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美利用卫星图像研究土地使用和植被变化关系如何影响人类健康和食品安全

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A Kansas State University geography professor is using satellite imagery to research how land use and land cover changes affect human health and food security.

Doug Goodin uses remote sensing, in combination with other types of data, to monitor and forecast the spread of infectious disease. Goodin and other scientists recently discussed this subject at the workshop, "Contributions of Remote Sensing for Decisions about Human Welfare," sponsored by the National Academies of Science in Washington, D.C.

According to Goodin, there is a confluence of change currently taking place across the globe. The world's population is steadily increasing, the global climate is changing and global ecology is being altered. All are thought to be related to the emergence of new diseases or re-emergence of old diseases, he said.

"One of the new paradigms for looking at this kind of thing is that we try to understand the disease as not just something that affects the human being," Goodin said. "We also try to understand its ecological context, its physical context and also its social context because there are certainly social human factors in any kind of disease."

Goodin said one reason for current interest in remote sensing is because it allows researchers to measure or note changes in the delicate balance of ecological systems. He is using the technology to study the re-emergence of hantavirus in the South American country of Paraguay.

The deadly rodent-borne virus is fatal 30 percent to 50 percent of the time in humans.

"By using remote sensing technology, we've been able to understand how human beings have changed the landscape the mice live in," Goodin said. "It forces different kinds of behavior for the mice. It brings them, perhaps, more in contact with each other, so the disease spreads horizontally in the rodent population, and more in contact with people, so there is a greater chance humans can contract this disease."

Goodin said the reoccurrence of the hantavirus, which re-emerged in the 1990s in United States, is evidence of the delicate balance of ecological systems and the possibility of disease to emerge or re-emerge when those systems are altered. He chose Paraguay to conduct his study because it is one place where there has been significant occurrence of the disease and also because there are several hantaviruses circulating there.

"Even though it is a relatively small country, Paraguay is a country with tremendous ecological contrast," Goodin said.

Goodin attributes the rapid deforestation of Paraguay's rain forest, the Atlantic forest, as a cause for the landscape changes. He said the Atlantic forest is more of a biodiversity hot spot than the more famous Amazon forest. He said the forest is rapidly disappearing because people need the land.

According to Goodin, remote sensing technology also can be used to reduce sickness related to poor water quality, such as diarrhea.

"That is something we can observe with remote sensing," Goodin said. "We can actually look at water bodies; we also can look at the context to see where pollutants in water are coming from. Armed with that kind of knowledge, we can actually suggest how try to eliminate these problems."

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