

THE NEED FOR THE SYSTEMS APPROACH TO RURAL DEVELOPMENT RESEARCH*

Luther Tweeten

Problems of low income, high incidence of poverty, inadequate or expensive community services, net out-migration and high dependency rates in rural areas are now well documented and widely recognized. Not so well recognized is, "What can be done about these problems?" This paper suggests systems analysis to answer this question. Following a description of the systems approach to planning, a case is made for applying such an approach to rural development. Finally, some new observations are presented on the economic payoff from various public programs suitable for inclusion in systems planning.

SYSTEMS PLANNING DEFINED

Systems planning is not new, but placing a man on the moon dramatized its effectiveness in solving problems and reaching objectives. Systems planning is not a technique, but a systematic way of solving problems. To the extent that it represents the common sense that any good researcher uses in solving problems, systems planning is as old as problem-solving itself.

No single, concise definition describes the systems approach, but the method of solving problems does have certain more-or-less accepted characteristics:

1. Recognition of the total problem; all parts of the phenomenon in question that bear significantly on the solution are accounted for within the system.
2. Each component or subsystem must be understood in its relationship to other subsystems and the total system. The problem solution must recognize time sequences and mesh the components properly in reaching the chosen target(s).

3. The system is tied together by communication networks and other linkages.

4. The process is monitored for efficiency. Cost-effectiveness, benefit-cost analysis, program planning and budgeting, and other terms describe the evaluation techniques.

5. The performance of the system is evaluated in relation to the targets or objectives, with feed-back to adjust the process from information gained from experience. Quantitative approaches such as simulation and programming are often used to gain "experience" through small-scale operation of the system. The study of the control mechanism for the system is sometimes called *cybernetics*.

I shall return to these elements of systems planning after making a case for systems planning in the next section.

THE CASE FOR SYSTEMS PLANNING

Seldom has the gap between political rhetoric and economic policy reality been wider than in rural development. The gap is explained on the one hand by the magnitude of rural problems which understandably justifies rhetoric, and on the other hand by the lack of an organized, effective power group to politically buttress sound programs providing sufficient resources to deal with these problems. Our adversary political system, coupled with fragmented rural interests, leads to expensive rural programs for some groups, but as a whole, rural people receive a disproportionately small share of public programs, whether the appropriate share is measured by population or magnitude of problems.

Luther Tweeten is regents professor of agricultural economics at Oklahoma State University. Comments of Gerald Doeksen, James Nelson, Dean Schreiner, and Jackie Smith were very helpful.

*Oklahoma State Agricultural Experiment Station Article No. 131.

Job Gap

Studies by Tweeten [26], the U.S. Department of Labor [28, p. 130], and the Office of Economic Opportunity [17] independently estimated the need for approximately three million jobs in non-metropolitan (micropolitan) areas. The persons needing jobs have low incomes but have physical and human resources which place them in the salvageable economic category. Past experience with public service employment programs indicates that these individuals could be employed for \$7,000 of public funds per person annually, for a total of \$21 billion per year. Such massive outlays exceed public funds available under even the most generous circumstances, and it is well to seek other public programs that will provide as much income as possible to meet development targets with the limited funds available. Other development gaps can also be identified, including that between actual income of poor persons and the poverty threshold.

Existing Programs to Close the Gap

Federal expenditures on labor and manpower programs increased from \$809 million in 1961 to \$2.6 billion in 1971. Federal public assistance payments for the entire nation increased from \$2.2 billion in 1961 to \$13.1 billion in 1971. The Economic Development Administration (EDA) provided assistance to eliminate substantial and persistent unemployment and underemployment in economically distressed areas. EDA outlays for 1973 included expenditures of \$217 million and loans of \$47 million. The \$217 million expenditures included \$162 million for development facilities grants; \$22 million for planning, technical assistance and research; \$22 million for operations and administration, and \$11 million for other expenditures.

Other major federal development efforts originated under the Manpower Development and Training Administration (MDTA) established in 1962 and the Office of Economic Opportunity established in 1964.¹ Programs included labor mobility projects, education, and training – including retraining and on-the-job training. These programs were aimed at the unemployed and underemployed and at minority groups with goals of alleviating poverty and insuring equal opportunity.

