

Developing U.S. Sustainability Certification Standards to Ensure Landscape-Level Sustainability



Incorporating Bioenergy In Sustainable Landscape Designs Workshop Two: Agricultural Landscapes
June 26, 2014



Rayane Agular, J.D.,
M.A. 2014



Matt Walker,
J.D./M.S. 2016



Building the BMAS Architecture

Thank you for your time and attention!
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Incorporating Bioenergy In Sustainable
Landscape Designs Workshop Two:
Agricultural Landscapes
June 26, 2014



Energy
Biosciences
Institute



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Problem



Biofuels Unsustainable?



Sustainability Questions Plague Bioenergy

Manomet Center for Conservation Sciences JUNE 2010 NCI-2010-03

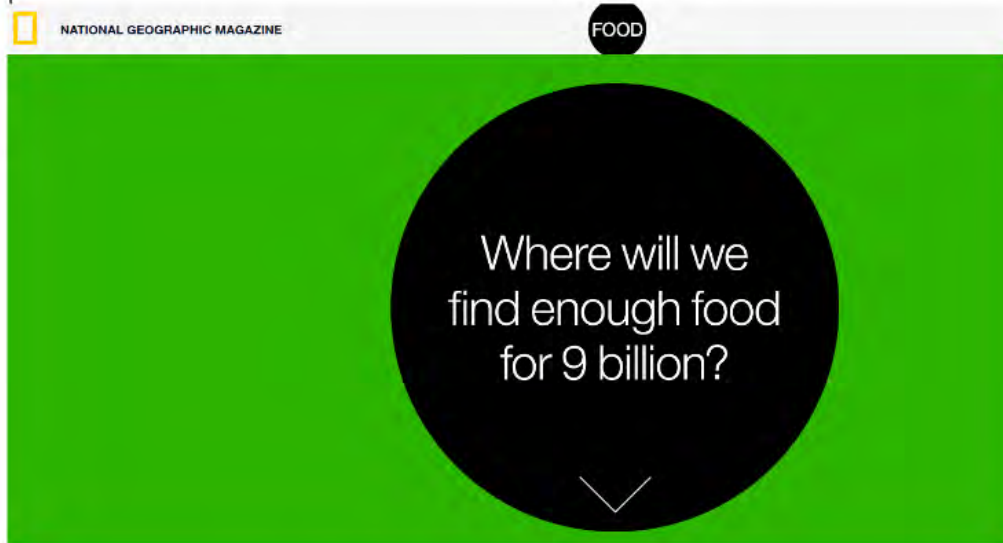


NATURAL CAPITAL INITIATIVE AT MANOMET R E P O R T



BIOMASS SUSTAINABILITY AND CARBON POLICY STUDY

NATIONAL GEOGRAPHIC MAGAZINE FOOD



Where will we find enough food for 9 billion?

theguardian

News | US | World | Sports | Comment | Culture | Business | Money | I

Environment > Biofuels

Corn biofuels worse than gasoline on global warming in short term – study

- \$500,000 study paid for by federal government
- Conclusion: 7% more greenhouse gases in early years

Associated Press in Washington
theguardian.com, Sunday 20 April 2014 15:48 EDT
Jump to comments (169)



Biofuels made from corn residue have attracted more than \$1bn in federal support. Photograph: Marvin Dembinsky Photo Associate/Wamy

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Home > Science Magazine > 29 February 2008 > Searchinger et al., 319 (5867), 1238-1240

Article Views Published Online February 7 2008
Science 29 February 2008:
Vol. 319 no. 5867 pp. 1238-1240
DOI: 10.1126/science.1151861

Abstract
Full Text
Full Text (PDF)
Supporting Online Material

REPORT

Use of U.S. Croplands for Biofuels Increases Greenhouse Gases Through Emissions from Land-Use Change

VERSION HISTORY
319/5867/1238 (most recent)

Timothy Searchinger^{1,2}, Ralph Heimlich², R. A. Houghton³, Fengxia Dong⁴, Amani Elobeid⁴, Jacinto Fabiosa⁴, Simla Tokgoz⁵, Dermot Hayes⁴, Tun-Hsiang Yu⁴

Author Affiliations

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OUR FORESTS AREN'T FUEL.

Policy and Business React: "Drivers" of Sustainability Quantification

Laws and Regulations



Policy and Business React: "Drivers" of Sustainability Quantification

Laws and Regulations

2009/29/EC of the European Parliament and of the Council

DIRECTIVE

DIRECTIVE 2009/28/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL
of 23 April 2009
on the promotion of the use of energy from renewable sources and subsequently
regarding Directive 2001/77/EC and 2001/80/EC
(Text with EEA relevance)

5.6.2009 95 Official Journal of the European Union L 140/63

DIRECTIVE 2009/29/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL
of 23 April 2009
amending Directive 2003/87/EC so as to improve and extend the greenhouse gas emission allowance
trading scheme of the Community
(Text with EEA relevance)



California Environmental Protection Agency
Air Resources Board
Public Resources Department
Low Carbon Fuel Standard Program



Laws

L 140/16

EN

Official Journal of the European Union

5.6.2009

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California Environmental Protection Agency

 **Air Resources Board**

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[Reducing Air Pollution](#)

[Air Quality](#)

[Business Assistance](#)

[Laws](#)

Low Carbon Fuel Standard Program

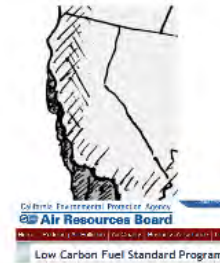


EPA

United States Environmental Protection Agency

Policy and Business React: "Drivers" of Sustainability Quantification

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Business-to-Business



Policy and Business React: "Drivers" of Sustainability Quantification

Laws and Regulations






Business-to-Business



Biofuels Unsustainable?



Meaningful Standards



Standards Should Prioritize
Measurement, Not Only Activity
Documentation

Otherwise Miss Paradigm-Shifting
Opportunities

Systems Approaches In Standards

Approaches to sustainability policy are often siloed; challenge is to incorporate the full set of pros and cons of bioenergy's enviro-socio-economic effects at various scales

Outside of standards, must deal with systemic causes of problems improperly assigned to biofuels (e.g., governance, diet)



Problem



Systems solutions to sustainability challenges rely on:

- Institutional architectures that
 - Facilitate data gathering and
 - Translate scientific analysis of data into holistic policy decisions that are
 - credible and verifiable



Standards Design Imperatives

- Seize on opportunities to show positive benefits, including reduced supply chain costs
- Provide credible and verifiable measurement of sub-field, field, and landscape sustainability
- Incorporate tremendous scientific capacity, including that built by USDA, DOE, and institutes like EBI
- Integrate agriculture and forestry for multifunctionality
- Provide communications support structure
 - Stakeholders in certification
 - Issues outside of certification
- Assist in harmonization of approaches
- Are usable for fuels, food, feed, packaging, chemicals



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Biomass Toolbox

Biomass Market Access Standards (BMAS) Group

Architecture enables policymakers to make informed decisions about the sustainability of biomass-based energy based on transparent data, analytics, and philosophies.



