

ABSTRACTS
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* Author Presenting Paper

National Extension Education Workshop: Current and Future Impact of Issues Facing Animal Agriculture

1 Introduction. Richard Reynnells*¹, ¹USDA/CSREES/PAS.

There is insufficient understanding by society of our food supply network. Our agricultural system is simultaneously robust and fragile, so must be protected, but is taken for granted. Our agricultural future requires mutual respect and a search for truth, versus special interests and myopic agendas.

Technological advances at the molecular level demand we deal with bioethical issues. We require an honest evaluation of the consequences of progress. Our keynote speaker will address GMO's in the Food Chain. Society's demand for inexpensive food, coupled with competition and grocery store's efforts to fulfil those requirements eliminated many good farmers. Consumers are appalled at the consolidation of farms, yet show little concern about the consolidation of grocery and other stores. These issues will be discussed by two speakers and an industry panel. ADDS, Inc. personnel will discuss and demonstrate their unique educational program.

Activist groups protest vigorously, and some may be considered a secular religion. Can animal rights dogma be promoted as originally intended, or must it be sold on welfare or a reduced version of "rights"? Can industry withstand the crucible of common decency in dealings with animals? Do they deal progressively with societal issues? Prescriptive Production Issues will be discussed by a panel, then there will be comments on Farm Level HACCP. Animal agriculture is presented as the major contributor of water pollutants. Is the USEPA moving toward acceptable agricultural pollution through credits that allow pollution? The final session is a panel of environmental experts. Full papers will be available in independently published proceedings.

Key Words: GMO's, Prescriptive Production, Agricultural Consolidation

2 A Rational Discussion of GMOs in the Animal Food Chain. S.K. Harlander*, *BIOrational Consultants, Inc.*

In the relatively short time since their commercial introduction in 1996, genetically modified (GM) crops have been rapidly adopted in the U.S. Over 25% of the corn, 54% of the soybeans, 61% of the cotton and 70% of the canola grown in the U.S. and Canada in 2000 were GM varieties. These crops are treated as commodities and have found their way into the vast majority of ingredients used for human food products and animal feed. Because FDA considers these crops "substantially equivalent"

to their traditional counterparts, no special labeling is required for ingredients derived from GM crops in the U.S. Crops are typically not identity preserved or segregated from their non-GM counterparts and co-mingling is common in the supply chain. Certain consumers who wish to avoid GM foods have raised concerns about the use of GM crops in animal feed. They question the safety and fate of DNA and protein derived from GM crops once they are consumed by animals. Some have suggested that animals that have consumed GM crops should be labeled as such. International scientific organizations agree that GM crops are as safe or safer than conventional crops. The DNA and protein present in GM crops is digested in the same manner as endogenous DNA and protein present in the food supply. Numerous studies have also demonstrated that protein and DNA from GM crops is not detectable in various organs, meat, milk or eggs. Animal feeding studies in a variety of animal model systems have confirmed that GM crops are nutritionally equivalent to their conventional counterparts. Further, animal performance is equivalent for conventional and GM varieties. The techniques of genetic engineering can be applied to animals in a variety of ways to improve animal performance, alter composition, or to engineer animals to produce pharmaceuticals in their milk or blood. This presentation will provide a rational discussion of the broad applications of genetic engineering to the animal food chain and the logistical, regulatory and consumer acceptance issues created by this emerging capability.

Key Words: Genetically modified crops, Fate of DNA and protein, Labeling

3 The Economics of the Animal Protein Chain. A Barkema*¹, M Drabentott¹, and N Novack¹, ¹Federal Reserve Bank of Kansas City.

One of the most striking developments in the animal protein industry in recent years is its rapid consolidation, highlighted by three recent events. First, recent census data indicate just a tenth of the nation's farms account for fully two-thirds of U.S. agriculture's output of food and fiber. Second, the share of the nation's steers and heifers slaughtered by the four largest meat processors edged up to more than 81 percent in 1999, up from slightly more than a third in 1980. Third, Wal-Mart recently took the lead as the nation's largest food retailer, boosting the market share held by the four largest food retailers to about a third.

