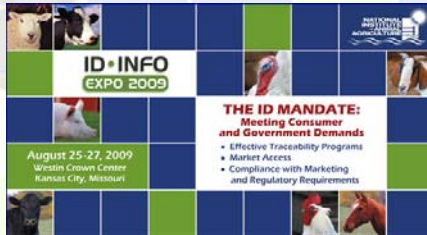


Obstacles to Implementing Animal Identification

The Costs of ID: Overview of USDA Benefit-Cost Analysis of the National Animal Identification System



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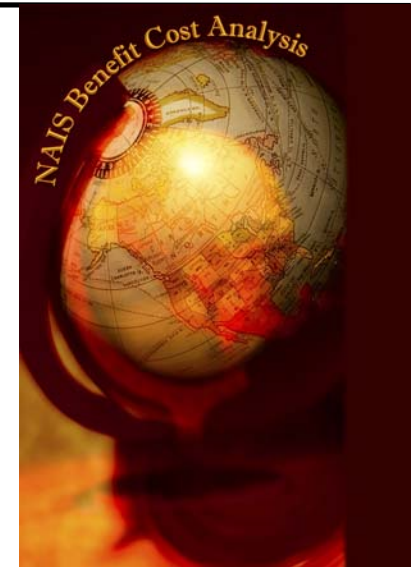
Benefit-Cost Analysis of the National Animal Identification System

NAIS Benefit-Cost Research Team:

Dale Blasi, Kansas State University
Gary Brestler, Montana State University
Chris Crosby, Kansas State University
Kevin Dhuyvetter, Kansas State University
Jennifer Freeborn, Kansas State University
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Jeri Stroade, Kansas State University
Glynn Tonsor, Michigan State University

APHIS Project Coordinator:

Dr. John Wiemers



Objectives...

- Estimate annual costs of adopting animal ID for major livestock species
 - Beef and dairy
 - Swine
 - Sheep
 - Poultry
 - Equine
- Determine how costs vary across different production sectors within a species
- Determine how costs vary by operation size

Objectives...

- Estimate costs for alternative ID adoption type scenarios:
 1. Premises registration
 2. Bookend (ID at birth and record termination)
 3. Animal or group ID and movement recording (full traceability)

Vary adoption rates from 10% to 100%
(30% to 90% used for benefit analyses)

Final report of study

- Approximately 150 pages of text, tables, and figures related to costs (entire report is 442 pages)...
- Attempt here is to give a broad overview of methods and key results of cost section...
- Full report is available at
<http://animalid.aphis.usda.gov/nais/naislibrary/plans.shtml>
 and
<http://www.agmanager.info/livestock/marketing/default.asp>

5

Beef and Dairy Sectors

- Production sectors
 - Beef Cow-Calf
 - Dairy
 - Backgrounders
 - Feedlots
- Marketing/processing
 - Auction markets
 - Packers
- Individual animal ID (RFID technology)



Understanding the budgets...

- Beef Cow-Calf and Dairy (two groups)
 - Operations that tag
 - Tagging is assumed at birth
 - Operations that do not tag
 - Assumed tagging will be done at auction when sold
- Backgrounders (one group)
 - Operations that buy cattle to background
- Feedlots (one group)
 - Operations that buy cattle to finish to slaughter weight

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Understanding the budgets (44 total)...

- Operation size categories used

| USDA NASS | | | | | | | | |
|---------------|----------------|----------------|----------------|-----------------|------------------|------------------|------------------|-------------|
| Beef Cow-Calf | | | | | | | | |
| 1-49 Head | 50-99 Head | 100-499 Head | 500-999 Head | 1000-1999 Head | 2000-4999 Head | 5,000+ Head | | |
| | | | | | | | | |
| USDA NASS | | | | | | | | |
| Dairy | | | | | | | | |
| 1-49 Head | 50-99 Head | 100-199 Head | 200-499 Head | 500-999 Head | 1000-1999 Head | 2000+ Head | | |
| | | | | | | | | |
| "Solved for" | | | | | | | | |
| Backgrounders | | | | | | | | |
| 31 Head | 104 Head | 345 Head | 496 Head | 722 Head | 1453 Head | 2963 Head | | |
| | | | | | | | | |
| USDA NASS | | | | | | | | |
| Feedlots | | | | | | | | |
| 1-999 Head | 1000-1999 Head | 2000-3999 Head | 4000-7999 Head | 8000-15999 Head | 16000-23999 Head | 24000-31999 Head | 32000-49999 Head | 50000+ Head |
| | | | | | | | | |

8

Understanding the budgets...

