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FEDERAL-STATE RESEARCH PROGRAMS IN THE ECONOMICS OF AGRICULTURAL PRODUCTION - - NEEDS AND PROSPECTS FOR THE FUTURE

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This paper is concerned with research priorities, future directions in production economics research, and organizational problems for the Federal-State cooperative research effort. The topic of foreign development and trade is an important one for production economists. However, the emphasis of this paper is "production economics in our domestic commercial agriculture." In terms of the perspective and scope of this specific subject, several related matters should be considered.

SCOPE OF AGRICULTURAL PRODUCTION ECONOMICS

The traditional lines of demarcation between production economics and marketing are much less distinct than they have been in the past. In fact, many decisions made within the agricultural industry now span the whole range from the acquisition of production inputs, on the one hand, to final sale of products at retail on the other.¹ This is particularly true in the case with respect to a number of specialty crops, such as fruit and vegetable products, and with respect to some livestock products. Suffice to say that it is necessary to devise ways to span the existing artificial barriers between production and marketing economics research in the past, and deal more effectively with the decision problems that span these stages. Some research currently being planned on an entire "subsector" basis merits enthusiastic support though it is too early to judge its potential.

With respect to the economic development topic, one can draw a somewhat more distinct line (than for

marketing) between this subject matter area and the one of farm production economics. It might be well to point out, however, that the two topics are none the less substantially interrelated. For example, as researchers undertake analysis of the economics of mechanization in the tobacco industry, one of the important by-products of the research is some assessment of the rate at which labor will be displaced in the tobacco production, marketing, and processing industries. Certainly, part of the total evaluation of such mechanization needs to be based on the social costs and benefits involved, as well as an appraisal of the opportunity for displaced labor to be productively employed in other economic sectors. One can make a rather strong case suggesting that in the past much of our production economics research has failed to adequately carry analysis to the stage of its effects on people and the rural economy. Even if one were to conclude that the "people related research" should be done primarily by someone other than production economists, there remains the need of effective liaison and research linkage between economists analyzing the individual farm and those concerned with economic development. To cite another example, evaluations of farm commodity programs should be conducted with increased attention directed toward the impact of farm programs on the economy of rural areas, generally, and on the incomes and opportunities for several differing strata, such as income and age, of people in rural areas, in particular. In short, if researchers are to be as relevant as possible, research can no longer be conducted with the single norm of profit maximization or cost minimization as the primary objective.

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¹ For further elaboration of this and related topics see: (1) James D. Shaffer, "A Working Paper Concerning Publicly Supported Research in Agricultural Marketing," and (2) K.R. Farrell and W.B. Sundquist, "Farm Production and Marketing Economics Research to Deal with the Problems of the Food and Fiber Industry," a paper prepared for presentation at the Seminar Toward Better Economic Research on the U.S. Food and Fiber Industry, Lincoln, Nebr., May 22-24, 1968.

An increasing role is being played by production economists working in the field of natural resources. A number of the goods, such as water, open spaces, etc. which were once essentially free goods, are rapidly becoming among our most valuable assets. Certainly, some of the key problems of our society are those dealing with the quality of our physical environment and the development and/or use of our natural resources. Moreover, because of their widespread effects, they are problems upon which our public research sector should place high priority. Increasingly, even those economic researchers concentrating on the "agricultural sector," as such, will have to assess the value of land, water, and ancillary resources for competitive nonfarming uses. Also, externalities, such as those associated with the effects of chemical fertilizers and pesticides on environmental quality, cannot and will not be ignored. Although the "natural resources" topic is not given specific attention in this paper, it is not because it is unimportant, but rather because of the need to concentrate more on some of the production economics topics centrally involving agriculture.

RESEARCH RESPONSIBILITIES

With respect to the ERS' major responsibilities in commercial agriculture, our clientele can be defined to include farmers, policymakers, the agribusiness sector, and society, generally. Increasingly, the State research complex appears to see its responsibilities similarly but typically on a "more local" basis. As a national research agency, we need to realize that our major research responsibilities and opportunities lie in looking at questions and providing inferences that go beyond the individual farm firm. That is to say, we need to respond to the set of questions with resource-wide, commoditywide, regionwide, and nationwide import. This is particularly true in the case of policy related topics where administrative or legislative action is expected to directly affect a commoditywide, a resourcewide, or an institutionwide situation, e.g., cotton, hired labor, or corporation farming. Though some of this more aggregative-type of analysis often needs to be compiled from microunit components, we cannot afford to stop short of eventual treatment of the more aggregative concerns as well.

