

Designing Better Farmland Preservation Policies using Economic Research Results

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Outline

1. Defining farmland preservation (1 slide)
2. The problem preservation seeks to address (3 slides)
3. Current practice in preservation (27 slides)
 - Listing of existing and innovative policies
 - Evidence on who participates
 - Recent research findings on performance
 - Ideas for improving policy—a better bang for the preservation buck
4. Summary and directions for policy design (4 slides)

1. Defining Farmland Preservation

Farmland preservation

- Perpetuating current land use
- Restricts conversion and certain uses to set level
- Mainly state- and local-level policy

Term is distinct from “conservation”

- Refers to farm practices
- Mainly federal-level policy

2. The Problem: Common Perception

Concern about land use transitions

- Farmland converted to developed uses
 - Irreversibility

Some in public perceive a problem (sprawl, encroachment on farms, **poor planning**)

Others do not (progress, highest and best land use)

	Agric. Acres (2007) ²	Land in Agric.	Change '97- '07 ² (Acres)	Change '97-'07 ²	Agric. Land Converted to Developed Uses '92-'97 ³ (Acres)
New Jersey	733,450	16%	-123,459	-14%	74,000
Delaware	510,253	41%	-78,854	-13%	16,000
Ohio	13,956,563	53%	-781,465	-5%	219,000
Pennsylvania	7,809,244	27%	-10,404	-0.1%	244,500
<i>SLC States</i>					
Florida	9,231,570	27%	-1,428,207	-13%	454,800
North Carolina	8,474,671	27%	-970,196	-10%	172,300
Georgia	10,150,539	28%	-1,112,299	-10%	201,700
Tennessee	10,969,798	42%	-1,016,460	-8%	212,500
Virginia	8,103,925	32%	-649,700	-7%	116,300
Maryland	2,051,756	33%	-141,307	-6%	97,100
Arkansas	13,872,862	42%	-951,003	-6%	84,000
Alabama	9,033,537	28%	-483,840	-5%	111,000
Missouri	29,026,573	66%	-1,176,199	-4%	132,800
Louisiana	8,109,975	29%	-257,868	-3%	73,600
Texas	130,398,753	78%	-3,557,606	-3%	767,700
South Carolina	4,889,339	25%	-84,799	-2%	104,400
West Virginia	3,697,606	24%	-598	-0.02%	53,500
Mississippi	11,456,241	38%	19,954	0.2%	82,700
Kentucky	13,993,121	55%	52,941	0.4%	164,100
Oklahoma	35,087,269	80%	1,018,068	3%	143,400

²2007 Census of Agriculture. Available: http://www.agcensus.usda.gov/Publications/2007/Full_Report/usv1.pdf

³American Farmland Trust. State Statistic Sheets (adapted from USDA NRI data).

Available: http://www.farmlandinfo.org/agricultural_statistics/index.cfm?function=statistics_view&stateID=SC

The Problem: The Economic View

Economists consider some land conversions to be socially suboptimal, while others are socially optimal

- Failure in some land markets
- When conversions do not bear full cost of community services
- When public goods supplied by farms are lost (loss of amenities)

Is preservation an appropriate intervention?

- Gardner (1977) identified four benefits of preservation
 - Food security
 - Local economic benefits of a viable agricultural economy
 - Provision of open space and environmental amenities
 - Efficient, orderly, and fiscally sound urban development
- Other concerns/benefits of preservation
 - Agricultural critical mass
 - Avoiding impermanence syndrome

3. Current Practice (with Research)

What key policies accomplish preservation?

- Differential tax assessment
- Agricultural zoning and right to farm
- Purchase of Agricultural Conservation Easements (PACE)

Institutional context (By whom?)

- State and locals or Federal or Nonprofits and land trusts
124 governments, 1.7 million acres 12 million acres

Research areas

- Policy
- Landowner participation (supply)
 - Adoption, characteristics of participating landowners, how PACE affects their operation
- General public perceptions (demand)
 - Alignment between what is delivered and what public wants from preservation policy

Preservation Techniques by Type

Regulatory	Incentive-based	Participatory	Hybrid
Agricultural protection zoning	Exactions (including impact fees and mitigation ordinance)	Fee-simple purchase or sale	Eminent domain with rights of first refusal
Agricultural use zoning	Mortgage assistance	Eminent domain	Land value as pension plan with PDR/PACE
Cluster zoning	Tontine	Land banks	Point systems
Right-to-farm law	Use-value assessment (UVA) including rollback and recapture taxes	PACE/PDR	Transfer of development rights (TDR)
Growth boundary	Circuit breaker taxation	Term easements	Marketable development rights
Growth management law	Transfer tax	Rights of first refusal	Agricultural districts
State executive order			Capital gains reduction
Little fiscal cost	Fiscal cost of foregone tax revenue	Large fiscal cost	Bargain sale, charitable donation
			State income tax forgiveness
			Installment sale

Research on Effectiveness of Preservation Policy

Lynch and Duke examined studies for evidence of effectiveness

Food security and local food supply

- One readily can make this argument (CSA, pick your own)
- No evidence was found

Viable local agricultural economy

- Some evidence, but not clear with PACE (participants likely to invest, learn)

Environmental and rural amenities

- Lots of evidence

Sound fiscal policy and orderly development

- Some evidence for PACE/tax that farmland loss is slowed (esp. mid-Atlantic)
- This, in turn, may affect local government expenditures (Agric. pays more in property tax than it consumes in services)
- But methodological difficulties limit evidence

State-Level PACE Programs

	Acres (2009)*	Program Funds Spent*	Of Farm Acres in 2007**, Acres in PACE
New Jersey	173,346	\$757,576,867	24%
Delaware	89,619	\$111,674,389	18%
Pennsylvania	407,647	\$675,897,230	5%
Ohio	33,250	\$19,754,679	0.2%
SLC States			
Maryland	336,110	\$552,488,057	16%
Kentucky	28,062	\$13,823,269	0.2%
South Carolina	9,615	\$9,717,604	0.2%
North Carolina	4,712	\$2,504,000	0.06%
Virginia	546	\$750,927	0.01%

No state-level PACE acres in Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, Missouri, Oklahoma, Tennessee, Texas, West Virginia

But all acres are not equal...

