

FARMLAND AS A MULTI-SERVICE RESOURCE: POLICY TRENDS AND INTERNATIONAL COMPARISONS

by

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Introduction

There is a distinct public policy trend in the United States and many other post-industrial developed nations toward protecting the various non-food amenity services of private farmland. Farmland is truly a multi-service resource, producing the various food and fiber products for which there is effective demand and certain amenity goods for which markets are imperfect at best. Amenities flow from open lands *other* than farmland, and active farming often produces such dis-amenities as water pollution or habitat loss. Emphasis here is on farms as a land use and only the positive amenity services they can provide.

Impetus for this trend in national, state/provincial, regional and local policy comes from several sources. First, and most importantly, there is demand for various amenity services of farmland. People are willing and able to pay for some of them and willing to commit the public treasury for others. That demand generally increases with income. Secondly, the diminishing supply of farmland, as technology substitutes for both land and labor and developers bid land away from farming, adds a sense of urgency to farmland policy both for farmland services and control of growth. People see farming areas declining and seek ways to alter the pattern and pace of farmland conversion. Third, there are various joint products from farmland -- we can have the food and fiber *and* the amenity service. People do value active farming as a land use. A modest change in a production system, reduced tillage for example, may enhance the amenity provided as well. Finally, there is both national and international trade policy emphasis on decoupling farm payments from

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production decisions by farmers. Thus, farmland protection policy may be a GATT-legal way of compensating farmers.

Demand for Amenity Services

There are many reasons that people seek to protect farmland. They range from habitat protection, flood mitigation and other eco-system services to retention of an attractive rural countryside. Some are private goods, rival in consumption and excludable. Markets can work for most of these, with some public effort to define property rights and facilitate exchange. Others are pure public goods requiring direct government action. Individuals will fold many of these services together in their support for policy action. And the policy environment for any particular proposal will bring together groups with very different motives.

Food Adequacy. Bunce (1998) has described a strong neo-Malthusian base to early farmland policy in North America. Concern about long term food adequacy in times of rapid farmland conversion led to the National Agricultural Land Study in the U.S. in the late 1970s, managed jointly by the U.S. Department of Agriculture and the President's Council on Environmental Quality. Press reports of "the perils of our vanishing farmland" and a worsening trade balance as U.S. food production declined (Easterbrook 1986) raised concerns about scarcity. The final report, issued in 1981, produced varying expressions of support and skepticism (Simon 1980, Brewer and Boxley 1981). Some were honestly alarmed about potential food scarcity, while others felt that the land numbers were massaged to create a false impression of scarcity, just to generate enthusiasm for the issue.

While there is no compelling evidence of impending food scarcity, there is a strong popular feeling that the risk of protecting too little farmland for long term food security is more onerous than the risk of too much farmland. Both imply a cost, but the risk of being wrong on the short side seems to many a greater concern (see Libby 1997). Participants in regional focus groups in the U.S., empaneled to identify farmland attributes for later conjoint analysis of amenity benefits (see Racevskis et al. 2000) voiced support for farmland policies to "protect the food-growing capability of American farms." Evidence of food abundance may be overwhelming, but people still have the nagging feeling that profligate abuse of farmland today will return to haunt us in the future. That perception is genuine and will affect farmland policy in the U.S. and elsewhere.

Who Cares About Farmland and Why? In their factor analysis of the attitudes and preferences toward farmland policy, Kline and Wichelns (1998) discerned three distinct sets of services desired -- environmental (wildlife habitat, groundwater recharge, ecosystem protection), aesthetic (rural landscapes, scenic quality), and agrarian (farming as a way of life, local produce) in that order of priority. Randomly selected landowners in northeast Illinois preferred spending public dollars for protecting open lands against development to spending for law enforcement, road maintenance, recreation or any other category (Krieger 1999). People *do* support farmland protection as a public goal, in the U.S., nations of the Organization for Economic Cooperation and Development (OECD 1998) and elsewhere.

Direct willingness to pay for non-food farmland services is evident in expenditures for on-farm recreation

experiences, for hunting rights, wildlife viewing or “bed and breakfast” visits (Bromley 1990) or the right to harvest medicinal herbs or prospect for biological organisms with potential commercial value (Mendelsohn and Balick 1995). Proximity to open farmlands adds to the value of residential property (Irwin and Bockstael 1999). These are separable, excludable and often rival amenity services of farmland for which there is effective demand.

