US rush to produce corn-based ethanol will worsen 'dead zone' in Gulf of Mexico

March 10 2008

The U.S. government's rush to produce corn-based ethanol as a fuel alternative will worsen pollution in the Gulf of Mexico, increasing a "Dead Zone" that kills fish and aquatic life, according to University of British Columbia researcher Simon Donner.

In the first study of its kind, Donner and Chris Kucharik of the University of Wisconsin quantify the effect of biofuel production on the problem of nutrient pollution in a waterway. Their findings will appear in the March 10 edition of the *Proceedings of the National Journal of Sciences*.

The researchers looked at the estimated land and fertilizer required to meet proposed corn-based ethanol production goals. Recently, the U.S. Senate announced its energy policy aims of generating 36 billion gallons annually of ethanol by the year 2022, of which 15 billion gallons can be produced from corn starch. The corn-ethanol goal represents more than three times than triple the production in 2006.

"This rush to expand corn production is a disaster for the Gulf of Mexico," says Donner, an assistant professor in the Dept. of Geography. "The U.S. energy policy will make it virtually impossible to solve the problem of the Dead Zone."

Nitrogen and phosphorus from agricultural fertilizer have been found to promote excess growth of algae in water bodies – a problem that's common across North America and in many areas of the world.

In some cases, decomposition of algae consumes much of the oxygen in the water. Fertilizer applied to cornfields in the central U.S. – including states such as Illinois, Iowa, Nebraska and Wisconsin – is the primary source of nitrogen pollution in the Mississippi River system, which drains into the Gulf of Mexico.

Each summer, the export of nitrogen creates a large "Dead Zone" in the Gulf of Mexico, a region of oxygen-deprived waters that are unable to support aquatic life. In recent years, it has reached over 20,000 km2 in size, which is equivalent to the area of New Jersey.

Donner and Kucharik's findings suggest that if the U.S. were to meet its proposed ethanol production goals, nitrogen loading by the Mississippi River to the Gulf of Mexico would increase by 10-19 per cent.

To arrive at this figure, Donner and Kucharik combined the agricultural land use scenarios with models of terrestrial and aquatic nitrogen cycling.

"The nitrogen levels in the Mississippi will be more than twice the recommendation for the Gulf," says Donner. "It will overwhelm all the suggested mitigation options."

The results of the study call into question the assumption that enough land exists to fulfill current feed crop demand and expand corn and other crop production for ethanol.

The study concludes that increasing ethanol production from U.S. croplands without endangering water quality and aquatic ecosystems will require a substantial reduction in meat consumption.

Source: University of British Columbia