Cost-Effective Agri-Environmental Payment Programs:

U.S. Experience in Theory and Practice

Workshop on Payments for Environmental Services
Titisee, Germany
June 16-18, 2005

Most U.S. programs have multiple environmental objectives

- Water quality
- Wildlife habitat
- Soil quality (productivity)
- Other objectives
  - Air quality (dust, odor)
  - Carbon sequestration

U.S. has ‘portfolio’ of programs

- Payment programs
  - Land retirement (from crop production)
  - Wetland restoration
  - Working land (crop and grazing land)
  - Farmland preservation
  - Stewardship rewards
- Technical assistance

Environmental cost effectiveness

- Maximize environmental benefit from a fixed budget
  - ⇒Identify and enroll (target) producers who deliver benefits at lowest cost
  - ⇒Minimize payment (=WTA)
- Key issues:
  - Minimized payments won't help target
  - Non-price targeting requires information on potential benefits and cost

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U.S. program features that increase cost-effectiveness

- Producer enrollment is competitive
  - Necessary because of budget limits
  - Facilitates information collection, targeting, and bidding
- Target with benefit-cost indices
  - Has targeting increased benefits?
- Bidding for financial assistance
  - Has bidding minimized payments (=WTA)?

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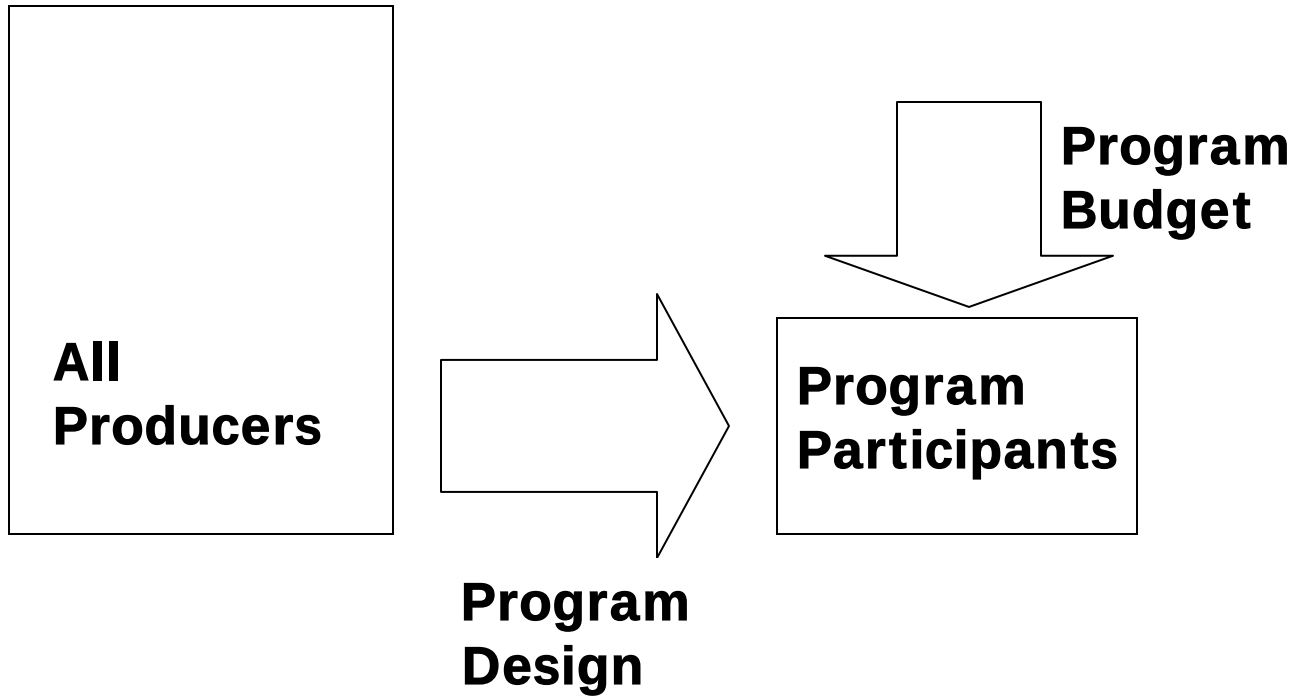
Program design as a winnowing process