Outlays for the above programs fall far short of what is needed to end poverty and

underemployment. Monumental problems emerge in coordinating the programs into a package that is efficient and effective in achieving goals of rural development as fully as possible.

Systems Planning to Close Development Gap

Three stages of development research are apparent. The first stage, documenting the dimensions of the problem, began as early as 1790 with the first census of population. This phase was prominent in the 1950's with numerous special personal interview surveys of rural areas. It continues through the present, though it now receives less relative effort than previously. The second stage, planning programs for development, gained prominence in the 1960's with emergence of major manpower and area development programs such as MDTA, EDA, and the regional commissions. Spurred by fashionable program planning and budgeting techniques, many of these programs were evaluated for cost-effectiveness. But the evaluations failed to view development programs as a package and to recognize the need for coordination of programs in reaching a critical mass of public and private investment in rural development.

The second stage, however, provided the foundation for a third stage, programming plans. In contrast to planning programs as separate entities, the third stage recognizes the need to determine the combination of programs required to reach development goals efficiently. The third stage can be methodologically conceptualized within the dynamic context of systems planning.

The Rural Development Act of 1972 is in danger of succumbing to the same pitfalls of the Rural Development Program of 1955 and the Area Redevelopment Act of 1961 which scattered too few funds too widely and in inefficient ways, pitfalls which succeeding legislation sought to correct in the form of the Public Works and Economic Development Act of 1965 (which created the Economic Development Administration). Politicians continue to express the view that depressed rural communities should pick themselves up by their bootstraps by appealing to the widely held but simplistic aphorism that local people best know and can best solve their economic problems.

...There are those of you who are muttering under your breath right now that these dollar amounts are

¹ Many programs of the Office of Economic Opportunity have been placed under the Dept. of Health, Education and Welfare. Some programs of the EDA in the U.S. Dept. of Commerce are being replaced or absorbed by the Rural Development Service of the U.S. Dept. of Agriculture as the Rural Development Act of 1972 is implemented.

not adequate to do any meaningful job with the [Rural Development Act of 1972]. I could not disagree with that position more.

Unlike revenue-sharing, the Rural Development Act does not put dib-dabs of money into every rural hamlet and county in the country. It provides mainly lending authority to those communities where people want to see growth and an improvement in their quality of life [6, p. 3].

One major function of systems planning is to confront policy-makers with the realistic alternatives that will help either to (a) scale down objectives to within credible range of resources provided, (b) increase resources to achieve the stated goals, or (c) use existing programs more efficiently to more nearly reach the stated objectives.

Just as specialties of farm management, marketing, and public policy developed to better research and ameliorate the economic problems of agriculture, so, too, specialties of community development, regional economics, and development policy emerged to better research and ameliorate the economic problems of greater rural America. Rural development research remains in a formative stage, seeking relevance. While rivalries sometimes surface among community development specialists, regional planners, rural sociologists, and public policy economists, this is expected in formative stages of research. Certainly public policy economists can applaud the efforts of micro-oriented rural development specialists while at the same time they research the economic payoff from alternative development strategies.

The strong micro-orientation of many development economists favors precise answers to small problems, rather than crude answers to large problems. Clearly, the economics of the forest is no less important than the economics of the tree. It is no longer adequate to report only the magnitude of investment gap, the number of people freed by technology, the multiplier associated with a given industry, or that a community development specialist generated enthusiasm for improving a town. We must go the next step of identifying how these programs influence, and are influenced by public policies.

In our free enterprise economy, two value judgments pervade rural development policy research: public policy is appropriate to (a) assist free enterprise to function more nearly in conformity with the norm of perfect competition, and (b)

provide for those who lack the human and material means to compete effectively for a socially acceptable level of earnings.

I have elsewhere [27] developed the thesis that imperfections in the market work to the disadvantage of micropolitan areas and that a system of taxes, subsidies or institutional rearrangements could allocate resources and products more nearly in conformity with the perfect market and to the benefit of people in micro as well as metro areas. These larger issues of a balanced national growth policy lend themselves to systems analysis, but issues treated here are less broad and begin with the assumption that we can identify lesser economic systems, such as multicounty districts, as well as the goals or targets of these systems; then the task in planning is to determine efficient paths to these goals or targets.

