2020 FOCUS BRIEF on the World's Poor and Hungry People

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HOW EFFECTIVE ARE FOOD-FOR-EDUCATION PROGRAMS?

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Education and child health are important tools of poverty reduction and economic development. With the recent focus on universal primary education as a Millennium Development Goal, many developing countries have made dramatic improvements in primary school enrollment rates, but primary school attendance and secondary school participation remain low. One reason is that school-age children in poor households are often needed to work on the farm or to care for younger siblings so that parents can work. Another reason is that poor health and short-term hunger cause children to miss school. Children who are hungry during school also learn less effectively.

Food-for-education (FFE) programs, which include meals served to children in school, as well as take-home rations conditional on a child's school attendance, are a popular means of improving school participation while fostering learning and supplementing the inadequate diets of school-age children. When the meals provided are well timed, they can reduce short-term hunger and help children concentrate and learn. The food is often fortified, which helps address nutritional deficiencies and may improve health and cognitive functioning.

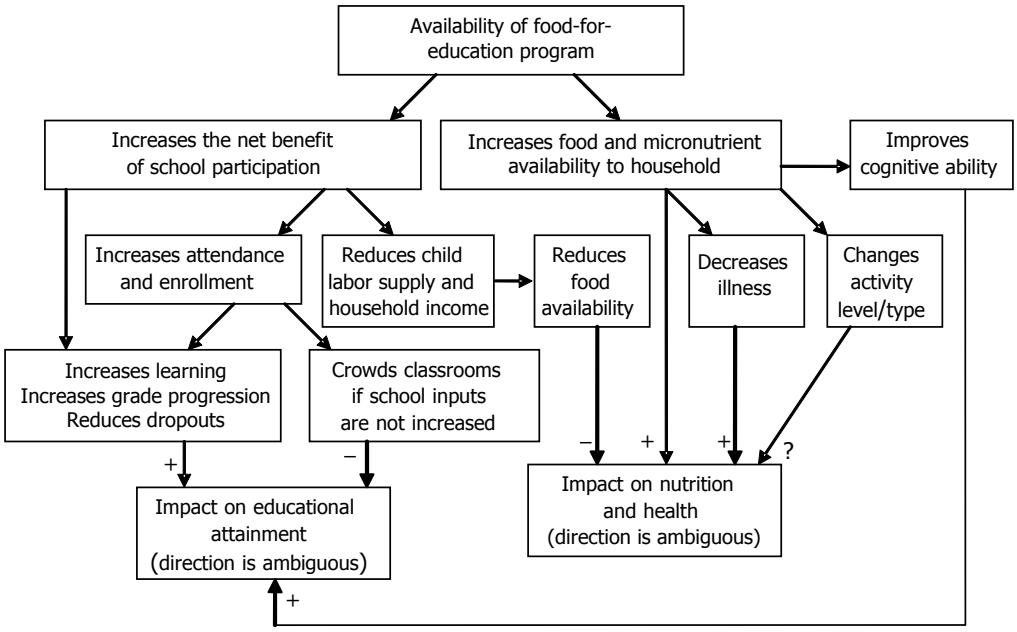
Figure 1 shows the pathways through which FFE programs may affect participants' education and nutrition outcomes. FFE programs raise the benefits of school participation, increasing enrollment and attendance. This may improve learning and educational achievement, which may be bolstered by improved nutrition and cognitive function. FFE programs may improve nutrition and health by directly increasing household food availability, but the net effect on nutrition could be negative if the family loses income because the child is spending more time in school and less time in productive activities. If an FFE program is not accompanied by increased school capacity, classrooms may be crowded, negatively affecting learning. Therefore, negative effects on both education and nutrition are possible. However, the evidence suggests that the effects on education are positive for most children. One possible exception is that children who were already attending school may suffer negative peer effects—the impact of lower ability children joining school. The impact on nutrition also appears to be positive, depending on the quantity and quality of food provided, but gains may be small relative to nutrition interventions in the first two years of life.

