pennsylvania
DEPARTMENT OF CONSERVATION
AND NATURAL RESOURCES

Success in the Farm and Forest Mosaic…

Through June 2015

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Purpose of this Publication

This publication provides an overview of the Agroforestry Program, its partners, and activities. Through this publication we hope to inform readers about the work our dedicated staff and partners do to make this program successful. Servicing the owners of our state's private forests and agricultural land—and everyone who benefits from these resources—is a huge challenge and can only be successful through the shared commitment of many stakeholders. It is impossible to describe all the work and efforts, but we hope that this publication will provide useful insights into the benefits accrued from our collaborative work for the forests of the Commonwealth.

The goals of this publication are to:

- Provide an overview of the breadth and depth of the program.
- Showcase the partners and the great work they have accomplished.
- Share success stories written by program partners and constituents that describe what this program has meant to them and to their communities.

Photo by Brett Chedzoy

We sincerely thank all the partners and constituents who contributed to this publication.

What is Pennsylvania Agroforestry ?

Simply put, agroforestry is intensive land use management that combines woody plants such as trees and shrubs with a combination of crops, forage, and/ or livestock. Four key criteria characterize agroforestry practices:

Intentional

An agroforestry system is *intentionally* designed and established in a way that trees, crops, forage or livestock are managed together to yield diverse products and benefits.

Intensive

Agroforestry practices are designed and *intensively* managed to maintain productive or protective functions.

Integrated

Components are combined structurally and functionally into a single *integrated* management unit tailored to meet the production and/or conservation objectives of the landowner.

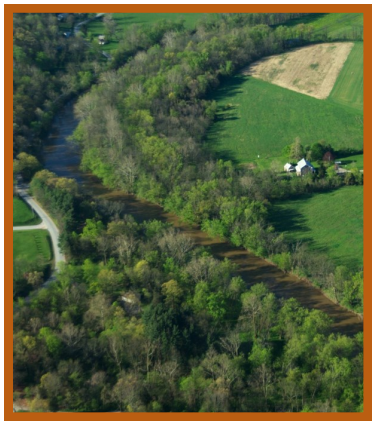
Interactive

Agroforestry systems actively manipulate and use the *interactions* among plant and and /or animal components to yield diverse harvestable products.

These criteria determine whether or not a practice is agroforestry or simply individual elements occurring together, but managed separately.

The Primary Agroforestry Practices

Riparian and Upland Forest Buffers



Riparian and upland forest buffers are permanent stands of trees, shrubs, forbs or grasses planted or managed along streams or water bodies for the purposes of capturing runoff and nonpoint source pollutants before they reach the water.

Windbreaks and Shelterbelts

Windbreaks & shelterbelts are rows of trees, shrubs, herbaceous plants /grasses planted and managed as part of crop or livestock operations to manage snow drift or control soil erosion. Some are designed specifically to enhance wildlife habitat and pollinating insects, others to enhance air quality and reduce odors from confined animal operations. In addition, these "vegetated environmental buffers" afford a visual screen for adjacent landowners.

Alley Cropping

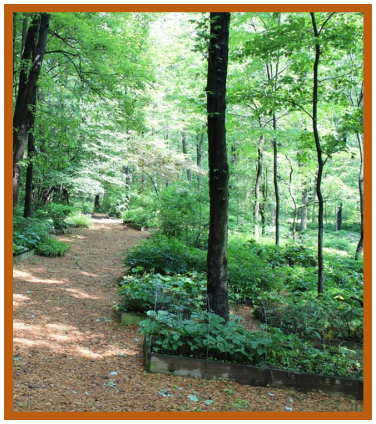
Alley cropping practices include agricultural or horticultural crops cultivated between rows of crop trees that will potentially provide lumber or nuts like chestnuts, pecans or walnuts that provide additional income while the long-term timber-crops mature.

Silvopasture

Silvopasturing combines trees or shrubs with compatible forage for livestock production. Silvopastures may be established by adding trees to existing pasture or by thinning an existing forest stand to add or improve forage. When w*ell -managed,* these systems can provide short-term income from livestock while providing long-term benefits from timber production. In the process, undesirable vegetation can be removed from the forest, and wildlife habitat and pollinator forage enhanced. Meanwhile, the trees are sequestering carbon, enhancing nutrient uptake and improving water quality.

Final Primary Agroforestry Practice

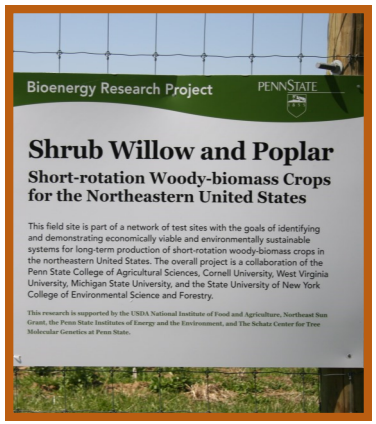
Forest Farming (Multi-Story Cropping)



Forest farming systems combine existing or planted stands of trees or shrubs modified or managed for production of high value, shade-tolerant specialty crops such as ginseng, ramps (wild leeks), fiddleheads or shiitake mushrooms. Overstory trees may be managed to produce timber or veneer logs, posts, and fuel, while shrubs may be grown to provide additional food, biomass and handicraft or decorative products.

Other Agroforestry Practices

Biomass Production



In general, biomass can be considered any organic material that can be converted into energy, including non-woody materials such as grasses or grains. Forest biomass is woody material that includes trees, tree branches, shrubs and other vegetation which can be used to burn for heat and steam.

Permaculture

The terms permaculture and agroforestry are often used interchangeably. Permaculture systems are designed to mimic growth patterns found in nature to achieve agricultural and ecological sustainability. Permaculture systems may integrate any combination of shelter, livestock (including poultry), waste recycling, pollination and energy systems along with food production to provide an ecologically sustainable system.

Edible Landscaping

Edible landscaping strategically replaces strictly ornamental plants with plants that produce food. Edible landscaping can be incorporated into residential or community projects to provide residents with locally grown fruits, vegetables and nuts. The integration of edible plants into new and existing gardens is gaining popularity in suburban and urban landscapes.

Why is Agroforestry Relevant to Pennsylvania?

Our regional forests are important for timber and wood products, recreation, wildlife, and aesthetics, but also provide important ecological services such as clean air and water. About 70 percent of the 17 million acres of forestland in Pennsylvania is privately owned. An estimated 20 percent of those private forestlands are associated with farms, but the management of these forests is rarely integrated into farming operations. Statistics from the 2007 Census of Agriculture indicate that while the number of farms in Pennsylvania is holding steady, the size of the average Pennsylvania farm decreased by nine acres between 2004 and 2007. Today the average Pennsylvania farm is 123 acres in size, but 38 percent of Pennsylvania farms are less than 50 acres. New farmers are facing farmland prices ranging from $3,000 to more than $10,000 per acre. With the size of farms shrinking and the cost of farmland rising, farmers are increasingly looking to glean more productivity from their land holdings, including their forestland. Well-managed agroforestry systems can provide farmers and other forestland owners with short-term income while growing long-term economic and ecological returns on the land. Agroforestry practices can provide these landowners with additional tools to manage their forested in a sustainable manner while still realizing economic benefits.

The Chesapeake Bay

Farms and forests play a vital role in the Chesapeake Bay Watershed. Approximately 22 percent of the watershed - 9 million acres - is in agricultural land use. An additional 4.2 million acres of woodlots exist on farmland in the Bay watershed.

Chesapeake Forest Restoration Strategy

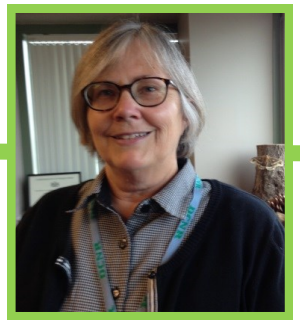
Though it may seem that Agroforestry is a new discipline, it has actually been practiced for centuries by indigenous peoples and is still used extensively around the world as a viable means to maintain forest cover and at least a portion of the environmental benefits forests and trees provide while sustainably producing crops and/or livestock for human and animal consumption.

