Meeting Nutritional Needs Through School Feeding: A Snapshot of Four African Nations

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Introduction: The problem, the purpose

Hunger and malnutrition among children in developing countries continue to impair health, quality of life, and survival. It is estimated that a child dies every six seconds from hunger related causes (1) and one out of four children in developing countries are underweight (2). School-age children are particularly vulnerable to undernutrition as the priority in nutrition interventions is often to prevent malnutrition during fetal development and the first years of life – the most critical period for growth and development (3). However, school feeding offers an excellent opportunity for targeted intervention in this age group, both as a means for enhancing nutrition and improving school attendance and educational outcomes. Progress toward these ends is directly in line with Millennium Development Goals 1 and 2: To halve the proportion of people who suffer from hunger around the world, and to ensure that all children are able to complete a full course of primary school (4).

Undernutrition represents both a cause and consequence of poor human health, development, and achievement across the lifespan (5). It is commonly reflected in a high prevalence of wasting, stunting, and micronutrient deficiency. Stunting, or low height for age, is a physical indicator of chronic or long-term malnutrition, whereas wasting or underweight (low weight for age) is an indicator of both chronic and acute malnutrition (6). Both are widespread in school-age children in developing countries. Perhaps most common, however, are less apparent, "hidden" forms of undernourishment with respect to energy, protein, and micronutrient deficiencies that can adversely affect child growth, development, life quality, resistance to infection, and chances of survival (5). The objective of this report is to provide a snapshot-style look at current efforts to provide food for schoolchildren as a means of addressing these nutritional and health deficits in select African nations.

Why focus on Africa?

Available data today suggests that every country for which information is available is attempting, to varying degrees, to provide food to its schoolchildren (3). This report focuses on four African nations - South Africa, Ghana, Kenya, Angola - that have demonstrated movement toward school feeding as a population-level nutrition intervention. Examining school feeding programs through a real-world lens, based on tangible experiences, fosters a greater understanding of the potential for school feeding

programs to improve the health and development of children in less developed nations, and the intricacies involved in the success and sustainability of such efforts. The countries were chosen to reflect a variety of success, challenge, and penetration in the development and coverage of school feeding programs. The following questions will be addressed for each country, with an eye toward future recommendations:

- What current nutritional deficiencies exist among schoolchildren?
- Have school-based nutrition interventions and school feeding programs been implemented?
- What has hindered progress or supported the success of such programs?
- Have any national nutrition standards been established for these programs?
- Are there targeting mechanisms to identify those children most in need?
- How might formulated foods fit into school feeding programs?

These foundational questions, further explored below, can be used as indicators for the direction of future public health and nutrition interventions designed to improve the wellbeing and educational experience of children across Africa and other areas of the developing world.

Micronutrient deficiencies

Micronutrient deficiencies affect nearly two billion people worldwide (7). Deficiencies of iron, vitamin A, iodine, and zinc among children are the most devastating in terms of impaired development and mortality. Iron deficiency, the most common form of micronutrient deficiency in school-age children, is caused by inadequate diet and infection, particularly hookworm and malaria (8). More than half the school-age children in low-income countries are estimated to suffer from iron deficiency anemia (6). Iron deficiency impedes cognitive development and evidence suggests that children with iron deficiency perform worse on educational tests and are less likely to attend school (6, 9). Iodine deficiency affects an estimated 60 million school-age children in the developing world, and is also associated with lower test scores and cognitive abilities. Studies of iodine deficiency indicate that between 35 and 70 percent of school children in developing countries may be iodine deficient (6). Recent data also suggests that vitamin A deficiency is a major public health problem, affecting an estimated 85 million school-age children (6). This deficiency impairs immune function and increases the risk of dying from diarrhea, malaria, and measles. It is also the leading cause of child blindness in developing countries (7). Finally, zinc deficiency contributes to growth failure and weakened immunity in young children and results in some 800,000 child deaths per year (7).

School feeding

Though school feeding programs cannot reverse the consequences of earlier malnutrition, the literature demonstrates that providing meals at school can have a significant impact on nutritional status and educational outcomes in children (3,6,10). Girls who are better nourished are more attentive and involved during class, and well-nourished boys exhibit improved classroom behavior and activity levels (6). School feeding programs have also demonstrated the potential for improved education attainment. Studies from Jamaica, Kenya, Bangladesh, the Philippines, and Uganda found increases in test scores, with many of these programs also demonstrating improved attendance and study skills (11, 12, 13, 14, 15). Evidence from randomized controlled trials also shows that school feeding programs increase enrollment and reduce dropout rates (3). Quite simply, school feeding keeps kids in school and supports learning by alleviating short-term hunger and improving health and cognitive abilities. Such programs have long-term implications for national development and social protection and the growth of productivity and social capital.

Fortified foods

As previously stated, micronutrient deficiency is common among schoolchildren in poor communities (3). Unlike stunting and other consequences of long-term malnutrition, micronutrient deficiencies can be rapidly reversed, lending support for the incorporation of fortified foods or supplements into school feeding programs. The process of fortification involves the addition of small quantities of vitamins and minerals to foods and condiments that are regularly consumed by a significant proportion of the population. Simply adding micronutrients such as iron, iodine, and vitamin A to commonly eaten foods such as salt, flours, or oils can effectively reduce micronutrient deficiencies (16).

In South Africa, a randomized placebo-controlled trial demonstrated that fortified biscuits reduced the prevalence of anemia and low urinary iodine in children ages 6 – 11 (17). Additionally, a study conducted by PATH and the Global Alliance for Improved Nutrition (GAIN) provided 61,000 school-age children in India an iron-rich lunch through a school-based midday meal program. The iron-rich meal came in the form of Ultra Rice – a manufactured, micronutrient packed, rice-shaped grain that is blended with traditional rice during the cooking process. The study showed a significant increase in the iron stores of children that consumed Ultra Rice compared to that of the control group. The children who consumed Ultra Rice also experienced a significant reduction in the incidence of morbidities compared to the control group during the study period (18).

Though supplementation might provide a short-term solution for acute vitamin and mineral deficiencies, food fortification is an effective medium-to-long term solution (16). The cost of food fortification is also less than supplementation, and can be as little as a few cents per person per year, with the ability to be self-financing. In addition to being

cost effective, food fortification does not usually necessitate a change in customary dietary practices, and has the potential to reach broad populations. Also, food fortification technology can be easily shared and transferred, presenting an opportunity for local businesses involved in food production and fortification to develop new markets and gain new customers (16). However, strong partnerships between government, the food industry, public distribution programs, and technical oversight agencies are critical for the promotion and sustainability of food fortification campaigns.

