

# VARIABLES ASSOCIATED WITH (*ENVIRONMENTALLY*) SUCCESSFUL PAYMENT FOR ECOSYSTEM SERVICES PROGRAMS

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# Payment for Ecosystem Services

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“A tool for environmental preservation and enhancement, as well as, for poverty alleviation”. (MEA Alcamo et al., 2005)

# Conclusion

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Besides environmental goals, payment for ecosystem services programs set social goals, specifically **poverty alleviation**.

However, this study suggests that programs usually defined its success primarily on the assessment of its **environmental impact**.

# Variables associated with successful programs

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- assessment type program effectiveness
- type of payment to landowners
- program administration
- development from other programs
- carbon payment component
- landowner training
- landowner participation decision making

# Sampled population

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We defined the target population as all PES programs valuating ES from around the world where payments are given to landowners who comply with a contract on sustainable use of natural resources.

# Objectives

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What are the characteristics (variables) associated with successful (or unsuccessful) PES programs?

Determine whether or not a common definition of success exists among PES programs.

# Databases searched

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BASE

EBSCO (Academic Search Complete)

EBSCO (Agricola)

Environmental Science Commons

Forest Science Commons

Science Direct

BioOne

EBSCO (Environment Complete)

EBSCO (Wildlife & Ecology Studies Worldwide)

First Search (WorldCat)

JSTOR

# Seed keywords for search profile

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Keywords Listed by Author	Keywords from Title and Abstract	Source
(none)	Ecosystems, Human well-being, Framework, Assessment, Ecosystem change, Ecosystem services	Alcomo et al.(2005)
Payments for Environmental Services, Renewable resources, Conservation, Market-based mechanisms, Environmental policy, Simulation, Rural development	Programs, Efficiency, Schemes, Characteristics	Alix-Garcia et al. (2008)
Ecological-economic modeling, Ecosystem models, Spatial modeling, Land use	Analysis, Valuation	Bockstael et al. (1995)
(none)	Payments for ecosystem services, Ecosystem services, Poverty reduction, Provision, Payments for environmental services, Market, Social objectives, Environmental objectives, Environmental protection, Poverty reduction, Effectiveness, Environmental regulation, Program	Bulte et al. (2008)
Conservation, Biodiversity, Economy, Land rights,	Biodiversity, Poverty, Access to resources, Protection Crane (2006) of biodiversity, Sustainable, Ecosystem service payment, ES market, program, policies, status	



# Final keywords for search profile

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General Keyword	Grouped keywords	Count
Ecosystem, Environmental*	Ecosystem, Ecological progress, Ecological system, Ecological valuation, Ecosystem benefits, Ecosystem change, Ecosystem goods, Ecosystem management, ecosystem service, Millennium ecosystem assessment, Restoring ES, Environmental conservation, Environmental condition, Environmental economics, Environmental governance, Environmental impacts, Environmental policy, Environmental protection, Environmental regulation, Environmental responsibility, Environmental service	40
Conservation, Preservation, Protect*	Conservation, Environmental conservation, Preservation, Biodiversity protection, Environmental protection, Protected areas, Protection of biodiversity, Protection of ES, Provision, Sustainable, Sustainable development	28
Payments, offsets, incentives, compensation*	Payments for ecosystem services, Payments for environmental services, Payment mechanism, offsets, Economic incentive, Financial incentive, Incentive, Incentive mechanism, Monetary incentive, Monetary compensation, assistance compensation	22
Service*	Biodiversity services, Ecosystem service, Environmental service, Services	18
Valuation, Price, Willingness-to-pay*	Contingent value, Ecological valuation, Economic value, Existence value, Total economic value, Valuation, Value of nature, Price, Willingness-to-pay	17
Economic*	Behavioral economics, Economy, Economic assessment, Economic benefit, Economic incentives, Economic value, Environmental economics, Total economic value	12
Program, Scheme, Project, Study*	Program, Assistance program, Scheme, Compensation Scheme, Project, Studies	11
Human well-being, Livelihood	Human well-being, Rural livelihood	8
Poverty	Poverty, Poverty alleviation, Poverty reduction, Poor households	8

