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THE ROLE OF EDUCATION IN ALLEVIATING RURAL POVERTY.

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A CHARACTERISTIC OF THE POVERTY EXPERIENCED BY 17 MILLION PEOPLE LIVING IN RURAL AREAS OF THE U.S. IN 1959 WAS ITS CONCENTRATION IN SPECIFIC GEOGRAPHICAL REGIONS AND AMONG CERTAIN OCCUPATIONS. EDUCATION, OCCUPATION, AND SOCIAL STATUS OF THE PARENTS HAVE BEEN SHOWN TO POSSESS A HIGH POSITIVE CORRELATION WITH EDUCATIONAL ATTAINMENT OF THE CHILD. THERE APPEARS TO BE A VICIOUS CIRCLE OF LOW INCOME AND LOW EDUCATION IN DEPRESSED AREAS WHICH IS PARTICULARLY RESISTANT TO EXTERNAL INTERVENTION. IT IS CONCLUDED THAT EDUCATION SPEEDS INDIVIDUAL DEVELOPMENT, THERE IS LITTLE INCENTIVE FOR EDUCATION IN DEPRESSED RURAL AREAS, AND EDUCATION IS NOT PARTICULARLY BENEFICIAL FOR THOSE WHO REMAIN IN DEPRESSED AREAS AFTER HAVING ACHIEVED THEIR EDUCATIONAL GOALS. RECOMMENDATIONS FOR FURTHER RESEARCH INCLUDE--(1) A DETERMINATION OF THE RETURN ON INVESTMENTS IN EDUCATION IN LOW INCOME RURAL AREAS, (2) AN ANALYSIS OF THE TAX SYSTEM AND AVAILABLE ECONOMIC RESOURCES FOR RURAL SCHOOLS, (3) A MORE ACCURATE EVALUATION OF THE QUALITY OF EDUCATION IN RURAL SCHOOLS BASED ON CRITERIA OTHER THAN TEACHERS' SALARIES AND PER-PUPIL EXPENDITURES, (4) A DETERMINATION OF WHAT ATTITUDES ARE MOST CONDUCIVE TO ENCOURAGING ECONOMIC PROGRESS IN DEPRESSED AREAS, AND (5) AN ASSESSMENT OF THE FEASIBILITY OF IMPLEMENTING VOCATIONAL EDUCATION PROGRAMS IN RURAL SCHOOLS. (DA)

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION

AGRICULTURAL ECONOMIC REPORT NO. 114

THE ROLE OF EDUCATION IN ALLEVIATING RURAL POVERTY

U.S. DEPARTMENT OF AGRICULTURE

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E R R A T A

Title: THE ROLE OF EDUCATION IN ALLEVIATING RURAL POVERTY

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Change page 2, paragraph 5, line 12 to:
... they were to earn the 1965 factory wage of $5,592--would be $4.5 billion.

Change page 3, paragraph 1, lines 2 and 3 to:
... would be permanent, and a 5 percent return on the investment would be required, then an investment up to $90 billion could be justified from an ...

Change page 4, last paragraph, line 3 to:
... 90,028 U.S. farm males age 20-24--28 percent of the age group (43).

Change page 4, last paragraph, line 6 to:
... income would be 90,028 times $568, or over 51 million.

Change page 12, paragraph 1, references in lines 2 and 5 to:
(162, p. 24).

Change page 22, paragraph 1, line 6 to:
... foster disrespect for work and rationalization of subsidy grants ...

Change page 32, paragraph 2, line 1 to:
According to estimates in table 5, the way to avoid this loss is to ...

Change page 34, equation 5 to:

$$E_t = \left[E_0 - \frac{\alpha + \beta\delta}{1 - \beta\gamma}\right]\left[\beta\gamma\right]^t + \frac{\alpha + \beta\delta}{1 - \beta\gamma}$$

PREFACE

This is one of several studies made to provide research approaches in different problem areas of rural poverty and economic development. These studies were initiated by the Economic Research Service to assist in program planning and guidance for future research. Generally, each one provides an outline of the problem of concern, a survey of previous research, evaluation of applicable research methods, and specific research proposals. Results are being used in expanding and reorienting the research program of the Economic Research Service. They should also be of value to other researchers in the areas covered.

This report was prepared by the author under contract. The author's opinions do not necessarily reflect the views of the Economic Research Service, or the U. S. Department of Agriculture.

Washington, D.C. June 1967

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THE ROLE OF EDUCATION IN ALLEVIATING RURAL POVERTY

Luther G. Tweeten 1/

The growing commitment by society to alleviate rural poverty has not been matched with effective prescriptions by economists for accomplishing the task. A growing body of literature documents the central role of human resources in economic development. Few studies have directed this thinking to problems of rural poverty. This study focuses on one important element of the human resource, education, and its role in raising income and living standards in rural areas characterized by low incomes.

The rich and growing body of literature on the economics of education in its broadest sense is drawn upon in this study where possible, and oriented to rural society. The purpose is to provide a framework for more effective research and action programs oriented to problems of rural poverty in the United States. Specifically, the objectives of this report are:

(1) To contrast educational attainment in rural poverty areas with that in other areas in the United States;
(2) To determine the contribution of education to income, economic growth, and alleviation of poverty;
(3) To develop a theoretic framework establishing the relationship between income and education in the process of economic growth;
(4) To explore the interaction between education, income, and such factors as aspirations, motivation, and achievement;
(5) To present problems confronting application of education as a tool to raise income levels; and
(6) To outline research proposals designed to answer important questions about the role of education in economic development.

DIMENSIONS AND COSTS OF RURAL POVERTY

The dimensions of poverty in the United States are summarized by Bird (14, p. iv).2/ Defining those living in poverty as members of families whose 1959 net money income was less than $3,000 and unrelated individuals (not included in a family unit) with an income of less than $1,500, Bird states that there were 35 million persons living in poverty in the United States in 1959. Half of the poor resided in rural areas, defined as open country or towns with less than 2,500 population. Among the poor, 6.2 million lived on farms. Incidence of poverty was more than twice as great in rural as in other areas.

1/ Professor, Department of Agricultural Economics, Oklahoma State University.
2/ Underscored numbers in parentheses refer to Bibliography, p.43.

A dominant characteristic of poverty is its concentration in certain geographic regions of the Nation and among certain occupations. Approximately half the poor live in the South. Negroes, farm people, and members of households headed by persons over 65 are overrepresented in the poverty brackets. Many regions and groups are chronically found in poverty classes.

Social and Economic Cost

The growing commitment by society to reduce the incidence of poverty is motivated not only by humanitarian ideals, but also by economic realities. The cost of poverty in direct welfare outlays, economic growth foregone, and crime and other forms of economically unproductive behavior is substantial.

A major midwestern city receiving a large number of migrants from the rural South, but in which these migrants comprise not more than 10 percent of the city population, reports that (a) 50 percent of the city criminal activity involves southern migrants, (b) 50 percent of the juvenile delinquency involves children of southern migrants, (c) 30 percent of the help given by relief agencies is received by southern migrants, and (d) 20 percent of the southern migrants are unemployed (93, pp. 153, 154).

Welfare payments constitute a substantial cost of rural poverty. In 1956, the largest single source of income among rural residents in Cherokee County, Okla., was welfare payments, comprising 21 percent of total income (24 p. 10). For nearly one-third of all rural families, welfare comprised the major portion of income, and for these families, welfare payments averaged $1,311.

Potential Benefits of Eradicating Low Farm Productivity

It has been estimated that 50 percent of the farmworkers produce approximately 90 percent of the farm output (141, p. 208) and that current farm output is approximately 7 percent in excess of needs (144). This suggests that nearly half of the farmworkers could be freed to work in nonfarm occupations more favored by consumer demand with no sacrifice in meeting food and fiber needs.3/ If output, prices, and total labor returns remained unchanged in farming, then dividing the total labor returns among half as many workers would raise average labor earnings per worker approximately to nonfarm levels, thus creating a condition near economic equilibrium. Moreover, if it is assumed that the marginal value of farm production of persons who leave agriculture is near zero, the potential contribution to national income of the released farmworkers--if they were to earn the 1963 factory wage of $5,200--would be $15.6 billion. This gain represents a maximum potential, since full adjustment could not be made because of social costs and since, in the short run, farmworkers would not be properly trained or motivated to adjust.4/ Also, opportunities in the nonfarm sector would be limited by unemployment and other institutional rigidities.

3/ Output conceivably might expand with farm consolidation, as the better managers would tend to remain.

4/ Bachmura (3, p. 14) lists 1.85 million underemployed in agriculture, based on the number of family and household heads in farming with net annual incomes less than $3,000 in 1960. These persons again represent an opportunity cost in terms of earnings and national growth foregone. Upchurch (151, p. 432) summarizes estimates of underemployment in agriculture that range up to 3.2 million workers.

Assuming that farm adjustments and attendant national income increments would be permanent, and that a 10-percent return on investment would be required, then an investment up to $156 billion could be justified from an economic standpoint for programs that would in fact accomplish the job.

But not all programs get the job done, and funds are very limited. Baum (7, p. 8) recognizes this condition in asking "Is the task of raising incomes in an underdeveloped region worth undertaking in terms of economic costs and returns? If the answer is yes, what is the most efficient way to accomplish the job, given the present set of conditions?"

EDUCATION IN LOW-INCOME RURAL AREAS

Quantity of Education

Serious lags exist in farm education, especially in some regions. Moore, Baum, and Glasgow (105) found that, in 1962, the proportion of farm youths who had completed eighth grade or higher was especially low among nonwhites in the South (table 1).

Table 1.--Percentage of farm youth aged 15-21 who had completed eighth grade or higher, 1962

Region	White	Nonwhite	Total
	Percent	Percent	Percent
South Atlantic	48	26	42
East South Central	59	26	52
West South Central	72	22	66

Moore, Baum and Glasgow (105, p. 10).

Of all U.S. nonwhites over 24 years of age, 28 percent in 1940 and 38 percent in 1950 had at least an eighth grade education (149, p. 117). From the data in table 1, the nonwhite farm youth in the three southern regions appear to lag the United States as a whole by 20 years.5/ Among all U.S. whites over 24 years of age, 71 percent had an eighth grade or higher education in 1940, and 74 percent in 1950. According to table 1, farm whites in the South Atlantic and East South Central regions lag this U.S. average for farm whites by at least 20 years.

Similar lags in education of farm youth as compared with nonfarm youth are apparent from data on median years of school completed. Farm median education in 1960 was strikingly similar to the overall U.S. median in 1940. Median

5/ Some youth go on to complete the eighth grade after they are 15 years of age, but this percentage is small.

years of education for both whites and nonwhites have been rising less rapidly in the rural farm sector than in the urban sector. This is alarming; it means that rural areas are dropping farther behind the remainder of the economy. The concern would not be so great if 9 years were a reasonable educational standard for successful operation and management of modern day farms, but a median educational level of less than 9 years is well below an adequate level.

Median years of school completed in five low-income counties of Kentucky ranged from 7.2 to 8.2 in 1960 versus the U.S. average of 10.6 (8, p. 8). These educational patterns are typical of low-income rural areas across the Nation. However, heavy outmigration of farm youth (who tend to be better educated than older residents) has reduced median educational levels in rural areas.

In 1960, 3.8 million U.S. youths between the ages of 20 and 24 were labeled "dropouts"--dropout being defined essentially as a person with less than a high school education (43). Of these, 260,000 were farm youths. The proportion of farm youths in this age group who were dropouts declined from 63 percent in 1950 to 44 percent in 1960; hence, progress is apparent. The dropout problem remains severe, however, especially in areas where rural poverty is widespread.

In 1950, the estimated total dropout rate for 19-year-olds was 53 percent among whites and 89 percent among nonwhites in the farm sector (43, table 4). By 1960, dropout rates had fallen to 35 and 72 percent, respectively, for whites and nonwhites in the farm sector. Despite some progress, these 1960 rates were still well above the 1950 urban dropout rates. The farm sector was over 10 years behind the urban in education in 1960, measured by this standard.

Regional differences in dropout rates are closely correlated with income. In 1960, dropout rates for farm youth in the high-income North Central Regions were similar to rates for urban white youth in the entire United States. The average dropout rate in 1960 was over 50 percent, however, for farm youth in the South Atlantic and East South Central Regions, where low incomes are most prevalent. This was higher than rates for all farm whites in 1950. Thus, in 1960 these low-income rural areas not only were substantially behind urban areas, but were more than 10 years behind other farm areas in school progress measured by this standard.

School dropouts represent a substantial opportunity cost to society. In 1960, for example, the eighth was the highest grade of school completed by 34,000 U.S. farm males--24 percent of the age group (43). Assuming a 10-percent return on high school costs totaling $5,680, 6/ the net income loss for not receiving at least a high school education is $568. The total net loss in income would be 34,000 times $568, or over $19 million. With dropout rates over 50 percent in many rural areas, the opportunity costs are large.