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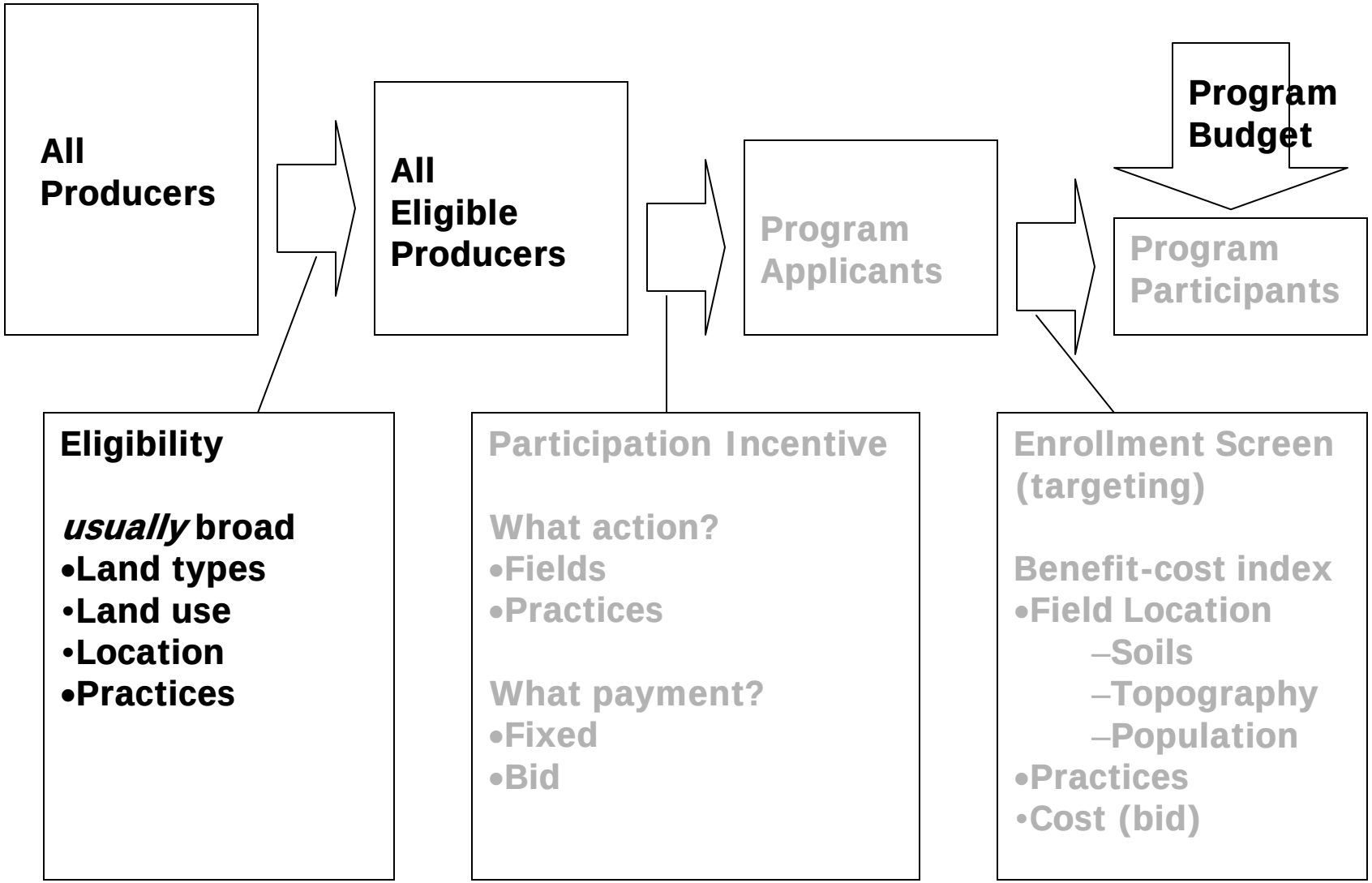