SYSTEMS PLANNING IN PRACTICE

This section describes application of the systems approach in rural development planning, including identification of the system, choice of quantitative model, objectives and targets, linkages among programs, and monitoring efficiency in the system.

Delineating the System

Ideally, the specific system chosen for analysis should be an economic, social, and political entity. As a political entity, it should be a decision-making unit such as a town, county, state, or nation. As a social entity, it should have a strong sense of community with citizens willing to make sacrifices for the betterment of the community as a whole. As an economic entity, the system should be large enough to encompass all economic aspects of rural development that bear significantly on its solution, encompass subsystems characterized by economic interdependence, and be large enough to provide agglomeration economies and minimize spillovers and externalities.

Because the ideal social system may be a village, while the ideal economic system may be the world, compromise is essential. The nation has now largely accepted the multicounty district as a useful system for planning and implementing rural development programs. The advantages and disadvantages of such a viable or functional economic area possessing a growth center have been discussed at great length in the literature [9] and need no further treatment here. While the multicounty district is useful for some systems planning, other entities are appropriate for analyzing and resolving other economic problems.

At Oklahoma State University we currently are

applying a systems simulation model to an economic development district in eastern Oklahoma. The population is divided into 21 categories based on age, education, income and other factors relating to eligibility for employment. The impact of seven public programs with appropriate income and employment multipliers on each of these population categories is being estimated. The seven programs being considered are (1) income maintenance, (2) public service employment, (3) academic education, (4) vocational training, (5) family planning, (6) industrial location incentives to generate local jobs, and (7) labor mobility subsidization. Although a pilot simulation model has been developed and used in the classroom as a rural development game, the results applied to the actual data for a development district are not yet available.

Quantitative Model

To overcome the basic limitation of the human mind in dealing with the behavior of socio-economic systems, we need computer models which match, to a useful degree, the behavior of actual systems. These models must be superior to the intuitive models in our heads on which we are now basing national social programs.

Perhaps the most difficult task facing those responsible for seeking ways to assess the implications of government policy is that many social systems appear to work counterintuitively. Massachusetts Institute of Technology Professor Jay W. Forrester told a House Subcommittee on Urban Growth:

“It is my basic theme that the human mind is not adapted to interpreting how social systems behave. Our social systems belong to the class called multiloop nonlinear feedback systems. In the long history of evolution it has not been necessary for man to understand these systems until very recent historical times. Evolutionary processes have not given us the mental skill needed to properly interpret the dynamic behavior of the systems of which we have now become a part [29].”

It is for this reason, Dr. Forrester explained, that many government programs prove to be ineffective, with results ranging from the unexpected to the opposite of what was desired.

Computerized simulation models, because of their flexibility and capacity to handle a large number of complicated functional forms, seem well suited for systems analysis. But systems analysis prescribes no one model as ideal, and conditionally normative optimizing techniques such as linear programming, as

well as positivistic procedures, can be used alone or in conjunction with one another.

Objectives and Targets

The moon program was successful in part because of a well-defined objective – a man on the moon by 1970. Rural development lacks well-defined goals. Public funds to promote rural development are limited; it is important to use them efficiently. The objective of rural development, in theory, is to maximize well-being of people, and, in practice, is to maximize net income, employment and other ends in view for people of a rural area or region with limited public funds available to promote development. Or the objective might be to minimize the public cost of reaching certain development targets expressed in terms of employment, income, or stability. A goal in the systems approach might be to reach targets by a selected year at the lowest public expense while maintaining at least a poverty threshold income for the poor. The focus is on efficient use of public funds, but private investment is frequently complementary. In fact, public funds are often most effective in raising incomes where they induce considerable private investment.

Communication Networks and Linkages

The complexity and diversity of public programs to promote regional economic development heightens the need for the communication and linkages among programs. A family assistance-type program would call for even stronger linkages. The federal-state employment service, vocational-technical training programs, and organizations administering welfare programs are key elements. The employment and welfare agencies increasingly refer the hard-to-employ to manpower training programs.

