
VARIATIONS IN U.S. ANIMAL PRODUCTION SYSTEMS: CURRENT TRENDS AND THEIR IMPACTS ON ANIMAL WELL-BEING AND THE ECONOMICS OF PRODUCTION

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Principles of biology and engineering have been applied wisely in animal agriculture. Sophisticated animal-production systems have been developed in response to various demands, needs, pressures. Many technological riddles remain, however. Our insatiable curiosity about nature and our inexorable drive to apply what we know mean that we shall want to continue searching for new knowledge and rapidly use it to upgrade and fine-tune animal environments for the benefit of animals, consumers, farmers.

After the glaciers receded and crop production started, animal production ascended. And the animal species that became domesticated way back then—the same ones that the world’s farmers raise today, incidentally—differed from their cousins that stayed in the wild in that the domesticated animals seem to have been innately adaptable to a much wider range of living conditions. Compared to their wild cousins, then, agricultural animals are relatively unfinicky, relatively tolerant of different environmental features.

Consider that, of the thousands of animal species on earth, only a handful have become domesticated and cultivated. To any great extent, a dozen or so. Could this have been happenstance?

Dr. E.B. Hale, professor emeritus of ethology in the Poultry Science Department at Penn State University, believes otherwise. He has taught that the animal species which eventually became domesticated are special and always have been. In general, the animals which became domesticated and which we have cultivated for food are relatively widely adaptable and relatively widely useful.

Hale has listed behavioral characteristics favorable to an animal’s being domesticated:

- large social groups,
- hierarchical group structure,
- promiscuous mating,

- critical period for species-bond formation,
- precocious young,
- tolerant of humans in the vicinity,
- little disturbed by environmental changes,
- omnivorous in their food preferences,
- adaptable to a wide range of environments, and
- limited agility.

Is there a lesson here for us? These animals which we use for food—and care for in return—are and have been for eons unusual creatures. Even before they became domesticated, they were special: they were extraordinarily adaptable.

As Stephen Budiansky points out in discussing the nature of domestication in his thoughtful book *The Covenant of the Wild—Why Animals Chose Domestication*:

[T]he first chore for anyone who would set out to prove that the domestication of animals is a natural product of evolution is to undo several thousand years of human self-importance. . . . It is a central myth of our culture that we are firmly in control of our destiny. . . . The only way to produce an animal with the desirable traits is through captive breeding, yet the only way they could have been captively bred is if they had the desirable traits to start with. This paradox is the crux of the entire, counterintuitive line of evidence that argues for domestication as an evolutionary, rather than a human, invention. The only way out is to recognize that, in an evolutionary sense, domesticated animals chose us as much as we chose them.

Returning now to the highly adaptable aspect of domesticated animals, this may well be why husbandmen have given the environment such a low spot in the hierarchy of production factors for so long. To be sure, basic needs for feed and health care and safety have been recognized and reasonably well fulfilled. But for the most part, until recently, most domestic animals resided in the natural environment, where they were more or less vulnerable to climatic rigors and other stressors.

Stephen Budiansky has something to say about this vulnerability, too:

When antifarming activists say that confining cattle to the farm dooms them to a life of boredom, few of us ask whether the cattle would have preferred extinction. . . . Sweden passed a law in 1988 actually requiring cows, pigs, and animals raised for fur to be kept “in as natural an environment as possible,” begging the question of what is natural for animals that are by their evolutionary heritage incapable of surviving in the wild. It is unnatural to feed a cow hay in the winter, for example; it is unnatural for cows even to be in Sweden in the winter in the twentieth century, for that matter. Wild cows became extinct in Europe thousands of years ago. Still, the law specifically requires that cows must be allowed to graze on pasture in the summer. In a bow to reality, it doesn’t mind if cows are shut up in a warm barn in the winter. . . . If all of these moves are incomprehensible to hunters, farmers, and the few others in our modern world whose daily work still brings them into contact with animals, it

is not because they are without compassion. It is because they know better. They know about the interdependence and competition that ties the species of this planet together because they see it every day. They know where meat comes from; they know, too well, about diseases, and sheep-killing coyotes, and survival. They know that death is a part of life, that in nature death makes life possible. They know that domesticated animals need us as we need them.

The Dutch poet P. C. Boutens knew that they need us as we need them a long time ago, when he wrote, “We serve, in never fulfilled repayment, the animals that accompany humankind.”

Then, fully three-quarters of a century ago, University of Illinois animal husbandry professor Herbert W. Mumford penned “A Tribute to The Stockman,” and his words captured the sense of what Budiansky talks about now, too. Mumford wrote, you’ll remember, “Behold the Stockman! Artist and Artisan.” And so on, as you know. I want to focus now on a single line in that poem, and it is: “Who cheerfully braves personal discomfort to make sure his live stock suffer not.” It is an important line, and we shall return to it later.

It is not likely that animal farms are today as we remember them—or as we thought they were—yesterday. Yet we must consider today’s animal farms in the context of the human cultures in which they were developed.

The number of people worldwide who grow food for themselves continues to dwindle. Most U.S. citizens have never set foot on a farm or harvested one mouthful—let alone a lifetime’s worth—of daily bread. Yet our farmlands and climates and our agricultural and food industries are this nation’s ultimate resources.

