

**CONVERSATION: THE ROLE OF LIVESTOCK IN SUPPORTING SMALLHOLDER
AGRICULTURE**

October 15, 2010 – 10:35 a.m.

Alice Pell – Vice Provost for International Relations, Cornell University

This is the Jo Luck session, and the livestock will not be absolutely at the periphery. I think we also need to continue the discussion that was involved in the previous panel.

The U.N. has a really excellent definition of food security – [that] we’ll know when food security exists when “all people at all times have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for a healthy and active life.” And that includes a lot of the micronutrient issues that were raised in the last panel and I expect that are going to be discussed in this upcoming panel. Basically, the last panel focused on nutrition. About half of the pregnant women in the world suffer from iron-deficiency anemia. In most villages across the planet we actually already are making iron supplements that are produced by local smallholders. And part of the discussion today in the livestock session is going to focus on that.

Today we have a panel that includes Nao Bee Lor, who is a livestock farmer from Laos. We also have Christie Peacock, who has been working for FARM-Africa; Carols Seré, who is the director general of ILRI; Thad Simons, the CEO of Novus; and Deepak Tikku, who has been working on Operation Flood in India. The order in which we’re going to have the presentations this morning, we’re starting with the farmer first, because that seems to have been a pretty important theme of the discussions this week.

I’d like to tell you a little bit about Nao Bee Lor. He’s a cattle farmer from Xieng Khouang village in Laos. He has been working with the Christian Reformed World Relief Committee, represented by Leexiong Leetakoon, and the Foods Resource Bank. He’s improved grasses for fodder, he has fish, peanut, and rice on his farm, so he has a very integrated crop-livestock system. His success in implementing new approaches has raised his family’s income, and we’re going to be very interested to see how that affects his life. So we’d like to start first with Nao Bee Lor.

Nao Bee Lor – Farmer, Xieng Khouang, Laos

Good morning. My name is Nao Bee Lor. I come from Laos. I have family; I have six children – four girls, two boys; I have seven grandchildren. I am a farmer. Firstly, I want to thank the World Food Prize for inviting me to this event, knowing how difficult [it is] to get a visa to enter the U.S. But right now, here among you, I am happy to be here, though sometimes difficult to get a visa.

Next I want to tell my story. This is my village; we have mountains, we have forests. So there is my farmhouse, [and] this is my family where we raise chickens, pigs, and ducks and also grow vegetables. This farm is away from my house, about one kilometer. I have a 4 hectare farm, and I start to grow grass since 2005; we have a local variety and we have a new variety also. This is the ag team from the district level [that] taught our farmers to grow [grass for] forage and to cut and take it to the cows to eat, and we have many farmers [who] learned from that team.

This is my farm [at] my house; I have 10 cows that I keep in my pens around my house, and I feed with the new [variety of] grass. Before the project came, I only was able to raise one cow at my house, but now I can raise ten or eight; since [starting the project], now, every year I can feed eight or ten cows a year. Right now I

have four times the income [as] compared to past years. And there are many farmers from my village and from other villages who visit me, to learn from me because I am a modern farmer in the village. More than that, other NGOs also visit my family and my farm to learn from my lesson. [And] when the traders came to my village, to my farm, they found that my cows are very healthy and very nice; they are very proud and gave me a good price.

Not only [do] I raise cows, but I also raise chicken, peas, fish, and I also grow vegetables around my farm as well. [At first] we have a few families try to do the new grass, but now many families, most of the families in my village, do the same thing as me. So I compare the past, and now I have four times the income.

My family and my village received [much] training from the project to train and to provide seeds and to provide training for our family and our village. So now I will have to finish. But thanks to everybody to come here, and I'm very proud — is my story. Thank you.

Alice Pell

Our next speaker is Christie Peacock, who has spent a lot of time working for FARM-Africa. She's an expert working with livestock in the NGO community. She's worked a great deal in Africa to improve natural-resource management, something animals often are accused of causing problems with. She's also worked in Southeast Asia, advising the Indonesian government's livestock research system and leading training programs in Thailand for FAO. She also ran a dairy goat development project in Ethiopia, something that's very close to my heart as a person who used to run a goat dairy. So, Christie, we really look forward to hearing your presentation.

Christie Peacock – Chief Executive, FARM-Africa

Thank you very much, Alice. It's really great to be here and great that livestock finally has made it big time in the World Food Prize meeting, and finally we've hit the big time. And Jo [Luck] and the work of Heifer is a great example of just exactly what I'm just about to talk about, I think.

Livestock play a complex and multiple role in the lives of very poor people who depend on crops and livestock for their living. It's my passionate belief – and more importantly [than] my passionate belief, there is a great body of evidence to show – that actually livestock can be the fastest route out of poverty for many people, not just in Africa, but also in Asia and other parts of the world. This is something that I know is close to everybody's hearts in this room. And that's why I think we, all the livestock people, believe that livestock has got to be much more mainstream in the new vision for agriculture that's coming forward at this time.

