

## The Impact of Education Across Sectors: Food Security

### Introduction

*The fact that hunger, illiteracy and lack of schooling affect many of the same areas and people is no coincidence... Hunger, malnutrition and food insecurity erode cognitive abilities and reduce school attendance. Conversely, illiteracy and lack of education reduce earning capacity and contribute directly to hunger and poverty.*

-FAO, State of Food Insecurity, 2004

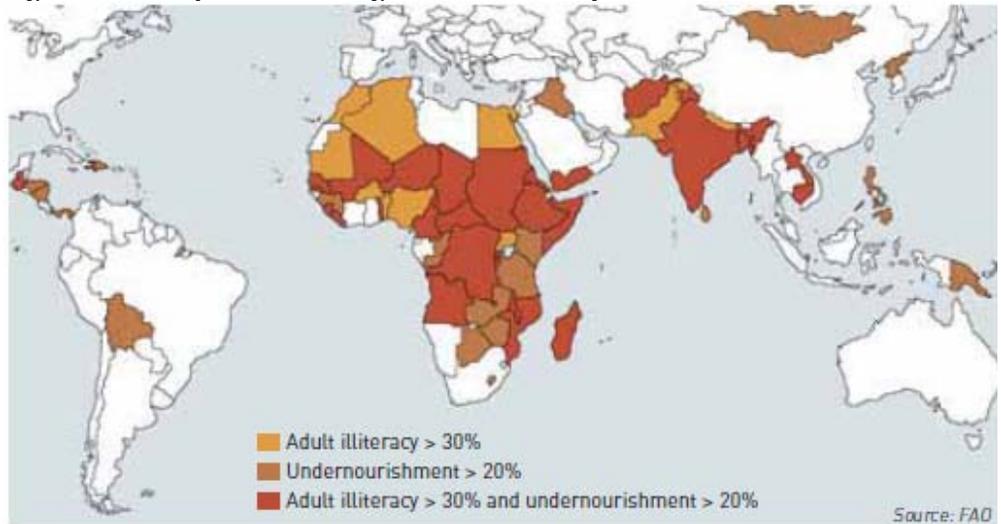
Large areas of the world suffer from the double burden of malnutrition and illiteracy, as shown in Figure 1. It is no coincidence that the first two Millennium Development Goals address the challenges of cutting hunger and ensuring universal primary education, as both are essential to human development. While the negative spiral between illiteracy and hunger is clear, the reverse is equally true: there are strong positive correlations between food security and education. Schools can educate children about agriculture, nutrition, and hygiene, and provide basic literacy training, all of which can lead to higher standards of living and greater food security. Additionally, schools can provide food directly to children to promote their attendance, nutrition and attention. Children who are food secure perform better in school: they have higher cognitive abilities, longer attention spans and better attendance rates. Importantly, girls benefit immensely from the promotion of both food security and education. Educated girls make better decisions about how to feed and care for their own children later in life, and families may choose to send their girls to school in part because food is available there. This policy brief explores ways in which the education sector contributes to the creation of food security, as well as how a more food secure population can have better educational outcomes, promoting an upward spiral of better nourished, better educated citizens.

### What is Food Security?

Food security is defined by the Rome Declaration as the state when “all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life” (World Food Summit, 1996). This definition encapsulates a number of different concepts, so food security is often broken down into four complementary components:

1. Availability of food, which focuses mostly on agriculture and food production.
2. Access to food, which includes both physical access (markets and infrastructure) and economic access (resources available to the household or individual).
3. Utilization of food, which emphasizes health and nutrition factors.
4. Stability of food supply, which incorporates the risk that conditions may change, for example due to seasonal or temporal variations, shocks, or disasters.

**Figure 1. Correspondence of high rates of illiteracy and undernourishment**



Simultaneously achieving the four components of food security is a complex challenge that cannot be addressed by any one sector but requires an integrated, multi-sectoral approach. The Feed the Future (FTF) initiative, launched in 2010 by the United States Government (USG) to assist developing countries to fight hunger, reflects this understanding. To achieve the goal of sustainably reducing global poverty and hunger, FTF has two objectives: to promote agriculture sector growth and to improve nutritional outcomes, especially for women and children. FTF reinforces the importance of leveraging the impacts of interventions from all sectors by incorporating objectives from health and nutrition, as well as agricultural production and economic growth. USAID, the lead USG agency for FTF, took further steps toward this integrated approach by creating a new cross-cutting Food Security Bureau in late 2010. This bureau capitalizes on expertise from agriculture, economic growth, private sector development, and other sectors.

This policy brief builds on this integrated approach by exploring the mutually reinforcing roles of food security and education, including the contributions of the formal education sector, which have not been fully elaborated under FTF. The education sector can contribute directly to the creation of food security through each of the four components: 1) food availability (for example, school gardens); 2) access to food (e.g., distribution of food through school feeding); 3) utilization of food (e.g., sanitation, hygiene, and nutrition education); and 4) stability of food (e.g., channeling disaster assistance to students and their families). At the same time, food security directly improves learning outcomes through a variety of mechanisms such as improved cognitive function and school attendance.