- **Auction markets**
 - costs based on previous study (Bolte et al.)
 - estimated continuous function by size
 - weighted-average cost based on distribution of auction markets obtained from LMA
- **Packers**
 - based on previous study (Pendell et al.)
 - estimated continuous function by size
 - applied cost function to GIPSA size distribution

9

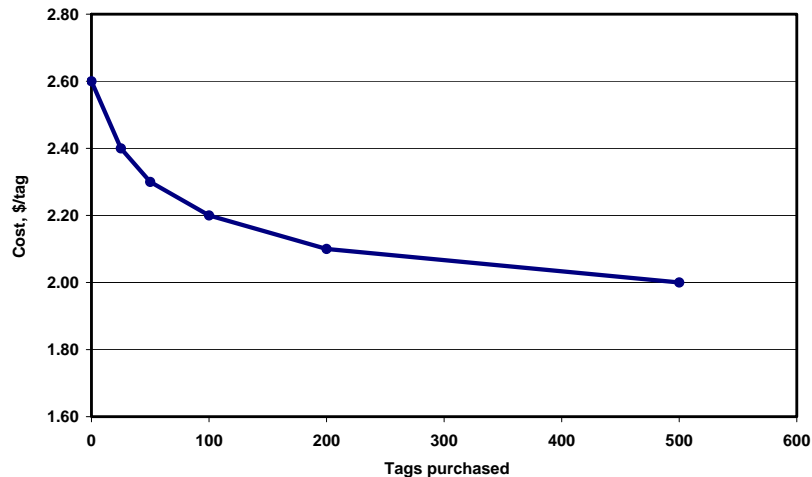
Understanding the budgets...

- **Cost categories**
 - Tagging-related costs
 - Tags and tag applicators
 - Labor
 - Chute costs
 - Shrink
 - Injury (human and animal)

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RFID tag costs...

Figure 4.1. Assumed RFID Tag Purchase Price as Volume Varies



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Understanding the budgets...

- **Cost categories**
 - Tagging-related costs
 - Tags and tag applicators
 - Labor
 - Chute costs
 - Shrink
 - Injury (human and animal)
 - Reading costs
 - Capital investment
 - Labor/chute
 - Shrink/injury

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RFID Reading Costs

- Split into five categories
 - Electronic reader
 - Data accumulator
 - Software
 - Storage database
 - Other costs (both fixed and variable)
 - Labor, internet charge, maintenance, etc.
- Custom reading charge estimated based on brand inspection fees for 10 states (range of \$0.85-\$2.90/hd)
- Costs used in budget were based on
 - Min [own(min(handheld, panel), custom)]

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Understanding the budgets...

- Cost categories
 - Tagging-related costs
 - Tags and tag applicators
 - Labor
 - Chute costs
 - Shrink
 - Injury (human and animal)
 - Reading costs
 - Capital investment
 - Labor/chute
 - Shrink/injury
 - Premises registration
 - Cost to reflect management time
 - Annual cost based on initial cost of \$20 and renewal cost of \$10 every three years thereafter (\$4.64/yr)

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Total costs to beef and dairy sectors...



Table 4.9. Summary of Cattle Industry Costs Under Scenario #3 (full traceability)

| | Beef Cow/Calf | Dairy | Background | Feedlot | Auction Yards | Packers | Industry Total |
|--------------------------|---------------|--------------|--------------|--------------|---------------|-------------|----------------|
| Number of Operations | 757,900 | 71,510 | 50,870 | 87,160 | 1,050 | 318 | 967,440 |
| Average Inventory | 33,120,600 | 9,158,000 | 17,229,903 | 26,964,948 | 38,128,769 | 35,017,500 | 100,953,011 |
| Total Annual Cost, \$ | \$139,764,146 | \$31,437,688 | \$12,072,978 | \$13,562,885 | \$8,765,395 | \$3,467,081 | \$209,070,173 |
| Cost Per Animal in Inv. | \$4.22 | \$3.43 | \$0.70 | \$0.50 | \$0.23 | \$0.10 | \$2.07 |
| Cost Per Animal Marketed | \$4.91 | \$6.21 | \$0.71 | \$0.51 | \$0.23 | \$0.10 | \$5.97 |
| Total Cost Per Operation | \$184 | \$440 | \$237 | \$156 | \$8,348 | \$10,889 | \$216 |