Targeting mechanisms

Because resources are generally limited in the poorest countries, and providing food can be expensive, targeting communities and families that lack the resources to adequately provide for their school-age children is a critical element in improving the impact and penetration of school feeding programs. Targeting can also be used as a mechanism to motivate enrollment in school or more regular attendance. If the school feeding program is intended to motivate families to enroll children in school and to ensure regular attendance, the target group is families with children who are not in school or who are frequently absent. Other targeting mechanisms include economic, geographic, and nutritional status criteria. In addition, specific education criteria such as overall enrollment, female enrollment, or student performance may be included in some circumstances (19). Targeting is essential in ensuring that programs provide the greatest benefit to those most in need.

In general, it appears that school feeding program targeting is best done at the school level, or based on a general geographic criteria, rather than individual selection, as the systems and data required for individual targeting are resource intensive and often considered out of scope for most low-income countries (19,3). The World Food program has developed a tool (the Vulnerability Analysis and Mapping) that analyzes the causes of food insecurity and the educational needs of populations within a country (3). Once target areas have been identified, schools within those areas are screened to identify those to receive food.

Individual targeting has been shown to be effective in select countries. The national school feeding program in Chile is an example of good practice with regard to individual targeting. In this case, schools are provided meal allocations based on a vulnerability index created using an array of socioeconomic household data collected from first grade students. Within each school, teachers are then asked to target free meal allocation to the most vulnerable children in the classroom, with the other children receiving meals at a cost (3).

Targeting mechanisms should reflect goals for school feeding program coverage and will depend on available resources and the needs of targeted populations.

A snapshot of Africa

Finally, this report will conclude with a side-by-side comparison of the school feeding efforts in the four highlighted countries. This snapshot will focus on program organization and targeting mechanisms, successes, challenges, and future recommendations.

South Africa

INTRODUCTION

South Africa is a middle-income, emerging market with an abundant supply of natural resources; well-developed financial, legal, communications, energy, and transport sectors; and modern infrastructure supporting an efficient distribution of goods to major urban centers throughout the region. Growth was robust from 2004 to 2008 as South Africa reaped the benefits of macroeconomic stability and a global commodities boom, but began to slow in the second half of 2008 due to the global financial crisis' impact on commodity prices and demand (20).

Since the first multi-racial elections in 1994, which ushered in an African National Congress-led government and the end of apartheid, South Africa has struggled to address apartheid-era imbalances in housing, education, and healthcare. Poverty, arising from joblessness, remains unusually high in South Africa compared to other middle-income developing nations. An estimated 50% of the population lives below the poverty line and levels of inequity in South Africa remain particularly high. In 2006, a major government study of incomes and expenditure found that (21):

- Half of all households (three to four persons per household) lived on less than R600 ($80) per person month.
- In contrast, the richest 10% of households received over R15 000 ($2,005) a month.
- As of 2006, 14% of households experienced food insecurity that resulted in children going hungry "at least sometimes."

NUTRITIONAL CONSIDERATIONS

South Africa is the only country in east and southern Africa considered self-sufficient in its food production, yet recent statistics reveal that millions of South Africans remain food insecure. Data from 2006 indicate that 43% of households were suffering from some level of food poverty (22).

Additionally, in South Africa, the following deficiencies have been noted (23):

- 25% of children under five suffer from moderate to severe stunting.
- 12% of children under five suffer from moderate to severe underweight.
- 3% of children under five suffer from moderate to severe wasting.
- 33% of children under six suffer from subclinical vitamin A deficiency.
- 21% suffer from nutritional anemia.

Although information on zinc deficiency in South Africa is sparse, a study carried out by the Nutritional Intervention Research Unit demonstrated that 27% of preschool children and 34% of primary school children in a rural community in KwaZulu-Natal are zinc deficient. And in spite of mandatory iodization of table salt, there is still evidence of iodine deficiency in rural areas (24).

There is currently a stable South African health knowledge network that seeks to provide innovative, evidence-based information to organizations and decision-makers working in the country to address malnutrition. This network includes the South African Medical Research Counsel, the Nutrition Intervention Research Unit, scientists, community leaders, political leaders, and partner organizations. Non-governmental organizations such as UNICEF, GAIN, Micronutrient Initiative, MOST, and USAID have also been instrumental in reducing micronutrient deficiencies.

According to the South African Medical Research Counsel, "Adequate nutrition is a basic human right and is essential for the development of an individual's full physical and intellectual potential. Undernutrition affects not only the growth and development of children, but also contributes to ill health and functional impairment in every stage of the life cycle"(25).

NUTRITION STANDARDS

Failure of nutrient-based guidelines to substantially influence dietary patterns in South Africa prompted development of the now widely used Food-Based Dietary Guidelines. Former nutritional recommendations (similar, if not identical to the United States' RDA) were criticized in South Africa for being too complex or aimed only at populations eating a typical Western diet (26).

The ten messages of the food-based dietary guidelines were designed to be more practical, positive, and culturally sensitive in their approach to helping South Africans over the age of five year to choose an adequate but prudent diet. The guidelines are based on consumption of local foods and aim to address nutrition-related public health

problems among consumer groups of different ethnic backgrounds in both rural and urban areas.

The guidelines are:

- Enjoy a variety of foods.
- Be active.
- Make starchy foods the basis of most meals.
- Eat plenty of fruits and vegetables.
- Eat dry beans, peas, lentils, and soya often.
- Meat, fish, chicken, milk, and eggs can be eaten every day.
- Eat fats sparingly.
- Use salt sparingly.
- Drink a lot of clean, safe water.
- If you drink alcohol, drink sensibly.

These guidelines, however, assume adequate access to a stable food supply and make it difficult to measure nutritional deficits (26).

In terms of school feeding, the results of a program evaluation in 2000 indicated the need for standardization of nutrient requirements among school feeding programs. It was decided that menus should provide at least 20% of the RDA for energy, protein, calcium, iron, zinc, and vitamin A (27). (This guideline was recently increased to 30%).

SCHOOL FEEDING

In 1994 the South African Department of Health introduced a national-scale primary school feeding program. This program was subsequently taken over by the Department of Education in 2004. The principles of South Africa's school feeding program (SFP) are outlined in Section 18 of the constitution, which declares the provision of basic education a right for all (28). The National School Nutrition Programme (NSNP) in South Africa aims to foster better quality education by enhancing children's learning capacity, encouraging regular attendance and punctuality, decreasing gender disparity, addressing micronutrient deficiencies, and alleviating short-term hunger by providing 30% of daily energy requirements of the child (27, 28, 29). Additionally, the three key pillars of South Africa's national school feeding policy are: (a) to have a school feeding program in place; (b) to use school gardens to stimulate local farm production; and (c) to promote healthy lifestyles (29). In South Africa, an average of 80% of males and 83% of females attended primary school in 2008 (23).

