

Managing manure

High levels of phosphorus in excrement considered harmful

By [Kristi Jourdan](#)

The State News

Published: January 23, 2007

You could say MSU is full of it. Cow manure, that is.

So much so that MSU officials are running out of options to remove farm animal waste from university property.

"Years ago, we could spread manure from all the research animals on a lot more acres," said Fred Poston, vice president for finance and operations. "We don't apply it to pastures anymore because of the odor problem. As the land we have available has decreased substantially, it's reached the point where we're in danger of not being able to get rid of the manure."

There also could be a danger to the environment because of overloading manure on limited university fields.

When these research animals produce waste, their excrement and everything in it breaks down in the soil. An excessive amount of phosphorus, a chemical element found in animal fecal matter, is capable of seeping into ground and surface waters.

"Soils generally have a good capacity to tie up the phosphorus," said Lee Jacobs, a crop and soil sciences professor.

"If you load up the soil too much with phosphorus and that phosphorus is no longer held strongly, than that phosphorus becomes more mobile."

This buildup of phosphorus can cause oxygen-depriving algae to grow in the water, which deteriorates its quality.

But administrators are devising ways to unload — so to speak — the dung.

Murky waters

Chuck Reid, director of land management for the university, said MSU officials are doing what they can to crack the problem.

Some of the 400 acres available for spreading have high levels of phosphorus, he added.

"A lot of what looks like open land is actually used for research," Reid said. "That's the reason why we cannot continually spread manure.

"With regulatory issues and potential weather factors, a rainfall forecast precludes us from spreading."

The algae interferes with fishing, swimming and recreation, said Alex Sagady, an East Lansing-based environmental consultant to the local chapter of the Sierra Club.

"This is a textbook example of what happens in the real world," Sagady said.

"If you keep on applying animal waste to the same fields year after year, and you don't have sufficient cropping out of the phosphorus, you have this buildup."

There are a few university fields where these levels are considered harmful, as determined by regulations MSU helped develop for the Michigan Department of Agriculture.

In order to cope with these harmful, yet "not necessarily illegal," levels of phosphorus, Reid said crops, such as hay or corn, were planted to draw the phosphorus back out.

"Not very many fields (have high phosphorus levels), just a small handful," Reid said. "Without looking, I want to say four or five out of dozens of fields. We no longer spread on those fields."

Currently, the university spreads the manure on campus property during the summer after composting the waste material, but it's not enough, Poston said.

University officials could cut back on the number of research animals, purchase more land to spread the manure, pay to have the waste products moved to another location or purchase an anaerobic digester that converts the waste into energy.

Dirty electricity

A digester generates methane from the excrement, which can be burned as a fuel source. When the waste is mixed with food scraps and inserted into the digester, the combination increases the amount of methane generated.

The methane then could power a "dirty turbine," creating electricity.

"With 50,000 meals a day we have a lot of food scraps," Poston said. "But that's ground up and goes through the sewer system."

Hauling the leftovers to a digester daily could be a "nightmare," he added.

But some university officials said there is not one solution to the problem, but rather a combination of possibilities can be used.

"An anaerobic digester won't make phosphorus disappear," Jacobs said. "It would reduce the volume of manure, but for some elements such as phosphorus, you may end up concentrating nutrients into less material.

"Basically, you don't have to haul as much material."

Instead, it's a matter of making adjustments to the animals' diets, he said.

"If the phosphorus is closer to what the animal actually needs to produce the milk or meat or whatever the product is, that will cut down the amount of phosphorus in the manure," Jacobs said.

"If you do a better job of balancing their diets to make sure the animal has what it needs, but don't overfeed the phosphorus, it will be helpful to balance phosphorus management."

For now, engineers are analyzing the problem and coming up with solutions, Poston said.

"(Engineers) are developing a commercial scale digester, which we could load the manure in," Poston said. "Assuming all this works, we wouldn't have a manure problem.

"I don't know if all of this is going to come together or not. It's intriguing — an intriguing solution to the problem. There's a lot of problems that can be solved if engineering and logistics can be worked out."

Kristi Jourdan can be reached jourdank@msu.edu.

Published on Tuesday, January 23, 2007