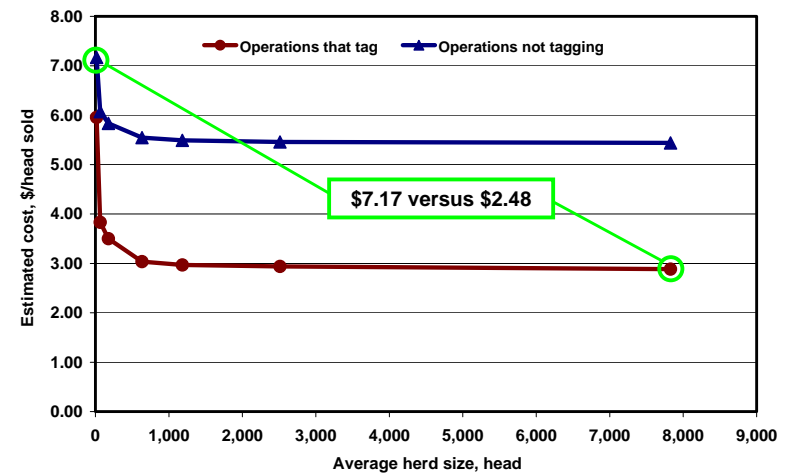
Table 4.10. Breakdown of Cattle Industry Costs Under Scenario #3 (full traceability)

| | Beef Cow/Calf | Dairy | Background | Feedlot | Auction Yards | Packers | Industry Total |
|-------------------------------|---------------|--------|------------|---------|---------------|---------|----------------|
| Breakdown of Costs (%) | | | | | | | |
| Tags and Tagging Cost | 90.4% | 70.9% | 30.8% | 37.1% | 0.0% | 0.0% | 75.3% |
| RFID Tag | 55.2% | 57.1% | 9.0% | 10.9% | | | 46.7% |
| Applicator | 3.9% | 3.3% | 9.8% | 9.3% | | | 4.3% |
| Labor | 2.1% | 2.6% | 4.8% | 6.8% | | | 2.5% |
| Chute | 21.3% | 6.6% | 3.5% | 4.9% | | | 15.8% |
| Shrink | 6.2% | 0.5% | 2.6% | 3.8% | | | 4.6% |
| Injury | 1.6% | 0.8% | 1.0% | 1.5% | | | 1.4% |
| Reading Costs | 7.1% | 28.1% | 67.2% | 59.9% | 100.0% | 100.0% | 22.6% |
| RFID Capital | 5.4% | 20.9% | 42.8% | 30.5% | | | |
| Labor/Chute | 1.4% | 6.5% | 14.1% | 20.3% | | | |
| Shrink/Injury | 0.3% | 0.8% | 10.3% | 9.0% | | | |
| Premise Registration | 2.5% | 1.0% | 2.0% | 3.0% | 0.0% | 0.0% | 2.1% |
| TOTAL | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% |

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Cost versus size of operation for beef cow-calf...

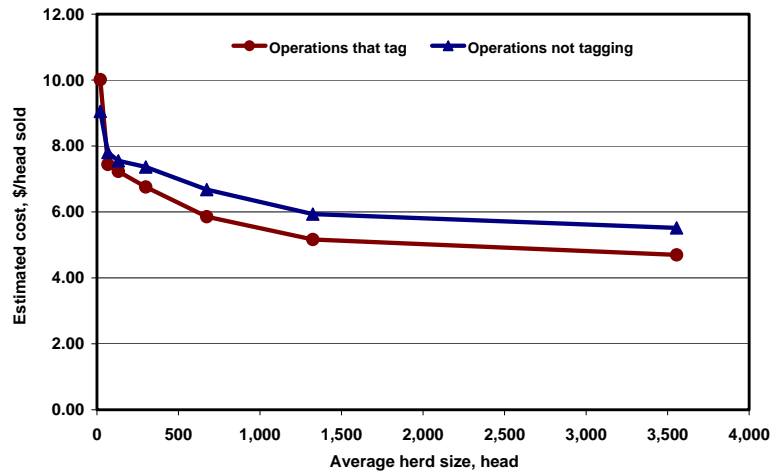
Figure 4.4. Estimated Costs of RFID Full Traceability Technology Adoption



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Cost versus size of operation for dairy...