By increasing productivity in recent decades, our farmers and the scientific and business endeavors that support this nation’s system of food production, processing, and distribution have proved to be able, reliable husbands of our precious agricultural resources. Growing food is an enormous task, requiring the management of numerous elements of nature which are recalcitrant, at best, while coping with myriad others which are unmanageable or unpredictable or both.

Our agribusinesses have made the task appear to be simple; plenty of safe, wholesome, inexpensive food is available in our eateries and groceries every day. But make no mistake; making this ideal a reality has not been a simple task. And it is incumbent upon those severe critics of American animal agriculture to recognize and appreciate these things and to make their judgments and demands accordingly.

Alas, while the overall picture is pleasing—much food is being produced—there are problems, too. All is not well with animal care and handling in American agriculture today. There are excesses. There are abuses. And any in our midst who would deny that this is so are showing either ignorance or dishonesty.

How have we come to the point where we cannot say in truth, borrowing that line of Mumford’s, that our livestock always “suffer not”? The reason probably has to do with the real, everyday compromises farmers and veterinarians and transporters and marketers and processors have to make and, more particularly,

with the wrong sides of these compromises we come down on all too often. Moreover, it probably has to do with some people—too many people, some of us would say—who work directly with animals but hold wrong attitudes about human responsibilities to agricultural animals. Boutens called it our “never fulfilled repayment.” They hold attitudes that are inconsonant with Mumford’s implied ideal that the livestock should “suffer not.”

But there is a paradox here. Objective observers know that the quality of animal care on our farms and ranches—feeding and health care in particular—has been improving clearly and steadily, year after year. Still, we have opportunities to improve animal well-being at three general points:

- farm environments, in which the animals reside most of their lives;
- handling and processing at the farm, which involves relatively short periods of the animals’ lives; and
- handling, transporting, and marketing as ownership changes, which involves animals for short periods as they move between farms, markets, and abattoirs.

The three situations—and thus the strategies for coping with them—are distinctly different.

There are two general situations where we can be found lacking and where we need to devise and apply remedies:

- situations where either science or common sense tells us right from wrong in a practice or procedure, yet the wrong way continues to be followed; and
- situations where, to ensure animal well-being, common sense ought not be trusted but science has not yet generated sufficient knowledge upon which to base rational approaches.

As another example of the first sort of situation, when an animal handler uses unnecessary force in urging an animal to go from one place to another, that person ought to know better but has chosen instead to go about the job in a wrong way. As additional examples of the second sort, consider current questions about animals’ so-called behavioral needs.

Problems of the first sort—we should know better—occur most frequently in commercial channels, especially when the people handling the animals do not own them. All too prevalent in the U.S. livestock industry is the passing along to the next owner of diseases and injuries that devalue the animals. Absent in such cases is any monetary incentive of the sort provided by an owner’s desire to protect an investment. Of course, problems of the first sort also ignore each human’s moral responsibility to the animals.

Animal well-being problems remaining in the transportation and marketing sectors of animal agriculture do not require much more research. They are well-understood, and they can be resolved by:

- uniformly applying existing knowledge and technology and
- changing handler’s and transporters’ attitudes toward the animals.

One remedy in such situations is straightforward. For several years, Dr. Temple Grandin has advocated active involvement of business firm managers in the actual handling of the animals. She has observed repeatedly that once management understands the situation and requires employees to have a right attitude in this regard, the employees will handle the animals in a more humane fashion.

Another remedy would be for animal producers to take matters in their own hands, to radically modernize livestock marketing from its current status as what one trade editor recently called a “horse-and-buggy system.” After all, the producers are the prime figures in the respective animal industries. They are the *sine qua non* of animal agriculture. Without the animals they produce, there would be no animals to transport, market, slaughter. It is not beyond the capability of U.S. animal producers to follow the lead of producers in other countries and form cooperatives to perform transportation, marketing, and even processing chores.

And there is another opportunity, too. In the last three years, several national animal agricultural organizations—notably, American Veal Association, National Milk Producers Federation, National Pork Producers Council—have started developing guidelines for the care of animals on commercial farms and ranches. Enlightened producers themselves are leading these initiatives because they sense the need to assure contemporary consumers of animal products that farm animals are being treated humanely.

Unfortunately, voluntary adoption of production-practice guidelines has turned out to be relatively slow in some quarters. Business economics is still the primary force in many producers’ decision making. But when quality assurance programs are tied to reasonable economic incentives for producers—as is now emerging at the hands of visionary statesmen in the industries who recognize the need to shore up consumer confidence and thereby ensure continuing demand for their products—then these protocols will be effective in quickly upgrading the respective industries’ overall quality of animal care.

As for problems of the second sort—we’re simply not sure—many concerns about agricultural animal-production practices await scientific confirmation of their inhumaneness. Scientific research is needed to determine the suitability of specific production practices and procedures, and to develop new ones to continually upgrade production systems in terms of supporting both efficient production and animal well-being.