For some areas, lack of natural resources and other factors favorable to local job creation may cause programs to encourage out-migration to be most cost-effective. For other areas, generating local jobs may be the appropriate program. Without proper recognition of the competitive nature of these two activities, an inconsistent policy of simultaneous movement of jobs to local people and people to outside jobs may be undertaken. Such a policy may not be inconsistent in all instances, because some persons' skills may be best suited for outside jobs, even while local jobs are being created – some of which can be filled only by outsiders with special skills. While firm a priori conclusions are not possible, the important point is that these interactions need to be recognized.

Monitoring Efficiency in the System

Cost-effectiveness refers to outlays required to reach a given objective. It can be expressed in several ways. One of the simplest concepts is the amount of public funds required to create a permanent new job. Another concept is the income generated in a region per dollar of public funds spent to promote economic progress. A broader concept is the net income generated in the nation per dollar of public and induced private expenditures in a given region. Benefits in the form of income generated in the region ideally should be adjusted for income changes in other regions. Income generated by publicly induced industrialization of a depressed area may mean loss of jobs to communities where some industry would have otherwise located. And programs to enhance mobility in a region may generate income in other regions by outmigrants. Another cost-effectiveness concept is the reduction in the incidence of poverty per dollar spent on a program. A criterion for a linear programming development model [25] is to maximize income per public dollar spent in a region, subject to constraints that the income of each subgroup must attain at least the poverty threshold.

Domestic development programs, like fertilizer application, cannot elude the law of diminishing returns. Injection of public funds into a program that is highly cost-effective eventually will drive efficiency down to a point where other programs more efficiently utilize incremental public outlays. This principle, coupled with uncertainty and the need to reach special groups, leads to diversification of funds among programs.

Diminishing returns influence supply; other factors influence demand. If the program is large enough to have a perceptible macro effect, the declining demand curve must be considered. Plans for a small development district may require few adjustments for declining prices as output is expanded through development programs. Plans for a large region which accounts for a major portion of the output of an industry would require more adjustments for declining prices.

One trial and error approach in simulation of a development system is first to introduce the program that contributes most to income per public dollar spent. If this program encounters diminishing returns, declining prices, or does not reach specific groups such as the poor, then a new program is introduced to supplement or replace the first program. This process is repeated until the objective function is optimized, subject to constraints that must be met. The process cannot easily be performed by trial and error

budgeting. The interactions, programs and subsystems are too numerous and complicated. But simple cost-effectiveness estimates to be presented later do give some first approximations which can help set program priorities until more refined estimates are available.

Unfortunately, substantial research evaluating the economic payoff from alternative programs has not originated from a systems orientation. Seldom do available data show the distribution of benefits among population subgroups and the proportion of each subgroup that will participate in any given program operated at various levels. Of greater concern is that large numbers of programs are not evaluated at all. I am unaware of any rigorous studies of the economic payoff from resources devoted to community development as a process to improve decision-making as emphasized by state and federal efforts of the extension service; of the economic payoff from comprehensive area planning for land use, housing, etc., nor of the payoff from federal assistance to improve water and sewer systems, although such programs are major elements in the Rural Development Act of 1972 and other legislation most narrowly viewed as rural development.

We now turn to some ad hoc observations on the economic payoff from several development policies and from programs of the type appropriate for inclusion in systems planning. Considerable research reported since my 1968 ranking (repeated two years later) [24, Ch. 14] of development alternatives leaves family planning and full employment as cost-effective means to move toward development goals, but schooling appears less favorable and industrialization more favorable as development tools than I reported earlier.

In examining program effectiveness, it is useful to distinguish between the salvable poor and those who are non-salvable because of severe mental, physical, or family problems. Research [7] on the Work Incentive Program reveals that efforts to move persons receiving public assistance off welfare and on to jobs are only moderately successful. Attrition rates in training are high, and a major portion of those trained either do not get jobs or hold a job only a short time. The lesson is not that persons receiving welfare should be ignored in manpower programs, but that the proportion of the poor for whom training and jobs, rather than cash assistance, are a cost-effective alternative is larger than anticipated. With rising affluence and economic opportunity for minority as well as other groups, the poor are increasingly hard-core unemployables. Particular emphasis is given below to cost-effectiveness of

programs in raising incomes of salvable persons with low incomes.

