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Research Orientation in Economic Development with Special Reference to Brazil

By Richard G. Wheeler[1]

RESEARCHERS IN economics may like to think of themselves as patient seekers for eternal truth. But their sponsors expect them to produce practical solutions for problems which may be important, but also short-lived. The transitory nature of many current economic problems places limits on the time and funds which can be expended. Researchers themselves need to be practicing economists in adjusting marginal inputs among various activities in a way that will produce more or less proportional benefits.

Although the analysis of problems usually involves the study of past events, few problems can be solved without making predictions about future behavior. Such predictions can sometimes be based upon firmly established principles or laws. Usually, however, the analyst must depend to a considerable degree upon his personal judgment in applying hypotheses which have not been fully tested and supported by evidence about historical behavior or by logical reasoning. Much of his time must be devoted to forming rather specific hypotheses about given situations and subjecting these hypotheses to such logical or empirical testing as may be possible before applying them in making predictions. The basis for making predictions may be very shaky, but without recourse to the best available basis for prediction, the analyst will solve few problems.

As social scientists, we often tend to slight the process of developing a plausible but complex hypothesis through logical reasoning related to all the evidence. Instead, we tend to prefer the more routine kind of activity involved in (a) gathering and summarizing facts, and (b) using such facts to test hastily chosen hypotheses in a historical setting. The results may provide accurate historical description without providing a sound basis for prediction; the possibilities for the existence of spurious correlation have already been well documented. Before one can have much confidence in predictions based on historical behavior, one needs a plausible explanation of why things happened as they did, and a basis for judging whether or not similar factors will operate in the future. The problem solver must emerge from his laboratory with definite conclusions about future behavior, not merely with a collection of relevant or irrelevant facts about past behavior. In other words, he must exercise considerable personal judgment in imputing causal relationship.

The Scope of Development Programs

Development programs are composed of many different elements that have to do with such activities as credit, extension education, minimum prices, technical services, road construction, marketing institutions, colonization, land reform, taxation policies, and many others.

Some of these elements involve changes in direct assistance to existing agricultural producers. Others represent changes of a more

[1] Based on a seminar lecture (in Portuguese), May 5, 1967, at Universidade Rural do Estado de Minas Gerais, Vicosa, Minas Gerais, Brazil.

Editor's note: The choice of economic problems and the appropriate combinations of research methods are two basic phases in economic analysis that often receive too little attention. Both are part of the economist's own economic problem in the use of scarce research resources. Some of the most pertinent discussions go on behind the research scene and are not reported. More of these should be preserved. This paper represents an expression of one point of view. It is hoped that this will stimulate more discussion of the issues involved.

general nature in the institutional environment. Still others involve programs which require public entities to undertake substantial production and marketing operations, in place of private producers and merchants.

The economic research needed to provide extension guidance to individual agricultural producers, of course, would be different from that needed if the government were to manage the marketing of any large part of total agricultural output. Thus, the kind of research to be given priority will depend, in some degree, upon the kinds of activities which are considered to be acceptable elements of development programs.

On the basis of present programs and indications, however, I think it reasonable to assume that Brazil's efforts toward agricultural development will include most or all of the following:

(a) Programs of developing infrastructure to permit penetration and colonization of relatively underdeveloped areas;

(b) Programs of land tenure reform;

(c) Programs of improving marketing infrastructure;

(d) Credit and minimum price programs;

(e) Programs of extension education and technical services;

(f) Programs for integrated community development.

Implications for Research

These likely activities imply that Brazilian agriculture will have a very dynamic character in the future. The geographic concentration of production has changed considerably in past years, and it will continue to change as the margin of cultivation moves toward the interior. Adoption of more intensive cultural practices in the established areas will lead to changes in crop combinations as well as changes in yields per hectare and per head. Relationships among prices of products and inputs will be modified appreciably in many areas, giving rise to additional changes in enterprise combinations and in yields. Flows of products toward the various consumption centers will change rapidly, partly because of changing production patterns, partly because of differential population growth rates, and partly because of changes in processing and other marketing activities.

Under these circumstances, I am very doubtful about the usefulness of research projects which, under static assumptions, seek to produce ideal solutions to complex problems of farm organization, marketing movements, and demand-supply relationships in general.

