Vernon W. Ruttan's Viewpoint

Agricultural Scientists As Reluctant Revolutionaries

Agronomists and other agricultural scientists, along with engineers and health scientists, have been the true revolutionaries of the 20th century. But they are reluctant revolutionaries!

They have wanted to revolutionize technology but have preferred to neglect the revolutionary impact of technology on society. They have often believed that it would be possible to revolutionize agricultural technology without changing rural institutions. They have been pleased to accept credit for reducing the cost of crop and animal production while avoiding the responsibility for lower commodity prices.

The Link Is Overlooked

Because they believe, and with good reason, in the benefits that technical change in agriculture brings to society and to farmers, agricultural scientists often fail to recognize the link between technical change, in which they take pride, and the institutional changes which they either do not perceive or which they fear. As a result, they often react with shock and anger when confronted with charges of responsibility for institutional changes in labor relations, farm structure, commodity markets, or environmental changes such as ground water contamination and the health effects of pesticide use that are induced by technical change.

How should the agricultural science community respond to these concerns? A first step is to recognize that similar economic and social forces have generated both the drive for technical change, leading to the advances in the productive capacity of plants, animals, machines, and men, and the drive for institutional changes designed to achieve more effective management of scientific effort and impact. The increased scarcity of natural resources—land, water, and energy—will continue to create a demand for technologies that generate higher levels of output per worker, per hectare, and per kilo-calorie. The rising value that society places on the health of workers and consumers, and on environmental amenities such as clean water, clear air and clean streets, will continue to lead to a demand for effective social control over the development and use of agricultural technology.

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A Necessary Step

A necessary step in any effective response to public concern about the social impact of technical change is for the research community to agree that *there can be no questions about society's right to hold the science community responsible for the consequences of the technical and institutional changes set in motion by research.* When credit is claimed for the productivity growth generated by advances in agricultural technology, responsibility cannot be evaded for the impact of, for example, pest control chemicals on environmental amenities or on the health of workers and consumers.

Once the right of society to hold its researchers responsible for the effects of the knowledge and technology they provide is accepted, it is then possible to deal with the more tractable question concerning how much responsibility a wise society will impose on its research community.

It is in society's interest to let the burdens of responsibility rest lightly on the shoulders of individual researchers and research managers. If society insists that it be assured that advances in agricultural technology carry minimum risk, and thus that agricultural scientists abandon their revolutionary role, society must accept the risk of losing access to the new income streams generated by technical change.

Society should exercise great care in insisting that research managers and scientists commit themselves to the realization of scientific or technical objectives that are unrealistic in terms of the state of scientific and technical knowledge. For example, it was unrealistic in the 1950s to expect that utilization and marketing research—post-harvest technology in today's terminology—could make a significant contribution to the solution of agricultural surplus problems in the United States. The allocation of excessive research resources to these areas led both to a waste of research resources and to erosion in the credibility of marketing research.

Research managers have a clear responsibility to inform a society of the impact of economic policy on: (1) the choice of mechanical, chemical, and biological technologies by farmers; (2) the incidence of technical change on the distribution of income among laborers, landowners, and consumers; (3) the structure of farming and rural communities; and (4) the health and safety of producers and consumers. They also have a responsibility to enter into the intellectual and political dialogues that are necessary if society is to achieve more effective convergence (1) between market prices and total societal costs—including environmental degradation, and (2) between the individual and revealed preferences of its citizens.

But agricultural research managers have neither sought nor been provided the resources to exercise this responsibility. For example, the competitive grants system administered by the USDA contains no funding for technology or, more broadly, social impact analysis. As a result, research managers often stand intellectually "exposed" before both their constituencies and critics when confronted with questions about the value or impact of their research programs.