Traditional maple sugaring in a Pennsylvania Forest

Through the revival and proper practice of this age-old discipline, there is great potential for a creative interweaving of conservation and food production, both of which are a necessity for life.

Staff

The Pennsylvania Agroforestry Program is directed and administered through excellent, dedicated staff members at DCNR:



Tracey Coulter, Agroforestry Coordinator

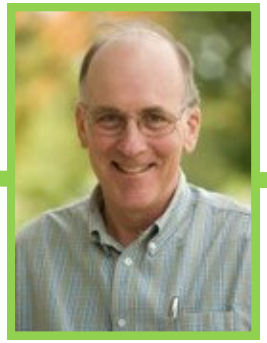
Andy Duncan, Woodland Stewardship Coordinator

Roy Brubaker, District Forester, Michaux Forest District And Owner of Blue Rooster Farm

Rachel Reyna, Section Chief, Rural & Community Forestry

Matt Keefer, Assistant State Forester

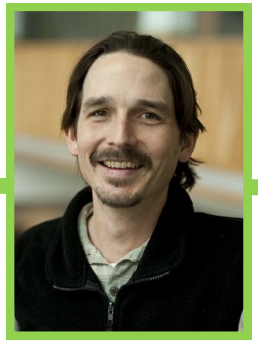
The DCNR staff work closely with exceptional staff at **Penn State Cooperative Extension** to successfully administer the program:



Dr. James C. Finley, Ibberson Professor of Forest Resources & Director of the Center for Private Forests

Dr. Allyson Muth, Forest Stewardship Program Associate

Leslie Horner, Program Associate



Eric Burkhart, Ph.D. Faculty Instructor, Ecosystem Science and Management, and Plant Science Director, Shaver's Creek Environmental Center

Dr. Michael Jacobson, Professor, Forest Resources

Staff

The Woodland Stewardship Program receives grants and program assistance from staff at the **USDA Forest Service**:

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USFS Liaison
Chesapeake Bay Program

Kate MacFarland,
Assistant Agroforester
USDA Nat. Agroforestry Center

Karen Sykes,
Forest Management Group Leader

Julie Mawhorter,
Mid-Atlantic Urban and Community Forestry Cooridnator

The DCNR staff receive advice, feedback, and assistance from **partners in other states and other agencies**:

Brett Chedzoy,
Sr. Resource Educator,
Ag and Natural Resources
Cornell Cooperative Extn.

Tom Ward,
Forester, USDA NRCS
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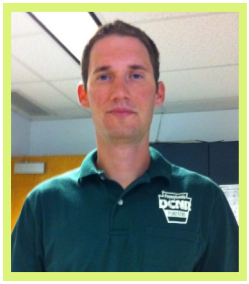
John Munsell,
Associate Professor &
Forest Mgt Extn Specialist
Virginia Tech

Steve Gabriel,
Extension Agroforestry Specialist
Cornell Small Farms Program

Pete Smallidge,
NYS Extension Forester
Director, Arnot Teaching and Research Forest

Field Staff

DCNR also supplies the program with technical support from 35 Foresters that work in field offices across the state.



Garrett Beers
District 19

Lucas Book
District 3

William Bow
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Andy Brought
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Ryan Brown
District 11

John Brundege
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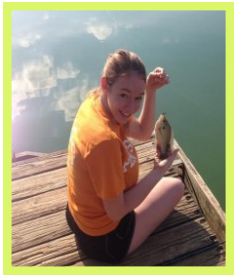

Celine Colbert
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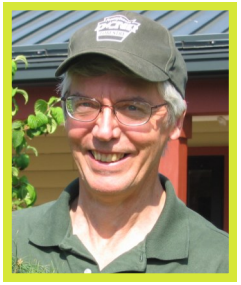
Dave Cole
District 8

Tim Cole
District 5

Tom Erdman
District 14

Chad Gadsby
District 20

Russell Gibbs
District 4



Gary Gilmore
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Ben Hardy
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Toby Herzing
District 13

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District 16

Gerald Hoy
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Rich Johnson
District 9

Matt Kern
District 1

Tim Latz
District 17

Mark Lewis
District 14

Robert Martynowych
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Eric Monger
District 15

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John Nissen
District 17

John Nobles
District 14

Ty Ryen
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Jessica Salter
District 17

Dave Scamardella
District 2

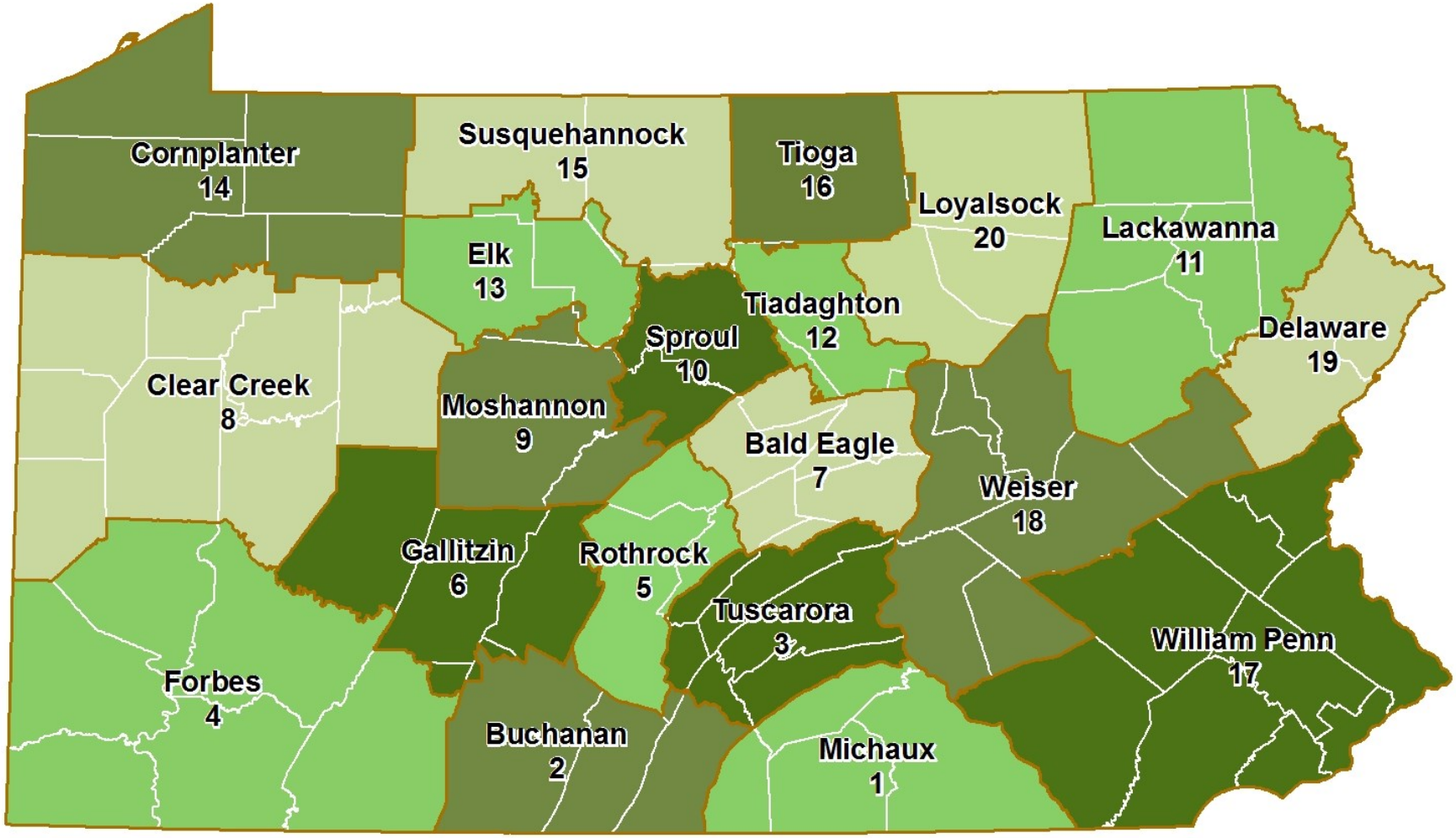
Jake Scheib
District 8

John Schwartzer
District 1

Jason Smith
District 12

Frank Snyder
District 18

State Forest Districts



DCNR field staff work out of 20 forest districts in the state.

