area	N	TN	bushels	1.25	1.25	1	1	1.25	1.25
Wheat for Grain Harvested Area	Y	TP	bushels	0.465	0.465	0.465	0.465	0.465	0.465
Wheat for Grain Harvested Area	Y	TN	bushels	1.25	1.25	1	1	1.25	1.25
Pastureland and rangeland other than cropland and woodland pastured Area	N	TN	acres	15	15	15	15	15	15
Pastureland and rangeland other than cropland and woodland pastured Area	N	TP	acres	4	4	4	4	4	4
Soybeans for beans Harvested Area	**N**	**TN**	**bushels**	**0.12**	**0.12**	**0.12**	**0.12**	**0.12**	**0.12**
Soybeans for beans Harvested Area	**N**	**TP**	**bushels**	**0.33**	**0.33**	**0.33**	**0.33**	**0.33**	**0.33**
Soybeans for beans Harvested Area	**Y**	**TN**	**bushels**	**0**	**0**	**0**	**0**	**0**	**0**
Soybeans for beans Harvested Area	**Y**	**TP**	**bushels**	**0**	**0**	**0**	**0**	**0**	**0**

Data provided by states after consultation with nutrient management program staff.

Chesapeake Bay Program Phase 6 Beta 3 Watershed Model Webinar
July 11, 2016

*AMS elected to multiply yearly yield by 1.1 assuming farmers are optimistic, and average yields are often under-estimated.

CRITICAL CONTEXT:
"Crop Application Goal" assumes Core NM is in place

Full Season Beans receive
0.12 lb N/bu
&
0.33 lb P/bu

Double Crop Beans
(application is on sm gr)
0 lb N/bu
&
0 lb P/bu

NM on full season beans is controlling/managing for phosphorus!

Soybean Crop Application Goal

Full Season Soybeans

- 0.12 lbs N/bu (~5.7 lbs N/ac)
- CBW Average: (~3.58 lb/N ac)
- UME, Penn State, VT recommend zero N application

Double Cropped Soybeans

- Zero N applications
- UME, Penn State, VT recommend zero N application

Assumption: "Nitrogen application is not recommended for soybean production, however, **use of commercially available fertilizer formulations may result in application of up to 50 lb N / acre when fertilizer formulation and application rate is determined by crop P_2O_5, K_2O, S, or other nutrient needs**. Organic waste nitrogen application to full-season soybean is not recommended because it is an agronomically inefficient use of applied nutrients. Organic wastes should only be applied to small grain - double-crop soybean rotations at rates and timings to supply the recommended nitrogen rate to the small grain crop." – UME SFM-1

Application Goal Multipliers (CORE)

Land Use	Non NM N Multiplier	NM N Multiplier	Non NM P Multiplier	NM P Multiplier
Full Season Soybeans	**1.2**	**1.0**	1.5	1.0
Grain with Manure	1.3	1.0	3	1.0
Grain without Manure	1.2	1.0	1.5	1.0
Legume Hay	1.2	1.0	1	1.0
Silage with Manure	1.4	1.0	3	1.0
Silage without Manure	1.2	1.0	1.5	1.0
Small Grains and Grains	1.2	1.0	1.5	1.0
Small Grains and Soybeans	1.2	1.0	1.5	1.0
Specialty Crop High	1.3	1.0	2	1.0
Specialty Crop Low	1.2	1.0	2	1.0
Other Agronomic Crops	1.1	1.0	1.5	1.0
Other Hay	1	1.0	1	1.0
Pasture	1	1.0	1	1.0

Data provided by Phase 6.0 Nutrient Management Expert Panel

CRITICAL CONCEPT:
Multipliers are applied to Crop Application Goal

Full Season Soybeans:
40 bu/ac @ 100 ac

Core NM:
40 bu/ac x 0.12 lbs N/bu x 1.0 x 100 ac =
480 lbs N applied
40 bu/ac x 0.33 lbs P/bu x 1.0 x 100 ac =
1,320 lbs P applied

Non NM:
40 bu/ac x 0.12 lbs N/ac x 1.2 x 100 ac =
570 lbs N applied
40 bu/ac x 0.33 lbs P/bu x 1.5 x 100 ac =
1,980 lbs P applied

Nitrogen Supplemental Nutrient Management

***Pre-requisite:** *Applications made in accordance wtith all elements of the Nitrogen Core practice**

Rate

One or more of the following practices implemented:

- Application rate < land-grant university recommendations.
- Applications split across the growing season, *resulting in lower-than-planned applications.*
- Applications are made using variable rate goals, *resulting in lower-than-planned applications.*

Placement

One or more of the following practices are implemented:

- Applications of N are injected into the subsurface or incorporated into the soil.
- Applications of N are made with setbacks from surface water features.