It is all to the good to develop simplified theories which show the major structural relationships among the various elements of complex economic problems. Such theories can help us avoid major errors in analyzing practical problems and in reaching workable solutions. An economist armed with an understanding of relationships between output and total revenue under conditions of inelastic demand can almost automatically avoid pitfalls that await the layman innocent of economic theory. But economic theory in general has been more concerned with the kind of equilibrium that would prevail in the absence of change than with the process of change itself. Thus, it offers little basis for showing how producers can be expected to behave under constantly changing conditions. Furthermore, some of the most useful theories are best characterized as greatly simplified generalizations about complicated relationships involving many variables; they are not specific formulas which describe the exact mathematical relationships.

Even when problems can be reduced to a set of mathematical equations capable of a unique solution, the quality of available data does not always warrant elaborate analyses. Until the reliability of production estimates by municipios (a Brazilian political subdivision) can be demonstrated with more certainty than has been possible so far, for example, I would be very skeptical about efforts to make refined analyses of optimum distribution of supplies among different markets. Rough-and-ready procedures for making successive approximations toward economic optimums will perhaps be more efficient and productive than more highly refined techniques.

The Operating Unit Approach

To repeat what was said earlier, the problem solver in the social sciences must work rapidly and with limited resources to make predictions

that will help solve complex but transitory problems. A crucial part of his task is to develop plausible hypotheses that are directly and rather narrowly related to specific situations, and that can be useful for prediction, not merely for description of past behavior. This requires efforts toward understanding causal relationships within specific, local settings.

To gain this kind of understanding, a knowledge of the characteristics, resources, goals, and adjustment opportunities of individual operating units is of strategic importance. It is not sufficient to think of agriculture as a large mass of uniform land, plus an army of identical human laborers, plus various quantities of other resources such as fertilizer and tractors--all awaiting directives from a central headquarters which would produce activity in accord with an aggregate Cobb-Douglas production function.

In fact, land is not uniform, laborers are not identical, and management does not emanate from a central authority, in Brazil or in most other countries. Aggregate analyses can be reduced to conveniently simple forms, but they will be unrealistic if they ignore the physical and institutional orientation of the resources involved. These resources are actually organized in thousands of individual operating units, each representing a particular combination of soils, structure, human abilities, and management objectives. It is in such units that the basic decisions about resource use are made. This is the reason for placing emphasis upon the operating-unit approach.

The operating unit may be a family farm, a latifundio, a marketing cooperative, a cotton gin, a wholesaling firm, or a public enterprise. In each case, the operating unit will be managed with a certain limited combination of resources and with certain specific objectives. Some units are operated with the objective of producing the highest return to a given labor force; others with the objective of providing maximum possibilities for employing labor at a modest rate of return; and many are managed with a combination of these or other objectives.

With knowledge of how individual operating units can be made more effective in terms of the chosen goals of society, the government can proceed to change institutions and initiate action programs in a way appropriate to achieving the desired results. Without such knowledge, action programs and institutional changes may fall far short of the mark.

Studies of Operating Units

Considering the large number of interviews which have been made with farm operators and landowners or their representatives in the course of economic research studies in Brazil, there is surprisingly little information available about farm operating units and their characteristics. We cannot even look to the census to provide an accurate estimate of the number of operating units, since noncontinuous parcels under the same ownership and operation are treated as separate units for census purposes. An operating unit may include several ownership units, of course, while, conversely, a single ownership unit may be divided among several operating units.

One does not have to look far to find evidence that countless hours and cruzeiros[2] have been spent in studies of the costs of producing a large number of individual crops. Nearly always, an important share of these costs is joint or overhead costs incurred by diversified producers. Yet seldom can one find adequate descriptions of the total organization and characteristics of the operating units where these cost studies were made. When relatively fixed supplies of land and labor represent the main inputs for producing a combination of interplanted crops, it seems to me that it is much more important to describe the total resources and activities of the operating unit as a whole than to engage in the sterile exercise of attributing costs to the individual products, in an almost wholly arbitrary fashion.

What are the principal characteristics of the predominant kinds of operating units in various parts of the country? Are they specialized, or diversified? Large, or small? Single tract, or multiple tract? Wholly owned, wholly rented, or part owned and part rented? Do they produce both crops and livestock? Is the labor supply mostly composed of permanent workers, or mostly temporary? How intensive is the use of purchased inputs such as fertilizer and

[2] Cruzeiro = monetary unit of Brazil.

pesticides? At best we can answer these questions only in terms of general averages for large areas, and such averages conceal much variation within any one area.