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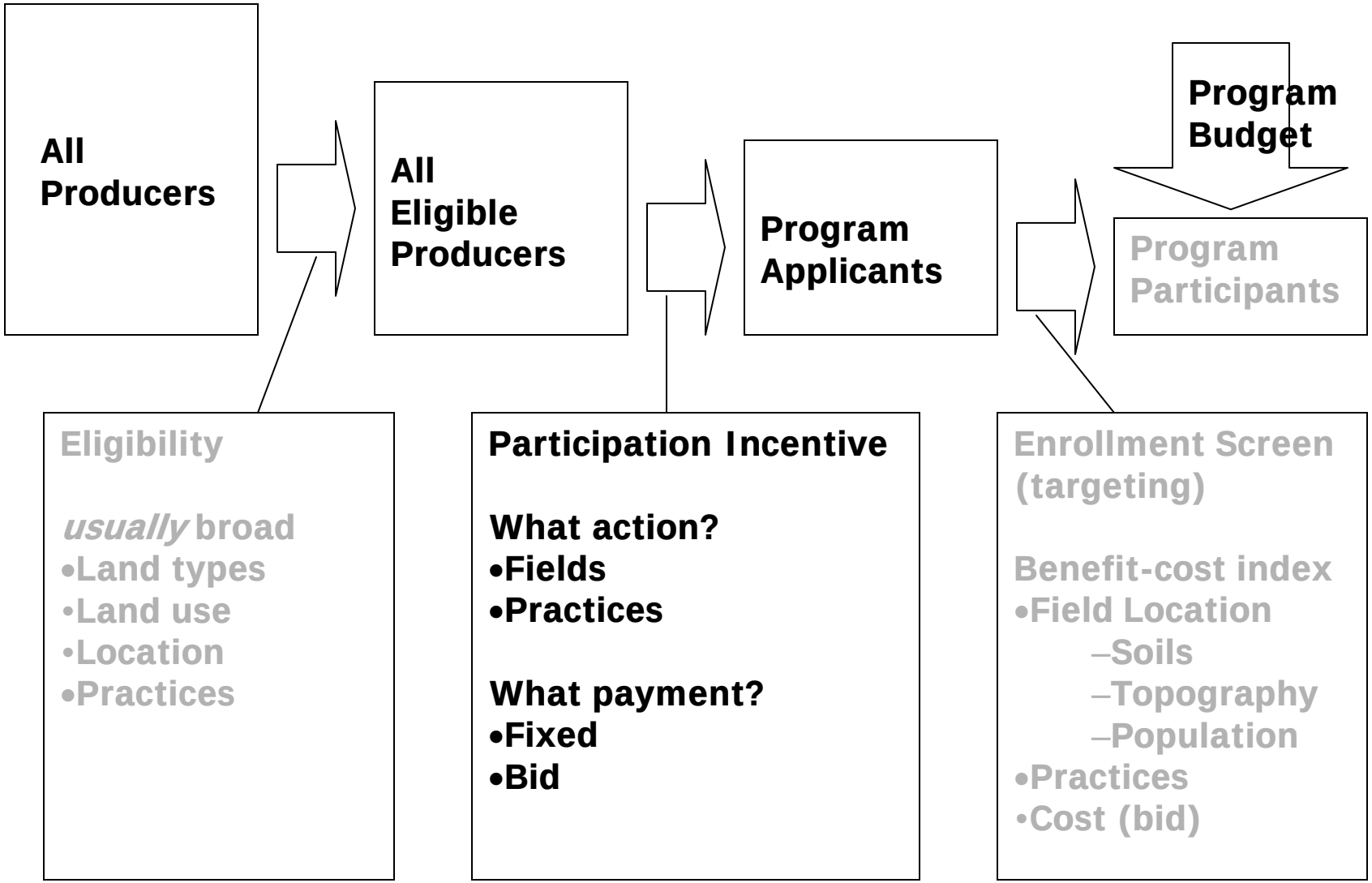

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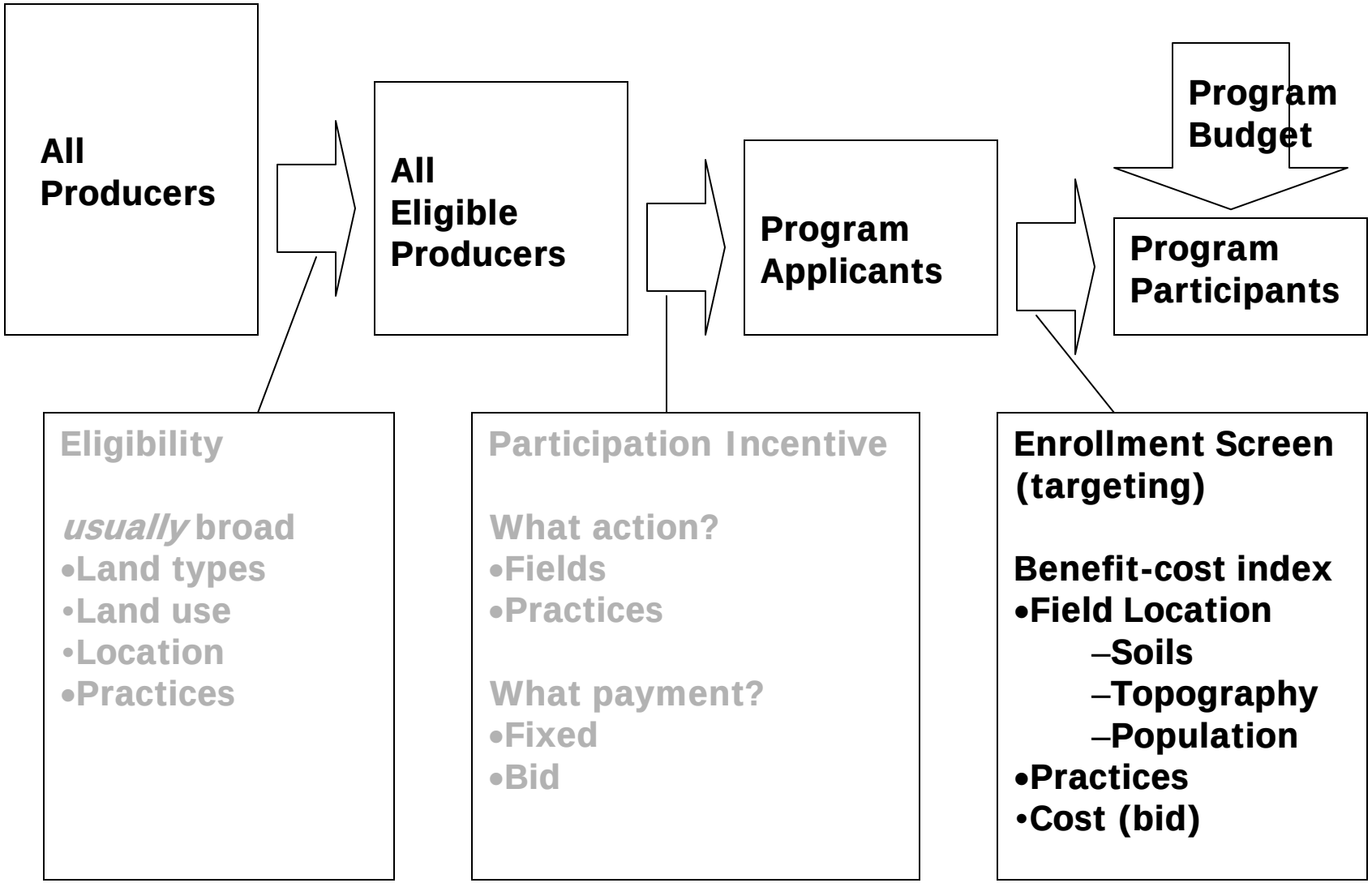


