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Panel: *Chris Nelson Nelson, Moderator*

PANEL:

ADAPTING TO CHANGE: THE ROLE OF ANIMAL PROTEIN IN FEEDING A HUNGRY WORLD

Introduction:

Ambassador Kenneth M. Quinn

President - The World Food Prize Foundation

I want to now take the opportunity to introduce the moderator of the next panel, someone who I've got to know because he's the CEO of Kemin Industries, which are located here in Des Moines. And I've got to know him first, of the Nelson family, and his mom and dad, R.W. and Mary Nelson. And 50 years ago plus a little, started this company and built it into a global powerhouse in terms of its impact. I think the company touches half the world's population every day with their products. So we said that, and then I was in India and saw their operation myself and saw how they're out at the farm gate and bringing those technological innovations of change.

In addition, so now R.W. and Mary turned to Chris Nelson Nelson to be the day-to-day CEO of the company. And as he continues to build it, I try to see him whenever he's in town; but he's not here much, because he is out everywhere. And Kemin has been one of the few companies designated by the World Food Programme to be an advisor to all that they do. And they have done just remarkable things. And now this panel is going to be Adapting to Change: The Role of Animal Protein in Feeding a Hungry World - something that Chris Nelson Nelson is doing every day. So, Chris Nelson, over to you.

PANEL:

ADAPTING TO CHANGE: THE ROLE OF ANIMAL PROTEIN IN FEEDING A HUNGRY WORLD

Panel Moderator:

Chris Nelson

President and CEO, Kemin Industries

Panel Members:

Balram Singh Yadav Managing Director, Godrej Agrovet Ltd.

Shouchun Wang Chairman and General Manager, Shandong Xiantan Co. Ltd.

Chris Nelson

Well, thank you, Ken, and thank everyone here for being here this afternoon. It's been my pleasure to be able to attend this symposium for many years in the past. But one of the things of us who are in animal agriculture, we always notice that, well, it seems we talk a lot about crops, but how often do we really talk about animal agriculture, the actual consumers of much of the crops that are produced.

One of the things that I would like to take a few seconds to focus on is perhaps the differences between what I would call acute, acute malnutrition and chronic malnutrition. Acute malnutrition – oftentimes when we see this throughout the world of where we are in an acute phase of people without food. And that normally translates into a caloric deficit – we're simply not being able to deliver calories to people so that they can meet their daily need.

Chronic nutrition, oftentimes, though has to do with protein malnutrition. The 2,000 or 2300 calories that we need per day are oftentimes overlooked that we need in that 2300 calories 52 grams of protein. And that 52 grams of protein, whether that's derived from vegetable or animal sources, most importantly, must contain the essential amino acids that are required for all of human life. Oftentimes we talk, unfortunately, about caloric needs or protein needs and fail to go to the next level, which means our requirement for 240 milligrams of lysine per day and our requirements for 80 milligrams of methionine.

Vegetable proteins can provide many of these, most of these, if provided in sufficient quantities, but oftentimes the concentration contained within vegetable proteins is simply insufficient to be able to meet the protein requirements, especially of growing children. It is at that point where protein from animal sources can become essential for overall human development. Whether we constitute one egg per child per day or a number of milliliters of milk or a small portion of chicken meat, all of these provide the essential components that are required for human growth. And it is this focus that the animal feeding industry and the animal production industry looks to, to provide.

Today we've got a very distinguished set of panelists who are going to be able to talk to us a little bit about, from a practical aspect, what is happening with animal production in two of the

largest population centers of the world, China and India. And in those countries how the challenge of meeting the protein requirements of all citizens, whether regardless of where they are on the pyramid, has to be met.

The nutrients that are available from protein from animal sources constitute in the American diet nearly 23% of the energy and 63% of the protein requirements that we have. They also constitute 99.9% of the requirements for vitamin B12 and 56% of the requirements for vitamin A, 56% of the requirements for zinc. These essential nutrients form really the basis of animal protein and its essentiality.

The questions and controversies around animal protein, though, remain many. Oftentimes opponents of animal protein will talk first about beef, which I still refer to as our “luxury protein,” and refuse to talk about the essentiality and the efficiency that is seen in milk production, egg production and chicken production, which in large part constitute the protein sources that are needed and have the ability to be able to feed those parts of the world that are suffering from chronic protein nutrition.