Partners

Alliance for the Chesapeake Bay

Association for Temperate Agroforestry

Capital RC&D

Chesapeake Bay Agroforestry Team

Chesapeake Bay Foundation

Cornell University

Cumberland Co. Conservation District

Dickinson College

Franklin County Conservation District

Frostburg State University

Grazing Lands Coalition

Juniata County Conservation District

Mifflin County Conservation District

Natural Resources Conservation Service

PA Assoc. for Sustainable Agriculture

PA Certified Organic

PA Department of Agriculture

PA Dept. of Environmental Protection

PA Women's Agricultural Network

Penn State Extension

Penn State: Poultry Science

Penn State: Shaver's Creek Envt Center

Penns Valley Conservation Association

SARE

Snyder County Conservation District

South Mountain Partnership

Stroud Water Research Center

The American Chestnut Foundation (PA Chapter)

University of Missouri

USDAPHIS– Wildlife Services

USDA Forest Service

USDA National Agroforestry Center

Village Acres Farm

Virginia Tech

West Virginia University

Women and Their Woods

Woodland Owners of Snyder County

Wyebrook Farm

And Many More…

Workshops

Agroforestry combines elements of two land management perspectives and traditions, agriculture and forestry, that use different lexicons, acronyms, tools and measures of success. One barrier to adoption of agroforestry practices is the lack of technical service providers (TSP) trained to work across these disciplines. Workshops provide information exchange along with networking opportunities among these diverse land management strategies.

PA DCNR and Penn State collaborated on a USFS Chesapeake Bay project, *Forests and Farms: Working Landscapes for Water and Ecology,* to provide TSP and Natural Resource Professionals a general introduction to agroforestry practices. The key objectives of this project were:

Provide an overview of five agroforestry practices including forest cultivation of ginseng and other commercial crops, alley cropping, windbreaks/shelterbelts, and silvopasturing. (Forest riparian buffers discussed, but not a focus).

Help participants identify opportunities to promote agroforestry practices that will meet client objectives while promoting public benefits through their work.

Provide an opportunity for participants to network with peers and content experts to help improve information flows among this critical natural resource audience.

TRAINING STATS	
Trainings Complete:	**8**
Participants:	**217**
Counties Represented by Participants:	**21 of 67**
States Represented by Participants:	**5**
Organizations Represented by Participants:	**8**

In addition, DCNR partnered with Pennsylvania Women's Agricultural Network (PA WAgN), Women and Their Woods (WaTW) and the Pennsylvania Association for Sustainable Agriculture (PASA) to host agroforestry workshops for farmers and other landowners. Workshops formats include an overview of agroforestry, and then focus on specific topics, including silvopasture, maple syrup production, mushroom production, and cultivation and marketing of non-timber forest products.

WORKSHOP SUCCESS:
Silvopasture Field Day in McVeytown, PA

Silvopasturing is an important new agroforestry system for the Northeast that allows for the sustainable production of timber, forages and livestock on the same land. Silvopasturing differs from past grazing practices in wooded areas in that the livestock and timber are intensively managed to achieve the desired objectives. New fencing systems, a better understanding of animal behavior, and the evolution of "management intensive grazing" practices have enabled the successful implementation of silvopasturing in the Northeast to provide significant environmental and economic benefits.

Workshop attendees listening intently

The host landowner (center) meets with foresters to prepare for the workshop

In this intensive one-day course, Brett Chedzoy, and Peter Smallidge (Cornell Cooperative Extension) taught participants the basic steps and skills needed to evaluate, plan for and implement silvopasture projects on their own land or land that they manage for others.

Throughout the day, Norm Conrad and Christopher Lent with the National Center for Appropriate Technology (NCAT) provided an on-site demonstration of solar- powered fencing and pumps, and information about how NCAT can assist farmers with Sustainable Energy, Farm Energy, Sustainable Agriculture, Information Technology or Business Services needs.

WORKSHOP SUCCESS:
Renewable Energy on the Farm and Woodlot: Charcoal for Power and Fertility

Gary Gilmore discussing the merits of charcoal

Gary Gilmore is the DCNR Service Forester for Jefferson and Armstrong Counties, but in his "spare time", he is a Tree Farmer, consummate tinkerer, inventor, blacksmith, gardener, do-it-yourselfer, and timber frame builder. Gary's diverse interests and skills resonate well with the sustainable agriculture community and he is a popular presenter at the PASA's annual "Farming for the Future Conference." This conference is held in the first week of February – when Pennsylvania weather is unfavorable for outdoor workshops, but participants were interested in seeing Gary's processes and inventions first-hand. This interest resulted in a one-day field day where Gary demonstrated the charcoal-making process, how to make the equipment to begin to produce charcoal, and how to sustainably manage woodlots for charcoal production. In addition, he covered the many uses of charcoal including as an energy source, a natural insecticide, a soil amendment, and even as fuel for an internal combustion engine. Small-scale farmers dominated the audience of twenty participants, some sharing their own strategies for using "low –value" timber in their own operations, but none quite as exciting as Gary's own wood chip-fueled VW!

Gary Gilmore's retooled VW, fueled by wood chips

WORKSHOP SUCCESS: DCNR at the Annual Conference of the PA Association for Sustainable Agriculture (PASA)

DNCR Bureau of Forestry and PSU Extension have staffed booths and provided forestry presentations at PASA Conferences over the years. In 2008, PASA received funding through the Chesapeake Bay Forestry Program to hold a two-day comprehensive pre-conference track focusing on Sustainable Forestry. Twenty-seven participants spent two days at the Shaver's Creek Environmental Center indoor and outdoor classrooms to study active woodlot management including: forest ecology, silvicultural methods, timber harvesting, primary log and lumber grading and processing, establishing and marketing woods-grown ginseng, medicinal plants, and edible mushrooms. Results from the exit evaluations were very positive, with 100% of participants rating the track as "good" or "excellent." When asked how likely it is that changes will be made in farming practice and/or business (if applicable) based on knowledge gained in this pre-conference, 73% of respondents indicated that they would make some changes, while 27% said that they would implement significant changes.

Following this successful workshop, DCNR and Penn State were invited to hold another pre-conference track in 2010: "Harvesting the Back Forty: Agroforestry in the Mid-Atlantic and Beyond". Support for this track came from the DCNR, Bureau of Forestry & The USDA Forest Service, Chesapeake Bay Program. This two-day track helped participants build the skill set necessary for successful forest farming. Combining indoor and outdoor activities, this track introduced and explained new ways to earn profit from forested land while encouraging the health of the forest. Some of the topics discussed were: The Basics of Silviculture, Timber Sale Management and Working with Consulting Foresters, Horse Logging, Woodlot Restoration and Management, Nut Crops, and The Ecology and Design of Edible Forest Gardens. This two-day track also received high marks for presentation and content, and the partners have offered 2 more preconference tracks as well as conference workshops.

The DCNR booth at the February 2015 PASA Conference

In all, over 200 conference attendees have participated in agroforestry sessions that covered topics from the importance of riparian forest buffers to producing energy from a farm woodlot.

Demonstration Areas

A study of Pennsylvania farmers and land owners (Strong and Jacobson, 2006[1]) found that 90 percent of the respondents would consider adopting agroforestry if information were made available and if they could see working demonstrations.

One of the Actions outlined in the Agroforestry section of the Chesapeake Bay Forest Restoration Strategy is to "establish agroforestry demonstration areas by finding early adopters with working farms and forests so that others can see the conservation and economic benefits of agroforestry practices. "

Wyebrook and Dickinson College farms are working farms managed by innovative early adopters and so are ideal locations for demonstrating agroforestry practices.

