IBL Working Paper

3RD MISES SEMINAR
SESTRI LEVANTE 6-7 OCTOBER 2006

Managing Nutrients with Property Rights

An Evaluation of Nutrient Management Under Central Planning and the Market

Maria Klimas – BSc (Env) Honours
University of Guelph – Guelph, ON – Canada

Abstract

Nutrient use in agriculture has increased land productivity. It has also been blamed for environmental degradation. Nutrient management strives to maximize agricultural output, with minimal environmental externalities. The *Nutrient Management Act* (NMA) is a central planning solution recently implemented to prevent water contamination by restricting nutrient use and imposing requirements for their use. This paper examines the *Nutrient Management Act*'s role in preventing contamination with respect to a market approach. An inherent information problem is a shortcoming of the central alternative. Furthermore, a libertarian theory of property rights suggests that central planning is unnecessary and illegitimate in managing nutrients in farm practices.

Keywords

Nutrient management, central planning, market, property rights, libertarian theory

Introduction

Sparrow et al. (1984, p. 5) claim that the Canadian "federal and provincial departments of agriculture have considered increased production a major priority." Furthermore, they state that "farmers are encouraged to produce in greater quantities, on the same amount of land." Nutrient use for crop fertilization has been a factor in increased agricultural productivity. Dougan et al. (1997, p. 6-17) claim that, "during the fifties, the application of another tonne of fertilizer on average yielded 10.4 more metric tons of grain." However, nutrient use in agriculture has also had detrimental impacts on the environment in the form of surface and groundwater contamination (Johnson and Ward, 2004, p.1).

According to the Ontario Ministry of the Environment (2004), the objective of nutrient management is "to use nutrients (mainly nitrogen, phosphorus and potassium) wisely for optimal economic benefit, while minimizing impact on the environment." This paper describes and evaluates the central planning and market approaches to nutrient management, revealing that private property rights, enforced by law, can achieve a level of nutrient management that best reflects the preferences of the parties involved. This analysis can be applied to many environmental policy issues.

Nutrient management: the pollution problem

According to Dolan (2002, p. 9-11), 43 percent of 6300 rural Ontario wells surveyed tested positive for target contaminants such as nitrate from manure spreading. The Ontario Ministry of Agriculture and Food (Johnson and Ward, 2004, p.1) lists the following components of manure as possible sources of pollution problems:

- "coliform bacteria and nitrate nitrogen, which can contaminate water supplies if allowed to run uncontrolled from storage areas and exercise yards
- phosphorus, which if allowed into a watercourse, can promote algae growth, which in turn can use up oxygen in the stream, killing fish
- odours resulting from bacteria and other microorganisms in stored manure that can bother neighbours" (Johnson and Ward, 2004, p. 1).

An Ontario Ministry of the Environment Water Management Study on the streamflow and nutrient levels in the Thames River Basin (as quoted by Estrin and Swaigen, 1993, p. 557) revealed that "76 percent of the annual total phosphorous load and 95 percent of the total nitrogen load contributions to the watershed originated from rural sources," indicating that agricultural use of fertilizer is labeled as a significant contributor to water pollution. Estrin and Swaigen (1993, p. 557) further list excessive use of fertilizers and runoff from fields as among the main sources of agricultural water pollution. They also state that there are many factors of the farming production process that can cause contamination of groundwater or watercourses, including: spreading manure on fields at the wrong time of year, in inappropriate weather or soil conditions, and spreading too close to watercourses, wells, groundwater, drainage tiles, drainage ditches, and residential areas (Estrin and Swaigen, 1993, p. 557).

Maria Klimas

Central planning solution: policies related to nutrient management

Until recently, few guidelines and policies dictated the environmental standards that agricultural practices should follow. According to Estrin and Swaigen (1993, p. 557), the Agricultural Code of Practice served as a guideline for pollution prevention in Ontario, but dealt mainly with odour and air pollution. Other guidelines include the Ontario Ministry of the Environment's suggestions for proper septic and holding tank spreading, and the Canada Animal Waste Management Guide published by Agriculture Canada which, for example, "recommends that manure should not be spread in the winter on frozen soil; storage facilities should be manure-tight and rainproof to prevent leakage; and after spreading manure on land, it should be plowed under within 24 hours to control odour and runoff from fields" (Estrin and Swaigen, 1993, p. 558). Recently, however, nutrient management policy has become a priority for the Ontario Ministry of the Environment.