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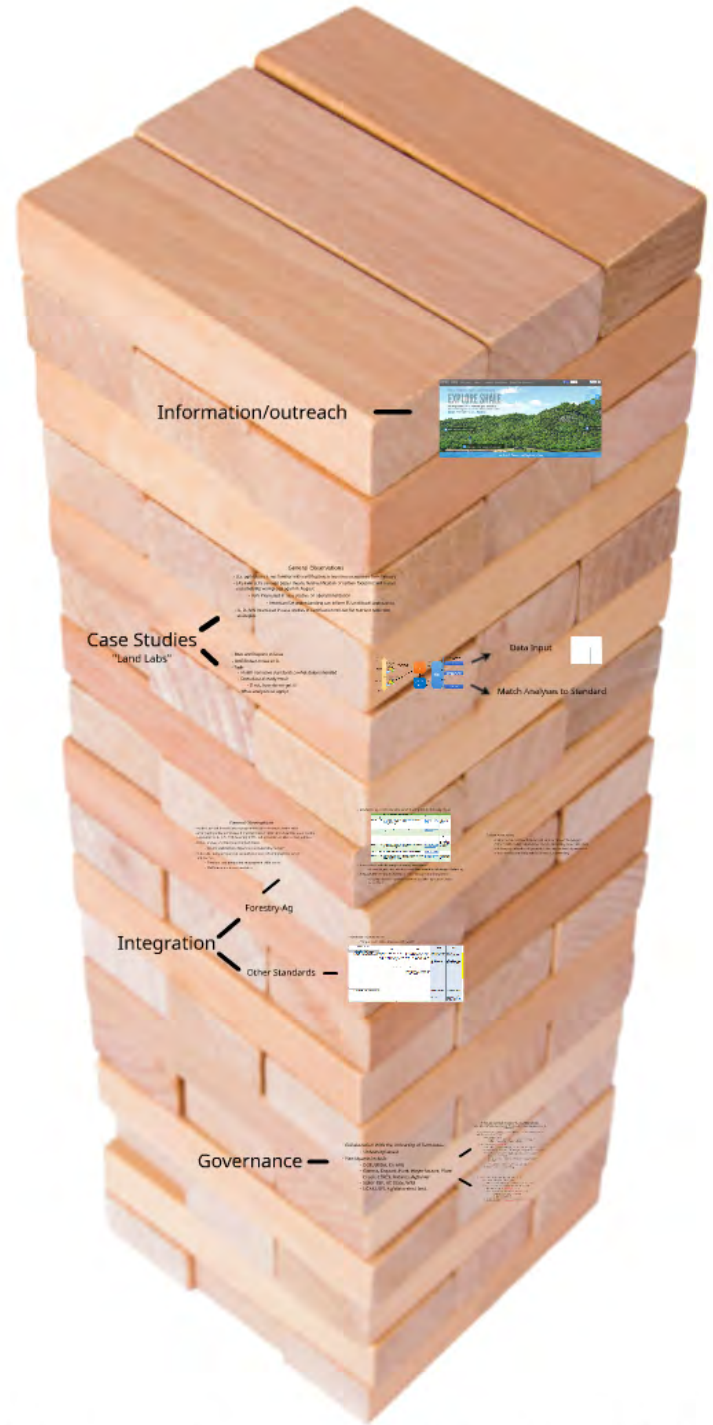


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**Biomass
Toolbox**
Enables Market Access Standards (EMAS) to
 enables policymakers to make informed
 decisions about the sustainability of biomass-based
 products through transparent data, analytics, and



Building the BMAS Architecture

Governance —

- Collaboration With the University of Tennessee
 - University based
- Participants include
 - DOE, USDA, CA ARB
 - Genera, Dupont, Poet, Weyerhaeuser, Plum Creek, CERES, Antares, AgSolver
 - SUNY-ESF, NC State, WIU
 - NCASI, SFI, Ag Watershed Inst.

Stakeholder Alignment in Complex Sociotechnical Systems: Reconsidering "Good Governance" Principles In Private Standards Setting (in prep. 2014)

1. Assessment of existing good governance guidance: used as a "gatekeeper" of whether standards are credible
 - ISO, ANAB/IASI, ISEAL
 - Are governments and businesses capable of dissecting what these guidelines really mean, and how they function?
2. Stakeholder mapping (**structural**)
 - Stakeholder capacity in identifying problems and critiquing science
 - Leaders with systems view and multidisciplinary experience (**behavioral**)
 - Who is most capable of mediating/interpreting science? Academic?
 - Culture of "peer review"
 - Fashion academic facilitation like Federal Advisory Committee Act's SABS
 - Separation of standards development from auditing
 - Inclusiveness, consensus, and timing
3. Process: uncertainty, philosophy, and transparency:
 - Precaution: "no action until we know"
 - But, how do we move forward without case studies to know?
 - Process, therefore, must build architecture for learning
 - Building case trust (**cultural, behavioral**)
 - Allows for movement forward through (**structural**):
 - Continuous improvement (testing)
 - Adaptive management
 - Leadership that values multidisciplinary (**behavioral**)
 - Communication (**structural, behavioral**)

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General Observations

- Agriculture and forest biomass proponents voices stronger as one voice
- Anticipating policy trend toward multifunctional landscapes: driven by water quality regulation in the U.S., CAP Greening in EU, and economics of diverse fuel supplies
- Polarizing nature of forestry standard choice
 - Market and membership versus sustainability output?
- Culturally, integrating agriculture with forestry is challenging because of approaches
 - Temporal and geographic management differences
 - BMPs versus outcome analytics

Forestry-Ag

Integration

Other Standards

Benchmarking of each state BMP (which forestry standards heavily rely on)