And I learned – the early part of my career has been spent with pastoralists, with the Maasai, and of course livestock are important to pastoralists; but it was when I worked in Ethiopia that I started to learn the role of, importance of livestock in the lives of smallholder farmers. And I'll never forget going to an area in Welayta in Ethiopia – finding two families that shared one chicken, being too poor to eat the eggs from that chicken, or to even eat the chicken; but the chicken was playing a really crucial role as an asset and as a sort of cash.

Now, I was running a dairy goat project, and I quickly learned that when crops fail, as we all know they do quite often in Ethiopia, that if you had two or three goats, then you could survive. You could sell those goats, you could buy food in the market and you could survive. If you didn't have those goats, then you were destitute, and you were going to be on food aid. It was as simple as that. Now, that's fine; that's one of the very many unrecognized roles of livestock. And in the absence of banking systems, insurance systems, livestock will continue to play that role. But, to move livestock on, to link farmers effectively with the market, we need to find other ways of ensuring household security and perhaps broaden the conversation out from crop and livestock insurance into looking at life and, indeed, perhaps, health insurance as well.

So livestock are critical, but we need to get a more specialized, focused production system going, linking farmers to market and really creating value at the farm level. And we need to look at ways we can delink this inexorable rise of population [and] livestock increase on the back of it, causing, as we know, pressure on the environment.

Now, we work, certainly in the African setting and elsewhere, in a very dynamic environment. All farming systems are subject to all sorts of pressures and changes that go on at the moment, and I've worked a lot in areas which are growing in area on very, very small farms, small farms that are an acre, less than that in some cases; and where there's great difficulty, actually, in increasing yields and increasing incomes on the back of increased yields alone of staple crops. And so I think it's not for nothing that farmers in parts of Tanzania have actually been digging up coffee trees to plant grass to feed to cows, because that's where they get the most income. And livestock, as I said from the start, are really critical means for people to get out of poverty and start becoming much, much wealthier.

It's a great frustration. If Dyno thinks that vegetables have been neglected, you should be in the livestock business, because we've been deeply, deeply neglected. It's not for nothing that less than, I think, it's less than half of 1% of aid goes on livestock, when they contribute 10-20% to GDP in many of these countries – it's an absurd, disproportionate spend.

But realizing the potential that's shown in this slide here, this is what we achieved in a dairy goat project in Kenya through simple interventions. This is not the application of rocket science. This is simple stuff. You can actually increase yields of dairy goats quite phenomenally, tenfold, without a huge effort; and increase incomes on the back of that to a very, very significant degree. You can take people from being casual laborers with very little land, very, very poor people, up to having an income of nearly \$1000 a year, which for them is a huge, huge step out of poverty towards a greater level of wealth. And these, of course, we know the value of income at a low level, the impact that can have, the transformational impact that that can have, on the lives of families.

And this photograph is of a lady called Tabitha in Meru; she's sitting with her back against a rather tatty, old mud-and-thatch house, and behind her is her brand-new house that she's managed to build on the back of the milk sales from her dairy goats and the sales of her breeding stock as well. And this has transformed not just her life but the lives of her sons and also daughters who can now, she can afford to send them to school. And also, of course, consume milk at home at last — it's not just a valuable thing that they have to sell everything; they can actually consume it at home. Building on what Dyno said about vegetables, there's a lot of evidence now about the role of animal-source foods and their important role in child development, particularly mental development.

So the theme of this meeting is *Take it to the farmer* and how we do that in a real sense in the livestock world. And of course we do have, certainly, issues to deal with, particularly around health; health of livestock that impacts trade, health that impacts human health in zoonotic diseases. And so there is a need to regulate, for the state to oversee animal-health delivery systems. But, equally, there is a need to move on from an entirely subsidized state veterinary service, which in Africa is simply not sustainable, and there are many NGO programs – Heifer programs and FARM-Africa's own programs – that are looking at ways of doing this through linking qualified vets with livestock technicians down to the grassroots and having trained community animal-health workers, or barefoot vets. Now, that's, I believe, a stop-gap measure; it's not the final solution, but we need to work towards a stronger system of delivery, of inputs and market opportunities, that will unlock the potential, finally, of livestock for poor people.

Alice Pell

Well, thank you very much, Christie. Our next speaker comes from the world's largest milk producer. And he comes from a country where the typical herd size is one to two cattle — it truly has been a pathway out of poverty. We'd like to welcome Deepak Tikku, who is a member of the National Dairy [Development] Board,

which in 1989, its founder, Verghese Kurien, received the 1989 World Food Prize. Mr. Tikku is chairman of the National Dairy Development Board's Dairy Services, a subsidiary company that was formed to implement India's national dairy plan. Both in the private sector and through NDDDB's cooperative network, Mr. Tikku has extensive experience expanding the scale of dairy and animal health networks from India's rural producers to the urban centers. And anyone who is not familiar with what Operation Flood and its successor programs have done for India, you need to look at that story.