*American Farmland Trust. Status of State PACE Programs, May 2009. Available: http://www.farmlandinfo.org/documents/37757/State_PACE_05-2009_Final.pdf

**U.S. Census Bureau. 2007 Census of Agriculture. Available: http://www.agcensus.usda.gov/Publications/2007/Full_Report/usv1.pdf

PACE Performance: Research Results

Scope of State PACE (data from American Farmland Trust)

- 23 states have programs
- \$336 million in 2008
- 121,373 acres protected in 2008
- Spent 14% more than 2007, preserved 28% fewer acres

PACE

- Purchase of development rights (PDR)
- Cost is function of (appraisal in development minus appraisal in agriculture) **then discount**

PACE evaluation (general perceptions)

- Strengths: Permanence, voluntariness, ownership status
- Weaknesses: Cost, selection procedures, conflicting rights/undermining regulatory approaches, permanence

Research on Participants versus Nonparticipants (Supply)

Evaluation of Delaware's PACE program (2003, with Ilvento)

- Survey of all Delaware participants (76% response rate)
 - PACE participants and Ag District participants
- Survey of sample of nonparticipants (51% response rate)

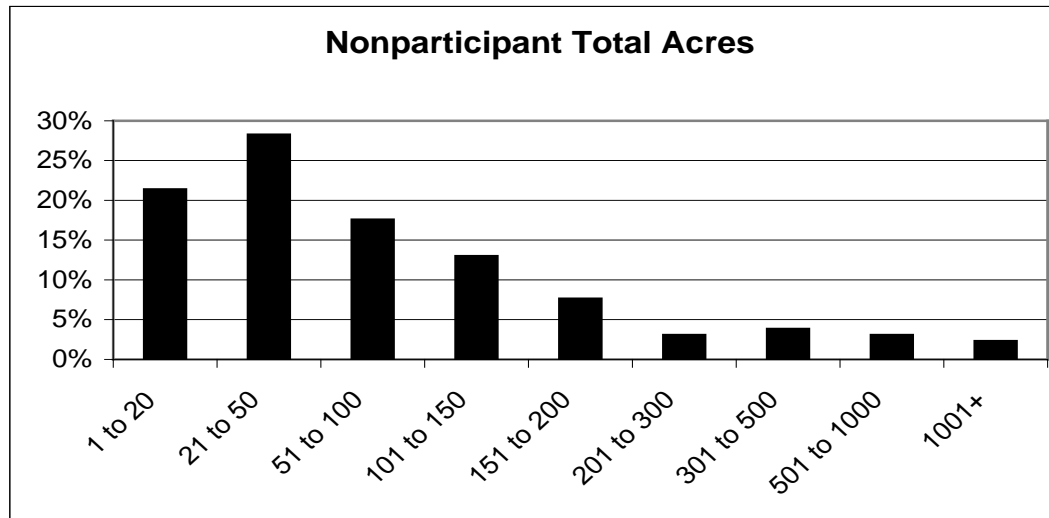
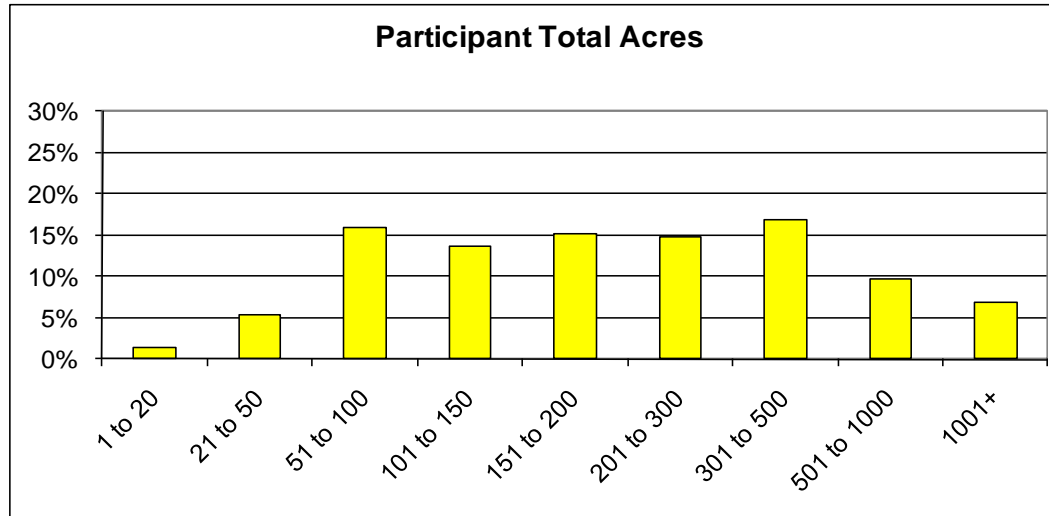
Goals

- To understand selection
 - What drives participation?
 - Are selection procedures getting parcels program managers seek?
 - In what ways do participants differ from nonparticipants?
- What do participants do with the money?
- How do participants evaluate their experience with the PACE staff?

Sources: Duke, Joshua M. 2004. Participation in agricultural land preservation programs: Parcel quality and a complex policy environment. *Agricultural and Resource Economics Review* 33(1):34-49

Duke, Joshua M. and Thomas W. Ilvento. 2004. Supplying preservation: Landowner behavior and the Delaware Agricultural Lands Preservation Program. *Dept. of Food and Res. Econ. Research Report RR04-01*, Univ. of Del. Available at: <http://www.udel.edu/FREC/PUBS/RR04-01.pdf>

Participation by Size of Operation



Operator and Household Participation in the Operation

	PACE	Agricultural District	Nonparticipants
Average Household Members involved in Decision-Making	2.15	2.09	1.78
Percent Operations with at least One			
Full-time Operator	40.2%	43.5%	17.2%
Part-time Operator working mainly on the Farm	8.6%	12.3%	7.8%
Part-time Operator working mainly off the Farm	18.0%	21.3%	21.6%
Decision Maker Retired	33.1%	30.4%	30.2%