State	Year	Standard	Notes
CA	2009	Forest Practice Act	...
OR	2009	Forest Management Act	...
WA	2009	Forest Practices Act	...
MT	2009	Forest Management Act	...
ND	2009	Forest Management Act	...
SD	2009	Forest Management Act	...
NE	2009	Forest Management Act	...
IA	2009	Forest Management Act	...
MO	2009	Forest Management Act	...
IL	2009	Forest Management Act	...
IN	2009	Forest Management Act	...
OH	2009	Forest Management Act	...
PA	2009	Forest Management Act	...
NY	2009	Forest Management Act	...
VT	2009	Forest Management Act	...
NH	2009	Forest Management Act	...
ME	2009	Forest Management Act	...
MA	2009	Forest Management Act	...
RI	2009	Forest Management Act	...
CT	2009	Forest Management Act	...
DE	2009	Forest Management Act	...
MD	2009	Forest Management Act	...
VA	2009	Forest Management Act	...
NC	2009	Forest Management Act	...
SC	2009	Forest Management Act	...
GA	2009	Forest Management Act	...
AL	2009	Forest Management Act	...
MS	2009	Forest Management Act	...
LA	2009	Forest Management Act	...
TX	2009	Forest Management Act	...
NM	2009	Forest Management Act	...
AZ	2009	Forest Management Act	...
CO	2009	Forest Management Act	...
WY	2009	Forest Management Act	...
MT	2009	Forest Management Act	...
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WY	2009	Forest Management Act	...

- How do these make their way into management plans?
 - Versus in agriculture, which does not have a tradition of this type of planning
- Although different standards exist, compare standards in actual practice
 - Important because opens the certification market up to more land to be certified

Carbon Accounting

- Neither FSC nor SFI have their own
- "Other" sustainability indicators
- Article in prep on methodologies
- Information/educational portal

Benchmarking to Bonsucro

- "Only outcome-based standard in the world"

Standard	Year	Scope	Notes
Bonsucro	2010	Sugarcane	...
FSC	2006	Forestry	...
SFI	2006	Forestry	...
PEFC	2006	Forestry	...
ISCC	2009	Biofuels	...
RSB	2009	Biofuels	...
UTZ	2010	Food Safety	...
GLOBALG.A.P.	2010	Food Safety	...
SA-COC	2010	Cocoa	...
SMETA	2005	Textiles	...
SA8000	2008	General	...
ISO 26000	2006	General	...
ISO 14001	1996	Environment	...
ISO 9001	1987	Quality	...
SA 8000	2008	Social	...
SA 2000	2008	Social	...
SA 3000	2008	Social	...
SA 4000	2008	Social	...
SA 5000	2008	Social	...
SA 6000	2008	Social	...
SA 7000	2008	Social	...
SA 8000	2008	Social	...
SA 9000	2008	Social	...
SA 1000	2008	Social	...
SA 11000	2008	Social	...
SA 12000	2008	Social	...
SA 13000	2008	Social	...
SA 14000	2008	Social	...
SA 15000	2008	Social	...
SA 16000	2008	Social	...
SA 17000	2008	Social	...
SA 18000	2008	Social	...
SA 19000	2008	Social	...
SA 20000	2008	Social	...
SA 21000	2008	Social	...
SA 22000	2008	Social	...
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SA 30000	2008	Social	...
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SA 39000	2008	Social	...
SA 40000	2008	Social	...
SA 41000	2008	Social	...
SA 42000	2008	Social	...
SA 43000	2008	Social	...
SA 44000	2008	Social	...
SA 45000	2008	Social	...
SA 46000	2008	Social	...
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SA 49000	2008	Social	...
SA 50000	2008	Social	...



Forestry-Ag



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- Benchmarking of each state BMP (which forestry standards heavily rely on)

State Best Management Practices (BMPs) for Forestry					
State	Soil or Water Focus	Description	Document Name	Citation/Reference	Other Notes
Alabama	BOTH	Document provides several strategies and approaches to implementing harvest methods, road access for logging, reforestation, wetland management and stabilization	Alabama's Best Management Practices for Forestry	http://www.forestry.state.al.us/publications/BMPs/2007_BMP_Manual.pdf	The 2007 is the most current update of this document
Alaska	BOTH	Alaska has a regulatory provision with suggested methods on implementation of the best management requirements found in the regulations	Implementing Best Management Practices for Timber Harvest Operations from the Alaska Forest Resources and Practices Regulations	http://forestry.alaska.gov/forestpractices.htm#facts	Other relevant documents are included on the site, particularly the regulations and BMP suggestions.
Arizona	???				The program in AZ has been discontinued and finding the documents on the state forestry website are not easily done, though legacy web pages are still present
Arkansas	BOTH	Focuses on reducing the amount of erosion and water pollution for the state, identifying specific practices for harvesting timber, including road creation, wetland protection, reforestation, etc.	Best Management Practices for Water Quality Protection	http://forestry.arkansas.gov/Services/ManageYourForests/Documents/bmpbookrevise.pdf	The 2002 BMP guide is the most recent document for BMP implementation
California	BOTH	California Code of Regulations that controls professional foresters law and water and soil matters	CALIFORNIA FOREST PRACTICE RULES 2014	http://calfire.ca.gov/resource_mgmt/downloads/2014_FP_Rulebook_w_TRA_No.1.pdf	
Colorado	BOTH	Emphasizes water protection and quality, but is a condensed version of a bigger document. The BMPs focus on planning to minimizing the impact for the watershed	Forestry Best Management Practices to Protect Water Quality in Colorado	http://csfs.colostate.edu/pdfs/ForestryBMP-CO-2010.pdf	Other, more complete documents are available at http://csfs.colostate.edu/pages/forests-

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- Neither FSC nor SFI have their own carbon accounting methodologies
- "Other" sustainability indicators could be used in existing carbon calculators
- Article in prep on methodologies in UK, USEPA approaches, CA, private tools
- Information/educational portal for increased understanding

approaches

- Temporal and geographic management differences
- BMPs versus outcome analytics

Integration

Forestry-Ag

Other Standards

Forestry-Ag

- Benchmarking to Bonsucro
- "Only outcome-based standard in the world"