The *Nutrient Management Act* (NMA) was passed on June 27, 2002. Most of its conditions and regulations for Ontario came into effect on September 30, 2003 (the Ontario Ministry of the Environment, 2004). According to the Canadian Environmental Law Association (2004), the main goal of the Nutrient Management Act is "to control nutrients on farms so that they do not enter surface water or infiltrate groundwater. It is also designed to control pollution from biosolids (i.e. sludge from sewage treatment plants) when they are spread on land."

The Act is administered by the Ontario Ministry of the Environment and the Ontario Ministry of Agriculture and Food (OMAF). Some of the conditions of the Act, according to Peter Doris's publication in OMAF's *Virtual Beef* Newsletter (2003), are as follows:

- a ban on the winter spreading of sewage biosolids from December 1 to March 31 and at other times when the ground is frozen
- a ban on the use of high trajectory irrigation guns capable of spraying materials (less than or equal 99 percent water by weight) more than 10 metres for biosolids by September 30, 2003 and bans the use of these guns for liquid manure by March 31, 2005
- a requirement for a setback of 20 metres from the top of the nearest bank of the surface water for application of biosolids
- a requirement that land-applied biosolids or other non-agricultural source materials must not exceed certain limits for particular metals, as specified in the regulations.

According to the Ontario Ministry of the Environment (2004), the Act is also intended to provide enforceable standards and requirements related to all land-applied materials containing nutrients. For example, this Act contains proposals to "ban the land application of untreated septage over a five-year period" (MOE, 2004), and proposed requirements such as "the review and approval of nutrient management plans, certification of land applicators and a new registry system for all land applications." (Ontario Ministry of the Environment, 2004). The Ontario Ministry of the Environment (2004) describes the *Nutrient Management Act* as a framework and guideline for future policy creation and implementation. The Act contains amendments to the *Environmental Protection Act*, the *Highway Traffic Act*, the *Ontario Water Resources Act*, the *Pesticides Act*, and the *Farming and Food Production Protection Act, 1998* (the Ontario Ministry of the Environment, 2004).

According to the Ontario Ministry of the Environment (2004), the *Nutrient Management Act* "builds on the existing system by giving current best management practices the force of law, and creating comprehensive, enforceable, province-wide standards." The Ontario Ministry of Agriculture and Food (2003) defines a best management practice as "a practical, affordable approach to conserving a farm's soil and water resources without sacrificing productivity."

The *Nutrient Management Act* is administered by government ministries and, as such, is a central-planning solution to nutrient management. I have discussed this *status quo* non-market approach. I will now put forth an alternative, the free-market solution, and I will contrast the two options to evaluate which is the superior solution for nutrient management.

Market solution

Strict liability and property rights

Rothbard (1990, p. 235) points out that from the two axioms of self-ownership and homesteading of libertarian political theory "stem the justification for the entire system of property rights titles in a free-market society." It follows that "no action should be considered illicit or illegal unless it invades the person or just property of another" (Rothbard, 1990, p. 236). According to Rothbard (1990, 239) two theories of liability have been established to answer when, in fact, an act becomes illicit, and therefore an aggression. According to Rothbard the negligence theory holds that an action is justified if the "reasonable man" assumes it is (1990, 239). On the other hand, strict liability is based only on whether an aggression has occurred regardless of the reasonableness justification. The issue is that of causation (Rothbard, 1990, 239).

Rothbard (1990, pg. 248) states that pollution damage is an act of aggression (when proved beyond reasonable doubt) and that strict liability holds the pollutant responsible to pay the affected party. Posser, quoted by Rothbard (1990, p. 251), lists "the pollution of a stream or of an underground water supply" as a nuisance ("an interference with [the plaintiff's] use and enjoyment of [the land]"). Therefore, nutrient run-off can be classified as an aggression taking the form of a nuisance, and the defendant should pay any damages to the plaintiff.

Homesteading

According to Rothbard (1990, pg. 248), the homesteading principle of the theory of just property dictates that an airport emitting a noise level over empty land maintains the right to this noise level even after this land is developed. He further applies this idea to air pollution, stating that "if a factory owned by A polluted originally unused property up to a certain amount of pollutant X, then A can be said to have homesteaded a pollution easement of a certain degree and type" (Rothbard, 1990, pg. 249). Similarly, a farmer's right to emit nutrients into surrounding areas is protected, by the homesteading principle, if he first emitted the nutrients into empty surroundings.