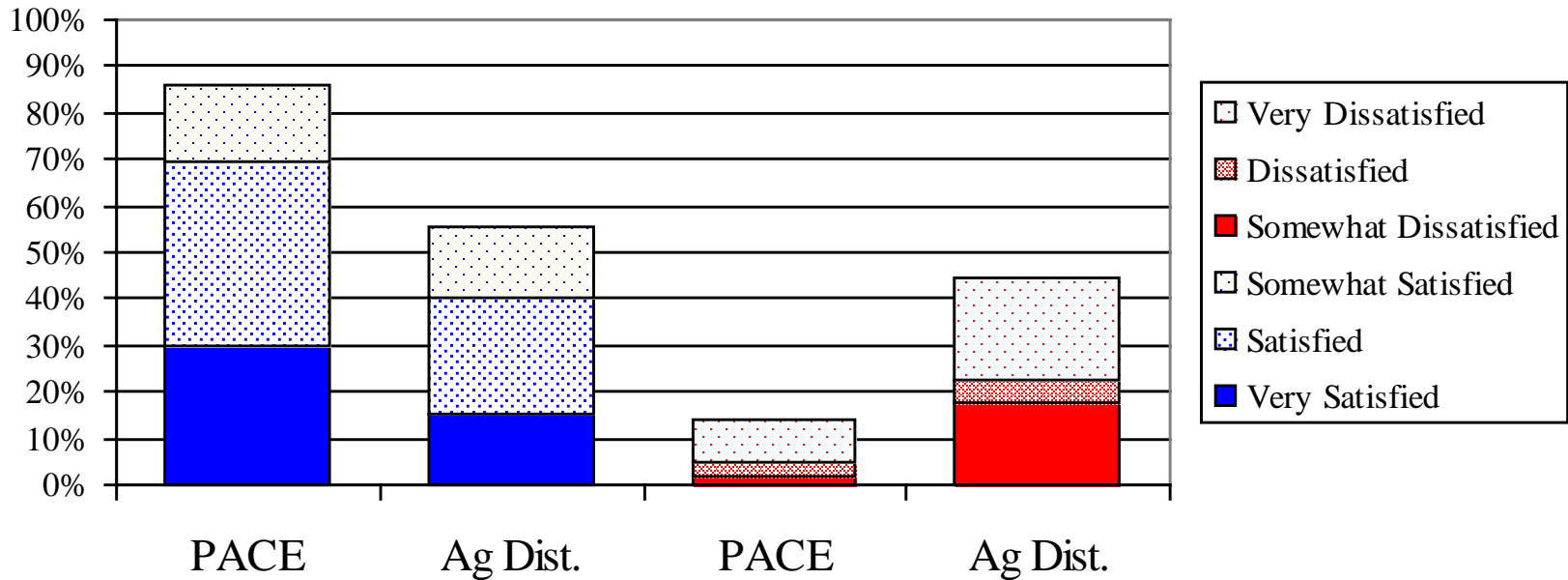
How Do Participants Learn about Preservation Programs?

How did you learn about the program?	Easement Program/Ag District Program	Ag District Program	Nonparticipants
Brochures	9.5%	16.8%	24.1%
The Internet	9.5%	9.6%	0.0%
Other Farmers	54.4%	54.4%	67.1%
Personal Contact with Program Staff	43.5%	36.0%	11.4%
News Reports	31.3%	30.4%	45.6%
Other	2.2%	2.5%	2.8%

For AD and PACE Participants

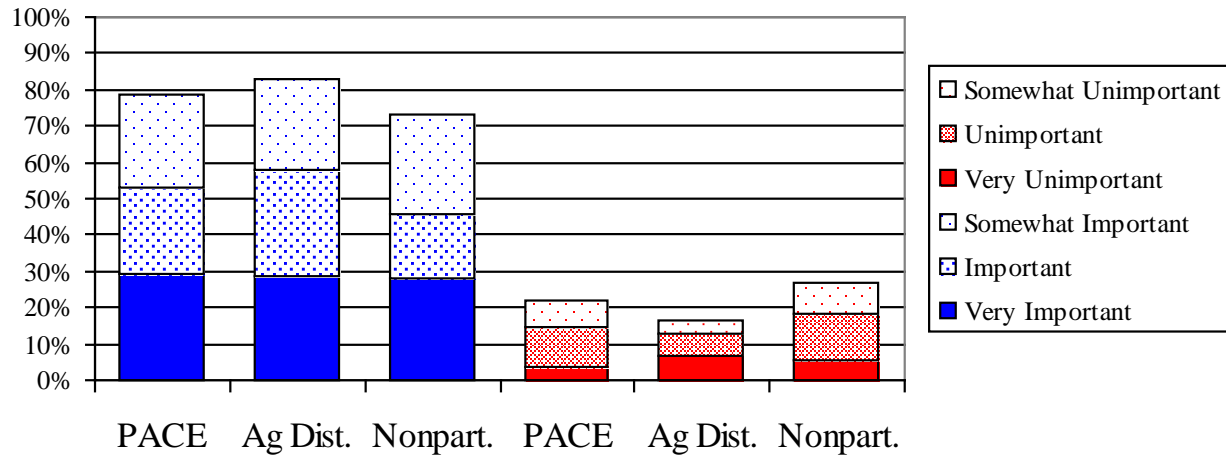
Satisfaction with the DALP Program

Satisfaction with your overall experience with the outcome

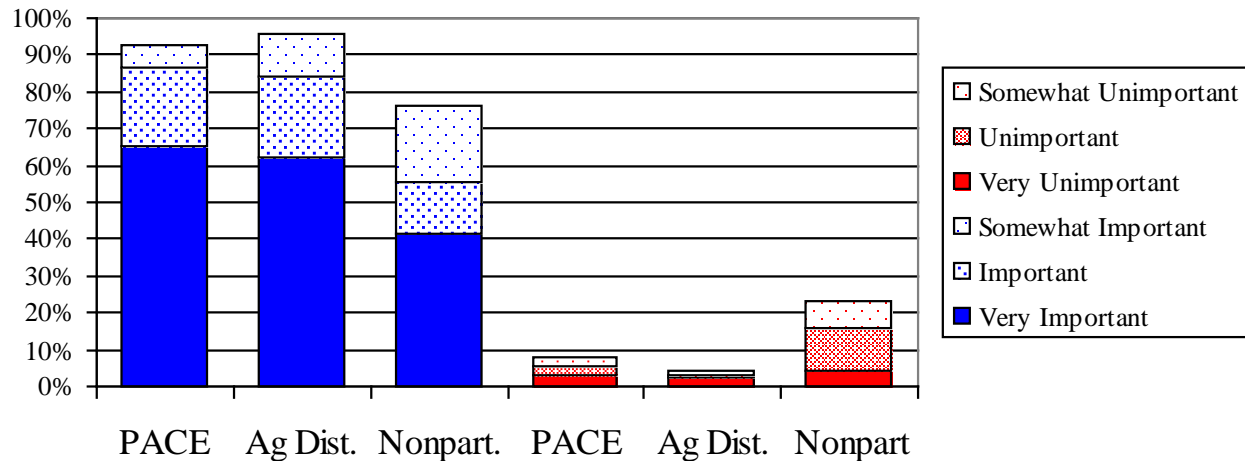


Why Apply/Consider the Program?

