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COST-BENEFIT ANALYSIS: A NECESSARY COMPONENT OF FUTURE  
AGRICULTURAL EDUCATIONAL RESEARCH

by

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"We strongly recommend that broad-based studies be made of the costs and benefits that can be expected if the various technologies involving audio-visual equipment, television, computers, and other devices are applied to instruction in the schools on a wide scale. Such studies should take into account the benefits that may be obtained through increasing the effectiveness of the learning process at the same time that they weigh the effects of the new resources in terms of the organization of instruction, teacher pay schedules, productivity, probable use by teachers, and other vital matters."<sup>1</sup>

This challenge arises from public concern over the use of resources, particularly the capital resource, in education. Public concern no doubt stems from rising taxes, some of which go for educational purposes; greater sophistication of the public concerning the use of their money; the high investment cost of new educational equipment technology; and the increasing investment costs in the educational plant. Together with the new teacher militancy, student unrest, and pockets of dissatisfaction with the educational system, these factors have brought the question of costs and returns to education into sharper focus. It is a well known fact that education is one of the largest enterprises in America. Annual

expenditures of elementary and secondary schools, colleges and universities are now about \$34 billion.<sup>2</sup> Public concern, coupled with massive spending of public and private monies, points to the need for empirical data on the costs to benefits ratios for various educational practices.

Vocational education in agriculture as a minority segment in the total educational complex is in a unique position in this respect. It may well be among the first to feel the heat - some may believe that this has already happened - and it is perhaps best qualified to demonstrate results. The responsibility of agricultural education to students is "to develop their ability to secure satisfactory placement and to advance in an agricultural occupation."<sup>3</sup> The record is good for all vocational education. Numerous studies indicate high placement and low unemployment of graduates.<sup>4,5</sup> It might be pointed out, though, that some of the data is suspect; "many thousands of pages have been written to prove the value of (adult) education but most of these were prepared to justify additional funding. Although it is hard to believe, we have only within a very broad range, any idea of the number of participants, of the cost by any definition, and the returns either to the individual or to society."<sup>6</sup>

Thus, the situation is before us: (1) agricultural education has justified its existence on the placement, earnings and favorable employment statistics on its graduates. Person's study of economic returns to adult farmers in classes in Minnesota, exemplifies the nature of this effort, but much more work is needed;<sup>7</sup> (2) agricultural education has extensively researched new methods and techniques of instruction. Comparisons are made on the effectiveness of various programs and procedures in effecting measurable differences in student outcomes. This effort must continue at an accelerated pace; (3) the efficiency of alternative instructional methods in terms of cost-benefit ratios has been largely ignored. For example, in a recent study I concluded that simulation or business gaming can be effectively used to teach farm business management. I went on to say, "certainly cost analysis, though not included in this study, must be made before simulation can be widely used in the classroom."<sup>8</sup> Unfortunately, this final important step is seldom taken.

One of the reasons for this deficiency is the obvious difficulty in quantifying educational outcomes. Indeed, it must be immediately recognized that the value of education exceeds that which can be quantified in economic terms.<sup>9</sup> Yet, this difficulty would seem less formidable to vocational education than to general education. Jobs, wages, and job satisfaction are easily quantified. How well certain programs, curricula, methodology, or innovations accomplish vocational objectives is measurable. It seems only reasonable then to subject innovation to cost-benefit analysis prior to its widespread use. In general, such has not been the case. In fact, many innovations have been promoted based on little evidence of educational effectiveness let alone any economic advantage - witness the teaching machine fad.

What is needed is a determination to carry through with cost-benefit analysis, and a methodology for doing it.

For economic analysis, the contributions of all educational resources must be acknowledged and valued. In any given circumstance, however, only variable costs need to enter into the analysis. Return to capital is extremely important - but it cannot be the sole consideration. Education, like all other enterprises, has four basic resources: (1) capital, (2) labor (students, teachers and others), (3) facilities and equipment, and (4) management (administration). Student educational attainment is the product. Analysis must consider which of the resources is the limiting factor in each circumstance. That is, where capital is the most limiting resource; the highest return to capital must be the criterion measure. Such economic analysis can be accomplished in three steps (figure 1).

The first step is to identify the magnitude of the combinations of resources used; to identify, classify and quantify the variable inputs; to differentiate the educational processes under study; and to identify, classify, and quantify the educational attainment of students. After these are done, cost-benefit analysis, both on the short-term and long-term basis, becomes possible and practical. Most research involving economic analysis has concluded after the first step. The usefulness of such research is severely limited unless steps two and three follow.