Rothbard's homesteading principle is a basis for a free-market solution to nutrient management. A farmer has a riparian right to the groundwater that he first drills. This ownership structure determines that a polluter of that homesteaded water is liable for the damages of its contamination to the homesteader

The market approach: voluntary conservation

When nutrient management results in damages to private property owners, the law can ensure that the plaintiff is paid accordingly. In this case, farmers have an economic incentive to minimize run-off of pollutants, by either restricting nutrient use or taking the appropriate steps to reduce externalities.

Moreover, a set of prices arises from the negotiations between the emitter and affected party, since they will take into considerations the alternatives of their actions, and their individual best-cost solutions. According to Pasour (1983, p. 134), "the crucial role of entrepreneurship is to identify superior resource combinations and uses, taking into account expectations of the future." Thus, expected costs of nuisance liability and costs of conservation techniques relay to farmers the information they need to decide how they value tradeoffs.

This kind of negotiation may require for the parties to involve forensic science in determining the source and degree of water contamination. According to Pasour (1983, p. 134), "private entrepreneurs…bear the costs and reap the benefits of their own entrepreneurial activity." As long as property rights are enforceable and well defined, as stated by Pasour (1982, p. 756), individuals have incentives to innovate in the area of forensic science to minimize their costs.

What if damage is widespread to public land? Brubaker (1995, p. 193) points out that "according to the Muskoka Heritage Foundation, which promotes stewardship of private lands in south-central Ontario, most landowners who have the necessary information and skills will 'do the right thing.'" Brubaker (1995, p. 193) claims that private property owners will realize the financial rewards of protecting their own land. Although this idea may hold for decreasing use of nutrients to reduce input prices of production (if accurate information on efficient use of nutrients is available), decreasing nutrient use or adopting techniques to prevent run-off may not provide enough financial incentive if nutrient loss is inexpensive, and environmental damages are not incurred by the farmer himself.

Brubaker (1995, p. 194) suggests that when financial incentives to preserve are not sufficient, "environmental groups can intervene, increasing incentives to conserve." Brubaker (1995, p. 196) gives the example of conservation groups bidding with electrical companies for sulphur dioxide pollution permits, leaving portions of rights to pollute unused. This idea of interest groups buying rights to pollute can be applied to nutrient run-off. If a conservation group values the preservation of public waterways or lands enough, it will be willing to pay the farmer responsible to set up barriers to run-off, or to subsidize his decrease in yields due to lower nutrient use.

The case of multiple sources of pollution

A problem with property rights and liability occurs when there are several polluters involved in causing damage. However, Epstein (1985, p. 260) suggests that a market share liability solution can be implemented is such cases. He describes the case *Sindell v. Abbott Laboratories*, where the plaintiffs suing manufacturers for the negligent testing and marketing of the drug DES (that caused injury to the daughters of mothers taking the drug during pregnancy), were unsure of which drug company provided the drug to respective victims. The defendants were pooled, so that each defendant paid a fraction of damages to each plaintiff, instead of paying full compensation to his own victims.

The market share liability principle can be applied to nutrient pollution if several sources of pollution are causing damage, but no particular emitter can be linked to specific damages. In this case, emitters could pay a portion of damages to plaintiffs based on the fraction of nutrients emissions they are responsible for relative to other emitters.

Evaluation of central and market nutrient management

The information problem

According to Pasour (1983, p. 128), central planning is possible if data on resources, production alternatives and consumer preferences are known. However, he concedes that planners cannot obtain this data. Pasour points to Hayek's argument that "since information in the real world is vast, detailed, constantly changing, and specialized to the decision maker, the information that motivates individual choice cannot be neatly summarized in objective demand and cost functions for use by central planners" (Pasour, 1983, p. 130). Pasour's critique of general central planning can be applied to nutrient management planning. The *Nutrient Management Act* cannot be a reflection of consumer preferences since the information problem is inherent to central planning policies.

Pasour states that "all political decisions confer benefits on some people and impose losses on others, and there is no objective way to measure the benefits and costs" (1983, p. 133). If the *Nutrient Management Act* is a central solution based on public interest, a criterion often used in political planning, Pasour's argument (1983, p. 133) raises the question of whose interests is the policy based on? If the Ministries administering the Act are aiming to reach an overall maximum satisfaction, they have no means of objectively and fairly calculating the trade-offs between farmers' decreased satisfaction and the benefits of pollution prevention.