To protect my estate from taxes

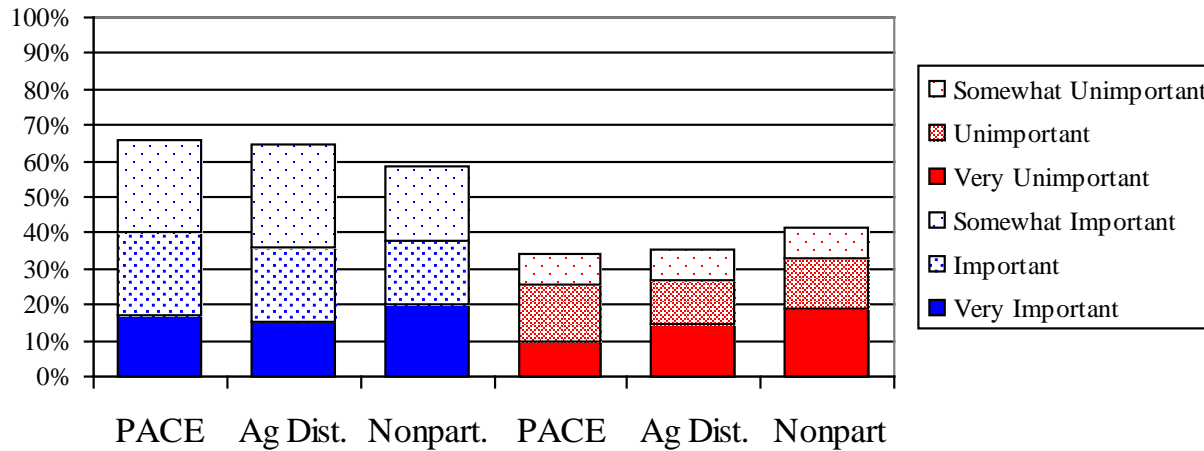


To preserve land for my family

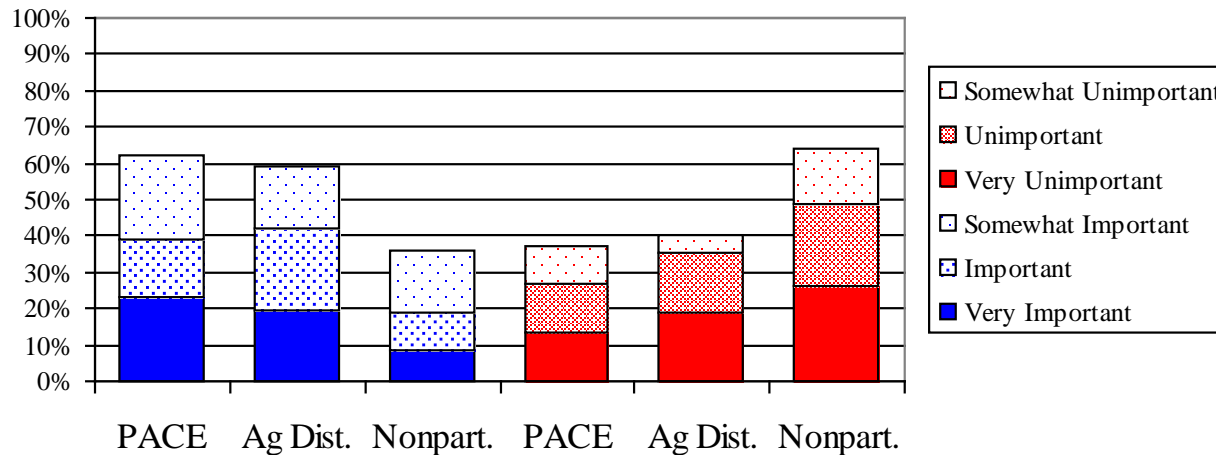


Why Apply/Consider the Program?

To provide retirement security

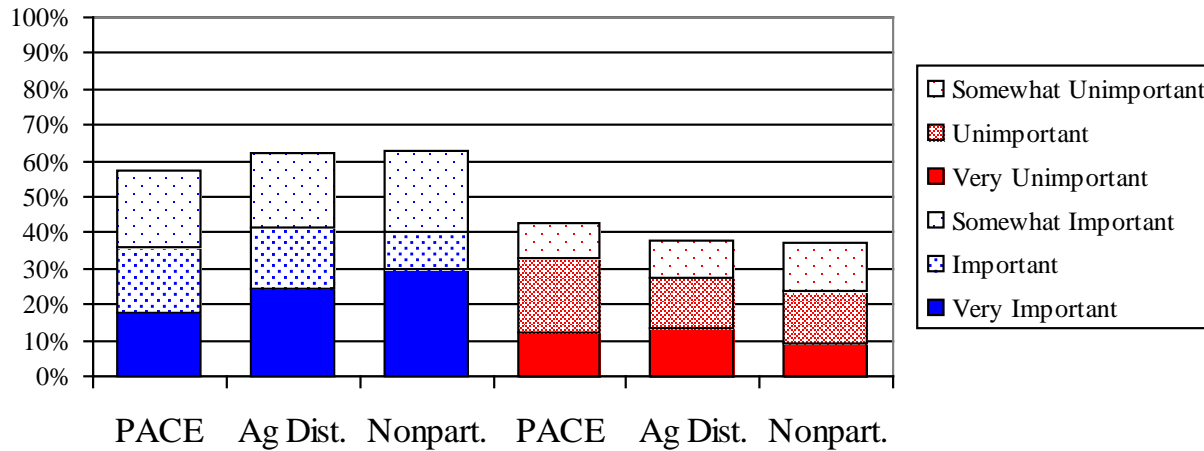


To reinvest in my operation

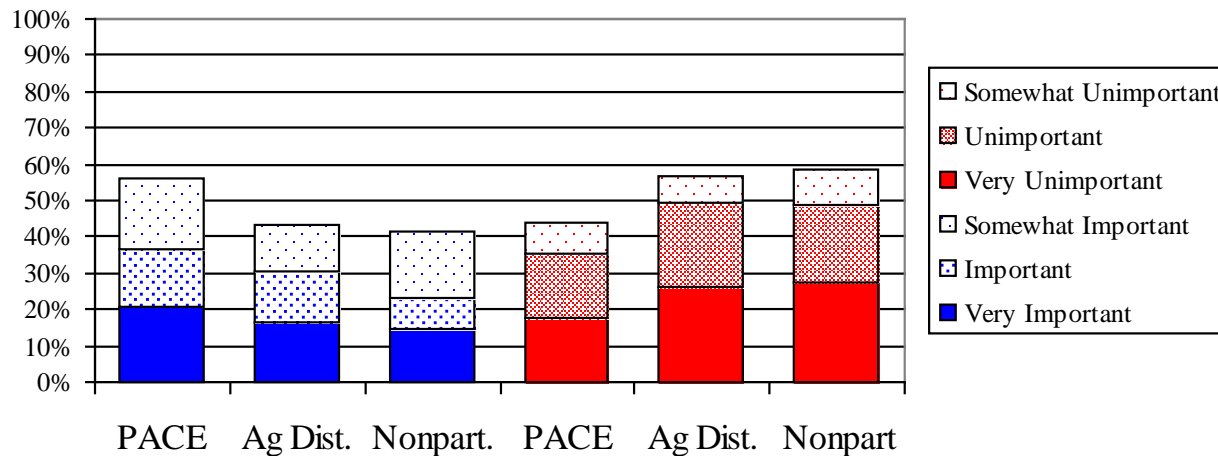


Why Apply/Consider the Program?