I would like to introduce our two panelists for today and our translator. We have been very, very welcomed to the United States. First of all, Mr. Balram Yadav, who is managing director of Godrej Agrovet in India. Godrej Agrovet is part of the overall Godrej group, a six billion dollar company in India; \$600 million of that sales yearly is done by the Agrovet group. They are some of the leaders in chicken production as well as in dairy production within the country, and leaders in egg production as they are producing feed for those animal sectors.

Our second panelist today comes from China, Mr. Shouchun Wang. Mr. Wang is founder and chairman of the Shandong Xiantan Co. It's the leading broiler company in Shandong Province, producing nearly 90 million broilers a year. They've been an essential part of providing broilers throughout the China area and into rural China to be able again to meet that protein deficiency that was so rampant in China until a few years ago. The company contains both breeding, feeding operations as well as farms, slaughtering and processing of chickens to be able to produce ready-to-eat products that are produced and sold throughout China.

These two gentlemen are going to be able to comment to us on a variety of topics that deal with animal agriculture and especially questions of sustainability. But before we begin, I'd ask of them to come to the podium to make a couple of brief comments as they see the place of animal agriculture. So first of all, Balram, if I could ask you to the podium, please. Please welcome Mr. Balram Singh Yadav.

Balram Singh Yadav

Thank you, Chris Nelson, for this introduction. Ladies and gentlemen, I will humbly try to make the case for animal agriculture in India, home to over 1200 million people, a fifth of them below poverty line who fight hunger on a daily basis.

India recently enacted a historical legislation called the National Food Security Bill, which will allow nearly two thirds of Indians to access cereals like wheat, rice and coarse grain at highly

subsidized prices, between two cents to six cents a kilo. Most of the focus of our policymakers and the world at large is restricted to availability of calories as an index of hunger and undernutrition. This view completely ignores the non-availability of protein as an important dimension of hunger – the point that Chris Nelson made so beautifully.

India is a protein-deficient country. The big myth is that India is predominantly a vegetarian country – it is totally incorrect. As per our national food statistics, 78% of Indians eat non-vegetarian, but are forced vegetarians due to unaffordability. In 2012 we produced nearly 7.5 million tons of nutritional protein from animal sources – milk, aquaculture, meat and eggs – and only about 4.5 million tons from vegetarian sources, not counting the protein contribution of cereals.

It is widely accepted that animal protein is much more similar to our own bodies and contain higher level of essential amino acids and are more efficiently digested than most plant proteins. Moreover, it is a very efficient way of converting inedible brown products like brans, cakes, extractions, roughages and crop residues into good-quality, edible protein.

As India becomes richer and its middle class expands, we have seen a rapid growth of animal protein industry. Though our per capita consumption of animal protein is much lower than the world average and even the recommendations of WHO, they are rising rapidly. In the past five years, 37% of agricultural growth output came from animal protein. Within this category, output of eggs and meat has risen faster, and poultry the fastest.

There is a joke in India that the IT sector and the poultry sector have done really well without support of the government in any way possible. The reason people give is one, that the IT sector they did not understand, and the poultry sector they did not bother. So all this growth has come at its own steam, which is commendable.

Animal agriculture today accounts for nearly 30% of agriculture GDP, and we believe that by year 2025 it will account for nearly 50% of our agri-GDP. It is also surprising that India has become first in milk production, second in freshwater aquaculture, third in egg production, fourth in broiler meat production. In the last few years it has become one of the top beef exporters in the world. Poultry sector alone created nearly 3.8 million rural jobs in India in the last five years without any government support. And one appreciation of our current RBI governor, who is the eminent World Bank economist.

As India grows, feeding its four or five hundred million people will always be a challenge. We shudder thinking about drought, as more than 40% of Indian agriculture is still dependent on monsoons. While the animal protein sector has done well, the future looks even brighter. It will have to overcome several challenges. Disease continues to be one single biggest challenge, be it bird flu in poultry, outbreaks in our aqua, or the recent FMD outbreak in cattle in several parts of India. As fodder areas compete with food areas, crippling fodder shortages might hit milk production in the future. Even though we may be number one in milk production, yield levels are very low. Nearly 300 million cows and buffalos produce 135 million tons of milk. We also cannot ignore the emission of methane and its immediate impact on global warming.