6/ Cost estimates are from Schultz (123, p. 29). The costs are based on U.S. averages for 1956. Correction to current dollars would substantially raise the cost, but this would tend to be offset by a correction for lower school costs in rural areas.

The Influence of Parents and Environment on Years of Schooling

A study by Brazer and David (30) gives a more detailed breakdown of the factors that determine a youth's education. Multivariate analysis based on a U.S. sample of 939 families was used to account for the variance in completed education of youth as related to characteristics of their parents and of their environment. The mean educational level was 11.82 years. Other things being equal, having an uneducated father reduced the completed education of the children by 1.6 years (table 2). Growing up in a household where the breadwinner was a farmer and had always been a farmer reduced education by 0.19 year. Being from a large family and being from the South each reduced education of children 0.54 year. If the family head possessed little motivation for achievement and believed that hard work was less important than luck, educational attainment of children dropped 0.26 year. Being from a fundamentalist church background lowered the education level another 0.55 year. Having a father who was very young when the youth was born tended to take another 0.92 year from the educational level. Being in a Negro family reduced education by another 0.52 year.

Table 2.- The estimated impact of parental and environmental factors associated with rural poverty on educational attainment of children

Item	Years of school completed
Overall mean	11.82
Adjustments for	
Uneducated father	-1.60
Father a farmer	-.13
Father always lived on farm	-.06
Large family	-.54
Low success drive of father	-.26
Fundamentalist religion	-.55
Young father	-.92
Home in the South	-.54
Negro family	-.52
Maximum adjustment	-5.12
Group mean if all above factors are present	6.70

Source: Brazer and David (30).

It is obvious that being from a family possessing these characteristics seriously limits chances for educational attainment. The total effect if all factors are present is to decrease expected educational attainment by 5.12 years. When 5.12 is subtracted from the mean educational level of 11.82 years, the result suggests that a child in these circumstances would receive only 6.7 years of education. These factors associated with low educational

attainment often are found in rural poverty areas. Thus, it is not surprising to find that this figure (6.7 years) is not inconsistent with earlier data on median education levels in poverty areas. Yet there is no one "poverty"or "income" variable. This suggests an interesting hypothesis. Perhaps poverty and attendant low educational attainment are the result of a concentration of negative factors in one family or area. According to the table 2 estimates, even being from a white family outside the South would raise the educational level of a child by a little over 1 year--to approximately 8 years--if all other poverty factors were still present.

The fact that being in a farm family had a relatively small impact on the education of the children studied gives some basis for optimism about raising educational levels in farm poverty areas. The fact that education of parents is such a large factor in a child's education means that progress may be slow, however. The characteristics (mainly of parents) listed in table 2 explained 44 percent of the variation in educational attainment. The attitude of the individual, and other factors associated with the individual, apparently accounted for some portion of the remaining variation in attainment, and these may be the factors that are most readily influenced by corrective policies. Also, although income was not explicitly included, all the factors are influenced by income. That is the hypothesis implicit in the remainder of this paper and in the model of income growth. (See p. 33.)

Quality of Education

In estimating educational attainment, quality as well as quantity is important. Measures of the quality of education are elusive. Indicators such as the pupil-teacher ratio, annual expenditures per student, and teacher salary are used as proxy measures. Educational attainment is closely associated both with annual expenditure per pupil and with teachers' salaries. To the extent that expenditures represent quality of schooling, average annual cost per student of $153 in the hilly poverty area of the Southeastern States and $294 in the United States as a whole would indicate educational quality in the poverty area to be only about half that of the United States as a whole. In the school year 1955-56, expenditure per Negro student in many Southern States was only half that per white student, suggesting inferior education for the Negro group (156).

Pupil-teacher ratios and proportion of classroom teachers with less than standard certificates do not differ markedly in the United States as a whole and in the Southeastern States, where educational quality is allegedly lower and poverty is more prevalent. But teachers' salaries are lower and educational expenditures per student are considerably below the U.S. average in several of the 12 Southeastern States.

It is doubtful whether teachers' salaries are an adequate measure of educational quality. It may be argued that lower living costs and lower incomes in other occupations mean that the teaching profession in poverty areas may compete on a favorable basis with other professions for able, qualified persons. On the other hand, the perceptive, intellectually stimulating, and well-trained teachers that poverty areas greatly need are the teachers most likely to be attracted to a nonpoverty environment more compatible from a salary, cultural, and intellectual standpoint.

In summary, the data are not adequate for making precise comparisons, but sizable lags appear to exist in educational quality as well as quantity in areas characterized by low farm incomes.

THE CONTRIBUTION OF EDUCATION TO INCOME AND ECONOMIC GROWTH

From a public policy standpoint, it is important to know whether education is a productive capital investment. Economic development is the aim of many policy measures. If education were purely a consumption good having no durable benefits that accelerate national income, a government committed to national growth might discourage education, and would surely find more productive uses for limited government funds than subsidizing education. The public ordinarily does not find it prudent to subsidize purchase of stereos, automobiles, or other items used for consumption purposes only. If, on the other hand, education were found to give high rates of return on investment, then a government committed to a policy of national growth could view policies to stimulate education as desirable, and could justify a policy of subsidy to education even though individuals might view their education as purely a "luxury" consumption good. Regions in poverty would wish to follow policies that would encourage education if it were productive of higher income and growth, but would discourage education if it were found devoid of productivity.

Historical Interest in the Economics of Education

Those individuals who lack the resources to obtain a socially acceptable standard of living are classified as being in a state of poverty. "Resources" here are interpreted broadly to include human as well as material capital. Human capital includes health, attitudes, skills, and training. Education is closely associated with these factors.

Society has long recognized the importance of education and other aspects of human capital. In 1696, a Government act ordered that schools be established in every parish in Scotland (157). Adam Smith later criticised the policy of state endowments to schools, favoring instead a policy whereby teachers and schools would be financed by the parents of pupils. According to Smith, parents could be relied upon to select the best teachers, hence the competitive process would insure high standards. J. S. Mill (157) recognized the inadequacies of the free market as an allocator of education, because the buyer was unable to judge the quality of product. Malthus (40) favored increasing the emphasis on education, not so much to create capital as to create values that would inhibit population growth. Alfred Marshall's statement (87, p. 212) is particularly relevant, since it foreshadows many elements of the current position of economists:

> No change would conduce so much to a rapid increase of material wealth as an improvement in our schools, and especially those of the middle grades, provided it is combined with an extensive system of scholarships which will enable the clever son of a working man to rise gradually from school to school till he has the best theoretical and practical education which the age can give.

Marshall (87, pp. 570-571), like Adam Smith earlier, recognized that investing capital to enhance the earnings of labor embodied the same types of economic criteria as investment in material capital. But he also recognized the limitations of the analogy between human cpaital and material capital, and was aware of the inability of parents to predict the demand for particular skills in order to plan their childrens' education to meet this demand.

Many economists undoubtedly shared Marshall's opinions on the economic profitability of education, but only a few studies followed, including those of Dodge (51), Gorseline (67), Clark (36), and Walsh (155). Reasons why economics was applied sparingly and seldom quantitatively to education include the following:

(1) The educational inputs are difficult to measure. Cost per student, number of school days per pupil, teacher salaries, or students per teacher reflect imperfectly the educational input.

(2) The production period between input and output is long, and neither the educator, student, parent, nor economist is an adequate judge of the optimum timing of input or output.

(3) Education is a consumption good, and rate of return is not always an instrumental or relevant variable in determining outlays.

(4) There is a great divergence in private and social benefits from education; hence a measure of private returns without a measure of social return would be misleading.

Social Gains from Education

Among the social gains from education that cannot adequately be measured in terms of private gains are: (a) the political stability fostered by an educated electorate; (b) the economic stability encouraged by expanded aggregate demand, in part caused by materialist consumer wants engendered by the school environment and in part by a rising, dependable capital outlay for education that smooths investment and business cycles; (c) reduced law enforcement needs; (d) improvement in the health of the people; (e) contributions by individuals to the national defense effort and to the cultural and other environmental factors associated with well-being but not reflected in private returns.

Bearing on the latter point is the statement by Marshall (87), p. 216):

> Less direct but no less in importance is the aid given to production by medical discoveries such as those of Jenner and Pasteur which increase our health and working power; and again by scientific work such as mathematics or biology ... All that is spent during many years in opening the means of higher education to the masses would be well paid for if it called out one more Newton or Darwin, Shakespeare or Beethoven.

The earnings of the individuals named by Marshall hardly reflected the social benefits from their education.

Wiesbrod (157) has shown that the flexibility for later on-the-job training and for future education options can raise the rates of return on education appreciably. Furthermore, there are benefits to future generations (children benefit from parents' education) that are not adequately measured in private returns of the current generation.

Private gains from education sometimes exceed social gains. For example, when a firm requires a college degree merely as a screening device or "union card" in selecting "qualified" salesmen without regard to investment in specialized training, social gain likely falls below private gain. Private gain is also of primary importance to girls who attend college only to find husbands. Some argue that the divergence between private and social returns from education is so great that a quantitative estimate of returns from education based on private return alone would be meaningless. The argument continues that education is a consumption good, not an investment good, hence rates of return have no bearing on educational decisions. The contention is further strengthened by the proposition that education cannot be analyzed from a strictly economic standpoint for the same reasons that investment in education is not allocated effectively by the price mechanism.

Despite the criticisms, work has been directed increasingly to the economics of education. Three factors perhaps motivated the accelerated attention of economists to education in the past decade: (a) the growth in national output unexplained by expansion in conventional inputs aroused intellectual curiosity, with education a prime hypothesis for explaining the phenomenon; (b) a disappointing national income growth rate in the latter fifties motivated the search for a more productive focus of investments; and (c) the existing major commitment of capital to education suggested that economic analyses be focused on the area. Aspects of this work are examined below.

Costs of Education

Resources committed to education have risen sharply since 1900. Investment in elementary education rose from 5 percent to 9 percent of gross physical capital formation between 1900 and 1956 (119). Spending for high school education increased from 2 percent to 13 percent, and higher education from 2 to 12 percent of the gross national investment in the same period (119). Educational outlays were 9 percent of gross capital formation in 1900 and 34 percent in 1956 (119). With the cost of elementary, secondary, and higher education totaling over $30 billion annually, it is well that some concern be expressed over the productivity of this investment.

Machlup (82, pp. 104-105) provides a comprehensive estimate of educational costs, including training on the job and education in the churches, armed forces, public and private schools, and so forth. He estimates costs, which include income foregone by students in the educational process, at $51 billion for the year 1955-56 and $60 billion for 1957-58. The trend is sharply upward, and suggests that present outlays are large indeed in relation to these earlier estimates. Machlup estimates that in the years analyzed these expenditures were one-eighth of the adjusted gross national product.

The production and distribution of knowledge is in fact much broader than formal schooling or training, and encompasses research, dissemination of information by use of radio, television, printing and publishing, motion pictures, and advertising; and many other activities. Education may, in fact, be viewed as a joint complement with these inputs in the production and distribution of knowledge. According to Machlup, the total cost of knowledge and

production and distribution was $136 billion in 1958, or 29 percent of the adjusted gross national product (82, pp. 354-357). He found that in the decade preceding 1958, the cost of knowledge production and distribution increased 10.6 percent annually, in contrast to a 5.9 percent annual increase in gross national product (82, p. 374).

Returns from Education

Miller (99) summarizes data on earnings by age and education. He notes that, based on 1958 conditions, an elementary school graduate can expect to receive about two-fifths more income on the average during his lifetime than a person who has received no formal schooling or terminated his education before completing the eighth grade. For 1958 conditions, he estimates lifetime earnings in 1958 dollars for three levels of education: elementary school graduate, $149,687; high school graduate, $215,487; and college graduate, $366,990 (99, p. 982). The marginal undiscounted revenue from high school over elementary school is nearly $66,000, and from college over high school is $151,000. When future earnings are discounted and related to costs, the monetary rewards from additional education however, appear less promising.

Bowman (27), Schultz (120), and Denison (49) have estimated the contribution of education to national economic growth. Denison attributes 23 percent of the national income growth in 1929-57 to education. Combining "education" with "advancement in knowledge," 43 percent of the growth in 1929-57 period is accounted for (49, p. 125). Schultz (120) imputes approximately one-third of the national income increment in the three decades preceeding 1956 to investment in education. Bowman (27) concludes that education contributed only one-seventh of the national income increment between 1929 and 1956.

The U.S. Department of Commerce has estimated that 68 percent of the growth in national income from 1909 to 1929 was attributable to conventional inputs; Kendrick and Kuznets estimated only 60 percent for the same period; Denison estimated 45 percent for the 1929-57 period (49).