Full Employment. Monetary policies for full employment have low opportunity cost. The major opposition to such policy stems primarily from the middle classes who experience a redistribution of incomes through inflation that attends low unemployment rates. Inflation has been called the "cruellest tax of all," but not for the poor, according to Robinson Hollister and John Palmer. They assert, "contrary to popular belief, only a small percentage of the aged poor (about 10 percent) receive money from pensions, annuities, and other forms of fixed valued income" [10, p. 251]. Of course, many of the poor live on a "fixed income" from public transfer payments, but the authors show "there have been surprisingly few cases in which even for a given year rises in public transfer payments have lagged behind rises in the price level" [10, p. 262]. The poor benefit more from the higher employment than they are hurt by the inflation associated with it.

The authors estimated that a drop of 1 percent in the unemployment rate would remove about 1 million to 1.5 million persons from poverty who would not be removed otherwise. Monetary policies to reduce unemployment 1 percent would dwarf the impact of all area development programs expenditures to date in generating jobs. The authors contend that "...the poor as a whole must be gaining both absolutely and relatively in economic well-being during periods in which inflationary processes operate" [10, p. 270]. Monetary policies that reduce the unemployment rate 1 percent are equivalent to a public service employment program that would cost \$7 billion annually based on \$7,000 per job.

It is cautioned, however, that Madden [15] found somewhat different results. With 4 percent national unemployment for 1966-1975, the incidences of poverty among farm-white families were projected to fall from 28 percent in 1966 to 20 percent in 1975. The incidence of poverty among non-white farm families was projected to fall from 75 percent in 1968 to 67 percent in 1975 under the same national unemployment percentage. The incidence of poverty by 1975 was nearly the same, assuming a 6 percent national unemployment rate. Monetary policies to promote full employment are not adequate alone to end pockets of low income in rural areas. Direct fiscal policies are required. Not all fiscal policies are equally cost effective in generating jobs for low income persons, however, and Weber [30] found that few dollars trickled down to low income persons from programs for rural area development of the type used in the past. It is now

well documented that the public employment service reaches very few rural people seeking employment [26]. It is questionable whether provision of additional services of the type currently being provided would be cost effective.

Manpower. Nelson and Tweeten [16] estimated the rate of return on outlays to train, counsel, and move persons from areas with excess labor supply to areas of excess labor demand averaged 15 percent on the public investment of just under \$1,000 per worker relocated. A most discouraging aspect of the large number of these subsidized mobility projects sponsored by the U.S. Department of Labor is that approximately two out of three relocatees returned home. Hence, the cost per worker permanently located is approximately \$3,000, and the issue remains of how to provide adequate local jobs and incomes to those who return home.

The success of other manpower programs decreases as the programs serve a more disadvantaged clientele [7, 21]. The Job Corps and WIN programs had placement rates averaging only about 20 percent, and the rate of return on the investment was near zero. The MDTA served a less disadvantaged group, had placement rates of approximately 50 percent, and the rate of return on investment averaged roughly 15 percent. Finally, the largely state-run vocational-technical programs which trained less disadvantaged youngsters had placement rates of approximately 75 percent, and the social rate of return on investment averaged approximately 20 percent. Placement and investment returns vary widely among schools, areas, and specific program orientation, however.

Education. Schultz [19] estimated that education contributed at least three-tenths and perhaps more than one-half the growth in U.S. national income between 1929 and 1956. Bowman [3] reduced that proportion to one-seventh, a figure in line with Denison's [4] estimate for the contribution of education to economic growth between 1950 and 1962. While these data symbolize early trends away from the more extravagant claims of those who embraced education as the panacea for economic ills, subsequent findings are even more discomfiting. On the whole, it cannot be said that micropolitan schools are inadequate, although a large number of them can be improved, particularly for minority students. Unfortunately, it is becoming increasingly clear that the process by which resources are converted in favorable student outcomes in terms of schooling achievement and future economic success is not well understood [18, 2, 11, 31]. The

fact that achievement scores have not improved in recent decades despite vast increases in funding per student indicates that productivity of schooling resources is declining. Numerous analyses of the relationship of specific schooling inputs to student achievement reveal no profitable sources of significant gains in efficiency with the current organization of schools. Private consultants have had little more success than public administrators in making the education process more efficient. It appears, therefore, that on the whole the *marginal* rate of return on additional schooling investment in the nation as a whole is near zero.