Deepak Tikku – Chairman, National Dairy Development Board Dairy Services

Thank you, Alice. I will speak to you about a program that has been done in India, which in our view, with appropriate changes, can be adopted in many parts of the world where small farmers are there. If I briefly speak about India, most of you are aware that we have a population of over 1 billion, which means about 200 million households. Out of these, about 140 or 150 million households are in rural areas, and 50% of these all households — that means about 70 million — have milch animals. The normal holding of milch animals would be one to three per households.

Our milk production, which was stagnating in the '70s [at] around 20 million tons, is currently 112 million tons. This makes India the largest milk producer in the world. Also, the rate of growth of milk production in India over the last 20-30 years has been much faster than the rate of the population growth, with the result that the per capita consumption, which in '80s was about 4 kilograms a year, is now around 100 kilograms a year. All this has been achieved through a program named Operation Flood, in which surplus dairy commodities in Europe and other places were donated; but instead of just recombining and using them to make milk and distribute to the smallholders, the poor, we had a special project by which we could monetize these commodities. By monetizing these commodities, and also with help of some loan from the World Bank, about \$1 billion was invested in this program.

In the earlier sessions, there had been some discussions that we can't have a project for smallholders and then exit. You have to have a program, and you have to have appropriate instructional structures. So this program targeted setting up an institutional structure through cooperatives in India. Currently we have 14 million smallholders in about 140,000 villages, which are federated to about 170 district unions, which themselves are federated to about 24 apex cooperatives at the state level. Thousands of electronic milk testing equipment and farm coolers collect about 30 million kilograms of milk every day through the system. The milk is processed over 150 plants and marketed all over India and also exported. About 50 cattle feed plants supply about 2.5 million tons of cattle feed through the system.

We have thousands of technicians in the cooperative network who conduct millions of artificial inseminations and also give health services. We have also capacity-building programs for the smallholder farmers. In the last decade, the NDDDB has conducted about 5,000 training programs, where over 100,000 farmers, 1500 board of directors of the farmers' cooperatives, and about 40,000 employees have been trained. So, as has also been said in the early presentations, it is necessary to have institutional structures. It is necessary to evolve and see that, apart from collecting milk and connecting it to the market, you should also give all the technical services that are required for the small farmer.

I also wanted to emphasize the importance of livestock with other agricultural production. In India now milk is the largest agriculture commodity and generates about \$50 billion at the farm gate, which means that it's more than the value of rice and meat in India. Further, our model is not one of mass production, but of production by masses. Also, one of the measures of measuring proper inclusiveness is the Gini coefficient. Studies have shown in India that the Gini coefficient for livestock is around .15 compared to around .45 for agriculture, which means that income distribution from dairy is much [more] inclusive than from agriculture.

After creating this structure, because of the high growth of GDP in India, the demand of dairy and dairy products is increasing very rapidly. And therefore the National Dairy Development Board, after the Operation Flood program, has now doubled up our national dairy plan to further increase production to

about 200 million tons and also to ensure that the coverage of milk is further increased and more and more farmers are involved. And we are in discussions with the World Bank and with the central government to start this program quickly. Thank you for your patience for listening to me.

Alice Pell

Well, thank you very much for that. We're going to change directions quite a bit right now. Thad Simons, who has been the CEO for Novus International, which is a firm that produces both animal-health products and nutritional products – he's been in that position since 2001. During that time, Novus has expanded globally with sales of nearly \$1 billion. Thad has worked at Novus since 1991 and also serves on the board of directors of various agribusinesses and global affairs organizations, including the National Chicken Council and the World Affairs Council of St. Louis. I think we're going to hear from the bird part of the species diversity that we have represented on this panel, from Thad. Thanks.

Thad Simons – President and CEO, Novus International

Well, thank you, Alice. And thank you all. We know we're coming up to the end of the World Food Prize ceremonies and events and symposium, and I think it's been a great time. I think the organizers have done a fantastic job in bringing so many perspectives from all around the world. I am happy that we can share in this and bring you a little example of what we've been able to do, in a small way, very recently.

It is true that our business is in terms of fortification of animal feeds primarily, so it was good to hear of the recognition of the importance of micronutrients in human nutrition. And it's also very important in terms of optimizing livestock production to have very good nutrition for the animals. It actually achieves the three roles of sustainability — to have an economic return to the farmer, because we can more efficiently feed the animals; it improves the environment, because there's less waste coming out, so less going in, less going out; and it also improves the health. We talk about “Health through nutrition” as being one of our mottoes in our company. So, in terms of animal wellbeing and actually food safety, these things really can be achieved by paying attention to animal nutrition.

And eventually it all comes back to helping to feed the people, and you'll see Novus' mission and vision statement, “To help feed the world affordable and wholesome food,” and we've had that as our vision statement since 1991.