It is estimated that roughly 7 of the 12 million total public school students in the 2008-2009 school year benefitted from school feeding (29). Data is used by the Department of Education to target schools in low-income and rural areas for participation in school feeding programs. Coverage varies within each school as to which grade levels are

selected for participation. However, results of an evaluation conducted in 2000 revealed that targeting directives were not being adhered to at either the provincial or school level (27). This evaluation also revealed a lack of uniformity in school menus, timing of meals and the number of feeding days (27). As a result, in 2004 steps were taken to standardize coverage and menu options. The minimum policy is to feed all grades from R (preschool) to grade 7 for 196 school days per year (27, 28). It was further decided that menus should provide at least 20% of the recommended dietary allowance for energy, protein, calcium, iron, zinc, and vitamin A. More recent guidelines (in the process of establishment) increase the requirement to 30% (29). Additionally, a meal must be served before 10am to enhance learning capacity. Common ingredients in South African school meals include: samp, beans, rice, canned fish, soya, fortified maize meal, fortified bread, and fruits and vegetables (27, 28).

Though there is both a national and a provincial monitoring and evaluation process that provinces must adhere to in order to receive grant money for school feeding, discrepancies continue to exist in program procedures and outcomes. As is common in most African countries, South Africa uses a decentralized or bottom-up approach to school feeding that relies heavily on local structures (30). Decentralization may result in uneven implementation, as has been observed between schools and regions in the country.

A survey of primary schoolchildren from a rural area in KwaZulu-Natal, where school feeding had been in operation at the school level for nearly two years, revealed a great number of children with persistent micronutrient deficiencies including inadequate vitamin A status (40%) anemia (28%), and iodine deficiency (97%) (17). Additionally, evaluations have demonstrated that not all children entitled to school feeding received food, with great variation in food availability between rural and urban areas (28). While urban schools often report that their stocks are sufficient to provide food regularly, rural schools may not always have sufficient ingredients. Also, there may be inadequate communication mechanisms between schools and caregivers regarding whether or not children receive food on a daily basis.

Additional school feeding challenges in South Africa include:

- Variation in cooking facilities between schools. Though there are a variety of approved meal plans, many schools choose "cold" menu plans (brown bread with margarine, peanut butter and jam) that don't require kitchens (28).
- Incorporating models that utilize local resources, gardens, and food products. Although there is no written policy to promote local farm production, recent collaboration with the Department of Agriculture has led to an increase of school food gardens, where the students help cultivate the crops to be used in their meals. The Department of Agriculture provides funding for this endeavor, in addition to agricultural equipment and training (27, 29). Also, recently in South Africa, the school feeding program has focused more on creating employment opportunities

for local women to encourage them to become suppliers for the school feeding program in a certain area (3).
- Lack of water on site at schools, despite most menus requiring water for preparation (27).
- Lack of basic equipment and utensils necessary for preparing and serving meals, though in some areas, community forums or 'imbizos' are used to provide some resources through donation (27).
- No official milk sponsor has been established, though some schools have partnered with a milk provider (29).
- Poor food quality and inferior food safety due to lack of hygiene (27).
- Providing nutrition education to parents, teachers, feeding program administrators.
- Disappearing food due to theft, corruption (28).
- Undependable infrastructure, including impassable roads during the rainy season, which prohibits food delivery (27).

While it is clear that improvements have been made in the administration of SFPs in South Africa since their implementation in 1994, much needs to be done to improve the quality, consistency and sustainability of these programs. Additional monitoring and evaluation mechanisms should be put in place to enable concrete, school-specific recommendations and links to appropriate resources. Also, following pleas at the community level, the Department of Education has only recently (2007) begun to investigate the possibility of extending the program to the nation's 4.3 million high schoolers, only a small fraction of whom receive the benefits of school feeding.

MECHANISMS FOR TARGETING CHILDREN MOST IN NEED

In South Africa, a quintile system supported by statistical data is used by the Department of Education to target school feeding program recipients (29). Priority is given to the poorest schools, particularly rural and farm schools, with certain provinces receiving a greater amount of funding. In general, variations exist between schools as to which grade levels are targeted for school feeding within each school, and often this is dependent on budget. The extent to which individual targeting mechanisms are used is unclear. It is crucial that the number of schools and students targeted for school feeding be based on a calculated budget that will not allow the quality and quantity of school meals to deteriorate.

FORMULATED FOODS

Compulsory iodization of table salt began in 2001 in South Africa, with support from UNICEF, Kiwanis International, and USAID (31). Iodine deficiency in children can cause developmental delays and mental deficiencies, with major deficiencies resulting in death.

Evidence of improved outcomes from the iodization of table salt was seen in primary school children in four communities of the Western and Eastern Cape provinces within one year of program implementation (31).

Additionally, UNICEF, Micronutrient Initiative, and GAIN supported the government in the implementation of additional food fortification regulations during 2004. This resulted in government regulation of compulsory maize meal and wheat flour fortification with 2 minerals (iron and zinc) and 6 vitamins (vitamin A, thiamine, riboflavin, niacin, folic acid, and pyridoxine) that have been identified to be most deficient in the South African diet. A serving of these ingredients represents about 25 % of the recommended daily allowance for individuals ages 10 and older. Because these staples are widely consumed, it was decided that fortification would provide a national solution to micronutrient deficiencies without requiring a change in dietary habits. This process has been a key milestone in addressing nutritional needs of all South Africans (31) and more than 30 million people of all ages now consume these fortified products (16).

Universal food fortification will help ensure that children are entering school with an improved nutritional status. A longitudinal study of South African pre-schoolers found that nutritional status (using height as a proxy measure) affected schooling in that children of at least normal height tended to start school earlier, complete more grades, and repeat fewer grades. This relationship was especially pronounced in girls (32). Once in school, school feeding programs may be an effective vehicle for distribution of fortified food products in an effort to improve the micronutrient status of schoolchildren.

