

# Using Auctions to Allocate Payments for Ecosystem Services –

## Experience from the US Conservation Reserve Program

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# Motivation

- Regulators typically lack information when designing PES schemes
- Auctions as a vehicle to reveal private actors' information and (normally) lead to lower PES (compared to posted prices)
- However: the design of auctions crucially depends on the environmental characteristics and the institutional setting
- Ex-post analysis of existing schemes (such as the US Conservation Reserve Program CRP) can deliver important insights for PES design

# Overview

1. Why Using Auctions for Allocating Payments for Ecosystem Services?
2. The US Conservation Reserve Program (CRP)
3. Some Lessons Learned
4. Final remarks

# 1. Why Using Auctions for Allocating Payments for Ecosystem Services?

- Auctions:
  - ... a market institution with an explicit set of rules determining resource allocation and prices
  - Participants compete for limited number of contracts
- Conservation auctions:
  - Often reversed auctions: rewarding the lowest bids
  - Costs converted into an index that results in high scores for low cost bidders and vice versa (as in the CRP)
- Static and dynamic auctions:
  - Static (sealed-bid) auctions: only one round; farmers bid once and clearance price (index) is determined
  - Dynamic auctions: several rounds; farmers can revise bids
    - Supply schedules auctions: similar to sealed-bid auctions
    - Ascending-clock auctions: agency states an index; bidders do not offer a price, but quantity of land they are willing to enroll

# 1. Why Using Auctions for Allocating Payments for Ecosystem Services?

## Advantages of Auctions:

- Information:
  - Farmers revealing information about true abatement cost
  - Creating transparency for farmers
- Incentives: Improving overall effectiveness:
  - Steering farmers' behaviour
  - Allocating areas with highest benefit-cost ratio
- Cost savings: by minimizing information rents

## 2. The US Conservation Reserve Program

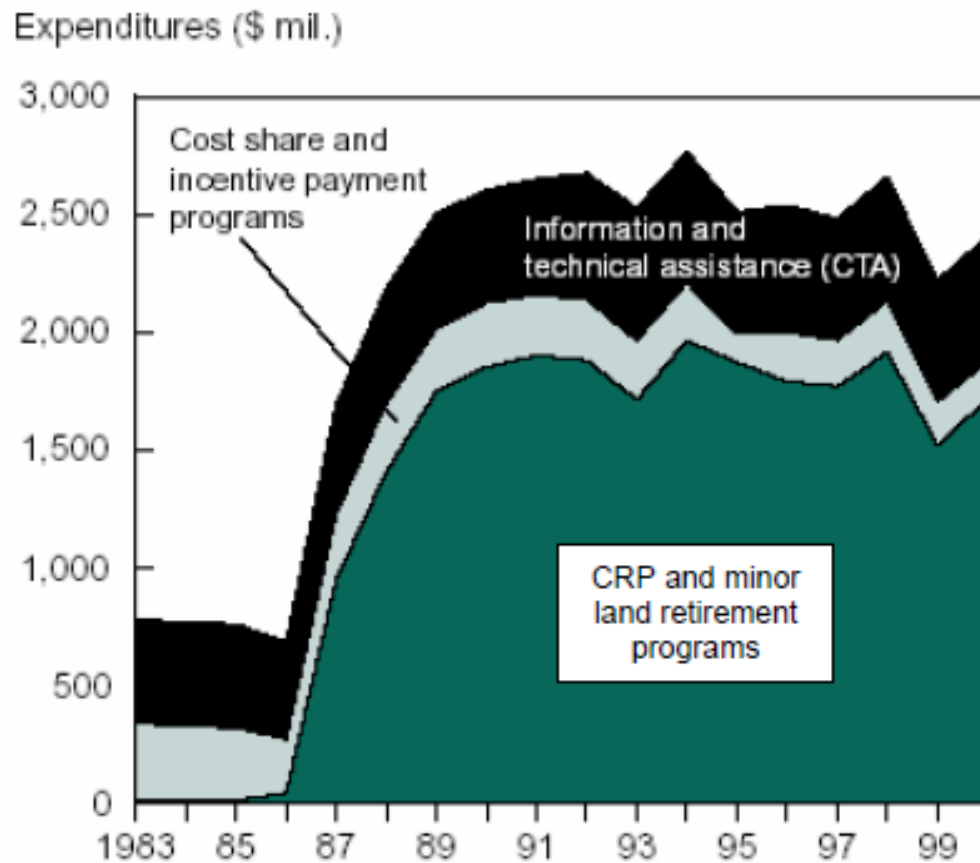
- Some characteristics:
  - Established in 1985 as land retirement program
  - Biggest Conservation Program in the US ever
  - CRP pays farmers for retiring croplands
  - Uses competitive periodic signups to select participants
  - Contracts running 10-15 years
  - Learning System: many adjustments and reforms over time
- (Original) Aims:
  - Reducing soil erosion
  - Enrollment cap: contracting 40-45 million acres of land (total agricultural land in the US about 455 mio acres)

## 2. The US Conservation Reserve Program

- Several revisions over time, e.g.:
  - 1990: Including broader environmental objectives
  - New Eligibility Criteria and enrollment procedures
  - 1996: „continuous“ signup for specific conservation practices and areas (land can be enrolled at any time in year while bidding mechanism is not used)
  - Enrollment rate: 36,4 mio acres
  - 1997: embedded in USDA's buffer initiative with responding practices
  - 2001: Farmland Wetland Program enhanced CRP focus
  - ...