To protect operation from lawsuits



To relieve pressure from debt



For PACE Participants

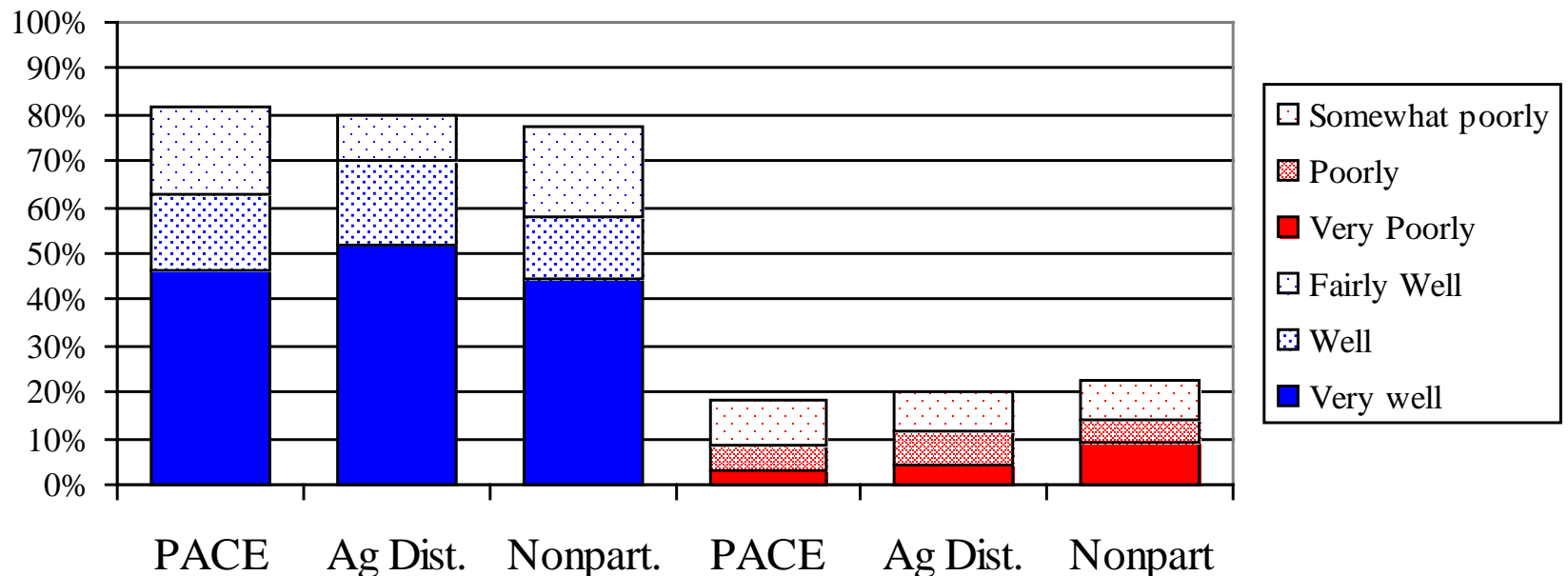
Where the PACE Money Went

Started or purchased a non-farm business	1.4%
Hired more employees	0.0%
Purchased another parcel to farm	15.3%
Used for educational purposes	3.5%
Established conservation practices	13.2%
Purchased farm machinery or equipment	15.3%
Savings, CD, Mutual funds, Stocks, etc.	54.2%
Decreased mortgage debt	33.3%
Decreased debt from operational loans	18.8%
Other	4.7%

Were Selected Parcels Going to Be Converted?

How well does this phrase describe your opinion...

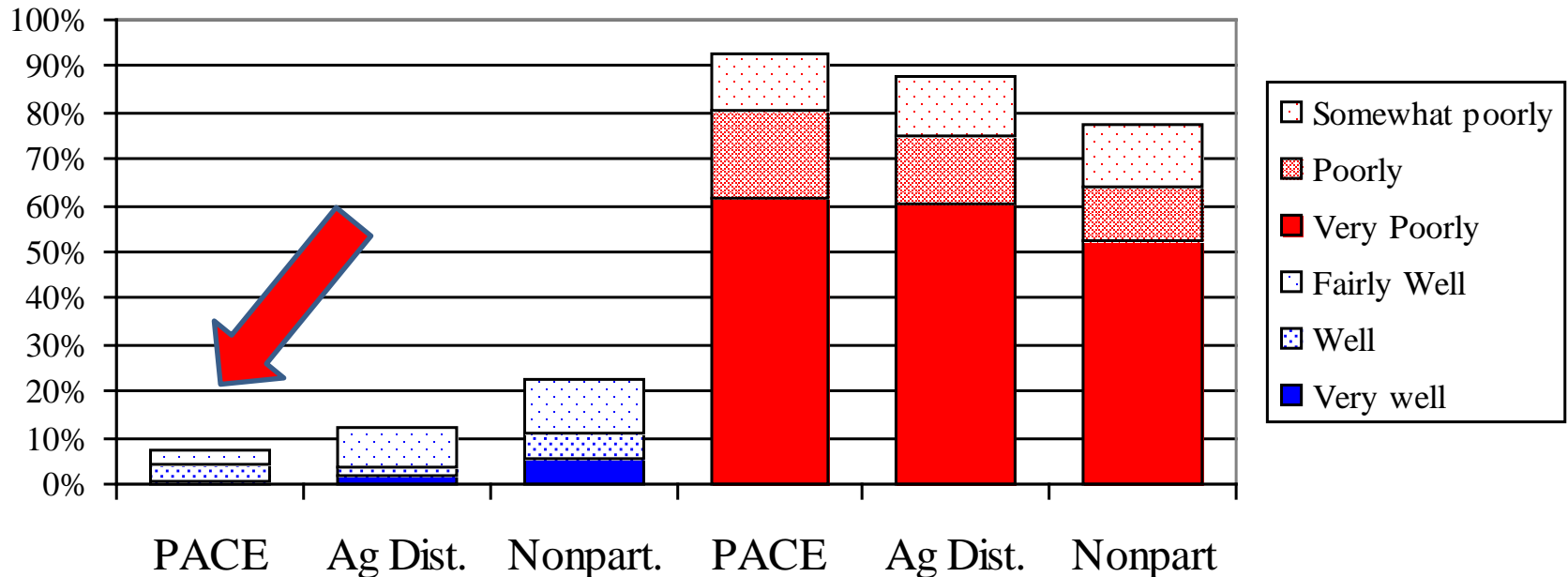
Farmers earn a lot more money by selling their land for development



Were Selected Parcels Going to Be Converted?