HIGH PRIORITY RESEARCH TOPICS

With this brief background, it is possible to outline some of the higher priority research areas that need effective Federal-State research cooperation:

(1) One of the high priority research activities in which we, at the Federal end, must be productively involved is aimed at *estimating short-term production response of major commodities for the United States and by regions under expected alternative farm pro-*

gram and price conditions. Over time, this program could also include analysis of effects on resource use and on the competitive position of major agricultural regions. The primary research questions that need to be asked are: What production, income, and resource use would be expected under specific price and program conditions? The primary uses of the analysis are for national farm program policy decisions and for assessing regional and national commodity supplies, income, and resource use, by a wide range of governmental, industry, and producer interests. Future analyses of the effects of Government programs will need to give careful attention to the distribution of program benefits as well as to the traditional topics of aggregate supply response and income.

For some time, at least, it is expected that this research activity will need to carry substantial professional components, both to keep the current program of analysis on a timely basis and to develop further research methodology. Though the need for research support will be particularly important in the major cotton, rice, wheat, and soybean producing areas, it will be needed in some degree throughout much of the Southern region. Because of a need for timely results, in all probability, we need to continue a part of this analysis within the Federal agencies. This is particularly the case for "very short-run analysis." However, there are some major areas for cooperation in preparing input data, in conducting special analyses for certain commodities and regions, and for tracing the implications of results to the regional or more local economies. Also, some analysis on longer-run implications of agricultural policies could be and should be done in cooperation with the Land Grant Universities. There are still some methodological problems in moving from the micro to the macro situation and conversely.

(2) A second important research area is the *financial structure of farming, financial management, firm growth and related topics.* The path for future research is not as well defined on this topic as it is on others. Yet, it is clear that our current research, which looks only at the financial status of farming in terms of an aggregate balance sheet approach, is inadequate. So is research which at the micro level assumes that the farm firm adjusts to a profit-maximizing equilibrium situation, and that adequate capital is available to make this adjustment. These procedures bypass many of the important financial problems of farmers and fail to capture some of the key changes in the financial structure of farming. A good deal of time and effort has been devoted to planning research in this subject matter area within the past year. The task force reports, which have been compiled in ERS, treating the topics of the financial structure of agriculture, markets for farm credit, and financial management

are evidence of this.²

In the financial management area and in farm adjustments research, generally, there is a need to effectively question our traditional assumption that the dominant and typical firm in farming is the full owner-operator unit. Our traditional accounting and budgeting systems should be modified to include the capital gains components of income and the effects of taxes, generally, and of tax shelters, particularly, on investment, farm organization, and income. Bostwick's analysis³ suggesting the partitioning of returns to ownership, entrepreneurship, and investment functions is a key to understanding the incentives for changes which are occurring in the farming sector. Such phenomena as differences in the equity leverages and sources of financing possessed by different firms and individuals will have much greater impact on the future structure of agriculture than will minor differences in the "on farm input-output relations" achieved by different farmers.

A broad proliferation of research projects on the topic of agricultural finance is unnecessary. A smaller number of well-planned and well-coordinated research projects would in all probability do the most effective job.

(3) A third topic of importance for research is the *interrelationships between farm labor and mechanization*, on the one hand, and *labor and changing institutions* on the other. Moreover, this research should be planned and carried to more ultimate implications than the ones for determining labor/mechanization substitution ratios. These more ultimate implications relate to employment opportunities in the farming sector, on the one hand, and to the income and competitive position of farm producers on the other. One of the central developments that is occurring within our society, generally, is the shift to a higher and higher wage economy. Further development of this trend in farming is inevitable. Thus, it is also inevitable that machinery will replace many workers in farming. It is less obvious, however, just who will be displaced from farm employment, what their rate of displacement will be, and what their alternative opportunities are. Of highest priority here is research dealing with those agricultural regions and commodities which still have a high labor input in farming. Good examples would be the flue-cured tobacco industry, various segments of the fruit and vegetable industry, as well as several others.

With respect to the institutional aspects of farm labor, several developments seem likely. Over time, farmworkers will undoubtedly receive many of the same wage, work hour, working conditions, and other employment benefits that are realized by workers in other sectors of the economy. The extent of the impact of such developments on the well being of workers, on employment opportunities for them in farming, and on the competitive position of different components of the farming industry need to be accurately assessed through well-planned research.

(4) *Effective research needs to be undertaken on the economics of size and structure in farming.* Accurate appraisals are generally available on the so-called "within plant input-output relationships" for small- and medium-scale farms. More research is needed on the large scale end of the continuum. Beyond these so-called "within plant economies," however, probably lie the major factors affecting future farm size and structure. The economies of large scale buying, selling and financing need more accurate and adequate research, as do such topics as corporation farming and integration of production phases with those of supplying inputs and/or marketing, processing and retailing of products.

In the past, the economics of size in farming has in all probability been primarily a farm management related question. It is rapidly becoming a major policy question as well. And the simple answer that most of the "within plant economies are probably realized by well organized one and two man farming operations," though it may be generally true, it no longer suffices as an explanation for continuing changes in farm size and structure. Few topics will undergo such intensive public discussion in the next several years, hence, our research needs to effectively capture the incentives and forces affecting the size, number, organizational basis and degree of integration of production units.