Before we can even begin to answer these questions, we need to decide how to deal with operating units which are considerably more complex than the single-tract, owner-operated farm. Horizontal and vertical integration in agriculture, as in industrial production, gives rise to some very complex operating-unit structures. On many occasions, of course, researchers have wondered whether they should treat a latifundio as a single operating unit or as a series of units operated by individual partners. Presently, one can find interlocking units which are even more difficult to handle. I have frequently cited a case encountered in Colombia, which was structured as follows:

> Producer A lived on a small tract of land owned by his wife, where he carried on a limited amount of agricultural production. He was also the owner of three other plots, in each of which he grew some crops for his own account. In the first of the three parcels, he was also engaged in growing wheat in partnership with producer B; in the second, he was engaged in growing wheat in partnership with producer C and potatoes in partnership with producer D; in the third parcel he grew potatoes in partnership with producer E.
>
> As the landowner in these partnerships producer A provided a share of the seed and fertilizer as well as the land; his partner provided labor, machinery, and the remainder of the variable inputs. Producer B, moreover, was also a landowner, and had separate agricultural activities on his own land, as was also the case for producer D. In addition, producer A grew crops in partnership with two neighboring landowners who were sisters and who possessed separate properties. On still another parcel of land owned by another individual, producer A was also a partner in growing potatoes. Finally, producer A was involved in a partnership for the operation of a tractor. In this partnership, producer A was the owner of the tractor, his partner was the operator, and the two shared in the tractor rental income, including charges billed to producer A for the work on his crops.

First then, we need to evaluate the concept of the operating unit itself, under Brazilian conditions, and develop some meaningful and workable definitions. Next we need to obtain at least a brief description of the principal characteristics of a fairly large number of operating units throughout the country, and classify them into more or less homogeneous groups, area by area. Next we need to reduce the results to a relatively simple map, showing the type or types of operating units which predominate in various areas. In so doing, emphasis should be given to relatively basic characteristics such as size, tenure, and range of production alternatives arising out of the general environment, rather than to the exact combination of temporary crops grown in any one year. If a given area includes several rather distinct types of operating units, one can make many analytical mistakes by treating it as if the units were homogeneous.

Given a type-of-farming area map and simple descriptive information about the type of farms in each area, it is time to analyze management alternatives on individual farms selected, insofar as possible, to represent the various groups. Comparative budgeting is an important technique to be used in such research.

If we know little about farm units, we know even less about the operating units engaged in assembling, processing, and distributing farm products. Considering how little is known about the middleman and the nature of his business, it is amazing how ready we are to blame him for most of the problems of agriculture. We need a great deal more information about marketing channels, margins, costs, and structure, but above all, we need to gather this information in a manner that enables us to understand the characteristics, problems, and alternatives of the operating units engaged in marketing.

Strangely enough, we seem to know comparatively more about the units where agricultural products are finally consumed than we do about the units where production and marketing take place. Nevertheless, our concern with demand elasticities has been such that we might have done a better job than we have of producing simple, direct summaries of what is consumed by families of various characteristics with respect to income, size, and location. Brazil's developing food processing industry has an urgent need for such information.

Other Research Orientations

By giving high priority to studies of the operating units engaged in agricultural production and marketing, I do not mean to belittle studies with other orientations. In fact, one must also attach a very high priority to the straightforward but difficult task of improving Brazil's basic estimates of crops and livestock production, production inputs, and farm prices. Perhaps you do not care to dignify the task of making continuous production estimates with the term "research," but specialized research is needed to find improved means of making such estimates.

With improved statistics on production, prices, stocks, and commodity movements, there will also be an opportunity for a major program of analyzing the agricultural situation and outlook. Two divisions of USDA's Economic Research Service devote major efforts to the situation and outlook work at the national and international levels, and these efforts are reinforced by corresponding work in each of the land-grant universities. Research in depth on individual commodities and other topics supports these comprehensive programs.

There are, of course, urgent needs for many other kinds of research oriented toward individual products, toward individual inputs, toward aggregate problems of individual areas, and toward the more general adjustment problems of the total economy. One could develop an almost endless list, and defend the urgency of many of them. But until we have made considerable progress in describing, classifying, and understanding the operating units engaged in the production and marketing of agricultural products, and until we have much improved aggregate statistics on Brazilian agriculture, many other studies will have a relatively low rating on my list of priorities.