Consider: when a firm offers Insurance, who tends to sign up?

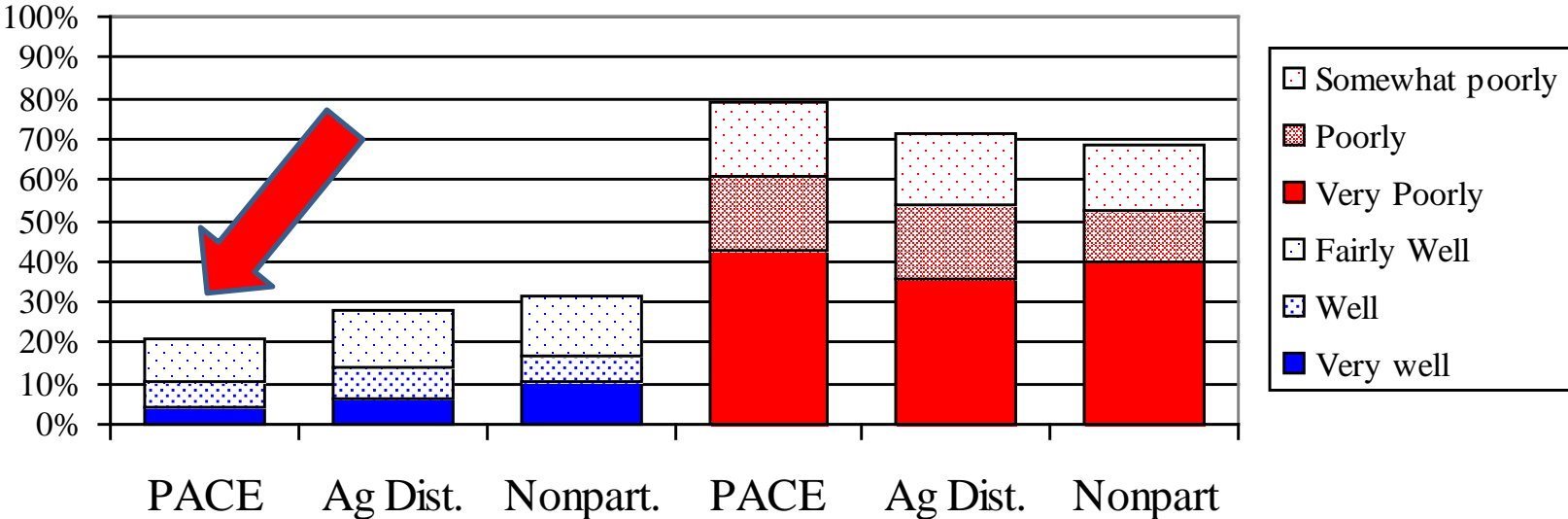
I intended to sell my farm for development



Possible Selection Problem

Were Selected Parcels Going to Be Converted?

I would have eventually converted my parcels, but the program stopped/would stop me

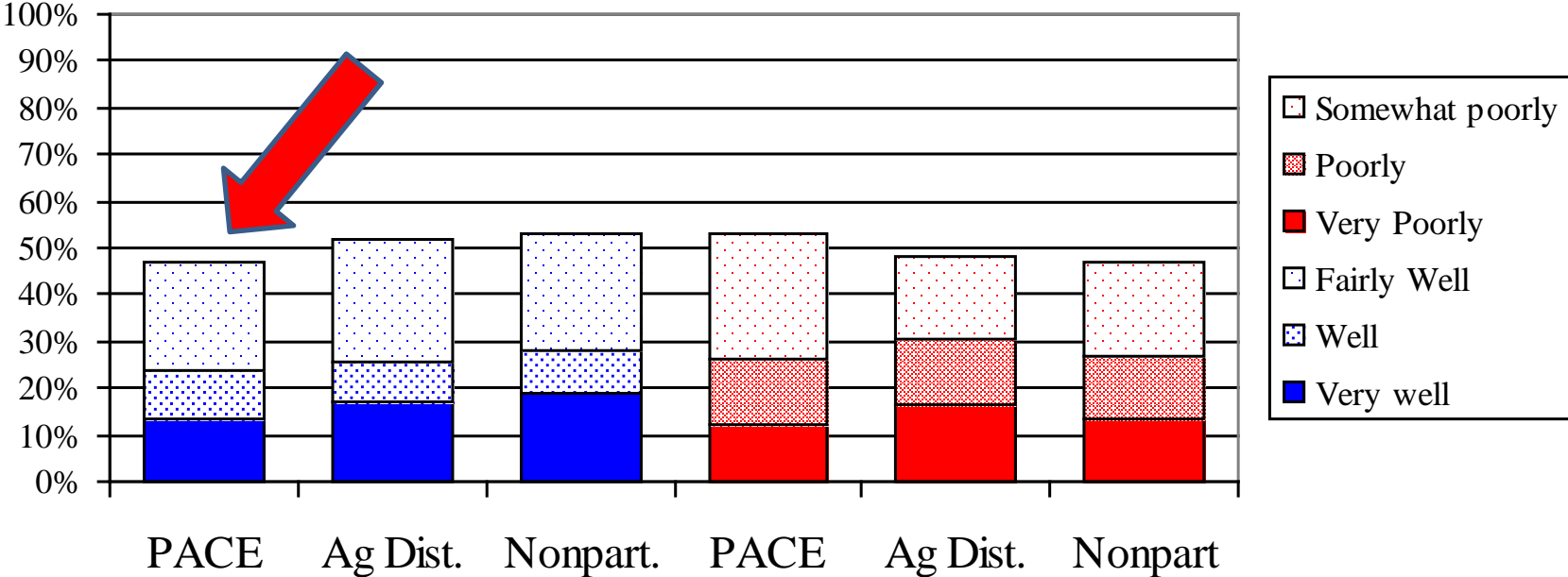


Possible Selection Problem

Sources: Duke, Joshua M. and Thomas W. Ilvento. 2004. Supplying preservation: Landowner behavior and the Delaware Agricultural Lands Preservation Program. *Dept. of Food and Res. Econ. Research Report RR04-01*, Univ. of Del. Available at: <http://www.udel.edu/FREC/PUBS/RR04-01.pdf>

Were Selected Parcels Going to Be Converted?