We are a very small part of the total value chain. Our primary customers are going to be the feed industry around the world, but in terms of where we play, we are actually active in selling to more than 90 different countries. We have people on the ground in more than 40 countries. We have one third of our sales in the U.S. with two thirds around the world from Africa to Europe to Asia, Latin America, everywhere. We work extensively with universities around the world, with education programs and research programs.

But what I wanted to bring to you today was a small example of something we did last week. Last Friday – probably most of you don't know this, but last Friday was World Egg Day. So World Egg Day is actually very important. There is an organization called the International Egg Commission; it's an international association of the egg producers from all over the world. And what they do is they come together twice a year and talking about how they can, as an association, work to increase egg consumption around the world. And we've heard a lot in terms of the health and needs of nutrition in human diets, and one of the best ways of addressing this, of getting additional protein at affordable cost into human diet, is through eggs.

So what we did as a company was to put together the materials you see there. Educational materials were distributed in African countries, and we were working in collaboration with our partner associations, the Kenya Poultry Farmers Association, the Association of Kenya Feeds Manufacturers, the Morocco Poultry Federation, the Poultry Association of Lagos State Nigeria, and the Poultry Association of Ogun State Nigeria. Working with these associations, in these three countries, we were able to put forward these

materials, and we were able to establish a kit that went out under a logo, “Know the truth about eggs.” And it went to a Web portal which is called – and you can go there; it’s still up and live – eggtruth.com.

At eggtruth.com you’ll much more about egg nutrition, how it’s important in terms of human nutrition, especially for mothers and young children – [there are] health benefits for adults as well, but really if we can get more eggs into early children, it’s very important for brain development; Christie, I think, even mentioned that in her talk. Sustainable platforms to share egg nutrition; and we support farmers in the community through these kinds of tools. We also provided something that’s kind of – in the modern day, with mobile phones being throughout Africa, we worked with the local mobile-phone companies and had 100,000 prepaid phone cards distributed through the country. Through this, we’re able to direct people to the website, eggtruth.com.

It’s very interesting to see the response. The anecdotal response is that, in Nigeria and in Lagos, there are no more eggs to be found in the supermarkets. So it’s partly building awareness for people [of] the importance – overcoming some of the myths about “cholesterol is very bad for you” in terms of eating eggs, and much more in terms of focusing on nutrition.

It’s a little bit unusual for us, because you see, we’re very far away from that consumer, but we are able to work with the local producers for them to build awareness. A lot of what we talk about in these kind of symposia [is] export and open trade and these kinds of things — but I think a lot of the importance of livestock production is addressing the nutritional needs of people in country and in the region. And I think this is where we’re putting our focus as we’re trying to work with our customers in Africa and Asia and Latin America and throughout the world – is really helping them to be as effective as they can be in terms of sustainable livestock production. So with that, thank you.

Alice Pell

Well, thank you very much, Thad. Our last speaker is someone who, for those of us in livestock community, probably doesn’t need a lot of introduction. Carlos Seré has been the director general of ILRI. He spends, I think, a little bit of time in Nairobi. I usually see him in Addis or probably more likely to see him in airports. But he has extensive experience as an economist. But for an economist, he really knows a lot about animals, and he’s been a very effective advocate for the livestock community in trying to find better ways to make livestock be an effective pathway out of poverty and also to make sure that we improve the nutrition of the children that we’re all focused on. So, Carlos.

Carlos Seré – Director General, International Livestock Research Institute

Well, it’s a real pleasure to be here, and I would join my colleagues in saying that we really appreciate that livestock finally graduated to the World Food Prize – and particularly that a woman, Jo Luck, got the Prize, given the importance of women in livestock. This is all a very nice development, obviously for all of us who have a particular stake in understanding how livestock can contribute to development – and understanding that there are challenges, and there are lots of questions, and I really hope that in the discussion we can raise some of them, but I think understanding those and understanding the nature of those trade-offs is very important when you deal with this sector.

I’d like to just address three questions. First of all I’d like to explain a bit about the role of livestock in sustainable intensification of smallholders; I’d like to talk a little bit about the institutional arrangements which are needed for that, and I’ll build on my colleague Tikku on that; and finally I’d like to discuss a bit the business case for the private sector — many of you come from the private sector — to engage in the livestock sector in the developing world.

So in terms of sustainable intensification, I think Prabhu Pingali made a very eloquent case about the importance of smallholders and the fact that, if you put the conditions right, they’re highly competitive.

We've done lots of studies with economies of scale, and we've found that in most animal production you don't find very significant economies of scale. You have economies of scale in the forward and backward linkages; you obviously have huge economies of scale. But in milking cows, really, it isn't that much.

Very clearly, smallholders are highly competitive, particularly when you've got ample supply of labor, and that is an essential point. Livestock is, as they say in Germany where I studied, like putting a second floor on your farm — you're producing your crops, but then you're using all those byproducts and your labor and turning it into something people want and want to pay for. And that's, I think, the major driver for all of us. Livestock, as has been discussed, and I think the micronutrient presentation showed, consumers do really want that. And it is consumers in the developing countries themselves. So you've got a unique opportunity here that you have a commodity which people want, be it milk, eggs, meat; at the same time you have something which you can produce by poor people just with labor and crop byproducts, grass grown along the road, etc. That is why — large commercial companies can produce, but when prices go down, these people don't give up and continue milking their cows. They're very resilient, and so you find that normally they are very, very competitive in the market. So that's sort of the niche for this.

