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### Lycoming professor says not all data is in yet, answers to come within five years

Is global warming real?

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Rising sea levels, widespread drought, dropping water tables, stressed crops, melting polar ice caps. All are pointed out as signs of global warming, which already may be having an impact here.

But a Lycoming College biology professor who deals with environmental issues at the local level says the data isn't all in on global warming — yet.

The issue of global warming — and how much human beings are to blame for it — was large on the worldwide stage this year, culminating in an international conference in Bali, Indonesia.

There, many scientists were pushing the United States to commit to deep cuts in greenhouse gas emissions.

"We can't say that this is 100 percent caused by human beings," said Mel Zimmerman, director of the Clean Water Institute and a biology professor at Lycoming College. "There are a lot of projections out there. Some scientists think we are beyond the tipping point and that there is nothing we can do now.

"This year was the year global warming became an international issue. I think in the next five years, we will have some answers."

He said this has been a watershed year for scientists who were at the Bali conference, where a ton of data was pored over.

"They (scientists) came out with three reports over the past year and about 120 countries and 10,000 delegates are looking at what can be done."

He said the Kyoto Protocols, international agreements on greenhouse emissions, are due to expire in five years. The United States and Australia did not sign on initially, but Australia recently did an about-face, leaving the United States as the lone holdout.

"What the conference is about, is with the new information we have about global warming, what can we do?" Zimmerman explained. "Can we as countries agree to make reductions in greenhouse gases?"

He said the American position is that such deep, quick cuts would "create a tremendous burden on people and companies." It also wants China and India to make more cuts in emissions as well.

The conference, he said, also was trying to come up with practical, specific ways to reduce the suspect emissions. But, the question among scientists, he said, remains, "Is the issue real?"

"There are some scientists who say it is overblown, that we have had past temperature (climate) changes," Zimmerman said.

"Scientists on the Intergovernmental Panel insist that the temperature is rising and that humans are responsible for a part of that."

A sampling of data from the Intergovernmental Panel's summary of its reports paints an alarming picture.

According to that report, "Global atmospheric concentrations of carbon dioxide, methane and nitrous oxide have increased markedly as a result of human activities since 1750 and now far exceed pre-industrial values determined from ice cores spanning many thousands of years. The global increases in carbon dioxide concentrations primarily are due to fossil fuel use and land-use change, while those of methane and nitrous oxide primarily are due to agriculture."

The report says carbon dioxide has increased from 280 parts per million before the industrial age to 379 ppm by 2005. Graphed data shows a spike in the amounts of carbon dioxide, methane and nitrous oxide within about the last 100 years.

Global average temperature and sea levels have risen since about 1950, while global snow cover,

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including the polar ice caps, has been shrinking. The report also says temperatures in the northern hemisphere have risen and are "likely higher than during any 50-year period in the past 500 years and likely the highest in at least the past 1,300 years."

"Methane, carbon dioxide, water vapor, can all have an effect (on climate) because they can change cloud cover," Zimmerman said.

So how much are humans to blame?

"It is hard to say how much (global warming) is caused by humans. But over the past year, it is becoming more acceptable to believe it is caused mostly by human beings and it is not going away," Zimmerman said.

Changes could be disastrous.

"They (the panel) are projecting that in the next 50 to 100 years, there will be a 1- to 4-degree temperature rise globally," Zimmerman said. Comparatively, he said, during the last ice age, average temperatures were about 5 degrees cooler globally.

"Globally, 2006 was the hottest year on record (since the early 1800s when weather record keeping began)."

What that means could be more drought, such as the one that parched the Southeast this year. In that region, states are 12 to 16 inches below normal rainfall.

Pennsylvania also had drought this year.

"In the Midwest, the soils are great, but if it becomes too hot for the crops, we may have to grow our food in Canada, where the soil isn't as good," Zimmerman said.

Meanwhile, water tables are dropping as droughts persist.

The effects on people and the environment with a lack of water are obvious, including the food supply. Energy costs could rise dramatically and some areas of this country may become arid.

"We can look for ways to reduce our dependence on fossil fuels," Zimmerman said. "We are looking at alternatives that won't put so much carbon dioxide and other gases into the air."

He says he hasn't totally been convinced humans are to blame for the latest global trends, but says answers will come.

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