I by no means call for less spending on schooling. In fact, spending may increase because teachers and other resources used in education need remuneration competitive with other uses to hold their services. But vastly expanded additional resources devoted to general schooling would probably give a disappointing payoff. Part of the problem is that while additional schooling improves mean incomes, it tends to shift the entire distribution of income upward, leaving the variance of income and hence relative deprivation essentially unchanged.

To be sure, studies of the payoff from private and public investment indicate social rates of return averaging approximately 10 percent for high school and college [24, Ch. 4], but these rates are averages for a grade or group of grades, and do not tell where to invest the next dollars — hence, they are not marginal rates of return.

On the other hand, major cost savings in schooling appear to be possible from economies of size through consolidation of many rural schools that are too small. Furthermore, common school funding can be made both more efficient and more equitable by reducing reliance on the local poverty tax, by increasing funding from state and federal sources out of income taxes, and by compensation for schooling spillovers. In short, although opportunities to improve schooling exist and should be exploited, education appears to be much less of a panacea for low income rural areas than was once thought. The most serious pitfall from over-enthusiasm for education is that it diverts attention from other programs that are more effective in narrowing the income distribution and serving the needs of low income rural areas.

Industrialization. Although rural communities made great efforts to seek industry in the 1960's, economists viewed such efforts as not only ineffective but also inappropriate from the standpoint of national economic efficiency. These studies [1, 23, 8] implied that the public cost of generating new jobs

in rural areas was infinite. Not only did empirical studies indicate that tax incentives and other inducements to bring industry had no significant influence, but economists reasoned that industry required skilled labor, a nearness to markets and agglomeration economies that could not be found in micropolitan communities. In a subsequent comprehensive article on industry location incentives, Singer [22] concluded that subsidies of approximately \$17,000 were required to generate each new job. Subsequent data revealed that industry indeed is decentralizing and that profit rates are not significantly different by size of community [12]. Major net economic benefits were found to accrue to communities attracting industry [20], and off-farm sources were found to be the major source of economic gains to farmers in the 1960's.

Comprehensive studies of a large number of actual development projects by the Economic Development Administration indicated that the public outlays per job generated are not as large as anticipated earlier. Data from the EDA [5] concluded that the public cost of generating a new job averaged approximately \$7,000, the same figure as estimated earlier by Tweeten [24, p. 445]. Much of the assistance provided by EDA to attract industry was for improvement of public services that in many cases did not result in permanent new jobs. If more cost-effective approaches are provided in the form of direct assistance to the industries that in fact do locate, the cost-effectiveness can be considerably higher.

Analysis of the cost per capita of providing public services, comparative profit rates of private industry, and analysis of attitudes suggest that policies to attract industries might well concentrate in cities of 20,000 to 1 million [27]. From 25-50 percent of the workers hired in new industry can come from the low income population [14, 20]. Subsidies to industry need not be regarded as a social cost. If the subsidies only encourage industry to do what a more perfect market would do in the absence of externalities and rigidities limiting growth of micropolitan industry, then subsidies may be regarded as a social gain rather than a social loss. In short, industry location incentives can be a more effective and efficient development tool than once was thought, with cost-effectiveness estimates trending down through time from an infinite cost, then to \$17,000 and finally to as low as \$5,000 per job generated.

Income Maintenance. Because public assistance payments do not generate as large a multiplier effect through private investment as other programs, they

are generally not regarded as a cost-effective means to increase incomes. Yet, for many non-salvageable poor, they are more cost-effective than investment in manpower which gives to middle class administrators, instructors, etc., but elude the poor who are unable to generate a future stream of earnings from the human investment made in them. The annual gap between income of persons in poverty and the poverty threshold has remained constant at approximately \$10 billion for a number of years. Of transfer payments totalling over \$150 billion per year, an estimated \$40 billion go to persons who are poor or who would have been poor in the absence of transfers. The majority of new funds for transfer payments goes to the middle class; that is why the poverty gap has not been reduced despite escalation of transfer payments by as much as \$20 billion per year.