Now, the uniqueness about it is a number of the other interactions, as I think Christie showed — animal traction being very important; there are numbers which show the huge volumes of diesel oil which animals are actually replacing with a renewable energy grass, basically. We're having lots of issues around water. People are talking about hundreds of thousands of liters of water for a kilo weight gain. Yes, if you use irrigated alfalfa in a feedlot, that's the case. But if you're feeding stubbles from sorghum or maize, maybe ground nut hulls — basically, those would happen anyway, with or without livestock, so the marginal contribution of animals to that water balance is very limited. The main point is, animal production is very different in different parts of the world. Animal production is uniquely able to use different combinations of resources.

So the key point is — we need to double production of food. It has to come from the developing countries themselves, and that's basically mixed systems, crop/livestock systems. But a lot of the discussion is just always focusing on the crop side. Just an example: people just look at the yields, you're talking about the grain. But the fact of the matter is, for the farmer, the total value of the plant is important. How much do you value the stover? Just let me give you an example; we've studied it in India, for example. People are moving stover over 400 kilometers to bring it to the peri-urban areas to feed buffalo, generally owned by women, who are then milking these buffalo which are fed that. We've done studies that, over the years, the relative price of the grain versus the stover of sorghum — the stover has increased in value. So as biomass is getting more scarce, this is becoming a more and more important income for farmers. So we need a perspective which is holistic around the system, and that's what we frequently miss.

The same applies to the issues of carbon. Yes, cows produce methane. If we feed them better and smartly — and that's where we need the help of the private sector, for example; to have the right supplements to these coarse forages which we have — we can reduce the amount of CO₂ and methane produced per kilo of milk dramatically. If we got paid for that, we could support the livestock sector very importantly in places like India, for example.

The main point I want to make is that the additional production of cereals will be very much linked to livestock, and we need to address that when we think about breadbasket strategies, things like that. Don't forget the livestock sector if you want really people to move. Normally, livestock is actually the engine which brings the cash into the system; the cereals provide the nutrition for the family, but you have to consider this as the motor which links it to the urban consumers. And the fact is that, if you want good nutrition, particularly women, they need income, and livestock allows even for landless people to get an income.

So that's all great, but why isn't it happening? And I think the problem we face is that livestock systems are very close-knit, particularly livestock systems of the poor. You're recycling the manure to the crop, you're using the feed to feed the animal, etc. Breaking into those systems and intensifying them requires a hell of a lot of different interventions at the same time. You need health inputs, you need fertilizer sometimes, you need seeds, you need insemination, you need a market for a perishable commodity.

So the key question really becomes, how do you deliver that cost effectively to people with one, two, three buffalo? That's where – this has been the crux of past development. Efforts like cooperatives have worked in many parts of the world. Frequently, in other parts, they have been politicized and haven't worked. I think the lessons from India and many other places is that nowadays we've got all sorts of different arrangements we can have, you have the private sector purchasing directly from contract farmers, you have cooperatives, you have producer organizations. There's a lot more space, institutional space. But the key issue is we need to aggregate those producers — only then do they become subject of commercial interest to the private sector.

So, finally, that brings me to the question of, what is the business model? And I would like to say that we normally think of replacing smallholders through large commercial operations, and in some sectors, like in poultry, it probably makes a lot of sense. That's one area where there are significant economies of scale. But in a number of other areas, they're not. And really the opportunity is to combine the entrepreneurship of the farmers with institutional arrangements as the ones which I've described.

Many times it's NGOs bringing it together. We're working on an experience which was mentioned yesterday by Jeff Raikes, the East Africa Dairy [Development] Program where Heifer, TechnoServe, and ourselves are putting together hubs. So we're trying to bring in all these different services around milk cooling places. The key difference with traditional approaches, which have been to have a project entity running it, is that you're bringing in SMEs to sell all those services. The fact that you cluster the farmers – for example, 3,000 farmers around the cooling tank makes this attractive for a small businessperson to come, sell insurance, sell [artificial insemination], sell feed supplements, sell drugs, and also, obviously, also provide all sorts of other companies, commercial — they need to buy soap and toothpaste and other things. The whole financial circle starts going.

So my main contention which I leave to you is: instead of thinking about replacing the sector, you have to recognize this is a huge sector, it's ubiquitous. We need to find ways to get the private sector to business with them. This is – if you want the paradigm of the bottom billion, most businesses have been thinking about how to sell things to them, a smaller package of shampoo or so on. The challenge now is, how do you link to give them income? This is huge potential, but it takes a lot of new, imaginative thinking in terms of distribution [and] delivery. I think there's lots of experiences happening around there; ICTs are providing new opportunities.