As the industry adopts of modern technology, it also faces severe talent competition from the more glamorous services and manufacturing sector. I was thrilled when the lady made this

comment that our sector is not sexy and cool, and I realized how true you are, because our problem today is to attract talent to the sector.

This list is very long, and the animal agriculture industry and the policymakers have their job cut out for the future. Thank you.

Chris Nelson

And now my pleasure to introduce Mr. Wang and our translator today, Mr. Fanglin Yu also from Kemin. Please come up.

Shouchun Wang

Good afternoon, ladies and gentlemen. Thank you to Dr. Nelson and all for having me in this dialogue. It is my pleasure to come to Des Moines and to attend this great event. The beautiful landscape here reminds me of my hometown, Yantai.

I'm a farmer from China, starting as a small broiler farm in 1993. My company expanded quickly and was named Shandong Xiantai Group in 2001. Now it has developed into a largest broiler company in China. Our business, including breeding, hatching, feeding and processing. My company and I are dedicated to providing people with grain safe and healthy chicken meat. Our unique location is in beautiful seaside city, Yantai, and makes broiler farming environmental friendly. We are one of the largest chicken meat producers in Shandong and have been called suppliers of McDonald's, KFC and also Shuanghui Group in China.

About 20 years ago, China's broiler farming industry just started. There was a short supply of protein food, not to mention healthy and delicious food. That's why I have this simple dream of raising chicken to meet my people's requirement. A lot of Chinese farmers have the same dream as mine. For so many years we have worked together to promote China's broiler industry and solve the problem of supplying protein food for a lot of Chinese people.

Since we have made it on many families' dinner table, we are facing a new problem. What we need to think about now is how to provide my people with more quality, healthy and delicious chicken meat product. This is a question that my new dream has meant to answer - to build a green industry and to produce healthy food.

I'm a farmer with a beautiful dream. I have witnessed China's broiler industry to develop from scratch. With the development of the industry, Xiantan employees and I have turned Xiantan from a qualified protein food supplier into a distinguished food producer.

So many thanks for everybody, and hope everybody keep healthy and happy. Thank you so much.

PANEL DISCUSSION

Chris Nelson We've got a variety of questions for the panelists. I would like to start off with my first question dealing with the issue of sustainability. And in the animal feed industry I know one of the principal ways that we measure our overall efficiency is by feed-to-gain ratios, in other words how much animal do we produce for a particular amount of feed. It's rare that an industry has a major economic metric that is directly correlatable to sustainability. Obviously, the more meat you can produce with the fewer amounts of grain that you use, the more sustainable you are.

There has been great progress on feed-to-gain ratios both in broilers, layers, even in dairy cows in the last few years. Where do you see the future of that going? And maybe, Balram, I'll start with you. Are we at a peak, or is there continued progress to make?

Balram Singh Yadav If you are asking me and if I understood it correctly, sustainability means that will we have enough raw materials, and will we continue to improve in efficiency? As for India's concern, the answer is a very big yes. We will not run out of feed ingredients for quite some time because our yield levels are very low. If you take corn productivity, two and a half ton, so we can triple with the same land as the hybrid penetration improves. And in soya we produce a ton per hectare, which can also be doubled. And presently also half our soya meal is exported, so we still have a long way to go.

As for the efficiency improvement is there, both nutrition and genetics have done tremendous job for broilers in the country. Ten years ago we talked about 2 kg feed for a kg of live weight, but today we are talking about 1.6 kg. And I don't think anything is impossible because chicken is actually 70% water, so we can really, really work towards making the FTG even below one. Because nobody would have believed if we would have talked about 1.5, 1.6 a few years ago. But science has made it possible.

As far as beef cattle and swine is concerned, India is not a pork and a beef country. Most of the animals are spent animals. We don't slaughter cows because of religious reasons. Buffalos are slaughtered, and most of it is exported.