Timing

- Split across the growing season into multiple applications

BMP Quick Guide

NM Supplemental Percent Reductions
(Only after Core NM is applied)

CRITICAL CONCEPT:
Supplemental NM is applied to Edge of Stream Delivery

Land Use	Nutrient Management BMP			Nutrient Management BMP		
	N Rate Supplemental	N Placement Supplemental	N Timing Supplemental	P Rate Supplemental	P Placement Supplemental	P Timing Supplemental
Full Season Soybeans	0%	0%	0%	5%	10%	1%
Grain w/ Manure	15%	5%	10%	10%	20%	20%
Grain w/o Manure	5%	3%	5%	5%	10%	1%
Legume Hay	0%	0%	0%	1%	10%	1%
Silage w/ Manure	15%	5%	10%	10%	20%	20%
Silage w/o Manure	5%	3%	5%	5%	10%	1%
Small Grains and Grains	5%	3%	10%	5%	10%	1%
Small Grains and Soybeans	5%	3%	10%	5%	10%	1%
Specialty Crop High	15%	5%	5%	5%	10%	1%
Specialty Crop Low	5%	3%	5%	5%	10%	1%
Other Agronomic Crops	5%	3%	5%	5%	10%	1%
Other Hay	0%	3%	5%	0%	10%	1%
Pasture	0%	0%	0%	0%	0%	0%

Data provided by Phase 6.0 Nutrient Management Expert Panel

What is Driving N Loads Increases?

(attributable to soybeans in CAST-19)

Agricultural Loading Rates?

- Ag Loading Rate Review Steering Committee:
  - Agricultural Loading Rates

Ag Census (i.e., Source Of Crop Data) ?

- 2017 Ag Census (input for CAST-19)

NM BMP Recommendations?

- Changing an Approved Expert Panel Recommendation Must Follow Science (BMP Protocol)
  - Protocol for the Development, Review, and Approval of Loading and Effectiveness Estimates for Nutrient and Sediment Controls in the Chesapeake Bay Watershed Model

Agricultural Loading Rates

Based on Available Literature & Best Professional Judgement

(Phase 6 Ag Loading Rate Review Steering Committee)

"N losses from soybeans are only somewhat lower than corn, because N fixation inputs (which are poorly characterized) are apparently substituting for fertilizer inputs." (p.11)

Ag Loading Rate Review Steering Committee: Agricultural Loading Rates

ACTION: Clarify with CBPO how the simulation of how N assumptions are handled in the model (e.g. reduction of N fixation in the model with applied N).