Other Standards

BMAS Standard Nomenclature		CPA 52	Iowa	Bonsucro	Point ES
1.1	Maintain or Improve Soil Health				
1.1.1	Soil Productivity and Conservation Planning				
	Do you assess and monitor nutrient levels of the soil in plans and soil capabilities to guide management decisions?	Resource Concerns 7: Soil Erosion, Soil Quality Degradation	<p>Identification through USDA NRCS Web Soil Survey for soil capabilities for management decisions</p> <p>http://websoilsurvey.nrcs.usda.gov/app/homepage.html?LANGU_ID=11&Web_Soil_Survey_application_id=31mrag2bthp0256</p> <p>Nutrient Assessments developed by Iowa State University Extension available here to determine recommended sampling and assessments: https://store.extension.iastate.edu/Products/94-General-Guide-to-Crop-Nutrient-Needs-Immediate-Recommendations</p> <p>- Targets pH between 6.0 and 7.0 for soil and makes recommendations for lime application based upon reaching the desired level</p>	100% of fields sampled at least at plough-out, planting and harvest and have acceptable pH scores (4.0 to 6.5) (5.2.4). Max/Min use of co-products does not affect industrial uses (e.g., render, ruminant feed, etc.) or affect the soil nutrient balance or soil organic matter (4.1.4)	2.2.3.8, 2.2.3.9 Discusses re-use of by-products for soil, but does not mention specific monitoring metrics 3.4.1 Identifies the soil and geology of the affected location for the past and necessary for the future
	Do you conserve soil and maintain its productivity through integrated resource management plan?	See Above, see also Resource Considerations, Field Inventory Guide Sheet	See Above and application of conservation through creating Iowa NRCS resources for agri. management conservation planning	Compliance with a recognized ESA (5.1.3)	3.4.3 Discusses ways that the soil would be preserved on location
	Are nutrients managed to reduce loss to air and water?				
1.1.2	Pesticide Removal				
	Do you retain maximum materials required for erosion control and soil fertility?			0-50% ground cover of trees or shrubs after harvest (5.2.2); 100% loss of co-products does not affect traditional uses (e.g., fodder, natural herbicide, stock feed) or affect the soil nutrient balance or soil organic matter (4.1.4)	See 3.4.3, discusses retaining for erosion control 5.1.1, 5.11.3 Discusses current farming practices from source, and the impact that the project would have on those sources - expected 100% reduction in insecticide for insecticide

- Benchmarking to Bonsucro
 - "Only outcome-based standard in the world"

BMAS Standard Nomenclature		CPA 52	Iowa	Bonsucro	Poet EIS
Criterion / Indicator	SOIL				
1.1	Maintain or Improve Soil Health				
1.1.1	Soil Productivity and Conservation Planning				
	Do you assess and monitor nutrient levels of the soil or plants and soil capabilities to guide management decisions?	<p>Resource Concerns F: Soil Erosion, Soil Quality Degradation</p> <p>Resource Concerns (Record results from planning steps 3 and 4.) Record the resource concerns that have been identified through the scoping and Resources Inventory and Analysis processes. Use the Resource Planning Criteria and Measurement and Assessment Tools in Section III of the FOTG to identify Resource Concerns present and compare the potential environmental effects of alternatives. Include all resource concerns that apply, adding additional sheets as necessary.</p>	<p>Identification through USDA NRCS, Web Soil Survey for soil capabilities for management decisions</p> <p>http://websoilssurvey.nrcs.usda.gov/app/HomePage.htm?TARGET_APP=Web_Soil_Survey_application_nva0jmvuvag5kmhipkp2t5lii</p> <p>Nutrient Assessments developed by Iowa State University Extension, available here to determine recommended sampling and assessments: https://store.extension.iastate.edu/Product/A-General-Guide-for-Crop-Nutrient-and-Limestone-Recommendations-in-Iowa</p> <p>- Targets pH between 6.0 and 7.0 for soil, and makes recommendations for lime application based upon reaching the desired level</p>	<p>100% of fields sampled at least at plough-out / replanting and have acceptable pH between 4.0 to 8.5 (5.2.4); Yes/No use of co-products does not affect traditional uses (e.g., fodder, natural fertilizer, local fuel) or affect the soil nutrient balance or soil organic matter (4.1.4)</p>	<p>2.2.3.8, 2.2.3.9 Discusses re-use of by-products for soil, but does not mention specific monitoring matters</p> <p>3.4.1 Identifies the soil and geology of the affected locations for the plant, not necessarily the soil for the sources</p>
	Do you conserve soil and maintain its productivity through an integrated resource management plan?	See Above, see also Resource Considerations, Field Inventory Guide Sheet	See Above and application of conservation through consulting Iowa FOTG resources for specific soil management conservation planning	Compliance with a recognized ESIA (5.7.1)	3.4.3 Identifies ways that the soil would be preserved on location
	Are nutrients managed to reduce loss to air and water?				
1.1.2	Residue Removal				
	Do you retain biomass materials required for erosion control and soil fertility?			> 20 % ground cover of tops or leaves after harvest (5.2.2); Yes/No use of co-products does not affect traditional uses (e.g., fodder, natural fertilizer, local fuel) or affect the soil nutrient balance or soil organic matter (4.1.4)	<p>See 3.4.3, discusses reseeding for erosion control;</p> <p>3.11.1; 3.11.3 Identifies current farming practices from source, and the impact that the project would have on those sources - expected 10% reduction in nutrient supply by removal of</p>

• Benchmarking to Bonsucro

• "Only outcome-based standard in the world"

BMAS Standard Nomenclature				Bonsucro	Poet EIS
Criterion / Indicator	SOIL	CPA 52	Iowa		
1.1	Maintain or Improve Soil Health				
1.1.1	Soil Productivity and Conservation Planning				
	Do you assess and monitor nutrient levels of the soil or plants and soil capabilities to guide management decisions?	<p>Resource Concerns F: Soil Erosion, Soil Quality Degradation</p> <p>Resource Concerns (Record results from planning steps 3 and 4.) Record the resource concerns that have been identified through the scoping and Resources Inventory and Analysis processes. Use the Resource Planning Criteria and Measurement and Assessment Tools in Section III of the FOTG to identify Resource Concerns present and compare the potential environmental effects of alternatives. Include all resource concerns that apply, adding additional sheets as necessary.</p>	<p>Identification through USDA NRCS, Web Soil Survey for soil capabilities for management decisions</p> <p>http://websoilssurvey.nrcs.usda.gov/app/HomePage.htm?TARGET_APP=Web_Soil_Survey_application_nvaojmvag5kmhipkp2t5lii</p> <p>Nutrient Assessments developed by Iowa State University Extension, available here to determine recommended sampling and assessments: https://store.extension.iastate.edu/Product/A-General-Guide-for-Crop-Nutrient-and-Limestone-Recommendations-in-Iowa</p> <p>- Targets pH between 6.0 and 7.0 for soil, and makes recommendations for lime application based upon reaching the desired level</p>	<p>100% of fields sampled at least at plough-out / replanting and have acceptable pH between 4.0 to 8.5 (5.2.4); Yes/No use of co-products does not affect traditional uses (e.g., fodder, natural fertilizer, local fuel) or affect the soil nutrient balance or soil organic matter (4.1.4)</p>	<p>2.2.3.8, 2.2.3.9 Discusses re-use of by-products for soil, but does not mention specific monitoring matters</p> <p>3.4.1 Identifies the soil and geology of the affected locations for the plant, not necessarily the soil for the sources</p>
	Do you conserve soil and maintain its productivity through an integrated resource management plan?	See Above, see also Resource Considerations, Field Inventory Guide Sheet	See Above and application of conservation through consulting Iowa FOTG resources for specific soil management conservation planning	Compliance with a recognized ESIA (5.7.1)	3.4.3 Identifies ways that the soil would be preserved on location
	Are nutrients managed to reduce loss to air and water?				
1.1.2	Residue Removal				
	Do you retain biomass materials required for erosion control and soil fertility?			<p>> 20 % ground cover of tops or leaves after harvest (5.2.2); Yes/No use of co-products does not affect traditional uses (e.g., fodder, natural fertilizer, local fuel) or affect the soil nutrient balance or soil organic matter (4.1.4)</p>	<p>See 3.4.3, discusses reseeding for erosion control;</p> <p>3.11.1; 3.11.3 Identifies current farming practices from source, and the impact that the project would have on those sources - expected 10% reduction in nutrient supply by removal of</p>