## 2. The US Conservation Reserve Program

U.S. conservation expenditures 1983-2000

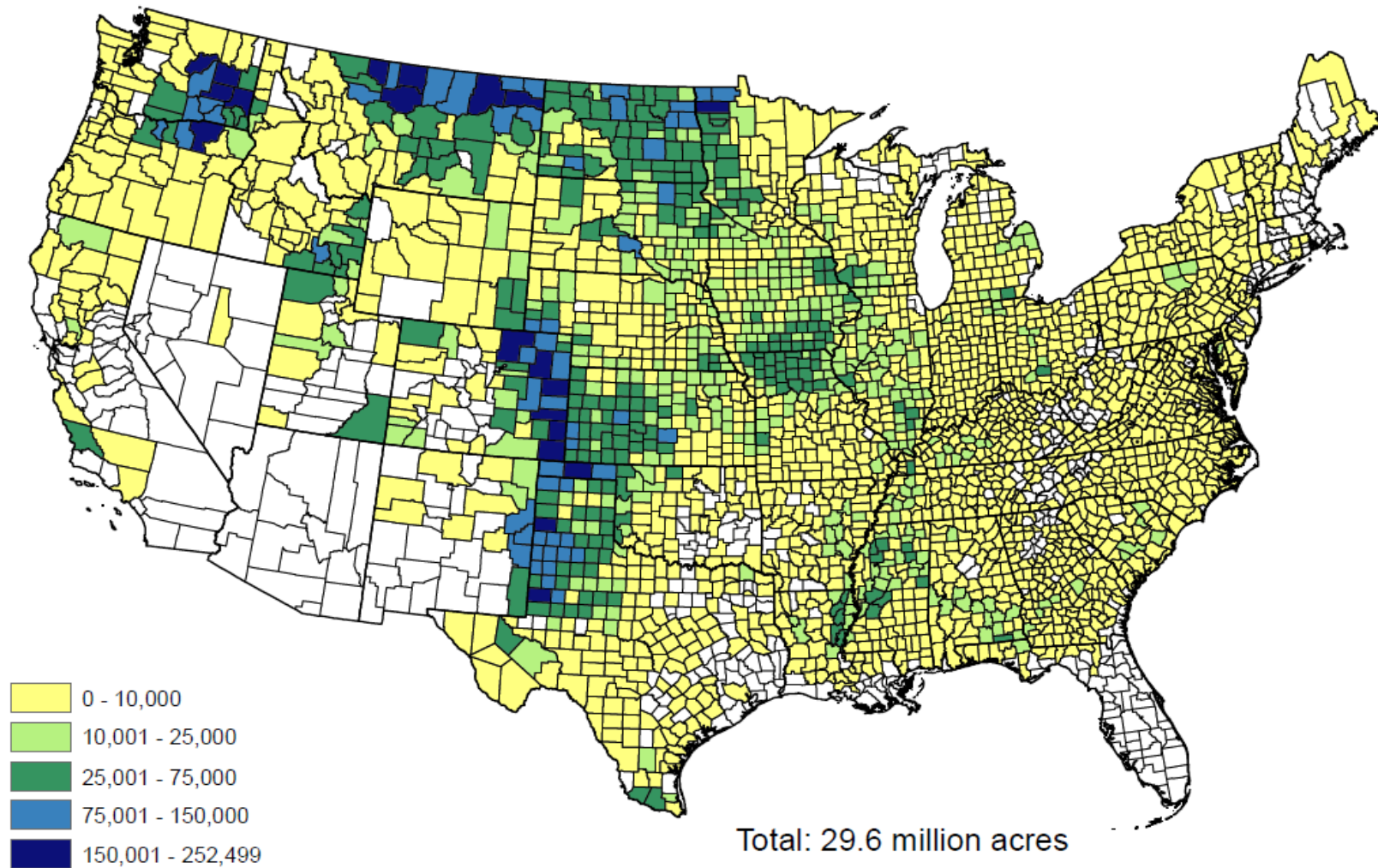


Source: Claassen et al. 2001, p. 8<sup>15</sup>