The industry's increased consolidation presents an important trade-off to both consumers and producers. On one hand, the consolidation heightens concern that big food companies could gain market power, pushing up food prices for consumers while pushing down commodity prices for producers. On the other hand, the consolidation could be beneficial, enabling more efficient product development and delivery systems while wringing out industry costs. Consumers could gain a wider selection of higher quality food products at lower prices. Producers could boost margins and manage risks by entering supply chain relationships with food companies. In either event, rural areas could see a new patchwork of growth and decline emerge as traditional farm-dependent communities wither and a comparatively small number of supply-chain hubs emerge.

These dramatic shifts in the economics of the animal protein chain pose big questions for policymakers. How much concentration is too much, and how do regulators know? What policy changes will help producers participate most profitably in the industry's new business structures? And how do rural communities position themselves to capture the benefits of the new livestock industry while minimizing any negative impacts? All of these questions point to the need to rethink the traditional approach to regulatory, farm, and rural policies that were built around commodities, a model that looks out of step with where the industry is headed.

Key Words: consolidation, concentration, food industry

4 Pork value chain economic concerns. Steve Meyer*, National Pork Producers Council, Des Moines, IA USA.

There is no "food" value chain. There is not even "a" pork value chain. In fact, there are hundreds of parallel value chains delivering foods of various varieties to consumers. They compete for consumer food dollars; a pool which has gotten smaller by opportunity, not necessity, in the U.S. New technology and the ability to apply it rapidly has allowed some producers, processors and retailers to gain cost advantages over competitors thereby enabling them to sell for less and create extreme economic pressure for rival firms. This pressure has, not surprisingly, forced many from the industry. The resulting consolidation has caused producer sector turmoil and political decisions aimed at economic problems. The issues for the future will be twofold. First, will the pork industry look to the consumer or producer end of the chain to decide who is "rightfully" served? Second, will value chain systems that equitably distribute the total consumer value be derived and, if so, will they provide enough income and profit to producers of live animals?

Key Words: value chain, consumer, equitably

5 Current and future challenges in the dairy food marketing chain. R. D. Yonkers*, International Dairy Foods Association.

All segments of the dairy marketing chain have undergone significant structural change in the past decade, a trend likely to continue. Increasing concentration exists among milk marketing cooperatives, dairy product processors and retailers and other outlets for dairy products. The dairy industry is characterized by low profit margins at all points in the marketing chain. In addition, the substantial level of government regulation of the dairy industry inhibits innovation at all levels, especially minimum price regulations and strict standards of identity for consumer products. The future growth of the U.S. dairy industry depends on successfully addressing the following challenges:

- 1) Transition current dairy industry regulations, which are nearly the same as those first developed in the 1930's and 1940's, to reflect current market realities.
- 2) Increase the dairy industry's cost competitiveness with other global dairy players as well as other domestic competitors for their share of the consumer stomach.
- 3) Successfully adopt existing and emerging technologies and develop product innovations designed to meet the changing consumer marketplace.

Key Words: Dairy markets, Dairy regulation, Cost competitiveness

6 The ADDS Program: facilitating cooperation and national leadership for agricultural knowledge delivery. J.M. Mattison*¹, M.B. Opperman¹, B.R. Eastwood², R.M. Kattnig³, and M.J. Joyce⁴. ¹ADDS Center, ²USDA-CSREES, ³University of Arizona, ⁴Wisconsin Milk Marketing Board.

The ADDS Program is a cooperative effort between USDA/CSREES, the Land Grant University system, producer commodity organizations and the private sector to develop information resources for decision support. These resources, or InfoBases, can be used by extension personnel, educators, producers and support personnel to facilitate the development of a decision support mechanism to benefit all of agriculture. Each InfoBase product is organized by a national committee of specialists representing Cooperative Extension, commodity producer groups and private industry. This committee sets the organizational structure of the InfoBase, including determining a project leader, organizing an editorial committee and developing review teams. The committee also develops guidelines for the information that will appear in an InfoBase, including subject areas, content requirements and review schedule. Standard operating procedures for the continuous updating and review of content are also outlined by the committee. This committee structure provides a forum for national leadership and cooperation for the development of specific commodity-based decision support tools. Each InfoBase committee selects three representatives to the ADDS, Inc board of directors. This board represents all active InfoBase groups, encompassing beef, poultry, dairy, pig, sheep, goat, catfish, FARAD and food safety industries. This groups maintains the policy and structure of the ADDS Center, which is the service bureau charged to facilitate the development, production and marketing of InfoBase products.