## Options for Promoting Food Availability, Accessibility, Utilization, and Stability through Education

The education sector can contribute to food security through multiple channels, including school gardens, school feeding, and the development of literacy skills, especially for girls. Depending on the design and implementation of these activities, they can address one or more of the four components of food security.

### *School Agriculture*

Schools can directly improve food availability through school gardens where students grow food crops or raise livestock on school grounds. The food produced by the school can be consumed by students, increasing the aggregate food availability for children who may face limited quantities at home. In some cases, vegetables, milk, and other fresh foods produced in school gardens are added to staple foods, such as maize or rice, provided by government or private school feeding programs. These additions can significantly enhance the quality of the students' diet. At the same time, vegetables, milk, eggs, meat, animal fodder, trees, honey, or other products from school agricultural programs can also be sold to meet cash needs for schools.

In addition to the direct improvements in food availability, school gardens can promote better utilization; for example, teaching children the importance of consuming a nutritionally balanced diet. Experimental learning activities can be developed in school gardens to teach children about weighing and measuring, plant growth, the nutritional content of different foods, weather, etc. Desmond (2004) traces the history of "garden based learning" back to 19th century Europe and discusses how school gardens can improve academic achievement, environmental education, health and nutrition, and provide skills-based vocational training. While school gardens aimed solely toward increases in food availability may distract students from educational pursuits, garden based learning can meet multiple food security and educational objectives. The most successful school garden programs not only increase food availability, especially for vegetables and nutrition-rich foods, but also provide practical lessons in agriculture and natural resource management. Students can develop business skills and entrepreneurship, and transfer these skills to the community (see box on 4-H).

#### **Youth education and the 4-H movement**

At least 10 African countries now operate 4-H clubs to educate youth about agriculture. Most of the clubs are associated with schools and led by teachers, operating either as an after-school program or a part of the school curriculum. The clubs focus on building entrepreneurial skills, improving agricultural practices and encouraging youth to consider agriculture as a viable career path. A pilot program in Tanzania uses cell phones, the internet, and emerging technologies to reach young people and develop their knowledge about improved agriculture. Members often divide the food produced, taking it home to contribute to their family's food supply or selling it to generate income for school fees or other cash needs.



### *School feeding programs*

School Feeding Programs (SFP) have been used in developed and developing countries for decades with the goal of enhancing food availability and access for school children, increasing attendance and improving academic performance. A systematic review of 18 SFP studies (Kristjansson et al, 2007) demonstrated that children from low income countries who were fed at school gained more weight than control groups, attended 4–6 more days of school per year, had higher math achievement, and received higher scores on short-term cognitive tasks. Similarly, SFPs have been shown to increase school enrollment and attendance, especially for girls, by providing families with an incentive to send their children to school (Jomaa, McDonnell & Probart, 2011).

In the past, many SFPs in developing countries involved the direct delivery of imported food aid, such as maize or rice, to schools, with a simple goal of providing a social safety net for children. Over the years, as a result of research into the costs and the efficacy of SFPs, programs have grown increasingly sophisticated. As it became clear that SFPs had educational benefits, the function expanded to include livelihood promotion for children. More recently, many SFPs have been transformed into ‘home grown school feeding’ programs, where local farmers grow food for schools, benefitting the local economy in addition to the students. Some SFPs incorporate health, nutrition and sanitation components, while others provide take-home rations for the family as a reward for school attendance, especially for girls (Devereux, Sabates-Wheeler & Pascual Martinez, 2010).

While debates continue about the costs and benefits of various SFP models (Galloway, 2009; Adelman, 2008), the programs are very prevalent around the world. The World Food Program currently provides more than 20 million children in 68 countries with school meals. Even more significantly, the governments of India and Brazil—two countries that have made significant strides in reducing food insecurity—provide 120 and 40 million children respectively with school meals as part of their national development programs.

Schools can also contribute to the stability component of food security (Bundy et al, 2009). After the Indian Ocean tsunami, emergency school feeding programs helped deliver food aid to affected zones. Emergency school feeding programs have also been used effectively to provide short-term indirect income support to vulnerable households, such as during the 2008 food price crisis.

### **Kenya's Healthy Learning Project**

School feeding programs can have a positive effect on school attendance, but in Kenya, the programs traditionally have relied heavily on imported food aid, so the cost and sustainability were questionable (Adelman, 2008). In 2008, the Ministry of Education, the Flemish Association for Development Cooperation, and Technical Assistance (VVOB) and the World Agroforestry Centre established the “Healthy Learning Project” to reduce costs and enhance the sustainability of providing food at schools.

The project encourages schools in arid and semi-arid zones to develop projects to grow vegetables to supplement school feeding programs, rear livestock, plant fruit trees, and promote sanitation. The program also encourages community participation and benefits to increase the sustainability of projects. The projects encourage active, relevant learning for children and help develop life skills that will help them reduce their own risk of food insecurity in the future.