Despite these potential benefits, FFE programs have come under attack recently by some donors and policymakers, who contend that these programs are an expensive method for producing the stated education and nutrition objectives and that other more cost-effective mechanisms exist. The empirical evidence on these claims is mixed and can be misleading. One reason is that most evaluations of FFE programs fail to account for both the education and nutrition impacts and for the potential joint benefits of feeding hungry children during school. As a result, aggregate impacts can appear modest. Also, many impact evaluations fail to consider program costs. Indeed, few comprehensive and rigorous studies of the cost-effectiveness of FFE programs exist. Another common critique is that FFE programs often fail in implementation because of unreliable food availability or disorganized meals that disrupt learning. There are examples to support these claims, but the solution is usually one of implementation rather than program design. The remainder of this brief describes the scope and type of FFE programs in operation today, providing a critical assessment of the evidence on their impact and cost-effectiveness, concluding with policy implications and a call for more careful evidence.

The Scope and Type of Today's FFE Programs

It is difficult to know the full scope of FFE programs in developing countries, but a summary of the programs currently operated by the World Food Programme (WFP), likely the world's largest multicountry provider of in-school meals and take-home rations, gives a good indication of the typology and popularity of FFE programs. WFP's FFE programs reached 21.6 million children in 72 countries in 2005. In addition to in-school meals and take-home rations, WFP sometimes provides fortified biscuits for distribution at school. Nearly half of WFP programs combine these modalities of linking food to school participation. In 24 percent of participating schools, only fortified biscuits are provided, while 22 percent of program schools use only on-site meals, and 6 percent use take-home rations exclusively. On average, in-school

Figure 1—Potential Benefits of Food-for-Education Programs



Source: Devised by authors.

meals provide 876 kilocalories (kcal) of food energy per child per day, while biscuits provide 313 kcal of energy. The average cost of running FFE programs at WFP in 2005 was $15.79 per child per year. The cost of on-site meals alone was slightly higher, while that of biscuits averaged $9 per child. For take-home rations, the annual average cost was much higher, at $30 per child, due to transport costs and differences in food bundles. WFP also supports complementary activities to improve child health. For example, deworming is provided in 56 percent of WFP-assisted schools, micronutrient supplements in 40 percent of schools, and hand-washing facilities in half of schools. In some cases, WFP partners with nongovernmental organizations, national governments, or other United Nations agencies to provide complementary school facilities and services.

A Critical Review of the Evidence on Education and Nutrition Impacts

The empirical literature on the impacts of FFE programs on education and nutrition outcomes is substantial. Education outcomes considered include school participation, measured by enrollment and attendance; grades completed or dropout rates; learning achievement; and cognitive development. Nutrition outcomes include food energy consumption, anthropometry, and micronutrient status. However, the number of studies with experimental or quasi-experimental evidence capable of providing causal impact estimates is relatively few. The nutrition literature offers many more experimental studies on nutrition outcomes than are available in the economics literature on education outcomes. However, many of the nutrition studies are controlled trials conducted in closely managed conditions, making it difficult to ascertain how these programs would fare in practice in a more typical setting. The number of experimental field studies for any outcome is few, but growing. From the existing literature, it is possible to draw conclusions about the likely impact of FFE programs on some outcomes, while for others the literature is inconclusive. The summary below presents the evidence for school participation, learning achievement, cognitive development, caloric intake, anthropometry, and micronutrient status, focusing on the studies with the strongest methodology for identifying causal impacts.

Both randomized trials and field experiments demonstrate a small causal impact of in-school meals on school attendance among children already enrolled in school. However, most studies do not test for the effect of in-school meals on net primary school attendance (attendance among children already enrolled and those not enrolled prior to the program) or enrollment rates for all school-age children living in the service area of a school. Thus, most impact estimates reported in the literature could greatly underestimate the full participation effects of these programs, particularly in areas where pre-program enrollment is low. The best recent evidence on net attendance and enrollment comes from a nonexperimental study in Bangladesh. This study found a strong association between in-school feeding and net primary school attendance, but the estimated relationship is not causal. The only study found on the effect of take-home rations on net school attendance and enrollment, also in Bangladesh, provides some support for a moderate impact.

The evidence for learning achievement is less conclusive. While two studies detect an impact of school feeding on students' test scores, each found a significant impact in only one of three tests. One study, in Bangladesh, found a significant impact on mathematics

scores, but no impact on English scores, while the other in the Philippines found the reverse. Neither study identifies whether the gains in learning attributed to in-school meals operate through improved learning efficiency or increased school participation.

FFE programs may also have an impact on cognitive development; however, empirical evidence on the effects of in-school meals is mixed and depends on the tests used, the content of the meals, and the initial nutritional status of the children. Nonetheless, a randomized trial in Kenyan primary schools found evidence that school meals improve arithmetic abilities, and meals rich in animal-source foods improve arithmetic and perceptual function in Kenyan children. Another study demonstrates the effect of breakfast on cognitive function of nutritionally at-risk Jamaican students. However, all of the evidence thus far comes from highly controlled experiments, so it is difficult to determine whether the same impacts would be found in a less controlled setting.