Estimating Amenity Benefits. When markets fail to capture either specific “point” or general amenity values, estimates of those values can be important for effective farmland policy. Policymakers need defensible estimates of what consumers *would* pay if given the chance. Using contingent valuation, Bonnioux and LeGoffe (1997) estimated that French households would each pay 200FF per year to restore scenic hedgerows to the farm landscape in Lower Normandy. Swedish citizens preferring open farmland to spruce forests were willing to pay an average of 78 ECU per person per year to prevent the conversion (Drake 1992). “Environmentally sensitive areas” in the United Kingdom produce various amenity services valued by citizens (Garrod and Willis 1995). Krieger’s 1999 survey of three counties in northeastern Illinois found substantial support for a purchase of development rights program in that farming region facing variable urban pressure. Over half of the Illinois sample would pay \$100 a year for five years, a present value of \$429; fourteen percent of the surveyed households would pay \$2000 a year for five years to protect open farmland. There are other case studies (see Racevskis et al. 2000), but there is convincing evidence that the amenity services matter to people and they are willing to sacrifice to keep or create them.

Another approach to estimating the economic value of non-food amenity services is by estimating the production cost of providing them. Whitby and Saunders (1996) have estimated a supply function for those services based on how they increase cost of production, assuming little jointness in output. The “management agreement” approach to compensating U.K. farmers for amenity services assumes that farmers have the right *not* to provide them and must be paid to do so (Hanley and Ogelthorpe 1999).

The Policy Instruments

All authorities retained by governments, to tax, regulate and spend, have been brought to bear on farmland retention. If property may be characterized as a “bundle of separable rights” (see Barlowe 1986), the distribution of rights between landowner and government varies significantly among nations. In the U.K., changes in farmer behavior require compensation. In Denmark, Sweden and Israel, on the other hand, government may act more directly to protect the interests of non-owners, *requiring* farmers to provide certain non-food amenities or to avoid producing such dis-amenities as water pollution.

Strong central land use planning in the U.K. and The Netherlands focus on urban containment rather than farmland retention, though the result may be nearly the same. A visitor to Britain is immediately impressed by the countryside, expanses of rolling green countryside, *without* scattered development, sustained by “town and country plans.” Dutch planning has accepted, however, that farmland and open space are quite different resources. Rapid consolidation of Dutch farms has brought little countryside amenity to the nation’s citizens, and other policies will be necessary for protecting open space. There is a strong planning tradition

in The Netherlands, with national goals implemented through a coherent local planning system that *must* include areas for farming (Alterman 1997, p. 237).

In the U.S., growth management and farmland retention are like two sides of a coin. The latter cannot be accomplished without the former, but each area of policy concern has evolved largely independent of the other. “Home rule” and the independent annexation authority of municipalities is virtually unknown outside the U.S. In both the U.S. and France, planning and land development policy are disaggregated to state and local governments with no effective national policy of urban containment *or* farmland retention.

Only the U.S. among the developed nations must deal with “the takings issue.” Under this legal principle, sustained by the fifth and fourteenth amendments to the U.S. Constitution, and defined in court tests of specific regulations, restrictions on private landowners that may remove most or all of the economic options for that land require “just compensation.” No such presumption of over-riding private right exists in Europe or much of Asia (see Alterman 1997).

Inducements. Most local services in the U.S. – schools, fire protection, police – are paid for by taxes on real property. Ownership of land is considered a reliable indicator of ability to pay taxes. All fifty states and the Canadian provinces have enacted farmland tax incentives to reduce that portion of production cost and thereby encourage continued farming. Some states have rollback provisions to capture a portion of the taxes avoided by eligible farmers who sell for development; others simply hope that the inducement is sufficient to affect land use decisions. A few states employ a “circuit breaker” device on the state income tax that limits property tax to a set percentage of household income, while most simply tax farm use value of farmland rather than market value. The notion here is that for a land intensive industry like farming, full market value of farmland is a poor indicator of ability to pay. Further, a farm needs less public service per acre than is true of other land uses.