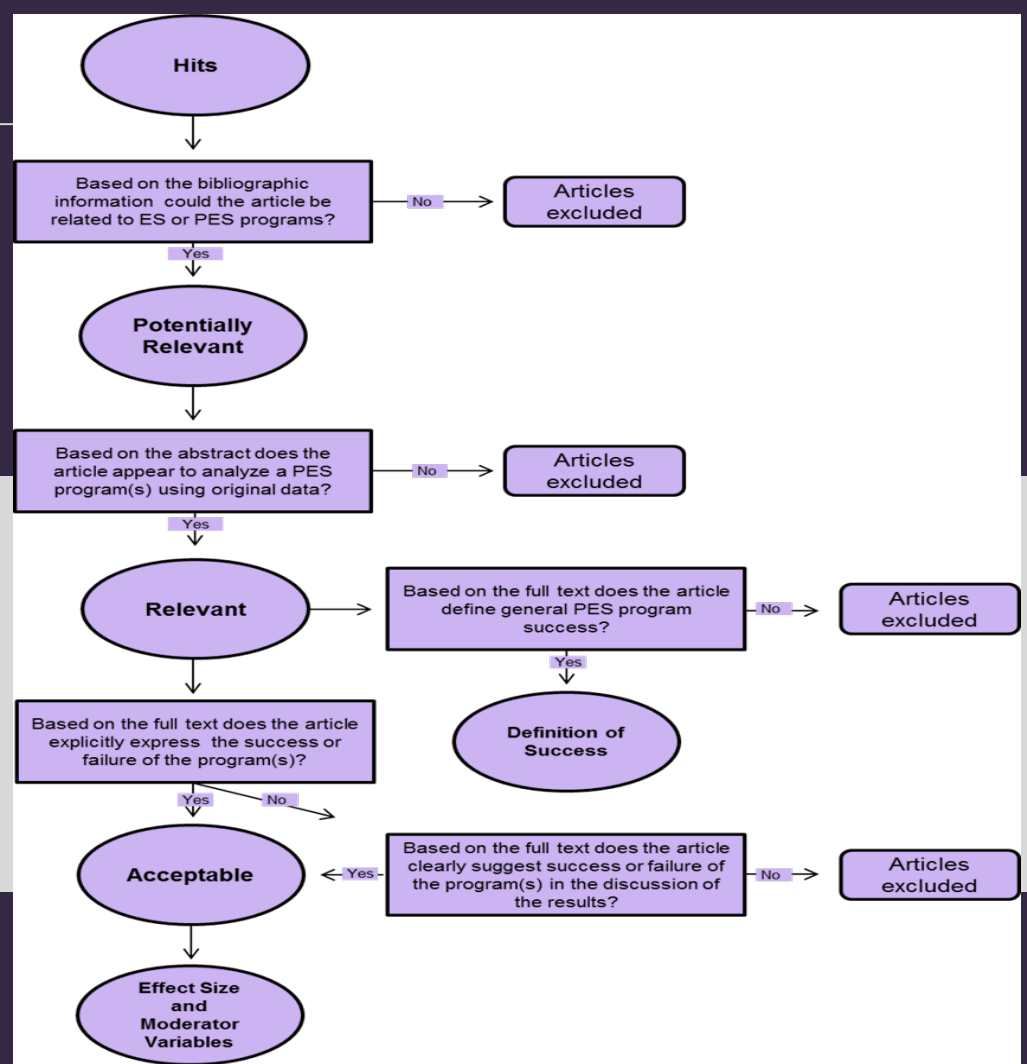
# Search profile

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payment\* *AND* (ecological *OR* biodiversity *OR* ecosystem *OR* environmental)

service\* *AND* (stud\* *OR* program\* *OR* scheme\* *OR* project\*)

# Search process



# Coding sheet

## Potentially relevant articles

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### CODING SHEET

#### Potentially relevant articles

- Title:

- Authors:

- Other Bibliographic Information

Year:

Type of Literature (check one):

- Journal       Report       Book       Book Section  
 Conference Paper       Thesis

- Search engine(s) that found study (check all that apply):

- BASE       BioOne  
 EBSCO (ASC)       EBSCO (Env. Complete)  
 EBSCO (Agri.)       EBSCO (Wildlife & Eco.)  
 Env. Sci. Com.       First Search/ WorldCat  
 Forest Sci. Com.       JSTOR  
 Science Direct

- Study Relevancy

Is study relevant ?       Yes       No

If no, why not relevant?