For nutrition outcomes, most of the evidence comes from randomized, controlled, in-school feeding trials, though some recent studies in the economics literature employ quasi-experimental field evaluations to assess changes in energy consumption. In-school feeding programs appear to show greater potential to improve children's total daily macronutrient consumption when children's baseline consumption is well below age- or weight-recommended consumption levels. FFE programs may also improve the quality of children's diets, if not the quantity. Part of the same Kenyan study detected significant increases in micronutrient intake even among children whose overall food energy (calorie) consumption did not increase.

FFE programs also show the potential to increase children's body size and muscle mass, though it is unclear whether the benefits are derived from increased energy intake or the provision of micronutrient-rich foods. Moreover, there is virtually no evidence on how in-school feeding affects children's activity levels, which could ultimately impact anthropometric outcomes. Given sufficient treatment duration, the evidence shows that small increases in weight or body mass index can result from school feeding. However, increases in height and body composition have been detected only when micronutrient-fortified or animal-source foods are provided. Deworming treatments can also improve the nutritional benefits of school feeding. A controlled trial in South Africa finds that deworming interacts positively with iron-fortified school meals to significantly affect several measures of anthropometry depending on initial iron status. The combined treatment had larger effects than either deworming or fortified meals alone. No study was found that tested for a causal effect of take-home rations on student anthropometric status.

The evidence that FFE programs have an impact on children's micronutrient status is sparse, though the available evidence does show some potential for the improved status of some micronutrients. Most evidence suggests that iron-fortified school meals improve children's iron status, compared with unfortified meals; children with low baseline iron stores or higher iron demands may benefit more. However, improvements in iron status were not detected among Kenyan children receiving iron-rich, animal-source foods. The evidence is even less conclusive for other micronutrients. While β-carotene and iodine fortification do improve vitamin A and iodine status in South African primary school students, the Kenyan study finds no improvement in vitamin-A status among students consuming foods rich in vitamin A. In fact, this study only detected a positive impact for vitamin B-12, although foods rich in vitamin A, vitamin B-12, riboflavin, and zinc were provided, and high baseline prevalence of deficiencies in these micronutrients was reported. The presence of malaria or other infections may impede detection of these benefits, particularly with respect to iron status.

Policy Implications

A reasonable consensus exists among those experienced in managing and studying FFE programs that in-school meals increase primary school participation. Where calorie intakes are low, providing meals at school has a unique ability to attract children. However, careful estimates of the size of the causal impact of in-school meals on school enrollment and attendance rates for all children living in the service area of a school are still not available, making it difficult to assess the cost-effectiveness of these programs, even for this primary objective. The evidence on secondary program objectives is mixed, but there is potential for impacts on learning achievement, cognitive development, individual food consumption, anthropometry, and micronutrient status. An important finding that deserves further study is the complementary impact on anthropometry of in-school meals coupled with deworming.

Despite this evidence on the impacts of FFE programs, very little rigorous evidence exists on the central policy question of cost-effectiveness: "Do FFE programs yield higher impacts per dollar spent than alternative programs?" No study has provided a thorough analysis of FFE program impacts across all of the outcomes considered here to obtain a complete impact measure on which to base a comprehensive estimate of cost-effectiveness. FFE programs typically appear expensive relative to other programs targeted at fewer outcomes. For example, providing daily meals at school is certainly a more expensive way of increasing learning achievement than providing textbooks to students, but such a narrow comparison is incomplete. The difficulty in evaluating the cost-effectiveness of FFE programs is in aggregating impacts across various education and nutrition outcomes in common terms, such as gains in future income. Though difficult, such an analysis is certainly feasible.

Cost-effectiveness studies of FFE programs are also complicated by the fact that the main source of food for

many such programs is food aid, which is provided free or below market cost. In the short run, a cost-effectiveness analysis could treat the food aid as free to the program, but this approach to financing the food transfers also reduces the sustainability of these programs. More accurate cost-effectiveness measures would capture the complete cost of funding and operating the programs. Because of concerns over sustainability and effects on local markets, "home-grown" school feeding programs that obtain food from local sources are now being considered in many countries. However, this approach faces other significant challenges, such as maintaining a reliable food source and developing systems to fortify the food with micronutrients as needed.