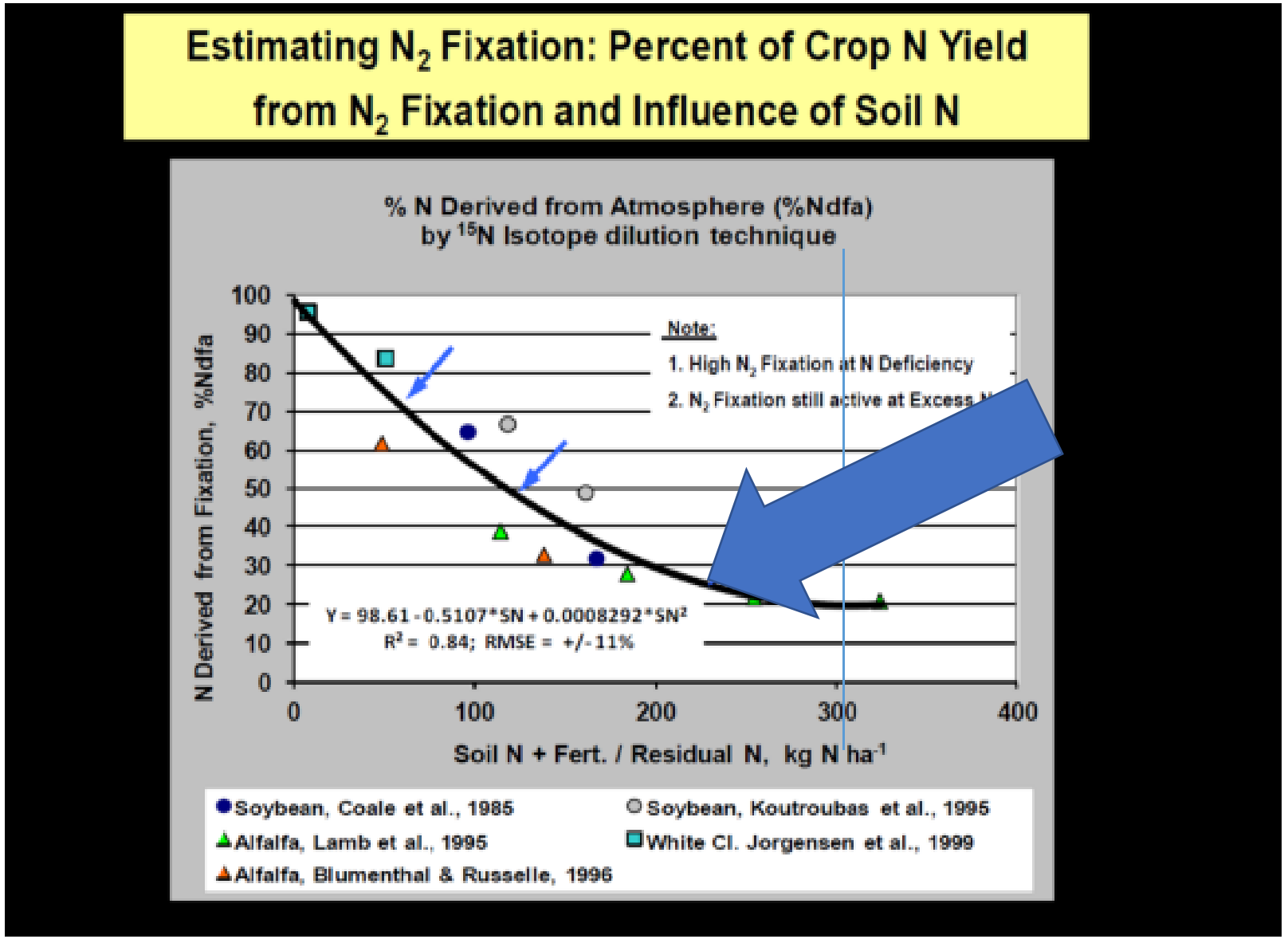


Figure 3-15: Nitrogen fixation as a percent of crop yield

CRITICAL CONCEPTS:

N Fixation is the Main Driver of N Loads for Soybean Land Use

Increase in Soil N or Applied N Will Decrease N Fixation

One Supplemental BMP @ 5% efficiency would remove more N than was applied

https://cast.chesapeakebay.net/FileBrowser/GetFile?fileName=P6ModelDocumentation%2F3TerrestrialInputs.pdf

Agricultural Loading Rates

Long-Term (post CAST-21): Phase 7 Review of Ag Loading Rates/Ratios

- Identification & Consideration of New Literature Sources
  - N Fixation
  - Soybeans (& other crop/pasture land uses)

Ag Loading Rate Review Steering Committee: Agricultural Loading Rates

Census of Agriculture

Concern Regarding Accuracy of Ag Census Crop Acres

Spatially Distributed Land Use from the Land Cover/Land Use Data Team Starting With the CAST-21 Could Mitigate Concern

CAST-21 Workplan TASK 4

Method of Modeling Double-Crop Soybeans Approved by CBP Partnership

Determined Sound by USDA-NASS

CAST-21 Workplan TASK 5

Census of Agriculture

Short-Term:

- Landcover & LiDAR Imagery to Define Changes in Total Ag Acres May Improve Accuracy of Modeled Crop Acres

Long-Term (post CAST-21):

- On-going Efforts to Supplement/Complement Ag Census with other data sources (subject to CBP partnership approval)

NM Expert Panel Recommendations

Land Use: Full-Season Soybeans

NM on Soybeans Controls for P (*not N*)

Land Grant Universities Do Not Recommend N Application (Via Fertilizer or Manure)

Core NM BMP → **N & P**

- Applies to Crop Application Goal (What is Applied/Distributed to Crop)
  - Small CAG for N on soybeans allows for appropriate distribution of nutrients across land uses (see reference slides)

Supplemental NM BMPs (Rate, Timing, Placement)→ **P only**

- Applies to Soybean **Edge-of-Field Total N Load**
  - **TN Load is Primarily Residual N From Fixation**
  - Applied (CAG) N is Tiny Fraction of TN Load
- Rate: Excess N Reduced is Still Excess N Subject to Loss…
- **Timing & Placement** of Excess N Irrelevant (Still Subject to Loss)

ACTION:

PA will work on gathering information to better understand what real-world soybean management looks like. Other jurisdictions are encouraged to do the same.

PA

Nutrients are being applied to full season soybeans in advance of planting.

Model's assumption of applied nutrients to these fields is conceptually correct.

MD

Statewide average (2020): 2.5 lbs N of manure/per acre.

Statewide average (2020): 6.9 lbs. N of commercial fertilizer per acre.

Numbers do not take yield into consideration.

NY

N application not recommended but sometimes unavoidable.

Guidelines available if N must be applied.

VA

N application not recommended.

Emergency disposal guidelines for manure.

Applications of N fertilizer for high yielding soybeans (90 bu/ac) may occur, but unusual.

Soybean Crop Application Goal

Full Season Soybeans

- 0.12 lbs N/bu (~5.7 lbs N/ac)
- CBW Average: (~3.58 lb/N ac)
- UME, Penn State, VT recommend zero N application

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Assumption: "Nitrogen application is not recommended for soybean production, however, **use of commercially available fertilizer formulations may result in application of up to 50 lb N / acre when fertilizer formulation and application rate is determined by crop P2O5, K2O, S, or other nutrient needs**. Organic waste nitrogen application to full-season soybean is not recommended because it is an agronomically inefficient use of applied nutrients. Organic wastes should only be applied to small grain - double-crop soybean rotations at rates and timings to supply the recommended nitrogen rate to the small grain crop." – UME SFM-1

ACTION: Obtain E3* clarification related to NM on full-season soybeans for communication to the AgWG and CBP stakeholders.