# 2. The US Conservation Reserve Program

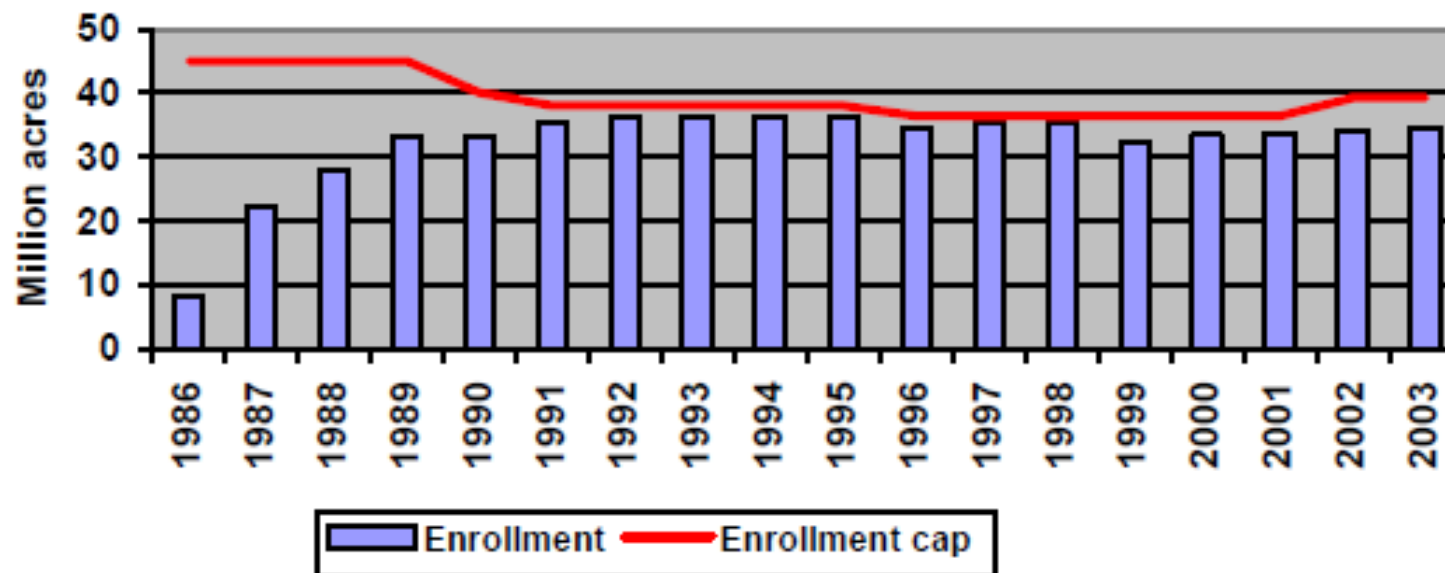
## CRP Enrollment - October 2011



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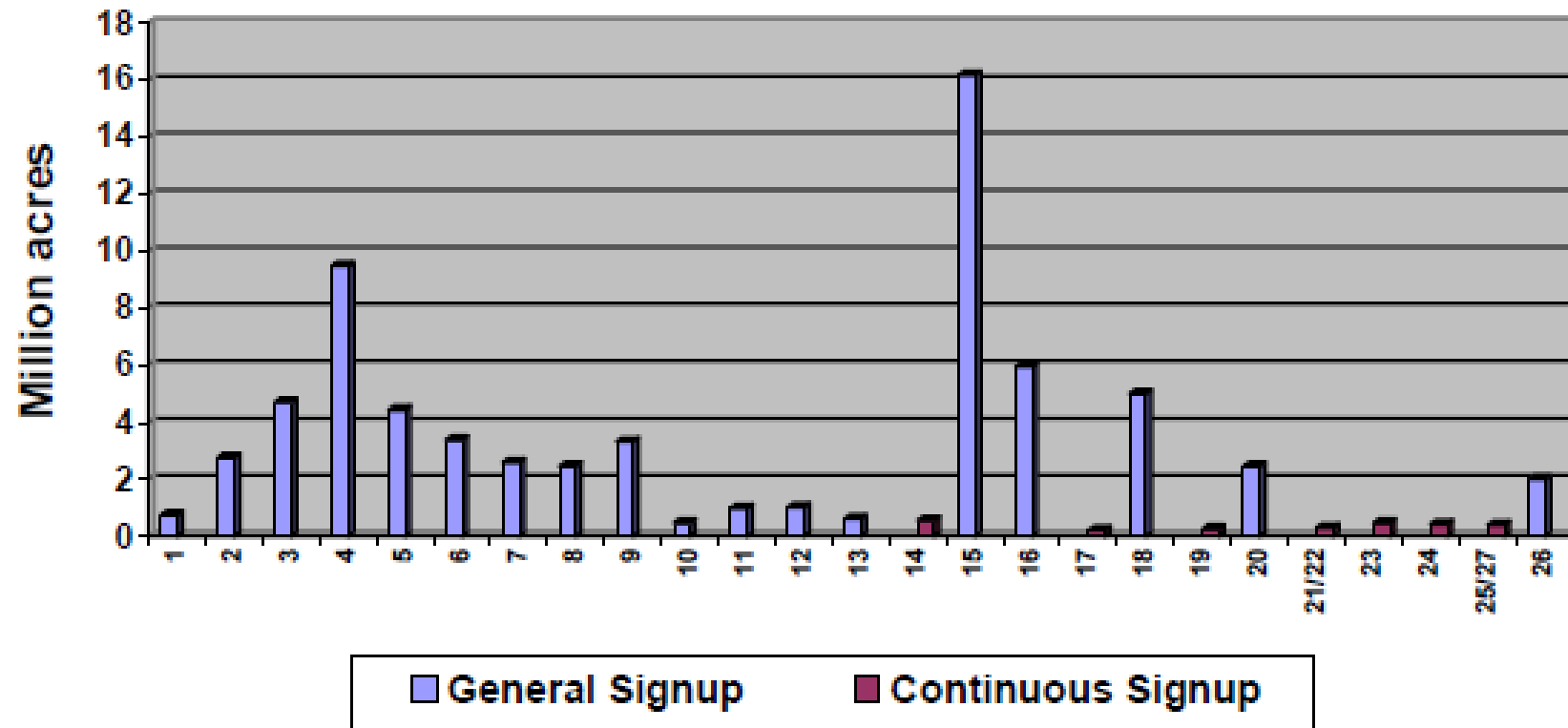
Prepared by FSA/EPAS/NRA