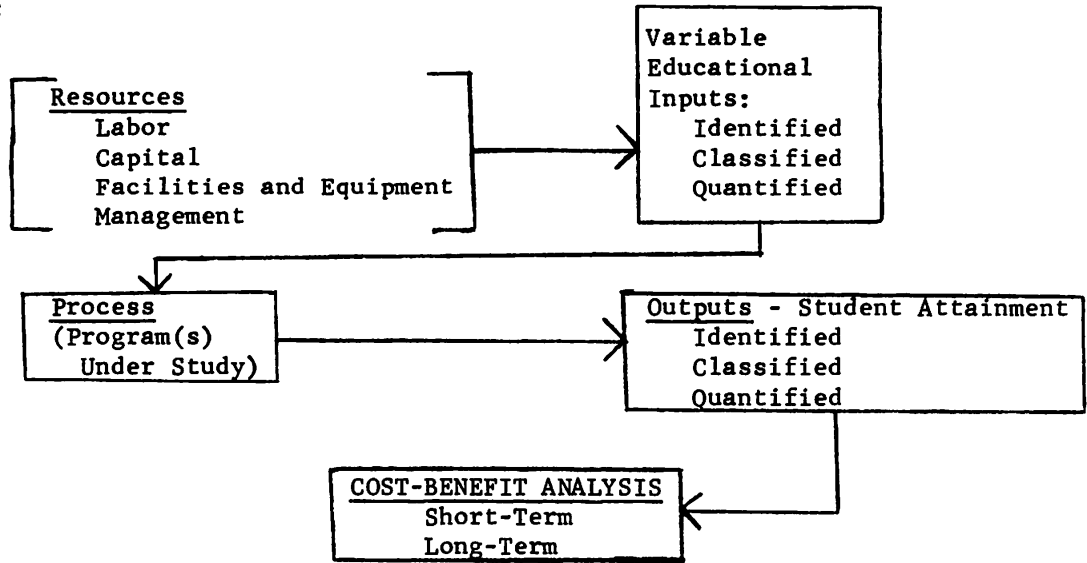
The second step involves the analysis of alternative inputs on the same or alternative processes. Analysis of the variable outputs gives a measure of efficiency among alternatives, thus creating an economic base for decision-making. The third step is simply a summary. The most efficient alternatives have been determined in step two. What remains is to identify the resource quantities needed, establish operational policies and guidelines, and allocate scarce resources for their most efficient utilization.

To allocate educational resources on the basis of measured efficiency provides a defensible position for ourselves and the public. No longer can we be satisfied with only job placement records. Total economic returns to education are not the answer either. It is necessary to be able to allocate educational inputs where the greatest return on investment is realized. The public has long demonstrated its willingness to support programs of proven value. In this respect, agricultural education stands on the brink of opportunity. "The national gains from improving the efficiency of education - from getting more educational results for each dollar or teacher-hour or student-hour - can be enormous."<sup>10</sup>

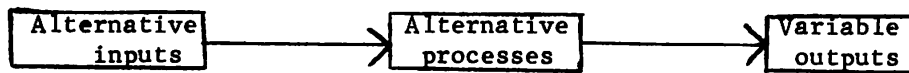
#### End Notes

1. Innovations in Education: New Directions for the American School. Committee for Economic Development, A Statement by the Research and Policy Committee, New York, July, 1968, p. 68.

STEP 1:



STEP 2:



STEP 3:

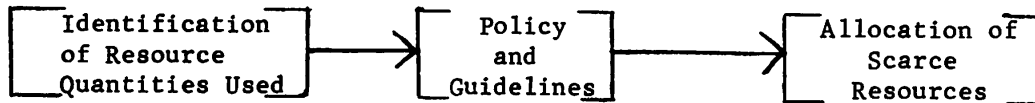


Figure 1. Steps in the economic analysis of educational institutions' use of resources.

2. Raising Low Income Through Improved Education. Committee for Economic Development, A Statement by the Research and Policy Committee, New York, September, 1965, p. 39.
3. Objectives for Vocational and Technical Education in Agriculture. Bulletin 1966, No. 4, (OE-81011) Office of Education, U. S. Department of Health, Education, and Welfare, p. 5.
4. Education for a Changing World of Work. Report of the Panel of Consultants on Vocational Education, U. S. Government Printing Office, Washington (1964).
5. Jacob Mincer, "On-the-Job Training: Costs, Returns, and Some Implications," The Journal of Political Economy, Vol. 70, No. 5, Part 2 (October, 1962), pp. 50-73.
6. C. B. Ratchford. "Some Questions for Economists and Society About Adult Education," American Journal of Agricultural Economics, Vol. 50, No. 5, (December, 1968), p. 1165.
7. Edgar A. Persons, Gordon I. Swanson, et. al. An Economic Study of the Investment Effects of Education in Agriculture. Office of Education, U. S. Department of Health, Education, and Welfare, April, 1968.
8. Samuel M. Curtis. "The Use of a Business Game for Teaching Farm Business Analysis to High School and Adults Students," American Journal of Agricultural Economics, Vol. 50, No. 4, (November, 1968), p. 1033.
9. C. B. Ratchford, p. 1176.
10. Raising Low Incomes Through Improved Education, p. 39.

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