* E3 = Everything by Everyone Everywhere

Does the 0% N supplemental NM efficiency for full season soybeans inhibit WIP goals due to E3 assumptions?

Does the 0% N supplemental NM efficiency for full season soybeans inhibit WIP goals due to E3 assumptions?

Short answer: No

CRITICAL CONCEPT:

All approved BMPs with approved effectiveness values are a part of E3 scenario, including:

- Supplemental N Nutrient Management for ag land uses.
    - Efficiency for edge-of-stream loss ranges 0%-15% (depending on land use)
    - **E3 assumes 0% N efficiency for full season soybeans** (per Expert Panel report)

WIP III SNAPSHOT:

Nutrient Application Management Core Nitrogen

State	2019 Progress % Implementation	WIP 2025 % Implementation
DE	70.90%	85.00%
MD	64.90%	63.10%
NY	8.70%	20.50%
PA	12.20%	70.20%
VA	20.80%	49.10%
WV	22.00%	22.40%

https://cast.chesapeakebay.net/Reports
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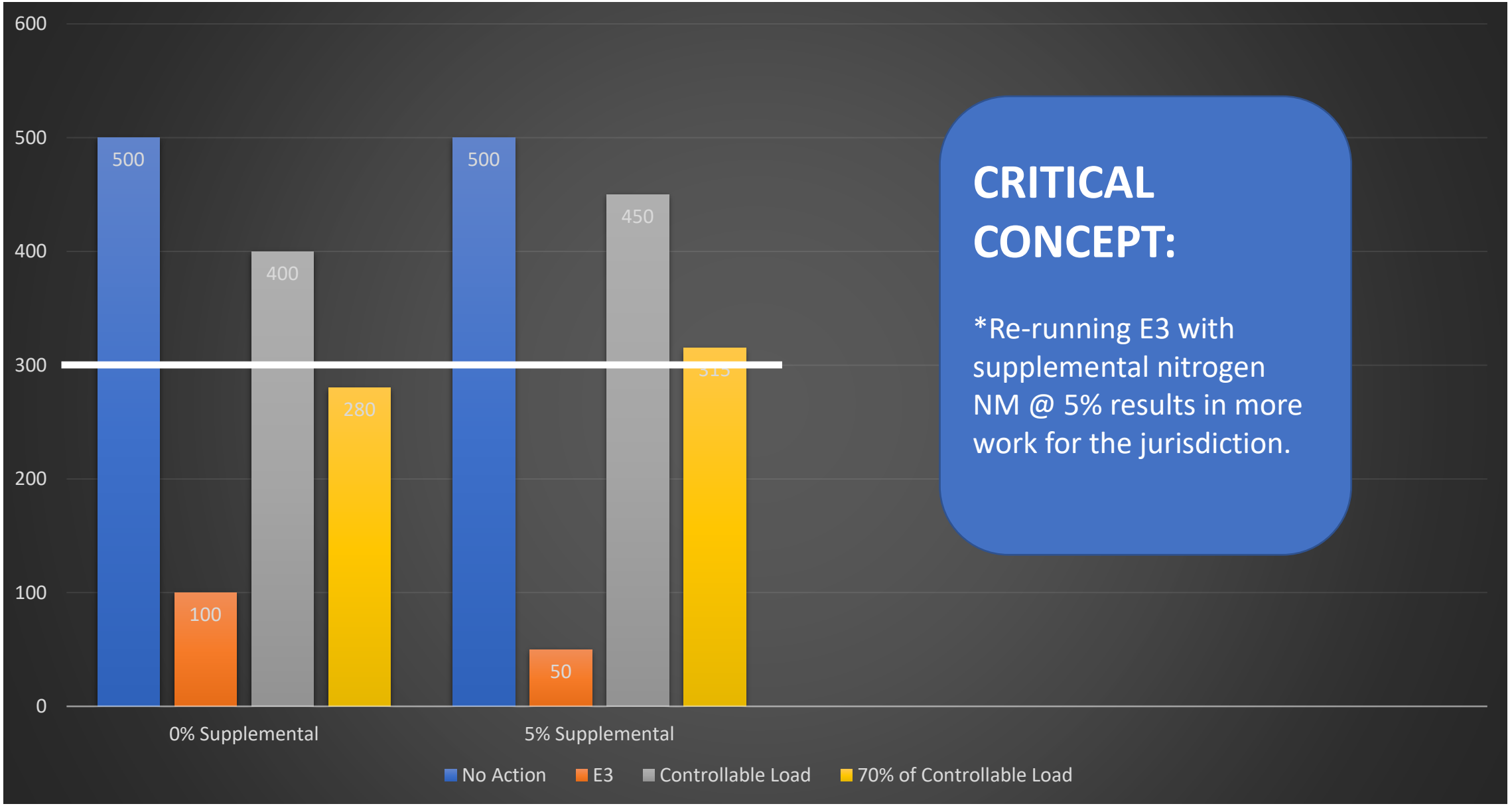

600
500
400
300
200
100
0
500
100
400
280
500
50
450
313
0% Supplemental
5% Supplemental
No Action
E3
Controllable Load
70% of Controllable Load
CRITICAL CONCEPT:
*Re-running E3 with supplemental nitrogen NM @ 5% results in more work for the jurisdiction.