Con

General Observations

- Agriculture and forest biomass proponents voices stronger as one voice
- Anticipating policy trend toward multifunctional landscapes: driven by water quality regulation in the U.S., CAP Greening in EU, and economics of diverse fuel supplies
- Polarizing nature of forestry standard choice
 - Market and membership versus sustainability output?
- Culturally, integrating agriculture with forestry is challenging because of approaches
 - Temporal and geographic management differences
 - BMPs versus outcome analytics

Forestry-Ag

Integration

Other Standards

Benchmarking of each state BMP (which forestry standards heavily rely on)

State	Year	Standard	Notes
CA	2009	Forest Practice Act	...
OR	2009	Forest Management Act	...
WA	2009	Forest Practices Act	...
MT	2009	Forest Management Act	...
ND	2009	Forest Management Act	...
SD	2009	Forest Management Act	...
NE	2009	Forest Management Act	...
IA	2009	Forest Management Act	...
MO	2009	Forest Management Act	...
IL	2009	Forest Management Act	...
IN	2009	Forest Management Act	...
OH	2009	Forest Management Act	...
PA	2009	Forest Management Act	...
NY	2009	Forest Management Act	...
VT	2009	Forest Management Act	...
NH	2009	Forest Management Act	...
ME	2009	Forest Management Act	...
MA	2009	Forest Management Act	...
RI	2009	Forest Management Act	...
CT	2009	Forest Management Act	...
DE	2009	Forest Management Act	...
MD	2009	Forest Management Act	...
VA	2009	Forest Management Act	...
NC	2009	Forest Management Act	...
SC	2009	Forest Management Act	...
GA	2009	Forest Management Act	...
AL	2009	Forest Management Act	...
MS	2009	Forest Management Act	...
LA	2009	Forest Management Act	...
TX	2009	Forest Management Act	...
NM	2009	Forest Management Act	...
AZ	2009	Forest Management Act	...
CO	2009	Forest Management Act	...
WY	2009	Forest Management Act	...
MT	2009	Forest Management Act	...
ND	2009	Forest Management Act	...
SD	2009	Forest Management Act	...
NE	2009	Forest Management Act	...
IA	2009	Forest Management Act	...
MO	2009	Forest Management Act	...
IL	2009	Forest Management Act	...
IN	2009	Forest Management Act	...
OH	2009	Forest Management Act	...
PA	2009	Forest Management Act	...
NY	2009	Forest Management Act	...
VT	2009	Forest Management Act	...
NH	2009	Forest Management Act	...
ME	2009	Forest Management Act	...
MA	2009	Forest Management Act	...
RI	2009	Forest Management Act	...
CT	2009	Forest Management Act	...
DE	2009	Forest Management Act	...
MD	2009	Forest Management Act	...
VA	2009	Forest Management Act	...
NC	2009	Forest Management Act	...
SC	2009	Forest Management Act	...
GA	2009	Forest Management Act	...
AL	2009	Forest Management Act	...
MS	2009	Forest Management Act	...
LA	2009	Forest Management Act	...
TX	2009	Forest Management Act	...
NM	2009	Forest Management Act	...
AZ	2009	Forest Management Act	...
CO	2009	Forest Management Act	...
WY	2009	Forest Management Act	...

- How do these make their way into management plans?
 - Versus in agriculture, which does not have a tradition of this type of planning
- Although different standards exist, compare standards in actual practice
 - Important because opens the certification market up to more land to be certified

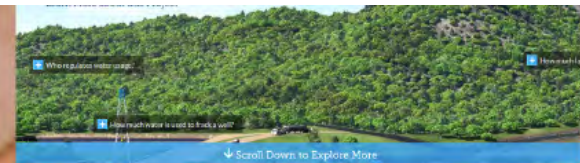
Carbon Accounting

- Neither FSC nor SFI have their own
- "Other" sustainability indicators
- Article in prep on methodologies
- Information/educational portal

Benchmarking to Bonsucro

- "Only outcome-based standard in the world"