My parcels were highly threatened by development pressures



Possible Selection Problem

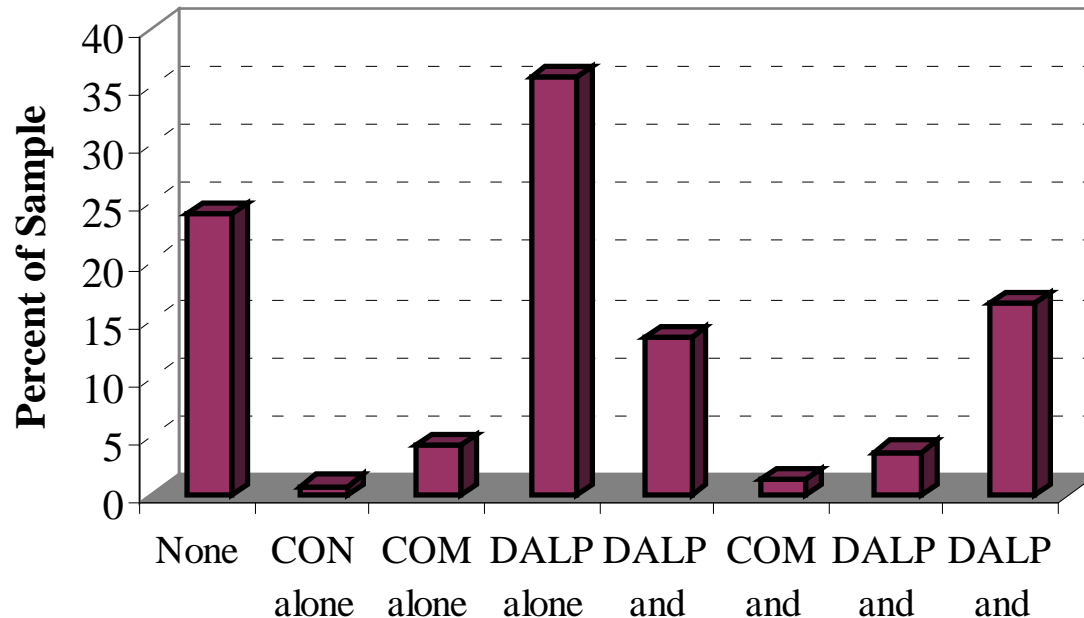
Sources: Duke, Joshua M. and Thomas W. Ilvento. 2004. Supplying preservation: Landowner behavior and the Delaware Agricultural Lands Preservation Program. *Dept. of Food and Res. Econ. Research Report RR04-01*, Univ. of Del. Available at: <http://www.udel.edu/FREC/PUBS/RR04-01.pdf>

Regression Participation Results

- In Delaware, PACE participation ↑
 - Cropland soil quality
 - Acreage
 - Relative environmental quality
 - Predominantly agricultural areas
 - Distance from urban areas
 - Owner's value for stewardship
 - Farming hours worked
 - Owners with a preservation ethic
- DALP participation ↓
 - Poultry production

Opportunities for Joint Participation (and Advertising)

Participation in Sample (Delaware Landowners)



DALP = State PACE

CON = Federal Conservation Programs

COM = Federal Commodity Programs

COM CON COM COM
and not not not
CON DALP COM CON

PACE Selection Criteria

LESA (Land Evaluation/Site Assessment)

Role of discounting

So, how can PACE be improved?

1. Account for propensity to convert

2. Relate to general public opinions

An alternate set of criteria

- Soil class
- Owner/operator
- Percent tillable
- Total revenue
- Large acreage bonus
- Sales in local markets
- Nutrient/conservation plans
- Proximity
- Type of zoning
- Miles of road frontage
- Ag tourism

Research on What Public Wants (Demand)

General public surveys on amenities

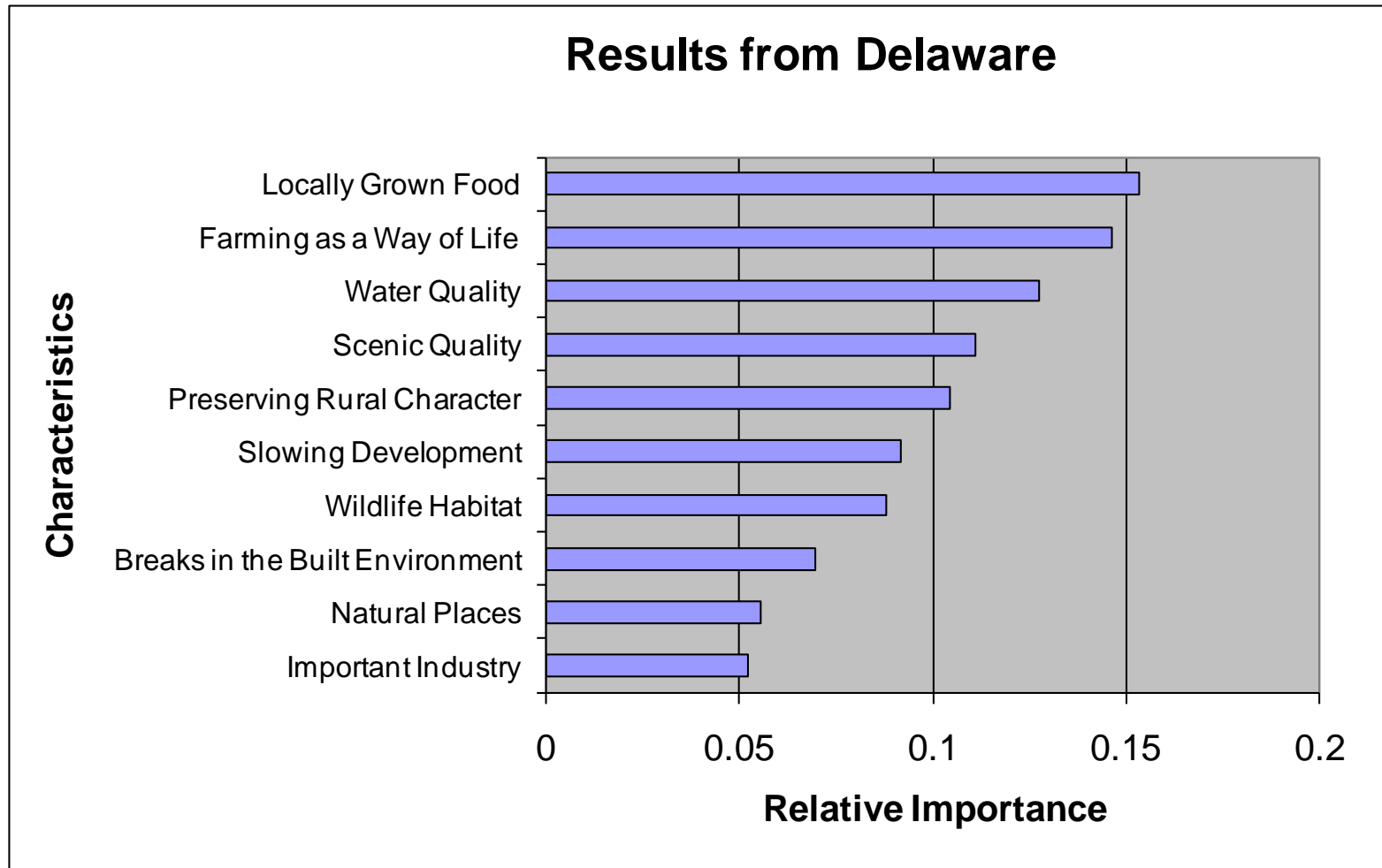
- Eight surveys 2001-2007 (collaborators Johnston, Ilvento, Aull-Hyde)
- Delaware, Connecticut
- Community and Statewide
- Multiattribute choice experiment technique with mixed logit regression
- Response rates; 32% - 54%