Chris Nelson Mr. Wang, obviously China has been able to see tremendous efficiencies; feed-to-gain ratios have decreased significantly. Do you think in China that we're going to see further decreases in feed-to-gain ratios?

Shouchun Wang Actually, China's endeavor to increase their feed efficacy, and now we are focused on the breeders and also on the quality of the feed, so I think China will improve these sort of works continuously. And also we will see the food safety, food supply, safety supply, and China actually, we also maintain some crops like rice and wheat, because everybody knows if we feed a lot of animals, we can lose about 10% of our total crops, because it's a nutrition concept. So Xiantai first maintained the food supply like rice and wheat and also increased the productivity of animals.

And just to continue answering his question, China also imported a lot of soybeans, soybean meals and corn from like U.S. to meet the growth of the animal protein requirements.

Chris Nelson That almost brings me to my next question is that in the United States, if we leave ethanol out of the equation, nearly 80% of the corn is fed to animals, 85% of the soybeans are fed to animals in the United States. As you look in China or India and we see an increasing amount of grains being fed to animals, I guess my first question is - do you see a development of alternate grains coming or alternate feed sources replacing some of these traditional corn and soybean-based diets, which I know are predominant in both of your countries? Mr. Wang, maybe we start with you on that question.

Shouchun Wang With the price increases from imported soybean meal, for example, from U.S., especially from the end of last year, Chinese government, also Chinese feed companies already exchanged some ideas, will have to make some replacement of their protein resources. Actually, we are using now cotton seed and some vegetable seeds, just like these cotton seed meals and vegetable seed meals to replace the soybean protein.

Balram Singh Yadav I think we see the similar trends in India. One good thing about India is that it has reasonably good diversity in oil seeds. We produce a lot of groundnut extractions, we produce a lot of cottonseed extractions, rape and mustard extractions. But they can be used in larger quantities in their feed but have strong limitation as far as broiler rations are concerned.

As far as grains are concerned, we also produce millets because a large part of India is rainfed agriculture, so we produce this millet called Bajra, which replaces corn very well. But I need to say something, that corn yields are improving at the rate of about 8 to 10% CAGR for the last several years. As I said, the penetration of hybrids increased, so the yields also increased. We have become a net exporter of corn, and we believe that India is not a big corn consumer as a grain. We are still dependent on wheat and rice, which are not used in animal agriculture at all.

Chris Nelson Very good. This question may be directed just to Mr. Yadav because you're involved in milk production. One of the problems in furthering milk production in India, I know, is just the lack of forages. And

oftentimes we hear much about grain yields and we need to raise the overall grain yields, but very rarely do I hear anything about raising the total forage yield per hectare, and this is a critical nutrient for dairy cows. What have you seen as India tries to develop more of its milk economy? Is forage going to be a big issue, do you think?

Balram Singh Yadav India has a crippling shortage of forage and dry fodder. But let me step back and say what has changed in India in the last five, six years. The best thing which has happened in India is the increase in food prices. They increased 12, 13% CAGR in the last five, six years. All of the economists call it food inflation, but we feel that it is more money in the farmers' pocket; when 60% of the population gets richer, the country really benefits. What it has also done is it has made, after a very long time, Indian agriculture very ruminative. It's a profitable venture. And as the lady said in the earlier panel, that our farmers treat it as business. So five, six years, seven years ago, 7% of total arable land was under fodder; now only 4% is under fodder. But in last 20 years things have changed. The fodder prices have gone so much. Because the milk prices have risen, the farmer wants to produce more. They cannot change the genetics immediately – but what can they change? They can change the nutrition. And fodder prices have risen. In last two years I see so many companies, so many multinationals have come with hybrid fodder crops, like sorghum, Sudan grass and other things. There's a very big market developing in India for forest seeds.

The government is putting focus. But I think we have reached a level where, if the government does not interfere too much, we can achieve very good business balances in the production of various crops and various things to keep this animal agriculture growth engine going.

Chris Nelson Very good. I want to compare and contrast maybe China and India in one aspect. And of course India does not utilize GMO crops, short of cotton, but I mean in animal feeding does. China has a variety of GMO crops. And I don't know if the two of you have compared productivities in your two countries, although I know that the broiler productivity is about the same. I guess I'll start with Wang. Mr. Wang, do you think that China is having an advantage in its animal agriculture because you have GMO crop availabilities. And Balram, do you think there's a disadvantage to India because you don't have GMO crops?