### ***Basic literacy and learning***

In addition to enhancing food availability and access through school gardens or feeding programs, education can improve food utilization. In many countries, high levels of mild to moderate malnutrition continue to exist in areas that produce plenty of food. Even when food is available, millions of children are physically and mentally stunted due to low quality diets with limited diversity (for example, an over-reliance on basic staples like maize). Poor hygiene and sanitation practices lead to disease and malnutrition even when food is available. Education can improve food through basic literacy, skills development, and direct learning.

It has long been understood that the skills derived from basic literacy enhance options for future earnings, which translates into poverty reduction and future food security. Educated children learn how to process and acquire new information and are therefore more likely to be economically productive than illiterate children. In addition, schools teach students about subjects relevant to improved food security, such as health (e.g., learning to prevent the spread of HIV/AIDS or other diseases), agricultural practices, and nutrition knowledge.

Educating students, especially girls, pays off later in life when they provide better care and feeding to their own children. In 2000, the International Food Policy Research Institute conducted a study of the factors that helped reduce child malnutrition by 15 percent in the developing world between 1970 and 1995. The results demonstrated that increases in women's education accounted for 43 percent of the total reduction in child malnutrition, by far the largest contribution, with improvements in food availability coming in a distant second (Smith & Haddad, 2000).

By attending school, children can also learn skills that contribute to the stability element of food security. Food security is closely correlated with diversity in income or diet: households that depend solely on rainfed maize production, for example, face a very high risk of food insecurity in the event of a shock like a drought. Educated households



develop skills and resources that allow them to diversify their income sources (e.g., set up a small business or raise small livestock) and enable them to withstand shocks (FAO, 2000).

## **How Food Security Improves Learning**

While it is clear that education plays a role in increasing food security, the reverse is also true: populations that are more food secure are better able to benefit from education. There is a strong, proven link between nutrition and brain function, including learning capability and behavior (Dani, Burrell, & Demmig-Adams, 2005). Students who are food secure can concentrate better during the school day than hungry students, and also are less likely to be pulled out of school seasonally during periods of peak demand for agricultural labor, or leave school early to earn income for their families. Children suffering from malnourishment achieve lower scores on achievement tests, are more likely to become sick and fall behind in their studies, and have lower energy levels. Moreover, chronic undernourishment has a lasting effect on cognitive development and school performance (Center on Hunger, Poverty, and Nutrition policy, 1995). Overall, food-secure children are more likely to stay in school and benefit from learning opportunities, especially if school feeding programs are in place.

The evidence that children who are food secure generally perform better in school indicates that food-related interventions are a cost-effective way to improve academic performance. For example, a unique longitudinal analysis of Filipino children found that early nutrition programs in a developing country could return at least three dollars worth of gains in academic achievement for every dollar invested (Glewwe, 2001). The analysis supported a causal link between nutrition and academic success, even controlling for factors such as parental input and home environment; although they were unable to make a definitive causal inference.

However, it is important to note that increased food availability alone is not sufficient to improve educational performance. Inadequate food utilization also negatively affects academic performance. Childhood anemia, caused by an iron-poor diet and/or intestinal parasites, has been linked with cognitive impairment and negatively correlated with educational outcomes, including grades and attendance (Bobonis, 2006). It is therefore important that children have both a sufficient quantity of food and also a well-balanced, healthy diet and healthy, sanitary eating practices. For example, school-based iron supplementation and deworming programs may be an effective means to improve food utilization, food security, and academic performance.

For maximum educational benefits, food security needs to be ensured before children enter school. When children are poorly nourished during their first 1,000 days of life, their cognitive abilities are impaired and they are less educable later. Deficiencies in certain vitamins and minerals, especially in early childhood, permanently disable children from learning. For example, iodine deficiencies can reduce a child's IQ by an average of 13.5 points (FAO, 2004). While school feeding programs can improve attendance and may increase retention, the impact of SFP on cognitive abilities and educational performance is less clear. Whaley carried out a rigorous study in Kenya and

demonstrated that cognitive increases can take place in school-aged children when their diets are supplemented by animal sourced foods, but academic abilities did not change significantly with the addition of grains or milk (Whaley, 2003).

The benefits of enhancing the food security of children from 0-5 years, in terms of increased educational attainment, lifetime economic productivity, and overall well-being, are clear. Since the most critical phase for cognitive development is in the pre-school years, educating young girls and boys about proper nutrition, health care, sanitation, and agriculture practices can benefit the food security of future generations.

## Conclusions

Education and food security interact in multiple, mutually reinforcing ways. Although some of the options described in this brief have been used widely around the world for decades (e.g., school gardens and school feeding), new research has identified ways that these activities can contribute to multiple food security and education objectives, if properly designed and implemented. School gardens should not focus on increasing aggregate food supply but on developing “garden-based learning programs” with a focus on nutrition and entrepreneurship. Likewise, home grown school feeding can benefit the entire community, strengthen agriculture markets and value chains, and improve school attendance and learning outcomes. Food secure children are more likely to enroll in school on time, miss fewer days, and repeat grades less frequently than food insecure children.

Designing food security and education programs with an explicit recognition of these positive linkages can benefit both sectors and contribute directly to the achievement of Millennium Development Goals 1 and 2.

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