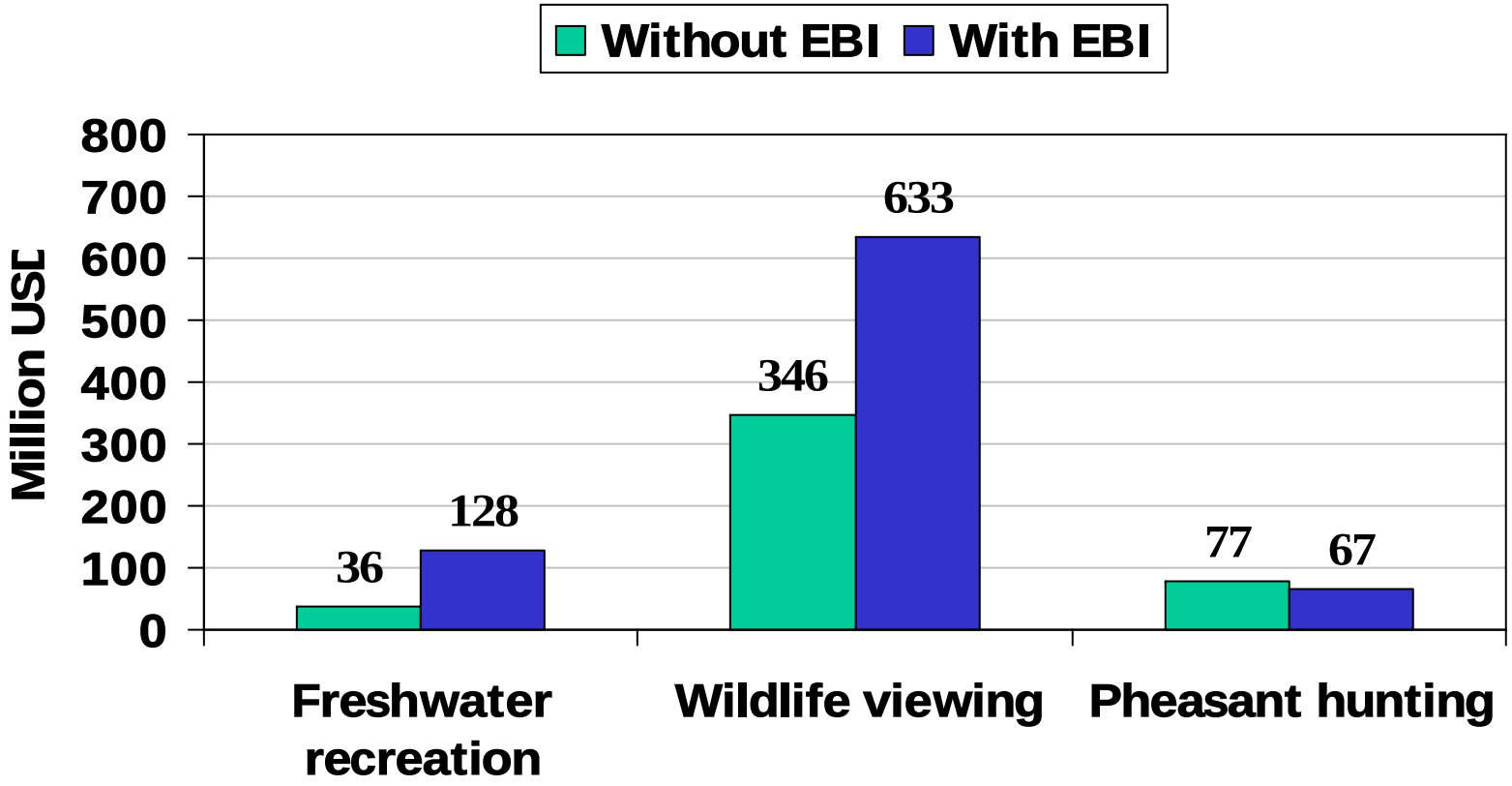
Two major U.S. agri-environmental programs