So I would just want to leave you with the fact that smallholder systems are the systems of the future for the developing world. Private sector, if you want to do business in that part of the world, mainly you will have to work with these people. Let's try to find ways to do it. Thank you.

Alice Pell

Thank you, Carlos; thank you, everybody. Now we have the opportunity for some questions.

Question

Thank you, Alice. Dr. Rattan Lal from Ohio State University. I have a question for Dr. Carlos Seré and Dr. Deepak Tikku and Christie Peacock. I fully agree with you that small-scale livestock holding, sustainable management is very critical for food security. I also am very interested in your idea of carrying crop residue several miles to the city to feed the buffalos. My concern is — it'll be sustainable as long as the manure comes back to the land. If the manure doesn't come back to the land, you've got a negative nutrient budget. You've got a depletion of organic matter, which in many cases some of the country you're talking about is 0.1%, 0.2%. The household cooking fuel being used, primarily from livestock manure, is causing the Asian brown cloud, the melting of the glaciers in the Himalayas, and the depletion of soil fertility. So the question to you is — How do you find a clean cooking fuel for the rural communities, the 150 million that Dr. Tikku said, so that this circle can be closed and the manure can be put back on the land rather than in cooking stoves?

Alice Pell

Why don't we collect a couple of other questions? Next.

Question

Patrick Binns from Seattle, Washington. My question is particularly for Dr. Tikku, but other members as well. Dr. Tikku, you said that in India, dairy income was more inclusive for smallholder farmers than agricultural product income in general. And I understood that statement to mean that dairy farmers are actually capturing a greater percentage of the retail value of the milk products than agricultural products that they may be producing. I'd like to see if you could confirm – is that the case? And what kinds of steps or factors can be pursued so that smallholder farmers do capture greater percentages of the total retail value of what they're producing?

Alice Pell

And one more.

Question

I'm David Zartman from Ohio State University. I'd like to have you on the panel speak to the question of management-intensive grazing as a part of the answer to Dr. Lal's question of keeping the manure on the soil so we don't export nutrients, as you would with plants that are sold away. And also, I salute you all for bringing the question of improved nutrition to human beings through livestock production. Thank you.

Alice Pell

Okay, so we've got a couple of people who are worried about the nutrient-cycling question. Who would like to take that on? Carlos.

Carlos Seré

Yeah, I think intrinsically crop livestock systems are very good at this – that, actually, the manure stays on the farm. Some people will argue biogas as an interim stage to provide some of that cooking energy, etc. Smallholder systems are quite efficient in that sense. Now, that will go on, I think, for quite a while in the rural areas.

I think FAO has been making a good case for what they're calling "area-wide integration" to recognize the same processes we see in Europe, and probably here, too – that farmers specialize, but within a region, so that you make sure that the nutrients are cycled within that region. So in the early stages you have it all recycled within the farm; when farmers become more specialized, etc., you will try to recycle within a region. The issue of the movement of straw from the rural to the urban areas definitely will imply nutrient transfers, that's correct. Obviously, if you import food and distribute it back to the rural areas, you may have some flowing in the other direction. But, yes, we haven't quantified the magnitude of the nutrient flow from those areas.

What is striking to us is that it shows that biomass is so scarce that people are investing in that large transport, and we're actually doing research around compacting and other things to make that transport more efficient, because we see that that is a very important trend which is going to happen. Surplus areas and deficit areas need to be connected.

In terms of grazing management – again, here, obviously, when you get into very small plots and areas with relatively high potential, and when you’re in mixed systems, you come to a point where you get into zero grazing. When you stabilize, have the animals a little stable, you feed the animals the crop stubbles in the pasture, and you bring back the manure. What we noticed, for example, in Kenya in the periphery of Nairobi — half of the land area is in Napier grass, even though you’re very close to a city where you would expect vegetables to grow. Well, it’s the topography, and the fact that that Napier grass, if you aren’t mining the nutrients from that plot, brings the nutrients into the sukuma wiki, the leafy vegetables Dyno was mentioning, which people produce, and the maize and the beans.

So obviously a different intensification stage is a different opportunity. If you can manage it on the pasture, that’s obviously the easiest way. But then when you get into more intensive systems, then the issue of distances and carting the manure, etc., becomes an issue. I’ll stop there.

Alice Pell

Any other comments on nutrient cycling? The other question was addressed to you, Tikku.

Deepak Tikku

I think Carlos has covered this. I only want to comment on this brown cloud, and, you know, using the dung for cooking. The experience in India [is] that we have used the dung to produce biogas and used that biogas for cooking.

Alice Pell

Okay, next question. Oh, yes.

Deepak Tikku

When we talked about inclusiveness, what it meant was in agriculture, the top 10% of the farmers would own 30% of the land or 40% of the land. The bottom 10%, in terms of income and all, may own, you know, 1% of land. In case of cows and buffalos, it’s the reverse; that means, the assets are well distributed along the income range. And if you take a cooperative system, there may be somebody who has two cows and somebody who may have twenty. But when it’s pooled in the cooperative and you sell it to a retailer, the money that you get is distributed equally. It was more in terms of the distribution of the assets around income, rather than retail. I hope I said this right.