Eligibility for such incentives tends to be very generous and there is little convincing evidence that tax programs really “save” farmland. But property tax programs clearly keep farming active in some areas longer than if there were no tax break, though perhaps simply waiting for the right time to develop. Land can be an important component of an investment portfolio and an owner may lease the land to a farmer, just to keep the tax break, waiting for the developable moment. While that may seem unwise or unfair, farming with attendant open space amenities continues in some urbanizing areas and taxpayers subsidizing farmers through the land tax incentive are often willing to pay for that amenity.

Several states also levy high capital gains or transfer taxes when open land is developed. This action removes some of the development incentive and captures value generated by public investment in roads and utilities. Canada has a steep capital gains tax but reduces it for farm sales to other farmers.

Farmland is exempt from all property taxes in Australia, the U.K., Sweden, Germany and The Netherlands. In the U.K., farm buildings are also tax-free. Use value taxes are applied in Switzerland, Denmark and

Finland (OECD 1998)

Ownership and Structure. U.S. farmland policy has little to say about tenure or farm structure, whereas those are central policy elements in several OECD countries. They are designed to foster ownership patterns deemed to offer various social advantages. Not just *anyone* can buy farmland and an owner may be limited in to whom he can sell. An eligible farmland buyer in Denmark, for example, must demonstrate a capacity to work the land and must commit to living on the farm for a set period of time. The German government must approve any change in farmland ownership. Considerable reorganization of small parcels into viable farm units is part of the French policy structure.

Purchase. Another set of policy instruments acquires the non-food services of farmland by buying them from the owner. Outright purchase of *all* land use rights to farmland is rare, since governments have little interest or capacity for managing farms. In some cases, a government agency has bought farmland and then leased it back to a farmer, but without the right to develop the land or diminish its non-food amenities (Frahm 1995). Farmers in the U.K. may negotiate individual agreements with the Ministry of Agriculture to provide certain wildlife habitat and other conservation amenities for a price reflecting lost food production. Designation of “environmentally sensitive areas” provides a mechanism for paying farmers to avoid farm practices that would compromise certain environmental services (Lomas 1994).

As of mid-2000, nineteen U.S. states have programs allowing local governments to purchase development rights (PDR) from willing farmers (AFT 1997). These are permanent development easements, going with the land, to assure that the land will remain in farming or a related use that provides the non-food services that voters and taxpayers want. The land deed restriction continues for any new owner. Price for the development right is generally the difference in value of that land for farming and developed use, though some farmers may donate a portion of development value as a tax deduction. Nearly all state programs have an escape clause allowing the farmer to repurchase the development rights when continued farming is impossible for some reason. Conditions for escaping from the permanent development easement are strict, however, requiring considerable evidence of hardship. In Massachusetts, for example, only through action by both houses of the state legislature may the development rights sale be reversed.

Purchase programs assume that the farmer has full rights to operate the farm as markets dictate and any reduction in his management options must be paid for. The public amenities of farmland belong to the farmer initially and are acquired by a public agency acting on behalf of all non-owners. There is no obligation by the farmer to sell and public spending decisions generally follow priorities established through a planning process. The states are having quite different experiences with these PDR programs. In Ohio, for example, there is still no funding for purchasing rights and many farmers are skeptical of permanently giving up the right to cash in the development value of their land. Pennsylvania and Maryland, on the other hand, have been buying development rights for many years and have more farmers interested in selling than there is money available to buy (Bowers 2000).

Regulation. There are strong regulatory limitations on farmland conversion in Germany and Israel

and fairly strong ones in the U.K. and Japan. Local comprehensive plans in Germany must include agricultural areas where farmland may not be developed and special agricultural plans address soil conservation, land consolidation and other factors unique to farming (OECD 1998, p. 34-36).

In Israel, farmlands can be developed only if approved by the national Committee for Protection of Agricultural Land (CAPL). The CAPL mapped all active farmland in 1968 as permanently agricultural, regardless of land quality or location, and declared a strong protection policy without required compensation. In fact, however, CAPL has approved most requests for conversion of land that was farmed in 1968, as growth needs increased. A major national push for housing in 1990 resulted in major conversions. Since then, the role and power of CAPL have been substantially weakened (Alterman 1997).