If education is regarded as a joint input with research and other forms of knowledge creation, and is used to explain the entire portion of national income growth not imputed to conventional inputs, then in recent periods roughly half the national income growth can be imputed to the increase in knowledge.

Rates of Return

Schultz (120, 123, p. 62) estimates that 1958 data support the following rates of return on an individual's educational investment: 35 percent on elementary education, 10 percent on high school education, and 11 percent on college education.

Becker (12, ch. IV) estimates that the private return to investment in 4 years of college was 11 percent in 1949 for white urban males. He finds a long-term tendency for high school rates of return to increase and for college rates to remain somewhat stable (12, p. 128). His findings indicate a considerably lower rate of return from education for Negroes than whites. But suprisingly, returns were higher for Negroes in the South than in the North. Becker

(12, p. 154) concludes that "the rate of return to an average college entrant is considerable, of the order of 10 to 12 percent per annum; the rate is higher to urban, white, male college graduates and lower to college dropouts, nonwhites, women, and rural persons." Social rates of return are even higher, perhaps 13 percent or more (12, p. 118).

Estimates by Hansen (70, p. 134) indicate significant benefits from completing elementary school, high school, and college.

Mincer (101) estimates that total returns from on-the-job training, such as apprenticeships and medical specialization, are similar to rates of return on total costs of college education. However, the private return appears to be higher for formal education.

Data from Machlup (82) and Denison (49) provide the basis for a crude estimate of the return on total investment in creation and distribution of knowledge. An advantage of using this procedure is that many returns that are external economies (social gains) to education become internal economies for knowledge. Also, there is some support for the hypothesis that education is an inseparable complementary input with research and other knowledge-creating inputs. Growing at 5 percent, the national income of $400 billion (approximate 1958 conditions) would rise $20 billion annually. Assuming that half the increment in national income, or $10 billion, can be imputed to creation of new knowledge and skills, and that these knowledge increments are permanent, then a 7.5 percent rate of return to internal economies is indicated for Machlup's (82) estimated cost of $136 billion for knowledge production and distribution.

Because some investments, such as investment in religious education or the operation of the postal service, may make only small contributions to gains in national income, the implication is that returns on other scientific and information programs, such as education and research, are much greater than 7.5 percent.

It is estimated that in the agricultural sector, costs of creating and distributing knowledge (mainly costs of education, research, and selected communication facilities) plus costs of disposing of unneeded farm output total approximately $10 billion (140). Investment in education and science increases the national income from agriculture by at least $1 billion per year. Assuming these gains are permanent, the internal rate of return is 10 percent.

The above estimates are crude, yet provide considerable support for the hypothesis that investment in education is productive from an economic standpoint, irrespective of cultural and social benefits of education as a consumption good. Even if the estimates do not apply to farm operators and laborers, relevance of these findings to rural poverty is nevertheless clear, since a substantial proportion of farm youth leave agriculture for the environment to which the estimates do apply. The data give some justification for public investment in education, not just from the standpoint of equity but also from the standpont of productive investment for economic growth.

Not all studies confirm the hypothesis that education at the high school level is profitable. Youmans (162, p. 26) found no significant differences between Kentucky school dropouts and high school graduates in unemployment rates and gross annual income, either among men living in eastern Kentucky or among men who had moved to urban centers (162, p. 26). The comparisons were made between individuals early in their careers. Dropouts had been in the labor force longer than high school graduates, hence might be expected to have higher earnings than graduates recently entering the labor force. A study of the same persons later would likely reveal higher earnings for high school graduates.

According to Miller (100, p. 145), in 1955 there was only a 4-percent difference in average earnings of veterans who participated in veterans' education programs and those who did not. But such empirical results raising doubt about the economic returns from education are few.

EDUCATION AND EARNINGS IN RURAL AREAS

Data in the 1960 census report on educational attainment suggest certain relationships between earnings and educational levels of farmers, farm managers, farm laborers, and foremen (146, tables 6, 7, and 9). First, a consistent positive relationship exists between education and income. In the 35-54 age brackets, the group of farmers earning less than $1,000 a year, has approximately an eighth grade education; the highest income group, earning $25,000 a year and over, has a median education slightly over the high school level. Second, the educational level of farmers and farm managers is improving. The median education of those 18 to 34 years of age is over 12 years, except for the group earning less than $1,000. Third, the data suggest that the heavy concentration of farmers and hired workers in the lower educational brackets would help to explain the prevalence of socially unacceptable income levels. Fourth, a 35- to 44-year-old farmer generally needs to be a high school graduate to earn an income of $5,000, the factory worker wage standard which some regard as a reasonable standard for agriculture. Fifth, both educational levels and income levels are low for farm laborers. Ironically, at lower income levels a given income appears to require less education for hired workers than for farm operators.

Previous estimates indicate that investment in education is economically profitable for urban males. Comparisons of rural and urban persons help to answer the question, "Is education profitable for farm youth?" In 1959, the median annual income of urban males with no formal education was nearly $1,000 above that of farm males with no formal education. The increment in income from a college education over no formal schooling was $4,037 in the farm sector compared with $5,101 in the urban sector. Gross returns from an elementary education for farm males is 66 percent as high as returns for urban males. A high school education appears to be as profitable in the farm as in the urban sector--the incremental income from high school for both farm and urban males in 1959 was about $1,200. As would be expected, the returns from college were less for those who become farmers.

Cost of education is lower in rural than in urban areas, hence, income from schooling need not be comparable in rural and urban areas for equivalent rates of return. The tentative inference from the 1960 census data is that

education through at least high school is a productive economic investment for persons who remain in farming. While income return from an elementary education is lower in rural than in urban areas, it is not sufficiently low to make an elementary education unprofitable.

The census data are not adequate for estimating rates of return for farmers in poverty areas, although data for nonwhite males may be somewhat representative of poverty areas. Twelve years of education raises the median annual income of farm nonwhites by $1,366 compared with $3,569 for urban males. Based on Schultz's estimates of education cost (123, p. 29), the average rate of return on 12 years of education for nonwhite farm males is just under 4 percent. Considering that educational costs for Negroes tend to be lower than used in the computations, and that there is often a lack of alternative investment opportunities for Negroes, this rate of return on education may not be unattractive. The rate of return on elementary education for rural nonwhites appears to be especially low. Nevertheless, the low educational costs for rural Negroes, the necessity of an elementary education as a stepping stone to higher returns on secondary education, and the benefits to future generations of additional education all suggest that that education may be a productive investment for them. If data for farm Negroes are indicative of opportunities for education for all individuals in rural poverty, the outlook is promising.

The use of median income tends to underestimate average returns because of the skewed shape of the income-education curve. On the other hand, the omission of equity capital costs and other noncash farm expenses tends to overestimate returns from education. This overestimation is apparent in 1949 income data for farm operators both in the South and in the rest of the country (table 3). It appears that the southern farmer with low education received greater income than the farmer outside the South with a similarly low education. At higher income and education levels, this relationship disappears, possibly even reverses. Perhaps the lower "supply" of education in the South may have made possible higher income with a given education than in the other areas in 1949.

Schultz (123) reports research showing that the rate of return on investment in education in the South may be as much as twice that in other areas, primarily because the general level of education is low. The same research also shows education to be a profitable investment for persons in the hired farm work force.

The prevalence and persistence of poverty among farm families where education is low is further evidenced by Bird's estimate that in 1959, the incidence of poverty was only 31 percent among rural farm families whose heads had 12 years of school, but was 57 percent in families where the head had less than 8 years of school (14, pp. 18, 20). In almost two-thirds of all U.S. families in poverty, the family heads had completed eight or less years of school. The incidence of poverty among rural farm families was much greater than among all U.S. families, given comparable education.

These data clearly are consistent with the hypothesis that poverty is most frequent in families with low education. Furthermore, for a family once classified in the poverty category, the probability of remaining in that category is high if the education of the family head is low.

Table 3.--Gross farm income and median education of farm operators, 1949

Full-time commercial farmers' gross cash farm income (dollars)	Schooling completed by farm operators	
	South	Non-South
	Years	Years
250-1,199	6.1	8.3
1,200-2,499	6.8	8.6
2,500-4,999	7.6	8.6
5,000-9,999	8.5	8.8
Over 10,000	10.5	10.2
Average, all farms	7.1	8.7

U.S. Bureau of the Census (145, p. 60).

Percentages of families classified as being in poverty in 1962 and still so classified in 1963 are given below according to years of education of the family head(56, p. 164):

	Percent
Less than 8 years	79
8 years	72
9-11 years	64
12 years	53
13-15 years	54
16 years or more	40

Approximately 60 percent of the poor families whose heads had 12 years or more of education in 1962 had escaped the poverty category by 1963. But only 21 percent of the poor families whose heads had less than 8 years education in 1962 had escaped the poverty trap by 1963.

The Importance of Occupational Mobility

With low levels of schooling, earnings of many unskilled laborers are as great on the farms as in other occupations. Also, earnings may be higher for persons with little education as farm laborers than as farm operators, because of the schooling required for successful decision making. For farm laborers, additional schooling and occupational mobility are mutually reinforcing as a means of increasing monetary gains.

The dotted envelope curve in figure 1 is the hypothetical occupational mobility line for maximum returns from education. Since institutional barriers prohibit entry into many occupations by persons not having a Bachelor's degree or better, solid line segments for some occupations begin only with high educational levels.

