Agriculture Technology, Research and the Rural Economy

Representative Richard Creagan (HI) introduced the speaker, Alison, L. Van Eenennaam, Ph.D., University of California, Davis, where she is an extension specialist in the field of animal genomics and biotechnology. Dr. Eenennaam was the recipient of the 2014 Council for Agricultural Science and Technology Borlaug Communication Award, and was elected as a fellow of the American Association for the Advancement of Science in 2017.

Dr.Van Eenennaam spoke to us about GMOs and animals, which are both quite controversial subjects. Because of the controversy, she has been forced over the years to become adept at science communication. She sees we are losing access to innovation, and it worries her. The projections for what is needed to sustain the population in the future are daunting, and if we have no access to innovation we cannot address the food security needs of the future. Scientists have to start talking to the public about agriculture.

She is an animal geneticist. Pet breeding is one thing, but when we apply the science to the food species, that's when it becomes serious. Plant and animal breeders have the greatest sustainability stories ever told, but no one speaks of it in terms of sustainability because the productivity improvements that have been enabled by conventional selection are breathtaking. Hybrid corn breeding and yield per dairy cow were two examples of non-GMO breeding that have taken place and made dramatic strides in agricultural productivity.

Positive Impacts of Science Innovation on the Environment

What would be the environmental footprint of a glass of milk today if it were not for the innovation that allowed us to so drastically reduce the number of dairy cows in the country? She reminded the audience that in the 1950s there was opposition to artificial insemination. It's not natural. It involved sex. The bull breeders rightly understood that this was the end of the bull breeder industry, and therefore we against AI. There always is pushback when technology gets introduced, and there are always winners and losers.

How to Measure Benefits vs. Losses?

How do we judge whether it's an acceptable technology, and whether the losses are too great or the benefits not enough to adopt these technologies? The improvements in the dairy industry due to AI prove that it was enormously beneficial. The pushback is nothing new, dating as far back as Luther Burbank in 1906 who warned about crossbreeding in plants.

Through her power point, Dr. Van Eenennaam showed the most striking example of change in conventional breeding can do to our food production – the broilers. Fifty years of conventional genetic selection showed an amazing change in the size and life cycle of the broiler chickens. People in the U.S. eat about 8 billion chickens a year, and globally it is approximately 50 billion chickens a year. If chickens were grown today the way they were in the 1950s, the impact on the environment would be devastating. The new movement to 'slow growing chickens' in effect is more harmful to the environment. Old fashioned agriculture is inefficient.

We have to increase animal products by one of two ways – have more animals, or have more productive animals. Environmentally, more productive animals is a better way to accomplish that. Yield trends are insufficient to meet projected demands. We need genome modification in order to meet these demands. She described the process, which can be simply removing pieces of DNA

sequence, or to incorporate an anele into a strand – either the species being modified or a different species or even another kingdom. It's a broad technology.

Dr. Van Eenennaam gave examples of the science. Hornless, polled dairy cattle and disease resistance were two projects she described for the audience. The problem is getting approvals from the FDA and other government agencies in order to make these safe scientific methods accessible to the public. The debate has been going on for twenty years, and has stopped technology getting adopted.

The non-GMO labeling of products that do not have GMO equivalents is especially disturbing to Alison. She feels it is simply scaremongering to sell product. She has become active in the pro-GMO movement. She is worried that we are going to lose access to this technology. She was involved in the production of the feature film 'Food Revolution'.

Modified Animals Labeled 'Drugs'

She explained her interest in GMOs because of the FDA has regulated genetically modified animals as if they are new animal drugs. They are overriding legislative authority because the FDA claims 'the RNA construct is a drug that alters the form or function of an animal', requiring going through the new drug process. Even the removal of a segment of the genomic sequence has been determined to result in the animal being considered a drug. 'Any animal whose genomes have been altered intentionally using modern molecular techniques are now drugs.' The process for approval is a multi-generational, multi-million dollar process.

Without ability to get this process approved, other countries concerned about food security will adopt the scientific methods and leave the U.S. at a competitive disadvantage.

Her video 'Those Were the Days', and her presentation are available on the session website.