Alice Pell

Okay, next question.

Question

This is a question for Dr. Seré and for Dr. Tikku. My name is Mark Kahn. I’m here from Omnivore Capital. In feeding dairy cattle, specifically for smallholder dairy farmers, there seems to be a debate right now between essentially improving the quality of green fodder, or, alternately, in getting more value, getting more nutrient value, out of residues. Right? And there’s sort of two schools of thought. In India, for example, you have Hatsun Dairy in Tamil Nadu, which is driving on this fodder argument. And in North India, NDRI is pushing very, very hard on essentially residues. It’s a bit of a debate right now, and I wanted to get your thoughts on which approach you think is more promising.

Deepak Tikku

Well, I would say both approaches are promising. But, you know, there are a lot of other technologies that are being developed. Even in cattle feeds, there are now bypass proteins, and there are work and experiments going on even for bypass fat. So there are many technologies that are being worked. And animal nutrition is a very important component, especially in countries like India where the cost of milk production is contributed 70% by the feed and fodder. So there are a lot of experiments going on. Green fodder is also important, and we have to enrich the crop residues we have with various technologies that are being planned.

Alice Pell

I'm going to interrupt here, because I'm actually the animal nutritionist on the panel. I think it's fairly easy; we definitely have the numbers that we need to be able to estimate quite accurately what a dairy cow's nutrient requirements are. Just as is the case with humans, there are many ways to meet those requirements. I think, probably, the results or the answers you've gotten from the panel so far are, there's not a right answer here. The residues are present and available, usually at relatively low cost – although I think Rattan Lal's concern about not incorporating them into the soils is something we have to keep thinking about. The legumes are higher quality nutritionally. So it's a tradeoff, and I'd hate to see people saying that this is a Y-branch, and we have to go one way or the other. I think we need to go in both directions and look at all of the byproduct feeds as well.

Question

The constraint, it seems to be, is water and land. There hasn't been more than 7% of India under green fodder ever, and water is sort of the tricky factor in there.

Alice Pell

Understood. You don't have to only use legumes, though. There are lots of grasses that require less water, and indigenous fodder. So there are many, many options in there, and it's a local question in a lot of ways.

Question

Sure, thank you.

Alice Pell

Next.

Question

My name is Gary Sullivan. I'm a grad student at Iowa State University, and I guess the question I have is for Dr. Seré. I work on the meat-science side; we deal with perishable products. Does ILRI do any work either developing or modifying techniques that we have to preserve food and work on disseminating that out into the countries?

Carlos Seré

That's a very simple question. No, we don't do that. We think there's a lot of alternative players out there, and we really are much more looking at food-safety issues, the institutional issues around wet markets, etc., how

you organize that, rather than actually the preservation of that. We do a little bit on milk, on lactoperoxidase and things like that.

Question

My name is Assetou from Mali. Most of the time, when we talk about poultry, it's mainly [about] chicken, but we have a bird that's called guinea fowl. That is a very good bird that is very interesting for a lot of women and also for, even, for all smallholders. But the biggest problem is that, when you get the little chick, the little guinea fowl, after one week or two weeks we have a lot of mortality. So I would like to know if anybody is interested on researching it – or if the research has been done, I would like to know about it and what maybe can be done to improve that bird. It contributes a lot for food security, because most of the problems of food come [to] my country in, mainly, June and July, and it is in that period that this bird makes a lot of eggs, and we sell it and it contributes to food security. So if there is any research on it, I would like to know more about it.

Alice Pell

Okay. Anybody know about guinea fowl research?

Carlos Seré

I like guinea fowl; they taste excellent.

Alice Pell

Yeah, they are good.

Carlos Seré

But in general with chicks what I think a lot of surveys have shown is that this early mortality is a lot related to predators and other things. And having safe chicken coops, which is not rocket science, is one of the things which reduces that mortality a lot.

Question

I'm Ravichandran, a farmer from India. There is a general sort of apprehension from activists of anti-GM crops, that GM crop has an adverse effect on livestock. I have been growing, breeding cotton, for the past so many years, and I have been grazing my cattle only in the cotton field without any adverse effect. I mean, is there any research work done in the institute on this aspect?

Alice Pell

I'm not sure exactly what effect you're talking about.

Question

Well, there is the allegation that...

Alice Pell

Oh, effects of GMOs?

Question

Yeah.

Alice Pell

I think that there's a lot of work underway in the human populations, but I don't know of any, specifically, in animal feeds. I think a lot of the early work, to prove the safety, to get it to the point that it could be fed to humans, actually was done on animals. So that level, a lot of research has been done. But I don't know of any current work that's being done on that question.

Question

Actually it does affect, only on the [inaudible] the insect, animal. So, I mean, there are some allegations and apprehensions. That's why I asked.

