

Chapter 2. Evaluating How Programs and Policies Impact Animal Agriculture

Government programs and policies shape agricultural systems in many ways and have since before the Articles of Incorporation were signed. In the modern era, corn, small grain, rice and cotton farmers are the most directly influenced by government programs and payments since historically they owe their economic survival to federal dollars.

Surpluses coupled with lagging market demand periodically drive cash market prices down, as they did in the mid- and late-1980s and again in the last few years. These are the years when crop farmers are almost totally dependent on direct payments from USDA to sustain economic viability. Except for the two to four really good years out of each decade, very few growers raising commodity program crops are able to turn a profit without government program payments. For decades, payments from USDA have accounted for one-quarter to as much as 40 percent of gross income to producers during the downside of market cycles and 100 percent of commodity crop net income (profit).

Total U.S. agriculture output in 2000 from crops and animal products was \$195.3 billion (Table 29, *Agricultural Outlook*, January-February 2001). Cash production expenses in year 2000 exceeded \$125 billion (Table 29, *Agricultural Outlook*). Commodity program crops accounted for less than \$50 billion of gross income, yet benefited from the vast majority of USDA's \$23.3 billion in direct payments made to farmers that year.

The rest of agriculture -- livestock, fruit and vegetable, and other horticultural operations -- accounts for over 75 percent of total agricultural output but must largely fend for itself in the marketplace. This does not mean, however, that government programs and policies have had little or no effect on the structure and performance of these segments of the agricultural sector. Sorting the effects out from other factors, and quantifying their importance, is more difficult than taking stock of direct payments made to commodity program crop farmers. This chapter assesses the role of policy in shaping some of these factors and forces.

Section A. focuses on agricultural research – an important but difficult policy area. While research priorities have clearly shaped today's agriculture and will continue to do so, our overall agricultural research agenda, and the ever-shrinking public component within it, is now private-sector dominated (Benbrook, 1989). For this reason, even significant reforms will have marginal impacts on the nation's total agricultural R&D activity. The reality is that environmental performance and food safety research often poses a threat to established interests in the food system and hence has been discouraged and marginalized within most public institutions. We discuss in the research section the genesis of this problem and offer some suggestions for reforms to begin to broaden the scope of research. Progress in this arena, though will be slow and come only after the investment of serious political capital.

In section B. we explain our methodology for evaluating the impacts of various programs and policies on animal agriculture. In the “References and Sources of Information” section at the end of this report, we provide access to a range of resource materials and information sources relied on in our analysis.

Subsequent chapters summarize policy and program impacts on the price of feed; manure management, odor control, and resource conservation; animal disease management, drug use and food safety; and various aspects of industry structure and performance.

In each chapter we identify those programs and policies having the most direct and significant impact on animal agriculture, identify what is known about the impacts and when possible, place a dollar value on them. As noted in the Executive Summary, a systematic and concerted effort will be required to shift the leverage of public policy so that all farm operations, regardless of size and linkages to other segments of the food system, can compete for consumer food dollars on a roughly comparable basis. This is clearly not now the case and substantial policy reform is the only hope if different farming systems and scales of operation are to prosper. Without changes in farming systems and the scale of production, the public cannot expect much progress in reducing animal agriculture’s contributions to environmental degradation and public health problems.

A. How Research Policies Have Shaped Animal Agriculture

Research priorities and expenditures are among the most profound policies impacting agriculture but also are among the most difficult to understand, quantify, and change.

Research and education policy shapes technological futures by creating the grist for innovation. Through the priority setting process, it determines which technologies and systems will have a realistic chance of gaining widespread adoption, and whether the impacts of different systems, technologies, inputs and policies are subject to independent evaluation. Public research institutions define the performance indicators and yardsticks against which the performance of U.S. agriculture is measured, and then also take the measurement systems to the field and collect and interpret most of the raw data.

Historically, the most closely followed measures of progress have been yields, hours of labor per unit of production, cost per unit of production, and capacity to expand the scale of production. International market share and competitiveness have also been key barometers of performance across a sector or agriculture as a whole.

Notably missing from the list of “leading indicators” of U.S. agricultural performance are any measures linked to the adequacy of resource conservation systems, water quality, food safety efforts, or rural community economic vitality or quality of life.

1. Need for New Performance Indicators

When Gordon Bethune took over as CEO of Continental Airlines in 1996(?), the company was on the brink of bankruptcy. A growing number of travelers were consciously avoiding the airline. He initiated a series of steps to find out why and the answer was clear -- flight delays and baggage handling problems. The story of how he turned around Continental's economic performance is told in detail in an article in Forbes Magazine entitled "[to come]".

