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CAN WE HAVE BOTH SUCCESSFUL FARMERS AND CLEAN GROUNDWATER ON LONG ISLAND?

By

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The Situation

When most people think of Long Island, they think of suburban landscapes, expressways or vacation spots with long sand beaches. Few think of Long Island as an agricultural region. Yet Suffolk County, on Eastern Long Island, contributes more farm income to New York's economy than any other county in the state. Long Island has long been an important agricultural region of the East Coast. Early settlers realized its potential for high agricultural productivity with its deep, easy to work soils and temperate climate. Potatoes and vegetable crops have done particularly well. However, in recent years, agriculture on Long Island has been retreating so that now it exists on only the easternmost part of the island. The principle reason for this has been the encroachment of suburbs, but other factors have included central city growth on the island and second home development in resort areas. To complicate matters further, Long Island agriculture is currently in a transition provoked by environmental problems. Chemicals used to control potato pests have been found in Long Island's groundwater. The area affected represents over 4% of the total recharge area. This is the only source of drinking water for the over 2.6 million residents of the Island.

The character of Long Island's agriculture is far from typical of farming in the rest of the state. Farmers on Long Island face conditions which are different from farmers anywhere else in the nation as well. Suffolk County leads New York State in the production of potatoes, cauliflower, duckling, cut flowers, sod, turf, nursery stock, and clams. Long Island's cropland has long been dominated by potato production.

The Long Island experience with development of agricultural land also is different from the rest of the state. Agricultural production is concentrated

on the eastern end of the Island. Most agricultural land is on the North Fork, consisting of Riverhead and Southold towns, with a substantial amount left on the South Fork, which include the towns of Southampton and East Hampton. The topography, soil and climate of this area are highly uniform and conducive to farming. Soil and climate vary slightly between the North and South Forks. Properly fertilized, Long Island soils are among the most productive in the state. The soils are deep, free of stones, level, and well drained. They are light and easy to work. On the other hand, Long Island soil lacks organic matter and is low in nitrogen. Another disadvantage is that these soils have a low capacity for holding water and require a great deal of irrigation. Of potato land, about half is irrigated on the South Fork, and 75% is irrigated on the North Fork. Virtually all vegetable land is irrigated. The depth of soil varies somewhat, and this affects water holding capacity, as well as the susceptibility to leaching.

Long Island's climate is outstanding for the Northeast. The temperatures are moderate, not too hot in the summer, with as long a frost free period as anywhere in the state. Long Island potato farmers enjoy some competitive advantages over upstate, Maine and Canadian farmers who have to wait longer before planting in the spring. Long Island agriculture also benefits from close proximity to one of the largest markets in the world: New York City. In addition to the New York City market, there is a substantial market on Long Island itself.

The soil and climate make Long Island ideal for growing potatoes. These conditions are also ideal for the Colorado Potato Beetle (CPB). Long Island has had an extensive history of CPB infestation. CPBs have developed a resistance to a number of pesticides, including DDT, several other chlorinated

hydrocarbon, and several of the organo-phosphate insecticides. The failures of these methods of control were followed by the introduction of systemic carbamates. The pesticides used were carbofuran and aldicarb.

Systemic carbamate pesticides have some properties which make them undesirable. They have high acute toxicities, are water soluble, and are persistant at low temperatures. As systemics, they are intended to be taken up by the crop, and were incorporated in the soil when the crop was planted. The light soils, abundant rainfall, and readily available irrigation which make Long Island an ideal place for growing potatoes also cause pesticides to be transported through soils more rapidly than many other places. Because the soils do not retain moisture, irrigation is necessary during dry periods. However, irrigation decreases the amount of time pesticides spend in the vadose zone. Because of the shallow depth to groundwater, pesticides prone to leach do not have time to break down before reaching the saturated zone. Pesticides, particularly aldicarb, have shown a tendency to be quite stable in the saturated zone, more stable than was predicted.

The sensitivity of Long Island's groundwater resources is well known. Nassau-Suffolk was the second aquifer in the country to be accorded sole source aquifer status. The towns of Brookhaven, Riverhead, Southold, Southampton and East Hampton have had all wells within 2,500 feet of potato fields tested for the pesticide aldicarb. Nearly 8,000 wells were tested, with concentrations ranging from not detectable to 484 parts per billion (ppb). Over 2,000 wells had detectable concentrations and, of those, over 1,000 wells had concentrations exceeding the state's recommended guideline of 7 ppb. This standard was set conservatively at 0.001 of the no effect dosage level. Two of the chemicals found, aldicarb and carbofuran have been de-registered for use on

Long Island. A third, oxamyl has been removed from Long Island by its manufacturer.

Union Carbide, manufacturer of aldicarb, offered free installation of water filters to households with concentrations exceeding 7 ppb. In return, homeowners had to agree to recharge and maintain those systems. Almost every household eligible accepted the offer. In spite of the conservative standard, this is evidence of risk averse behavior by consumers. Those who have wells with contamination levels below 7 ppb must pay for any treatment system installed.

There is evidence that aldicarb contamination is following a pattern of moving from shallow areas of high concentration into deep areas of low concentration.[1] This is caused by four major processes: Movement of aldicarb residues from the unsaturated zone into the aquifer; movement of aldicarb residues through the aquifer; dispersion of the aldicarb residues occurring in both the unsaturated zone and in the aquifer; and the degradation of aldicarb residues.

