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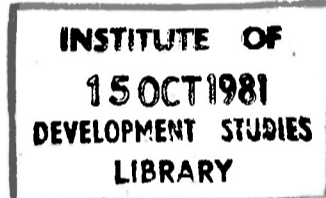
DOES EDUCATION INCREASE FARM PRODUCTIVITY

Paper submitted to the National Committee on Educational Objectives and Policies. Ministry of Education, Government of Kenya.

by

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DOES EDUCATION INCREASE FARM PRODUCTIVITY?

Peter Hopcraft*

The economic development of a country is a complex, multi-faceted process involving changes in the nature of society and changes in the productivity of its people. The present writer has recently undertaken a major econometric study to investigate the interactions of education and small farmer productivity in Kenya. Since the overwhelming majority of school leavers and certainly the additional school leavers who will result from an expansion of the school system must be employed, if at all, in agriculture, the findings of the analysis have considerable bearing on the rate of expansion and the nature of the country's schools. This paper reports in a summary fashion the results of the econometric investigations into the impact of formal education on the productivity of farmers and draws some implications for the rate of expansion of expenditures in the school system. The more technical aspects of the study are briefly described in an appendix.¹

While educative activities undoubtedly have other purposes, whose importance is not to be denied, this study concentrates on the economic purpose of such activities; that of improving the relevant capabilities of people who will engage in the productive process. Despite the large and growing surplus of school leavers in the urban areas, the notion that education is strictly an instrument for acquiring non-farm wage employment has become embedded in the perceptions of vast masses of people. Yet, given the slow growth of formal wage employment and the rapid growth in the number of school leavers, expanded employment opportunities on a scale necessary for Kenya's rapidly growing and increasingly educated labour force can only be provided by the agricultural sector. Under these circumstances the economic justification for expanding education must rely on evidence as to whether education improves the productivity of farmers, and education planning must be concerned with the productive utilization of school leavers in the rural areas. In an agricultural sector where output is determined by the individual farmer on the basis of his skill, knowledge and information, some effort to enhance the farmer's productive capabilities is at the very core of any serious development strategy for the sector.

* The author is the Acting Director of the Institute for Development Studies, University of Nairobi. Many thanks are due to Caroline Swartz for substantial editorial work in producing this paper.

1. See Peter N. Hopcraft, Human Resources and Technical Skill in Agricultural Development: An Economic Evaluation of Educative Investments in Kenya's Small Farm Sector. Ph.D. dissertation, Stanford University, 1974 for the complete text of this study.

The implications of the study are several. With respect to formal schooling, the findings suggest that the school system is not the main source of technical knowledge for the farmer. In fact, the study shows that the farmer's technical knowledge is largely derived from the family and the local community. This is particularly true in the case of the off-farm generation, where the school system is seen to have a negative effect on the farmer's technical knowledge. The study also shows that the farmer's technical knowledge is largely derived from the family and the local community, and that the school system is not the main source of technical knowledge for the farmer. This is particularly true in the case of the off-farm generation, where the school system is seen to have a negative effect on the farmer's technical knowledge. The study also shows that the farmer's technical knowledge is largely derived from the family and the local community, and that the school system is not the main source of technical knowledge for the farmer. This is particularly true in the case of the off-farm generation, where the school system is seen to have a negative effect on the farmer's technical knowledge.

That the school system is not the main source of technical knowledge for the farmer has several implications. First, it suggests that the school system should be re-evaluated in terms of its role in the farmer's education. Second, it suggests that the school system should be re-evaluated in terms of its role in the farmer's education. Third, it suggests that the school system should be re-evaluated in terms of its role in the farmer's education. Fourth, it suggests that the school system should be re-evaluated in terms of its role in the farmer's education. Fifth, it suggests that the school system should be re-evaluated in terms of its role in the farmer's education. Sixth, it suggests that the school system should be re-evaluated in terms of its role in the farmer's education. Seventh, it suggests that the school system should be re-evaluated in terms of its role in the farmer's education. Eighth, it suggests that the school system should be re-evaluated in terms of its role in the farmer's education. Ninth, it suggests that the school system should be re-evaluated in terms of its role in the farmer's education. Tenth, it suggests that the school system should be re-evaluated in terms of its role in the farmer's education.