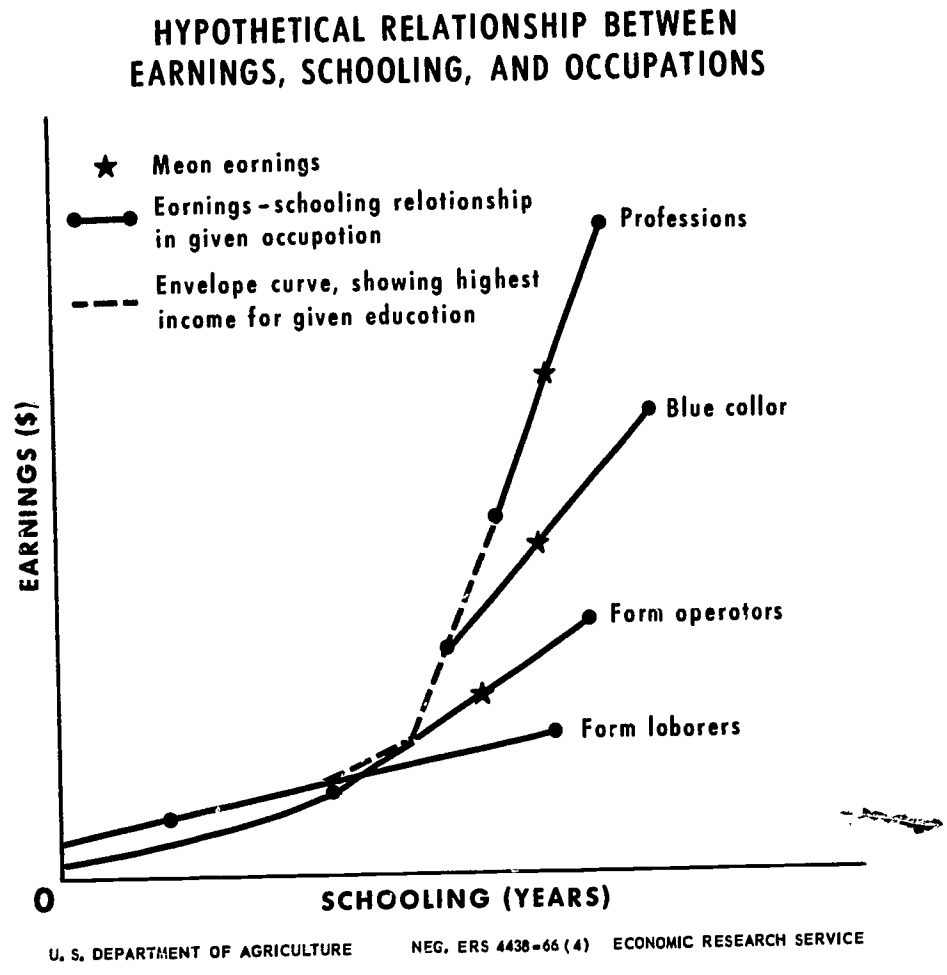


Figure 1

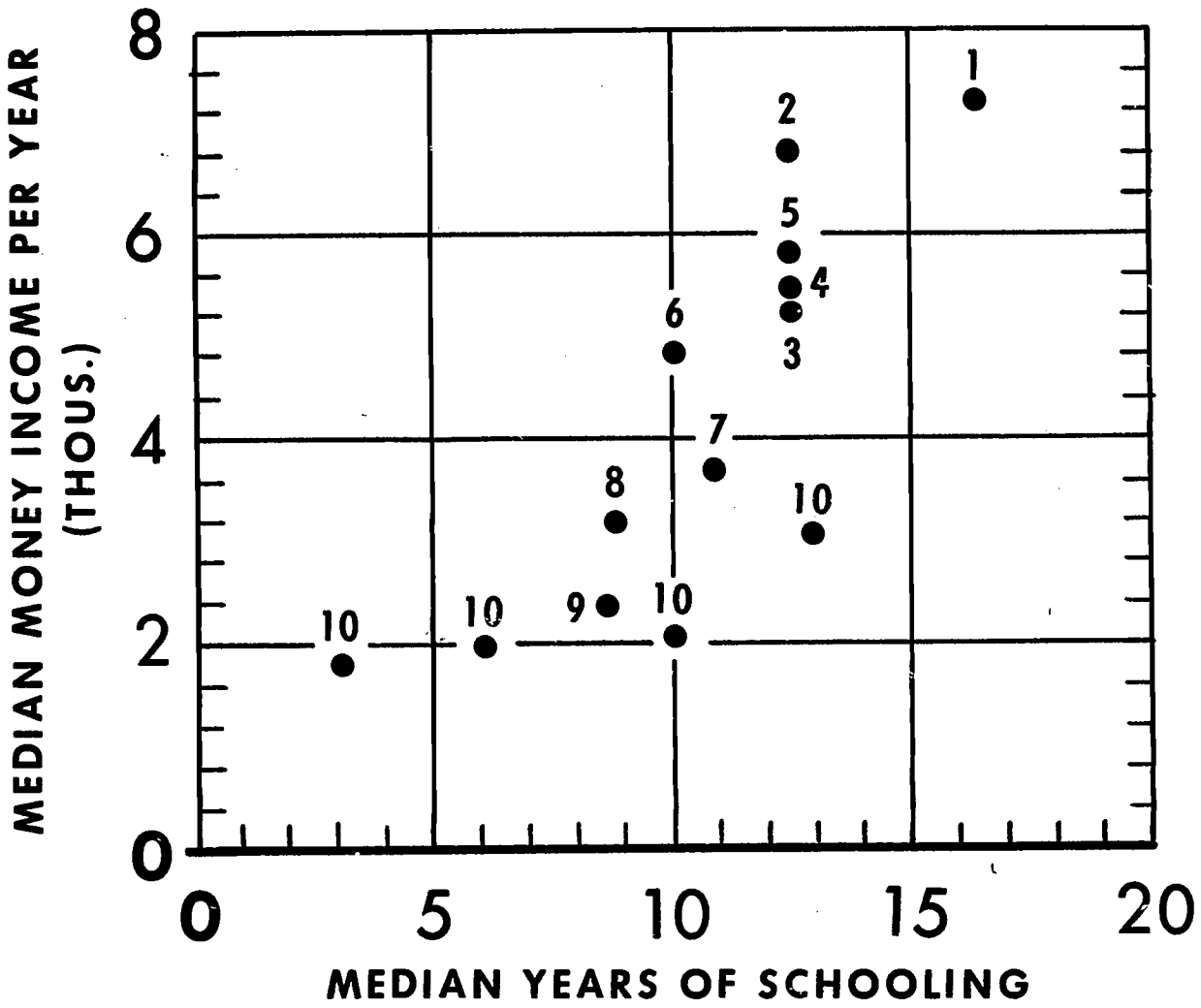
The importance of occupational mobility in realizing the benefits of additional schooling is supported by the data in figure 2. It is notable that the average returns of farm operators fall into line with the schooling-salary structure in other occupations, which gives credence to the hypothesis that labor earnings are low in agriculture due to inadequate investment in the human agent. The implication is that at the same educational levels labor earnings tend toward equilibrium among occupations. It appears that further gains in agriculture's relative income position must be accompanied by educational advances.

In figure 2, observations for hired labor adapted from table 4 have a less steep slope than observations for all occupations--the slope of a linear regression through the farm labor observations is $99, and through all occupational observations is $680. The conclusion is that the full benefits of additional education above approximately the 10th grade are lost without occupational mobility. Below the 10th grade, earning opportunities appear to average about the same in agriculture as in other occupations. Thus, to solve the problems of excess labor supply and low labor returns in agriculture, education of rural youth to the 12th grade level appears to be necessary.

In summary, the evidence is by no means clear or complete, but the data discussed above support the conclusion that education is a highly profitable investment for society as a whole in terms of economic growth. Education has a high economic payoff to individuals in most areas and occupations. It is

INCOME AND SCHOOLING BY OCCUPATIONAL GROUPS

All U.S. Males, 1962, and Hired Farm Labor, 1961



1. PROFESSIONAL & TECHNICAL
2. MANAGERS, OFFICIALS, & PROPRIETORS
3. CLERICAL & KINDRED WORKERS
4. SALESWORKERS
5. CRAFTSMEN & FOREMEN
6. OPERATIVES & KINDRED WORKERS
7. OTHER SERVICE WORKERS
8. LABORERS, EXCEPT FARM
9. FARMERS & FARM MANAGERS
10. FARM LABORERS, INDIVIDUAL OBSERVATIONS

SOURCE: STATISTICAL ABSTRACT OF THE UNITED STATES, 1964 (U.S. DEPT. COMMERCE); AGR. ECON. RPT. 51 AND AGR. HANDB. 275, 1964 (U.S. DEPT. AGR.)

U. S. DEPARTMENT OF AGRICULTURE NEG. ERS 4439-66 (4) ECONOMIC RESEARCH SERVICE

Figure 2

Table 4.--Hired farm workers, by education and daily wages, 1961

Years of school	Number of workers	Daily wage
	Thousands	Dollars
0-4	262	6.20
5-8	419	6.85
9-11	150	7.10
12 and over	172	10.55

Handbook of agricultural charts (148, p. 151).

highly profitable to individuals in rural poverty areas who have geographic and occupational mobility, but is likely to be only marginally profitable to those lacking mobility. Considering the risks involved, and the shortage of individual capital and the small tax base that are characteristic of rural poverty areas, it should not be surprising that many local communities have little enthusiasm for an expanded program of education. Individuals who profit most from education are likely to be those who leave the local community. The fact that some of the capital invested in education at considerable sacrifice is lost, and the fact that communities are understandably unwilling to see individuals leave the community, help to explain reluctance to invest adequately in education in poverty areas.

Support for the hypothesis that education is not a productive investment for persons who remain on farms in the low income areas is provided by reports of Burkett and Thompson (34) on Kentucky and a report on Oklahoma by Booth (24). In 1956, over half the rural families in Cherokee County, Okla., had incomes below $2,000. The average per capita income in the county was $626, and net farm income averaged only $310 per family. Forty-five percent of all the families received food from commodity welfare programs. But most important, Booth concluded, was the limited opportunity for increasing farm size. A doubling of acreage on cattle farms (which had the greatest development potential) would bring the average to 368 acres and would increase net income per farm from $492 to $863. Rural families even when they were not utilizing their land effectively, were unwilling to give it up so that others could expand their holdings. Booth states that large enough landholdings for adequate incomes could not be considered economically feasible. Gigoux, in a study (65) in another eastern Oklahoma area, reached the same conclusion (66). The productivity of an investment in education likely would be limited for persons remaining in such an environment.

Burkett and Thompson (34) found that the relationship ordinarily existing in the United States between education, income, and type of job "seems to be suspended" in five low-income counties in Kentucky, where high school graduates earned no more than dropouts. Nonfarm workers were not much better off than farmers. The median income of farm operators was $1,500, and of rural nonfarm workers, $1,606. At the time of the study, it appeared that at least half of

the 14- to 17-year-olds in households with earnings under $1,000 and more than a third of those in households with earnings between $1,001 and $3,000 would not finish high school. Two-thirds of the households in the sample had earnings of less than $3,000. In sharp contrast, in many urban areas nearly two-thirds of all students went on to college.

Although limited capital and lack of economic opportunities in the low-income rural areas limit the productivity of education for persons who remain in the areas, many researchers feel that education offers the only real hope for increasing incomes.

Over 80 percent of the low-income able-bodied adults represented in the Cherokee county, Okla. study were interested in finding other work, and half of these people were willing to migrate from the county in search of such work (24, p. 1). Cherokee county is only 35 miles from Muskogee (1964 population, 39,000) and 75 miles from Tulsa (1964 population, 279,000). The proximity of large cities with employment opportunities indicated that Cherokee County residents lacked either the motivation or the education to make adjustments necessary to increase earnings.

Burkett and Thompson (34) concluded that "education offers the best hope for improving the income level of the five-county Kentucky area" on which they reported.

North Carolina researchers (92) concluded that "the ability to manage may be the most important single determinant of potential farm income, and may offer the most logical starting point for overcoming low incomes." Findings of their study support the need for much-improved general education for low-income rural areas, and indicate that adult education designed to raise management ability will need to be detailed and intensive.

Bishop (19, p. 66) states that "the only avenue out of poverty for these people [children in rural poverty families] is through education and training."

Schultz (122, p. 97) states his position unequivocally: "Surely the most universal limiting factor in achieving economic growth is ignorance."

Groves (68, p. 7) finds that "economists are discovering that growth may be mainly a matter of developing human talent and that it can be deliberately fostered by judicious and generous allocation of resources for this purpose."

EDUCATION AND MIGRATION

The Need for Migration

It is an accepted fact that migration is necessary to eliminate rural farm poverty. Migration may be to near or distant nonfarm employment, but it must occur. Of the 100 farm youths reaching an age for productive employment, no more than 50 are needed to replace "normal" exit of established farmers and leave a stable population. Hence, at least 50 percent must leave to maintain a stable population. Furthermore, the number of farmers must decline to raise

income levels, which means that in most rural poverty areas at least 75 percent of farm youth reaching a productive age must leave the farm to make satisfactory progress toward solution of the poverty problems.

How well is the migrant from rural areas prepared for nonfarm employment? Shannon (127, p. 148) says that "when the rural-reared urban migrant is compared with urban-reared city dwellers, the rural-reared urban migrant is found in the lower status postions no matter what measures of status are selected."

Bowman and Haynes (28, p. 254) state that when the problems of rural poverty areas spill over into urban centers, problems often become greater. While the more educated leave low-income areas, these same individuals find themselves to be at a disadvantage in education and training in the urban areas.

Statistics consistently show a heavy reverse flow of migrants back to disadvanted areas (64,65). This reverse flow undoubtedly is prompted in no small part by inadequate education and values inconsistent with smooth integration into urban society. Smith (129, p. 820) reports that nearly half of the Indianapolis migrants whom he interviewed indicated they were dissatisfied to the extent that they were hoping or actively planning to return home after only a brief and unsatisfactory experience. The importance of cultural factors and educational quality is reflected in Smith's finding that among rural migrants with similar amounts of education, wages were higher for northern whites than for southern whites in Indianapolis (129, p. 822). The same study revealed that several employers discriminated against southern whites from rural areas because high turnover rates made training economically infeasible.

A study of farm migrants to Des Moines by Bauder and Burchinal showed that farm migrants were lower in occupational status, income, and other measures of socio-economic status in the city than were urban migrants and urban natives (6, p. 360). But these differences were accounted for by lower educational levels among farm migrants. The implication of these findings is that cultural factors do not have a depressing effect on social and economic status over and above the educational quality when migrants are from commercial farming areas. The same cannot be said for urban migrants from underdeveloped rural regions.

A disturbing fact is that very large numbers of farm youth in poverty areas do not face the reality of lack of opportunities in farming until their formal education is essentially complete. And it is also a fact that among farm youth, those planning to farm have lower educational aspirations than those planning for nonfarm employment. This may be because the expected payoff from education on a low-income farm is small.

The Impact of Education on Migration

Several studies have attempted to determine the impact of education on aspirations and desire to improve economic status through job mobility.

Roy (118) found that number of years of schooling completed by the farm husband or wife was not associated with levels of aspiration for improved economic status.

Amount of formal education was not found to influence the stated desire to move of men in Eastern Kentucky (162, p. 26). However, Census data reveal substantially higher rates of net outmigration of the more highly educated from the area. Net outmigration as a percentage of the resident population was 1.5 for persons with at least a high school education, and was between 0.5 and 0.7 for persons with less than 4 years of high school (287, p. 202).

Such selective migration has disadvantages, since it tends to leave a residue of less educated individuals to become leaders and make future decisions on education in poverty areas. It is interesting to note the opinions of a group of men interviewed in 1960 who had been in the 8th grade in Eastern Kentucky in 1950. Among the members of the group still living in Eastern Kentucky, school dropouts did not differ significantly from high school graduates in their estimate of how much education a young man ought to have. But among those who had migrated to urban areas, high school graduates differed significantly from dropouts in their estimates. Virtually 100 percent of all respondents in all areas said a high school education was necessary. Seventy-one percent of the high school graduates who had migrated to urban areas compared to 58 percent who had remained in the local community said a young man ought to have a college education (162, p. 30).

