Nutrient budgets in organic vegetable production systems

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Goals and Objectives

The long-term goal of the proposed work is to develop tools that will help farmers optimize soil fertility management in organic cropping systems. This will require a much larger effort than is outlined in this proposal, however our request emphasizes work that is a critical first step in developing organic soil fertility management strategies.

1. Develop nutrient budgets for the major nutrients (nitrogen, phosphorus and potassium) as well as estimates of carbon inputs for 10-15 organically-managed vegetable production systems in New York state.

2. Begin the process of compiling a database of crop and soil amendment nutrient contents that can be used in estimating nutrient exports from organic vegetable production systems.

Final Report

We were happy with our progress in this first year considering that we knew from the outset that this ambitious project will take 5-6 years to complete. We have made several solid first steps in establishing relationships with organic farmers in the region and collecting the information we will need to eventually produce a nutrient management tool for organic farmers. Perhaps the most important accomplishment this year was that we were able to collect enough preliminary information to leverage additional funding to pursue our long-term goals. We received funding from two sources to expand this work for the next two years: 1) the USDA-IFAFS Program ($120,780) and 2) the Organic Farming Research Foundation ($9,220). The funding from the Towards Sustainability Foundation was instrumental in providing the means to collect the preliminary data that is necessary in order to compete for funding from these sources.

Objective 1. After surveying the organic farms in the vicinity of Ithaca, we decided to conduct a more in depth sampling of crops on fewer farms. This allowed us to analyze a greater number of vegetables and varieties through time on the same farm in order to begin to identify major sources of variation. During the 2000 growing season, we collected management information and vegetable crop samples from six organic farms in the Ithaca area. Very early on, it became apparent that farmers are using different units to record yields and are rarely recording harvests on a weight basis. Therefore, we realized that in order to develop nutrient budgeting tool for farmers we would have to develop a series of conversion factors based on the harvest units recorded by farmers. During this first year, a fair amount of effort was devoted to this task.

Objective 2. A wide range of the important vegetable crops grown by organic producers were sampled, including potatoes, lettuce, kale, chard onions, summer and winter squashes, broccoli, tomatoes, peppers, eggplants, carrots, beets, cabbage. Vegetable samples were dried to

determine dry weight/fresh weight ratios for the various crops and sub-samples were analyzed for nutrient content (P, K, Ca, Mg and micronutrients). We are still in the process of analyzing compost and vegetable samples for nitrogen. For some crops where multiple varieties are grown several varieties were sampled within the same field in order to evaluate varietal differences in nutrient contents. In addition, for those vegetables that are grown as serial plantings early and late season harvests were sampled in order to determine whether there are significant effects of planting date on nutrient content.