## Enrollment by year and corresponding enrollment caps



Source: Smith 2003, USDA 2002a, USDA 2003g.

# Accepted acreages by signup



Source: own figure, data from Smith 2003, USDA 2003g, USDA 2003h.

# 3. Some Lessons Learned

## Lesson 1: Set binding enrolment restrictions

- Each auctioning system must include a binding „cap“ (enrolment restriction) so that some farmers fail
- If there is no such a restriction and too much budget available, virtually all bids in the system are accepted
- Farmers will not reveal their true costs and cost-effectiveness of the auction is undermined

# 3. Some Lessons Learned

## Lesson 2: Implement a multi-criteria assessment process

- Selecting bids only on costs can lead to cost-effective solutions. **However**: not only cost-targeting, but also benefit-targeting is required
- Multiple benefits: Creation of Environmental Benefits Index (EBI) (since 1990)
  - In the beginning seven equally weighted conservation and benefit areas
  - Structure was made public since 1995
  - Several changes since then
  - Inclusion of cost factor (annual rental rate required by the farmer)
  - Maximum scores for environmental sensitive factors
  - Higher payments for certain types of land (e.g. tree growing areas) and additional incentives

## 2. Environmental Benefits Index (EBI) since the 2003 signup

Wildlife	Cover factor 50		Enhancement factor 20	Wildlife priority area 30
Water quality	Water quality area 30	Groundwater quality 25	Surface water quality 45	
Erosion	100			
Enduring benefits	50			
Air Quality	Wind erosion 25	*	**	Carbon sequest. 10
Cost	Cost share 10	Maximum payment rate 15	Bid factor -	

Source: Feather et al. 1998, updated with USDA 2003e (\* Wind erosion soils list 5 points, \*\* Air quality zones 5 points).

# 3. Some Lessons Learned

## Lesson 3: Provide information on the ranking process

- In early years farmers were not informed how bids were ranked nor how the EBI was assessed.
  - This created high uncertainties among farmers, contributed to low participation rates and a suboptimal selection of farmers
- In addition: a static auction was used so that farmers could not revise their bids.
- Later: change of auctioning process and provision of information about targets and composition of EBI
  - Comprehensive explanations by agency (information improves farmer's bid so that bid has higher chances to get accepted)
  - Mixed impacts on transaction costs

### 3. Some Lessons Learned

#### Lesson 4: Restrict auctioning by additional eligibility and payment constraints – Heterogenous goods require specific treatment

- Since 1996: „continous signups“: Practices with high environmental benefits (riparian, wildlfe habitat, wetland buffers, filter strips Measures with high ecological impacts (filter strips etc.) were automatically accepted for enrolement (and are not subject to competitive selection)
- Definition of additional eligibility criteria for highly erodable land and conservation priority areas
- Additional payments constraints – maximum allowable payment was fixed



## 4. Final remarks

- The CRP as one of the largest PES schemes worldwide offers a lot of experiences and lessons learned
- Auction are a decisive design element
- The CRP auctions were change over time, mainly due to ecological requirements and farmers' informational needs
- Today a highly complicated system – lessons are relevant for highly-developed countries with excellent organisational and institutional conditions

# Thank you for your attention !

