# *Human, Animal, and Ecosystem Health*

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Woodrow Wilson International Center for Scholars

***Edited Transcript – Steve Osofsky***

Thank you all very much for making the time this afternoon. I'm going to run through a series of case studies from Africa to highlight and illustrate what we call the "One Health" approach and its value as an entry point for facilitating both conservation and development. Basically, all these things I'm going to discuss in the next 15 or 20 minutes are about this relationship between human health, wildlife health, domestic animal health, and environmental health and stewardship. And a lot of the examples I'm going to give you are related to the AHEAD, the Animal Health for the Environment And Development program, and a lot of them are executed by collaborating partners in other organizations. But I've chosen them to illustrate different ways to basically take advantage of these relationships to achieve conservation and development goals.

This is an iconic image for me. This is a dead wildebeest along a foot and mouth disease fence in Botswana, and this goes back to my time in the early 1990s as Botswana's first wildlife veterinarian. And I need to go back a few decades to explain to you why this happens. Back in the late 1950s and early 1960s, colonial governments and donors were looking at ways to give southern African countries some economic traction, and to make a long story short, I understand the context of that time period, they were thinking fairly mono-sectorally, and they focused on the creation for export markets for beef, so that southern African countries could get beef to Europe largely, to the EEC at the time. The reason that they had to put up fences: in order to get beef to Europe, it had to be disease free, and there's a virus called foot and mouth disease that's carried by wildlife, specifically by the African buffalo. Buffalo don't get sick from this virus, but they carry it and they can spread it to cattle. So the consequence was that thousands of miles of these fences were put up across the SADC region in order to facilitate these export opportunities. And because of those fences, over the subsequent decades, hundreds of thousands of wildlife died, and many, many species.

That's just the background. Let's look at southern Africa today, where I think there's some exciting news for those of us interested in conservation and its economic potential. The

circles on this map are transfrontier conservation areas, and very simply, many of you who have been to the region have been to the national parks contained within those circles. Southern African leaders have been looking for, you know, what is their comparative advantage economically? And many of them have come to the conclusion that sub-Saharan Africa still leads the world in opportunities related to nature: in terms of tourism, in terms of consumptive uses like trophy hunting. And so in order to maximize those opportunities, southern Africa right now is really leading the world in a very bold experiment. You've probably heard the term 'peace parks.' These transboundary projects are linking protected areas like national parks, usually across international boundaries, and essentially making wildlife the preferred land use of choice. I'd like to say that this is all being done to drive conservation of biodiversity. Really, the fundamental driver is economic. If you look at SADC, the Southern African Development Community, from a GDP point of view, tourism, consumptive uses like hunting that I mentioned, those nature-based activities now exceed the contribution to GDP of forestry, fisheries, and agriculture combined. That's astounding. So in that context, this transfrontier conservation area concept is getting a lot of traction. I should mention if you add up all the different TFCAs -- and that's the abbreviation I'll use -- you get about 120 million hectares of land, potentially focusing on wildlife as the primary land use. That's the size of New York, California, and Texas combined, to give you an idea of the scale that I'm talking about.

The first place I want to take you to is what's called the Great Limpopo transfrontier conservation area. That was one of the circles on this map. And I'm going to run through this as an example; it's sort of a microcosm of some of the challenges we face in these different TFCAs. Remember I was telling you that they put up a lot of fences back in the 50s, 60s, and since. Well, in order to foster these peace parks, we're really talking about re-zoning, taking fences down. What does that mean? Well, the Great Limpopo is where South Africa, Zimbabwe, and Mozambique come together. Many of you, I'm sure, have heard of Kruger National Park. And this circle represents about 100,000 square kilometers. That's about the size of the state of Virginia; it's vast. Now I don't want you to misinterpret this and think this is about turning this whole area into one giant national park. That's not what this is about. This is a complex land use matrix. This area has villages, roads, railroads, irrigation, all the things you think about. But again, the vision is to reconnect the protected areas in South Africa, Zimbabwe, and Mozambique, and again making wildlife what I describe as an economically rational, and socio-culturally acceptable land use choice.