(5) The fifth and final area of important cooperative research that requires attention is the *analysis of longer range alternatives for organizing agriculture and agricultural production*. The specific mix of questions that might be researched needs mutual discussion and development. However, a few of the research topics that fall into this area of research are: (a) Analysis of the effect of combining a negative income tax with transition to a free market situation for farm commodities. This alternative would basically provide

² For more detail on the financial management topic, I would direct you to a report by Don Bostwick, entitled "Farm Financial Management Research -- A Theoretical Analysis." U.S. Dept. Agr., Econ. Res. Serv., ERS-389, 1968.

³ Partitioning Financial Returns, An Application to the Growth of Farm Firms, U.S. Dept. Agr., Econ. Res. Serv., ERS-390, 1969.

program payment options which would not be tied to the land resource, as such, so that the benefits would not accrue primarily to landowners. (b) Analysis of the effects of a general cropland retirement program on production and income. Here, some ancillary analysis would need to be aimed at the possible impact of developing new cropland, and/or using existing cropland more intensively, on the operation of a general cropland retirement program. Though some micro analysis has been done for selected situations, it needs to be intensified and evaluated on a more aggregative basis. (c) At least some research analysis should be directed at the income, production, and required resource adjustments which would result if agriculture were, in the future, organized along "efficiency" lines. Clearly, this is not an all pervasive norm but it is a useful one for assessing the prospect for future change and for appraising the effects of alternative programs and institutions. (d) Though it may or may not be appropriate under this heading, such a topic as the impact on feed grain and soybean producers and on production and prices, given extensive production of high lysine corn, is a type of question that needs to be researched. This and related questions are being asked repeatedly. Their analysis requires estimation and evaluation of cross elasticities of demand and other measures of product substitution. It also requires searching analysis of the economics of production of these products and a desire to make key judgments and assumptions about producer behavior.

There are a number of other topics, such as the economics of the farm supply industries, the economics of pesticide use, the impact of weather and technology on production and appraisal of various segments of the feed-livestock industry, which need research attention by some people in the Federal-State research complex. However, the need for Federal-State cooperation is not as great here as for the topics which are listed in more detail above.

ORGANIZATION FOR RESEARCH

A complaint of long standing in the economics research profession is the "difficulty in organizing and implementing research to deal with some of the more substantial topics in production economics." These include, for example, topics of regionwide or national import, on the one hand, or those dealing with commoditywide or resourcewide problems on the other. Ready solutions to these problems of research organization are less obvious. One could argue that research can be effectively organized along commodity lines, on a resource basis, on a functional basis, and/or to treat a problem situation. An example of research on a "commodity basis" is an appraisal of the economics of and future developments in the cattle-feeding industry. Also, labor is a "resource situation" upon which we have organized some effective re-

search in the past. Our Division's "national model" activity has effectively worked on the problem of developing estimates of the impact on production response and income of alternative program and price situations. One could cite a number of cases of research organized to deal with specific problem situations. Thus, no single basis for research organization is a panacea for all efforts. One of the real key components of any effective research effort, however, is the planning of and providing for leadership by an individual or individuals who have capacity to lead a research project. Efforts to organize research dealing with subsectors of the agricultural industry seem to have substantial possibility and are now in the experimental stage. One of the important needs in a research effort involving several people is the provision of an appropriate set of incentives and rewards to the individuals participating.

In most research activities, it is necessary to direct research at clearly developed questions. Many research efforts fail because the objectives are not adequately specified and the feasibility of research are not adequately determined. This is not to say that all or even a major part of such questions should be immediate policy questions. However, reporters for almost every research undertaking should be able to say, "here's the question or set of questions which we have addressed, this is the way we addressed them and this is what we found out." Even our basic economic intelligence or data series seem to have to be developed in terms of utilization, not independent of it.

Within the mix of Federal-State research resources - - primarily in terms of the set of well-trained and competent researchers - - there has been some decline in recent years in the total resources committed to production economics work in agriculture. The addition of new resources in this area has not been adequate to offset new commitments which have been assumed in the areas of natural resource economics, foreign development and trade, and domestic economic development. This suggests two things. First, there is increasing need to give greater effort to research planning and organization in order to effectively utilize the limited resources that are available. Second, there is need to concentrate research effort on the higher priority research topics and let topics of only limited importance drop or be assumed by others.

A number of farm management-type research activities are being assumed by extension workers and by the agribusiness sector. This suggests that those engaged in the Federal-State research complex must focus more attention on problems of broader importance. Rather clearly, even with such a redirection of focus, substantial work is necessary at the micro level. This need is particularly apparent in the financial management area as well as in the large-

scale farming area and several others. Even here, however, the work can be developed with the intention of providing answers to some of the broader questions that harass us. We cannot hope, for example, to service a wide range of individual farm planners or managers with detailed information on how to organize their individual production units. The feasibility of success with limited research resources is too low and the opportunity costs are too high.

