



Students at SUNY Morrisville make On-Farm Connections with Soil Fertility and Sustainability using NMB Curriculum

By Melanie Soberon

This past spring, undergraduate students at SUNY Morrisville in Dr. Jennifer Gilbert Jenkins' *Soil Fertility* course appreciated connecting classroom knowledge about soil health and sustainability with actual farm assessments by utilizing the Nutrient Mass Balance (NMB) curriculum entitled "Assessing Environmental Sustainability of Farming through Whole Farm Nutrient Mass Balances."

With degrees in Environmental Studies from SUNY Buffalo, Natural Resource Management and Engineering from the University of Connecticut, and Environmental Soil Chemistry from the University of Delaware, Gilbert Jenkins is an environmental educator who knows the importance of education in topics related to sustainability.

Gilbert Jenkins first began to incorporate the NMB curriculum into her Soil Fertility course as part of the pilot program conducted in the spring of 2021. The curriculum was developed by the Nutrient Management Spear Program (NMSP) at Cornell University under leadership of PhD student Agustin Olivo in collaboration with Dr. Quirine Ketterings, team lead for the NMSP, and Dr. Jeff Perry, Senior Lecturer in Instruction and Education, Department of Global Development at Cornell University.

When Ketterings approached Gilbert Jenkins about possibly collaborating on the evaluation of the curriculum, Gilbert Jenkins enthusiastically responded.

"I have a very strong interest in sustainable agriculture particularly as it relates to soil health. Working with Agustin and Quirine was mutually beneficial, and this particular project focus was directly related to the work I do with my students," Gilbert Jenkins said.

While Olivo took the lead on designing a curriculum for 9th – 12th graders to be used in eleven sessions (40 min each), the NMB concepts and evaluation are also an integral part of a senior level Cornell University course

in whole farm nutrient management (ANSC4120).

Gilbert Jenkins integrated various aspects and examples from the NMB curriculum into her soil fertility course for undergraduates at SUNY Morrisville. The students were predominantly freshman and sophomores studying Agricultural Science, Agricultural Business or Dairy at SUNY Morrisville.

"The team developed this curriculum predominantly for high school students so there were pieces of it that I felt I was able to skip because I knew that my students had that information. I was able to tailor the various pieces and just pull out what was necessary for my college students."



Dr. Jennifer Gilbert Jenkins incorporated elements of the Whole Farm Nutrient Mass Balance curriculum into her Soil Fertility class at SUNY Morrisville this spring semester.

Gilbert Jenkins went on to say, "The course that I use this curriculum in is called *Soil Fertility* and so the focus of the course in general is understanding the chemistry behind

soil fertility, understanding what the sources of nutrients in agricultural settings are and how to best manage them. This curriculum fits with sections on how to best manage nutrients. As they are learning the chemistry, they also step back and look at the big picture and see that it's not just how many ions can hold onto the soil but understand that the entire farm is a system, and you have to pay attention to what's going in and what's going out."

The NMB curriculum was designed to combine hands-on activities and discussions to allow students to cover the fundamentals of the whole farm NMB concept and conduct a whole farm NMB, identifying opportunities for efficiency and sustainability improvement at the farm level.

"My students really appreciated it!" emphasized Gilbert Jenkins. "The students we get are very much focused on implementing ideas, so it was helpful for them to see the connections...they really liked going out to the farms and saying, 'Ok these are the practices we see people doing on farms all the time...now what does it mean for nutrient applications?'. It was really helpful to have the students walk through the example exercise in the curriculum to understand the theory before they went out and worked with a farm of their own."

Olivo recounted, "Jenn had students work with real farms...they went to the farms, collected data, mostly from people they knew - a friend's farm or a farm that a parent worked at - so they were connected to the whole process and knew what was going on at the farm."

Gilbert Jenkins said, "They weren't treating it like a classroom activity where once the semester is over, we don't care anymore. Because they had connections to the farms, they wanted to see this through to the end!"

One student, Courtney Sarlouis, was so motivated by the assignment that with Olivo's help she put together a report for the farm.

Salouis remarked, "Soil fertility has been one of my favorite classes offered at SUNY

Morrisville. When I heard we would be taking part in a nutrient mass balance program I thought to ask Morrisville alum Kyle Clark. Through this program I was able to gain a deeper understanding of nutrient inputs and outputs with the help of Clark Farms Dairy located in Delhi, NY. Through this process I was able to gather enough information to complete a full report for the whole farm nutrient mass balance assessment with Agustin. Seeing all the information compiled into a final project was amazing and an experience I truly enjoyed".

"It was great to see the students really engaged in collecting the data from the farms and running the assessment using the whole farm NMB software. I think creating a meaningful learning experience for the students, but at the same time, being able to report information back to the farmers made this collaboration with Dr. Gilbert Jenkins and her class at SUNY Morrisville even more impactful", Olivo shares.

As for the future, Gilbert Jenkins said, "I will definitely continue to use this - it was great. Morrisville is very much a hands-on, applied learning school, so having the component where my students learn about the process, and then went out to farms, collected the data, did the implementation in the model and saw the results - it fits right in with the type of learning opportunities that we look for. They are not just learning the theory, they're learning the practice, asking 'how do I then take this information that I have learned and use it as I leave Morrisville?' I would love to see more of the Ag Ed teachers in the state using it!"

(October 6, 2021)



Cornell University
Cooperative Extension



The **Nutrient Management Spear Program (NMS)** is an applied research, teaching, and extension program for field crop fertilizer and manure management on dairy and livestock farms. It is a collaboration among faculty, staff and students in the Department of Animal Science, Cornell Cooperative Extension, and PRO-DAIRY. Our vision is to assess current knowledge, identify research and educational needs, facilitate new research, technology and knowledge transfer, and aid in the on-farm implementation of strategies for field crop nutrient management including timely application of organic and inorganic nutrient sources to improve farm profitability while protecting the environment. An integrated network approach is used to address research, extension, and teaching priorities in nutrient management in New York State. For more information on NMS projects and extension/teaching activities, visit the program website (<http://nmsp.cals.cornell.edu>) or contact Quirine Ketterings at qmk2@cornell.edu or (607) 255-3061.