A study by Guither (69) of migrating farmers showed that the median schooling completed by those who left farming was 9 years, not significantly different from the median for all farmers in the area. Bauder and Kenkel (5, p. 415) report similar results for Iowa for the 1950-61 period. In 1962, Hill (75, p. 426) reported that the farm people who migrated to nonfarm jobs from an Iowa community were not those with lowest incomes, the least efficient, the poorest farmers, or the physically disabled. The educational level of farmers in the survey, the average farm size (measured by acres or gross sales), and the average age of migrating operators compared closely with country averages and distribution. Nearly all those questioned agreed that they would make the move again to nonfarm employment, and many said they would make it sooner--again suggesting that migration is a much smoother transition process from commercial farming areas where education and cultural values make contrasts between farm and city less severe.

Hathaway (73) summarizes the results of several studies which report conflicting results, some showing that the more educated migrate, some showing that the less educated migrate. Danhof (48, pp. 17-20) more recently has summarized a number of studies, some of which are conflicting but which in summary leave the general impression that the more able and productive are overrepresented in outmigration.

According to Bogue (1, footnote 1, p. 31), rates of migration from an area vary inversely with the level of educational attainment in the area. Tarver (1, footnote 1, p. 75) used State data to predict 1940-50 net white migration rates and found that the percentage of a State's population 25 years or older completing four or more years of high school was related directly to migration and was highly significant in explaining migration rates.

Cohen and Schuh (38, p. 12) provide evidence that the rural farm migration is selective from both the higher and lower educational categories. Thirty-six

percent of the migrants sampled had a college education, compared with 20 percent of the nonmigrants. But the migrants also had a higher proportion with less than 12 years of education than did the nonmigrants--32 percent compared with 27 percent.

It was suggested earlier that persons with little education often are as well off in farming as in other occupations. The evidence that the low-income group is overrepresented among rural farm migrants is not necessarily in conflict with this suggestion.

Sharecroppers, tenants, and small farm owners are the low-income groups from which migration tends to be heavy and it is the push of restricted farming opportunities rather than the pull of attractive nonfarm alternatives that explains the mobility of these groups. These farmers, often ignorant and untrained, generate more than their share of the social problems of rural migrants in the "reluctant" urban areas to which they migrate. A strong case can be made for greater education for these groups to reduce this social cost, even if it will not materially speed needed adjustments through migration.

GOALS AND VALUES

This section is devoted to an examination of the interrelationship in the milieu of rural poverty, between education and the goals and values of a community. The success or failure of efforts to alleviate poverty by education and other means rests on ability to cope with the unique value structure found in rural poverty.

Education has a two-fold effect on rural poverty. First, it increases skills of persons, potentially raising farm management levels as well as increasing suitability for nonfarm jobs. But equally important may be the second effect of education--enhanced motivation and aspirations for improved earnings and living standards, and changed attitudes more consistent with reasonably frictionless assimilation into a new environment.

Even where economic determinants indicate high returns from education, social determinants can hinder educational achievement. To a sizable extent, the educational attainment of youth is determined by social forces acting through parents, teachers, and peers. Parents impart values through example and overt urging. The dominant influence of parents on educational attainment was apparent in the work of Brazer and David (30) cited earlier.

Vaizey (152, p. 29) states: "Education, indeed, can be regarded as an intervention to save the individual from the family."

What are the goals and values of people in rural poverty? To some extent the values and attitudes are shaped by contrast with the standard of living in other areas of society. Standards of living and earnings in many areas of poverty in the United States are higher than in Formosa or Japan. Yet the goals and values are quite different as measured by the attitudes, morale, and motivation of the individuals.

Poverty is a state of mind as well as an economic condition. And the "poverty" state of mind is determined to a great extent by relative income levels. The indifference that accompanies U.S. rural poverty may be its most difficult characteristic to treat and overcome. Welfare programs of direct subsidy tend to reduce the feeling of worth and dignity of individuals, and to foster respect for work and rationalization of subsidy grants. The following statement by Williams (159, p. 87) perhaps is too strong, but was no doubt motivated by his observation of the demoralization that attends chronic poverty:

> Are we as a nation on the way of creating a kind of 'sub-proletariat' of uneducated and unskilled and poorly motivated workers--in rural communities and among rural migrants to cities--who are becoming frozen in self perpetuating enclaves within our generally affluent middle-class society? So far as I can see, an outcome of this kind is inevitable unless imaginative and decisive public action to prevent it is taken in the near future.

The difficulty of emancipating people receiving welfare grants from poverty is increased by the fact that "many types of current welfare programs...carry provisions whereby individuals are penalized for obtaining higher incomes in that as earned income increases, welfare payments decrease (19, p. 65)."

The confidence and morale of the rural poor must be restored by associating merit with rewards. In all welfare programs, except for the disabled and aged, recipients should be made to feel that they are doing something useful and productive to receive benefits. Welfare payments might be made contingent on attendance at educational meetings or on performance of work such as helping with conservation of resources or reforestation. This would likely increase the shortrun costs of welfare programs but would raise productivity of programs and reduce the longrun cost.

One sociological point of view presented by John (78) holds that rural and urban people differ in their views of how money contributes to status. In the city, social position is determined by level of living--the house lived in, size of car, and manner of dress. In rural areas, social position is determined more by the amount of accumulated assets, paid-for property, and money in the bank.

The high propensity of farmers to save and accumulate found by Heady and Tweeten (74, ch. 12) is consistent with this appraisal. This rural value structure makes for high rates of capital accumulation and economic growth in commercial agricultural areas, but is hardly apropos for rural poverty pockets.

Brewster's (32) interpretation of values is more relevant for rural poverty areas. His analysis helps to contrast "traditionalist" cultures usually found in low income countries or regions with the "contemporary" cultures of high income countries or regions. Brewster's fundamental postulate is that in all cultures, the dominant striving of people is to earn a favorable image of themselves in the eyes of others and of themselves. The question is, what type

of behavior elicits esteem. If it is the belief that dependence on economic employment is indisputable evidence of lack of capacities of mind and character that entitle one to higher position (leisure to hunt, fish, commune with neighbors or pursue social "graces"), then the belief inhibits economic growth. But if proficiency in economic behavior is believed to be the appropriate way of earning an ever higher valuation in the eyes of others and of oneself, then economic growth is enhanced and encouraged.

Back was one of the first economists to recognize and articulate the importance of goals and values for economic development in poverty areas. The attendant role of education is apparent in his statement (4, p. 284):

> Also, we do not know how to overcome the resistance of families with low income to moving to areas having higher income. Currently, public education is our only publicly acceptable way of attacking the kind of value and knowledge problems existing in low income areas. I believe the major knowledge problem of people in areas of low income is limited perceptions of reality, and combined with this problem, is an image of reality skewed by the major beliefs and values of their culture. If we want a program to develop agriculture's human resources, increased public support of education in areas having low income may be the only feasible way to get the job done.

Bishop (15) is optimistic about the ability of education to shape rural values:

> Over the long run, however, preferences of individuals need not be taken as given. Conflicts of preferences can be removed by changing the preferences of individuals. This can be accomplished through education and through subjecting people to new experiences. Positive action to alter the values of people rests in the willingness of one to assume the position that there are superior sets of values and that particular environments exist that are consistent with the acquisition of these superior values.

Merrill (96, p. 88), after asking where aspirations come from, answers: "All human beings have aspirations, but it is education that controls to a very large extent the kind and quality of aspirations which people have." This statement summarizes the thinking of many social and economic scientists.

A disproportionate share of rural poverty is concentrated in the South, as shown earlier. Nicholls has devoted a book to the subject of conflicts of regional development with southern tradition. According to Nicholls (111, p. 174), "Rural poverty in the South is community-wide and, because it has deep historical and cultural roots, tends to be self perpetuating." He lists the key elements in the southern way of life that have hampered economic progress as (1) the persistence of agrarian values, (2) the undemocratic nature of the political structure, (3) the rigidity of social structure, (4) the weakness of social responsibility, and (5) the conformity of thought and

behavior (111, p. 15). The agrarian values embrace the soil as the best and "most sensitive" of vocations; agriculture, therefore, should have the economic preference and maximum number of workers. The result of these values, according to Nicholls, has been a lack of emphasis on education. For farm laborers and operators of the ubiquitous small farming units, the economic value of education was likely to be small. The value of education as a consumption good also appeared to be low. The result of this apathy was underinvestment in education and a retarding effect on progress that has not yet been overcome.

Paarlberg referred to this apathy in the following statement (113, p. 268):

> Farm people with low income, especially the older ones, are likely to be somewhat apathetic about this [rural development] program. Some of them have lived so long under restricted opportunity that they no longer aspire to improve their economic condition. They are "adjusted" in the sociologist's meaning of the term. They do not respond well to the conventional ways of doing extension work. They do not come to meetings.

The lack of emphasis on education is apparent from a recent study by Bowman and Haynes which showed that despite gains in education in low income areas, the gap between these areas and the remainder of the Nation is growing. The authors report that (28, p. 242):

> There is no evidence on the part of local communities [eastern Kentucky] of efforts to raise the standards of their schools. Even among the select group who complete high school, achievement test scores are low. Expenditures per capita are lower in the mountains than anywhere else in the state, and so are expenditures relative to income. School tax rates on property are low. The spread of interest in continuing through elementary school has not been matched by increased community effort to make the schools better and should be a matter of grave concern.

Such data lead to the conclusion that the education-economic growth cycle is recursive, with each sequence building on and reinforcing the other. That is, education makes for a larger income base and the social environment consistent with higher educational levels in the next phase. But can education be accelerated by public policy in an area whose people are apathetic and not prepared by previous education-income interaction for emphasis on education? Two approaches are possible. One is to increase education through first stimulating income by public measures. But education is an essential catalyst of economic growth, and Bowman and Haynes see little feasibility in this approach. The authors state:

> ... a few main points are absolutely clear. The Kentucky mountains will not develop a significantly expanding economy, no matter what public policies are pursued. In an area of this kind, neither ARA nor any

> other program designed primarly to increase job opportunities can have significant effect...Given the hard facts it is in outmigration above all, that the major problems and the greatest challenge to public policy formation reside (28, p. 266).

The second approach is to stimulate local income and mobility through first expanding education. The problems of doing this are apparent in the following statement in which Bowman and Haynes make clear that their sentiments lie with education:

> Although there is good reason for believing that improvement of the regular school system and the levels of schooling attained may be the single most important policy goal for the future of East Kentucky, the push to raise the holding power of the schools has found little active mountain support. People lacking education and a knowledge of its importance in the job markets outside the mountains do not spontaneously attribute their ills to deficiencies in themselves. Only as the process of de-isolation moves ahead does education of local youth begin to be something on which a local politician can safely place major emphasis (28, p. 279).

They go on to conclude that:

> To overcome threshholds of inertia and resistance, education...must touch all age groups; it must become a part of every aspect of life, until the hills are saturated with it. State foundation programs are not nearly enough. Such a multiple strategy could and should be supported by local and outside sources--the state, the federal government, foundations (28, p. 282).

Additional insight on attitudes of rural people may be gained from a report of the findings of a group of sociological studies in several Southern states (37). The studies were oriented to rural areas, and included both farm and nonfarm respondents. The results emphasize the aspirations of rural residents.

Texas researchers concluded that raising educational levels materially increased levels of living (37, p. 5). However, of the persons indicating they were "very satisfied" with their family income, one-third were classified in the low level-of-living group. When asked to indicate the source of their greatest satisfaction in life, 90 percent of the homemakers cited either "relations with family" or "religion." "Job or work" and "education" received an insignificant response. Respondents classed in low level-of-living groups tended to be more pessimistic in outlook than respondents in high level-of-living groups.

Louisiana researchers found that respondents with low educational attainment tended to view their work more favorably than did those with higher educational attainment (37, pp. 6,7). All respondents aspired to high-prestige occupations for their sons. These aspirations were unrealistic in many instances,

and indicated a lack of willingness to face squarely the feasible alternatives. The respondents named "glamorous" occupations, perhaps due to lack of information about alternatives or desire to give interviewers acceptable answers. As major obstacles to occupational achievement, respondents cited lack of training, lack of money, and "no opportunity."

In the southern appalachian area of Kentucky, researchers found that family and kin were "infinitely" more important than work in the value structure of respondents, in contrast to the work-achievement-success value structure predominant in American society (37, pp. 7,8). Researchers also found that respondents said they were satisfied with their incomes, though in dire need. A large majority were not willing to move from where they lived. A highly important variable in explaining escape from poverty was the homemaker's education, a higher education providing awareness of alternatives and conflict with present circumstances and creating a desire for mobility.