Employee job descriptions, performance reviews, and bonuses were revised and linked to specific, quantitative performance goals. The key goals were reducing the percent of flights leaving and arriving late and lowering the number of baggage handling mistakes. Within months, progress was evident in official FAA statistics. Travelers regained confidence in the carrier and the percent of empty seats started to fall. Early successes triggered bonuses and other rewards for employees, instilling a sense of empowerment and motivating all employees to work both better together and individually at their job.

The company's resulting financial turnaround is regarded on Wall Street as one of the most dramatic in many years. In the Forbes article CEO Bethune said the secret to Continental's success is a simple yet powerful concept, "What gets measured gets managed.

This concept speaks volumes about what is known – and not known – about the performance of production agriculture. Given the general lack of performance indicators and benchmarks, baselines, and measurement efforts focusing on environmental and food safety performance, it is no wonder that so little management attention has been devoted to them.

Lack of animal agriculture performance indicators beyond production per animal, profits, and production per dollar spent on husbandry facilities and systems has created a giant rock obscuring many of today's food safety and environmental problems. A consistent pattern of public research policy decisions (to not invest) over many years created the rock and has allowed it to become an enormous constraint to progress now that society is calling upon agriculture to lessen its contribution to a host of environmental and public health problems.

The lack of research on the genesis and consequences of well-known manure management, animal husbandry, and farm structure problems over time explains why there is now relatively little management expertise to tap in solving these problems, and it also makes it easier for skeptics, including those with vested interests, to defend the status quo. And finally, it feeds into the argument that some degree of environmental degradation, and some level of food safety risk, is a small price to pay for the progress made in reducing the cost of food.

The scientific debate over the impact of subtherapeutic use of antimicrobials in poultry, pork and beef production on bacterial resistance and human health is a good example of an issue that has festered far longer than necessary. The debate has raged on since the early 1960s yet the scientific “conventional wisdom” has not budged. Nor have there been any change in the Food and Drug Administration’s willingness to sanction and defend such uses of antimicrobials.

In Europe the underlying scientific uncertainties paralyzing the policy process in the U.S. were settled by the mid-1980s. Conventional wisdom was thrust aside because several governments considered it essential to support the research needed to more firmly document the factors contributing to the emergence of more and more pathogens resistant to multiple antibiotics. As a result, Europe moved aggressively to reduce the nontherapeutic use of antimicrobials in livestock production in the early 1990s. Consequently, recent evidence confirms that some of the most damaging (to humans) multiple-drug resistant strains of pathogens in Europe have become less resistant and more susceptible to key antibiotics that doctors prefer to use for a host of medical reasons (Molbak, 1999).

New knowledge creates the will to tackle tough problems and overcome vested interests and bureaucratic inertia. It also provides the basis to target solutions where most needed and truly justified and to monitor progress and craft mid-course corrections when and as needed. The lack of knowledge allows problems to fester and spread. It complicates the search for practical solutions and in the end, makes their adoption more costly and contentious.

2. Forces Shaping the Public Research Agenda

In recent years three powerful forces have dramatically changed the role of public agricultural research institutions and efforts:

The huge redirection of resources to molecular biology and biotechnology since the early 1980s has dramatically shifted system-capacity toward genetic-based solutions and away from those grounded in management- and system-design innovation.

Budget cuts have caused real erosion of capacity, focused in most states on applied field research -- just what is needed to understand farming system performance and to design novel systems-based solutions.

As the economic clout and political power of the private sector has grown, so too has its ability to shape what research gets done. The private sector increasingly controls research agendas and focus, as well as what information is generated on the performance of farming systems. This in turn has had a pernicious impact on the information reaching the general public and on those setting research priorities, appropriating funds, and making regulatory decisions.

In the 1950s through the 1970s, public agricultural research first discovered and then paved the way for a host of new technologies including hybrid seeds, pesticides, animal drugs, confinement livestock systems, and high-capacity materials handling equipment. By the 1980s these and other new technologies were driving rapid change in production systems and in the scale of production required to support a family.

Industrial reorganization and concentration have driven another set of changes enhancing the economic clout of both input manufacturers and crop and livestock product buyers. Corporate financial gains have almost always come at the expense of farm profit margins.

In the 1990s public concern has grown steadily over the unintended impacts of agricultural production technology and systems. “Progress” and problems have become intertwined in new ways and pose many challenges for public research institutions. This has placed on the public research policy agenda a critical question that, regrettably, receives almost no serious attention or discussion –

To what extent should public researchers and institutions focus on monitoring and managing the problems caused by current technologies and systems, in contrast to investing their time and energy in developing improved systems and technologies?

Since the 1970s an increasingly large share of resources has been allocated toward near-term problem-solving and relatively less effort has been invested in the science needed to underwrite more fundamental system changes. For example, many of today’s most talented entomologists working in cotton and corn have become heavily involved in research on the emergence of resistance to *Bacillus thuringiensis* as a result of the introduction of *Bt*-transgenic plant varieties.

