Case Study

How New York City Used an Ecosystem Services Strategy Carried out Through an Urban-Rural Partnership to Preserve the Pristine Quality of Its Drinking Water and Save Billions of Dollars

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The New York City Water system serves nine million people. It provides these customers with 1.2 billion gallons of water a day, delivered to 600, 000 residential and 200,000 commercial building in the City, and close to two dozen local water systems in the northern suburbs.

Beginning in the 1830s, the City of New York created a water system that was generally considered to have no equal in the world. Determined to have pristine water at the lowest possible ongoing cost, generations of City leaders chose to go far north and west of the City, and ultimately into the Catskill mountains over a hundred miles away, to find rural environments that would provide pure, pristine water.

For 150 years, until the 1980s, New York City received the benefits of the largely undamaged rural ecosystems that provided New York with pure drinking water at a fraction of the cost of other cities paid. But in the 1980s, as the economics of industrialized agriculture transformed American farming and began to undermine the economic vitality of the small family farms that dotted the Catskills, things began to change. Catskill farmers, in a desperate attempt to remain economically viable, began industrializing their own farm operations. Nutrient use increased, erosion accelerated, and fears of pathogen contamination began to grow. In a further attempt to maintain economic viability, farmers also began selling off the forested portions of their land for environmentally damaging exurban development.

Attempts to control these developments by traditional environmental regulation completely failed, as traditional top down environmental regulation of agriculture has always failed in the United States. By the end of the 1980s, public health specialists were publicly stating the City would have to substantially increase the treatment of its source water. Given the amount of water New York City used daily, the costs for the advanced treatment the City required were estimated to be $4 billion to build the necessary treatment facilities and $200 million annually to operate them. These amounts would double the cost for water in New York City, with major adverse impacts on low-income families.

Thus, when this author become Commissioner of the New York City Department of Environmental Protection and Director of the New York City Water and Sewer system in early 1990, determining if there was any alternative to filtration was at the top of a very crowded agenda.

However, unlike nearly the entire American water industry and its regulators, both of which were dominated by civil and public health engineers who thought almost exclusively in facility construction terms to water quality problems, this author's background was in management reform, public finance and environmental policy, particularly land use; and he was experienced in addressing issues from an integrative, multi-partner, problem-solving perspective, rather than from the menu driven solutions of the traditional, single issue expert that had shaped the filtration debate until that point.

The author and his new management team were quickly convinced that allowing Catskill drinking water purity to deteriorate and then spending massive sums to clean it up was not the ideal option. Initial calculations showed that a comprehensive program of watershed protection would cost far less than filtration, would maintain water quality more effectively, and would produce numerous other benefits as wellwhereas a filtration strategy would be nothing more than a money pit. Instead of paying to clean up the results of degrading the water producing environment, the City would invest in preserving the rural Catskill environment that was providing it with the world's best urban water. The team's philosophy was that a good environment will produce good water. And that made investing in the environment in an area 100 miles and more a smart and profitable investment for New York City.

The problem was how to overcome history, prejudice, bureaucratic folklore and institutional biases to refocus on creating a working program of pollution prevention. It took eighteen months of mutual work between the City and the Catskill farming community but, in the end, using concepts that have now come to be called ecosystem services, an innovative and far reaching agreement was crafted.*

Operationally, the question became what environmental investments should the City make. Some, such as adding to the publicly held land in the watershed, particularly critical lands threatened by development, stream corridor restorations and better stewardship of City owned lands were obvious. But that did not answer how to control non-point source pollution on privately held farmlands and other rural landscapes.

The City began to organize an unprecedented program of regulatory enforcement against non-point source pollution runoffs in its watersheds. As the scope of the City's intentions became apparent, farmers and other rural landowners reacted angrily, denounced the City and vowed all out resistance to the New York City invaders who intended to undermine their livelihoods and destroy the value of their land.

Though the City could not afford to back away from that conflict, it fortunately realized that it should first seek to defuse it. The City quietly approached the New York State Department of Agriculture and requested their assistance in creating a dialogue with the farming community. New York State Agricul-

ture. proposed that the two sides first spend some time in mutual education. Thus the City first provided for the farming community primer on the specifics of preserving drinking water, the City's regulatory obligations, the risks it was trying to deal with and its overall strategy for doing so. At the end of that discussion the farmers began to replace their stereotypes of the City and were grudgingly acknowledging that the City had some real needs that had to be met.

