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FARM LEVEL IMPACTS OF REDUCED CHEMICAL USE ON SOUTHERN AGRICULTURE: DISCUSSION

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Professor Richardson and his collaborators have addressed an issue of importance, not only to agriculture but also to the general public (Richardson et al.). From the widest perspective, this paper explores some of the tradeoffs to be grappled with by policymakers in addressing the legitimate concerns of the impact of agriculture's chemical-intensive technologies on the environment and food and water supplies.

The researchers seek to test, at the firm level, recent findings by Knutson et al. (1990a) and Smith et al., revealing significant differences in economic impact by crop, by region, and by sector (crop vs. livestock). Specifically, they propose to "quantify the impacts of a pesticide and inorganic nitrogen fertilizer ban on the economic viability of representative farms" in Southern agriculture (Richardson et al., p.2).

Because of professional involvement in the support and conduct of the earlier studies by Knutson et al., (1990a) and Smith et al., I must excuse myself from evaluating those works in the course of this discussion. However, I do reserve the right to draw attention to the perceived strengths or weaknesses of these studies which influence this specific effort.

Given the technology scenarios and representative farms specified, the results derived from the application of FLIPSIM appear plausible. I concur with Dr. Richardson and his co-investigators that the observed firm-level impacts of reduced chemical use are consistent with the macro and/or sector impacts reported by Knutson et al., (1990a) and Smith et al. Results from the tests of economic viability of representative crop, livestock (swine), and dairy farms revealed that crop producers' net farm incomes would increase with chemical use restrictions (due to price effects), and the economic viability of Southern livestock producers would be threatened (especially for dairy farms heavily dependent on purchased feeds). The analysis of the diversified hog-grain farms is not definitive, in my opinion. The results do strongly support the earlier findings that impacts of reduced chemical use will vary significantly by crop and by region. Of the representative farm situations studied, those with a southern "ex-

posure" did not fare as well financially when compared to the "northern" farms. However, there is some question as to whether or not sufficient depth and breadth of southern agriculture is reflected in the representative farms specified to conclude that—"if anything, this analysis indicates agriculture in the South would be more adversely affected than the Knutson et al. conclusions (Richardson et al., p. 19)." It is not that clear-cut to me.

The most significant differences in regional performance were observed in the "moderate-size grain farms" and the performance of "northern" versus "southern" dairies. I grant a personal and a parochial bias in defining "southern". However, the Texas Northern High Plains representative farm specified, in my opinion, is not representative of southern cash grain farms. Likewise, casual inspection of the resource situations suggests that much of the difference in the economic performance of the regional dairy farms can be attributed to reliance by the southern dairies on purchased feeds (Richardson et al., Table 2). The results appear to have little to do with the intensity of chemical use on these farms. It is reasonable to expect that many southern dairies heavily reliant on purchased feeds, if confronted with higher prices for feedstuffs due to mandated chemical use reductions, would readily switch to substitutes that could be produced on-farm. Forage-based dairy feeding systems, while capitalizing on the South's long growing season, should have little, if any, negative impact on productivity. Additionally, I find the suggestion that southern swine operations would experience the same loss in revenue as the southern dairy producers unsupported—whether they are self-sufficient in feed production or not (Ibid, p.19). And, in my opinion, any discussion of the impacts of reduced chemical use and southern agriculture, either at the macro or micro levels, should include the poultry industry. Simply put, poultry production and the associated commercial activities dominate major regions of the South. In these regions, the growing awareness of the potential adverse environmental impacts of the industry will necessitate design and implementation of crop nutri-

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ent management strategies, especially for inorganic nitrogen use.

Given the importance of part-time farming in southern agriculture, specification of a representative farm operated as a part-time farm would increase the utility of the results. Our field experience at TVA is that chemical-intensive crop production technologies, and the attendant custom application services, have played a significant role in permitting farm families to maintain commercial operations while capitalizing on off-farm employment opportunities. If reductions in chemical use necessitate the use of substitutes which are more labor and management intensive, the impacts may be much more severe on southern agriculture than these results suggest. Even though a significant increase in effort would be required, I believe specification of additional resource situations is necessary for research to be more definitive concerning the impacts of reduced chemical use on southern agriculture.

Likewise, I believe production practices need to be refined. In particular, I have difficulty with the ban on inorganic nitrogen. I appreciate, and generally concur with, the necessity of the zero limits on the agricultural chemicals. However, nitrogen nutrient management is another matter. At a minimum, we need to be able to reconcile practices employed with the findings of Norris' dissertational research in Virginia, and Novak and his associates' work with Auburn University's "Old Rotation." Options exist to reduce inorganic nitrogen use without negatively impacting productivity and economic viability while improving the environmental performance of agriculture practiced in the South.

The authors' apparent reluctance to extend themselves beyond the reporting of simulation model results is understandable. But the significance of the basic issue and the prominence given it at this meeting begs for more. In particular, I would like the researchers' opinions on observed data gaps or areas where improvement in the quality of data would significantly improve the quality and utility of research efforts into firm level impacts. At a minimum, I expect the agricultural economist's obligatory call

for further research. I'm disappointed; surely this isn't the last word on firm level impacts of appropriate technology choice!

The measurement of firm-level impacts in this instance focuses primarily on private costs and private benefits. The issue is an issue primarily because of the divergence between social and private costs and benefits. How may future research of this nature shed some light on the efficiency and effectiveness of alternative policy options to bridge this divergence? For example, with firm-level economics strong, as suggested by the magnitude of these firm-level impacts, is it reasonable to expect a voluntary approach to reducing chemical use in agriculture to be very successful? Obviously, a litany of such rhetorical questions could be posed.

Interestingly, I find that this analysis of farm level impacts of reducing chemical use supports one of the major benefits associated with reduced input and/or alternative agriculture. The results from the dairy and livestock farms are particularly supportive of the notion that integrated farming systems are less vulnerable than capital-intensive cropping systems, especially those reliant on inputs from off-farm sources. The contribution of diversified farming systems in attaining or maintaining farm-level economic viability as suggested by this analysis is at least worthy of note.

In overview, the most significant outcome of this analysis is the added evidence that impacts from reductions in input use will vary significantly by crop and by region. This finding, when coupled with the observation that the adverse impacts of agricultural chemical use on the environment are prevalent only in certain regions or sub-regions and only under specific management practices (National Academy of Science), places high priority on the careful analysis of proposed policy options for efficiency, effectiveness, and equity. If Dr. Richardson and his co-workers have spurred interest in identifying alternative policies or farming systems which mitigate the impacts of reduced chemical use in southern agriculture while promoting economic viability, they will have made a significant contribution.

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