AgEcon SEARCH
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

Give to AgEcon Search

AgEcon Search
http://ageconsearch.umn.edu
aesearch@umn.edu

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

Subsidizing Carbon Sequestration via Forestry in Maryland: A Benefit-Cost Assessment

Rachel Hettich, M.S. in Agricultural Economics, Purdue University

rachelhettich1@gmail.com

Philip Abbott, Professor of Agricultural Economics, Purdue University

abbottpc@purdue.edu

Selected Poster prepared for presentation at the

2015 Agricultural & Applied Economics Association and Western Agricultural Economics

Association Joint Annual Meeting, San Francisco, CA, July 26-28

Copyright 2015 by Rachel Hettich and Philip Abbott. All rights reserved. Readers may make verbatim copies of this document for non-commercial purposes by any means, provided that this copyright notice appears on all such copies.

Subsidizing Carbon Sequestration via Forestry in Maryland: A Benefit-Cost Assessment

Rachel Hettich
Philip Abbott
Department of Agricultural Economics

Funded By: NASA

Motivation

- Increasing **forest carbon sequestration** is one mitigation strategy in the fight against global climate change
- **Maryland** is at the forefront of incentivizing private landowners to invest in forestry
- Both state and federally funded programs are in place for private landowners in Maryland to receive **cost-share assistance for forestry investments**
- This analysis suggests that certain programs have large **carbon sequestration potential (CSP)**, but **participation seems slow relative to the program scope**

Research Questions

1. Are the **current subsidies big enough** to elicit program participation? In other words, do **net present values (NPVs)** of forestry investments turn positive with current subsidies?
2. If the subsidies were based on the amount of **permanently sequestered carbon** from forestry investments, would they be larger? How do **carbon abatement costs** of forestry investments compare to current **carbon market prices?**

Methods

Use private Benefit-Cost Analysis (BCA) results to estimate the individual's economic return or loss from participating in a forestry cost-share program

↓

Use social BCA results to compare current cost-share assistance to the social carbon benefits that result from the forestry investments

↓

Compare BCA results to actual program participation and program scope according to the results of a GIS analysis, based on NASA's Carbon Monitoring System data products

↓

Compare program scope with goals set forth by Maryland's climate change initiatives

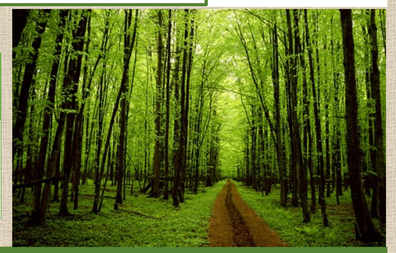
Woodland Incentive Program (WIP)

- State funded program that provides **65% cost-share assistance** for **timber stand improvements** for landowners with at least **5 acres of forested land**
- **BCA scenario:** private landowner who has a loblolly pine stand that is in need of **pre-commercial thinning (PCT)**, which is an eligible management practice for **WIP cost-share assistance**
- **NPV results** indicate that the landowner would realize a **positive economic return** by investing in pre-commercial thinning and participating in WIP
- **Carbon sequestration benefits** provided to society are **larger** than the current cost-share assistance

***736,761** eligible acres*
***24,443** acres enrolled from 2007-2014*
*CSP: **139 million tons***

NPVs: With minus Without ($/acre)

Discount Rate	With PCT	With PCT & WIP
2.5%	$17.49	$98.93
5%	-$20.72	$60.62



Environmental Quality Incentives Program (EQIP)

- Federally funded program that provides cost-share assistance for **conservation practices on agricultural land** based on pre-determined **average costs** of each practice
- **BCA scenario:** private landowner who is considering **converting** (conv.) **cropland/pastureland** to **an oak/hickory stand**, which is an eligible practice for **EQIP cost-share assistance**
- **NPV results** indicate that the landowner would realize an **economic loss from converting cropland to forest** in all cases; **Converting pastureland or marginal land to forest results in a positive economic return** in some cases

***1.9 million** eligible acres*
***344** acres enrolled from 2009-2013*
*CSP: **2548 million tons***

NPVs: With minus Without ($/acre)

Discount Rate	With Conv.	With Conv. & EQIP	With Conv.	With Conv. & EQIP
	Cropland		*Pastureland*	
2.5%	-$1,075.07	-$777.56	$122.01	$419.52
5%	-$1,376.52	-$1,079.01	-$534.74	-$246.23

Lawn to Woodland Initiative (L2W)

- State funded program that provides **100% cost-share assistance** for **establishing forests** on at least **1 acre of lawn**
- **BCA scenario:** private landowner who has 1 acre of **lawn to convert to forest**, which is eligible for **L2W cost-share assistance;** NPVs calculated with and without timber harvest
- **NPV results** indicate that the landowner would realize **higher economic returns by investing in the conversion to forest** in all cases; **Avoided lawn maintenance costs are large**
- **Carbon sequestration benefits** provided to society are **larger** than the current cost-share assistance when no timber is harvested

***230,450** eligible acres*
***15** acres enrolled in 2014*
*CSP: **302 million tons***

NPVs ($/acre)

Discount Rate	Without Conv.	With Conv.	With Conv. & L2W	With Conv.	With Conv. & L2W
		No Timber Harvest		*With Timber Harvest*	
2.5%	-$11,230.18	-$616.41	-$280.50	$1,033.31	$1,369.22
5%	-$7,812.57	-$548.35	-$212.44	$80.86	$416.77

Abatement Costs of Forestry Investments

- The **effective abatement costs of forestry investments** were calculated using the following equation:

$$\frac{-(NPV\ \text{“with investment”} - NPV\ \text{“without investment”})}{\text{tons of carbon sequestered by the investment}}$$

- **Negative abatement costs** indicate that those investments are profitable for private landowners with the current incentives
- L2W abatement costs would be **even more negative** if avoided lawn maintenance costs were included as **opportunity costs**

Effective Abatement Costs of Forestry Investments ($/ton)

	2.5%	5%
WIP: *PCT*	-$12.67	$15.02
EQIP: *Cropland*	$138.24	$176.99
Pastureland	-$15.69	$69.91
L2W: *Timber Harvest*	-$132.86	-$10.40
No Timber Harvest	$5.96	$5.31
Carbon Price: *RGGI*	$4.94	$4.94
California	$12.14	$12.14
Social Cost of Carbon: *Interagency Working Group*	$54.54	$11.76