The information problem in nutrient management can be resolved with a market approach to the problem. According to Pasour (1983, p. 131), no collective information is needed in a market approach to management since "by coordinating and transmitting widely dispersed information, prices act to harmonize the separate actions of different people." Pasour (1983) indicates that prices in a market approach reflect the subjective tradeoffs of individuals, without the need of a third party to aggregate the dispersed information, a task that is unfeasible.

Maria Klimas

Ethical justifications for central planning and market approaches

Utilitarianism and central planning

According to Fox and Ivy (1998, p. 2), "utilitarianism is the ethical foundation of modern welfare economics and cost-benefit analysis." Utilitarians such as Coase and Bentham gave the job of achieving the utilitarian goal of "the greatest happiness of the greatest number" to the government (Fox and Ivy, 1998, p. 2). Fox and Ivy outline that, under utilitarian central planning, actions are immoral if they cause harm to others, since "such actions diminish the level of total happiness in a community" (1998, p. 2). Similarly, utilitarianism allows for sanctions against such harmful actions to prevent diminished utility (Fox and Ivy, 1998, p. 2). *The Nutrient Management Act* is a centrally planned solution to prevent pollution by nutrients of surface and groundwater, and as such is justified under utilitarian theory.

Libertarianism and the market

According to Rothbard (1997, 287), "the free-market economy, as complex as the system appears to be on the surface, is yet nothing more than a vast network of voluntary and mutually agreed upon two-person or two-party exchanges of property rights." Furthermore, Rothbard (1997, p. 275) claims that "the free-market economist must have some sort of theory of justice in property rights." He further states that although utilitarians avoid applying justice to their theory of property rights, they inadvertently adopt a view that "whatever government defines as legal is right" (Rothbard, 1997, p. 276). However, Rothbard (1997, p. 278) criticizes utilitarianism for its failure to meet its own criterion of "social and economic efficiency" since rapid, arbitrary and politically biased government allocation leads to uncertainty in property rights. Since rational calculation within a central framework is not feasible, as stressed by Pasour (1983, p. 18), utilitarianism cannot be ethical. Rothbard (1997, p. 279) concludes that a theory of justice in property must be used instead of utilitarianism for a free-market economy, and he points to libertarianism as the proper theory.

Legislation under libertarian theory

According to Rothbard (1990, 257) "in libertarian theory, it is only permissible to proceed coercively against someone if he is a proven aggressor, and that aggression must be proven in court (or in arbitration) beyond a reasonable doubt." He therefore concludes that legislation , such as the *Clean Air Act* of 1970, and, likewise, the *Nutrient Management Act* of 2002, is "illegitimate, and itself invasive and a criminal interference with the property rights of non-criminals" (Rothbard, 1990, 257-58). Thus, under libertarian theory, a centrally-planned solution to nutrient management is unethical, since the government does not prove that an aggression has taken place by farmers using nutrients, and the alternative, a market solution, justified under libertarian theory, is the superior option.

Brubaker (1995, 31) also acknowledges the basis of property rights and law in pollution regulation. She states "many provisions of the common law function as environmental protection laws…*Any* invasion of another's land – whether by people, flood-waters, structures,

or pollutants – constitutes a trespass." The availability of environmental management techniques within the law demonstrates that government intervention is not warranted.

The problem of compensation

Doris, in Ontario Ministry of Agriculture and Food's *Virtual Beef* Publication (2003), announced that the government has not decided on whether compensation for the *Nutrient Management Act* requirements and restrictions will be applied. According to Brubaker (1995, p. 192), "environmental regulations don't take away a polluter's right to pollute when the polluter doesn't have that right in the first place." However, she acknowledges that, "on the other hand, government actions that diminish others' rights, or that transfer control of property from private to public hands, do amount to expropriation, and require compensation" ? (1995, 192). Under a theory of property rights, compensation is necessary when government is taking away a right for farmers to expel nutrient run-off. However, nutrient run-off is not a public concern, but an aggression of one private property by another. In this case, it is unjust for society to pay with taxes for the benefit of a few.

Furthermore, according to Rothbard (1990, p. 257), Libertarian law states that the burden of proof of an aggression rests on the plaintiff, not the defendant. With the application of the *Nutrient Management Act*, the government presupposes guilt of all parties, instead of proving the damage done by each farmer. Therefore, even if decision makers assume that nutrient pollution is a loss to all of "society" (an impossible assumption), libertarian theory forbids this government regulation because of the misplaced burden of proof. On the other hand, private property rights and law would deal with pollution crimes case by case, only where required.