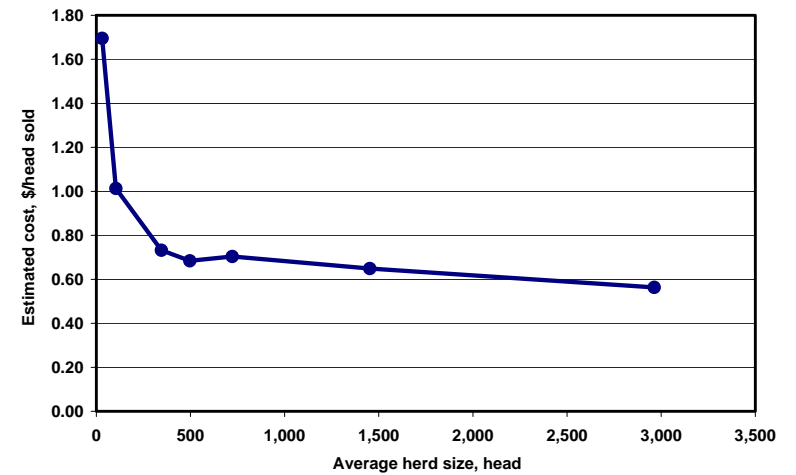
Figure 4.5. Estimated Costs of RFID Full Traceability Technology Adoption



19

Cost versus size of operation for beef backgrounders...

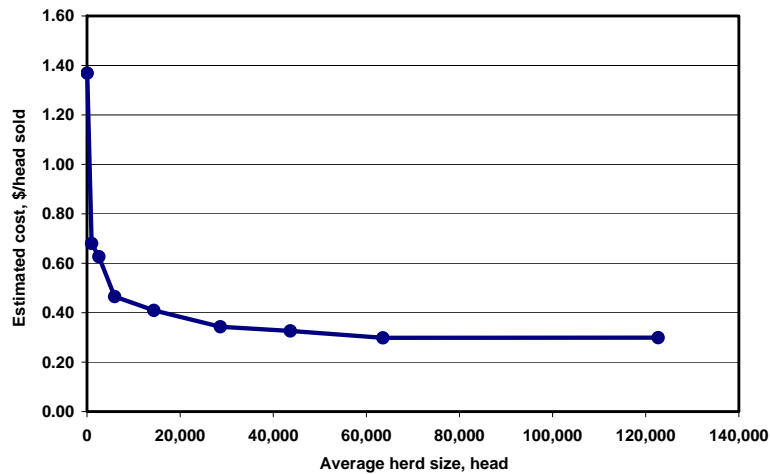
Figure 4.6. Estimated Costs of RFID Full Traceability Technology Adoption



20

Cost versus size of operation for beef feedlots...

Figure 4.7. Estimated Costs of RFID Full Traceability Technology Adoption



21

Total costs to beef and dairy sectors...



Table 4.11. Total Cattle Industry Cost versus Adoption Rate Under Alternative Scenarios

| Industry Sector | Premises Registration | | Book End | | Full Traceability | |
|-------------------|-----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| | Total | \$/head ¹ | Total | \$/head ¹ | Total | \$/head ¹ |
| Beef cow-calf | \$3,515,591 | \$0.12 | \$129,792,734 | \$4.56 | \$139,764,146 | \$4.91 |
| Dairy | \$331,706 | \$0.07 | \$22,601,817 | \$4.46 | \$31,437,688 | \$6.21 |
| Background | \$235,965 | \$0.01 | \$3,958,165 | \$0.23 | \$12,072,978 | \$0.71 |
| Feedlot | \$404,300 | \$0.02 | \$5,442,789 | \$0.20 | \$13,562,885 | \$0.51 |
| Auction yards | \$4,871 | \$0.00 | \$0 | \$0.00 | \$8,765,395 | \$0.23 |
| Packers | \$1,477 | \$0.00 | \$3,467,081 | \$0.10 | \$3,467,081 | \$0.10 |
| TOTAL COST | \$4,493,910 | \$0.13 | \$165,262,586 | \$4.72 | \$209,070,173 | \$5.97 |

| Adoption rate | Premises Registration | | Book End | | Full Traceability | |
|---------------|-----------------------|----------------------|---------------|----------------------|-------------------|----------------------|
| | Total | \$/head ¹ | Total | \$/head ¹ | Total | \$/head ¹ |
| 10% | \$17,923 | \$0.00 | \$11,042,459 | \$0.32 | \$13,269,613 | \$0.38 |
| 20% | \$78,209 | \$0.00 | \$23,173,569 | \$0.66 | \$28,030,002 | \$0.80 |
| 30% | \$171,464 | \$0.00 | \$35,408,252 | \$1.01 | \$43,179,355 | \$1.23 |
| 40% | \$269,120 | \$0.01 | \$47,857,435 | \$1.37 | \$58,940,210 | \$1.68 |
| 50% | \$369,892 | \$0.01 | \$61,313,638 | \$1.75 | \$76,084,734 | \$2.17 |
| 60% | \$576,690 | \$0.02 | \$79,128,199 | \$2.26 | \$98,847,876 | \$2.82 |
| 70% | \$853,119 | \$0.02 | \$98,289,501 | \$2.81 | \$122,563,473 | \$3.50 |
| 80% | \$1,724,410 | \$0.05 | \$118,145,015 | \$3.37 | \$147,191,641 | \$4.20 |
| 90% | \$2,915,856 | \$0.08 | \$140,285,046 | \$4.01 | \$175,868,526 | \$5.02 |
| 100% | \$4,493,910 | \$0.13 | \$165,262,586 | \$4.72 | \$209,070,173 | \$5.97 |