NM Expert Panel Recommendations

Land Use:
Full-Season Soybeans

Long-Term (post CAST-21):

- Improve Understanding of Real-World Soybean Management
  - Reconsider Baseline Assumptions
  - Are NM BMPs Sufficient for Representing Use of "4R*" Practices?
  - Incorporate in CAST (watershed model)

*https://nutrientstewardship.org/4rs/

Task 6: Consider additions to current methods for "crediting" Nutrient Management on soybeans and propose options

Ask: Change Nutrient Management Expert Panel Recommendations

- Apply Non-Zero Reduction Efficiency Value for Supplemental Nitrogen Nutrient Management BMP on Full-Season Soybean Load Source (Rate, Timing, and/or Placement).

Summary of Concern

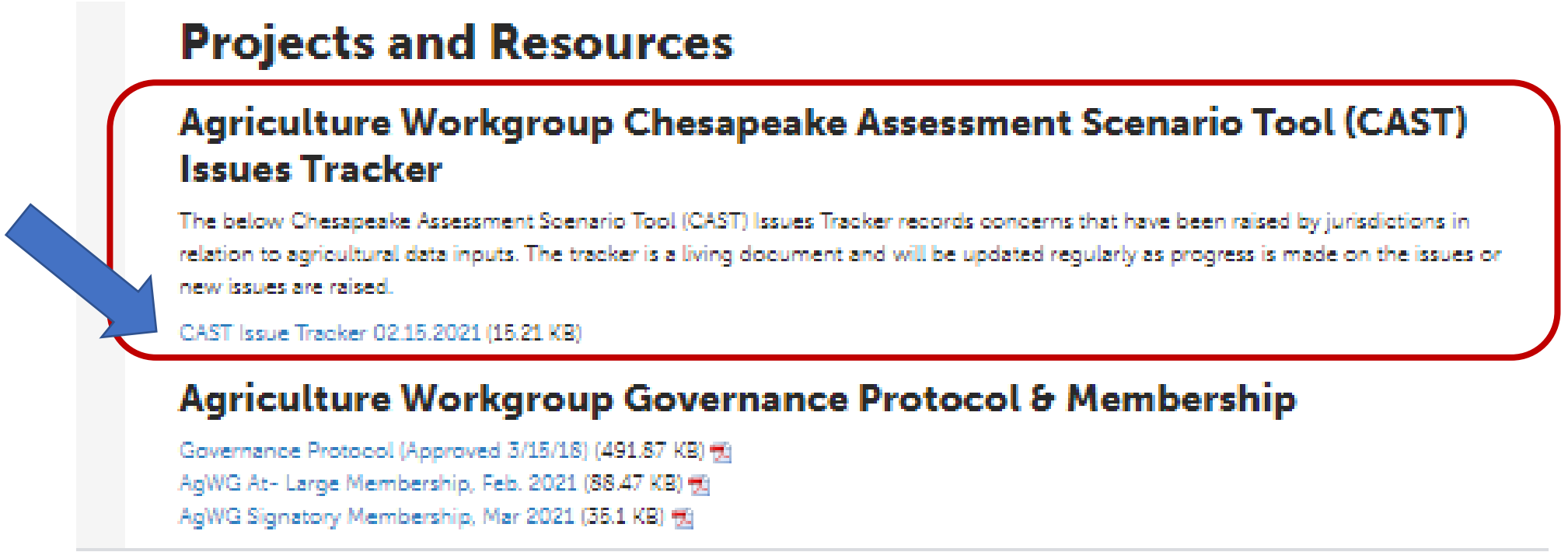
- Establishment of Load Without a Means to Reduce that Load Through Control & Uptake (PA)
- Supplemental NM Practices Will Have Some Beneficial Effect that Should be Reflected in the Model- Emphasis on "Placement" (PA)

Summary of Ad Hoc Discussion

- Need for Change?: No Consensus Among Group
  - Split Among "No", Stand Aside, Endorse…
- Need to Better Understand Ag Management & Apply to CAST
  - Manure Application is Not NM BUT if it Happens, Can We Incentivize Responsible Application?

Prioritizing Concerns (post CAST-21)

- AgWG Home Page https://www.chesapeakebay.net/who/group/agriculture_workgroup



Projects and Resources

Agriculture Workgroup Chesapeake Assessment Scenario Tool (CAST) Issues Tracker

The below Chesapeake Assessment Scenario Tool (CAST) Issues Tracker records concerns that have been raised by jurisdictions in relation to agricultural data inputs. The tracker is a living document and will be updated regularly as progress is made on the issues or new issues are raised.