In an Alabama study, it was found that occupational aspirations were low in low-income rural areas (37, pp. 8,9). The conclusion, that applies equally to many similar situations, is that the men responding recognized their limited opportunity for occupational improvement and had lowered their aspirational levels to goals believed attainable. The Alabama study showed that aspirations, though low, tended to be most intense among the poorly educated and declined as education increased. This finding may merely reveal that the better educated persons face realities in an area of limited opportunities more honestly. It could also imply that educated persons with high aspirations have found employment outside the sample area, leaving a residue of persons with low aspirations, even among the more educated. In general, aspirations declined for occupational improvement as skill and earnings increased. However, farmers were at the low end of aspiration levels. The study found little educational aspiration among persons who needed education most to raise their mobility and earnings.

Mississippi researchers found that wives and mothers play an important role in educational and mobility decisions (37, pp. 10,11). The researchers concluded that needed adjustments among low-income families could come only through increased education and greater care in planning for careers.

A study reported by Sperry on educational goals of rural youth in the South again showed the importance of mothers in educational plans of children (37, pp. 13,14). The study results also indicate that educational aspirations were higher among nonfarm youth, among youths with more highly educated parents, among youths in small families, and among families with high incomes.

Based on a study of migration in low-income areas, Moon reported that adjustment problems seemed to lie, not in a lack of favorable attitudes and aspirations toward better adjustment, but rather in why their aspirations had not been achieved (37, pp. 11,12). One conclusion is that studies should focus more heavily on motivation compared to aspirations. The strength with which aspirations are held and the effort persons are willing to expend to realize aspirations are critical factors that have received too little attention.

In summary, there is considerable evidence that rural farm persons in low-income areas have accommodated their goals and values to their environment.

One of the most challenging tasks of economic development is to overcome the inertia of these characteristics. The data suggest that education is less than completely successful in this process. Yet education appears to offer the only feasible means of accomplishing the task.

Again it is emphasized that higher levels of economic development and education change attitudes and values and that changed attitudes and values can increase the desire for better education and employment. This process is taking place in low-income rural areas, but growth begins at such a low level that increments are small--smaller than in more progressive areas. Thus, public policies to intervene in the process may be judged desirable by society.

INDUCEMENT FOR GREATER EDUCATIONAL ATTAINMENT

Few studies have been focused on what inducements are needed to increase educational attainment of farm youth. Elementary and high school education entails no tuition cost, yet dropout rates are high in rural poverty areas. Why? One reason is opportunity cost. Children often are pressed to support themselves or the family at an early age in broken homes or where parents are too poor to hire labor or provide necessities. Undoubtedly many children, embarrassed by lack of presentable clothes, money for books, and other side expenses quit school to avoid embarrassment.

The impact of having to work at home is often overrated. The pressure for children to work on farms is diminishing with growing farm mechanization. Youmans found that rural dropouts reported they had stayed home more often than other students during their last year of school to do unpaid work, but he goes on to state (161, p. 25):

> During the last year of school, the youth who continued his formal education did significantly more paid work, missed more time from school to do this work, and earned more money than did the youth who dropped out of school. Apparently the youth who took advantage of opportunities to earn money while he was going to school found that this money helped him continue his formal education. Although the American public school is "free" to all children in the school community, there is a substantial cost attached to attendance. The youth without sufficient funds is barred from many school activities and cannot be independent in his dealings with his school friends. The probable consequence is that he tends to withdraw from an unpleasant situation.

Motivation Versus Finances as the Limiting Factor in Educational Attainment

A substantial body of research indicates that lack of motivation rather than lack of finances is the principal reason for low educational achievement of farm youth. 7/

7/ For a summary of these studies see Burchinal (33) and Beezer and Hjelm (13).

Fifty-five percent of the 607,000 urban high school senior males included in a 1959 survey planned to attend college (47, p. 108). Of the 160,000 farm males in the sample, 34 percent planned to attend college. These were U.S. rates across all income levels. The percentages from poverty areas would be much lower. Thirty percent of the 85,000 male rural farm high school seniors not planning to attend college cited "lack of money, needed at home" as the reason. Only 19 percent of urban male seniors gave the same reason. Among 223,000 male high school graduates aged 16 to 24 from rural farm areas who, in fact, did not attend college, 19 percent cited "lacked money" as the reason. Only 6.3 percent gave "needed at home" as the principal reason. "No desire to go" was the most frequent response; it was given in 45 percent of the responses. Twenty-nine percent of the urban males gave this reason. While "no desire to go" may have been the reason given by many students who in fact lacked financing, still it appears that value structures are different between farm and urban youths.

In the fall of 1960, roughly 63 percent of the high school graduates from households headed by white-collar workers, compared with 30 percent from households headed by manual laborers or service employees and 28 percent from households headed by farmers or farm laborers were enrolled in college (108). Even among families with similar incomes and among graduates with similar levels of ability, occupational differences of household heads made a difference in college attendance.

Incentives for Schooling

Bishop (19, p. 66) suggests the use of direct payments to induce youths in depressed areas to attend school. He also suggests reducing welfare payments to families whose children are truants or dropouts.

Another approach is to induce greater interest and participation in school through an enriched program. Thompson, Isenberg, and Aiton (136, p. 199) state that rural schools are too limited in curricula and are lacking in expertness in nearly all specialized areas. Rural schools in many communities are too small and lack financial resources to provide students with the challenging and diversified program needed to stimulate interest and response. The way to increase participation may be to provide a more rigorous program not only to challenge the ability and imagination of students but to equip them more adequately for jobs. Observing the successful products of an adequate school system is, in the longrun, one of the really effective means of generating enthusiasm for schooling.

Tweeten and Walker (143) have shown that many rural schools are too small for diversified programs at reasonable costs. Further consolidation is necessary to achieve economies of operation and offer classes for pupils with differing interests and aptitudes(117). A further advantage of consolidation of schools is that sending rural students to schools in larger communities tends to broaden their outlook and expose them to the social and economic value of education more apparent in larger communities.

Research findings summarized by Harris are not specifically oriented to rural farm youth, but give some insight into the impact of financial inducements

on college plans. On the basis of previous studies he concludes that: "...less than 20 percent of an average sample of students would be induced to go to college as a result of scholarships (72, p. 209)." But he reports that among Minnesota high school graduating seniors surveyed in 1950, 58 percent of the high-ability students who were not planning to go to college reported that they would change their plans and attend college if about $750 of financing was provided (72, p. 209). In a group of Wisconsin boys in the top quarter of their high school graduating classes, only 10 percent failed to attend college because of financial need (72, p. 209).

A Vermont study cited by Correa (40, p. 89) showed a sharp increase in enrollment when tuition at the University of Vermont was reduced from $625 to $325. It is not known to what extent the enrollment increase came from individuals who merely shifted colleges, and what came from those who would not otherwise have attended for lack of money.

INTEGRATING EDUCATION WITH OTHER MEASURES TO COMBAT RURAL POVERTY

To be most effective as a tool for economic development, education must be viewed as a complementary input with industrialization and other measures. It is unlikely that education alone, migration alone, or industrialization alone can be successful in combating rural poverty. The industries needed to make a significant improvement in income levels in a community require a skilled and educated labor force. Labor-intensive industries attracted to an area only by cheap labor may actually perpetuate problems of rural poverty. Industries which pay wages that increase income levels require the high labor productivity of an educated labor force. Low-income rural communities cannot be expected to marshal the pool of labor required to attract such industries. But these communities are generally within commuting distance of urban areas that have such potential for viability.

A functional economic area is defined by Fox (63, p. 138) as "an area economy of sufficient size and complexity to satisfy [wants for private goods and public services] efficiently." The concept of a "viable economic area" may be more useful in planning for economic development than the concept of a functional economic area. The viable community would include at least one population center of sufficient size for growth potential. Studies indicate that sizable agglomerative economies have stemmed from closeness to sizable resource and product markets.8/ Southern found that from 1950 to 1960, cities of approximately 10,000 represented a break-even size-- cities smaller than 10,000 tended to lose population while larger cities gained (132, p. 8). The same effect is apparent in the regression equation below--equation (1)--where Y is proportional increase in population per square mile between 1950 and 1960 and X is the 1950 population per square mile.9/ Observations are for Oklahoma's

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8/ Resources include financial and legal resources as well as skills and managerial talent. The approach abstracts from natural resources which, of course, are all-important in some cases.

9/ $$Y = \frac{X_{1960} - X_{1950}}{X_{1950}}$$

77 counties. Dummy variable D_1 is equal to 1 (zero elsewhere) for the 26 counties in eastern Oklahoma included in the Ozark-Ouachita low income area. Dummy variable D_2 is for Panhandle counties where irrigation and sparse population present a different agglomerative structure. Dummy variable D_3 is for Comanche and Jackson counties, which have experienced sizable gains from military installations. It is hoped that the use of dummy variables permits the relationship between Y and X to reflect agglomerative efficiencies, irrespective of unique local circumstances.

$$Y = \underset{}{-22.91} + \underset{(6.14)}{.47X} - \underset{(4.53)}{.00074X^2} - \underset{(3.51)}{8.20D_1} + \underset{(3.61)}{18.47D_2} + \underset{(9.19)}{62.64D_3} \quad R^2 = .75 \quad (1)$$

The highly significant coefficients (t-values in parentheses) and R^2 of 0.75 suggest substantial agglomerative economies. Setting Y = 0 and solving for X indicates that populations per square mile of 54, 76, and 10 are necessary on the average for viability in the typical counties, low-income eastern counties, and Panhandle counties, respectively. Assuming the average county size of 895 square miles, the respective county populations required for viability are 48,000, 69,000, and 9,000. Above these populations, counties have tended to grow in population; below it they have tended to decline. Assuming a rural population of 8,000, it is apparent that as an average for the State an urban population of approximately 40,000 or above is required for viability in the typical counties. The fact that this break-even size for Oklahoma exceeds the 10,000 break-even size for the United States as a whole indicates that regional differences may be important. However, the concept used is quite different from Southern's -- the technique for Oklahoma in the above equation would permit 4 cities of 10,000 population each in reasonable proximity to be a source of viability.

The concept of a viable economic area has important implications for educational and economic growth. An area delineated for development planning should, if possible, contain at least one core urban community of sufficient size for economies of scale in labor and product markets to attract industry. In an area without growth potential and with heavy outmigration, it is difficult to generate local enthusiasm for taxing resources to the extent needed for adequate schools. This is understandable if the investment in education is exported outside the area. The benefit-cost ratio from educational investment in a given community is expected to grow in concentric circles around the community. Especially for low-income areas where outmigration is high, the benefit-cost ratio is likely to be considerably less than 1.0 for the home community. This ratio may increase to 1.0 or more as the geographic base is expanded to include large cities. Our earlier discussion indicates that education can be a highly profitable activity for aggregates as large as the United States.

A viable economic area might alternatively be defined as an area for which the benefit-cost ratio from education is at least 1.0. Use of local multipliers and study of the local tax base and of returns from education could provide the information for determining the boundaries of a viable area on this basis. Tax and administrative boundaries might be restructured to this concept. If persons in the area could visualize themselves as part of a viable

economic community, they would be more willing to impose the changes in tax and education structure needed to insure adequate vocational and general education. No one likes to be part of a declining community. The need is to overcome demoralization by broadening the concept of community where possible to a larger entity with growth potential. It has been shown that sizeable economies in educational as well as other community expenditures can stem from this restructuring (143). Southern (132, p. 17) has illustrated that the majority of rural areas with severe income problems are within less than 50 miles of cities with 25,000 or more population.

The value of conceiving a viable economic area as the focal unit of growth is illustrated by table 5. The table shows estimated effects in the South

Table 5.--Projected employment, population, and income under alternative educational efforts in the South, 1960-1975

Item	1960		1975			
			Moderate southern educational effort		Strong southern educational effort	
	Non-South	South	Non-south	South	Non-South	South
	Millions					
Population	130	49	171	64	164	71
Employment						
Agriculture	3.4	2.4	3.0	2.0	2.8	1.4
Nonagriculture	46.9	13.7	64.2	21.4	60.8	26.0
	Dollars					
Per capita income	2,443	1,681	3,585	2,399	3,591	3,033

Source: Bishop and Tolley (20, pp. 59-76).

of two alternative levels of educational expenditure. One, a "moderate educational effort," is defined as a continuation of past rates of increase in expenditures, which would involve doubling 1960 expenditures by 1975. The other, a "strong educational effort," is defined as the expenditure necessary to close the gap between outlays in the South and the remainder of the Nation--entailing an investment of $9.1 billion annually in 1975 compared with $3.2 billion in 1961. The effect of the strong effort is an accelerated decline in agricultural employment but a substantial increase in nonagricultural employment.