¹ Per head marketed annually

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Swine Sector

- Production sectors
 - Farrow-to-wean
 - Farrow-to-feeder
 - Farrow-to-finish
 - Wean-to-feeder (nursery)
 - Feeder-to-finish (grow/finish)
- Marketing/processing
 - Packers
- Group/lot ID for market hogs
individual ID (visual tag) for breeding



Understanding the budgets...

- Operation and pig numbers based on
 - NASS (2007)
 - ARMS (2004)
 - NAHMS (2006)
- Industry totals reconciled with NASS data when possible
- Analysis is based on number of operations as opposed to number of sites

25

Understanding the budgets...

- ID methods used in analysis
 - group/lot ID for market hogs
 - individual visual ID for cull breeding stock
 - Operations < 200 sows – tag cost = \$0.75
 - Operations > 200 sows – tag cost = \$0.17
- Cost of reading/reporting per lot was minimum of
 - \$7.39 (30 minutes x \$14.60/hr + data storage)
 - reader and related costs (i.e., bar code reader, computer, software, internet, labor, etc.)

26

Total costs to swine sector...



Table 5.8. Summary of Annualized Animal ID Costs to Swine Industry

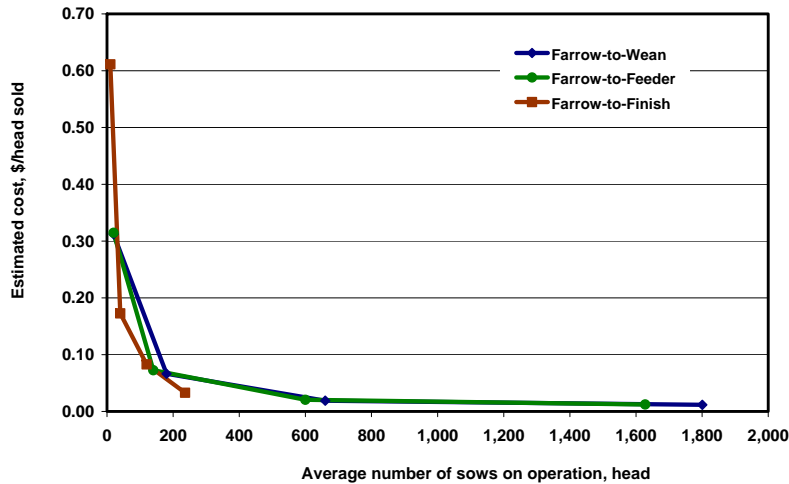
| | Farrow-to-Wean | Farrow-to-Feeder | Farrow-to-Finish | Wean-to-Feeder (Nursery) | Feeder-to-Finish (Grow/Finish) | Packers | Total |
|-----------------------------|----------------|------------------|------------------|--------------------------|--------------------------------|-------------|-------------|
| Total Operations | 5,979 | 4,297 | 20,489 | 5,231 | 29,644 | 168 | 65,640 |
| Pigs sold per year | 64,755,701 | 31,314,955 | 20,381,497 | 60,141,077 | 84,579,799 | 109,171,600 | 109,171,600 |
| Breakdown of costs (\$) | | | | | | | |
| Tagging | \$615,910 | \$296,253 | \$525,327 | \$0 | \$0 | | \$1,437,491 |
| Recording/reporting | \$905,444 | \$519,906 | \$1,871,146 | \$382,420 | \$853,949 | \$147,489 | \$4,680,355 |
| Premise registration | \$27,732 | \$19,933 | \$95,041 | \$24,266 | \$137,506 | | \$304,477 |
| Total Annualized Cost | \$1,549,086 | \$836,092 | \$2,491,514 | \$406,686 | \$991,455 | \$147,489 | \$6,422,323 |
| Breakdown of costs (%) | | | | | | | |
| Tagging | 39.8% | 35.4% | 21.1% | 0.0% | 0.0% | 0.0% | 22.4% |
| Recording/reporting | 58.5% | 62.2% | 75.1% | 94.0% | 86.1% | 100.0% | 72.9% |
| Premise registration | 1.8% | 2.4% | 3.8% | 6.0% | 13.9% | 0.0% | 4.7% |
| Total Annualized Cost | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% |
| Cost per pig sold, \$/head* | \$0.0239 | \$0.0267 | \$0.1222 | \$0.0068 | \$0.0117 | \$0.0014 | \$0.0588 |

* Total for industry is based on hogs slaughtered

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Cost versus size of operation -- farrowing operations...