- N1 - General study of PES not specific to one (or few) case studies.

# Coding sheet

Relevant and acceptable articles

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## CODING SHEET

### Relevant and acceptable articles

- Title: \_\_\_\_\_ ID: \_\_\_\_\_

- First author, Year:

- Specific source (journal, conference, etc.):

- Acceptability

Is study acceptable?    Yes                       No

If no, why not acceptable?

- Y – Acceptable
- M – Meta-analysis of studies by other authors.
- N1 – Misclassified as relevant.
- N2 – Study was too brief or not enough program information.
- N3 – Not enough original data from author.
- N4 – The author did not conclude the success of the program.
- N5 – Duplicate of previously published study.
- N6 – Article could not be obtained.

- Definition of success:

- Program characteristics (List all):

# Some results

Table 6. The amount of hits from each search engine used in the literature search.

Search Engine	Hits	Potentially Relevant	Relevant	Acceptable
BASE	1,365	293	78	46
BioOne	1,300	101	23	7
EBSCO	-	415	101	76
EBSCO (Academic Search Complete)	406	-	-	-
EBSCO (Environment Complete)	576	-	-	-
EBSCO (Agricola)	99	-	-	-
EBSCO (Wildlife & Ecology Studies Worldwide)	289	-	-	-
Environmental Science Commons	691	50	11	0
Forest Science Commons	83	16	6	1
JSTOR	467	57	15	2
ScienceDirect (open access)	938	36	10	2
First Search	813	155	36	12
<b>Total</b>	<b>7,027</b>	<b>956</b>	<b>233</b>	<b>113</b>

# Moderator variables

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MODERATOR VARIABLE	DESCRIPTION
Year	Was the program implemented before or after the Millennium Assessment published in 2005? Before the MA or After the MA
Poverty reduction goals	Did the program aim to improve the livelihoods of people near or below the poverty level? Yes or No
Restrictions	Did the program require complete elimination of land management or were landowners allowed to continue sustainable management? Complete restriction of any management or Sustainable uses allowed
Contract length	What was the length of the contracts signed by landowners? Less than 10 years or Greater than or equal to 10 years
Monitoring used	Did the program include any form of monitoring of contract compliance? Yes or No
Monitoring type	What type of monitoring was used to determine contract compliance? Field visits, Remote sensing or Both field and remote sensing
Assessment type	Was contract compliance determined from assessing the type of management being used or changes in ecosystem services? Management assessed or ES assessed
Recipient	Were landowners enrolled and paid individually or as a community? Household level enrollment, Community enrollment or Both households and community
Type of payment	How were the landowners compensated for contract compliance? Monetary payments, In-kind payments (beehives, fruit harvest, timber harvest) or Both monetary and in-kind
Payments per year	How many payments were given each year? One payment, More than one payment or One-time payment
Frontloaded	Was a portion of the payment paid upon enrollment or were payments only given during the first years of the contract period? Yes or No
Differing rates	Did payment rates change based on the amount of land enrolled? Yes or No
Tiered rates	Were there different levels of payment rates offered to landowners based on certain criteria (type of land enrolled, level of management, etc.)? Yes or No