Japanese zoning identifies agricultural zones, amounting to about 80% of currently active farmland, where conversion is prohibited or at least strongly discouraged.

Canadian provinces take farmland protection seriously, generally prohibiting development of farmland. Specific controls are tightest in British Columbia, Quebec and Newfoundland while other provinces have more general growth management programs.

All development proposals must be submitted for central government review in the U.K., presumably affecting the supply of housing (Monk and Whitehead 1999).

Agricultural zoning in the U.S. is inconsistent at best. Twenty-two of the 50 states reportedly have agricultural protection zoning (AFT 1997), but only a few have regulations truly intended to restrict land uses to those consistent with active farming. These are *exclusive* agricultural zones that either have large minimum lot sizes for non-farm residences (greater than 20 acres) or have a very restrictive list of permitted uses. Only Hawaii has true state level agricultural zoning, while Oregon has state-mandated local agricultural zoning and Pennsylvania has clear direction for local officials on why and how farmland may be protected (Libby 1999). Large minimum lot sizes accomplish farmland protection indirectly, by making it too expensive to develop for residential use. Experience shows, however, that buyers will in fact purchase 20, 30 or even 60 acres for a single residence, just for the amenity of living in the “open spaces.” Thirty-five acre “ranchettes” are quite common in Colorado which has a statewide minimum lot size of 35 acres (AFT 1997, p. 49) and Wisconsin farmers have seen no evidence that a 40-acre minimum lot size has reduced the pressure on farmland (Gehl and Libby 1999). Further, large minimum lot sizes will limit the amount of affordable housing in an area.

Ohio is an example of the more permissive or *inclusive* agricultural zoning that essentially defines agricultural areas as those not zoned for residential, commercial or industrial and with a long list of permitted uses. Only 38% of Ohio counties have any local zoning with agricultural districts, and of those 87% have minimum lot sizes for non-farm residences of less than three acres. Just about any legal use is permitted in these agricultural zones, including some industrial and commercial activities not related to farming. Some Ohio counties and localities have quite effective agricultural zoning, but the general record is spotty (Stamm

1999).

Centner (1993) has proposed establishing rural zones in the U.S. patterned after the German agricultural areas. Agriculture would be strengthened within those zones through strict enforcement of “right to farm” rules and mandatory imposition of development impact fees to discourage development in those areas. Thus non-farm development would be directed away from farming areas through incentives rather than restrictions, maintaining private property rights while reallocating the cost of development.

Agricultural protection zoning to protect farmland assumes that the public has a right to the non-food amenities of farmland. Neither financial inducement nor outright purchase is necessary – compensation is not part of the picture. As discussed, “the takings issue” requires some attention in the U.S. though not in the other developed nations reviewed here. Regulatory limits on the farmer must not be so onerous as to remove *all* economic potential from the land. Cordes (1997) has argued that real exclusive agricultural zoning that is clearly tied to the public interest and consistently administered is more available than generally believed, since mere loss of economic potential through regulation is not sufficient basis for overturning an ordinance. Farming is an economic use of land.

Thus, farmland protection policy is widespread though extremely diverse among developed nations coping with the pressures of urban incursion into rural areas. The goals are essentially internal, retaining the food and non-food services of farmland, reducing the various costs of unguided development and maintaining some degree of control over the pattern and pace of urbanization. Consequences of these policies include possible impacts on structural change within the agricultural sector and some reallocation of development. Perhaps fewer people will transition out of farming and into a “higher value” occupation than would be the case without those policies. Perhaps strong agricultural regions will see fewer improved roads and other infrastructure and may see the jobs, tax revenues and incomes of industrial and commercial development go elsewhere. Continuing support for these policy initiatives suggests that most people see a net gain, but some will clearly perceive reductions in their quality of life.