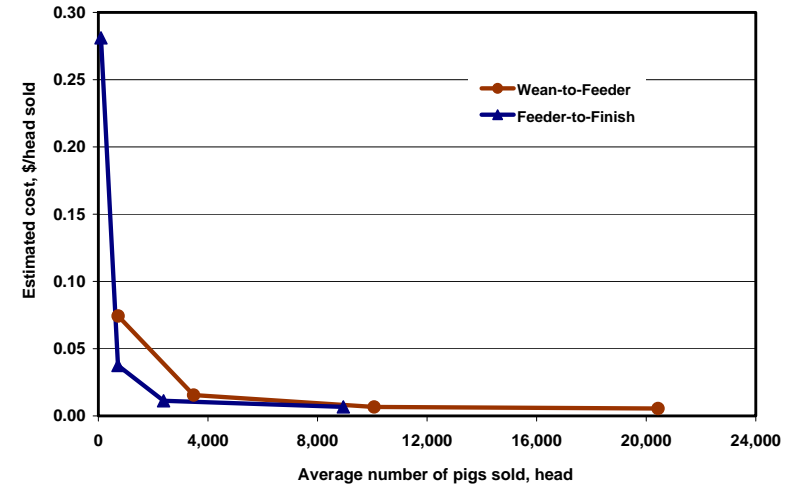
Figure 5.1. Estimated Costs of Animal Identification for Swine



29

Cost versus size of operation – feeding operations...

Figure 5.2. Estimated Costs of Animal Identification for Swine



30

Total costs to swine sector...



Table 5.9. Total Swine Industry Cost versus Adoption Rate Under Alternative Scenarios

| Industry Sector | Premises Registration | | Book End | | Full Traceability | |
|-------------------|-----------------------|----------------------|--------------------|----------------------|--------------------|----------------------|
| | Total | \$/head ¹ | Total | \$/head ¹ | Total | \$/head ¹ |
| Farrow-to-Wean | \$27,732 | \$0.0004 | \$643,642 | \$0.0099 | \$1,549,086 | \$0.0239 |
| Farrow-to-Feeder | \$19,933 | \$0.0006 | \$316,186 | \$0.0101 | \$836,092 | \$0.0267 |
| Farrow-to-Finish | \$95,041 | \$0.0047 | \$620,368 | \$0.0304 | \$2,491,514 | \$0.1222 |
| Wean-to-Feeder | \$24,266 | \$0.0004 | \$24,266 | \$0.0004 | \$406,686 | \$0.0068 |
| Feeder-to-Finish | \$137,506 | \$0.0016 | \$137,506 | \$0.0016 | \$991,455 | \$0.0117 |
| Packers | \$781 | \$0.0000 | \$147,489 | \$0.0014 | \$147,489 | \$0.0014 |
| TOTAL COST | \$305,259 | \$0.0028 | \$1,889,457 | \$0.0173 | \$6,422,323 | \$0.0588 |

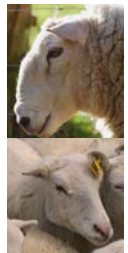
| Adoption rate | Premises Registration | | Book End | | Full Traceability | |
|---------------|-----------------------|----------------------|-------------|----------------------|-------------------|----------------------|
| | Total | \$/head ¹ | Total | \$/head ¹ | Total | \$/head ¹ |
| 10% | \$18,638 | \$0.0002 | \$115,895 | \$0.0011 | \$556,877 | \$0.0051 |
| 20% | \$38,153 | \$0.0003 | \$238,321 | \$0.0022 | \$1,132,810 | \$0.0104 |
| 30% | \$58,248 | \$0.0005 | \$366,074 | \$0.0034 | \$1,715,790 | \$0.0157 |
| 40% | \$82,833 | \$0.0008 | \$524,582 | \$0.0048 | \$2,315,409 | \$0.0212 |
| 50% | \$116,895 | \$0.0011 | \$707,976 | \$0.0065 | \$2,925,519 | \$0.0268 |
| 60% | \$153,609 | \$0.0014 | \$915,093 | \$0.0084 | \$3,572,658 | \$0.0327 |
| 70% | \$190,792 | \$0.0017 | \$1,132,818 | \$0.0104 | \$4,249,410 | \$0.0389 |
| 80% | \$228,349 | \$0.0021 | \$1,351,754 | \$0.0124 | \$4,936,530 | \$0.0452 |
| 90% | \$266,447 | \$0.0024 | \$1,609,870 | \$0.0147 | \$5,668,691 | \$0.0519 |
| 100% | \$305,259 | \$0.0028 | \$1,889,457 | \$0.0173 | \$6,422,323 | \$0.0588 |