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Well, if we're going to do that, we have some issues, and I'm going to run through a few examples of where the disease issues are important, and I don't want to frighten you. When I'm in the region working with my colleagues, I always am working on the premise that what we're trying to do is highlight these issues to be proactive, not to destroy this vision but to recognize its complexity. So the first issue I want to talk to you about is called bovine tuberculosis, very closely related to human tuberculosis. This is an alien invasive species, if you will. It doesn't belong here. It was introduced to South Africa about 150 or 200 years ago by European cattle. Well, again, to make a long story short, bovine TB was discovered right here in Kruger National Park's buffalo in 1990, and since that time, it's been found to move from south to north throughout the whole park, and has spilled over into a whole range of other species, such as kudu, cheetah, lion, baboon -- it's quite a problem. I also need to explain that bovine TB is a lot like human TB in that it's a zoonotic disease, meaning it can move from animals into people, and make people sick as well. So remember, we're talking about connections, about building corridors. And if we want to reconnect Kruger, for example, to Gonarezhou in Zimbabwe, one of the potential routes is through this area, called Sengwe. This is the Sengwe Corridor. There are thousands of people and thousands of cattle living here, and preliminary research today indicates that there's no bovine TB in the cattle. Believe it or not, before Zimbabwe's recent political implosion, they had a very strong veterinary services. And they've had BTB under control. OK, and what we know right now; it's still early days, but we don't think that there's BTB in the wildlife of Gonarezhou.

So if we reconnect this area this way, and the wildlife of Kruger bring BTB in, that's got a few ramifications, and let's take a step back and look at this cross-sectorally now. Another piece of the puzzle is that the people of Sengwe have among the highest HIV/AIDS prevalences in the region, so they're often immunosuppressed. They also have very poor meat hygiene, and they don't boil their milk. So they're very susceptible to the main routes of transmission for BTB. So the message here is if we're going to do this, we can't let a conservation initiative cause negative consequences for the agriculture and livestock sector and the public health sector. It would be a net loss. And as a conservationist, I want this vision to succeed, but we have to look at these cross-sectoral impacts.

So let's look at another disease -- let's look at rabies. Rabies is a big problem on the Mozambique side. When you have rabies, it's often due to uncontrolled feral dogs, and the victims are often children, and that's the case here. Interestingly, those of you who know Kruger know it's [probably] the best-studied park [in terms of disease] in Africa. There had never been a case of rabies in Kruger until December '06, and it was traced back genetically



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to a domestic dog strain from Zimbabwe. Again, with the current chaos, dog vaccination has slacked off in Zimbabwe, and so rabies spilled into Kruger. Well, if we're going to reconnect this area, take down fences and potentially let rabies into an ecosystem like Kruger that historically has never had it, that could wreak ecological havoc. Okay, so that's another thing we have to be proactive about.

I'm going to give you a few more examples. Up here we have nagana, sleeping sickness of cattle, carried by tsetse flies, a vector. How we reconnect this conservation area, how we create this corridor, is very important. If we create habitat that facilitates the movements of a vector like the tsetse fly, and nagana, sleeping sickness, trypanosomiasis comes back here -- huge implications. South Africa hasn't had nagana since 1903, and they don't want it back. This part of South African near Kruger is full of cattle, a very important part of the economy. And interestingly, those of you who know the history of white rhinos know that there were less than a few hundred in the late 1800s, early 1900s. South Africa saved the white rhino from extinction. Kruger is now home to the largest population of white rhinos on the planet. White rhinos are actually fairly susceptible, to nagana, to trypanosomiasis, so we don't want nagana coming back this way. So if we're going to reconnect, we have to be sensitive about the vector issue. And if we take, again, that step back and look at this macro-economically, remember we were talking about foot and mouth disease at the beginning -- there's a strain of foot and mouth up here that if we reconnect this landscape and don't take the proper precautions and the buffalo bring that strain of foot and mouth into the larger landscape, that could impact South Africa's exports for beef -- multimillion dollar annual impact. So again, all these issues -- and these are just some sort of nice examples of potential cross-sectoral impacts between a conservation initiative, livestock agriculture, and public health -- if we don't deal with them proactively, this vision, which has real potential for the region, could fall away.