Shouchun Wang In China, actually, everybody knows that China is the biggest population in the world, so the foremost thing is how to meet the requirements of food supply, maybe the same in India? And in China, not only in the feed industry for GMO and also I think many Chinese people already eat the GMO food. So currently we have not seen any negative effect of GMO feed or food, so actually the advantage is the GMO feed provides a lot of raw material resources to the Chinese feed industry. So I think our

government, we will continue this strategy or policy to improve usage of GMO crops, I think.

Balram Singh Yadav The case for GMO is already made, because we have seen the evolution that cotton has done; the yield levels have doubled; in three, four years GMO penetration in cotton from 20 to 30% has gone to 95%-plus. As far as animal agriculture is concerned, are we feeling the pinch? The answer is not yet, because we are still surplus in soy extraction. We are still measuring up to all the corn production and corn output we need. But in time to come, maybe five, seven years later when the yield becomes a critical factor in increasing production, we will probably have to think very seriously about GMO crops to feed the growing population of the country.

Chris Nelson Very good, very good. We hear a lot about climate change and obviously the earth getting warmer. And from a scientific standpoint, it doesn't seem deniable anymore that that is certainly a phenomena that is happening. As you see the warming of the climate, we know that this is affecting, of course, a variety of crop productions, but I very rarely hear anybody talking about how this is affecting animal production. Within India and China - maybe we'll start with India first, how do you see this climate change affecting overall animal productivity and changes in India. And then maybe to China.

Balram Singh Yadav The Indian narrative on climate change is restricted to the manufacturing sector right now. And I think government has enacted a lot of legislations in trying to control that. And the legislations have come under severe criticism also, because it has truncated the manufacturing activity to a certain extent.

As far as the agriculture is concerned, it is just considered a holy cow. I'll be very frank with you that 300 million animals are the biggest contributor to methane emissions and GHG emissions, and nobody talks about it.

But I think there are several things which are changing. One of the things which is changing is that people are realizing that having such a large herd of unproductive animals is uneconomical. So at some point in time religion and economics will start having a dialogue. And that we are seeing last year drought, we saw a severe reduction in our herd size as far as cows were concerned. And I feel that the population of cows in the country is not likely to grow in the future. The only thing is the salience of crossbreds continuously go up, and the yield levels will continuously go up. In the last five or six years, we have seen that the yield is contributing more than the population as far as growth of milk is concerned.

Coming to buffalos, buffalos can be slaughtered. We are becoming a very big beef exporter. Last year we exported almost \$4 million of beef; we are likely to grow 25% this year again. With the rupee depreciation, we have become even more competitive than the rest of the world.

So I feel that in some way the natural balance will come in climate change from the animal agricultural sector by restricting the herd flock, which will happen automatically. If you ask me whether government will take steps or will we improve the digestion and other things in the next five years to restrict that, the answer is no.

Chris Nelson So anyone you're saying in India the number of cows is going to go down just because as a result and thus we should have an impact actually on the climate, yeah. How about in China, Mr. Wang?

Shouchun Wang Actually, Chris Nelson has said the important issue of global warming, and I think one of the main factors there is carbon emission. And for Mr. Wang's company, his suggestion is to enhance the feeding productivity and strengthening the administration of the farm and also to culture better breeders. So that's his answer.

Chris Nelson Very good

Balram Singh Yadav I wanted to add one more thing.

Chris Nelson Sure, go ahead.

Balram Singh Yadav I missed one point. One is that recently our company pact has been changed, and 2% of our pact has to be sent on CSR activity. And the good thing is that most of the companies are thinking of two very important things in CSR. One is environment, and second is skill development, and I think both things will help animal agriculture.

Chris Nelson Very good. My next question is really somewhat unique to animal agriculture, and that is - in the last year, especially in China, we saw the spread of disease from animals to humans, avian influenza, which obviously the disease itself has a very negative effect on animals, but now obviously the chances of these vectors going from animals to humans. As animal production increases and the desire for more animal protein increases, one would think that the risk is going to go up. As producers of animals, especially chickens, Mr. Wang, how do you see your company responding to avian influenza in that regard?