A number of welfare reform proposals have been made to include the working poor, eliminate incentives for family disintegration (only families who do not have an able-bodied male head are currently eligible for programs in most areas), and provide incentives for work. These issues deserve more treatment than can be given here, but it is clear that opportunities exist for more efficient use of public funds for the disadvantaged.

Family Planning. Surveys indicate that "...poor women want no more children than nonpoor women have, and perhaps fewer" [13, p. 60]. The authors estimate that if the poor had only the number of children they want, there would be 450,000 fewer poor born each year, and that others would move above the poverty line because of being in smaller families. Supplying family planning devices and advice was estimated to cost \$20 per woman per year. If all the approximately five million poor women of child-bearing age took advantage of family planning help, although of course not all would, the cost would be \$100 million. These estimates by Kershaw and Courant [13, pp. 60-61] imply that the cost-effectiveness of family planning is very high, not much over \$200 to reduce the number of poverty by one person. Although undoubtedly on the optimistic side, this program, even with a substantial allowance for error, remains at or near the top of the cost-effectiveness category in meeting one development target — reduction of the number of persons in poverty.

SUMMARY AND CONCLUSIONS

Shortcomings of legislation and inadequate planning have resulted in fragmented, short-sighted, inefficient, and overlapping programs for rural development. Planners and policy-makers have not considered the many possible programs for economic development as part of a comprehensive system with interactions and linkages. Overly ambitious goals coupled with a commitment to programs that were neither efficient nor adequately funded inevitably give way to demoralization apparent in retrenchment in the early 1970's on numerous development programs begun in the 1960's.

Even where economists have identified the development gap measured by income or employment, they must go the next step of estimating the level and efficient mix of programs that constitute a policy to close the development gap. Economic evaluation of the efficiency of various programs, viewed in the context of systems planning, can help decision-makers decide which public programs to expand and which to contract, and what total level of funds is required to reach development targets. Systems planning can be used to devise an efficient rural development strategy that makes limited funds go as far as possible to reach development targets. Although systems planning has application at all levels of rural development, the purpose of this paper was only to outline the case for systems planning of public policy for rural development.

Systems analysis disciplines our thinking to do research that will improve the efficiency of the market and provide transfer payments to those intended. The application of systems analysis to rural development highlights data gaps, including the payoff from programs now in use that have never been rigorously evaluated, the impact of programs on specific population categories, interactions among programs, and estimates of diminishing returns to the various programs.

One professor at Oklahoma State University tells his class "good economics is good politics." While it is difficult, indeed, to confirm this aphorism by examining rural development legislation, a final judgment awaits "good economics."