So that's what I call the landscape level entry point for health and conservation. I'm just going to diagrammatically run through sort of the main issues I just talked about. We talked about the zoonotic diseases like BTB, like rabies, that animals and people do share, and then diseases of economic importance that aren't zoonotic, like foot and mouth. Foot and mouth doesn't affect people, but it affects their livelihoods. And if we can think about this, we're talking about the impacts on the animal production side, domestic animals, and impacts on the livelihoods of farmers, and as a conservationist, I'm talking about the impacts on the wildlife production side. That's what I want. My job is to make wildlife the land use of choice. We essentially want to make more of species that are [currently] endangered. And



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again, whether that's successful feeds back on tourism, hunting, the economic drivers of conservation.

At the center of this, and what relates directly to local, national, and regional economic outcomes, are the disease control strategies we choose. If we don't think cross-sectorally and we just throw up fences, that can devastate a particular sector like wildlife. If we use a pesticide and don't do our homework in terms of environmental impact assessments, if we create water conditions that contribute to malaria, there's all kinds of impacts of different types of strategies, and the point is to try and get the balance here right, and focus on the outcomes of the strategies we're going to choose through sensible scenarios planning.

I want to take you to another part of the region to give you another example of how health impacts conservation. I'm now taking you to Namibia. This is what I call the animal health policy entry point. I want you to pay attention to the colored areas. The green areas are state-protected areas. This is Etosha here, and the colored areas are what are called conservancies, and they are mostly adjacent to protected areas for good reason. This is all semi-arid Kalahari. This is very, very dry land. This is all, you know, what you picture when you think about a desert area. Conservancies have a very interesting history; I'm going to define what they are for you. This history of this region under colonial times is that wildlife didn't belong to the people -- it was the "king's game." The state owned all wildlife. And when you have a situation like that, as I'm sure most of you are aware, you often end up with a tragedy of the commons situation. Wildlife was exploited, hunted out, it was a resource that no one could claim ownership to. Well, Namibia really led the region, and very smartly about 15 years ago changed the legislation to give conservancies tenure rights. Conservancies are places where communities now have not only the rights to live where they are, but they have the rights to manage and utilize the wildlife resources on their land. This was a watershed legislative event in the Namibian government, and it was very, very smart. And what it's done is given people an opportunity to make very sensible economic decisions. Again, this is semi-arid area. Wildlife is much more productive than livestock. When people were given tenure rights, they put wildlife in these conservancies. And so now you have species like gemsbok and sable and buffalo reproducing extraordinarily well, and this has been largely funded by USAID over the past decade plus. You have wildlife production augmenting greatly, economic opportunities abounding.

But let's talk about the animal health policy issue. Right here is what's called the red line in Namibia. Going back to our friend foot and mouth disease, if you're in a conservancy north



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of this red line, you're not allowed to export live wildlife out of your region. In the greater SADC area, live game is very valuable. People are constantly restocking game farms, both public and private, for tourism and other uses. And this potential right now is bottled up in the conservancies. So we've been working with colleagues in Namibia about trying to tweak this policy. When this red line was put in place, you had a zero risk tolerance [for foot and mouth disease] -- for largely white farmers, [who were] protecting [their] livestock. The ministry of agriculture is very heavily subsidized. Now that we've got a conservancy movement where poor black Namibians are starting to benefit, there's an opportunity to tweak this policy without really risking foot and mouth spread to [white-owned] livestock holdings, but facilitating the export of live game -- and I think creating a tipping point for the ultimate sustainability of conservancies. Again, my job -- make wildlife a socio-culturally acceptable, economically rational land use choice. If we get the foot and mouth disease policy right, the export markets blossom, and these conservancies will be around for a long time. So that's the animal health policy entry point.