According to an expert panel on school feeding, to the extent possible, foods provided in schools should be fortified with vitamins and minerals to benefit nutritional and learning outcomes (3). The South African Medical Research Council has conducted a number of trials in South Africa examining the feasibility and efficacy of incorporating fortified foods into the school feeding program (27). A 12-month randomized controlled trial in rural KwaZulu-Natal using a fortified biscuit resulted in a significant improvement in vitamin A, iron, and iodine status. In addition, respiratory- and gastrointestinal-related morbidity also was favorably affected: 30% fewer school days in the experimental group were lost during the intervention period due to respiratory-related illness, and 35% fewer days were lost as a result of gastrointestinal-related illness. This study also had a positive effect on the cognitive function of these children as demonstrated by significant between-group differences for a number of tasks (17). Red palm oil, a natural rich source of carotenoids and tocopherols, was also examined as an alternative form of baking fat to be used as a vitamin A fortificant in the preparation of the biscuits and results showed that red palm oil was as effective as carotene from a synthetic source in improving vitamin A status (33). A micronutrient-fortified bread spread using red palm oil fat as a base, with iron, vitamin C, and zinc added as fortificants, was also shown to be effective in improving vitamin A status and hemoglobin levels in anemic children (27).

Other food fortification techniques have been examined in the context of school feeding in South Africa. A soup powder fortified with iron and ascorbic acid (to improve iron absorption) showed positive changes in iron status, especially in children with low iron status at baseline (34). An additional randomized controlled trial demonstrated that incorporation of the orange-fleshed sweet potato into school feeding menus significantly improved the vitamin A status of 5- to 10-year old schoolchildren (35). Children in the experimental group also experienced fewer absences due to upper-respiratory tract and skin infections. The results from the above studies confirm school feeding to be a suitable vehicle for targeted fortification in schoolchildren.

SNAPSHOT SOUTH AFRICA

- South Africa is a relatively stable, middle-income country, and is one of the only African nations considered self-sufficient in its food production.
- 50% of South Africans live below the poverty line and levels of inequity in the country remain particularly high.
- Food poverty, undernutrition, and micronutrient deficiencies affect large percentages of the population.
- In 1994 South African Department of Health introduced a national-scale primary school feeding program. This program was subsequently taken over by the Department of Education.
- The National School Nutrition Programme (NSNP) in South Africa aims to enhance children's learning capacity, encourage regular attendance and punctuality, decrease gender disparities, address micronutrient deficiencies, and alleviate short-term hunger by providing 30% of daily energy requirements of the child.
- In 2000 it was determined that school feeding menus should provide at least 20% of the RDA for protein, calcium, iron, zinc, and vitamin A. New guidelines increase this requirement to 30%
- Seven of the 12 million total public school students in the 2008-2009 school year benefitted from school feeding, though coverage varies at the provincial and school level due to reliance on local structures.
- Challenges to school feeding in South Africa include: lack of uniformity in program implementation and meals components; resource shortages; lack of basic supplies and clean water; insufficient linkages to local agriculture/food vendors; and corruption and theft.
- Targeting is used to give priority to the poorest schools, particularly rural and farm schools, with certain provinces receiving a greater amount of funding. Variations exist between schools as to which grade levels are targeted for school feeding.
- National iodization of table salt and compulsory maize meal and wheat flour fortification with minerals and vitamins was a milestone in addressing nutrient deficiencies among all South Africans.
- Numerous studies have demonstrated that fortification of food products for use in the NSNP is an effective mechanism for improving nutritional status, and health

and educational outcomes.

Ghana

INTRODUCTION

Located in West Africa, Ghana is considered one of the more politically and economically stable countries of the region. In 1957, Ghana became the first sub-Saharan country in colonial Africa to gain its independence. The nation subsequently experienced a tumultuous period of political and economic instability. A series of coups took place until 1981 at which time Lieutenant Jerry Rawlings took power. Ruling from 1981 to 2000, Rawlings established a new constitution and negotiated a structural adjustment plan with the International Monetary Fund, changing many old economic policies and prompting a movement toward economic recovery (36). Though well endowed with natural resources, Ghana remains heavily dependent on international financial and technical assistance. The domestic economy continues to revolve around agriculture, which employs over half of the workforce (36).

Over the past two decades, Ghana has made progress in halving poverty from 58 to 29 percent, though it is still officially classified as a low-income country (37). Additionally, undernourisment has been reduced from 64 percent in 1979 to 18 percent in 2006 (37). These achievements, however, mask a wide socioeconomic gap between the southern and northern areas of the country, with Ghana's northern regions facing severe poverty and food shortages. Approximately 28% of the population lives below the international poverty line of US$1.25 per day, the majority of which are Ghanaian women from the politically marginalized and poor northern region. According to the World Bank, Ghana's per capita income has barely doubled over the past 45 years (38).

NUTRITIONAL CONSIDERATIONS

The Ghanaian diet is based on starchy roots (cassava, yams), fruit, and cereals (maize, rice). Starchy roots and cereals supply nearly three quarters of energy intake and dietary diversity is low. Malnutrition, which manifests itself as protein energy malnutrition (PEM), stunting, vitamin and mineral deficiencies and other diet-related diseases, remains a pervasive problem (39).

Many families in Ghana's northern region face severe seasonal food shortages. The main occupation in this area is subsistence farming, confined to a short rainy season. As a result most people face chronic food insecurity and abject poverty for the majority of the year, and unstable food production and lack of road infrastructure also contribute to undernourishment. In the Northern Region, five out of ten people are considered poor, and in the Upper West Region, this number climbs to nine out of ten (37). In this area, nearly half of all children under five are malnourished, which is more than twice the national average (37).

Additionally, at a national level in Ghana, the following deficiencies have been noted (40):

- 14% of children under five suffer from moderate to severe underweight.
- 9% of children under five suffer from moderate to severe wasting.
- 28% of children under five suffer from moderate to sever stunting.
- Only 32% of households consume iodized salt.
- Only 24% of children under five receive vitamin A supplements.

Undernutrition in Ghana is associated with widespread micronutrient deficiencies though figures are vague and vary by region and district (39). The proportion of households using adequately iodized salt remains unacceptably low and vitamin A supplementation programs often do not reach the most vulnerable populations. Anemia affects more than three quarters of young children and nearly half of women of childbearing age (39). These deficiencies are significant with regard to school feeding programs as children in poor health start school later or not at all. In Ghana, malnourished children enter school at a later age and complete fewer years of school than better-nourished children (41).

NUTRITION STANDARDS

There is very little published data regarding nationally established nutrition standards in Ghana. In most instances, RDAs and other internationally-accepted intake recommendations are used as guidelines in the literature for measuring individual- and population-level deficiencies.

There are no nationally established nutrition guidelines for school feeding programs. Schools are instructed to provide a "nutritious" meal daily, and in most districts, menus are said to be prepared with assistance from a nutritionist. However, menus are often not displayed and are not always followed (42).