Then it was the farmers' turn. The Catskill farmers created a program they called "Whole Farm Planning," a title designed to capture the fact that it incorporated environmental planning into the business strategy of the farm. Under whole farm planning, a pollution control plan was developed for each farm, by a team consisting of the farmer and local farm and agricultural experts. Instead of using "one size fits all" standard pollution control measures, the whole farm plan was tailored to the needs of each individual farm and farmer, using his or her own knowledge and expertise. The plan was then reviewed and approved by the Watershed Agricultural Council, a locally based institution that was created to run the Catskill Farm program. Once approved, the City would then pay the capital costs of implementing it, as well as an ongoing annual stipend. By joining the program, the farmer was not only relieved of the ongoing burden of dealing with pollution control regulators. An equal incentive was that many of the measures in individual whole farm plans had specific economic benefits for the farmer, helping to restore the viability of Catskill farming.

To ensure pollution control efforts would reach critical mass, the program set a goal of obtaining the participation rate of 85% of Catskill farmers within five years. Thus, while the program was voluntary for any individual farmer, the Catskill farm community as a whole was committed to reach a goal that would ensure the City met its pollution reduction objectives. They did even better. After five years, 93% of all Catskill farmers were full program participants. In terms of Clean Water, the results speak for themselves:

- There was a 75% to 80% reduction in farm pollution loading;
- The pristine quality of the City's matchless drinking water was preserved and improved and the threat that New York would have to spend billions of dollars on advanced treatment of drinking water was eliminated;
- The program paid for itself many times over through its many cost savings and played a critical role in helping to stabilize water and sewer tariffs, providing major benefits to low-income households;
- The program was wildly popular with the public and helped build strong urban support for future watershed protection efforts by New York City.
- On a broader scale, the Catskill program spurred watershed protection and environmental friendly farm programs throughout the United States and catalyzed interest in non-structural alternatives to meet water resource needs as opposed to the traditional facility construction approaches of the U.S. water industry.

And New York City did not limit its innovations in ecosystem services to its watersheds. Between 1990 and 1993, it carried out the largest water conservation program in American history including environmentally friendly storm water management, permanently reducing its per capita water use by close to 20%.

Also critically, the program did not mean a spike in rates. In 1990, the water and sewer rates had been going up at an average of 14% a year for close to a decade. At the end of 1993, the annual rate increase was zero for two years, and has not exceeded the inflation rate until 2002-2003. With an expenditure of $550 million dollars, the City saved several billion dollars in construction expenses and hundreds of millions in ongoing operational costs. All of those savings went right to the bottom line in terms of water and sewer tariffs, significantly lowering the costs for City households. Thus environmental investment translated directly into cost savings for water and sewer system customers, giving their a huge incentive to support environmental stewardship and, in effect, using the cost savings from its environmental strategy to fund that environmental strategy, creating a righteous investment cycle where the more we did for the environment the more we did for the economy.

The lessons that particularly deserve to be stressed are as follows. First, the effort was explicitly goal oriented. The City set out its goals; preserve pristine drinking water, with a clear description of what that would mean in practice. The farm community set out its goals, maintain the economic viability of Catskill farming (and of their cherished rural culture and way of life), and what that meant in terms of the kind of environmental regulation they could accept. Then both sides agreed that any partnership had to achieve both goals, in a mutually compatible way. This commitment to the mutual interdependence of economic and environmental goals is the essence of sustainability.

Second, it utilized the social capital of the farm community. The Catskill program was not an attempt to get the farmers to accept a City created program. Instead, the farmers designed most of the program themselves, using their local knowledge and supplemented by their own experts. The City wisely recognized that what they wanted was clean water and if the farmers could design a successful way to obtain it so much the better. For large institutions to share power, particularly with non-experts or those they perceive as non-experts, is always difficult, but it is often the only way to success.

Which highlights the third point. The effort to design the Catskill program was highly entrepreneurial and focused on identifying new opportunities and better ways to meet the City's needs for pristine water, irregardless of whether or not doing so would clash with bureaucratic orthodoxy, existing divisions of institutional turf or environmentalist pre-conceptions of how to solve the agricultural pollution problem. The watershed program cut across the responsibilities of five state different bureaucracies: health departments, water and sewer authorities, agricultural departments, environmental regulators and economic development institutions. Yet narrow bureaucratic concerns and agendas were never allowed to guide the structure of the program. Instead, agencies learned to put aside their provincial concerns and to identify the particular contributions they could make to the program's success.