I'm going to very quickly talk to you about another entry point, which I call the public health entry point. And I'm not going to steal any of Gladys's thunder; this is actually a slide I borrowed from her a few years ago, and she's going to talk in much more detail. But when we talk about great apes, we have a very special situation where we share 140 or so pathogens with chimps and gorillas, for example. And this is the tri-national area where the Democratic Republic of Congo, Uganda, and Rwanda come together. Basically we have the last few hundred mountain gorillas, and they're living in a sea of people. Because we're all great apes, essentially, we have to take some special actions when we're talking about conservation here. We have to do all the normal things we do; anti-poaching, making sure that there's education, making sure that people living around these protected areas share the revenues that these protected areas bring in, but in addition, we have to make sure there's good public health. And when I give this talk when Gladys isn't in the room, I talk about her work as an example of using conservation, and I just love the name "Conservation Through Public Health." It's great, because that's what this is all about. This isn't about saying to the people, "We're going to worry about your health because we really care about gorillas." No. This is a reciprocal relationship, and the fact is, using Rwanda as an example, in some years, gorilla tourism is the number one earner of foreign exchange in Rwanda. And so the people want health, we all do, and they want to keep their gorillas healthy, so that's why public health is such an important entry point in a landscape like this when we're talking about great apes. I'll let Gladys cover that more. I will say that just recently there was a study on chimps in the Ivory Coast, where it was pretty clear that the number one cause of mortality



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was respiratory viruses, almost certainly traced back to researchers and local people. So it is almost killing them with kindness by visiting them if we don't take the right precautions.

Okay, so moving on from the public health entry point, I want to talk to you about what I call the community-based animal health entry point. What do I mean by that? This is an example from Kenya. And this chapter is from a book that we did a few years ago on these issues -- that's one of the fliers I gave you, and it's very interesting. Most of the places we work as conservationists in the world, we have conflict between people and particularly carnivores. People who keep livestock often lose them to lions, leopards, hyenas, whatever it may be. Well, a group of veterinarians went into several sites in Kenya and looked at what was really impacting livestock mortality. And when you have a lion print next to the remains of your cow, you're pretty angry. But when you're looking through a veterinary lens, and you realize that the impacts of disease are orders of magnitude higher in terms of livestock productivity, it gives you another opportunity to change the balance. What these veterinarians found was these local people -- some of them were Masaii -- were very well aware of the presence of disease. They've grown up with it. But it was sort of background noise, because they didn't have any way to intervene. But by training people to implement very simple animal-health programs, using relatively inexpensive interventions and doing it on a cost-recovery basis, all of the sudden livestock, meat, milk, even chickens and egg production can go way up. If you combine that with awareness raising and education, you can actually raise people's thresholds of tolerance for living with carnivores. And so by using community-based animal health, teaching 'barefoot vets,' if you will, in different communities, people's food security improves, and at the same time, they can be more tolerant of the occasional losses by lions once they understand that their net productivity is actually much higher than it was before the intervention. So that's in a very simplistic way what I call the community-based animal health entry point.

Related to that is what I call the food security entry point. For those of you who work in conservation, if you haven't recognized the linkages to food security, this is a very important issue. COMACO stands for Community Markets for Conservation. It's a project we have in Zambia, and I'll try and describe it as simply as I can. It's essentially creating a farmer's cooperative in parts of Zambia. It takes out the middleman, and gives producing farmers better prices for their commodities, both crops and livestock. And at the same time that people's food security is improved, there are conditionalities attached, where if you want to participate in this cooperative, you have to agree not to poach -- you turn in your guns, you turn in your snares. Well, one of the things we've done here is we've worked with a group



