



# Biosecurity: Getting the Incentives Right on the Farm



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# [Format]

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- Emphasizing incentives, I'll
  - Provide some facts
  - Point to what economics can say about costs and optimal resource allocations
  - Tongue-in-cheek, outline some policy options

# [ US, Main Crops, 2005, \$ Bil. ]

Commodity	\$ Bil.	% of Total	% Cumul.
All	239	100.0	
Livestock	125	52.3	
Crops	114	47.7	
1. Cattle	49.2	20.6	20.6
2. Dairy	26.7	11.2	31.8
3. Broilers	20.9	8.7	40.5
4. Corn	19.1	8.0	48.5
5. Soybeans	16.8	7.0	55.6
6. Greenhouse/nursery	16.2	6.8	62.3
7. Hogs	15.0	6.3	68.6
8. Wheat	6.8	2.9	71.5

# [ US Ag. Exports, \$ Bil. '04-'05 ]

Product	2004	2005
Live Animals	0.5	0.6
Red Meats & Products	3.2	4.3
Poultry Meats & Products	2.5	3.0
Wheat	5.1	4.3
Corn	5.9	4.8
Soybean	6.7	6.3
Fruits, Nuts, Etc.	5.4	6.4
Vegetables & Products	5.3	5.8
Cotton	4.3	4.0
Total, incl. other Ag. Exp.	61.4	63.0

# Loss Estimation, P=prevent and A=after-the-fact

Subject	Type	Ability to measure
On-farm production	(P; A)	(Yes, rough; Yes, rough)
Domestic consumption	(P; A)	(Yes, FAPRI; Yes, FAPRI)
Int'l markets	(P; A)	(Yes, FAPRI; Yes, FAPRI)
Government	(P; A)	(Maybe, Maybe)
Mortality, life quality	(P; A)	(Maybe, Maybe)
Food/Ag.-input sectors	(P; A)	(Yes, rough; Yes, rough)
Other sectors	(P; A)	(Yes, rough; Yes, rough)
LDCs	(P; A)	(Yes, rough; Yes, rough)
Individual liberty	(P; A)	Hard
Animal welfare	(A)	Maybe

# Animal Movement, National

## US State-to-State Live Animals Shipments (Mill. Head and % of Inventory)

Item	1960	1980	2001
Cattle	13.5 (14.0%)	20.0 (18.0%)	21.8 (22.4%)
Pigs	2.5 (4.5%)	4.6 (7.1%)	26.9 (45.0%)
Sheep	6.1 (18.4%)	2.2 (17.3%)	1.5 (21.7%)

# Animal Movement, Int'l

## Live Animal Exports (Mill. Head)–World

Item	1961	1981	2002
Cattle	4.9	7.3	9.0
Pigs	2.6	9.6	17.1
Sheep	6.5	15.8	19.4
Goats	1.3	1.9	2.9
Chickens	83.8	366.2	836.3
Turkeys	0.0	14.6	58.7

# [ Changing Countryside ]

## Farms ('000) in US, by Enterprise

Enterprises engaged in	1974	2002
Beef Cows	1,025	796
Dairy Cows	404	92
Hogs	470	79
Broilers	34	32
Grain Corn	883	349
Wheat	534	170
Soybeans	542	318



# Animal Identification

- Recent events show need for animal id. in the event of a problem
- USDA National Animal Id. System seeks to do so
  - Premises registration (give contact info, no cost)
  - Animal identification (tag animal or lot number)
  - Animal tracing (choose private sector tracking database and report relevant movements)
- Voluntary, resistance from smaller producers. Cost (\$1-\$3/head), privacy, paperwork issues

# [ Prevention & Communication ]

- Each producer facing costly biosecurity action to keep a disease/pest out of a region can think
  - Why bother as entry is likely anyway, or
  - Better do it as others are doing it, I'm a weak link
- Which thought wins depends on what one thinks others do. Either *most act* or *few act*
- Communication about what others are doing is key to ensuring most see their action as critical

# [ Motives for Production Scale ]

## ARMS 2000 Dairy Survey data

	50-99 cows	≥ 500
Herd size	88	955
lb. milk/year/cow	16,157	17,326
Labor hrs/100 lb. milk	0.44	0.11
lb. feed/ 100 lb. milk	252	162
Prevent. med. practices (Yes=1, No=0)	0.94	0.97
Vet. expenses (\$/100 lb. milk)	0.71	0.60

# [ Integration, Cons ]

- Large, vertically integrated feedlots tend to have
  - Exposure to large lot losses from disease
  - Central feed/water/AC/heat systems, attack vulnerable
  - Productive but genetically vulnerable stock

# [ Integration, Pros ]

- Have scale economies in biosecurity investments
  - Think of fencing 1 (4 units of fencing) animal vs 100 (40 units or 0.4 per animal).  
10-fold scale economy,  $1/\sqrt{N}$  law
- Are easier to find, deal with in prevention/emergency
- Don't use marts

# [ Policy Issues, I ]

- Global control: More \$\$ and emphasis on human/animal links
- Subsidize animal id. and tracking systems
- Do more to encourage animal trading that does not involve livestock marts
- Better coordinate biosecurity outreach to smaller growers

# [ Policy Issues, II; Carrots/Sticks ]

- Stick: Regulations to promote biosecurity in animal agriculture
- Carrot: Subsidies to encourage best biosecurity management practices, like EQIP program for environmental practices in (mainly) crop ag.
- Carrot & Stick: Provide growers some free insurance in event of major problem. This is needed for prompt reporting. Require those insuring to comply with some practices

# [ Policy Issues, III ]

- Revisit food irradiation attitudes
- Facilitate professionalization of biosecurity management career
- Encourage development of economic epidemiology sub-discipline
- Think about a major corn crop failure