

THE ROLE OF EXTENSION IN CONFINED ANIMAL FEEDING OPERATIONS

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INTRODUCTION

The trend toward confinement production systems for livestock has altered, to some extent, the role of Extension specialists in some academic disciplines. The economies of scale gained by a producer's move to higher degrees of livestock confinement with ever-greater numbers of animals permit him to retain private expertise for specialized purposes such as nutritional, veterinary and environmental consultation. Seeing this trend develop and accelerate, some have called into question the need for traditional Extension specialists and county-based educators. In such a privatized atmosphere, these individuals argue, technology transfer is no longer the province of state and federal government but of the consulting market. The trends and premises are valid, but such a Draconian conclusion misses the point: technologies to improve production efficiency and environmental protection require the constant scrutiny, dispassionate evaluation and scientific innovation that are, taken together, central to the land-grant mission. On the other hand, defenders of the traditional specialist-agent-producer pathway for technology transfer ignore the implications of the parallel trends toward increasing scale and private consultation in the confined livestock industry. As technology races ahead, Extension programming must do more than simply adapt; it must innovate as well, identifying and reaching a new clientele with a new set of messages that yoke together the energy of the market and the integrity of sound science.

TRENDS IN CONFINED LIVESTOCK PRODUCTION

Sweeten (1997) summarized the worldwide supply and demand scenario for animal protein with the following projections:

1. There will be 9 billion relatively affluent people (i. e., able to afford a diet consistently high in animal protein) on earth by the year 2040.
2. Consumption of animal protein in Third World Asian countries will increase from the current level of 15 g/day to 55 g/day by the year 2030.
3. Worldwide production of animal protein must triple in the next 45 years to keep up with demand.
4. Major food production regions (North and South America; Ukraine; northern China; Europe; Australia) will continue to be the primary sources of animal protein under these growth scenarios.
5. The United States' Great Plains region can easily produce more than the market can bear under current and near-term demand, but to do so requires ever-increasing scale and degree of confinement:
 - a. 50,000- to 100,000-head feedyards;
 - b. 20,000-sow farrow-to-finish swine operations; and
 - c. 1 million bird layer and broiler operations.

Newspapers across the High Plains and the Southwest are filled with daily confirmations of the trend: a feedyard expansion here, a new swine facility there, some new statistics on national chicken consumption, and always some new debate about the environmental stress posed by livestock "factories." Although there is no way to be certain that livestock production will continue to concentrate in this fashion, there is certainly no indication that the trend will reverse in the foreseeable future.

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OUR PREMISE

The question we have been asked to address, at its essence, is a question of *relevance*. In a market-driven society such as our own – that is, in a developing economy in which CAFOs that retain their own professional specialists are the rule rather than the exception – how does the Extension professional ensure that resources underwriting his existence are generating a return on the public's investment? Given the roiling of the waters at the interface where modern livestock agriculture and suburban living meet, the Extension specialist is, by definition, a catalyst for dispute resolution at that interface. We believe that the answer to the question of relevance lies in a modern manifestation of age-old virtues: competence, integrity and (spanning all of the others) leadership. Where those virtues thrive and grow, relevance is assured. In this view, the role of the Extension specialist is at the same time traditional and futuristic. We proceed, therefore, to provide working definitions of those virtues as they should be applied in the context of Extension programming in highly-charged environments.

THE RESPONSIBILITY OF THE EXTENSION AGRICULTURAL ENGINEER

The range of challenges that arise from increasingly confined livestock production goes far beyond the purview of the front-line scientists (e. g., the animal scientist, the nutritionist and the veterinarian). Still, the core virtues that ensure the relevance of the Extension professional are surely common to all disciplines whose expertise can be brought to bear on those challenges. Consequently, we approach those challenges from the perspective of the agricultural engineer. Professionals within other agricultural disciplines can make the appropriate applications readily.

Competence. Because Cooperative Extension is a public trust, its professionals must always recognize that we are accountable for what we express to the public that we serve. Accountability measures are constantly changing, but the irreducible minimum requirement of technical professionals is *competence*. For the modern Extension professional, competence has at least three dimensions: technical, social and administrative. *Technical* competence begins, obviously, with a thorough and increasing understanding of the scientific principles that serve as the foundation for one's technical discipline. It is much more than that, however. The Extension specialist must also be:

1. Recognized within his profession at large;
2. Capable of synthesizing abstract concepts and communicating them clearly, both in speech and in writing;
3. Able to fill in knowledge gaps with a credible program of applied research; and
4. Capable of working in a multidisciplinary environment, with a capacity to understand scientific disciplines far removed from his own.
5. Able to identify and develop a range of technical alternatives tailored to the situation.

For the 1990s and beyond, we are committed to the concept of the joint research appointment for the Extension specialist. Because technology is advancing more rapidly than ever, scientists and engineers that wish to play a key role in shaping industrial structure – to use our earlier term, those that wish to be *relevant* – must keep one foot solidly planted in the research community. Although the joint appointment may not be appropriate in some individual cases or political contexts, we believe that, as a rule, establishing joint research/Extension appointments helps to ensure that technology transfer is current and credible. In addition, a faculty member with a joint appointment can more easily identify an explicit outreach component to be attached to research projects that have near-term implications for the industry.