Accelerated outmigration from agriculture is anathema to many farmers and community leaders who feel that the goals of education would thereby be controverted. The effect of outmigration from a region is illustrated by a Tennessee study which estimated that the drain on investment in youth through outmigration totals $135 million annually for the State (111, p. 170). Net migration out of the South was 1.4 million persons in the decade preceding 1960 (134, p. 10). The cost of educating these individuals averaged at least

$250 annually for 8 years, or $2,000 per person--a loss of $2.8 billion. Tarver (135) gives estimates up to $15,000 for all costs of rearing a child; hence, the capital outflow from the South could be as high as $21 billion. The loss is partly offset by inmigration of more educated persons and lower "rearing" costs than indicated. Danhof (48, p. 19) summarizes cost estimates that lie between the above figures.

According to the estimates in table 6, the way to avoid this loss is to spend more rather than less on education. With a strong educational effort in the South, population in the region is estimated to reach 71 million by 1975, but with a moderate educational effort it is estimated to reach only 64 million. Farm population, however, decreases with greater educational effort. The same results would be expected in much smaller areas. Many rural farm communities fail to understand this relationship between rural and regional economic growth. The need is to identify rural thinking with a viable economic area so that the success of some parts of the area can be the basis for pride in accomplishment even though rural population falls.

Table 6.--Average education of children, by education of family head

Education of family heads 1/	Cases in sample	Average education of children
	Number	Years
No education	26	9.14
Elementary school	478	10.86
Some high school	177	12.01
High school diploma	92	12.81
High school diploma plus noncollege training	50	12.76
College, no degree	65	13.90
Bachelor's degree	35	14.70
Advanced degree	16	15.72

1/ List includes only those family heads whose children had terminated their schooling.

Source: Brazer and David (30, p. 28).

The dominant factors determining educational attainment of youth have been found to be the education, the occupation, and the social status of parents. But these are not instrumental variables capable of being manipulated by public policy. Youth in low-income communities are caught in a parent-child cycle of low income and low education that has deep roots in goals and values. The following recursive model of economic growth emphasizing education develops this theory formally.

The data already provided give substantial support for the conclusion that income is directly associated with the level of education. Educational attainment in rural poverty areas is unmistakably low. But are people poor because they are uneducated? Or are they uneducated because they are poor? Stated in other terms, does income determine education? Or does education determine income?

Both questions can be answered affirmatively without conflict if the time sequence is recognized and the education-income complex is viewed as a recursive process. In the short run, the educational attainment of youth may be regarded as a function of income of parents, cultural environment, and other factors. Change in educational attainment in the short run has little impact on income; hence education can be viewed as the dependent variable, and income an independent variable in the functional equation estimating demand for education. The situation in the long run for adults in aggregate is the reverse. Once education has been attained, income level can be viewed as a function of education. Some interdependence is present, however, because a decision to terminate education involves an interrelationship between educational attainment and immediate income.

This latter interdependence is not believed to be dominant, however, and the economics of education and income can be represented by a recursive growth model. The income and aspirations of the first generation determine the education of the second generation. And the education of the second generation determines the aspirations and income of the succeeding generation. This cycle repeated over several generations comprises an economic growth model which may have considerable validity in explaining economic development, not only for individuals, but also for regions including poverty areas.

The recursive process through which education and income interact in the process of economic growth is, when focused on poverty, termed the "poverty cycle."

The following model abstracts from functional relationships explaining material capital formation. The implicit assumption is that, given the proper skills and attitudes--which are created to a considerable extent by the educational process--material capital formation is a somewhat "automatic" process (subject to natural resource limitations, of course). This untested, tentative hypothesis is a very significant element in the application of education to the theory of economic growth, and needs much study.

In the following model of income growth, the education of children is assumed to be a linear function of the father's income as shown in equation (2), where E_t is educational attainment of youth (measured in years), Y_{t-1} is income of the parent, and ε_t is an error term. The income of the parent is assumed to reflect occupation, schooling, and cultural environment of the past generation t-1. The impact of Y_{t-1} on the education of the current generation t is indicated by β.

$$E_t = \alpha + \beta Y_{t-1} + \varepsilon_t \qquad (2)$$

Income of the current generation Y_t is assumed to be a linear function of acquired education in equation (3), where E_t is derived from equation (2) and μ_t is the disturbance.

$$Y_t = \delta + \gamma E_t + \mu_t \tag{3}$$

Lagging (3) by one generation and substituting the right side of equation (3) for Y_{t-1} in equation (2), it is apparent in equation (4) that education of the current generation is a function of education of the past generation. (The error term is omitted in equation (4) and in later equations.) Solving the difference equation (4), the education of the current generation t is expressed as a function of time (t) and the initial education level E_0 in (5). A similar expression, equation (6), relates current income to time and the initial income.

$$E_t = \alpha + \beta\delta + \beta\gamma E_{t-1} \tag{4}$$

$$E_t = \left[E_0 - \frac{\alpha + \beta\delta}{1 - \beta\gamma}\right]\left[\beta\gamma\right]^t \frac{\alpha + \beta\delta}{1 - \beta\gamma} \tag{5}$$

$$Y_t = \left[Y_0 - \frac{\delta + \alpha\gamma}{1 - \beta\gamma}\right]\left[\beta\gamma\right]^t + \frac{\delta + \alpha\gamma}{1 - \beta\gamma} \tag{6}$$

To gain insight into the progress of economic growth through education, the empirical form of the model is synthesized from scattered data. Table 6 depicts the relationship between education of family heads and children. It is apparent that when education of family heads is below the college level, children tend to receive more education than the family heads. Children of college graduates tend to receive less education on the average than the family heads. Fitting a linear equation to five observations from table 6 (omitting "no education," "advanced degree," and "high school diploma plus noncollege" data) the result is equation (7), where E_t and E_{t-1} represent years of education of children and household heads, respectively. 10/ The t-value in parentheses is highly significant.

$$E_t = 7.114 + \underset{(28.58)}{.4785E_{t-1}} \tag{7}$$

$$R^2 = .996$$

Data on IQ from Correa (40, p. 150) and income-education data from figure 2 of this report give the regression shown in equation (8) below. I_t, the IQ level, is coded so that an IQ of 100 is 10; of 120 is 12, and so on. Y_t is average annual income per U.S. male.

$$Y_t = -18{,}095 + \underset{(2.25)}{1{,}766E_t} + \underset{(1.51)}{1{,}413I_t} - \underset{(1.50)}{101(EI)_t} \tag{8}$$

$$R^2 = .90$$

10/ The excluded observations were considered to be too indefinite and non-homogeneous in relation to the other categories for quantification.

Based on the t-values in parentheses, only the coefficient of E_t is statistically significant at the 95-percent probability (one-tail) level. Excluding the IQ and interaction variable from equation (8), the new regression is as shown in equation (9). The coefficient of education is highly significant.

$$Y_t = \underset{(5.82)}{-3,060 + 680E_t} \quad R^2 = .85 \tag{9}$$

Table 7 shows average income levels predicted from equations (8) and (9).

Table 7.--Predicted annual earnings of U.S. males by IQ and education level

Education completed	Equation (8), IQ of--				Equation (9)
	90	100	120	140	
	Dollars				
Elementary	1,508	2,116	3,335	4,553	2,380
High school	4,948	5,155	5,568	5,980	5,100

Equations (10) and (11) are the empirical counterparts of equations (2) and (3), synthesized from equations (7) and (9). 11/ E_t again is years of school completed and Y_t is annual income of the current generation.

$$E_t = 9.267 + .0007034Y_{t-1} \tag{10}$$

$$Y_t = 3,060 + 680E_t \tag{11}$$

The difference equations (5) and (6) are solved, forming equations (12) and (13).

$$E_t = [E_0 - 13.64][.4783]^t + 13.64 \tag{12}$$

$$Y_t = [Y_0 - 6,214][.4783]^t + 6,214 \tag{13}$$

The growth models in (12) and (13) indicate that given E_0 = 8 years and Y_0 = $2,380 to reflect "poverty" conditions, education and inome will grow to 11 years and $4,380, respectively, in the next generation. Thus, sizable gains are indicated. The attitudes, opportunities for employment, and other assumptions embodied in the coefficients of the above growth model are for the entire United States, however. This degree of gain is not likely in low-income areas.

11/ The elasticity of demand for education computed from equation (10) is somewhat lower than several estimates, summarized by Schultz (123, p. 9), that range from 0.73 to 3.5.

Arbitrarily assuming a generation of 30 years, the above model implies average annual compound growth rates in education and income of 1.1 percent, respectively, for the first generation after $E_0 = 8$, $Y_0 = \$2,380$. The ultimate equilibrium level of education is 13.64 years (junior college level), and per capita and per male income is $6,214. While these are above the current U.S levels, structural changes through time undoubtedly will create new parameters and raise the equilibrium level. The model is stable since $\beta\gamma = 0.4783 < 1$. If the propensity β of parents to provide education for their children were equal to 1.0, and if $1 of education increased annual income $1 ($\gamma$), the model would be on the borderline. Higher values of β or γ then would create an explosive model.

RESEARCH PROPOSALS FOR APPRAISING THE POTENTIAL CONTRIBUTION OF EDUCATION TO AREA GROWTH

Research is needed to determine what public policies are socially acceptable and economically feasible to redirect the self-sustaining "vicious circle" inimical to development of competence. In broad terms, education appears to be one answer. But what types of education? This and other questions are treated in the following research proposals.

Economic Returns from Education in Rural Areas Characterized by Low Income

The purpose of the proposed research project outlined below is to estimate the rate of return on investment in education for rural areas where incomes are low.

Rates of return on formal education would be computed for youth reared on farms and later employed locally as farm laborers, farm operators, and off-farm workers. Rates of return also would be estimated for farm youth employed in cities outside the particular area. The extent to which rates of return would be broken down by area, occupation, schooling, and aptitude would be set by size of sample and by the research resources.

At least two alternative research procedures are possible. One would be to survey persons in rural and urban communities, ascertaining their income and educational level. Data on class standing or average grade could be collected. Memory and other bias factors could be significant using this approach.

A second approach would be with school administrators in rural communities, using a sample of all students who were in a specific grade in a selected past year. Records on school performance, aptitude, and other tests would be available. In many rural areas, addresses are available on the current residence of former students. These persons would then be interviewed to determine attitudes, earnings, and other pertinent data needed for estimating rates of return on educational investment for alternative IQ levels, occupation, and residence.

Incidence of Costs and Benefits of Education

Decisions on educational outlays are influenced by who pays the cost and who receives the benefits. Public outlays for education may be inequitable to the extent that depressed local communities and farm owners pay a disproportionate share of school costs through property taxes.

The procedure for research on this subject would be to analyze the tax structure and sources of funds for schools in rural communities. Using data from the proposed project on economic returns, the distribution of the economic returns from education would be analyzed by groups and localities. An attempt would be made to determine the benefit-cost ratio for concentric circles around the "home" school. If the benefit-cost ratio were 1.0 or more in the home community, there would be justification for reliance on local support for schools. If the ratio were less than 1.0 for the community but 1.0 or more for the State, then there would be justification for State support to local areas. On the other hand, if the benefit-cost ratio were 1.0 or more only when areas outside the State were included, then the inference might be that Federal support for education would be justified.

The Economics of Quality Education

Teachers' salaries and expenditures per pupil have been used to measure educational quality. These criteria are imperfect, particularly in the broad context in which they have been used, such as in comparing quality of education among States over the Nation. A need exists to estimate more accurately the quality of education in rural areas, and the economic implications thereof.

The procedure for such a study would be to delineate an area relatively homogeneous in cost of living, occupational mix, and culture. Data on schools in the area would then be examined to determine teacher salaries, expenditures per student, size of school, educational program, and other factors or inputs influencing educational quality. The "output" would be measured by scores on tests of school achievement commonly administered throughout the area, dropout rates, percentage of students continuing education in schools of higher learning, and occupational mobility and earnings of former students. These factors would be quantified into economic measures where possible and related to investment in education. Rates of return on quality education would be computed where possible--in other instances the analysis might be of a more descriptive nature.

Identification and Measurement of Attitudes and Their Role in Area Development

Numerous studies cited in the text have been conducted for examining aspirations of rural people, but few have focused on what attitudes contribute most to economic progress in low-income areas. The purpose of such a study would be not only to identify attitudes that contribute to economic progress in individuals, but also to determine how these attitudes are formed. For public policy formulation, it is important to know whether attitudes can be influenced significantly by educational programs and at what cost. Where possible, estimates of costs and returns would be derived to guide decisions on where limited public funds would go farthest to raise incomes.

An interdisciplinary effort by educators, psychologists, sociologists, and economists would be necessary to make progress in this important but difficult research.