Demonstration Areas At-a-Glance

Areas Created:	2
Estimated Visitors:	2,500 annually
Areas Proposed:	3
Locations (Counties):	Cumberland
	Chester

The Wyebrook landowner and farm manager meeting with natural resource professionals

[1]N. Strong and M.G. Jacobson. 2006. A case for consumer-driven extension programming: agroforestry adoption potential in Pennsylvania. Agroforestry Systems (2006) 68:43–52 _ Springer 2006 DOI 10.1007/s10457-006-0002-x

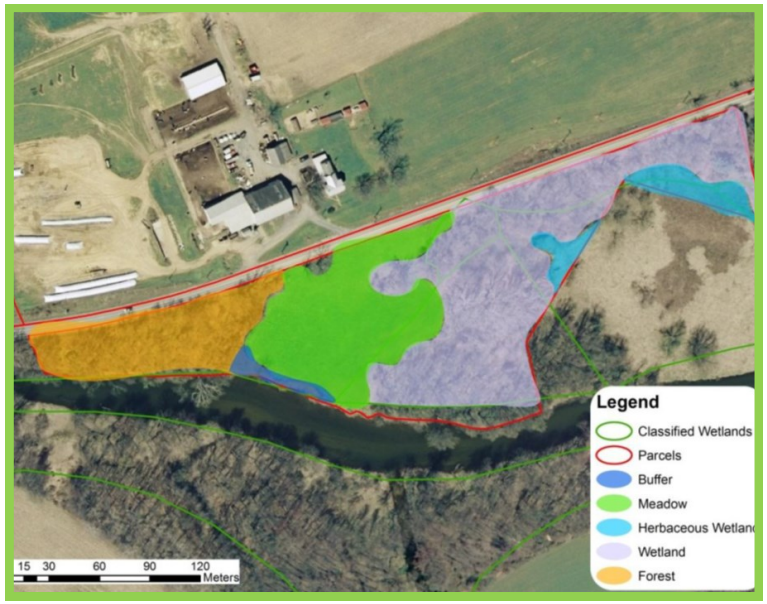
DEMONSTRATION AREA SUCCESS:
Dickinson College Farm

From Dickinson College Farm's Grant Report

The Dickinson College Farm is a 180-acre working farm and educational resource that provides produce to the college's dining hall, a local food bank and members of the farm's co-op. The Dickinson Farm integrates agroecological theories and practices to create an ecosystem that is self-supporting and is not dependent on synthetic inputs. The Farm staff works to integrate students into the many layers of farming to provide a hands-on learning experience. In addition to raising vegetables, herbs and flowers for sale, the College Farm manages a small flock of sheep and flock of laying hens. The farm adjoins a premier trout stream – the Yellow Breeches, a tributary of the Susquehanna. Its central location, commitment to outreach, innovation and education, and the combination of plant and animal crops, makes Dickinson College Farm an ideal choice for the region's pilot agroforestry demonstration farm. Dickinson College Farm Received a USDA Forest Service Chesapeake Bay grant to develop a demonstration site for key agroforestry practices: riparian forest buffers, alley cropping, windbreaks, forest farming, and silvopasture. Through this grant, students and researchers developed plans to meet the farms educational, economic and ecological restoration goals.

Forest farming and silvopasturing apply specifically to the Dickinson College Farm because both can be actively integrated into the approximately five-acre woodlot which until recently was not being utilized for agriculture. This would not only boost profitability of the farm by increasing the amount of land utilized at the farm, but could also improve the health of the forest by targeting removal of invasive species and encouraging the growth of native trees, shrubs, and herbaceous species that can improve diversity of the woodlot.

Dickinson students collaborated with the college's ALLARM (Alliance for Aquatic Resource Monitoring) team and other students, faculty, NGO and agency staff to write a plan to convert this former wetland pasture to a productive buffer to protect the waters of the Yellow Breeches. This report, "Riparian Buffer Management Guide" incorporates the ecological value of forested buffers using traditional native riparian species such as sycamore, along with pawpaw and hickory that will someday produce crops for use in the College's dining halls or for sale through the College's CSA or farm market stand. This buffer, along with the windbreaks and silvopasture sites are the first steps in establishing Dickinson College Farm as an important Central Pennsylvania Agroforestry Demonstration site.



Map of Dickinson Farm showing land uses

DEMONSTRATION AREA SUCCESS:
Wyebrook Farm

Submitted by Rick Hartlieb, PA DCNR Bureau of Forestry, Assistant District Forester, William Penn Forest District

Wyebrook Farm is located in Chester County, Pennsylvania. This farm, adjacent to the Brandywine creek, had been in row crops for many decades. The new owner/operators decided to change that historical approach to agriculture, and implement a pasture system instead. The soils and slopes were leading factors in that decision, in addition to trying out a system of agriculture that declined in the 1930's. Today, there is not a single acre that is tilled.

Beef cattle, hogs, chickens, and turkeys are all raised on the farm. Heritage breeds are used to breed a hardier animal that can withstand the elements. The idea of silvopasturing was implemented when productivity could be increased. So trees (120 honey locusts) were brought into the pasture, and the pasture was brought into the trees (30 acres). The livestock are able to bask in the shade when it's hot, shelter in the forest when it's cold, and feast on the leaves and seeds from the trees. A timber harvest was conducted in 2012 to open the woodlot up to promote grasses and forbs for additional forage.

Goats at Wyebrook Farm

In addition to growing timber and raising animals on the woodlot, there are some other ideas in the pipeline. Wyebrook also has a farm store/ butcher shop on premises. Many of the products sold there are sourced from the farm. Local firewood may be sold in the future. Maple syrup can also be made on the farm, as there is a health sugar bush in the woodlot that was reserved in the harvest.

DEMONSTRATION AREA SUCCESS:
Goats Tackling Invasive Plants at Hawk Mountain Sanctuary

Excerpts from a Press Release Created by Hawk Mountain

Goats in the Woods: Got invasives? Get goats

This summer, Hawk Mountain Sanctuary embarked on a wooly experiment: testing the use of goats as a no-chemical alternative to invasive plant removal.

"It was certainly an experience," laughs Hawk Mountain Director of Land and Facilities Todd Bauman, and he's not kidding. Testing goats required herders, and mapping areas of invasion with GPS units to measure success over time. Goats also had to be supplemented with hand-pulling and other removal applications to compare the effectiveness of removal methods.

"Riparian habitats are ecologically sensitive, so using a chemical spray isn't an option at Hawk Mountain. The chemicals will spread, so you can't limit it to the siltgrass, and that negatively affects the native species," he says.

Enter the goats, and with interest and support from the Pennsylvania Department of Conservation and Natural Resources, the Sanctuary received funding for materials as well as oversight. Other partners included local goat farmers, including a Pennsylvania Game Commission land supervisor, and local landowners interested in using goats on their own properties.

"Hawk Mountain was always interested in testing goats, and forester Frank Snyder recommended a presentation I could attend, and also recommended that I also talk with Tracey Coulter, agroforestry coordinator at DCNR. Tracey had more contacts, and soon we had a group interested in following this project and offering advice along the way," Bauman says.

"The goats during our first round simply would not eat the stiltgrass," Bauman admits, "so it was disappointing, but the team wasn't ready to give up. The question became 'why,' and if other goats already proven to eat the grass could be identified, we were happy to try it again."

And so they did. From southern Pennsylvania came four more adults who did, in fact, graze happily on the stiltgrass for the remaining two weeks of the project...

Presentations

Although many landowners may not relate to the word agroforestry, many are interested in practices that are considered agroforestry. Early presentations provided agroforestry overviews to new audiences, but as the term became more familiar to agricultural and forest landowners and resource professionals, presentations began to focus on specific practices. Audiences included woodland owner associations, small-scale and sustainable agriculture associations, conservation districts, land conservancies and students, among others. Presenters included partners from state and federal agencies, NGOs, universities and farmers. These presentations often lead to new partnerships and outreach opportunities:

An introductory presentation at the PA Woman's Agricultural Network conference lead to a field day that connected women who own and manage woodlands (WaTW) to women who own and manage farms (PAWAgN). Bern Sweeney's (Stroud) keynote presentation at the 2009 PASA Conference highlighted the importance of riparian forest buffers and brought the concept of "watershed = foodshed" to an audience of more than 1,200 farmers and supporters of sustainable agriculture. Dr. Sweeney's presentation inspired PASA Executive Director Brian Snyder to write a newsletter editorial about the connections between watersheds and foodsheds: https://www.pasafarming.org/files/newsletter-archives/BS.Column_JanFeb%202009.pdf/at_download/file

Agroforestry provides opportunities to bridge agricultural and forest management strategies and to look at landscapes as wholes and not in terms of separate, independent and competing land uses. Presentations help to inspire ongoing dialog.