Every graduate student working on *Bt*-resistance, and every research project designed to develop and refine resistance management strategies lessens the public research effort focusing on prevention-based insect pest management systems and technologies. It is these sorts of systems, more so than *Bt*-transgenics, that promise to give farmers the tools to solve pest problems in a much more elegant way, and significantly, do so while also reducing production costs and expanding farm profit margins (Lewis, et al, 1998).

The monitoring and avoidance of *Bt*-resistance is a problem and challenge created by the private sector. Fairness dictates that the costs of managing this problem should, as a result, be borne largely by those profiting from *Bt*-seed sales. The same case can be made for the costs stemming from StarLink problems (a specific *Bt*-corn that was only approved for corn destined for animal feed), the adverse impacts of *Bt*-corn on Monarch butterflies, and any other unintended consequences of this biotechnology.

Instead, the introduction of genetically modified crops (GMOs) has imposed a major drain on public research institutions in two ways. As noted above, there has been

a huge shift in research focus toward molecular biology, with the hope of discovering new traits to move into tomorrow's GMO-plants. And second, new demands have been placed on public researchers to monitor and manage the adverse and unforeseen consequences of these technologies. Together, these trends have dramatically shrunk the investment in other technologies and strategies with potential to solve problems by avoiding them in the first place. Such research is far more likely to benefit farmers and system-managers on a sustainable basis, as opposed to input manufacturers, seed and biotechnology companies, and those holding intellectual property rights to patentable university innovations.

Research policy reforms are needed to expand the share of resources available to public sector scientists to work on problems of greatest concern to the public and farmers. The public wants and needs answers to environmental, food safety, and quality of life concerns. Farmers need sustainable, profitable solutions that rest upon problem-prevention through system-design and management innovations. Both sorts of research are now being squeezed out by research priorities driven more so by the needs of the private sector than those of farmers or society as a whole.

B. Projecting Program and Policy Impacts on Animal Agriculture

Our focus throughout is on whether and to what extent a program or policy tips the competitive edge toward large scale, resource intensive and vertically integrated livestock and poultry farms, enterprises and industries. This emphasis is warranted by the well-documented linkages between the scale of individual operations, the number of animals in a given area, and unintended adverse impacts on animal health, resource conservation, water and environmental quality, food safety, working conditions, and the economic stability and viability of rural communities.

In agriculture size is not an original sin nor does smallness and independence guarantee virtue. A well-managed 10,000-acre farm managed by experienced people with a commitment to food safety and resource conservation typically will outperform 10 poorly managed 1,000-acre farms producing a comparable mix of crops and livestock. But 10 well-managed 1,000-acre farms will also outperform the best 10,000-acre farm because of inherent advantages in better matching resources to production enterprises, lessening pest and disease pressure, and more flexibility in assuring the timely completion of routine farming tasks.

But when the 10,000-acre farm secures a preferential deal on the price of feed ingredients, delivered in volume by train, or locks in a premium price through an exclusive contract with a meat packer, these economic advantages can dramatically tilt the economic playing field.

A 10,000-acre farm producing thousands of animals that is vertically integrated with input suppliers and meat packers and food processors also can tap into a host of technical experts and financial strategies to reduce input costs, lessen tax liabilities, and reduce the cost of capital and labor. These added advantages have fueled the trend

toward mega-livestock operations and has made it possible for the production agriculture sector to become part of the trend toward concentration across the American economic landscape, a trend some embrace and others deeply fear.

A farm, regardless of scale, is a biological enterprise heavily dependent on the skillful match between farming enterprise choice, system-design, technology, genetics, and natural resources. Bigness depends to a large extent on specialization and standardization, whereas success in farming requires flexibility and responsiveness to changing circumstances, weather, pest and disease pressure, and prices.

Policy has markedly enabled opportunities for large-scale operations to take advantage of bigness and it has eroded, largely through neglect, the natural advantages of moderate scale operations. Now the trend toward bigness and integration has gained so much momentum that many consider it unstoppable. It certainly will not stop, or even slow down without consensus that the performance parameters for animal agriculture have been defined too narrowly. This change must be coupled with greater investment in, and insistence on preventing problems as opposed to dealing with their consequences. Such consequences include, of course, the fight now underway in multiple venues over who is to blame for animal agriculture's problems and who must bear the costs to deal with them.

1. Consequences of Scale

As a practical matter, large operations tend to create bigger and more concentrated problems than operations of moderate size and small operations are more adept and adaptable. For this reason farms of modest or moderate scale are generally better able to manage resources and animal husbandry systems so that environmental and food safety problems are largely prevented on the farm.