	Conservation Reserve Program (CRP) (regular sign-up)	Environmental Quality Incentives Program (EQIP)
Type	Land retirement (from cropland)	Working land (crop and grazing land)
Eligibility	• Highly erodible cropland • Priority areas • Permanent cover: grass, trees, wetland	• All land • All practices
Participation incentives	• Bid-based, with cap (1991-) • Fixed rates (1986-90)	• Bid for cost-share or incentive (1996-01) • Fixed rates (2002-)
Enrollment screen	Environmental Benefits Index (EBI)	Offer Index

Benefit-cost targeting in the CRP: the Environmental Benefits Index (EBI)

Index factor	Maximum points
Wildlife	100
Water quality	100
Soil erodibility	100
Enduring benefits	50
Air quality	45
Cost	Varies

Benefit-cost targeting in the CRP: Change in annual benefits with EBI



Source: Economic Valuation of Environmental Benefits and the Targeting of Conservation Programs: The Case of the CRP, Agricultural Economic Report Number 778, Economic Research Service, USDA, 1999

Key facts about CRP bidding and implications

- Bids subject to field-specific caps

  $\Rightarrow$Producers bid only if willing to accept pay $\leq$ bid cap

- Producers know EBI cutoff score for past signups

  $\Rightarrow$Producers form expectations about acceptable score

- Producers know environmental score *before* bidding

  $\Rightarrow$If high, producer may bid at cap even if > WTA

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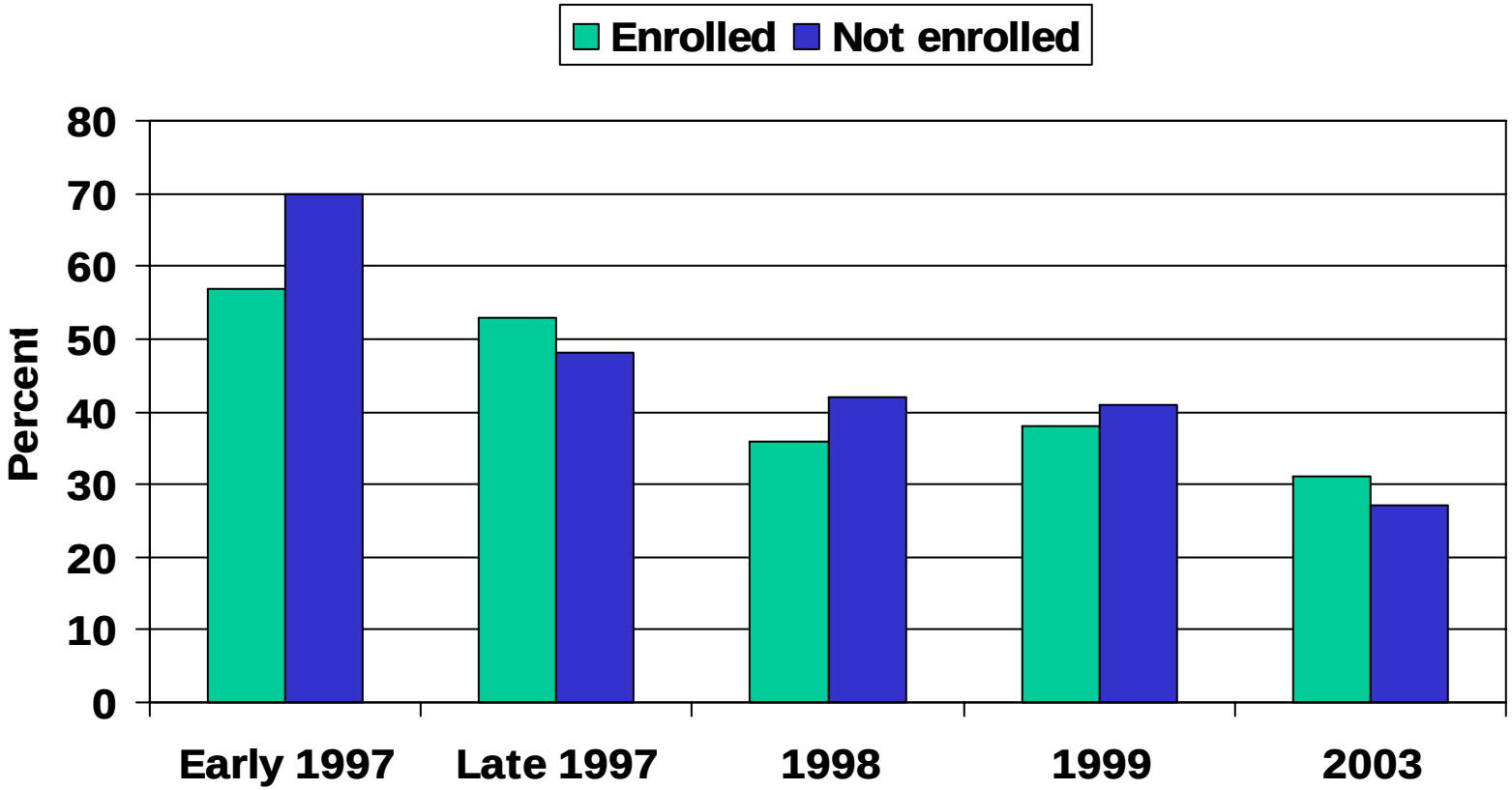
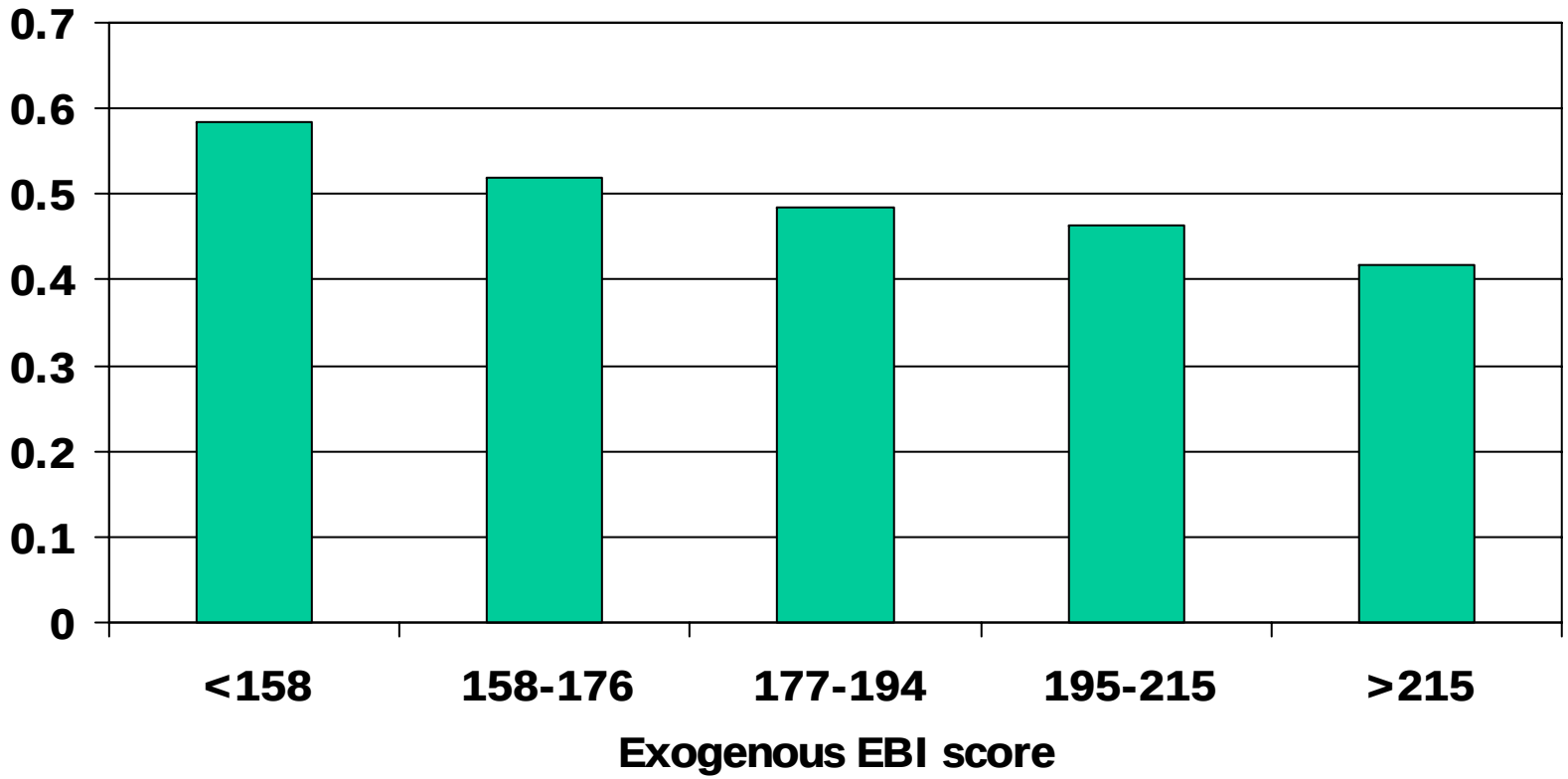
Percent of acres offered for CRP at discount from bid cap