Farm consolidation, exodus of people and land from farming, and other changes will continue in response to new production technologies, with or without farmland protection policies. Food production simply needs fewer people and acres. But the rate and location of those transitions may be altered by farmland programs. Differences in culture, history and legal structure among nations obviously lead to different policy mixes. Programs that work in The Netherlands will be less viable in the prairie provinces of Canada. These programs respond to preferences about how resources should be used and who should pay for the preferred pattern of use. *Virtually all developed nations have such policies, thus there is little real impact on comparative advantage among nations, or on terms of trade.*

Implications for International Trade

“Multifunctionality” is the contemporary operable term for considering the many services of actively farmed land in an international context (see OECDa November, 1998). General policy reform among OECD

nations and parties to various international trade agreements means separation of farm income support by government from farmers' production decisions. Direct financial support for production of certain crops will affect the terms of trade, comparative advantage among trading partners and even intra-sectoral change within a country. Policies that strengthen multifunctionality of farming, on the other hand, help nations respond to general policy reform while providing other benefits to consumers and providers of those land services, without distorting trade.

The General Agreement on Tariffs and Trade (GATT) makes few references to agri-environmental policies. Two sections of the 1949 agreement list exceptions for national policies designed to protect human health or animal and plant life, or for "conservation of exhaustible natural resources, if such measures are made effective in conjunction with restrictions on domestic consumption or production" (Ervin 1999, p. 74). The Uruguay Round Agreement (URA) refers to sanitary and phyto-sanitary measures as relevant to health and safety. These exceptions generally refer to reducing the environmental and safety hazards of farming, rather than increasing the environmental amenities of farmland. The trade-distorting potential here is the abuse of sanitary and phyto-sanitary rules to deliberately limit imports of certain products from certain countries.

Payments to farmers to encourage environmental management are also exempted from URA, so long as payments do not exceed the farmer's cost of providing the environmental benefit. This *could* be problematic in cases where payments go beyond cost to induce provision of farmland amenities. Induced application of reduced tillage, on the other hand, may produce both public and private benefits, helping the farmer and the public. Rationale for an inducement would be the greater social gain, though actual payment could net out the private benefit. The fact remains that real trade neutrality must be determined on a case-by-case basis – general rules are hard to come by. Countries *are* undertaking growth controls and amenity-inducing payments in response to citizen demands without granting meaningful competitive advantage to those farmers. Any effect on trade is certainly small compared to domestic gains; trade arrangements must be undertaken in light of those valid domestic needs within trading countries.

Conclusions

Land markets are evolving. Land market rules in all developed trading nations, at least those reviewed here, are under revision in search of an exchange process that will encompass the many services of farmland. At stake are the specific rights and obligations that define land ownership. Allocation of rights varies among nations, reflecting culture, history and prevailing preferences about how land should be used. From a policy perspective, distribution of rights determines "who must come to whom" in securing the appropriate mix of farmland services. These facts about the reality of markets fly in the face of the prevailing wisdom among many economists that only voluntary and compensatory measures are valid, for internalizing external benefits of private land use. Accuracy of that assertion depends on the starting point – what owner's rights are for sale and more importantly what are the *responsibilities* of ownership?

With development comes increased demand for amenities. Demand for non-food amenities of actively farmed land tends to be income elastic. As more nations join the global trading community, they

will experience increasing demand for the visual, environmental and ecological services of open farmland. Experience shows that demand for these services increases with information and education as well. Thus success in the international development process will yield greater demand for the non-food services. Demand for food, on the other hand, tends to be income inelastic. Farmers in developed nations must recognize the economic realities of all of this – their continued success depends on provision of certain non-food services. And consumer demand for those services will drive support for the long list of incentives and assistance that farmers need and enjoy. Imbedded in the farmland policies of all developed nations, though, is recognition that very long term food security requires that farmland conversion be careful, thoughtful, and based on mature land markets.

We need to know more about demands, and policy performance. Improved market information is essential. What value do people place on these public good services? What is the willingness to pay, in actual currency or in opportunities forgone in land use change? Further, how does the choice of policy instrument influence output of service and distribution of cost? Preferential assessment of farmland is easy to implement and enforce. Other taxpayers pay the taxes avoided by eligible farmers, but are taxpayers really receiving a service for that expense? Purchase programs secure open land, but at what cost? And PDR programs have their own disadvantages. Further information and analyses of specific policy instruments are needed.