Surveys of students in high school would permit sizable samples at reasonable cost. Parents might also be interviewed. Sampling of the same persons 4 years later might provide a check on earlier results and provide more information on important economic and social decisions such as choice of job. Emphasis would be placed not only on aspirations, but also on motivation. Special studies in conjunction with school administrators and counselors might explore the influence of special programs to influence attitudes conducive to higher earnings.

Evaluating the Economic Significance of Special Educational Programs

One socially acceptable and promising means of reorienting values common to the parent-child circle of rural poverty is the preschool program under the Economic Opportunity Act. Cultural enrichment to supplement the home environment of a child at an early age offers one of the few opportunities to intervene in the cycle of values at variance with school attainment and economic development.

The purpose of economic research on preschool and other special programs is to determine the effectiveness of these programs in alleviating low income. Effectiveness in motivating school achievement and reducing dropout rates is of course important to the achievement of higher incomes and living standards, and the increased consumption of education as a cultural good. All phases of progress along the means-end continuum need to be evaluated.

Estimates, from cross-sectional studies, of the relationship between preschool programs and school performance and between school performance and economic performance would provide the basis for one measure of the economic value of preschool programs. The impact of preschool programs on attitudes and achievement would be evaluated over a considerable period, preferably following the child through a life cycle, even to determining economic and social performance later in life. Cost and time limitations preclude continuing the study through the entire life span. Data are needed as soon as possible as to what programs are effective and deserving of emphasis. To circumvent problems of time and cost, cross-sectional research approaches may be necessary. The effect of preschool programs on student aspirations, motivation, grades, and achievement would be made by comparing children enrolled in the preschool program with other children with the same characteristics who had not been enrolled in the program.

There is considerable research and theory (50) which shows that school enrichment programs can enhance a child's performance, even raise his IQ. Thus, the first step would be to determine the impact of educational enrichment programs on IQ's, grades, and school performance test scores. These in turn would be related to economic and social perfomance of adults. If successful,

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Evaluating the Economic Significance of Special Educational Programs

One socially acceptable and promising means of reorienting values common to the parent-child circle of rural poverty is the preschool program under the Economic Opportunity Act. Cultural enrichment to supplement the home environment of a child at an early age offers one of the few opportunities to intervene in the cycle of values at variance with school attainment and economic development.

The purpose of economic research on preschool and other special programs is to determine the effectiveness of these programs in alleviating low income. Effectiveness in motivating school achievement and reducing dropout rates is of course important to the achievement of higher incomes and living standards, and the increased consumption of education as a cultural good. All phases of progress along the means-end continuum need to be evaluated.

Estimates, from cross-sectional studies, of the relationship between preschool programs and school performance and between school performance and economic performance would provide the basis for one measure of the economic value of preschool programs. The impact of preschool programs on attitudes and achievement would be evaluated over a considerable period, preferably following the child through a life cycle, even to determining economic and social performance later in life. Cost and time limitations preclude continuing the study through the entire life span. Data are needed as soon as possible as to what programs are effective and deserving of emphasis. To circumvent problems of time and cost, cross-sectional research approaches may be necessary. The effect of preschool programs on student aspirations, motivation, grades, and achievement would be made by comparing children enrolled in the preschool program with other children with the same characteristics who had not been enrolled in the program.

There is considerable research and theory (50) which shows that school enrichment programs can enhance a child's performance, even raise his IQ. Thus, the first step would be to determine the impact of educational enrichment programs on IQ's, grades, and school performance test scores. These in turn would be related to economic and social perfomance of adults. If successful,

this procedure would provide a measure of the economic return on investment in educational enrichment programs and the effectiveness of the programs in helping to eliminate poverty.

Ideally, research on the preschool education program would be conducted as a controlled experiment. Of the children coming the first day, some portion selected at random would not be given the program and would become the control group. If enough children were available, those in the program would be divided into several classes. One class would be given a Montessori program of cultural enrichment, with emphasis on making the child familiar with the artifacts, institutions, and ways of thinking characteristic of the dynamic economic and cultural sectors of society to which he is foreign. Another class would emphasize preparation for formal schooling through a head start in recognition of symbols and methods used in the formal classroom. Another might be even more specifically directed to inculcation of those attitudes of thought and behavior most often found in individuals who have made successful adjustments to our commercial society. Such attitudes might include aspirations to achieve higher living standards, drive for achievement, optimism for success, awareness of alternative economic opportunities, and so forth.

These educational approaches, and research to evaluate their results, need not be restricted to preschool children, of course. Similar programs could be carried out through summer or academic-year programs for youth in elementary and secondary schools, or in job corps centers. 12/ The broadening experience of military service suggests that enrichment programs through exposure to a nonpoverty culture can speed adjustments. If a program of exposure were adequate in itself, television would be a sufficient instrument for creation of attitudes consistent with escape from the poverty cycle. The need is for identification with a progressive culture. For this, the presence of a teacher appears to be essential.

All of these programs require coordination among educators, psychologists, sociologists, and economists. Special education programs are sometimes drastic measures to overcome the alienation of disadvantaged groups. But it is not yet clear what programs are effective. It is possible that programs that break with traditional methods will require the least social and economic cost for success.

The Economics of Vocational Education in Rural Areas

Becker (12, ch. 2) has shown that private firms cannot be expected to develop general training to equip persons for jobs in industry. A firm which trains a person in generalized skills must pay wages which will compensate for the added productivity of the person trained or the worker will be attracted to another firm where he will receive a higher wage. Hence, the training program is an expense to the firm which increases the cost of production and reduces the firm's ability to compete with other firms lacking such programs. An alternative is to have the prospective trainee sign a long-term

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12/ The benefits of exposure to commercial culture suggest advantages in locating job corps training centers outside low-income rural areas.

contract to stay on a wage that will allow the firm to recover training costs from the added productivity. Such contracts generally are invalid, however, being considered involuntary servitude. Thus, it is the individual or society rather than private industry that usually must bear the cost of vocational training. Rural communities characterized by heavy outmigration are in particular need of assistance in financing such training. Vocational training is essential to attract industry. Again, the concept of viable economic areas is important, since a small community can develop neither the quantity nor the diversity of skills needed to attract firms with adequate payrolls. Also, emphasis on vocational education for nonfarm jobs is often a way to interest students who would otherwise be dropouts.

Further research must be directed to the economic feasibility of vocational education for depressed rural areas. Sampling the progress of persons who complete training in vocational schools in rural areas would provide needed data to determine returns. An economic appraisal of the effect of vocational agriculture programs in rural areas is overdue. Into what occupations are students trained in vocational agriculture going? Is this training economically productive?

The complete vocational training program supported by public monies needs to be reviewed. To what groups and areas are vocational programs made available? What are the backgrounds, IQ's, and other characteristics of persons in vocational programs? Are the occupations emphasized in vocational training programs consistent with future demand for workers? What is the rate of return on investment in vocational education for the student and for the public? Many of these questions could be answered from secondary data, but the answers would require time and research resources. Also, surveys of students would often be necessary.

Appraising the Use of Incentives to Raise Educational Attainment

Research attention is now being directed to school dropouts, but too little of this attention appears to be oriented to depressed rural areas, where the acute problem is unwillingness of individuals to receive enough education to compete successfully with better educated persons for jobs.

An alternative to the often difficult task of changing the basic aspirations and motivation of dropouts is a direct monetary incentive. One procedure would be to place more emphasis on the financial and other benefits of education in counseling sessions. Another approach would involve payments to students.

A research program would determine the impact of payments to students attending school. The compensatory rather than direct payment approach appears to be most promising. In the compensatory approach, high school and elementary students would be given "research assistantships." For example, even at the elementary school level, students might write reports (though naive) for a workshop on topics relating to local economic and social development. In high school, projects would be more sophisticated and might entail surveys of the community, job opportunities, and attendant skill and preparation required for

jobs. The gain would not be in profound research findings by students, but rather would be in (a) financial inducement, perhaps geared to performance and need, to attend school, (b) greater awareness of economic opportunities at home and elsewhere, and (c) reorientation of values away from the local culture toward a more dynamic, commercial culture.

The program could be integrated with a broader program of education for the community, with anyone receiving welfare payments being required to attend educational sessions. Also, parents of dropouts might have welfare payments reduced. Programs of vocational and general education through adult night classes might also be integrated with the preschool, elementary, and secondary programs--all oriented to create a community-wide educational effort and overcome the inertia of cultural conformity.

In summary, the above research proposals are designed to fill several of the important knowledge gaps by applying education to problems of underdevelopment. Other research proposals can be suggested, some that would logically follow those above. The time is yet far off when the coefficients of education, industry, recreation, and outmigration activities can be placed in a linear programming model complete with area restrictions on capital and labor resources and used to compute the least-cost combinations of public policy for desired adjustments. Nevertheless, additional work such as the projects suggested can give a basis for crude budget estimates of public investment needed to bring specific adjustments.

Some projects discussed above relate to programs that may not now be politically or socially feasible. Occasionally, however, economic feasibility provides momentum for political feasibility. It might be useful to have facts available from pilot studies for future consideration of alternatives that at this time are not considered politically expedient.

CONCLUSIONS

The relatively small commitment of public effort to relieve rural poverty is attributed as much to lack of clearly feasible procedures as to public indifference. 13/ A substantial number of publications on area development conclude with optimism about the role of education. Yet education has received comparatively minor research emphasis, and many questions remain unanswered. The purpose of this paper was to review research findings to date, and,where necessary, to orient them to education in rural areas, and to suggest further lines of needed research.

The review of literature on past research establishes several conclusions:

(1) An adequate education is a necessary although not always a sufficient condition for sustained social and economic progress in rural areas. Education is regarded as a catalyst in the development process, facilitating migration, local industrial development, and other mechanisms.

13/ For estimates of the USDA budget, showing amounts of funds devoted to alleviation of poverty, see Martin (91).

(2) Youth in low-income rural areas lag seriously in education and training needed to farm or to compete effectively with other youth for available nonfarm jobs.

(3) An educational drive tends to be lacking in rural communities where poverty is prevalent. While limiting financial resources are responsible for some school dropouts, the basic problem is presence of attitudes inimical to educational attainiment.

(4) Education is a profitable economic investment for society. This conclusion applies to rural youth from poverty areas who have attitudes and education that permit smooth assimilation into the nonfarm economy. It remains doubtful whether investment in education has a profitable economic payoff on the average for youth who remain in depressed areas. The social value of education as a consumption good and as a precondition for economic development may justify use of public funds for education even where direct economic gains are not large.

The growing determination of society to alleviate poverty, and the importance of education in economic development programs lead to the fundamental question of how the quantity of education can be increased in poverty areas, and the quality raised.

The fact that local communities and States in many instances have not given sufficient support for education where economic lags are greatest is due in part to lack of motivation and in part to lack of resources. Harris (72, p. 344) shows, that, on the average,rich States spend relatively less of their available funds than poor States on education. Low-income areas have fallen behind in percentage of tax dollars used for some forms of education. The Federal Government has increasingly become involved in aid to education. A long history of Federal aid to education under the Morrill Act and the Smith-Lever, Smith-Hughes, and more recent programs has led to growing realization by society that such outlays can be of benefit without the undue Federal control feared by many. Thus, there appears to be growing support for broadly based aid to education in depressed areas. But on what types and levels of education should that aid be focused for maximum effectiveness?

A model of educational advancement and economic growth is conceptualized in this study. Economic progress creates a larger economic and social base for education. Consequent increases in education in turn create skills and motivation for greater economic growth. Progress in this process has been slow in many rural areas, however, and because of growing lags, society deems it desirable to speed the development process. Merely pumping additional funds into depressed areas for education may give disappointing results. Yet this may be a gamble which society should take. Students who are not far along in the income-education growth process are not necessarily attracted to good schools; hence they are not culturally ready to make maximum use of good facilities. Making students acceptable for better schools may be justified on grounds of equity rather than efficiency. Even on efficiency grounds, the productivity, though low, of additional support for education may be higher than of other public measures to alleviate poverty.

Several alternatives for intervening in the growth cycle to accelerate educational attainment and income levels have been suggested, including head start programs for preschool children, monetary incentives to attend school, and counseling programs to improve attitudes. Research on such programs is particularly important. The large number of unanswered questions about the role of education in economic development will require much evaluation. The proposals in this study are designed to provide basic data for designing effective public policies on education for economic development.

Education has one of the most flexible outputs from public investment, hence, perhaps fewer mistakes are likely to be made. If the educated youth migrates, education equips him to adjust socially and economically to a new environment. If he stays in the local community, he can contribute enlightened, informed leadership which strengthens the desire for education in the community. Results also show that education of housewives, though often unproductive in cash earnings, may help to raise cultural standards and create attitudes fostering more education in sons and daughters.

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