Source: ERS analysis of CRP bid data

Proportion of acres offered with discount, by exogenous EBI score, 1997-2003



Source: ERS analysis of CRP bid data

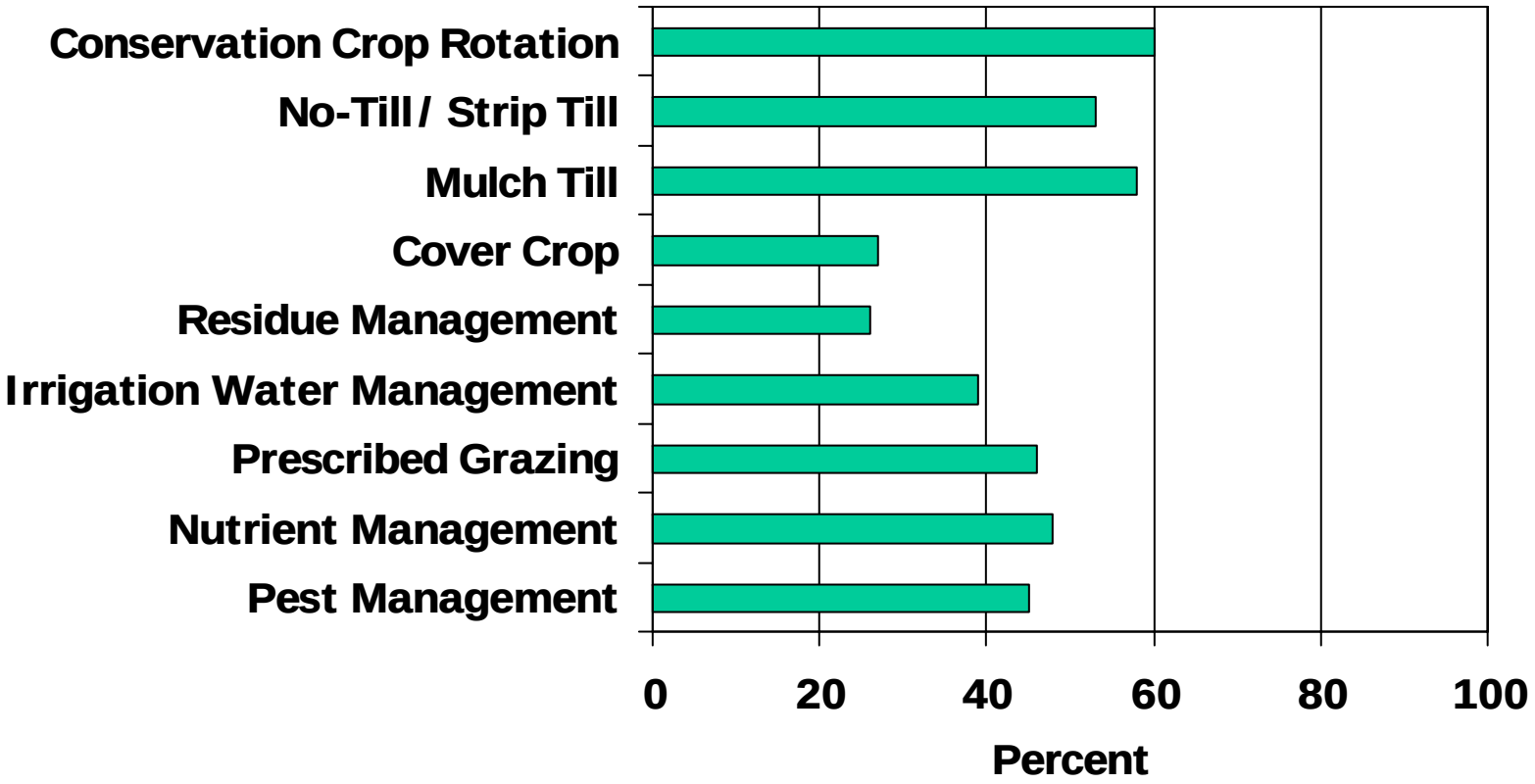
EQIP bidding differs from CRP

- Offer index is constructed differently from EBI
  - EBI cost factor is additive; Offer index was B/C ratio for 1997-2001
  - Indices were state-specific for 1997-2001

- Bidding during 1997-2001
  - Structural practices: Bid on % cost share
  - Management practices: Bids are % of maximum