Goals

- To understand what types of land the public wants preserved
- To estimate the social benefits of preserving various types of parcels
- To develop a prioritization based on estimated benefits and actual costs of preservation
- To compare public priorities to selection criteria used by programs



Amenities: General Public Priorities



Source: Duke, Joshua M. and Rhonda A. Hyde. 2002. Identifying public preferences for land preservation using the analytic hierarchy process. *Ecological Economics* 42(1-2):131-45

Amenity Values: Key Research

Irwin, Nickerson, and Libby (2003) report that demand for farmland amenities:

- Rises with income levels
- Increases with educational attainment levels
- Increases with population growth, especially near the rural–urban fringe
- Increases as agricultural land becomes scarcer
- Decreases when other nonfarm, rural lands are abundant

Other results:

- In some communities, land use does not matter (crop, forest, nursery)
- In some communities, crop and forest values dominate wetland values
- Amenities: Proximity, high development risk, access

Sources: Irwin, E.G., Nickerson, C.J., and Libby, L. 2003. What are farmland amenities worth? *Choices* (Third Quarter), 21–3

Duke, Joshua M. 2008. Estimating Amenity Values: Will It Improve Farmland Preservation Policy?

Choices 23(4-Fourth Quarter):11-15. Available at: <http://www.choicesmagazine.org/magazine/article.php?article=50>

Bergstrom, J.C., Ready, R.C., 2009. What have we learned from over 20 years of farmland amenity valuation research in North America? *Review of Agricultural Economics* 31, 21-49.

PACE Parcel-Selection Prioritization Through Benefit Measurement

Estimation: PACE amenity values in Delaware

Parcels at high risk of development: *If government is going to pay, then are benefits greater than cost?*

- Forest providing moderate levels of public access \$131,881/acre
- Cropland with no public access (Pure nonuse value) \$54,691/acre
- Nursery providing moderate levels of public access \$117,598/acre

Parcels at low risk of development:

- Cropland with no public access \$2,233/acre
- Cropland with high levels of public access \$65,132/acre

Notes: For prioritization, calculate benefit-to-cost ratio and rank parcels. PACE costs in Delaware roughly \$2,000/acre. Benefits and cost vary widely.

The Method of Preservation Matters

In survey of Delaware and Connecticut residents,
the general public preferred preservation using state PACE

- Below are the costs per household of using other methods

Preservation Method	Costs of not using State PACE (conditional logit)
State Purchase of Land Fee Simple	\$51.81
Land Trust Purchase of Land Fee Simple	\$52.80
Land Trust PACE	\$42.78
Conservation Zoning	\$107.70

Summary 1 of 3:

How to improve delivery of services

Economic issues in PACE

- Parcels most likely to be converted (participation problem)
 - Selection issues
- Highest benefit per dollar spent (cost-effectiveness problem)
 - Currently: Benefits are coarsely measured, cost is focus
 - Amenity benefit measurement through original studies or benefit transfer
 - Prioritization/optimization

Punch lines

- Account for conversion risk
- Match selection criteria to general public desires

Summary 2 of 3:

How to improve delivery of services

Consider mix of techniques

- Don't dismiss conservation zoning out-of-hand (possible complement)

Consider what you and public truly desire (and match this to policies and selection criteria)

- Preserve the most acreage?
- Prevent conversions?
- Deliver money to the agricultural community?
- Preserve rural character?

Consider innovative techniques

- Public access, tax treatment of easement donations
- **Impact fees**
- Rights of first refusal (**Massachusetts**)/PACE

Policy Innovation: PACE with Rights of First Refusal

Rights of First Refusal (ROFR)

- Contractual right, purchased by state
- Allows state to match offer between farmer and developer

With PACE

- State buys land, severs conservation easement, and resells to another farm
- Cost effective—only threatened parcels
- Most favored in analysis with lawmakers, experts, program managers, and landowners

Possible implementation

- As a condition for participating in differential tax assessment or agricultural district

Summary 3 of 3:

How to improve delivery of services

Discuss lingering challenges

- Yes, we can preserve land, but can we “preserve”:
 - (1) land use?
 - (2) the farmer?
 - (3) community?
- Condemnation protection (a primary concern of farmers)

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Farmland Preservation Publications in Academic Journals

Johnston, Robert J. and Joshua M. Duke. Forthcoming. Informing preservation of multifunctional agriculture when primary research is unavailable: An application of Meta-Analysis. *American Journal of Agricultural Economics*

Duke, Joshua M. and Robert J. Johnston. Multifunctionality and land use policy: An application of nonmarket valuation to urban fringe farm and forest preservation, in *New Perspectives on Agri-Environmental Policies: A Multidisciplinary and Transatlantic Approach*, ed. Stephan Goetz and Floor Brouwer. Routledge (forthcoming).

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