Alice Pell

I know from experience with the U.S. dairy and livestock industries, GMO feeds are fed widely, and, probably, most of the milk and meat products you've consumed here [are] from animals that consumed GMO plants.

Carlos Seré

Even the Europeans have approved GM feed for animals.

Alice Pell

Okay. I think that the last couple of minutes, I liked the idea of the sort of elevator talk idea of what are the – in one sentence (and I think we have time for two sentences) – what I'd like to do is focus on what you think the most important single issue — and, I understand, in a world where we look at complexity, I'm not being very helpful there — but what are the areas that we really need to focus on? And if you were asking me, because I have vast amounts of money, what would be the single thing you would be searching for funding because you think it's so important to research? Christie, why don't we start with you.

Christie Peacock

Okay, Alice. I think the big issue of concern, I suppose — not to answer your question at all at the moment — is the growing anti-livestock lobby, which is growing in the North and has great potential to do a lot of damage to livestock keepers in the South. Having said that, I think that we livestock people need to get our act together as well and look quite critically at the systems that exist and how we can rationalize them to reduce the environmental impact of these systems.

But it's obvious from all the work that's been done, that there are big hotspots of damaging, environmental damage in the Amazon and, you could argue, in feedlots in North America and a growing problem in Southeast Asia as well, in much more intensive systems. And so this is a global problem. But I would not personally like to see the life chances of very poor livestock keepers who use, really, relatively, very low input systems, to see their life chances prejudiced — by Northern prejudice, essentially. So that's a big concern that will be an ongoing and heated debate as the climate-change discussion progresses.

In terms of where I would like to see investment – well, we in FARM-Africa are seeking significant investment to develop just the kinds of business models that Carlos was talking about and really elevate the standard of service delivery to farmers. And to address this issue of quality, which hasn't been talked about very much, there are very significant issue of quality of drugs, of vaccines, and of inputs going into the livestock sector in very unregulated, weakly regulated markets. This has great impact on the performance of livestock systems and the actual returns that farmers are getting on their labor. In some cases the incidence of poor quality drugs can be as high as 60-70%, it's believed. So I think we need more data than that.

Alice Pell

Okay, it's a run-on sentence.

Christie Peacock

So I think livestock service delivery, market linkages would be the big area for future investment.

Deepak Tikku

I would only reemphasize that the most important thing, if you want to develop the smallholder, would be an appropriate institutional structure which can connect the producer to the market and also connect him to the service producers who can give him breeding services, nutrition services, and veterinary care.

The other issue that I think of importance for small dairyholders is water, like somebody raised. It's important for daily production and feed and fodder.

And last thing I think we would have to consider a little bit more would be on the greenhouse gas emissions.

Thad Simons

So I think that I would like to echo Christie's appeal towards quality, because I find that the farmers in the emerging markets are paying way over world prices for very poor quality. So something more in terms of standards and investments that would actually support – because we talk inputs, and we talk about the need for them, but when you're there on the ground, you find that they are very expensive and hard to come by, and the farmers are not really getting the value of what they're paying for.

The other, I think, is a lot of work needs to be done in terms of aquaculture – some in poultry but more in aquaculture, because we're talking in terms of efficiency of production, [of] how much meat that we can get for a kilo of feed. This is where the most efficiency is going to be available. Trying to feed the world and doubling food production, we need to be able to think in terms of the work that has to be done at small-scale, teaching small farmers and building the structures around that. A lot of good work has been done around dairy; I think a lot of good work has been done around dairy around the whole world — but very little work has been done in terms of the other species, which actually will go more towards more efficient production.

Alice Pell

Carlos?

Carlos Seré

Yeah, I think the question of efficiency is central. I would argue that intellectual effort has to go into this sustainable intensification of smallholder systems. How do we manage these nutrient cycles much more

efficiently? How do we avoid the environmental negatives? How do we intensify? How do we combine it, for example, with trees, which can sequester carbon in those systems and can provide dry-season feeding? So the whole issue of intensification. And smart use of the biomass – the trade-offs are getting more and more difficult. We used to talk just about humans and animals, but now we're having also the biofuels and the soil, so everybody's competing, and that competition is going to get tougher in the future as we get more and more people on the planet. Thanks.

Nao Bee Lor

I'm sorry I cannot speak English but I have Leexiong to help me translate. Last week I have visited a beef farm in Minnesota, and I found a big difference between our countries, because he has the big farm; in my country we have these individual farms, small farm. We have many challenges for my family, for my village, for livestock production. Some people don't trust vaccination, so that's a challenge for us to overcome these, how to overcome this challenges for my village and my family also. Also, we don't have enough of the grass because in the dry season, because of drought, and we are thinking how to have more food for our animals in the dry season. That is our challenge for our family and our village.

Alice Pell

Okay, well, thank you. I think probably the very most appropriate way to end this session is to end with the voice of the farmer. So we'd like to thank everybody very much for participating.