Discussion
by
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of the paper by
John H. Berry

"The Energy Problem
and Agricultural Production"

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It is hard to disagree with the first sentence of John Berry's conclusions section. He says: "There is little question about the importance of energy if U.S. agriculture is going to meet the demand for its products at acceptable prices." [1, page 10] Certainly a large and growing energy input is necessary to sustain agriculture as we know it today. There is, however, greater chance of disagreement over whether agriculture as we know it today will survive, and with what constitutes "acceptable" prices for necessities such as food and fiber.

The results arrived at by Pimentel and by Ruttan are interesting. Perhaps it is true as Berry concluded from Pimentel's data, that U.S. agriculture is in stage II of its production function--although I'm not sure I can accept the required assumption of no shift in that production function. Berry seems to imply that being in stage II somehow helps agriculture in facing its energy problems. Unfortunately, the fact that agricultural energy is being used efficiently (if in fact true) does not assure that the industry is immune from forced energy cutbacks. The fuel and fertilizer shortages this spring never reached the crises proportions that some feared--but the potential for shortage and high prices will persist for years.

Berry says: "The important question, however, may not be how much energy is used in this industry, but what effect will changes in energy price have on the cost of and demand for services from this industry." [1, page 8] But in spite of this being the important question, his paper touches only briefly on such effects for the processing and production

sectors. Berry's brief coverage of this topic is, unfortunately, indicative of the state of the arts. There have been only a very small quantity of research results dealing with how the U.S. food and fiber sectors would (or will) react to energy shortage.

During the period this past winter when I was working on the staff of the Office of Food of the Cost of Living Council, we were very concerned over whether energy shortages might be a major problem in the effort to bring food prices back into a more normal range. Lacking more substantive research results to rely on, we were reduced to some rather heroic and non-quantitative speculation. For example, we could only say that a fertilizer shortage this spring would cause some farmers to shift from corn to soybeans, or that short fall fuel supplies would cause crop drying problems and consequent losses. The Cost of Living Council's policy analysis function would have been a lot easier and more precise if there had been some definitive research results which we could have relied on.

Knowledge of how and how much energy is used in agriculture is an important first step in our research task, but only a first step. The question of agriculture's overall energy efficiency or energy balance has at least academic interest although I am not sure just what the policy implications are. However, it is time to make an effort to go beyond this kind of research. It is time for us to do some comprehensive analysis of the probable long and short run impacts of energy shortage. We need to work toward a behaviorist analysis of what would happen, under various energy scenarios, to agriculture as one of many interrelated economic sectors competing for energy. This would approach the general

systems science simulation model proposed by Glen L. Johnson [4] and the consequential analysis advocated by Daniel Bromley [2]. It is vital that agricultural production economists continue their progress in that direction if energy policy questions are to be decided in a rational manner.

I was originally hopeful that Berry's paper would take this approach, and perhaps outline some USDA research results showing specific probable results which an energy shortage would induce. I suppose I was overly optimistic as to the timetable for research both in the USDA and in the universities. I do know that the USDA is supporting the work of Otto Doering at Purdue, which is making efforts in this direction. Berry does refer briefly to such a consequential analytic approach in his discussion of minimum tillage: "---there appears to be little incentive for a major shift toward less energy intensive agriculture---." [1, page 7] Berry has good company in that conclusion. Norm Whittlesey in an earlier paper stated that:

> As long as there is a national policy to supply agriculture its entire fuel needs without restriction there seems to be no immediate concern in this area. Fuel costs will probably continue to rise but without causing a large change in the total cost of production since fuel costs are a relatively small portion of total cost. Even if fuel costs should double in the near future it would probably not severely affect Washington's agriculture. [5, page 13]

I am not sure I can fully accept the spirit of these conclusions. The implication is that agriculture has a very price inelastic derived demand for energy. We know that the demands for automobile fuel, for electricity, and for space heating energy are also very price inelastic at least in the short run. In a scenario of moderate energy shortage these factors suggest that energy cost could rise very sharply--to the point where it would become a very important production cost.

In a comprehensive system for analysis of energy problems one must take note of embodied energy. In the current situation the embodied energy costs have not yet stablized. Don Conlin, former Associate Director of the Cost of Living Council stated in the July-August issue of Challenge magazine:

> I should note here that the pass-through of energy costs in the industrial system has barely begun. Thus, even if all other things were constant, there is the suggestion that the direct and indirect effects of fuel and energy price increases will cause continued high rates of inflation for as long as it takes to adjust to the new economics of energy. [3, page 13]

Before we start to congratulate ourselves because we can still afford to buy tractor fuel, we may need to ask how far into the future we will be able to afford to buy tractors and fuel. A consequential analysis which views agriculture as only one of many competing and interrelated energy users will be necessary to get a total picture of energy use adjustments.

I have one further interest in energy shortage impact analysis which may or may not be proper to mention in this session. My concern is with rural people and rural communities. Energy shortage and price problems will cause shifts in the competitive positions and the incomes of the various farm regions. This will certainly affect the development or non-development of these rural areas and will affect interregional migration patterns and national population distribution in yet to be determined ways.

In conclusion, there are two things I would like to see in the future research thrust on energy problems and agriculture. First, we need to remember that we are dealing with a complex of producers, processors, and consumers who are people--we need to focus more on how they will react to shortage--and less on how they could or should react. Second, we need

to remember that the economic system supposedly exists for the benefit of people, so we need to be conscious of how people and communities are affected by energy induced change.

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