Amenity payments are distributed differently from income supports. With recent policy reforms, the various amenity inducement and purchase programs are basically replacing price supports. Distribution of funds will differ, however. Farmers in areas with few non-farmers around to directly experience the amenities will likely see fewer inducements for non-food services. This has already happened with payments to U.S. farmers under the Environmental Quality Incentives Program (EQIP). Midwestern farmers are less eligible for EQIP payments than are farmers on more vulnerable or erosive lands, near populations that feel those effects. A recent USDA report examined the distributional implications of targeting the Conservation Reserve Program (CRP) on wildlife habitat protection rather than land erodibility. Wildlife viewing is more productive where there are people, thus this change in CRP targeting would shift funds toward farms in more populous areas (Feather et al. 1999). With fewer price supports under current farm and food policy, spending patterns have shifted from the “breadbasket to the periphery.” There are defensible reasons for that, but not all farmers will be pleased.

Farmers blend into the general economy. Farmers in the U.S. and other developed nations reviewed here increasingly depend on off-farm sources to augment income from the farm. For example, more than 40% of Ohio farmers worked 200 days or more off the farm in 1992 and only 51% of farmers responding to the agricultural census that year listed farming as their primary occupation. A similar pattern exists in other states. Farms and farmers are thus increasingly integrated into the broader economy. Amenity policies are consistent with that change.

Distortion is a loaded term. Much is made of “minimizing the market distortions” of amenity policies by insisting that any increase in production cost be compensated, even resorting to auction methods

if necessary (see OECDa 1998, p. 19). In fact, however, the starting point in this compensatory regime differs importantly from place to place and over time. If a standard uniform “market” could be defined, that policy might work. Once again, our *ceteris paribus* conditions in economics provide an attractive escape from policy realities.

REFERENCES

Alterman, R. "The Challenge of Farmland Preservation: Lessons from a Six-Nation Comparison," *The Journal of the American Planning Association*, 63:2, Spring, 1997, pp. 220-243.

American Farmland Trust. *Saving American Farmland: What Works*, Northampton, Massachusetts: The American Farmland Trust, 1997.

Barlowe, R. *Land Resource Economics*, Englewood Cliffs, NJ: Prentice-Hall, Fourth Edition, 1986, pp. 328-361.

Bonnieux, F. and P. LeGoffe. "Valuing the Benefits of Landscape Restoration: A Case Study of the Cotentin in Lower-Normandy, France," *The Journal of Environmental Management*, 50:3 (1997), pp. 321-333.

Bowers, D. "Nation's Farmland Programs Vary Widely in Funding, Politics," *Farmland Preservation Report*, 10:5, March 2000.

Brewer, M. and R. Boxley. "Agricultural Land: Adequacy of Acres, Concepts and Information," *The American Journal of Agricultural Economics*, 63:879-887.

Bromley, P. "Wildlife Opportunities: Species Having Management and Income Potential for Landowners in the East," *Income Opportunities for the Private Landowner through Management of Natural Resources and Recreational Access*, edited by W. Grafton and A. Ferrise. Morgantown, West Virginia: West Virginia Cooperative Extension Service, 1990.

Bunce, M. "Thirty Years of Farmland Preservation in North America: Discourses and Ideologies of a Movement," *The Journal of Regional Studies*, 14 (2): 233-247, 1998.

Centner, T. "Circumscribing the Reduction of Open Space by Scattered Development: Incorporating a German Concept in American Right to Farm Laws," *The Journal of Land Use and Environmental Law*, 8:2, Spring 1993, pp. 307-324.

Cordes, M. "Takings, Fairness and Farmland Preservation," *Ohio State Law Journal*, 60:3 (1997), pp. 1033-1084.

Drake, L. "The Nonmarket Value of the Swedish Agricultural Landscape," *The European Review of Agricultural Economics*, 19:1992, pp. 351-364.

Easterbrook, G. "Vanishing Land Reappears," *The Atlantic Monthly*, July, 1986, pp. 17-20.

Ervin, D. "Toward GATT-Proofing Environmental Programs for Agriculture," *The Journal of World Trade*, 33:2, April 1999, pp. 63-82.