We see in various segments of animal agriculture now an openness to trying production system alternatives. In the dairy industry in the Northeast, for instance, producers are building fences and putting their cows out on pasture again. To many of them, it makes economic sense. And as we meet here today dairy scientists are scrambling to generate information on new forage cultivars and ways to supplement the pasture diet of high-producing cows, among other things. Plus there is the reality of production seasonality that the dairy industry would need to deal with in ways it has not had to for three or four decades.

In the pork industry, the mega-producers are just now trying out pasture production systems in large-scale operations. During appropriate weather, sows can farrow and nurse piglets and hogs can be grown and finished outdoors. But seasonal production cycles must be taken into account here, also.

Several large pork producers have started dabbling in equipment and facility research. But early experiences indicate that some are having trouble believing certain scientific research results, especially when they fly in the face of conventional wisdom or hucksters' testimonials. In any case, results of this kind of research are proprietary and thus of little or no use—at least right away—to independent producers.

Finally, for the most part, animals experience stress in intensive production systems and in extensive production systems, alike. But the complex of stressors varies considerably from place to place. Research results indicate that the effects of multiple simultaneous stressors are additive, so in any kind of production system the manager should attempt to minimize the total stress load on the animals.

Let's consider some experimental results. A few years ago at the University of Illinois, we studied multiple stressors in connection with the growth of chicks. We employed six stressors that chicks commonly encounter in broiler houses and studied them in every possible combination with one another. That makes a total of 64 treatment combinations. And here is what we found. The rates of body-weight gain, feed intake, and gain/feed ratio declined in respective statistically straight lines as the number of stressors the chick was experiencing increased. The results were simple, straightforward, and staggering—chicks experiencing all six stressors at once grew at less than 38 percent the rate of those experiencing none. The animal manager should try to minimize the total stress load on the animals, even that coming from minor stressors.

What we in the mainstream of agricultural animal care are about now is searching for the line that separates wellness (in the broadest sense of the term) from illness (in the broadest sense of the term) in these animals. We are obliged to find that line and then to abide by it. The search for that line by scientists in a variety of disciplines has turned out to be a difficult undertaking.

One reason is that the line between wellness and illness most likely does not lie at the point of maximal comfort for the animal, but rather somewhere below it. The point of maximal comfort might be analogized to a person staying at The Plaza in New York City, whereas that person might get along very well indeed staying at the Holiday Inn outside Kokomo.

It is axiomatic that, when an animal's needs are not being met, it is not as well as it could be. Its welfare is more or less jeopardized. But here we must keep in mind that a particular decrement in well-being does not necessarily mean that the animal is residing in an ethically unacceptable environment. Perhaps the animal simply experiences less well-being, but still an ethically acceptable amount of well-being.

On any farm, achieving the highest level of animal well-being possible, consistently, is still a vague exercise, and it probably will be well into the future.

D.C. Hardwick of the United Kingdom formulated an idea that for farm animals—adaptable creatures that they are—an ethically acceptable level of animal well-being exists over a range of environmental conditions provided by a variety of agricultural production systems, not only in one set of circumstances someone arbitrarily calls ideal.

Hardwick envisioned what he called a “welfare plateau.” It involves the line between wellness and illness mentioned earlier. That line might be said to stand at the bottom of the range of ethically acceptable conditions.

Upward movement above that line—even a relatively small improvement in the environment—might enhance, even if subtly, an animal’s overall well-being, but still anywhere in the range of ethically acceptable conditions the animal is as free of suffering as possible.

The animal producer as businessperson recognizes that most often already in the range of ethically acceptable conditions, the economic law of diminishing returns is on. In other words, in the acceptable range, returns to investments in environmental improvements are not sufficient to pay for the improvements.

Below the range of ethically or socially acceptable conditions lies the range of ethically unacceptable conditions, where the story is a different one. Often in the unacceptable range, it turns out, small environmental improvements result in dollar returns that are more than adequate to pay for the improvements. This is because well-being and productivity usually are directly linked, and especially so in poor environments.

Now the clincher. In view of these realities in the business of animal production, there is a tendency for the production systems adopted most widely in respective animal industries to be located at or slightly above the bottom of the range of ethically acceptable conditions, but no higher. No Big Apple Plaza when a Hoosier Holiday Inn will do.

The farmer is faced with the necessity of compromising maximal animal well-being for the sake of economic viability. To locate production environments near the place of maximal animal comfort (and perhaps well-being) would be an unwise business decision. But for so long as the production system adopted lies in the range of ethically acceptable conditions, the producer’s ethical obligations have been satisfied.

So as it attempts to resolve issues of animal well-being, production animal agriculture faces a dilemma. Producers must decide on animal-production practices, procedures, and systems while constrained by humane concerns—their own as well as those of the consuming citizenry—on one hand and by the realities of doing business in a free-enterprise climate on the other.

This dilemma, it seems, will be resolvable only if and when we know enough about animal well-being that we can evaluate respective production environments and determine whether they fall in the range of ethically acceptable conditions.

Until we can do this, the public issue of food animal welfare will be irresolvable. In order that we can do this, we must have results of much scientific research at hand. The research is not simple, but it is doable. The problem is, not much is being done.