It is important to emphasize though that this capacity to better manage environmental and food safety problems on operations of modest-to-moderate scale is not universally exploited, in part because society as a whole and in particular some states, have not placed a premium on avoiding these problems. Also important is the reality that doing so would place operations of modest scale at an economic disadvantage relative to other operations choosing to just get by with minimal effort and using local surface waters, for example, as an all-purpose waste disposal system.

Three core challenges face animal agriculture and each is intimately linked to recent changes in industry structure:

- Finding economical ways to manage manure and odor without degrading water quality or excessive loss of nutrients.
- Reducing disease pressure and reliance on antimicrobials, and hence animal agriculture's contribution to the rapidly growing pool of multiple-antibiotic resistant pathogens.

- Improving the rates of return and economic sustainability of independent, moderate scale family-controlled operations.

In fact the last two farm bills have identified each of these challenges as key priorities. Finding – and financing – solutions is already a major U.S. policy goal with at least some impact on public investments in a host of research, education, regulatory, market, food safety, and conservation programs. Dealing with these challenges is bound to play a much more prominent role in the upcoming farm bill and evolving regulatory policy debates. An undercurrent in the debate, as noted above, will be whether policy and program expenditures should flow toward managing and dealing with the problems and off-farm costs of large-scale operations, in order to sustain their viability and make them more palatable to rural communities, or whether resources should instead be invested in a transition toward more modest-scale systems with potential to largely avoid the factors giving rise to the food safety and environmental problems in the first place.

It thus follows that the impact of policy reforms will rest in large part on whether they cut to the core of the factors triggering problems, as opposed to simply addressing or managing, to the extent possible, the adverse consequences of the problems.

Many studies have shown and experts believe that manure management and animal health related problems are intrinsically and unavoidably scale-dependent, especially when certain thresholds in animal density within a defined geographic area are exceeded. Certainly these linkages are embedded in the logic and facts shaping the Environmental Protection Agency’s “Concentrated Animal Feeding Operations” (CAFO) proposed rule (for more, see Chapter 4).

For policy makers wanting to solve animal agriculture’s manure, food safety, and farm viability problems by dealing with their underlying causes, a premium must be placed on system-innovation and reversal of the trend toward larger operations and denser geographic concentration of livestock. The only other option, and a true long shot, will be to impose stricter environmental and food safety performance goals and regulations, and let nature and economic forces sort out the sustainable systems from those that prove just too risky and erratic. This regulation-driven economic Darwinism would trigger sometimes heroic and often very costly efforts by the mega-farm owners and operators, the results of which are likely to fully please no one.

2. Our Analytical Focus and Approach

This report addresses how policy and government programs have tilted the economic playing field toward large scale, vertically integrated animal agriculture industries, and what policy reforms offer the greatest promise in reducing this policy bias, and indeed over time, reversing it.

Few program details are offered; the interested reader should pursue the many sources of additional information, particularly on government websites, identified in the

reference section. Policies and program provisions are highlighted that have a direct impact on animal husbandry systems, technologies, food safety, animal health, the environment, or scale of production. In many cases, similar policies and programs are in place at both the state and federal level. Improving the coordination and interactions between levels of government is a generic need. Too often today state government officials view their federal agency counterparts with suspicion if not disdain and the sum of multiple, ongoing government efforts adds up to lots of paper and meetings and depressingly modest progress.

To the extent possible, we identify how programs and policies, and in some cases parts of a program or regulation, impact the nature and scale of animal agriculture and whether the impact is:

- Largely scale and husbandry system neutral.
- Likely to reinforce or enable the trends toward larger scale, vertically integrated and more concentrated livestock production.
- Targeted to provide needed assistance to moderate scale, independent family producers.

A full accounting of the impacts of all programs and policies is a mammoth undertaking. In this report we focus on just a few of the “big ticket” impacts. Policies altering the price or availability of feed, or those pushing producers toward, or directly subsidizing, certain management practices or systems are reviewed. Regulatory programs, especially those governing animal health and manure management, play a critical role in establishing performance standards. These in turn influence choices in the design and management of systems to manage manure, prevent diseases, and minimize human health risks.

Other relevant programs and policies impact industry structure and performance more so than individual farms. Enforcement of antitrust laws and tax expenditure policies are good examples, as are rules governing liability for environmental contamination.

No one policy reform will turn the tide now pushing animal agriculture toward vertical integration, mega-farms, and specialization. A systematic review must be made of policies in several areas and a reform agenda crafted that brings about big change by linking together and leveraging lots of smaller, but politically acceptable incremental changes. This report identifies some of the key places where change is both possible and clearly warranted and how changes needed to address one problem can help jump-start progress in dealing with others.