CAST Issue Tracker 02.15.2021 (15.21 KB)

Agriculture Workgroup Governance Protocol & Membership

Governance Protocol (Approved 3/15/18) (491.87 KB)
AgWG At- Large Membership, Feb. 2021 (88.47 KB)
AgWG Signatory Membership, Mar 2021 (35.1 KB)

Ad Hoc November Recommendation: Create a tracking mechanism for jurisdictions' wish list for 2-year CAST updates & the next model phase.

CBPO- NASS annual dairy surveys

Animal Data

Animal Populations: explore other estimating options (MD/NY; Task 1)

AgWG May Updates

Crop Production/Acres

Crop Production Acres: improve annual estimates (MD; Task 1)

Nutrient Applications/Assumptions

Fertilizer Sales and Use Data (MD; Task 1)

MD Working w/ State Chemist

BMP Tracking & Reporting

Dairy Precision Feeding (PA)

Target Date June 2021 for Report Back to the AgWG

BMP Effectiveness/Modeling

Winter Crop (NY/PA)

Manure Transport / Manure Treatment Technologies (PA)

Forthcoming Discussions

Future Discussions with Modeling Team

- May AgWG CAST Concerns Ad Hoc:
  - Clarify Winter Crop BMP Ask
- May AgWG
  - **Decision** Landcover/ LiDAR Data (Task 4)
  - **Decision** Double Crop Methods (Task 5)
  - **Decision?** NM on Soybeans (Task 6)
  - Hillandale Data (Task 7)
- June AgWG
  - Prep Any Remaining CAST-21 Workplan Decisional Items for June 28 WQGIT
- June Ad Hoc/AgWG
  - Update from Dairy Precision Feeding Group
    (for 2021 progress)

Improving Ag Data? (TASK 1)

Crop Acreage Data

Crop Application Goal

Alternative methods to account for fitting Ag Census data to CBP needs?

- Adjusting methods for estimating crop acres (e.g. double crops)

Alternative/supplemental data sets

- Other data sets at the state or federal level?

Animal Population Data

Additional NASS Annual Survey Data may be available to inform population trends between census years (incorporated every two years)

- Dairy, Beef Cattle, Layers, Swine…

Direct from industry data can inform animal population ***trends*** between census years.

- Requires careful cooperation
- Legal, privacy assurances

Manure Generated

Other Data Issues (new data incorporation every 2 years)

Soil P data

- Gary Shenk Sept 2018 presentation to AgWG on data set incorporated into the CBWM
- **Additional soil P data is welcome and encouraged (NY & WV have made inquiries)**

Manure Nutrient Concentration Data

- Changes in management may result in changes in nutrient concentrations
- **Additional manure concentration data is welcome and encouraged**

Fertilizer Data

- More accurate allocation of fertilizer within the CBW?
  - **Jurisdictions working with state chemists**

4. Define Inorganic Fertilizer Available to Crops

CRITICAL CONCEPT:

To maintain integrity of CBWM there are two options for new data sets:

- Provide data all the way back through 1985.

  OR
- Use the **trend** in new data sets for the years available.

CBWM= Chesapeake Bay Watershed Model

Agriculture Practices	Duration	Unit	Delaware (CBWS Portion Only) 2019 Progress	Delaware (CBWS Portion Only) WIP 3 CAST-2019 version	Maryland (CBWS Portion Only) 2019 Progress	Maryland (CBWS Portion Only) WIP 3 CAST-2019 version	New York (CBWS Portion Only) 2019 Progress	New York (CBWS Portion Only) WIP 3 CAST-2019 version	Pennsylvania (CBWS Portion Only) 2019 Progress	Pennsylvania (CBWS Portion Only) WIP 3 CAST-2019 version	Virginia (CBWS Portion Only) 2019 Progress	Virginia (CBWS Portion Only) WIP 3 CAST-2019 version	West Virginia (CBWS Portion Only) 2019 Progress	West Virginia (CBWS Portion Only) WIP 3 CAST-2019 version
Nutrient Application Management Core Nitrogen	annual	Acres	70.90%	85.00%	64.90%	64.10%	8.70%	20.50%	12.20%	70.20%	21.80%	49.10%	22.00%	22.40%
Nutrient Application Management Rate Nitrogen	annual	Acres	0.00%	60.00%	20.00%	28.40%	7.50%	20.50%	0.90%	11.90%	1.70%	39.20%	0.00%	0.00%
Nutrient Application Management Placement Nitrogen	annual	Acres	0.00%	60.00%	6.20%	18.30%	7.80%	20.50%	0.00%	9.80%	0.40%	22.40%	0.00%	0.00%
Nutrient Application Management Timing Nitrogen	annual	Acres	0.00%	60.00%	3.90%	8.10%	7.30%	20.50%	0.00%	14.60%	1.30%	22.40%	0.00%	0.00%

https://cast.chesapeakebay.net/Reports

Pulled 04/13/21

Comments on CAST-19: Soybean nitrogen application (p.2)