Presentations At-a-Glance:

Number of Presentations:	**25**
Number of Attendees:	**1,700**

Presentations Given to:

All-Bay Conservation Meeting

Chesapeake Bay Forest Working Group

Dickinson College

State Conservation Commission

Pennsylvania Farmer's Union

Penn's Valley Conservation Association

PA Women's Agricultural Network

Women and Their Woods Retreat

Cumberland Co. Woodland Owner Association

Sullivan County Conservation District

PA Chapter of the Garden Clubs of America

And many more...

PRESENTATION SUCCESS:
Women's Groups Network on Agroforestry

An introductory presentation at the PA Woman's Agricultural Network (PAWAgN) Conference lead to a field day that connected women who own and manage woodlands, Women and Their Woods (WaTW) members, to women who own and manage farms. PA WAgN then invited DCNR, Penn State Forestry Extension, and Nancy Baker, a private forest landowner to the subsequent PAWAgN Conference to talk about agroforestry and the Women and their Woods program. Nancy Baker is a private forest owner in Bradford County, PA, where she currently stewards The Panther Lick, a property her great-grandfather purchased in 1861. Each subsequent generation has had different objectives over the nearly 150 years of family ownership, including animal farming and row cropping. Nancy has chosen to use her forest property to host educational events to demonstrate the benefits of working the forest with the assistance of a professional forester and an active management plan. The history of Panther Lick mirrors the history of much of Pennsylvania's forests – old farms now reverting to forests suitable for agroforestry.

Nancy Baker discusses hemlock issues with Dr. Beth Brantley, of PSU Mont Alto

PRESENTATION SUCCESS:
Appreciation of DCNR's Role in Agroforestry Outreach and Education

"Thank you for setting everything up for the field day. I definitely would like to continue to work on this partnership. I'd also like to see if you and Allyson would be interested in doing a presentation for our December Conference again. It is Monday Dec. 8th. Your presentation last year was one of the most popular. I think it would be a great venue talk Agroforestry and Women and Their Woods. Let me know if you would be interested."

Patty Neiner
PA Women's Agricultural Network
Penn State University

"It was an outstanding program - very informative and thought provoking. I'm pretty sure the attendees were quite happy with the experience. Huge thanks go to Tracey for coordinating and hosting the whole event!"

Allyson Brownlee Muth, Ed.D.
Forest Stewardship Program Associate
The Pennsylvania State University

Published Articles

Agroforestry is a relatively new concept to many woodland owners, farmers, conservation, natural resource professionals and municipal officials. Education and outreach are key first steps toward establishing agroforestry practices on the landscape, so it is important to develop a multi-strategy approach to "getting the word out." Articles can lead to speaking invitations, speaking opportunities lead to workshops and conference presentations – the ultimate goal of all of these outreach approaches is to promote adoption of agroforestry practices for all the economic, ecological and societal benefits they can provide. Most of the requests for articles were generated by conversations - at conferences, meetings, field days or presentations.

In the Northeast, agroforestry information is distributed in many forms including:

- Magazines and Newspapers
- Blog posts
- Newsletters (both electronic and print)
- Handouts, fact sheets, and brochures
- Posters
- Banners
- Social media

Paw-Paws, an ideal crop for forest farming

A Sampling of Published Articles by the PA Agroforestry Partners:

Agroforestry by Tracey Coulter, PA DCNR Bureau of Forestry (1st Quarter 2015) of *Wildflowers*, the bulletin of the Botanical Society of Western PA

An Overview of Agroforestry in Pennsylvania by Tracey Coulter, PA DCNR Bureau of Forestry, (Winter 2014)Penns Valley Conservation Association Newsletter

Forest Farming in Focus: Ramps, Non-timber Forest Products and "Forest Grown " Verification, By Eric Burkhart, Botanist, Agroforester and Plant Science Program Director, Shaver's Creek Environmental Center and Lee Rinehart, Director of Education and Outreach, Pennsylvania Certified Organic (March/April 2015) *Passages*, Newsletter of the Pennsylvania Association for Sustainable Agriculture

Pennsylvania Forests (Summer 2015) Magazine of the Pennsylvania Forestry Association. Issue dedicated to agroforestry and features diverse agroforestry perspectives from regional authors

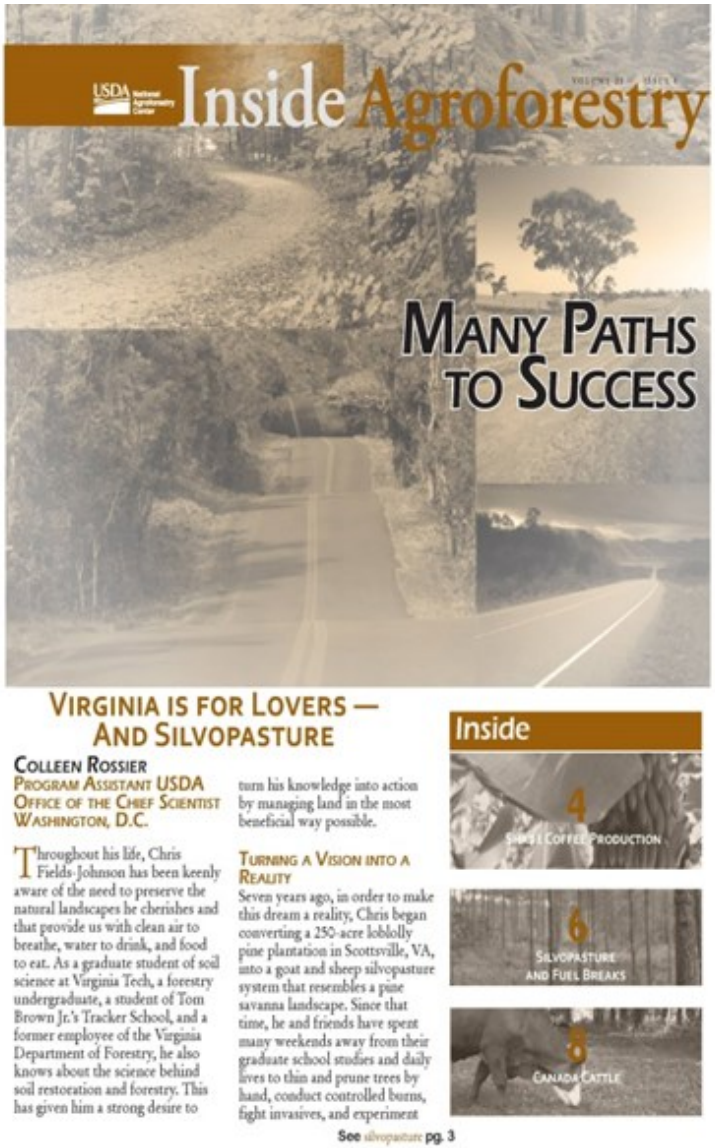
PUBLISHED ARTICLE SUCCESS:

National Exposure: Agroforestry and Forest Restoration in PA

In 2013, Tracey Coulter, Pennsylvania's Agroforestry Coordinator (former job title: Watershed Coordinator) received a request to write an article for the USDA National Agroforestry Center's newsletter: *Inside Agroforestry.* Tracey's article was titled: *Agroforestry and Forest Restoration in Pennsylvania.*

This article, which provides an overview of the work that is underway in Pennsylvania, was included in Volume 21, Issue 1—garnering national attention for Pennsylvania's agroforestry efforts. You can read Ms. Coulter's article on page six of the following link:

http://nac.unl.edu/documents/insideagroforestry/vol21issue1.pdf


Inside Agroforestry

MANY PATHS TO SUCCESS

VIRGINIA IS FOR LOVERS — AND SILVOPASTURE

COLLEEN ROSSIER
PROGRAM ASSISTANT USDA
OFFICE OF THE CHIEF SCIENTIST
WASHINGTON, D.C.