The Dilemma

Between pesticide failures and environmental problems, farmers have had to search for alternatives to conventional management practices. Economic adjustment to these problems has not been easy. Having the pesticide treadmill abruptly interrupted placed severe financial stress on many farmers. Chemical

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[1]Henry B. F. Hughes and Keith S. Porter, Interim Results Tracking Aldicarb Residues in Long Island Ground Water (Ithaca, Cornell University Center for Environmental Research, 1984).

control is still widely practiced on Long Island, but no chemical has been successful at controlling the CPB.

The dilemma hinges on whether farmers need to use polluting chemicals to survive economically. If the banning of pesticides makes Suffolk County uncompetitive, farmers cannot remain in business. If pesticides necessary for agricultural production contaminate groundwater, then successful farmers and clean groundwater cannot co-exist. Some pesticides have been removed from the market, yet farmers have adapted to the new conditions.

Farmers responded to the removal of these pesticides from the market in several different ways. Some switched to growing other crops. Some got out of farming completely. Most substituted other pesticides for the ones that were banned. Those farmers who are changing their production are switching to high value fruit and vegetable crops. The conversion to these crops will require substantially more labor than potato production has. This situation has forced farmers to consider alternatives to these specific pesticides. More importantly, it has forced farmers to examine pest control methods which do not use pesticides.

Another reason farmers have been able to survive in Suffolk County are the strong incentives for retaining agricultural use on their land. Agricultural land use in Suffolk County is subsidized in two ways. First, land which is enrolled in agricultural districts are taxed at agricultural use values, rather than at market value. Second, farmers can sell development rights to the town or county. These subsidies cost Suffolk County taxpayers millions; money spent for preserving agricultural land. These programs are popular, widely regarded as successful, and have good participation from farmers.

Suffolk County farmers are wary of any government intervention. Nowhere in New York State will you find agriculture operating on such a large scale subject to as restrictive land use controls. Any program which threatens to further curtail the exercise of property rights will be viewed with suspicion. An argument used in the past to preserve agricultural land has been to protect groundwater quality. The rationale behind this was that high density development causes increased saltwater intrusion, more septic leaching, household and lawn chemicals to intrude upon the groundwater. Agriculture is not the only alternative to high density development.

Agriculture in Suffolk County remains quite healthy. One can recall the rapid decline of Nassau County's agriculture following the Second World War, and can easily imagine a similar fate for neighboring Suffolk. After aldicarb, carbofuran and oxamyl, one would also not be too surprised at other pesticide contamination incidents, even if not as toxic or widespread. Suffolk County agriculture remains viable, but is rapidly changing.

Policy Recommendations

We can have both successful farmers and clean groundwater, but it will not be easy. Consumers, farmers and politicians need to realize that clean, safe drinking water is not a free commodity, and that we have been getting it cheaply for too long. They will have to pay for clean drinking water either directly or indirectly, but either way they will have to pay. The difficulty in quantifying so many of the costs is discouraging. How can one estimate future health care costs, pain and suffering, increased water supply costs, and premature death associated with pesticide contamination in water? One can make

an educated guess, but it is this author's contention that such estimates serve more to obfuscate than elucidate the decision-making process.

The transition from an agriculture which depends on agricultural chemicals for pest control to a more integrated approach to pest management will undoubtedly cause economic hardship for some farmers. It will take time and effort from agricultural researchers, and money from the public to do so. Rather than focusing on research which increases output, the focus of agricultural research needs to shift to reducing inputs. Not only will this reduce the out of pocket costs of the farmer, it will also help correct the imbalance caused by overproduction. Reduced input farming will thereby enhance profitability and improve environmental quality, including the quality of groundwater. This solution to farm problems is not new, yet has not been readily supported.

The reasons for this are both technological and institutional. The companies which manufactures agricultural inputs have no incentive to reduce purchased inputs. A sales-, market share- or growth-maximizing firm would want to maximize the amount of purchased inputs used by farmers. Research carried out by these firms are unlikely to have farm profitability as a motivating factor, and are less likely to have protection of groundwater as a primary objective.

Agricultural scientists may derive more intrinsic satisfaction from higher yields than they do from lower inputs. This psychology may be reversing somewhat. While starving people remain on the earth, it is appealing to increase the amount of food produced on an acre of land. Agricultural scientists have a responsibility to pursue a more efficient agriculture. Efficiency has a different meaning to different people, and professional biases

arise. By efficient, I mean producing as much with as little as possible. The output is food, the input is not just land and labor, but also water, capital and purchased inputs.

Monocultural practices no longer make economic sense in many places, and never made ecological sense. Not only is a diversified cropping system less susceptible to disease and insect infestation, it is also better capable at handling market risk. Long Island's farm economy will remain healthy if it can diversify and expand into specialty crop markets. Suffolk County has already made strong advances in this direction.

Farmers can change practices to reduce impact to groundwater, but it will not pay for them to do so. Government can force them to modify their practices, but this is undesirable. If agricultural pollution of groundwater is to be alleviated, farmers will need assistance in the form of direct payment subsidies for low-impact crops in the short run, subsidized technical assistance in the medium run, and, over the long run, research for reduced input production techniques. To be equitable and efficient, this should be paid by the beneficiaries of clean groundwater. Otherwise, citizens in critical recharge areas will have a choice between successful farmers or clean groundwater.