The trend toward greater confinement brings with it a broad array of public concerns about water quality, air quality, economics and occupational health (Thu, 1995). The scientific questions that can be answered by Extension specialists and programming inevitably have social implications that must be explicitly acknowledged and substantively addressed.³ *Social* competence refers to the professional's ability to

³The question of CAFO odor illustrates this point vividly. Among the venerable, four-fold scientific factors that describe odor – frequency, intensity, duration and offensiveness – at least two (intensity and offensiveness) have subjective dimensions that may be heavily influenced by the physical, social and psychological condition of the human receptor. Public health implications of odorous emissions from CAFOs may also have psychosomatic origins (Thu, 1995).

maintain a high level of objectivity, both in scientific approach and in public communication. The Extension specialist, if he is to play a role in the resolution of a particular issue, must be able to see and articulate both its technical and social aspects. Ideally, the modern Extension professional feels equally at home in a meeting with a producer association, with members of his technical peer group or with an environmental advocacy organization. Extension specialists on the front lines of local, regional and national discussions must be conversant in the many languages that are sure to appear at the table. (To be clear: the socially-competent Extension professional is not an ambassador for any of the interest groups represented at the bargaining table; nor is he a loose cannon wielding a personal agenda. Technical and social competence exercised in concert with principles of intellectual independence but with a keen eye to one's limitations is an excellent starting point for a working definition of *integrity*.)

A recent editorial (Broder, 1998) examined an environmental compact reached – unanimously – by the 18 members of the Western Governors' Association (WGA). The document produced in the June 1998 meeting was a statement of eight overarching principles that should govern the negotiation of interstate approaches to environmental conflict. The following quote from Governor Mike Leavitt (R-Utah) unwittingly underscores the twin competencies that the successful Extension specialist must possess. Speaking of the usual route taken by disputants, Leavitt said:

[Those] fights start with people taking polarized positions. Then after years of confrontation and frustration and the expenditure of millions of dollars on legal and political battles, they eventually get to common ground. We thought there had to be a way to start from the center, with the ideas of environmental balance and stewardship that ultimately have to prevail.

The approach espoused by Leavitt and the WGA is not just some vapid call merely to bring people together to “discuss issues.” The key terms in Leavitt's “center” are loaded with technical and social significance: *environmental balance* and *stewardship*. For example, among the eight principles enumerated in the WGA compact, Broder listed four that represent substantive positions on disputable issues:

1. Set national environmental standards, but leave room for local and regional solutions.
2. Reward results, and don't get hung up on compliance with regulatory minutiae.
3. Use science to establish the basic facts, not as a weapon to advance a particular ideology.
4. Market-driven solutions are preferable to regulatory fiat.

Using the achievements of the WGA compact as an illustration, the Extension specialist need not see the virtue of social competence as an excuse to serve merely as a discussion facilitator. Consistent with the ideals of secondary education, he should feel free to engage the seminal issues actively, but within the constraints of his technical competence. His role is an active participant at the nexus of his technical and social competence. He is a team-builder, but not a passive one; he assembles the required expertise, establishes a common vernacular for the participants and then contributes his own expertise from a credible base of peer-reviewed research.

As a requirement for Extension specialists, *administrative* competence is perhaps an artifact of two recent political realities: (1) shrinking public budgets and (2) increased demand for results and returns on public investment. With few exceptions, Extension programs are increasingly underwritten by so-called “soft” dollars (e. g., contracts and grants), and as a logical result, specialists must be prepared to juggle a wide range of resource types, funding agencies, reporting requirements and competing priorities. Those administrative challenges may be nothing more than a frustration to the average specialist, but to the eager, enthusiastic professional, they may be some of the trophies of his program's relevance. (Because the need for this level of administrative capability is a relatively recent phenomenon, Extension administrators may need to devise and implement advanced grant-management seminars for inexperienced Extension faculty. University curricula, even at the graduate level, do not prepare young faculty to swim proficiently in these waters.)

Leadership. Volumes have been written about the need for capable, visionary leadership in all facets of collective endeavor. Surely we know a great deal about its origins and its principles. Still, we do not always have at our disposal a solid working definition of leadership that is appropriate to the occasion. For

the present purpose, we like the simplicity of a paraphrased definition attributed to Drayton McLane, owner of the Houston Astros Major League Baseball Club: “A leader takes people where they would not otherwise go.”

Such an elegant definition actually permits us to spend less time wrestling with the application of leadership principles than we would normally expect. In order to apply the McLane definition of leadership to the role of the modern Extension professional, we need ask only one central question: “Were it not for the effort of a capable Extension specialist, how would this matter have been resolved?” Based on our experiences in Texas, we offer some concrete ideas about how modern Extension leadership plays a key role in managing the trend toward large-scale confined livestock production.