Standard	Year	Scope	Notes
Bonsucro	2010	Sugarcane	...
FSC	2006	Forestry	...
SFI	2006	Forestry	...
PEFC	2006	Forestry	...
ISCC	2007	Biofuels	...
RSB	2008	Biofuels	...
UTK	2008	Biofuels	...
ISCC-CO	2009	Biofuels	...
ISCC-EU	2009	Biofuels	...
ISCC-NA	2009	Biofuels	...
ISCC-UK	2009	Biofuels	...
ISCC-CA	2009	Biofuels	...
ISCC-CH	2009	Biofuels	...
ISCC-IN	2009	Biofuels	...
ISCC-IT	2009	Biofuels	...
ISCC-JP	2009	Biofuels	...
ISCC-KR	2009	Biofuels	...
ISCC-MX	2009	Biofuels	...
ISCC-TH	2009	Biofuels	...
ISCC-VN	2009	Biofuels	...
ISCC-AR	2009	Biofuels	...
ISCC-BR	2009	Biofuels	...
ISCC-CL	2009	Biofuels	...
ISCC-CO	2009	Biofuels	...
ISCC-CR	2009	Biofuels	...
ISCC-CU	2009	Biofuels	...
ISCC-DK	2009	Biofuels	...
ISCC-FR	2009	Biofuels	...
ISCC-DE	2009	Biofuels	...
ISCC-GR	2009	Biofuels	...
ISCC-HK	2009	Biofuels	...
ISCC-HU	2009	Biofuels	...
ISCC-ID	2009	Biofuels	...
ISCC-IE	2009	Biofuels	...
ISCC-IL	2009	Biofuels	...
ISCC-IN	2009	Biofuels	...
ISCC-IT	2009	Biofuels	...
ISCC-JP	2009	Biofuels	...
ISCC-KR	2009	Biofuels	...
ISCC-KW	2009	Biofuels	...
ISCC-LA	2009	Biofuels	...
ISCC-LB	2009	Biofuels	...
ISCC-LC	2009	Biofuels	...
ISCC-LI	2009	Biofuels	...
ISCC-LK	2009	Biofuels	...
ISCC-LT	2009	Biofuels	...
ISCC-LU	2009	Biofuels	...
ISCC-LV	2009	Biofuels	...
ISCC-LX	2009	Biofuels	...
ISCC-LY	2009	Biofuels	...
ISCC-MX	2009	Biofuels	...
ISCC-NL	2009	Biofuels	...
ISCC-NZ	2009	Biofuels	...
ISCC-OM	2009	Biofuels	...
ISCC-PK	2009	Biofuels	...
ISCC-PL	2009	Biofuels	...
ISCC-PT	2009	Biofuels	...
ISCC-RO	2009	Biofuels	...
ISCC-RU	2009	Biofuels	...
ISCC-SG	2009	Biofuels	...
ISCC-SI	2009	Biofuels	...
ISCC-SK	2009	Biofuels	...
ISCC-SL	2009	Biofuels	...
ISCC-SM	2009	Biofuels	...
ISCC-SN	2009	Biofuels	...
ISCC-SR	2009	Biofuels	...
ISCC-ST	2009	Biofuels	...
ISCC-SV	2009	Biofuels	...
ISCC-SW	2009	Biofuels	...
ISCC-SX	2009	Biofuels	...
ISCC-SY	2009	Biofuels	...
ISCC-TA	2009	Biofuels	...
ISCC-TG	2009	Biofuels	...
ISCC-TH	2009	Biofuels	...
ISCC-TJ	2009	Biofuels	...
ISCC-TK	2009	Biofuels	...
ISCC-TL	2009	Biofuels	...
ISCC-TM	2009	Biofuels	...
ISCC-TN	2009	Biofuels	...
ISCC-TO	2009	Biofuels	...
ISCC-TP	2009	Biofuels	...
ISCC-TS	2009	Biofuels	...
ISCC-TU	2009	Biofuels	...
ISCC-TV	2009	Biofuels	...
ISCC-TW	2009	Biofuels	...
ISCC-TZ	2009	Biofuels	...
ISCC-UG	2009	Biofuels	...
ISCC-UK	2009	Biofuels	...
ISCC-US	2009	Biofuels	...
ISCC-UZ	2009	Biofuels	...
ISCC-VN	2009	Biofuels	...
ISCC-VU	2009	Biofuels	...
ISCC-WF	2009	Biofuels	...
ISCC-WG	2009	Biofuels	...
ISCC-WI	2009	Biofuels	...
ISCC-WJ	2009	Biofuels	...
ISCC-WK	2009	Biofuels	...
ISCC-WL	2009	Biofuels	...
ISCC-WM	2009	Biofuels	...
ISCC-WN	2009	Biofuels	...
ISCC-WO	2009	Biofuels	...
ISCC-WY	2009	Biofuels	...
ISCC-WZ	2009	Biofuels	...
ISCC-XA	2009	Biofuels	...
ISCC-XB	2009	Biofuels	...
ISCC-XC	2009	Biofuels	...
ISCC-XD	2009	Biofuels	...
ISCC-XE	2009	Biofuels	...
ISCC-XF	2009	Biofuels	...
ISCC-XG	2009	Biofuels	...
ISCC-XH	2009	Biofuels	...
ISCC-XI	2009	Biofuels	...
ISCC-XJ	2009	Biofuels	...
ISCC-XK	2009	Biofuels	...
ISCC-XL	2009	Biofuels	...
ISCC-XM	2009	Biofuels	...
ISCC-XN	2009	Biofuels	...
ISCC-XO	2009	Biofuels	...
ISCC-XP	2009	Biofuels	...
ISCC-XQ	2009	Biofuels	...
ISCC-XR	2009	Biofuels	...
ISCC-XS	2009	Biofuels	...
ISCC-XT	2009	Biofuels	...
ISCC-XU	2009	Biofuels	...
ISCC-XV	2009	Biofuels	...
ISCC-XW	2009	Biofuels	...
ISCC-XX	2009	Biofuels	...
ISCC-XY	2009	Biofuels	...
ISCC-XZ	2009	Biofuels	...
ISCC-YA	2009	Biofuels	...
ISCC-YB	2009	Biofuels	...
ISCC-YC	2009	Biofuels	...
ISCC-YD	2009	Biofuels	...
ISCC-YE	2009	Biofuels	...
ISCC-YF	2009	Biofuels	...
ISCC-YG	2009	Biofuels	...
ISCC-YH	2009	Biofuels	...
ISCC-YI	2009	Biofuels	...
ISCC-YJ	2009	Biofuels	...
ISCC-YK	2009	Biofuels	...
ISCC-YL	2009	Biofuels	...
ISCC-YM	2009	Biofuels	...
ISCC-YN	2009	Biofuels	...
ISCC-YO	2009	Biofuels	...
ISCC-YP	2009	Biofuels	...
ISCC-YQ	2009	Biofuels	...
ISCC-YR	2009	Biofuels	...
ISCC-YS	2009	Biofuels	...
ISCC-YT	2009	Biofuels	...
ISCC-YU	2009	Biofuels	...
ISCC-YV	2009	Biofuels	...
ISCC-YW	2009	Biofuels	...
ISCC-YX	2009	Biofuels	...
ISCC-YY	2009	Biofuels	...
ISCC-YZ	2009	Biofuels	...
ISCC-ZA	2009	Biofuels	...
ISCC-ZB	2009	Biofuels	...
ISCC-ZC	2009	Biofuels	...
ISCC-ZD	2009	Biofuels	...
ISCC-ZE	2009	Biofuels	...
ISCC-ZF	2009	Biofuels	...
ISCC-ZG	2009	Biofuels	...
ISCC-ZH	2009	Biofuels	...
ISCC-ZI	2009	Biofuels	...
ISCC-ZJ	2009	Biofuels	...
ISCC-ZK	2009	Biofuels	...
ISCC-ZL	2009	Biofuels	...
ISCC-ZM	2009	Biofuels	...
ISCC-ZN	2009	Biofuels	...
ISCC-ZO	2009	Biofuels	...
ISCC-ZP	2009	Biofuels	...
ISCC-ZQ	2009	Biofuels	...
ISCC-ZR	2009	Biofuels	...
ISCC-ZS	2009	Biofuels	...
ISCC-ZT	2009	Biofuels	...
ISCC-ZU	2009	Biofuels	...
ISCC-ZV	2009	Biofuels	...
ISCC-ZW	2009	Biofuels	...
ISCC-ZX	2009	Biofuels	...
ISCC-ZY	2009	Biofuels	...
ISCC-ZZ	2009	Biofuels	...