Finally, from the very beginning it was understood that the City would pay for the program out of the cost savings that the program would produce. To keep and enhance its current level of ecosystem services, it would pay back some of the wealth the ecosystem services was creating for New York City. Moreover, it would do so not from some special appropriation or short term funding source. Instead,

the need to pay for the ecosystem services the farmers would provide was recognized as a long term core cost of the water and sewer system, one to be financed, like any other, out of the proceeds of the water and sewer tariffs, and one to be factored into the rate base in setting the amount of those tariffs. This guaranteed long term financing and made it possible to plan for a program of ecosystem services that would become a long-term component in the economy of the Catskills.

Conclusions

Ecosystem service payment programs like the one used in NY are a way of capturing the environmental profits from the services rural ecosystems provide urban areas and then funneling those profits back into the rural landscapes and the rural communities that provide them, creating a righteous cycle of mutually supportive economic and ecological investments between urban and rural areas, leading to a more sustainable future for both.

The importance of PES payments for the future of rural landscapes in particular cannot be overstated. All over the world, rural landscapes are being transformed at a rate that has no historic or economic parallel. The production of food and fiber is being industrialized and reoriented towards urban markets, many of them through global export. This process is achieving its economic success at the cost of massive increases in environmental pollution and natural resource depletion. The result is a fundamental reorienting of the rural economy in which a few landowners who can ramp up to meet the economies of scale of agri-industry and industrial scale forestry will earn massive profits, while the remainder of the world's rural populations, unable to compete, are inexorably forced off the land, leading ultimately to a depopulated, mono-culture dominated countryside. PES payments can alter that dynamic and stabilize rural land use at a more balanced point that can preserve rural social capital and offer rural economic opportunity, by making environmental stewardship a new source of economic wealth for rural populations.

Many would argue that this is a naïve, even romantic, view of rural society, and that industrialized agriculture is necessary to meet both food needs and raise rural income levels. But maximizing food production in ways that depend on massive misuse of environmental resources is to ensure a steady loss of food producing capability, while the premise that this industrialization of the rural economy is necessary to raise rural incomes is demonstrably incorrect. What experience shows is that industrialized agriculture raises income only for a favored few. The result for the remainder of the rural population is to be forced off the land into the cities, substituting an urban poverty problem for a rural one.

What then should be particularly be remembered if PES initiatives are to be a success?

First, PES initiatives represent a three-sided bargain, an economic, environmental and social deal so to speak, and the deal has to work for all three parties to the deal: the rural ecosystem, the rural communities, and the urban purchasers of ecosystem services. PES programs are not just about the environment. They are about sustainability.

Second, the level of PES payment must be substantial, substantial enough to do the job. PES is not a way to get an environmental job done more efficiently; not a way to make a few welfare type transfer payments to rural populations. The program must have critical mass; it must build a sustainable rural landscape. That means it must be looking to change, long term, the opportunity cost equation between the industrialization of rural agriculture and forestry, and a rural economy based on environmental stewardship.

Third, and following from the first two, a successful PES program will be one that invests in the long-term capital resources needed for environmentally sustainable rural development. It will have a strategic plan for a rural future in which the environmental and economic investments are mutually supportive and wealth building, not wealth extracting.

Fourth, it will build on existing social capital, on the hopes and aspirations of rural communities and their leaders, and it will draw on, and rely on, their knowledge and their social commitment to the betterment of their communities. Significantly, this growing involvement of stakeholders in securing the health of the rural landscape becomes a political force capable of turning back such present and future threats such as fracking.

Fifth and finally, it will be ecosystem oriented, recognizing that healthy ecosystems are the best and most efficient way to get the natural resources our urban communities needs for their own survival and prosperity.

This paper shares the view of many that PES schemes have perhaps their largest and most immediate potential in the area of water, and that water utilities and water stakeholders have a particular role to play in promoting them. The list of water related ecosystem services is almost endless. It includes preserving drinking water quality, preventing and cleaning up water pollution, flood control, better hydrologic regimes leading to better drought protection, aquifer protection, reduced erosion and sedimentation, more and richer aquatic life and fish resources, enriched biodiversity, improved recreational and tourism opportunities and, in certain instances, increased water flows. In each of these instances and more, the use of an ecosystem services based on pollution prevention and utilizing natural capital can meet urban needs faster, easier and cheaper than traditional water industry facility construction solutions. Water utilities need to go beyond deployment of their traditional engineering skills and pioneer in innovative financial arrangements with upstream residents, as New York City did, to take full advantage of these potentials.

The full introduction, recommendations and case studies from *Water Commons, Water Citizenship and Water Security: Revolutionizing Water Management and Governance for Rio + 20 and Beyond* are available at www.ourwatercommons.org. Join us in exploring the following cases:

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