Throughout his life, Chris Fields-Johnson has been keenly aware of the need to preserve the natural landscapes he cherishes and that provide us with clean air to breathe, water to drink, and food to eat. As a graduate student of soil science at Virginia Tech, a forestry undergraduate, a student of Tom Brown Jr.'s Tracker School, and a former employee of the Virginia Department of Forestry, he also knows about the science behind soil restoration and forestry. This has given him a strong desire to turn his knowledge into action by managing land in the most beneficial way possible.

TURNING A VISION INTO A REALITY

Seven years ago, in order to make this dream a reality, Chris began converting a 250-acre loblolly pine plantation in Scottsville, VA, into a goat and sheep silvopasture system that resembles a pine savanna landscape. Since that time, he and friends have spent many weekends away from their graduate school studies and daily lives to thin and prune trees by hand, conduct controlled burns, fight invasives, and experiment

See silvopasture pg. 3

Inside

4 SHADE COFFEE PRODUCTION

6 SILVOPASTURE AND FUEL BREAKS

8 CANADA CATTLE

PUBLISHED ARTICLE SUCCESS:

Agroforestry in the Spotlight

Article by Dr. Mike Jacobson, Agroforester at PSU Extension—Published in Forest Finance and Taxation (Nov. 27, 2011)

Everyone in the natural resources business may have heard of 'agroforestry' but few actually take it seriously as a land use system. That may be changing.

Agroforestry is everywhere. Trees are ubiquitous across our landscape and agroforetsry is defined as the integration of trees and crops and/or livestock. However, the windbreaks, or trees on farms or pastures are more a remnant than an intentional practice. For it to be 'agroforestry' it needs to be intentional and interactive. But why should a farmer or forest landowner bother? The point is the interaction between trees and crops or livestock has benefits which outweigh the costs. Many of the benefits from trees are environmentally related such as carbon sequestration, water quality improvements, reduced soil erosion, and biodiversity. These environmental benefits provide indirect values that are often difficult to measure in the market place so for agroforestry to work it also needs to have direct economic benefits. These include income diversification and niche markets from specialty crops, extended forage growing seasons, nitrogen fixing capabilities of trees, etc.

Concerns about current farming systems, problems with forest sustainability, and growing movements in organic farming and local foods have given agroforestry some new found life. The New York Times recently discussed this in an article and the USDA is talking about an 'all lands' management approach and came out with a strategic framework for agroforestry. It's the first time all USDA land agencies are trying to work together that I can remember.

We are also seeing more interest from farmers and forest landowners to diversify and develop alternative income opportunities in these trying economic times. Good news for the science of agroforestry.

PUBLISHED ARTICLE SUCCESS:

Agroforestry Research and Information

Articles and Papers by Dr. Erik Burkhart, Shaver's Creek Environmental Center; and Dr. Mike Jacobson, PSU Extension

Agroforest Syst (2013) 87:1157–1172
DOI 10.1007/s10457-013-9627-8

American ginseng (*Panax quinquefolius* L.) floristic associations in Pennsylvania: guidance for identifying calcium-rich forest farming sites

Eric P. Burkhart

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Abstract In the eastern United States, there is interest among forest landowners in American ginseng husbandry, and particularly in cultivating this plant on forestlands using a wild-simulated forest farming approach. This study documented the flora and soil conditions associated with wild and wild-simulated ginseng populations throughout Pennsylvania (PA) to develop floristic "indicators" that can be used to identify supportive growing sites on forestlands. A total of 243 plant species were documented associates of ginseng across PA: 32 over-story trees, 37 shrubs and understory trees, 15 vines, 143 herbs, and 16 ferns. Statistical analysis revealed a largely shared floristic assemblage throughout the state although some associates did differ according to region and physiographic province. Previous studies have suggested that a soil calcium content, especially soils having at least 3,360 kg ha^{-1} (3,000 lbs ac), appear to be particularly conducive to wild and wild-simulated ginseng occurrence and/or vigor, and indicator species analysis in this study revealed that three of the top plant associates that can be used for determining sites that meet this calcium threshold in PA are white ash, Jack-in-the-pulpit, and rattlesnake fern. These results suggest that successful adoption of wild-simulated ginseng forest farming is likely to be improved in forested areas where these species are found collectively as a dominant component of local plant assemblages.

Keywords American ginseng · Forest farming · Medicinal plant cultivation · Plant husbandry · Wild-simulated ginseng

Introduction

American ginseng (*Panax quinquefolius* L.), hereafter referred to as ginseng, is an herbaceous perennial forest plant that has been collected throughout eastern North America as a valued export commodity for nearly 300 years (Carlson 1986; Evans 1985). The historic native range of this species includes a broad geographic area in North America spanning from southern Canada to Georgia, and west to states along the Mississippi River (Gleason and Cronquist 1991). Currently, 19 states within this range export wild ginseng roots to supply a niche market centered in East Asia where ginseng is valued as a tonic and adaptogen (Court 2000; Hu 1976). Between 1990 and 2011, wild ginseng root exports from the United States totaled between ~20,000 and ~72,000 kg (dry weight) annually (FWS 2012). During the past 100 years, ginseng has also become a specialty field crop in certain parts of its natural North American range (e.g., Wisconsin, Ontario) and elsewhere in the world (e.g.,

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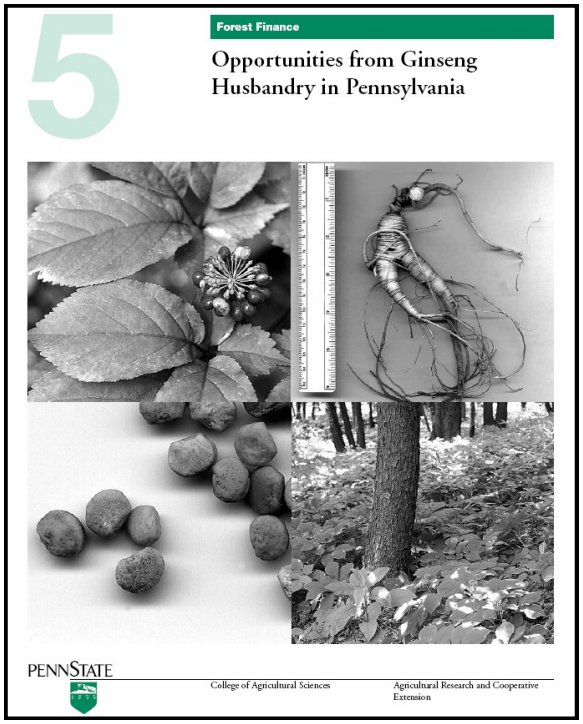
Springer

Published 2013



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Forest Finance

Opportunities from Ginseng Husbandry in Pennsylvania

PENNSTATE
College of Agricultural Sciences
Agricultural Research and Cooperative Extension

Published 2007

Agroforest Syst (2009) 76:437–453
DOI 10.1007/s10457-008-9173-y

Transitioning from wild collection to forest cultivation of indigenous medicinal forest plants in eastern North America is constrained by lack of profitability

Eric P. Burkhart · Michael G. Jacobson

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Abstract The forest flora of eastern North America includes many herbaceous plant species traded in domestic and international medicinal markets. Conservation concerns surrounding wild-collection exist and transitioning to cultivation in agroforestry systems has potential economic and ecological benefits. Costs and revenues associated with adopting forest cultivation were modeled for eight North American medicinal forest plants. Sensitivity analysis examined profit potential in relation to (1) discount rates; (2) propagation methods; (3) prices; (4) growing period; (5) production costs; and (6) yields. Results indicate that intensive husbandry of six of eight species would be unprofitable at recent (1990–2005) price levels. Exceptions are American ginseng (*Panax quinquefolius* L.), and under certain circumstances (e.g., maximum historic prices, low production costs) goldenseal (*Hydrastis canadensis* L.). Direct marketing to consumers and retailers might improve grower profits, but is undermined by the availability of cheaper, wild-collected product. We suggest that the North American medicinal plant industry could play a key role in facilitating any transition from wild to cultivated product, perhaps through development of a certification and labeling program that brands "forest cultivated" products. This could generate price premiums, to be passed along to growers, but must be accompanied by aggressive consumer education. A "forest cultivated" certification and labeling program has potential to benefit industry and consumers if assurances regarding product identity and quality are a central feature. Plant species that are not viable candidates for commercial cultivation due to limited consumer demand (i.e., species with "shallow," erratic markets) are best addressed through proactive government and industry initiatives involving targeted harvester education programs.