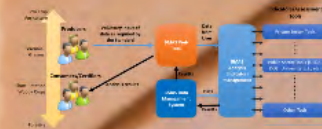


General Observations

- U.S. agriculture is not familiar with certification; is learning acceptance from forestry
- CA's new LCFS concept paper means field verification of carbon footprint; will restart sustainability workgroup again in August.
 - Very interested in case studies on operationalization
 - American/CA understanding can inform EU and Brazil approaches
- IL, IA, MN interested in case studies in certification roll out for nutrient reduction strategies

Case Studies "Land Labs"

- Poet and Dupont in Iowa
- DOE/Indian Creek in IL
- Task:
 - Match narrative standard to what data is needed
 - Does data already exist?
 - If not, how do we get it?
 - What analytics to apply?



Data Input



Match Analyses to Standard

General Observations

- Agriculture and forest biomass proponents voices stronger as one voice
- Anticipating policy trend toward multifunctional landscapes: driven by water quality regulation in the U.S., CAP Greening in EU, and economics of diverse fuel supplies
- Polarizing nature of forestry standard choice
 - Market and membership versus sustainability output?
- Culturally, integrating agriculture with forestry is challenging because of approaches
 - Temporal and geographic management differences

• Benchmarking of each state BMP (which forestry standards heavily rely on)

State	BMP	Standard	Notes
CA
IL
IA
MN

• How do these make their way into management plans?

Carbon Accounting

- Neither FSC nor SF have their own carbon accounting methodologies
- "Other" sustainability indicators could be used in existing carbon calculators
- Article in prep on methodologies in UK, USEPA approaches, CA, private tools
- Information/educational portal for increased understanding

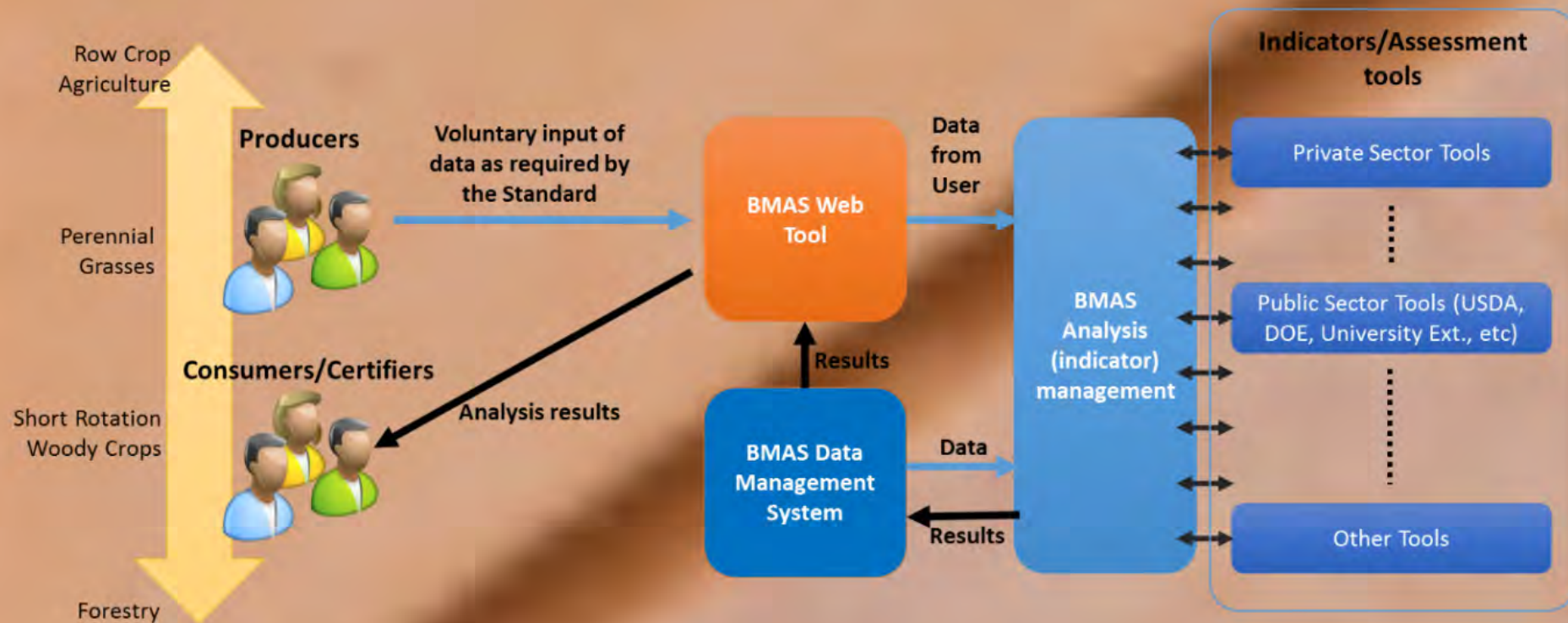
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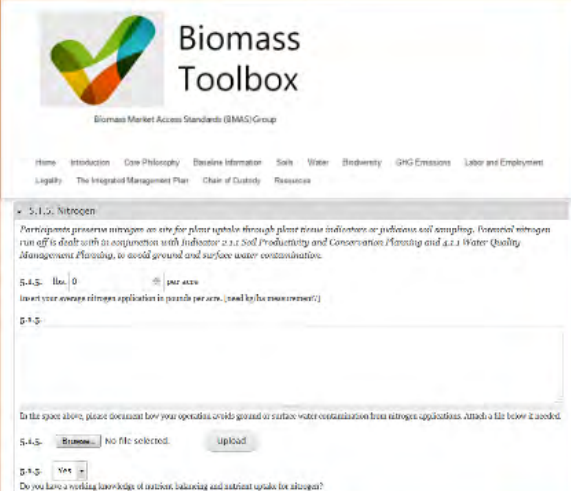
• Poet and Dupont in Iowa

• DOE/Indian Creek in IL

- Poet and Dupont in Iowa
- DOE/Indian Creek in IL
- Task:
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Data Input



Biomass Toolbox
Biomass Market Access Standards (BMAS) Group

Home Introduction Core Philosophy Baseline Information Soils Water Biodiversity GHG Emissions Labor and Employment
Legality The Integrated Management Plan Chain of Custody Resources

5.1.2. Nitrogen

Participants preserve nitrogen on site for plant uptake through plant tissue indicators or periodic soil sampling. Potential nitrogen run off is dealt with as appropriate with Indicator 2.1.2 Soil Productivity and Conservation Planning and 4.2.1 Water Quality Management Planning, to avoid ground and surface water contamination.