First, Extension professionals should be willing to question conventional approaches to environmental policy and regulations. For example, since the 1972 Federal Water Pollution Control Act and the subsequent National Effluent Guidelines of 1974, feedlots have been listed as point sources subject to an arbitrary “no discharge” requirement. Such a requirement stands in contrast to industrial and municipal wastewater sources, who are permitted to release wastewater into the environment provided that it has been purified to a strict standard. The traditional “no-discharge” approach to CAFO regulation has squelched innovation in the development of alternatives to the anaerobic lagoon/land application system. If there is no possibility of releasing treated effluent to the environment, there is little incentive to pursue advanced treatment technologies that might obviate the need for large parcels of irrigated cropland as land-application areas. Extension personnel with a high-tech view of the future should question this arbitrary, innovation-squelching policy.

Second, specialists should be willing to forge technical partnerships beyond traditional disciplinary boundaries. In Texas, for example, Extension specialists and research faculty are forging alliances with faculty in nuclear engineering, medicine and industrial hygiene to communicate state-of-the-art knowledge about the environmental health risks of advanced processing techniques for surplus weapons plutonium in a major agricultural region. A willingness to forge these innovative technical partnerships brings an entirely new breadth of expertise to bear on difficult crossover issues.

Third, Extension specialists should actively engage in constructive, meaningful dialogue with non-traditional partners such as environmental advocacy groups. To be sure, meaningful dialogue can only take place when both parties are open to reasonable debate, and there are many advocacy groups that appear to seek the notoriety that accompanies strident, extreme posturing. However, the Extension professional should go out of his way to seek those quiet, reasonable voices within allied groups that are open to constructive, pragmatic dialogue. As the WGA deliberations showed, as long as disputants begin from a common set of principles, discussions begun in good faith can weather the controversies that surround provocative ideas and can give rise to effective policy.

Fourth, specialists should seek opportunities to provide thoughtful review and comment on the technical aspects of proposed environmental policies and regulations. The role of regulatory critic is a delicate one that must be undertaken with care to avoid the appearance of defending agricultural interests from reasonable regulation. Still, taking care to avoid such appearances need not mean abdicating the land-grant university’s rightful role as an advocate for sound science. If technical analysis of proposed regulations is left to producer groups and associations, the presumption of self-interest deadens the impact of otherwise well-founded criticisms. Academic independence is an important tool, but only if it is used to its fullest.

It has been observed that where strong Extension agricultural engineering programs exist, strong engineering consulting likewise thrives, and vice-versa. The Extension agricultural engineer must not try to assume the role of engineering consultant for individual clientele, nor the role of the USDA-NRCS in providing design services for the masses of producers. Rather, a stronger role (and more in keeping with the land-grant university mandate) is to supply the technical leadership, not the nuts and bolts.

These four examples illustrate ways in which Extension specialists can use science and engineering to take people where they would not otherwise go. Whether it be innovative partnerships, provocative ideas or

withering scrutiny of public policy, there is an implicit expectation that Extension professionals will provide the technical leadership to surmount modern challenges.

CONCLUSIONS

The role of the Extension specialist has always been a public trust, but the nature of that trust necessarily responds to the nature of the agricultural and social structures that define the problems to be solved. The trend toward confined livestock production has given rise to unprecedented changes in the nature of the rural-urban interface and the policies that mediate its conflicts. Among the three pillars of the land-grant mission, Extension outreach may be the most difficult to redefine in the rapidly changing agricultural economy of the late 1990s.

We have identified two core virtues that will help to ensure that Extension specialists remain sought-after public resources in a new era of integration and consolidation in the livestock industry. The traditional role of the Extension specialist as a one-dimensional technical resource in the classical producer/county agent/specialist model is simply too confining. He must still be able to work one-on-one with producers and agents, but he must also adopt a new and evolving clientele of consultants, leveraging his expertise by "training the trainers" at a demanding technical level. The successful Extension professional of this new era leaves nothing behind except a passive allegiance to the traditional description of his role. He learns the lessons of the past, but he is not beholden to its methods. His role is no longer only that of an educator; he must also be a researcher, a trustworthy listener and a visionary. He must instill confidence, hope and commitment in the hearts and minds of producers and regulators that technology exists to overcome today's obstacles.

In summary, the Extension specialist is an important player in the process of developing and implementing technologies that accommodate modern production trends within the framework of evolving social values. As a product of the academy, he has the intellectual freedom to pursue, describe and communicate scientific and engineering knowledge that serves as the objective basis for economic and political decisions. In the realm of confined livestock production, he recognizes that the rapid increase in scale gives rise to an indeterminate increase in ecological and social stresses, stresses that are not yet well understood and whose most effective management strategies are still in their infancy. As Broder (1998) observed regarding the policy choices of WGA member states, "a big part...involves public education, because, as another of the eight [WGA] principles says, 'success of these policies ultimately depends on the daily choices of our citizens.'" If we are to meet the challenges of feeding a growing world population with an increasing proportion of animal protein without sacrificing the long-term sustainability of our natural resources, we will need Extension specialists that are truly committed to the ideals of competence, integrity and leadership.

"It is the job of university faculty and administrators to support and seek the truth wherever that path leads" (Barron, 1998).

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