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Should We Consider the Co-benefits of Agricultural GHG Offsets?

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Feng, Kling, and Gassman (in this issue) argue that significant co-benefits can be realized when agricultural management strategies are utilized to offset or reduce greenhouse gas (GHG) emissions. Such benefits arise in the form of cleaner water, increased recreational land, and improved farm income, among other categories. However, their attention to such effects is limited to those arising in the agricultural sector; we wish to broaden the issue to consider effects arising outside of agriculture.

About 84% of US GHG emissions arise from the petroleum-related energy and electrical power sectors. Under most of the proposed approaches for implementing GHG emission reductions, permits to emit would be allocated to emitting and carbon sequestering parties. In turn, a market structure would be established that allowed trading of permits. Many agriculturalists feel that such trading will involve sales by agriculture and that the case for such sales is bolstered by accompanying co-benefits (identified by many advocates as a win-win situation). This suggests that agricultural permit sales will allow increases in emissions by those in the energy sectors. The question, then, is what happens in terms of co-effects.

Let us consider the commonly discussed case where a coal-fired electrical power plant, which is allocated fewer emission permits than it needs under its current practices to meet its anticipated business activities, finds it less expensive to purchase sequestration-based agricultural permits than to reduce its own emissions. In turn, the sequestration activity would stimulate agricultural co-benefits. However, purchasing sequestration permits allows both power generation and coal burning by-products, including commonly discussed air pollutants like NO_X, SO_X, and mercury, to increase. Because these emissions are often associated with health and other environmental costs, there could be attendant increases in damages relative to a no-trading case.

A full accounting of co-benefits, therefore, would suggest balancing the agricultural benefits and the nonagricultural costs. Specifically, policy makers interested in considering co-benefits should consider the relative magnitude of the countervailing coeffects. (Elbakidze & McCarl, 2004, provide a more detailed discussion.)

Estimates have been constructed for the co-effects of reduced GHG emissions by power plants by Burtraw and colleagues at Resources for the Future (Burtraw et al., 1999, 2003). Their results indicate that increased power plant activity would generate additional environmental costs amounting to about 50% of the value of emission permits purchased. These costs arise from the consequences of worsened health and needed increased investments in air pollution abatement. In addition, increased power plant activity increases ozone damages, which negatively affects water quantity and quality, nutrient cycling, recreational opportunities, and terrestrial carbon uptake. Felzer et al. (2003) estimate that the co-costs of this are an additional 5–20%. Collectively, then, the co-costs are in the neighborhood of 60% of the value of a permit. This compares with agricultural co-benefits currently estimated to be in the neighborhood of 60–70%. Agricultural co-benefits therefore may be almost entirely offset by the nonagricultural co-costs.

What, then, do we do about co-benefits and co-costs in formulating GHG policy? The implicit argument in the consideration of agricultural co-benefits is that there be a government role in increasing the use of sequestration-based credits through some form of subsidy that lowers the costs. The use of subsidies is justified, because agricultural co-benefits are not reflected in the price of traded permits. However, the countervailing co-benefits suggest that any incorporation of co-benefits into agricultural policy be carefully approached with simultaneous consideration of the implications of increased nonagricultural emissions.

There is also an inherent difficulty in both estimating the magnitude of co-effects and then comparing them on an equal footing (i.e., comparing the incidence of cleaner water with increased ozone-induced health problems). Co-benefits and costs are likely highly dependent on the specific situation posed by the purchasing emitter and the entity creating the sequestration depending on proximity to population centers, regional water quality, and so on. Such difficulties coupled with the approximate offsetting nature of the co-effects suggest that policy and trading be based on direct costs for now without consideration of the co-benefits.

References

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