¹ Per head marketed annually

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Sheep and Poultry Sectors

- **Sheep**
 - Sheep and lamb producers
 - Packers
 - Group/lot ID for feeder/market lambs
 - individual ID (visual tag) for breeding
- **Poultry**
 - Layers, Broilers, and Turkeys
 - Group/lot ID
- **Similar approach and assumptions as used for swine sector**



33

Total costs to sheep sector...



Table 6.6. Summary of Annualized Animal ID Costs to Sheep Industry Under Scenario #3 (full traceability)

| | All Operations | Packers | Total |
|-------------------------------|--------------------|-----------------|--------------------|
| Total operations | 70,590 | 58 | 70,590 |
| Sheep and lambs sold per year | 3,411,140 | 2,642,123 | 2,642,123 |
| Breakdown of costs (\$) | | | |
| Tagging Cost | \$2,090,948 | \$0 | \$2,090,948 |
| Reader/Reading Cost | \$1,213,562 | \$32,012 | \$1,245,574 |
| Premise Registration | \$327,438 | \$0 | \$327,438 |
| Total Cost, Annualized | \$3,631,949 | \$32,012 | \$3,663,961 |
| Breakdown of costs (%) | | | |
| Tagging Cost | 57.6% | 0.0% | 57.1% |
| Reader/Reading Cost | 33.4% | 100.0% | 34.0% |
| Premise Registration | 9.0% | 0.0% | 8.9% |
| Total Cost, Annualized | 100.0% | 100.0% | 100.0% |
| Cost per sheep sold, \$/head* | \$1.06 | \$0.01 | \$1.39 |

* Includes lambs and cull ewes and rams, total for industry is based on total head slaughtered

34

Total costs to sheep sector...



Table 6.7. Total Sheep Industry Cost versus Adoption Rate Under Alternative Scenarios

| Industry Sector | Premises Registration | | Book End | | Full Traceability | |
|-------------------|-----------------------|----------------------|--------------------|----------------------|--------------------|----------------------|
| | Total | \$/head ¹ | Total | \$/head ¹ | Total | \$/head ¹ |
| All operations | \$327,438 | \$0.12 | \$2,418,387 | \$0.92 | \$3,631,949 | \$1.37 |
| Packers | \$32,012 | \$0.01 | \$32,012 | \$0.01 | \$32,012 | \$0.01 |
| TOTAL COST | \$359,450 | \$0.14 | \$2,450,398 | \$0.93 | \$3,663,961 | \$1.39 |

| Adoption rate | Premises Registration | | Book End | | Full Traceability | |
|---------------|-----------------------|----------------------|-------------|----------------------|-------------------|----------------------|
| | Total | \$/head ¹ | Total | \$/head ¹ | Total | \$/head ¹ |
| 10% | \$14,865 | \$0.01 | \$165,603 | \$0.06 | \$286,959 | \$0.11 |
| 20% | \$33,298 | \$0.01 | \$331,206 | \$0.13 | \$573,918 | \$0.22 |
| 30% | \$70,474 | \$0.03 | \$496,809 | \$0.19 | \$860,877 | \$0.33 |
| 40% | \$111,757 | \$0.04 | \$662,412 | \$0.25 | \$1,147,837 | \$0.43 |
| 50% | \$153,039 | \$0.06 | \$828,015 | \$0.31 | \$1,434,796 | \$0.54 |
| 60% | \$194,321 | \$0.07 | \$993,618 | \$0.38 | \$1,721,755 | \$0.65 |
| 70% | \$235,603 | \$0.09 | \$1,159,220 | \$0.44 | \$2,008,714 | \$0.76 |
| 80% | \$276,886 | \$0.10 | \$1,344,147 | \$0.51 | \$2,314,996 | \$0.88 |
| 90% | \$318,168 | \$0.12 | \$1,617,275 | \$0.61 | \$2,709,481 | \$1.03 |
| 100% | \$359,450 | \$0.14 | \$2,450,398 | \$0.93 | \$3,663,961 | \$1.39 |

¹ Per market lamb marketed annually

36

Total costs to poultry sector...