Another approach to measuring the cost-effectiveness of FFE programs is to conduct side-by-side field experiments with alternative programs. Little research of this type has been undertaken. One exception is a randomized field experiment from the Philippines that compares the education impact of in-school meals to programs that provide teaching materials or foster parent–teacher communication, or both. The program that combined teaching materials with improved parent-teacher communication was most cost-effective, though this study is hampered by a small sample and only limited measures of education outcomes. To make this comparison more accurate, only part of the cost of the FFE program should have been attributed to the education outcomes in the cost-effectiveness measures, since school-based education interventions do not typically affect nutrition. Still, this type of side-by-side field experiment provides some of the best evidence of relative cost-effectiveness. Given the current level of expenditure on FFE programs and the tenor of the debate on their effectiveness, more careful evaluation studies are needed.

For Further Reading: S. Adelman, D. O. Gilligan, and K. Lehrer, *How Effective Are Food-for-Education Programs? A Critical Assessment of the Evidence from Developing Countries*, Food Policy Review 8 (Washington, DC: International Food Policy Research Institute, forthcoming); A. U. Ahmed, "Impact of Feeding Children in School: Evidence from Bangladesh" (International Food Policy Research Institute, Washington, DC, 2004); A. U. Ahmed and M. Arends-Kuenning, "Do Crowded Classrooms Crowd Out Learning? Evidence from the Food for Education Program in Bangladesh," *World Development* (Vol. 34, No. 4, 2006); A. U. Ahmed and C. del Ninno, "The Food for Education Program in Bangladesh: An Evaluation of Its Impact on Educational Attainment and Food Security," Food Consumption and Nutrition Division Discussion Paper No. 138 (Washington, DC: International Food Policy Research Institute, 2002); A. Case and A. Deaton, "School Inputs and Educational Outcomes in South Africa," *Quarterly Journal of Economics* (Vol. 114, No. 3, 1999); A. Gelli, *Food for Education Works: A Review of WFP FFE Programme Monitoring and Evaluation, 2002–06* (Rome: World Food Programme, 2006); P. Glewwe, "Schools and Skills in Developing Countries: Educational Policies and Socioeconomic Outcomes," *Journal of Economic Literature* (Vol. 40, No. 2, 2002); M. Kruger, C. J. Badenhorst, E. P. G. Mansvelt, J. A. Laubscher, and A. J. Spinnler Benadé, "Effects of Iron Fortification in a School Feeding Scheme and Anthelmintic Therapy on the Iron Status and Growth of Six- to Eight-Year-Old Schoolchildren," *Food and Nutrition Bulletin* (Vol. 17, No. 1, 1996); S. P. Murphy, C. Gewa, L. Liang, M. Grillenberger, N. O. Bwibo, and C. G. Neumann, "School Snacks Containing Animal Source Foods Improve Dietary Quality for Children in Rural Kenya," *Journal of Nutrition* (Vol. 133, 2003); J. H. Siekmann, L. H. Allen, N. O. Bwibo, M. W. Demment, S. P. Murphy, and C. G. Neumann, "Kenyan School Children Have Multiple Micronutrient Deficiencies, but Increased Plasma Vitamin B-12 Is the Only Detectable Micronutrient Response to Meat or Milk Supplementation," *Journal of Nutrition* (Vol. 133, 2003); D. Simeon and S. Grantham-McGregor, "Effects of Missing Breakfast on the Cognitive Functions of School Children with Differing Nutritional Status," *American Journal of Clinical Nutrition* (Vol. 49, 1989); M. E. van Stuijvenberg et al., "Effect of Iron-, Iodine-, and β-Carotene-Fortified Biscuits on the Micronutrient Status of Primary School Children: A Randomized Controlled Trial," *American Journal of Clinical Nutrition* (Vol. 69, 1999); J. P. Tan, J. Lane, and G. Lassibille, "Student Outcomes in Philippine Elementary Schools: An Evaluation of Four Experiments," *World Bank Economic Review* (Vol. 13, No. 3, 1999); S. E. Whaley, M. Sigman, C. Neumann, N. Bwibo, D. Guthrie, R. E. Weiss, S. Alber, and S. P. Murphy, "The Impact of Dietary Intervention on the Cognitive Development of Kenyan School Children," *American Society for Nutritional Sciences* (Vol. 133, 2003).

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