Key Words: Infobase, Decision, Knowledge

7 Prescriptive production issues - a UK / European perspective. Malcolm Mitchell*¹, ¹Roslin Institute.

In Europe, public and political concern relating to animal welfare and commercial production has increased dramatically. In particular, public awareness of the issues has been raised by extensive media coverage and the high profile activities of both animal welfare (e.g. UK Farm Animal Welfare Council) and animal rights organizations. Inextricably linked to the animal welfare concerns is the perception that modern intensive production systems have influenced food hygiene and human health (e.g. spongiform encephalopathies and salmonella infections). The result is an ever-changing background of interrelated legislation, codes of practice and quality assurance schemes regulating animal production, handling, transport, slaughter and processing. There are many participants in the development, implementation and policing of the regulations and codes. A major driving force for improvement is general public concern although the animal welfare lobby has drawn attention to specific problems. Much of the pertinent legislation originates at European level in the form of European Community Regulations and Directives. These are binding upon member states and must be implemented, by governments, through "domestic law". The standards defined in this manner may often come in to conflict with World Trade Organization agreements. Superimposed on this legal framework is the influence of the food retailers who in the UK can exert tremendous economic influence on animal producers. These retail organizations can achieve commercial advantage by promoting higher welfare standards and production systems. There are many recent examples of changes in agricultural practice resulting from all of these prescriptive pressures, including the abolition of pig farrowing cages and tethers, the phasing out of battery cages and the prohibition of amputation procedures. The increased costs of higher welfare standards and better production systems are generally borne by the producers and few subsidies for this purpose are available. A major challenge to the scientific community is to provide the sound, objective basis for improvements in welfare regulations and methods of production, which consider the well being of the animals but allow for the economic supply of high quality animal products.

Key Words: animal production, welfare, legislation

8 Government perspective on animal production food safety. Alice Thaler*, *USDA/FSIS, Washington, DC/USA.*

The Food Safety and Inspection Service (FSIS) is committed to ensuring food safety for meat, poultry and egg products using a farm-to-table approach. Issues affecting producers include regulatory requirements at slaughter, humane handling, and residues. FSIS has no direct regulatory authority on the farm; however, regulatory requirements at slaughter establishments will impact the relationship between producers and processors. The FSIS has 35 cooperative agreements with state regulatory officials and universities to educate producers about these impacts. These educational efforts in animal production are part of a larger change whereby FSIS will redefine the role of its veterinarians who will become public health professionals overseeing the effectiveness of farm-to-table food safety systems.

Humane issues potentially impact producers. FSIS considers humane methods of handling animals and humane slaughter operations a priority, and is committed to ensuring that there is compliance with the Humane Methods of Slaughter Act in federally inspected establishments that slaughter livestock. FSIS participates in the USDA Animal Well Being Task Group, which is comprised of agencies with regulatory authority over humane treatment of animals under prescribed circumstances, such as animals under exhibition. FSIS plans to develop objective criteria for determining whether observed handling and stunning practices for livestock are humane. Also, beginning with School Year 2000-2001 purchase, USDA will no longer accept ground beef that includes product from non-ambulatory cattle.

Residues continue to be an important issue in the minds of consumers. FSIS is developing an approach to regulatory enforcement that will be compatible with a HACCP environment. This may include condemnation of carcasses whenever a target tissue is found to exceed the regulatory tolerance for a pesticide or drug.

All in all, responsibility to prevent, reduce or eliminate hazards will be shared throughout the farm-to-table continuum. Industry quality assurance programs are expected to address more food safety issues in the future. This will be a major change for producers who do not currently have programs in place to address microbiological, chemical, and physical hazards.

Key Words: residues, HACCP, food safety

9 Overview of environmental protection concerns and potential solutions. H. F. Tyrrell*, *U. S. Department of Agriculture, CSREES, PAS.*

The impact of livestock production on the environment has evolved into a major issue confronting livestock producers in the United States. The U.S. Environmental Protection Agency has proposed new regulations for Animal Feeding Operations which will have major impact if enacted as proposed. The Supreme Court has upheld new Air Quality Standards which, for the first time, will include ammonia as a criteria pollutant under the National Ambient Air Quality Standards. The bottom line is that it will not be business as usual for livestock producers. The livestock industry is going to have to factor in the cost of dealing with nutrients entering and leaving the animal feeding operation by whatever route. The starting point for the development of nutrient management

systems has to be the application of mass balance principles to the total livestock production system. We have to be able to accurately identify source and fate of each nutrient as it moves through the production system. Route of loss will be different for each nutrient. Loss of nitrogen to the atmosphere, for example, can be the primary route from the production system to the environment whereas phosphorus loss via this route would be negligible. Only when one considers total mass flow of all nutrients through a livestock production system can realistic comparisons of alternative nutrient management strategies be made.