SCHOOL FEEDING

The Ghana School Feeding Program (GSFP) was launched in 2005 with the goal of contributing to poverty reduction and increasing food security in Ghana. The three objectives of the program are to 1) reduce hunger and malnutrition by providing all

primary and kindergarten students in beneficiary schools a nutritious meal each school day 2) increase school enrollment, attendance, and retention and 3) boost domestic food production by sourcing GSFP meals locally, providing a sustainable market for local food producers in the community (43). These objectives align closely with the United Nations' Millennium Development Goals surrounding hunger, poverty, and primary education. The key actors in the implementation of the GSFP are the Government of Ghana and the Dutch Government, which is co-funding the project. The technical partners include USAID, the Netherlands Development Organization, the World Food Program, Catholic Relief Services, and the Adventist Development and Relief Agency (43)

In an effort to boost enrollment rates and ensure that school-age children are well fed, the Government of Ghana has initiated two types of feeding programs: 1) take home rations for girls in schools in deprived communities in three Northern regions and 2) provision of one hot meal per school day to primary-school children using locally-grown food products (44). The latter branch of the program originally provided lunches to over 975 primary schools and over 400,000 students. It was projected that by 2010 the program would serve 2,900 schools and approximately 1.04 million primary school children (44), however, recent estimates indicate that the program currently covers 656,000 students or about 22% of all pupils in public schools across the country (45). Seventy-five percent of primary school age children in Ghana attend school, though this number fluctuates dramatically by region (40). There is a continuous decline in enrollment at the junior high and secondary school level, especially among the poorest of the poor (46).

The take home ration component of the program is being piloted as part of a New Partnership for Africa's Development (NEPAD) and World Food Programme (WFP) Home-Grown School Feeding and Health Programme. This program is designed to link school feeding to agricultural development through the purchase and provision of domestically grown food products, generating a stable demand for products from local farmers and encouraging higher rates of school enrollment, attendance, and retention for girls in particular (3, 37). Locally produced food is also used in some districts for the school lunch program, though the WFP provides fortified food rations (composed of 150 grams of fortified corn-soy blend, 3 grams of iodized salt and 10 grams of palm oil per child per day) to children to complement the nutritional value and type of foods procured locally (46).

An initial analysis of the average cost of take-home rations indicated that rationing comes at a higher cost compared with other modalities of school feeding (47). However, the costs were due mostly to the larger volume of food distributed per child; take-home rations delivered twice the amount of food per child as compared to on-site meals alone (47). This ration program for girls, which began in 1999, has contributed to attainment of gender parity in Ghana's three northern regions and will be gradually phased out and replaced with the national school feeding program (37).

Ghana, like most African countries, uses a decentralized approach relying heavily on local structures to implement school feeding programs (3). Although it was rolled out nationwide under high level political leadership, Ghana's school feeding program varies at the regional, district, and school levels in structure, how food is obtained, menu development, and meal preparation (3). In most Ghanaian regions, resources are channeled to a School Implementation Committee (SIC), which is responsible for buying, storing, and preparing the food (3, 42). The SIC is to receive resources from the District Implementation Committee (DIC) to procure necessary supplies. DICs are set up by District Assemblies, which are responsible for ensuring that DICs and SICs are established and that the necessary infrastructure is in place to mobilize communities to provide needed inputs to schools in the program. At the regional level, the Regional Coordination Offices and the Regional Coordinating Council are assigned to oversee district-level operations and provide regional leadership (42).

A 2007 review of the school feeding programs in 5 Ghanaian regions published by the Netherlands Development Organization (SNV) revealed that regional/district/school partnerships and organizational mechanisms were limited, and many schools lacked a functional school implementation committee (42). Hence, a number of schools reported problems in the regularity of food and supplies. The findings of this report were based on a large-scale school-level inventories, and exposed irregularities in coverage and implementation, structural deficits, and financial dysregulation throughout the GSFP (42).

Additional school feeding challenges in Ghana included in the report were (42):

- Lack of kitchens, storage, and dining halls in GSFP schools.
- Insufficient supply of food to schools, creating inadequate/irregular food portions.
- Lack of training in hygiene and nutrition for school cooks.
- Lack of sanitation facilities and regular safe water (a large proportion of schools are still without poly tanks).
- Inadequate resources for students following influx of attendees in response to school feeding programs.
- Varying degrees of linkage to local farmers/local food supply for food procurement.
- Difficulties in monitoring cooking done outside the school.
- Lack of transparency in records of food supply and payment procedures.
- Students not receiving daily meal, lack of communication with parents.
- Cooks paid irregularly.
- Low community involvement.
- High regional disparity in the allocation of beneficiary schools.
- Lack of preparedness of most districts to pre-finance supplies.
- Increasing school enrollment without commensurate increases in food supply, number of classrooms and teachers.

Based on the findings of the inventory and reported mismanagement of funds, in 2007, the Dutch Government chose to suspend its financial support of the program (43, 45). However, financial support was reinstated in late 2009 following implementation of recommendations and managerial restructuring (43). This vote of confidence, along with renewed commitment from the government of Ghana to establish GSFP as a permanent national program, indicate advancement in the right direction for the success of school feeding in Ghana. At a February 2010 Parliament workshop, the Ghanaian Minister of Local Government and Rural Development, Joseph Yiele Chireh also expressed the need to explore alternative sources of funding for the program to enhance its sustainability should donor funding come to an end (43).

Some notable successes in the implementation of the GSFP include (42):

- Increased school enrollment by 20% in pilot schools (46).
- Reduction in truancy and absences, improved punctuality.
- Reduced dropout rates.
- Improved school performance.
- Reduction in the number of children reported sick to the school authority.
- Opportunities for local employment for school food vendors, cooks, and program administrators.
- Integration of nutrition education into school curriculum.

The GSFP continues to rely on financial and technical support from the government and from development partners. Additional partnerships between the GSFP and the Ministry of Agriculture will be necessary to ensure that local products are purchased for use within beneficiary schools. While the GSFP initiative has led to an increase in enrollment and attendance, especially in poor and rural districts, this increases the likelihood that educational quality will be compromised if the number of students exceeds available resources (teachers, desks, textbooks, etc). Indeed in the 2006/2007 academic school year, national enrollment increased by 21% (37). Attention should be drawn not only to consistent nutrient food provisions and nutritional standards, but also to learning and educational conditions within beneficiary schools.

MECHANISMS FOR TARGETING CHILDREN MOST IN NEED

The GSFP is focused on providing children in public preschools and primary schools in the poorest Ghanaian communities with one hot, nutritious meal per day (37). The program targets include (43):

- Districts classified as “deprived” according to Ghana Poverty Reduction Strategy classification.
- Food insecure districts.
- Districts with low literacy levels.

