Agricultural Biosecurity: Costs, Incentives, and Policy

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Format

- 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	2005
Live Animals	0.6
Red Meats & Products	4.3
Poultry Meats & Products	3.0
Wheat	4.3
Corn	4.8
Soybean	6.3
Fruits, Nuts, Etc.	6.4
Vegetables & Products	5.8
Cotton	4.0
Total, incl. other Ag. Exp.	63.0

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

Motives for Production Scale

ARMS 2000 Dairy Survey Data

Cow number class	50-99	≥ 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

Source: Short (2004)

Animal Movement, Domestic

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

Item	1980	2005
Cattle	20.0 (18.0%)	20.8 (21.8%)
Pigs	4.6 (7.1%)	33.4 (54.8%)
Sheep	2.2 (17.3%)	1.5 (24.3%)

Animal Movement, Int'l

Live Animal Exports (Mill. Head)–World

Item	1981	2004
Cattle	7.3	8.0
Pigs	9.6	22.7
Sheep	15.8	14.8
Chickens	366.2	816.9
Turkeys	14.6	64.0

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

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

Cost of Outbreak

- Cost: what, where, when caught, how managed, if zoonotic, importer response, luck
- Prompt Congress $ needed, having thought through, e.g., FMD control concerns earlier
- Many scenarios have been run for different diseases, regions, severity
- FMD in US could cost $5-$18 Bill.??

Animal Id.

- Recent events show need for animal id. USDA Nat. 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 some smaller producers. Cost ($1-$3/head), privacy, paperwork issues. Growers may resent inference they aren't doing enough

Prevention & Communication

- Each producer facing costly biosecurity action to keep a disease/pest out of a region can think
  - Why bother, entry is likely anyway, or
  - Better do it as others are, 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

Integration, Cons and Pros

- Large, integrated feedlots tend to be
  - - exposed to large losses, centralized feed etc. systems, and productive but perhaps vulnerable stock
  - + easy to process in prevention/crisis and don’t use marts
  - + scale efficient biosecuring. Illustration: 1 pig needs 4 units of fencing, 100 need 40 or 0.4 per animal

Policy Issues, I

- Global control: More $$ and emphasis on one medicine
- Subsidize animal id. and tracking systems
- Encourage less reliance on 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 animal and 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
- Facilitate professionalization of biosecurity management career
- Encourage development of economic epidemiology sub-discipline
- Think about a major corn crop failure

Pandemic Issues

- If severe, 2%-6% GDP???
- Invasive species, farm species interactions?
- Health trends for farm laborers, especially if undocumented?
- K-12 science matters to prevent/control pandemic
- R&D capacity building
- Room in public research for curios like scrapie, leading to the prion theory