Key Words: Nutrient, Regulation, Environment

10 EPA's Vision—the Next Steps. Roberta Parry*, *U.S. Environmental Protection Agency, Washington, D.C..*

The U.S. Environmental Protection Agency (EPA) proposed new Confined Animal Feeding Operation (CAFO) regulations in January 2001. The regulations focus on preventing animal manure from reaching surface waters. Nutrients are the major pollutants of concern, since they are the number one cause of water quality impairments in lakes and the number three cause in rivers. Pathogens and sediment are also important pollutants from CAFO operations. In order to update the 25-year old CAFO regulations, EPA has proposed several changes to better protect water quality. These changes focus on three major areas: 1) who needs a permit (all CAFOs including dry poultry, immature swine and heifer operations, and integrators with substantial operational control over growers); 2) feedlot requirements (existing beef and dairy CAFOs and all new CAFOs—zero discharge to groundwater that is hydrologically connected to surface water),(veal, swine, and poultry—zero discharge with no overflow allowance); and 3) land application of manure (Permit Nutrient Plans including rate, timing, and method of application; 100' setback from water; maintaining records on manure transferred off-site). EPA has taken public comment on the proposal and will be revising the regulation for final action by December 2002. In addition to the CAFO proposal, the Total Maximum Daily Load regulation may require animal operations to adopt additional practices if the operations are in watersheds where agriculture impairs water quality. Livestock producers will need assistance from many different sources to understand their responsibilities under these regulations and implement changes on their operations.

Key Words: Confined Animal Feeding Operation, Water Quality, EPA Regulations

11 Industry View of Environmental Issues. C. H. Iltis*,¹ *National Milk Producers Federation.*

As a result of various federal, state, and local environmental initiatives, livestock producers are having to become increasingly aware of minimizing any potential environmental impacts on their farms. This presentation will review various initiatives to manage livestock waste from both regulatory and educational/technical assistance standpoints. In addition, we will discuss producer-led efforts to address their environmental concerns.

Key Words: Environmental, Livestock

Current Concepts of Animal Growth X: Metabolic and Cellular Regulation of Protein Deposition

12 Amino Acids: Regulators of Global and Specific mRNA Translation. S.R. Kimball*¹, ¹*Pennsylvania State University.*

A continuous supply of a complete complement of essential amino acids is a prerequisite for maintenance of optimal rates of protein synthesis in both liver and skeletal muscle. Deprivation of even a single essential amino acid causes a decrease in the synthesis of essentially all cellular proteins through an inhibition of the initiation phase of mRNA translation. However, the synthesis of all proteins is not repressed equally. Specific subsets of proteins, in particular those encoded by mRNAs containing a 5-terminal oligopyrimidine (TOP) motif, are affected to a much greater extent compared to most proteins. The specific decrease in TOP mRNA translation is a result of an inhibition of the ribosomal protein S6 kinase, S6K1, and a concomitant decline in S6 phosphory-

lation. Interestingly, many TOP mRNAs encode proteins involved in mRNA translation, such as elongation factors eEF1A and eEF2, as well as the ribosomal proteins. Thus, deprivation of essential amino acids not only directly and rapidly represses global mRNA translation, but also potentially results in a reduction in the capacity to synthesize protein.

13 Cellular Control of Protein Degradation. Didier Attaix*¹, Lydie Combaret¹, M-Noelle Pouch¹, and Daniel Taillandier¹, ¹*Human Nutrition Research Center of Clermont-Ferrand and INRA.*

A few years ago protein degradation was considered to be a global, non-selective and poorly regulated metabolic process that was mainly involved in housekeeping functions. This area of research has developed exponentially in the last decade, and it is now clear that many major biological functions are controlled by the breakdown of specific proteins. In