- With the increase in full-season soybeans and decrease in double cropped soybeans in CAST-19, the N application rates were examined. Chris Brosch-DDA, Jill Whitcomb-PA-DEP; James Martin-VA-DEQ

Comments on CAST-19: Soybean nitrogen application→Response (p.3)

- N applications on soybeans depend on whether the soybeans are full season or double cropped.
- Double-cropped receive 0 N applications.
- Full season have a N crop need of 0.12 lb./bu (5.70 lbs./ac)
  - watershed-wide avg
    - 2.23 inorganic lbs./acre applied
    - 1.35 organic lbs./acre applied
- The University of Maryland, Penn State, and Virginia Tech nutrient management guidelines recommend zero N on full-season or double-cropped soybeans.

Comments on CAST-19: Soybean nitrogen application_Resolution (p.3)

- A comparative analysis of changing full-season soybeans to corn and the resulting nitrogen loads was provided to PA-DEP.

- The soybean N application and N fixation assumed for Lancaster County and the average in the rest of PA's watershed were provided to Jill Whitcomb, PA-DEP.

- The CBP will provide to Jill Whitcomb, PA-DEP, and other states the peer reviewed research and other sources that document nutrient runoff/leaching rates from legumes, and how it is applied in the modeling tools (e.g., is it a constant throughout the year or is there a difference in seasonality, is there a difference depending on what crop preceded/followed, etc.) by the May 25, 2020 WQGIT.

- The AgWG will be asked to consider establishing a group to evaluate nutrient management BMPs for nitrogen on full season soybeans. [see Workplan Task 6]

Concern:

Nutrient management on full-season soybeans?
YES: "core NM"
NO: "supplemental NM" for N rate, placement & timing
Why? NM on soybeans is controlling for P…

Given the same acreage…
A shift from double-crop to full-season soybeans will result in an increase in attributed N load.

CRITICAL CONCEPT:
N load attributed to soybean acres includes estimated leaching/runoff of residual N based on scientific literature review.

Ag Loading Rate Review Steering Committee
Agricultural Loading Rates

Model Assumption

Full Season (under Core NM):
Assume 40 bu/ac @ 100 ac

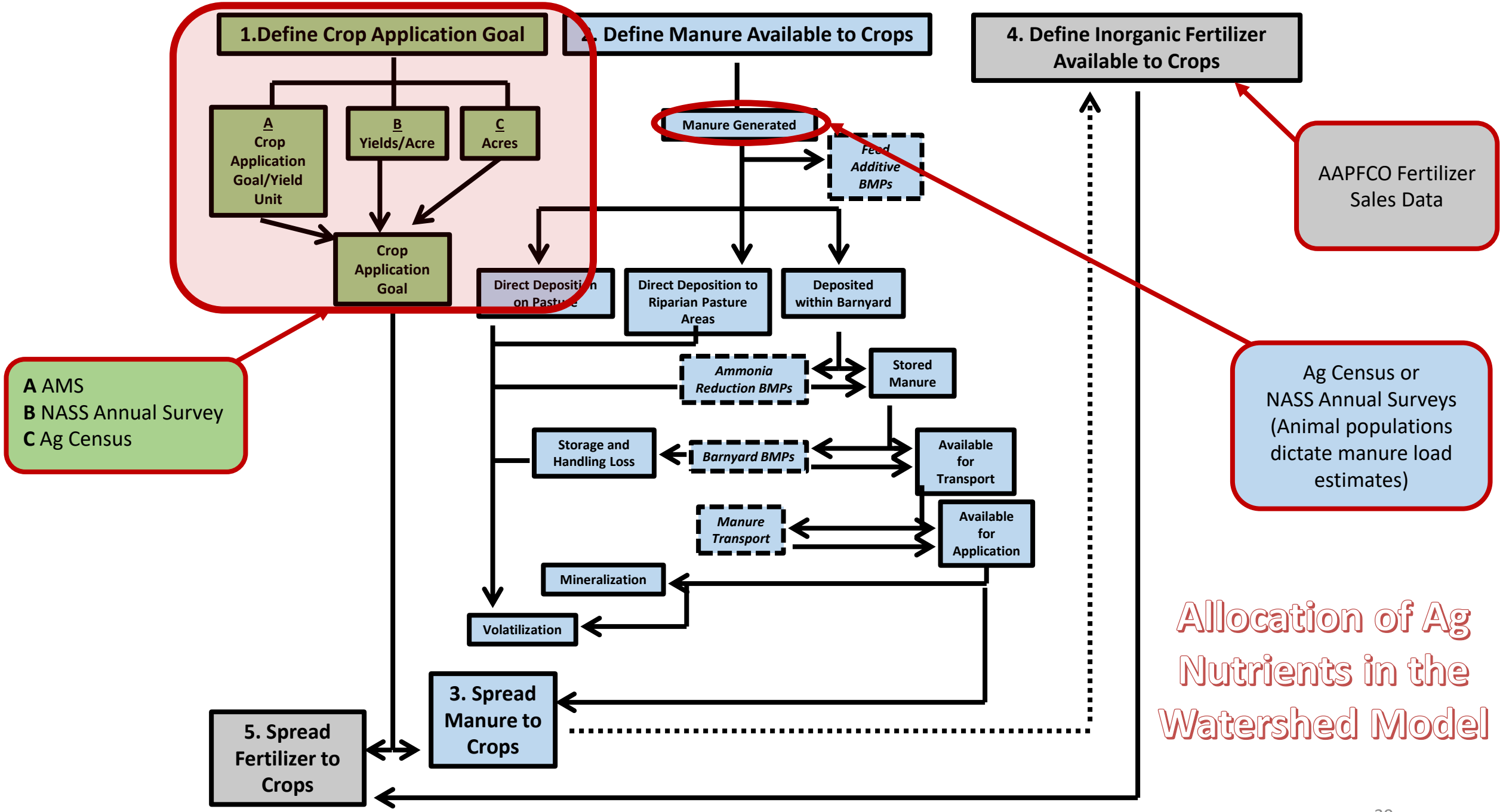
40 bu/ac x 0.12 lbs N/bu x 1.0 x 100 ac =