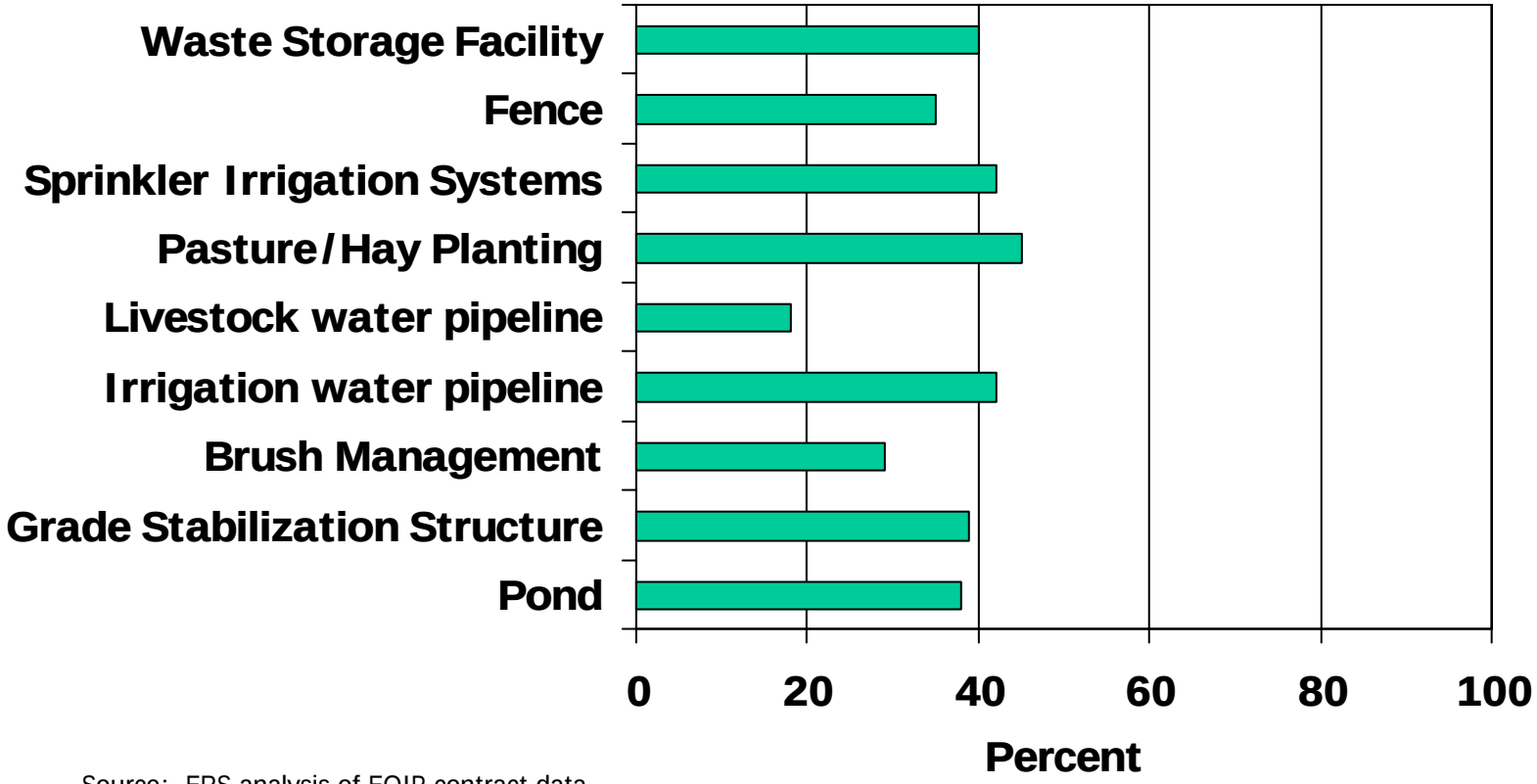
Average EQIP bid (% of max. rate), common management practices, 97-01

(maximum bid = 100%)



Source: ERS analysis of EQIP contract data

Average EQIP bid (% of cost), common structural practices, 97-01
(maximum bid = 75%)



Source: ERS analysis of EQIP contract data

Other issues in paper

- Additionality
- Retention
- Unintended consequences
- Monitoring and enforcement

Conclusions

- Environmental cost-effectiveness based on information gathering built into program application process

- Institutions and infrastructure significantly reduce program delivery costs
  - Technical assistance staff in every county
  - Extensive data available in GIS format
  - Environmental indices like EBI

Conclusions

- Targeting appears to have increased cost-effectiveness, but many uncertainties remain
- Competitive bidding has reduced costs, but costs are probably not minimized

Additionality and retention

- EQIP pays only for adoption of new practices, but
  - Provides assistance with regulatory compliance
  - Can’t always tell whether practice would have been adopted anyway
- CRP land must be cropped 4 of 6 years prior to first enrollment, re-enrollment is possible
  - Recent study indicates only 50% of CRP land likely to return to crop production

Additionality and retention

- Some U.S. programs buy permanent easements, ensuring retention;
- Others reward past stewardship (little or no additional environmental gain).

Unintended consequences

- Payments can encourage land use shifts
  - Payments that exceed conservation cost and favor one land use over another (e.g., crops over pasture) could unintentionally encourage land use change
  - These shifts can undercut environmental gain
  - Most U.S. programs attempt to minimize payments and limit cropland-based payments to land that was cropped before enrollment

Unintended Consequences

- Slippage in CRP occurs when land is shifted to crop production in lieu of land retired by CRP.
  - Wu (2000) estimates slippage rates of 21 percent
  - Roberts and Bucholtz (using same data) estimate minimal slippage

Monitoring and enforcement

- Recent review of enforcement in some U.S. agri-environmental programs have raised some concerns
- Monitoring and enforcement can be enhanced by selecting practices where implementation and maintenance can be observed
  - Conservation buffer practices, designed to intercept nutrients as they runoff the field, can be monitored effectively.
  - Nutrient management, which depends largely on fertilizer application rates and timing, is practically impossible to monitor.