REFERENCES

- [1] Advisory Commission on Intergovernmental Relationships (ACIR). "State-Local Taxation and Industrial Location." A-30. Washington, D.C., 1967.
- [2] Averch, Harvey, et al. *How Effective is Schooling?* Report to the President's Commission on School Finance. Santa Monica: The Rand Corporation, 1971.
- [3] Bowman, Mary Jean. "Schultz, Denison and the Contribution of 'Eds' to National Economic Growth." *Journal of Political Economy*. 72:450-64, 1964.
- [4] Denison, Edward. *Why Growth Rates Differ*. Washington, D.C.: The Brookings Institution, 1967.
- [5] Economic Development Administration. "Program Evaluation: The Economic Development Administration Growth Center Strategy." Washington, D.C.: U.S. Department of Commerce, 1972.
- [6] Giltmier, James E. "National Rural Development Leaders School." (Mimeographed, Speech presented to rural development leaders school, Lincoln, Nebraska) Washington, D.C.: Senate Subcommittee on Rural Development, 1973.
- [7] Goldstein, Jon. "The Effectiveness of Manpower Training Programs." Paper No. 3 of Joint Economic Committee, 92nd Congress. Washington, D.C.: U.S. Govt. Printing Office, 1972.
- [8] Hansen, Niles. "Regional Development and the Rural Poor." *Journal of Human Resources*, 4:205-14, 1969.
- [9] Hansen, Niles, ed. *Growth Centers in Regional Economic Development*. New York: The Free Press, 1972.
- [10] Hollister, Robinson and John Palmer. "The Impact of Inflation on the Poor." Chapter 14 in *Redistribution to the Rich and the Poor*. Edited by Kenneth Boulding and Martin Pfaff. Belmont, Calif.: Wadsworth Publishing Co., 1972.
- [11] Jencks, Christopher, et al. *Inequality*. New York: Basic Books, 1972.
- [12] Janssen, Larry. "Comparative Profit Rates of U.S. Manufacturing Firms by City Size." Unpublished M.S. thesis, Oklahoma State University, 1974.
- [13] Kershaw, Joseph and Paul Courant. *Government Against Poverty*. Chicago: Markham Publishing Co., 1970.
- [14] Kuehn, John; Lloyd Bender, Bernal Green, and Herbert Hoover. "Impact of Job Development on Poverty in Four Developing Areas." Agricultural Economics Report No. 225. Washington, D.C.: ERS, U.S. Dept. of Agriculture, 1972.
- [15] Madden, J. Patrick. "Poverty Projections in Relation to Aggregate Demand, Economic Growth and Unemployment." Chapter 30 in *Rural Poverty in the United States*. Report by the President's National Advisory Commission on Rural Poverty. Washington, D.C.: U.S. Govt. Printing Office, 1968.
- [16] Nelson, James, and Luther Tweeten. "Subsidized Labor Mobility An Alternative Use of Development Funds." *Annals of Regional Science*, 7:57-66, 1973.
- [17] Office of Economic Opportunity. "Public Employment: Policy Issues and Data Needs." Washington, D.C.: Office of Planning, Research and Evaluation, OEO, 1971.
- [18] Ribich, Thomas. *Education and Poverty*. Washington, D.C.: The Brookings Institution, 1968.
- [19] Schultz, T. W. "Investment in Human Capital." *American Economic Review*, 51:1-17, 1961.
- [20] Shaffer, Ronald. "The Net Economic Gain from New Industry in Eastern Oklahoma." Unpublished Ph.D. thesis, Oklahoma State University, 1972.
- [21] Shallah, Salim and Luther Tweeten. "Economic Returns to Technical Education." Oklahoma State University Agri. Exp. Sta. Bulletin B-685, 1970.
- [22] Singer, Neil M. "Federal Tax Incentives for Regional Growth." *Southern Economic Journal* 38:230-7, 1971.
- [23] Stinson, Thomas. "The Effects of Taxes and Public Financing Programs on Local Industrial Development." Washington, D.C.: U.S. Dept. of Agriculture, 1968.
- [24] Tweeten, Luther. *Foundations of Farm Policy*. Lincoln: University of Nebraska Press, 1970.
- [25] Tweeten, Luther. "Applying Welfare Economic Theory to Rural Development Research." *Quantitative Techniques with Application to Rural Development Research*. Edited by Bradford and Saunders. Proceedings of seminar sponsored by Southern Farm Management Research Committee and Farm Foundation. Lexington: Dept. of Agric. Econ., University of Kentucky, 1972.
- [26] Tweeten, Luther. "Manpower Implications of the Rural Development Act of 1972." *Manpower Planning for Jobs in Rural America*. Proceedings of conference sponsored by Center for Rural Manpower and Public Affairs. East Lansing: Michigan State University, 1972.
- [27] Tweeten, Luther. "Emerging Issues for Sparsely Populated Areas and Regions Under a National Growth Policy." *American Journal of Agricultural Economics*, Vol. 55, No. 5, Dec., 1973.

- [28] U.S. Dept. of Labor. "Rural Manpower Dilemmas." *1971 Manpower Report of the President*. Washington, D.C.: U.S. Govt. Printing Office, 1971.
- [29] U.S. Dept. of Labor. "Side-effects." *Manpower*. Washington, D.C.: Manpower Administration, Dec., 1973.
- [30] Weber, Bruce. "Trickling Down: The Responsiveness of Rural and Rural Poor Family Income and Labor Supply to Regional Economic Growth." Unpublished Ph.D. thesis University of Wisconsin, 1973.
- [31] White, Fred, and Luther Tweeten. "Internal Economics of Rural Elementary and Secondary Schooling." *Socio-Economic Planning Science*, 7:353-69, 1973.