480 lbs N applied

Double-Crop
Assume 25 bu/ac @ 100 ac

25 bu/ac x 0 lbs N/bu x 1.0 x 100 ac

0 lbs N applied (on beans)
N applied to sm grain

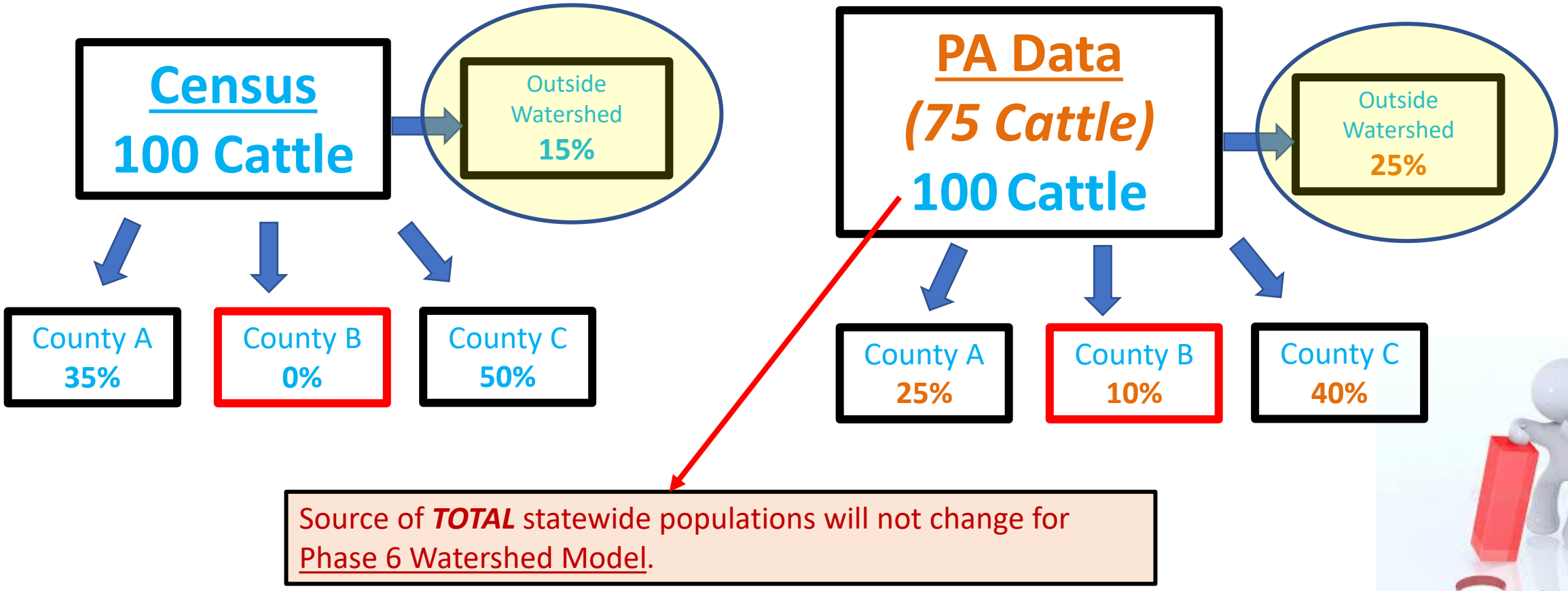


AMS= Agricultural Modeling Subcommittee

CRITICAL CONCEPT

Source for ***distribution*** of statewide populations can change.

Example: Pennsylvania provides fraction of cattle in every county for the year 2019, and these fractions are used to distribute TOTAL statewide cattle populations from the Census of Agriculture.



Source of ***TOTAL*** statewide populations will not change for Phase 6 Watershed Model.