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is not supported by the study: resources would better be used elsewhere, including other educative activities. It is possible to attempt to correct this misallocation of resources by re-orienting the school system to instill more realistic expectations in its students while simultaneously adjusting the curriculum so that it provides more useful knowledge, less divorced from the students' environment, but there is no assurance that even this would lead to a radically different conclusion. The restructuring of curricula, the reorientation of examinations and the retraining of teachers should be undertaken not necessarily in the "vocational" direction which frequently involves higher costs, excessive specificity and tedium, but certainly away from rote learning unrelated to the experience or the environment of the students. Nevertheless, changes in the educational system, even when they are well conceived, backed by conclusive evidence and given full support by policy makers, will occur only slowly. Implementing such changes will be even more problematic if they are contrary to the wishes of the parents and children served. The clientele of the educational system is likely to continue to view formal education as an instrument of access to off-farm employment, even if the prospects of acquiring such employment are slight. While political pressures to expand the educational system are thus likely to be strong and strident, the social payoff to additional investments in such expansion is likely to remain low or even negative. This indicates a need to view with great care the expansion of the existing educational system. Such an expenditure of scarce resources must be considered in the light of alternative investment opportunities to increase the productivity and the welfare of the Kenya population.

APPENDIX

The data base for the empirical estimations of this study is an intensive study of Kenya smallholders carried out by, and with the cooperation of the Kenya Ministry of Finance and Planning. The survey involved opening and closing inventories and monthly visits to some 1500 farms over the period of a year. The data includes information about assets, production costs, etc. broken down by crop and livestock enterprise on each farm. In addition, a complete profile of the farmer's human resource characteristics was collected. This includes not only his formal education, age and experience but his exposure to a range of educative services aimed directly at farmers. While a number of serious difficulties with the validation of the data set had to be overcome, it does provide a wealth of economic information for empirical research.

The approach of this study is that of examining the production relations of the farm firm, and testing the extent to which educative variables can be shown to affect economic performance. Three different kinds of production functions are developed and fitted; each is designed to shed light on a different aspect of the farmer's technical and allocative efficiency. The first is the conventional, single commodity type of engineering function with human resource factors formulated to account for "neutral" shifts in productivity. The second is a family of aggregate earnings functions in which educative inputs either increase earnings for a given resource use, or change the intensity with which particular physical factors are used. The third is a set of value added or profit functions in which each of the farmer's physical factors is treated as either fixed or variable. When a factor is treated as variable, the net earnings or profit consequences of its use are attributed to the human resource characteristics of the farmer. The extent to which those characteristics enhance the economic efficiency of the firm is then tested. In all cases, econometric findings are subjected to rigorous tests of significance, and the analysis is pursued within the context of the author's detailed experience with Kenya agriculture.

APPENDIX

The data for the empirical estimation of this study is an intensive study of energy markets on a monthly basis. The data is derived from the monthly energy balance sheets of the Ministry of Energy and Mineral Resources. The data covers the period from 1980 to 1990. The data includes information about assets, production costs, and prices. In addition, a separate profile of the energy market is provided. The data is collected from the Ministry of Energy and Mineral Resources and is available to the public. The data is used to estimate the parameters of the model. The data is also used to validate the model. The data is used to estimate the parameters of the model. The data is also used to validate the model.

The approach of this study is that of a dynamic production function of the form $Y_t = A_t K_t^\alpha L_t^{1-\alpha}$, where Y_t is the logarithm of output, K_t is the logarithm of capital, and L_t is the logarithm of labor. The parameters α and $1-\alpha$ are estimated using the method of moments. The data is used to estimate the parameters of the model. The data is also used to validate the model. The data is used to estimate the parameters of the model. The data is also used to validate the model.