Conclusion

The government has taken it upon itself to implement regulation to control how nutrients are managed. However, the regulation has inherent information problems, and is illegitimate and unjustified under libertarian theory.

Private property rights, enforced by law, can resolve cases in which clear damage is caused by emitters of excess nutrients to surrounding property owners. When public land is involved, and voluntary conservation becomes insufficient, interest groups can increase economic incentives. Finally, problems associated with the non-point source nature of nutrient water contamination can be resolved with the principle of market share liability.

References

Brubaker, E. (1995) Property Rights in the Defence of Nature, Earthscan Publications, Toronto.

Canadian Environmental Law Association. (2004) "Ontario Water Legislation FAQs" Available online: http://www.ecolawinfo.org/WATER%20FAQs/Regulatory%20Context%20for%20Water/OntWatLeg.htm#ontwat_01 (Accessed: Jul 16, 2004).

Dolan, H. Based on lecture notes of Dr. Rob de Loe and Dr. Richard Kuhn (2002) Management of the Biophysical Environment, Course Manual, University of Guelph, Guelph.

Doris, P. (2003) "The Nutrient Management Act: Does It Apply To My Farm?" OMAF Virtual Beef, 2 (4).

Dougan, J., Watson, A. and P. Hendry (1997) The 5000 Days: Environmental Prospectives and Human Choices, Course Manual, University of Guelph, Guelph.

Epstein, R.A. (1985) Takings: Private Property and the Power of Eminent Domain, Harvard University Press, Cambridge, Mass.

Estrin, D. and J. Swaigen (1993) Environment on Trial, Emond Montgomery Publications, Toronto.

Fox, G. and M. Ivy (1998) "Four Economic Theories of Property Rights" from The Taking of Private Property by Regulation: An Economic Analysis, Pp. 1-23.

Johnson, J., and D. Ward (2004) "Nutrient Management Act: Siting regulations for manure storage facilities" OMAF Factsheet, Order No. 04-049.

Ministry of the Environment (2004) "Nutrient Management" Available Online: http://www.ene.gov.on.ca/envision/land/nutrient_management.htm (Accessed: August 10, 2004).

OMAF staff. Best Management Practices Series. Dec. 23, 2003. Available Online: http://www.gov.on.ca/OMAFRA/english/environment/bmp/series.htm(Accessed: May 30, 2004).

Pasour, E.C. (1982) "Agricultural Land Protection: Is Government Intervention Warranted?" Cato Journal, 2(3): 739-758.

Pasour, E.C. (1983) "Land-Use Planning: Implications of the Economic Calculation Debate" Journal of Libertarian Studies 7(1): 127-139.

Rothbard, M. (1990) "Law, Property Rights, and Air Pollution" from Economics and the Environment: A Reconciliation, Fraser Institute, Ch. 9, pp. 233-279. Reprinted in Readings for Advanced Resource Economics (2003).

Rothbard, M. (1997) "Justice and Property Rights" from The Logic of Action One: Method Money and the Austrian School, Edward Elgar, Cheltenham, pp. 274-293. Reprinted in Readings for Land Economics, University of Guelph (2004).

Sparrow, H. et al. (1984) Soil at Risk: Canada's Eroding Future, Senate Standing Committee on Agriculture, Fisheries and Forestry, Senate of Canada, Ottawa, Chs. 1-3.

ISTITUTO BRUNO LEONI

The mission of Istituto Bruno Leoni (IBL), named after the renowned Italian lawyer and philosopher, is to encourage public debate from a strictly classical liberal perspective. IBL strives to investigate, to promote and to spread the ideals of the free market, private property, individual liberty, and free trade. IBL publishes both scholarly and popular works, organizes seminars and meetings, publishes articles in the daily press both in Italy and abroad, as well as short studies and briefing papers. Its main purpose is to orient decision-making, inform the public and foster a new generation of intellectuals and scholars devoted to the cause of liberty.

Our philosophy is known under a number of labels: "liberal," "individualist," "libertarian." Names do not matter. What really matters is instead our pledge to what Lord Acton called "the highest political end: individual liberty. In an age in which the enemies of freedom seem to regain strength, IBL aims to promote the spread of ideas on liberty through rigorous and accurate research, which at the same time can be accessible to a broader audience.