Keywords Financial analysis · Forest farming · Medicinal plant conservation · Non-timber forest products · Plant husbandry · Specialty forest products

Introduction

As many as 50 plant species indigenous to eastern North American forestlands annually find their way into domestic and international medicinal trade networks (American Botanicals 2008; Robbins 1999; Strategic Sourcing 2008). Commerce in a particular species fluctuates in response to consumer and industry demand, and frequently changes within and between years (AHPA 1999, 2003, 2006, 2007).

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Springer

Published 2009

Leadership

With the support of the US Forest Service, Penn State and other partners, DCNR has become a leader in regional agroforestry outreach and education. We have been called upon to write articles, lead teams, coordinate trainings, source project funding and participate in expert panels – all the while learning and teaching as we go. We are building new partnerships. We have been invited to speak to agricultural organizations that are opening up new audiences for our messaging (PA Farmer's Union, Women's Agricultural Network, Pennsylvania Department of Agriculture, Pennsylvania Association for Sustainable Agriculture). We have achieved National recognition (Two Chiefs Award, *Inside Agroforestry*) and we were delighted when we were invited to consult with a neighboring state's forestry agency. We partnered on a successful NE SARE PDP grant, "*NE Advanced Agroforestry Training for Natural Resource and Agricultural Educators,*" which will allow the Chesapeake Bay Agroforestry Team to expand the understanding and practice of agroforestry in the Northeastern United States.

Agroforestry at the PA DCNR Bureau of Forestry developed because of a recognized need to "look beyond the buffer" for watershed restoration. The PA Agroforestry Partners continue to forge ahead, using the creativity inherent in agroforestry practices. We strive to find sustainable environmental and economic opportunities for farmers and forest landowners by asking questions like:

- What if fence rows could become economically productive?
- What if buffers yielded marketable crops?
- What if trees in a pasture could enhance livestock production and provide forage for insects that are beneficial to orchards?

Pennsylvania is one of the few, perhaps the only, state that has an Agroforestry Coordinator on staff. This coordinator helps to galvanize efforts among the PA Agroforestry partners and within the region. We look forward to our future shared accomplishments.

LEADERSHIP SUCCESS:
The Chesapeake Bay Agroforestry Team

Much of the credit for the growth of landowner interest in agroforestry could be attributed to the investment of state and federal partners in agroforestry outreach and education. Agroforesters are now sought out to present to a wide variety of audiences and are challenged to cover subjects that are beyond their level of expertise. For example, most foresters are not trained in animal husbandry, but may be called upon to consult on silvopasture or a prescribed grazing. Fortunately, regional agroforestry communities are developing, including the Chesapeake Bay Agroforestry Team. This diverse team of natural resource professionals includes members from state, federal, NGO and private sectors. Lead by the US Forest Service Chesapeake Bay Program, team members hale from as far away as Nebraska and North Carolina, but mostly represent New York, Pennsylvania, Maryland, West Virginia and Virginia. Most meetings are teleconferenced because the membership is so widely dispersed. However, in, May 2014, Pennsylvania DCNR hosted a face-to-face conference at Kings's Gap Environmental Education Center in Cumberland County, Pennsylvania. Twenty-seven agroforesters met for 2 days to present the status of agroforestry in their states, discuss innovations, barriers, and opportunities for agroforestry adoption in their jurisdictions. The second day was dedicated to a facilitated discussion of the future direction of the group.

The group recognized a need to schedule regular agroforestry trainings for resource professionals and farmers; to set a "common language" (branding) –

The Chesapeake Bay Agroforestry Team Seeks to:

- Provide regularly scheduled training for resource professionals
- Set a "common language" surrounding Agroforestry
- Help generate excitement in the farming community and among natural resource professionals
- Leverage funding and create incentives for practitioners
- Foster interdisciplinary network-building

The Chesapeake Bay Agroforestry Team posing for a photo on the veranda at Kings Gap State Park

LEADERSHIP SUCCESS:
Chesapeake Bay Forest Restoration Team Recognized with Two Chiefs' Partnership Awards

Edited from USDA Forest Service, Northeastern Area State and Private Forestry Media Advisory, January 17, 2014

NEWTOWN SQUARE, PA—U.S. Forest Service Northeastern Area State and Private Forestry partners received USDA Two Chiefs' Partnership Awards for their work with the Chesapeake Bay Forest Restoration Strategy. The Chiefs of the Forest Service and NRCS select award winners. Team members who received special recognition for their efforts on the Strategy included Sandra Doran, U.S. Fish & Wildlife Service; Bruce Pluta, Environmental Protection Agency; Scott Eggerud, Office of Surface Mining Reclamation and Enforcement; Tom Ward, USDA Natural Resources Conservation Service; Anne Hairston-Strang and Tim Culbreth, Maryland Forest Service; Tracey Coulter, Pennsylvania Bureau of Forestry; and Sally Claggett and Julie Mawhorter, U.S. Forest Service.

During 2011-2012, the Forest Service worked with over 60 representatives from over 30 Federal, State, and nongovernmental organizations to craft this Strategy. The Strategy was endorsed by the Chesapeake Bay Program partnership and officially released on December 5, 2012 in a signing ceremony with the U.S. Forest Service Chief Tom Tidwell, Chesapeake Bay Program Director Nick DiPasquale, and State Foresters from Delaware, Maryland, New York, Pennsylvania, Virginia, West Virginia and the District of Columbia. The award recognized the Chesapeake Bay Forest Restoration team for their work developing a strategy for the Chesapeake Bay area. The strategy provides a roadmap to guide and expand forestry partnership efforts. These collaborative efforts will accelerate forest restoration in priority areas with a focus on urban and community forestry, wildlife and fisheries habitat, agroforestry, mined lands, and contaminated lands. The award recognizes exemplary employees and projects from the Forest Service, NRCS, State forestry agencies, and conservation districts who have worked collaboratively to support conservation and forest stewardship.

Tracey Coulter's Two Chiefs' Award

LEADERSHIP SUCCESS:
National Praise for the PA DCNR Bureau of Forestry

Submitted by Kate MacFarland, National Agroforestry Center

"The Pennsylvania DCNR Bureau of Forestry plays an important role in building networks, raising awareness, and providing technical information about agroforestry in Pennsylvania and in the broader Chesapeake Bay and northeast regions. As a national center with a small staff based in Nebraska, the USDA National Agroforestry Center relies on our partners to share technical and outreach information with local landowners, agencies, and non-profits about agroforestry, as well as to communicate their needs to us. PA DCNR has been an excellent partner in accomplishing this. Through the work of Tracey Coulter (Agroforestry Coordinator) and other staff at the PA DCNR, interest in agroforestry has increased among new groups of landowners in these regions. They have also been instrumental in instigating important demonstration sites, training opportunities, and working groups that help develop technical expertise and assist private landowners and communities more effectively access information about agroforestry."

Quote from Kate MacFarland of the National Agroforestry Center

LEADERSHIP SUCCESS:
Partners Help Create Forest Grown Verification for Ginseng

Submitted by Tracey Coulter, PA DCNR Agroforestry Coordinator

PA Agroforestry partners Erik Burkhart (Shaver's Creek Environmental Center) and Chris Firestone (DCNR Bureau of Forestry Botanist) worked with PA Certified Organic to help create a Forest Grown verification process for American ginseng. This effort assures consumers that they are buying responsibly (and legally) produced and harvested ginseng. This is especially important given the popularity of television shows such as "Appalachian Outlaws," which glorify the poaching of this important plant.