Table 7.9. Total Poultry Industry Cost versus Adoption Rate Under Alternative Scenarios

| Industry Sector | Premises Registration | | | Full Traceability | | |
|-------------------|-----------------------|----------------------|---------------------|--------------------|----------------------|---------------------|
| | Total | \$/bird ¹ | \$/lot ² | Total | \$/bird ¹ | \$/lot ² |
| Layers | \$456,043 | \$0.0036 | \$3.10 | \$2,492,469 | \$0.0195 | \$16.93 |
| Broilers | \$148,463 | \$0.0000 | \$0.29 | \$6,059,914 | \$0.0007 | \$12.02 |
| Turkeys | \$39,131 | \$0.0001 | \$0.94 | \$560,473 | \$0.0020 | \$13.49 |
| TOTAL COST | \$643,638 | \$0.0001 | \$0.93 | \$9,112,856 | \$0.0010 | \$13.15 |

| Adoption rate | Premises Registration | | | Full Traceability | | |
|---------------|-----------------------|----------------------|---------------------|-------------------|----------------------|---------------------|
| | Total | \$/bird ¹ | \$/lot ² | Total | \$/bird ¹ | \$/lot ² |
| 10% | \$6,388 | \$0.0000 | \$0.01 | \$629,118 | \$0.0001 | \$0.91 |
| 20% | \$13,785 | \$0.0000 | \$0.02 | \$1,283,803 | \$0.0001 | \$1.85 |
| 30% | \$27,677 | \$0.0000 | \$0.04 | \$2,020,954 | \$0.0002 | \$2.92 |
| 40% | \$70,125 | \$0.0000 | \$0.10 | \$2,829,849 | \$0.0003 | \$4.08 |
| 50% | \$150,181 | \$0.0000 | \$0.22 | \$3,734,503 | \$0.0004 | \$5.39 |
| 60% | \$233,730 | \$0.0000 | \$0.34 | \$4,703,411 | \$0.0005 | \$6.79 |
| 70% | \$322,351 | \$0.0000 | \$0.47 | \$5,719,316 | \$0.0006 | \$8.26 |
| 80% | \$420,178 | \$0.0000 | \$0.61 | \$6,841,228 | \$0.0008 | \$9.88 |
| 90% | \$531,137 | \$0.0001 | \$0.77 | \$7,976,271 | \$0.0009 | \$11.51 |
| 100% | \$643,638 | \$0.0001 | \$0.93 | \$9,112,856 | \$0.0010 | \$13.15 |

¹ Per bird marketed annually

² Per lot marketed annually

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Producer Adoption Cost (100% adoption)

Average Annual Producer Adoption Costs of NAIS

| Sector | Unit | Bookend | Full Traceability |
|------------------|--------------|---------|-------------------|
| Dairy cow | \$/cow | \$2.47 | \$3.43 |
| Beef cow | \$/cow | \$3.92 | \$4.22 |
| Backgrounding | \$/hd sold | \$0.23 | \$0.71 |
| Feedlot | \$/hd sold | \$0.20 | \$0.51 |
| Farrow-to-wean | \$/hd sold | \$0.01 | \$0.02 |
| Farrow-to-finish | \$/hd sold | \$0.03 | \$0.12 |
| Feeder-to-finish | \$/hd sold | \$0.00 | \$0.01 |
| Sheep | \$/hd sold | \$0.92 | \$1.37 |
| Layers | \$/bird sold | n/a | \$0.0195 |
| Broilers | \$/bird sold | n/a | \$0.0007 |
| Turkeys | \$/bird sold | n/a | \$0.0020 |

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How producers recapture adoption costs...

1. Market access makes prices received higher – industry-wide benefit
2. Adopt technology to enhance production and marketing efficiency – producer-specific benefit
3. Secure market premiums for process certification etc. -- producer-specific benefit

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Summary...

- Economies of size exist, but most of the benefit is captured relatively quick
- Beef and dairy have relatively higher cost than other species
- Producers reluctant to adopt because of
 - Concern about confidentiality
 - Not sure which technology will prevail
 - See increased cost without seeing direct benefit (free rider problem)

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The screenshot shows the AgManager.info website in a Windows Internet Explorer browser. The page features a navigation menu on the left with categories like Agribusiness, Crops, Energy, Farm Management, and Livestock & Meat. The main content area includes a 'Recent Updates' section with a list of articles such as 'Updated MYA 2009/10 Price Estimates for ACRE' and 'Crop Basis Maps'. There are also promotional banners for '2009 Ag Lenders Conferences' and '2009 Insurance Workshop'. A blue box with the text 'Questions?' is overlaid on the bottom left of the screenshot.