- Districts with low school attendance or low enrollment rates.
- Districts with high drop-out rates.
- Districts with high "community spirit" or "management capabilities".
- Districts lacking dietary diversity.

Additional criteria for selection of *schools* were as follows (42):

- Willingness of the school-community to provide basic infrastructure.
- Commitment by the District Assembly to sustain the program.
- Poverty status based on poverty mapping.
- Low school enrollment or high gender inequality.
- Low literacy rates.
- Poor access to potable water.

At the start of the program, districts were asked to select five schools for participation. However, upon implementation it became clear that there was a disparity by region and district in the number of schools involved in the program. While this may be a result of variations in population density, it is unclear whether strict criteria were followed in school selection. Also, in instances where parents have a choice of schools for their children, they may choose to send them to a GSFP school, causing a decrease in enrollment in other schools (42).

Targeting has had a tremendous impact on girls' education in Ghana's three northern regions. The take-home ration program in place in this area provides extra take-home food for girls to encourage higher rates of enrollment and attendance. Girls' enrollment in assisted schools grew from 9,000 to 42,000 at the peak of the program, and retention rates doubled to 99 percent (48). The program has successfully encouraged gender parity in these regions and plans are in effect to replace the program with the national school feeding program (37).

FORMULATED FOODS

In 2007, Ghana launched a five-year national food fortification program to fortify vegetable oil with vitamin A and wheat flour with vitamin A, riboflavin, niacin, iron, and folic acid in an effort to reduce micronutrient deficiencies and improve the health of women and children (49). The program, co-developed with the Global Alliance for Improved Nutrition (GAIN), represents a partnership of 35 organizations from the public and private sector and is designed to reach a large proportion of the population through fortification of staple food products.

The World Food Program is also working to build the capacity of local agro-processing industries to produce fortified food commodities such as corn soya blend, maize meal, iodized salt, and palm oil, both commercially and at the local level. Historically, WFP-

assisted schools have provided these locally produced micronutrient-rich foods to students, and iodized salt has been distributed by WFP to beneficiaries of the take-home rations for girls' education program (3, 37). While there is a paucity of literature as to the efficacy of fortified foods in improving micronutrient deficiencies in school-age children in Ghana, the use of micronutrient-fortified, energy-dense Nutributter has been shown to have a positive effect on growth and acquisition of motor skills among 12-month-old Ghanaian infants (50). This study also demonstrated that this type of dietary supplementation improved iron status and was well accepted by the population (51).

The use of formulated foods and investment in long-term food fortification programs should be considered as a viable option for ensuring that certain nutrient standards are met through school feeding programs. To the extent possible, food should be fortified with vitamins and minerals to benefit nutritional and educational outcomes (3).

SNAPSHOT GHANA

- Ghana is relatively stable politically and economically.
- Ghana has experienced success in reducing poverty and hunger rates in recent decades.
- Severe seasonal food shortages are common, particularly in Northern Regions where women and their daughters lack physical and economic access to food.
- Malnutrition, which manifests as protein energy malnutrition, stunting, micronutrient deficiency and diet-related diseases, remains a pervasive problem.
- There are no established nutrition guidelines for school feeding; in some instances nutritionists are consulted for menu planning.
- 75% of primary school age children attend school in Ghana, though there is high regional variation. In some regions, enrollment rates are as low as 35%, while in others close to 100% of children enroll in school.
- The Ghana School Feeding Program (GSFP) was launched in 2005 with the goal of contributing to poverty reduction and increasing food security.
- GSFP provides one hot meal per day to 656,000 students or about 22% of all pupils in public schools across the country, and take-home rations to girls in three Northern regions.
- Attempts are being made to procure food locally as part of the Home Grown School Feeding program, sponsored by the World Food Program. In some schools, 100% of food is obtained from local vendors.
- GSFP is a national program designed to have a decentralized hierarchical regional-district-school oversight structure. Organizational mechanisms and effectiveness varies greatly by region and district.
- The GSFP continues to experience irregularities in coverage across regions and districts, food and supply shortages, structural disorganization, and financial dysregulation.

- There has been a 20% increase in enrollment in pilot GSFP schools, as well as reductions in absence and dropout rates, and improvements in school performance in these schools.
- WFP is working with local industry to fortify food products for use in school meals. Nationally, Ghana has implemented vegetable oil and wheat fortification programs.
- Targeting mechanisms include poverty-, enrollment-, and gender-based measures, though exact school selection strategies are unclear.
- GSFP continues to rely on financial and technical support from numerous development partners.

Kenya

INTRODUCTION

Kenya is a low-income East African nation with a population of approximately 39 million (52). The country is divided into eight provinces, which are subdivided into districts, which are further divided into divisions. About 80% of the population, including three out of four poor people, lives in rural zones.

Kenya has maintained remarkable stability despite pervasive governmental corruption, turmoil, recurrent political changes, and crises in neighboring countries. However, following a widespread outbreak of violence that erupted after the December 2007 general elections, Kenya experienced a setback to the development of its economy, which relies heavily on tourism and agricultural production.

In June 2008, the government launched a long-term development strategy, Vision 2030, and a Medium Term Plan for 2008-2012. These plans are rooted in short- and long-term structural and governance reforms, improvements in infrastructure, reductions in income inequality, and job creation (53).

The per capita income in Kenya averages about US$360. It ranks 148th among 177 countries in the United Nations Development Programme's Human Development Index, which measures a country's development in terms of life expectancy, educational attainment and standard of living (54). More than half of the population lives below the national poverty line, and 7.5 million people live in extreme poverty. The burden of diseases such as HIV/AIDS, malaria and water-borne illnesses weighs heavily on Kenyan families, affecting income, food security and development potential.

NUTRITIONAL CONSIDERATIONS

Maize is the basic staple of the Kenyan diet. *Ugali*, the most common main dish, is a thick porridge of maize meal that is usually eaten with a sauce of vegetables or meat, or simply accompanied with fermented milk. Cassava and sweet potatoes are other staple foods, along with rice in urban areas. Milk and dairy products are also an important part of the diet.

In 2004, it was estimated that more than 10 million Kenyans were experiencing chronic hunger (55). Food insecurity in Kenya is often considered to be a problem of food availability due to a poorly performing agricultural sector, but problems with food access also play an important role as a result of inadequate market and transport infrastructure and low income and purchasing power. Seasonal food insecurity affects households in rural areas before the start of the harvest and Kenya is plagued by acute food insecurity primarily from droughts and/or floods, which threaten the lives and livelihoods of the most vulnerable groups of the population, particularly in the semi-arid and arid regions. Often school feeding programs are suspended during times of severe drought when food is simply not available. An assessment conducted in July 2005 by the Government of Kenya and the World Food Programme indicated that there has been significant deterioration in household food security in most parts of north-eastern Kenya as well as in farming households in the south-eastern and coastal marginal districts (55).