Check out the program at http://www.paorganic.org/forestgrown

American Ginseng (photo by US Fish and Wildlife Service)

Direct Seeding

Excerpt: Article by Andy Duncan, DCNR Woodland Stewardship Coordinator—printed in PA Forests Magazine, Fall 2011

DIRECT SEEDING AS AN AFFORESTATION/REFORESTATION PRACTICE

Preparation of seed drill prior to planting

Recently a group of conservation professionals toured a private forest property in Bradford County where there has been a history of artificial forest tree planting done by the landowners. Mr. Clark Beebe, current owner of the Beebe Crown Vetch Farm, was gracious enough to host us on his family's farm on a hot July day. Clark's father Joe originally purchased the farm many decades ago, and operated a profitable seed production farm to meet growing demand for Crown Vetch as an erosion prevention cover crop. As demand for seed lessened in the 1990's, Joe Beebe began to consider converting his open fields of crown vetch to forested stands. He gathered information from NRCS and the Bureau of Forestry at the time regarding afforestation efforts of his fields. When it came time to make decisions, Joe was intrigued by the idea of using seed, rather than developed seedlings, to convert his fields to forest. With advice and assistance from conservation professionals, and some creative thinking amongst friends and family, Joe formulated an action plan for converting fields to forest beginning in 1997. Joe turned an old tree seedling planter into a converted seed planter that could be hitched on the back of a tractor. From years 1997-1999, prior to his untimely passing, Joe Beebe planted Black Walnut, various Oaks, and Black Cherry seed in rows throughout his fields. The only treatment to the fields prior to planting was the mowing of established Crown Vetch and other grasses. Seeds were dropped into furrows created by the planter, with spacing between seeds of 2 feet, and rows roughly 6-10 feet apart. Our tour in July of 2011 yielded remarkable results, with fully stocked stands of Black Walnut and White Ash that volunteered on the sites. Most of the Black Cherry did not survive, however many of the oaks remain, though are suppressed in the understory. Overall though, the goal was successfully reached in restoring native forests to the property, now providing a variety of options to the Beebe family.

Direct Seeding is not a new idea. Mother Nature has been doing it for millions of years. Foresters, land managers, and some forest landowners have had success with this method that much more closely mimics the effects of natural forest reproduction done in nature. Much of the national focus of reforestation/afforestation efforts where artificial planting is desired has focused on hand planting of developed seedlings of various species. Typically, these seedlings are grown for 1-3 years, sometimes more, and then planted on a grid system that will maximize landowner goals for the planting. Older seedlings typically have larger root systems and taller shoots, therefore increasing survivability when planted correctly. Most artificial plantations typically do not use greater than 500 seedlings/acre for reforestation. Competition from other present plant species onsite is first controlled through chemical, mechanical, or other methods, followed by seedling planting. In areas where deer and other seedling predators pose a problem, seedlings are often protected with tree shelters staked firmly to the ground. Maintenance of these plantations is critical for the first three years after planting until seedlings are firmly established, and recommended for several years after until seedlings are above the height of deer. Without yearly maintenance, seedling based plantations often fail...

Full article printed in Fall 2011 issue of PA Forests Magazine

Forests for the Bay

A significant portion of forest owners in PA own less than 20 acres. Many of these owners express interests in wildlife habitats, recreation, peace and solitude, nature study, and non-timber forest products. Traditional forest management that includes periodic timber harvesting is often difficult to accomplish on these small tracts of land. Forests for the Bay (FFB) was developed through collaboration between the Alliance for the Chesapeake Bay and the US Forest Service, with support from the Pennsylvania DCNR Bureau of Forestry (BOF), the Maryland Forest Service and the Virginia Department of Forestry. The purpose is to promote sound forest management practices to private landowners as a way to increase the vitality of the region's woodlands and improve the health of local streams, rivers and the Chesapeake Bay.

Landowners can go online and fill out information about their values, interests, and goals for their property, and get a free online management plan with tactics for reaching their goals and improving the health of their lands. Measures to combat invasive species, control streambank erosion, enhance backyard wildlife habitats, create native plant systems, and many other tactics are provided.

FORESTS FOR THE BAY SUCCESS

Submitted by Craig Highfield, Forests for the Bay Program Manager, Alliance for the Chesapeake Bay

Both Bureau of Forestry and Penn State Extension personnel have provided invaluable support to our outreach efforts throughout the commonwealth. They have helped us organize and execute over 9 woodland owner workshops in 5 counties that reached over 825 landowners. They have connected our efforts with various woodland owners associations in Pennsylvania.

Bureau of Forestry personnel are also assisting and supporting the development of natural resources education course for real estate professionals regarding the benefits of forests management and conservation that we will offer in the fall of 2015. BOF also contributed and helped to edit our landowner publication *Welcome to Your Pennsylvania Woods*, which is produced as a reference guide to new woodland owners.

Healthy forests = healthy water

Bureau of Forestry personnel regularly serve on the steering committee of our annual Chesapeake Forest Champions award program that recognizes the outstanding effort of individuals and groups to manage, conserve and champion forests in our region.

BOF personnel also provided us technical assistance in developing the Alliance's *Buffer in a Box* program, which provides training and tree seedlings to private landowners interested in reforesting their riparian areas. BOF Service Foresters provided technical expertise with our afforestation projects on private land in south central Pennsylvania.

Next Steps

The PA Agroforestry Program has blazed trails from its inception. The program partners continue to forge new paths at the forefront of Agroforestry work in Pennsylvania and the nation.

Future exciting plans for PA Agroforestry include:

- Actions prescribed in the Agroforestry Section of the *Chesapeake Forestry Restoration Strategy*:
    - Establish agroforestry demonstration areas
    - Explore a Bay branding campaign for agroforestry projects
    - Design and implement agroforestry research projects to ensure stakeholders have access to cutting-edge and regionally relevant science
    - Develop targeted train-the trainer workshops
    - Expand application of agroforestry practices and innovations to small-scale landscapes, including urban settings
- Work on a Chesapeake Bay Forestry grant recently awarded to Penn State a to implement upland and riparian buffers on three confined poultry operations in the Susquehanna and Potomac drainages of Pennsylvania. These farms will be included in a growing list of demonstration areas to educate technical service providers and producers about the animal health, economic and environmental benefits of buffering barns, barnyards and adjacent streams with plants.

The Pennsylvania farm-forest mosaic

- Creation of a Northeast region "Agroforestry Academy." Funding was received through a NE SARE Professional Development Grant. Regional partners will begin work in the Fall of 2015 to develop training materials, webinars, work-shops and 2 three-day trainings modeled after those held recently in Missouri and Minnesota. The primary audience is natural resource professionals and technical service providers, who in turn will reach out to and assist producers in implementing agroforestry practices on the ground.

Conclusion

Agroforestry can be adopted throughout the landscape – from urban lots to suburban lawns to rural fields and pastures and forests. Integrating trees into non-forested landscapes or crops into forests to produce food, fuel or fiber can remind growers of the very real benefits trees provide to us all. Agroforestry can help mitigate some of the challenges our watersheds, farms and forests are now facing because of climate change, invasive insects and diseases, and the high costs of land ownership. Windbreaks can capture particulate matter from poultry barns before it reaches adjacent streams or provide habitat to nurture beneficial insects. Silvopasturing livestock can reduce heat stress while producing timber. Forest farming can produce valuable crops on forest land once deemed "vacant." Alley cropping can produce marketable crops while the primary crop is maturing. Finally, riparian forest buffers provide the last stop before runoff reaches our rivers and streams.

Forest farming at Spring Haven Nursery

Through the revival and proper practice of the age-old discipline of Agroforestry, there is great potential for a creative interweaving of conservation and food production, both of which are a necessity for life. Farmers and forest landowners can use these techniques to earn additional income while working to rehabilitate currently degraded forestland into better condition and to help provide income during the long period between timber harvests.

Pennsylvania has long been considered a leader in conservation – adapting agroforestry practices to achieve conservation goals is simply a continuation of that storied tradition.

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