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called the International Rural Poultry Cooperative to do something very simple. We've been vaccinating chickens, again, using community-based tools like I described previously, with a very inexpensive vaccine, again, on a cost-recovery basis, vaccinating chickens for a disease -- a virus called Newcastle's. This is a devastating virus. It comes through a couple of times a year, and it can wipe out all your chickens. But when you control it with this vaccine, all of the sudden very interesting social phenomena develop. First of all, women in these villages control the chickens. They suddenly have cash. They can pay school fees. If there's a few eggs each week that the kids get, that has benefits in terms of growth and cognitive development. So there's all kinds of obvious nutritional and social benefits from something as simple as vaccinating chickens. But again, because COMACO is an integrated program, people are [realizing] at the same time, now that their protein needs are being better met by domestic animals, there are fewer incentives for them to poach. And they're starting to take advantage of the rebounding wildlife populations and are actually diversifying their income portfolios, if you will. They're building bush camps and starting to have tourists come to the areas that were depleted of wildlife, but the wildlife is now rebounding, because we've displaced their protein demands. I'm not at all trying to imply this is automatic. This takes a very concerted effort and a partnership between the project and the people. In fact, the people now own the farmers' cooperative COMACO. So it's a very interesting model, but it's the food security entry point that we're using to facilitate, again, both conservation and development.

I'd be remiss if I didn't describe what I call the classic wildlife health entry point: we've had the landscape level entry point in the Limpopo; we've had the animal health policy entry point in Namibia; we've had the public health issues in central Africa; we've had food security and community-based health. This is [the] wildlife health [entry point] -- this is the bread and butter of what WCS started doing several decades ago -- this is the Global Avian Influenza Network for Surveillance or GAINS. And this is based on something we've always done, which is get good data on diseases of wildlife. But until recently, nobody cared about that data except us, wildlife conservationists -- particularly those with interests in disease. But since things like SARS and avian influenza, all of the sudden we have new partners in the public health arena. This program is largely funded by USAID and CDC. All of the sudden, there's a recognized synergy between the wildlife health community, the public health community, and those interested in agro-biosecurity and agricultural trade. And so all of a sudden, wildlife health has a new relevance, and again we're using our wildlife health tools as a constituency builder. So people who didn't really care about what we did before now have a direct incentive, and they're collaborating with us because here's



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an issue that's of relevance to us as conservationists, and it's relevant to these other sectors. So that's what I call sort of the wildlife health entry point.

A lot of what I've run through very quickly, we work pretty hard to make it available and put it in the public domain. I often give talks to my colleagues, but it's more important for me to give presentations and put things on the Web site for people who aren't in the veterinary business, because our most successful programs are those that involve partnerships with sectors that we didn't used to interact with. So there's a lot of material on our Web site, a number of books. I've given out the flyer. One of the chapters that I gave out is from a new book called *State of the Wild 2008-2009*. It's really important for us to get the public to understand this, so that they're supportive of integration. If you think about in our own country the relationships between USDA and the Department of Interior and CDC, those are not easy relationships, and those of you in government know this, but the types of issues I've talked about are starting to force, if you will, really important partnerships.

So just to conclude, this is the Kavango-Zambezi, the KAZA transfrontier conservation area. This is where five countries in southern Africa come together: Namibia, Angola, Zimbabwe, Zambia, and Botswana. When [and if] this comes to pass, this will be the largest connected conservation area on the planet. The reality is it's a long way from happening. If you travel in this area, what you come across as you move around are fences -- fences because of the foot and mouth disease virus that I told you about before, but also because of another disease called lung disease -- contagious bovine pleural pneumonia, which is a disease of cattle. It doesn't even affect wildlife, but people have chosen fencing to control that disease as well. And what's been interesting for me is to meet with my colleagues in conservation who aren't from a health background, and have them recognize for the first time, perhaps, that if they don't deal with the veterinary issues, if they don't deal with animal health and its economic implications, any vision for connectivity is just an illusion. So the realities in a place like southern African are that if we don't foster these cross-sectoral partnerships and look at the trade-offs proactively, ultimately as conservationists, we lose. We might have a short-term victory, but that's not what I'm after. So if KAZA's going to work, it's going to require the types of intersectoral collaboration that I've been describing. Otherwise, these fences -- they'll never come down.



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