In Kenya, the following deficiencies have been noted (56, 57):

- 21% of children under five suffer from moderate to severe underweight.
- 6% of children under five suffer from moderate to severe wasting.
- 35% of children under five suffer from moderate to severe stunting.
- 84% of children under five are vitamin A deficient.
- 37% of children under five are iodine deficient.
- 69% of children under five are anemic.

While data on nutritional deficiencies and hunger among school-age children in Kenya is lacking, a nutritional intervention study of a large group of rural Kenyan children ages 5 to 14 found a high prevalence of micronutrient deficiencies for iron, zinc, vitamin A, vitamin B-12 and riboflavin (58). In February 2005, the Kenyan Coalition for Action in Nutrition (KCAN) held its first National Nutrition Congress in Nairobi, focusing on various issues and strategies for combating nutritional problems in Kenya. It provided a forum for discussion of research, policy, and programs, and the Ministry of Health addressed the need for competent professionals in nutrition (55).

Interestingly, a longitudinal observational study in Kenya, Mexico, and Egypt revealed positive associations between regular consumption of animal source foods (milk, meat) and physical growth, cognitive development, behavior, and school performance among children (59). These associations remained significant after controlling for total energy intake, socioeconomic status, parental education, and social factors.

NUTRITION STANDARDS

There is very little published data regarding nationally established nutrition guidelines in Kenya. In 2002, the Inter-Ministerial Committee of Food and Nutrition (ICCFN) was charged with setting up a task force to develop a national nutrition policy. The task force, made up of members from government ministries, research institutions, and universities, is coordinated by the Food and Nutrition Planning Unit in the Ministry of Planning and National Development. The subsequent policy contained a number of key objectives, e.g. 'to improve the nutritional status of women of child bearing age and children under five years of age', and 'to increase the number of infants being breast-feeding in Kenya during the first four to six months of life' (60). However, no guidelines have been established for recommended daily intake levels of specific nutrients, and internationally accepted values are often used as guidelines in the literature for measuring individual and population level deficiencies.

There are also no nationally established nutrition guidelines for school feeding programs in Kenya, and the meals provided to beneficiary children in select schools vary in energy and nutritional content. Children in WFP-assisted schools receive a daily meal, mixed with oil and salt, providing 703.25 calories, including 13.5 grams of protein and 5 grams of fat, a necessary macronutrient for growth (61).

SCHOOL FEEDING

The World Food Program and the Kenyan Ministry of Education have been implementing school feeding in Kenya since 1980. Education is a challenge in Kenya, because of extreme poverty and nomadic livelihood patterns, and 1.4 million children are out of school (62). However, according to a WFP 2008 survey, the net primary school enrollment rate for boys and girls in Kenya has risen from 77% in 2002 to 92% in 2007, due in large part to the institution of the Government of Kenya's Free Primary School initiative in 2003 (61). This increased the number of new students by 1.3 million and brought Kenya closer to the Millennium Development Goal of complete primary education for all children and achievement of gender parity (63). School feeding enhances free primary education by providing a meal at school so children from food insecure households do not have to miss school to search for food. There is also evidence that school feeding programs attract more underprivileged girls to school, though gender ratios remain below parity in all schools (61). And although progress is being made, there continues to be significant regional disparities in access to education and school enrollment. For instance, in Nairobi's slums, more than 70% of primary school age children are not enrolled in school, as compared to the national average of 8% (62).

In addition to promoting universal primary education, Kenya's SFP seeks to target

socioeconomically disadvantaged and nutritionally vulnerable children in pre-primary and primary schools in select districts. Specific objectives and expected benefits also include improving the attention span and learning capabilities of children, improving school facilities, supporting school-based micro-enterprises, and providing a significant contribution to the nutrient intakes of schoolchildren (64). However, these goals will not be met without adequate facilities, food access, resources, and training.

The WFP and the Kenyan Ministry of Education (Government of Kenya) have been the main organizations supporting school feeding programs in Kenya. The activities of these organizations have targeted 1.2 million children in roughly 4,000 schools (approximately $1/6^{th}$ of children enrolled in primary school) and have expanded school feeding activities in food-insecure areas (62, 64). While a national school feeding program has not been fully implemented in Kenya, school feeding was included in the 2005 Session Paper on Policy Framework for Education, approved by Parliament, which highlights the need for school meals, calls for the expansion of the program, and encourages communities to provide mid-day meals to needy children. The Kenyan Education Support Program provides an institutional framework by including school feeding as one of the main components of the School Health, Nutrition, and Feeding Program, and the 2008 National Nutrition and Food Security Policy includes a section on school meals and the need to enhance and expand the school feeding program (62). The current schools covered by the program include pre-primary and primary schools in arid and semi-arid areas, schools in unplanned urban settlements of Nairobi, and early childhood development centers in arid districts (64). Children in beneficiary schools receive a mid-day meal, with children in slum schools and early childhood development centers receiving an additional 40 grams of corn soya (64). Some additional support for the unplanned settlements comes from the private sector and from non-governmental religious organizations operating in the area. The full cost of running the school feeding program in Kenya, including community contributions, is estimated to be $28 per child per year (3).

A range of contributions are also made by parents and community members to school feeding programs. The school management committee generally manages the program and agrees on the fees that will be charged to families of children in the school to help support the program. The school levies charged per child in Kenya are in the range of 100 to 300 Kenya shillings (US$1.38 to US$4.17) per year (3). Parents who cannot afford to pay often provide services or other contributions.

WFP's new five-year development program (2009-2013) has emphasized the need to hand the program over to the Kenyan Government after 28 years of assistance. Management responsibilities are gradually being transferred. The government receives external assistance for purchasing and providing food for the program, and is responsible for food distribution to each assisted school. Additionally, the Government's 2008/2009 budget included US$5 million for feeding an additional 550,000 children through a Home-Grown School Feeding Program. This program brings school feeding and agricultural

development together through local procurement of food, support of school gardens, and agricultural education in the classroom. The initiative involves cash transfers to schools for local purchase of cereals, pulses, and oil and represents the continuation of a long-term handover strategy to the government (3). The government used a targeting exercise to identify 28 marginal agricultural districts with access to markets for the new program.

A recent study conducted by the WFP in partnership with the International Food Policy Research Institute and the Gates Foundation demonstrated that if school feeding programs in Kenya were to purchase maize from smallholder famers in a high-potential area for maize, the annual incomes of 175,000 farmers would increase by about US$50 per year (65). However, this local procurement scheme is contingent upon a stable food supply and increases in farmers' yields so as not to cause a rise in prices, which would harm many buyers in the region.