Targeting	What types of targeting, if any, was used to identify landowners or land to enroll in the program? None, Ecological targeting, Economic targeting or Both Ecological and economic targeting
Voluntary	Was participation in the program voluntary? Yes or No (including quasi voluntary)
Eligibility	Were there special requirements to be eligible to participate in the program? Everyone eligible or Special requirements to participate
# households	How many households were enrolled or covered in the program? Less than 1,000 households or Greater than or equal to 1,000 households
Area covered	How much land was enrolled in the program? Less than 5,000 hectares or Greater than or equal to 5,000 hectares
Administration	Who was involved in the development, management and decision-making of the program? Public (governmental), Private (non-governmental) or Hybrid (both)
Funding	What kind of funding did the program receive at any point? Public (governmental), Private (non-governmental) or Hybrid (both)
Attitudes	What were the overall feelings of the landowners towards the program? Positive or Negative
Dynamic	Did the program change its structure, payments or rules at any point after it was implemented? Yes or No
Developed from other program	Did the program evolve from another payment program previously administered? Yes or No
Carbon payment component	Did the program produce carbon credits and receive or plan on receiving outside payments for the carbon sequestered? Yes or No
Training component	Did the program provide training or education about the program and environment to the landowners? Yes or No
Community development	Did the program include funding or programs to improve the communities involved? Yes or No
Landowners included in decisions	Were the landowners involved in the decision making process or were they able to influence decisions? Yes or No
Majority poor	Was a majority of the program participants near or below the level of poverty? Yes or No



# Testing moderator variables

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H0:

Odds Ratio = 1, the odds of success given the presence of a moderator variable is equal to the probability of success given the absence of a moderator variable.

HA:

Odds Ratio  $\neq$  1, the likelihood of success given the presence of a moderator variable is not equal to the likelihood of success given the absence of a moderator variable.

Moderator variable	Success		Total
	Yes	No	
Yes	O <sub>11</sub>	O <sub>12</sub>	n <sub>1.</sub>
No	O <sub>21</sub>	O <sub>22</sub>	n <sub>2.</sub>
Total	n <sub>.1</sub>	n <sub>.2</sub>	n <sub>..</sub>

# Logistic regression

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$$\text{Ln}\left(\frac{P}{1-P}\right) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_k X_k$$

where

$\beta_i$  = the regression parameters estimated

$X_i$  = moderator variable

$P_i$  = probability of PES program success

$i = 1 \dots$  number of PES programs

# Assessment type landowner participation

- Front-end: land management
- Back-end: improvement ecosystem service



odds of  
success  
10:1

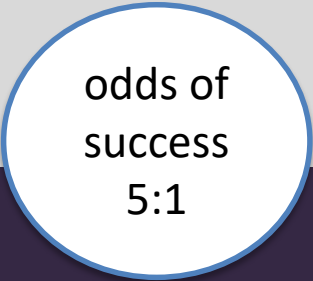
# Payment type

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- Cash

- In-kind

- Hybrid



odds of  
success  
5:1

# Administration type


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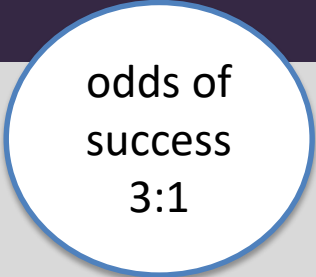
- Public administration
- Private administration
- Hybrid

odds of  
success  
4:1

# Program origin

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- Original program 
- Derived from another program



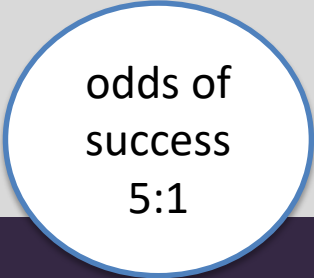
odds of  
success  
3:1

# Carbon sequestration payment

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- Present

- Absent 



odds of  
success  
5:1

# Training component

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odds of  
success  
6:1

- Present 

- Absent



Communication with landowner  
Landowners part of decision process

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- Present

odds of  
success  
8:1

- Absent



The vulture and the little girl, also known as "Struggling Girl", is a photograph by Kevin Carter which first appeared in The New York Times on 26 March 1993. The picture won the Pulitzer Prize for Feature Photography award in 1994.



# Payment for Ecosystem Services

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A tool for poverty alleviation, as well as, for environmental preservation and enhancement.