Feather, P., D. Hellerstein, and L. Hansen. *Economic Valuation of Environmental Benefits and the Targeting of Conservation Programs – The Case of the CRP*, Agricultural Economic Report Number 778, U. S. Department of Agriculture, Washington, DC, April 1999.

Garrod, G. and K. Willis. "Valuing the Benefits of the South Downs Environmentally Sensitive Area," *Journal of Agricultural Economics*, 46:1995, pp. 160-173.

Gehl, S. and L. Libby. "Understanding the Rules, Practices and Attitudes Regarding Land Use in Waukesha County, Wisconsin," *Under the Blade: The Conversion of Agricultural Landscapes*, edited by R. Olson and T. Lyson, Boulder, Colorado: Westview Press, pp. 347-358, 1999.

Farmer, M. and A. Randall, "The Rationality of a Safe Minimum Standard," *Land Economics*, 74:3, August 1998, pp. 287-302.

Foster, K., P. Vecchia and M. Repacholi, "Science and the Precautionary Principle," *Science*, 288:12 May 2000, pp. 978-981.

Frahm, R. *Alternative Methods of Land Acquisition*, Tampa, Florida: Southwest Florida Water Management District, 1995.

Hanley, N. and D. Oglethorpe. "Emerging Policies on Externalities from Agriculture: An Analysis for the European Union," unpublished AAEA conference paper, Edinburgh, Scotland: Scottish Agricultural College, 1999.

Irwin, E. and N. Bockstael. "Interacting Agents, Spatial Externalities and the Evolution of Residential Land Use Patterns," Columbus, Ohio: unpublished paper, November 1999.

Kline, J. and D. Wichelns, "Measuring Heterogeneous Preferences for Preserving Farmland and Open Space," *Ecological Economics*, 26 (1998), pp. 211-224.

Krieger, D. *Quantifying the Nonfarm Benefits of Farmland*, DeKalb, IL: The American Farmland Trust, 1999.

Libby, L. "Improving the Farmland Policy Options for Ohio Local Governments," unpublished staff paper, Department of Agricultural, Environmental, and Development Economics, The Ohio State University, June 1999.

Libby, L. "Farmland Protection for Illinois: The Planning and Legal Issues," *Northern Illinois Law Review*, Volume 17, Number 3, Summer 1997, pp. 425-440.

Libby, L. and P. Stewart. "The Economics of Farmland Conservation," *Under the Blade: The Conversion of Agricultural Landscapes*, edited by R. Olson and T. Lyson, Boulder, Colorado: Westview Press, 1999.

Lomas, J. "The Role of Management Agreements in Rural Environmental Conservation," *Land Use Policy*, 11:2, 1994, pp. 119-123.

Mendelsohn, R. and M. Balick. "The Value of Undiscovered Pharmaceuticals in Tropical Forests," *Economic Botany*, 49:1995, pp. 223-228.

Monk, S. and C. M. E. Whitehead. "Evaluating the Economic Impact of Planning Controls in the United Kingdom: Some Implications for Housing," *Land Economics*, 75:1, February 1999, pp. 74-93.

Organization for Economic Cooperation and Development. "Multifunctionality: A Framework for Policy Analysis," Paris, France: OECD, 18 November 1998 (unpublished document).

Organization for Economic Cooperation and Development. *Adjustment in OECD Agriculture: Reforming Farmland Policies*, Paris, France: OECD, 1998.

Racevskis, L., M. Ahearn, A. Alberini, J. Bergstrom, K. Boyle, L. Libby, and C. Paterson. "Improved Information in Support of a National Strategy for Open Land Policies: A Review of Literature and Report on Research in Progress," unpublished paper presented at the International Conference on Agricultural Economics, Berlin, Germany, August 13-18, 2000, Columbus, Ohio: Department of Agricultural, Environmental, and Development Economics, The Ohio State University.

Simon, J. "Resources, Population, Environment: An Oversupply of False Bad News," *Science*, 208 (1980), pp. 1431-1437.

Stamm, J., "The Ohio Zoning and Land Use Survey," unpublished report, Columbus, OH: Ohio State University Extension, September, 1999.

Whitby, M. and C. Saunders. "Estimating Conservation Goods in Britain," *Land Economics*, 72:1996, pp. 313-325.