S.4.5: Max: 0 per acre
Insert your average nitrogen application in pounds per acre. (read by the measurement)

S.4.5:

In the space above, please document how your operation avoids ground or surface water contamination from nitrogen applications. Attach a file below if needed.

S.4.5: No file selected.

S.4.5:

Do you have a working knowledge of nutrient balancing and nutrient uptake for nitrogen?

Match Analyses to Standard



Biomass Toolbox

Biomass Market Access Standards (BMAS) Group

[Home](#) [Introduction](#) [Core Philosophy](#) [Baseline Information](#) [Soils](#) [Water](#) [Biodiversity](#) [GHG Emissions](#) [Labor and Employment](#)
[Legality](#) [The Integrated Management Plan](#) [Chain of Custody](#) [Resources](#)

5.1.5. Nitrogen

Participants preserve nitrogen on site for plant uptake through plant tissue indicators or judicious soil sampling. Potential nitrogen run off is dealt with in conjunction with Indicator 2.1.1 Soil Productivity and Conservation Planning and 4.1.1 Water Quality Management Planning, to avoid ground and surface water contamination.

5.1.5. lbs. per acre

Insert your average nitrogen application in pounds per acre. [need kg/ha measurement?]

5.1.5.

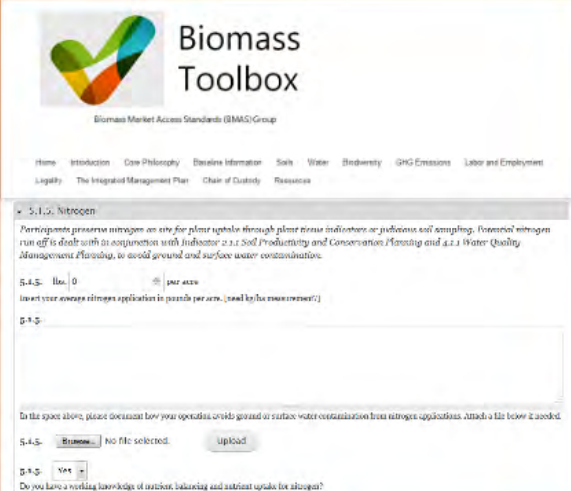
In the space above, please document how your operation avoids ground or surface water contamination from nitrogen applications. Attach a file below if needed.

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5.1.5.

Do you have a working knowledge of nutrient balancing and nutrient uptake for nitrogen?

Data Input



Biomass Toolbox
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Legality The Integrated Management Plan Chain of Custody Resources

5.1.2. Nitrogen

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S.4.5: lbs. per acre
Insert your average nitrogen application in pounds per acre. (read by the measurement)

D.1.3:

In the space above please document how your operation avoids ground or surface water contamination from nitrogen applications. Attach a file below if needed.

S.4.5: No file selected.

D.1.3:

Do you have a working knowledge of nutrient balancing and nutrient uptake for nitrogen?

Match Analyses to Standard

Data Input

Legality: The Integrated Management Plan | Code of Conduct | Resources

3.1.3. Nitrogen

Participate in a nitrogen audit for plants, ponds, through plant cover indicators or indicators and sampling. Potential nitrogen run-off shall not be in excess of 100 kg N/ha and Conservation Planning and 2.4. Water Quality Management Planning, to avoid ground and surface water contamination.

\$4.0: The 0 per acre
Insert your average nitrogen application in pounds per acre (used by the assessment.)

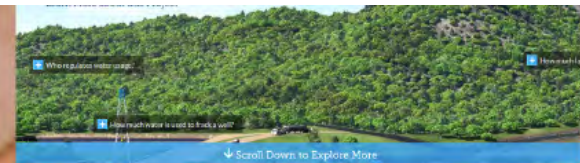
\$4.0:

In the spreadsheet, please enter the average nitrogen application for nitrogen application, and a file for the audit.

\$4.0: No file selected.

\$4.0: Yes
Do you have a working knowledge of water quality indicators and indicators for water quality?

Match Analyses to Standard

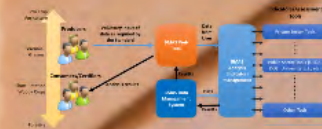


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 - American/CA understanding can inform EU and Brazil approaches
- IL, IA, MN interested in case studies in certification roll out for nutrient reduction strategies

Case Studies "Land Labs"

- Poet and Dupont in Iowa
- DOE/Indian Creek in IL
- Task:
 - Match narrative standard to what data is needed
 - Does data already exist?
 - If not, how do we get it?
 - What analytics to apply?



Data Input



Match Analyses to Standard

General Observations

- Agriculture and forest biomass proponents voices stronger as one voice
- Anticipating policy trend toward multifunctional landscapes: driven by water quality regulation in the U.S., CAP Greening in EU, and economics of diverse fuel supplies
- Polarizing nature of forestry standard choice
 - Market and membership versus sustainability output?
- Culturally, integrating agriculture with forestry is challenging because of approaches
 - Temporal and geographic management differences

• Benchmarking of each state BMP (which forestry standards heavily rely on)

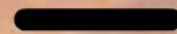
State	BMP	Standard	Notes
CA
IA
IL
MN

• How do these make their way into management plans?

Carbon Accounting

- Neither FSC nor SF have their own carbon accounting methodologies
- "Other" sustainability indicators could be used in existing carbon calculators
- Article in prep on methodologies in UK, USEPA approaches, CA, private tools
- Information/educational portal for increased understanding

Information/outreach



General Observations

- U.S. agriculture is not familiar with certification; is learning acceptance from forestry
- CA's new LCFS concept paper means field verification of carbon footprint; will restart sustainability workgroup again in August.
- Very interested in case studies on operationalization

Public Media for Public Understanding

EXPLORE SHALE

An exploration of natural gas drilling and development in the Marcellus Shale.
Learn More about this Project



+ Who regulates water usage?

+ How much la

+ How much water is used to frack a well?

↓ Scroll Down to Explore More



Developing U.S. Sustainability Certification Standards to Ensure Landscape-Level Sustainability



Incorporating Bioenergy In Sustainable Landscape Designs Workshop Two: Agricultural Landscapes
June 26, 2014



Rayane Agular, J.D.,
M.A. 2014



Matt Walker,
J.D./M.S. 2016



Building the BMAS Architecture

Thank you for your time and attention!
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