Shouchun Wang Especially this year avian influenza has impacted our business a lot. You know, it's not only affected bird flocks but it has already caused people's death. So the Chinese government and almost every Chinese people pay more attention to this issue. Actually, until now I think many Chinese

broiler producers a negative profit, though the price of broilers increased to some extent.

For the government and the scientist, they are just focusing and endeavor to find the reason, the real reason and the real effect is passed. How can the virus affect a human being. But for our farmers what we can do is to do better prevention of the diseases, such as enhance our facility to raise birds and also to make the bird houses cleaner. And we hope from the efforts from government, scientists and also farmers we hope we can solve this problem in the future.

We still have this issue, that actually the patient who would be infected by avian influenza is not the worker from our industry. It's just people outside the industry. Maybe somebody buys some chickens in the market, then they are infected. So I think nobody in this industry could have fear of it.

Chris Nelson

Well, and I would point out that disease has transmitted from animal to humans probably since man first domesticated animals. And in some cases, go back in history, this was positive when cowpox was acquired by milking cows, that prevented smallpox. So it's certainly one of the factors of life. In India, Balram, what do you see?

Balram Singh Yadav

Actually, the problem is very real, and we have seen the devastating impact of bird flu in Asia, particularly – not so much in India, but southern parts of Southeast Asia have seen mixed farming. Their swine and chicken are raised together, and that's a very serious problem. But the point is, the marginal farmers do that, and you cannot tell them not to do it and deprive them of their livelihood. I think the proactive role of government throughout Asia is very important in this particular aspect. Industry has, particularly in India and several parts of Asia I go, industry has done their job of educating the farmers on biosecurity taking measures for prevention of disease. But I think immunization still remains in the control of the government. And the risk assessment of government is not always correct as far as immunization programs are concerned.

The second thing is that, since these diseases are viral diseases, the mutation happens very quickly. So immunization is one part, and second is development of evolution of immunization by bringing in private sector vaccine companies, is a very, very important method of containing this problem. And I think big countries like China, India and Thailand, etc., will have to do that. And they're doing that, I suppose so, but I think they have to do more of it to the security of human health.

Chris Nelson

One of the things that is well recognized is that nearly a billion families rely on animal agriculture for their livelihood. And whether that's very small stakeholders to very large stakeholders, animal agriculture remains

very key. As I see the development, say, in rural China and also in rural India, the importance of a place to sell your crop, in other words a market, and the market being a place that makes animal feed would seem a very logical first market for many, many of the grain farmers and then eventually going back to the small stakeholders. Especially in India, I know your company is very widespread throughout the country, have you seen a growth of purchased animal feed as a source of further economic development among small stakeholders?

Balram Singh Yadav The penetration of compound feed is getting better every year. One of the reasons is that demand for animal protein is rising, and genetics takes a lot of time to change. But nutrition can deliver very quickly, at least we can push through animal genetic potential in a very short time. So that is another reason why things are changing, particularly in the dairy sector. In the poultry sector, I think almost 90% is very well organized. It is consolidated. It matches with the world's standard in production, and you know that - you've been visiting India. The only thing is that we are not going whole hog by processing and getting into food. But as far as the production systems are concerned, they are very well organized as far as poultry is concerned.

Chris Nelson Mr. Wang, obviously your company in China has been very involved in the broiler industry. How have you seen the development of the layer industry, providing eggs especially in rural China - is it going to undergo some of the same changes that you saw as a small broiler farmer when you started and now a very large broiler farmer? Do you see that happening within the egg-laying industry in China?

Shouchun Wang The laying industry?

Chris Nelson Yes.

Shouchun Wang From Mr. Wang's point of view, since the broiler industry has trace back to 20 years ago and you see Chinese broiler industry developed very fast. But from his perspective, the Chinese layer industry also will improve very quickly, just as you can trace in the past what our broiler industry had.

Chris Nelson Well, we are out of time. I would like to thank our panelists and our translator very much for their participation today, and hopefully that everyone in the audience has learned a little bit more about animal agriculture within these two very critical developing markets in the world. Thank you very much and "xiexie ni."