Unpredictable weather forces also threaten the stability of local food supplies and as recently as July 2009 a severe drought prompted top education officials to produce an emergency plan to improve school feeding program food-security measures in several drought stricken districts (66). As a result of drought, many families resort to pulling their children out of school to work, so families can eat one meal a day. In schools where school meals are offered, however, this is less likely to happen (61).

The benefits of school feeding in Kenya have been demonstrated in a number of studies. A randomized controlled trial of Kenyan preschoolers demonstrated that children receiving breakfast scored 8.5% higher in school participation than a control group (67). Also, in a demonstration of the ways in which school feeding programs have the potential for improved educational attainment, Kenyan schoolchildren in a school feeding program who received meat improved arithmetic scores by 0.15 standard deviations and their performance on a test of nonverbal reasoning improved by 0.16 standard deviations (68). Generally, attendance rates in assisted schools have also risen dramatically, as has the number of girls attending school (61).

However, numerous challenges continue to impede the progress and stability of Kenyan school feeding programs. Schools receiving an influx of pupils following the 2003 abolition of school fees have yet to acquire the additional staff, facilities, and supplies necessary to maintain quality educational standards, and many districts remain unable to finance a school feeding program. For school feeding operations already in place, Kenya continues to be dependent on aid and voluntary contributions from the international community for the provision of food and technical expertise. Additionally, a lack of adequate dining spaces and hand-washing facilities for children, in combination with poor hygiene practices is not conducive to a healthy feeding environment. According to WFP, this situation could potentially be improved with food-for-work, cash-for-work, and projects to enhance sanitation facilities and sensitize communities on basic sanitation practices in schools (62). A 2008 baseline survey conducted by the WFP found that 94% of children in schools with feeding programs agreed that school feeding improved

attentiveness and the ability to learn, but that the program should improve the actual cooking and preparation of the food and increase the quantity and variety of meals (69).

Other challenges include (61, 64):

- Seasonal migration of families, interrupting school attendance.
- Cultural practices such as early marriage, which keep girls out of school.
- Lack of sustainable funding necessary for maintenance and expansion of school feeding programs. Programs remain dependent on donor funds.
- Lack of uniformity in school feeding standards and meal provisions.
- Weak institutional in implementation arrangements.
- Seasonal droughts and floods impairing the food supply and access to local markets.
- Lack of stable infrastructure and political stability.
- Lack of community participation and ownership.

One interesting, innovative approach to dealing with school feeding challenges in Kenya has been the development of computer-based monitoring system jointly run by the Ministry of Education and the WFP. This tool is designed to gather timely reports from school feeding project review committees and has resulted in the identification of poor management practices and the need for assistance in vulnerable areas (61).

MECHANISMS FOR TARGETING CHILDREN MOST IN NEED

School feeding in Kenya has traditionally been targeted to districts in the country with the lowest enrollment and attendance rates, as well as those with unequal gender ratios as compared with national averages (3). Poverty, hunger, cultural values, and inadequate school facilities often keep children in these areas out of the classroom. However, WFP, in cooperation with the Government of Kenya, has recently developed a new targeting mechanism based on a weighted indicator that takes into consideration education, poverty, and food insecurity variables (61). This mechanism is designed to ensure proper targeting to the neediest districts, and led to the handing over of more food-secure districts to the government's Home Grown School Feeding Programme. This tool can also be used to re-target school feeding on an annual basis in an effort to reach the most vulnerable populations. Historically, however, Kenyan schools have often relied on emergency WFP assistance during times of severe drought or instability, and it is unclear how effective the targeting mechanisms are in consistently and dynamically pinpointing schools and communities most in need.

FORMULATED FOODS

As a result of advocacy efforts by Micronutrient Initiative (MI) and other partners, the Kenyan Ministry of Health has now adopted fortification of foods as an accepted and important strategy for combating micronutrient deficiencies. Many school feeding programs in Kenya already use a fortified corn-soya blend and a randomized placebo-

controlled trial of Kenyan children ages 3-8 years showed that iron-fortified whole maize flour improved iron status (70). Additionally, WFP Kenya has added iodized salt to its school feeding programs (61).

Current strategies for food fortification in Kenya include salt iodization and fortification of oil with vitamin A. A vast majority of households have access to iodized salt, though additional tools and monitoring systems are needed at the factory, warehouse, and retail level as a foundation for a national universal salt iodization policy (57). Efforts of MI, the Government of Kenya, and the Kenyan oil industry have also resulted in three certified vitamin-A-fortified products on retail shelves, and similar efforts are being taken to stimulate flour fortification in the country (57).

SNAPSHOT KENYA

- Kenya is a low-income nation; half the population lives below the national poverty line.
- Many Kenyans experience chronic food insecurity due to inadequate food access and supply, infrastructure, droughts, flooding, and poverty.
- There is a high prevalence of micronutrient deficiencies in Kenya.
- Kenyan schools have experienced recent increases in enrollment due to Free Primary Education initiative; net enrollment rate for boys and girls was 92% in 2007, with vast variations in enrollment and attendance by district.
- WFP and the Kenyan Ministry of Education (Government of Kenya) support 1.2 million children in school feeding programs in nearly 4,000 schools.
- There are no nationally established minimum nutritional values for school feeding programs.
- There is a sound national policy framework for SFPs, though national school feeding guidelines not established.
- There is great potential for linkages between school feeding and local agricultural development through government the sponsored Homegrown School Feeding Programme.
- The educational benefits of school feeding have been demonstrated in Kenyan schoolchildren receiving school meals.
- School feeding in Kenya lacks stable sources of funding and the institutional and implementational arrangements necessary for sustainability and efficiency.
- Droughts and flooding disrupt access to food and school feeding infrastructure.
- Investments are needed in agriculture and infrastructure.
- Salt iodization and vitamin A fortification of oil have been adopted in Kenya with select schools using fortified food products to improve the micronutrient status of children.
- A greater variety of food is needed in school feeding program meals to ensure adequate nutrition.

- Targeting mechanisms are used to ensure school feeding programs reach educationally-vulnerable and food insecure populations. No report is available on the effectiveness or consistency of targeting methods.

Angola

INTRODUCTION

Angola is a country in south-central Africa bordered by Namibia on the south, the Democratic Republic of Congo on the north, Zambia on the east, and the Atlantic Ocean on the west. Angola is divided into 18 provinces and 163 municipalities.

Following independence from Portugal in 1975, Angola experienced a 27-year civil war resulting in the loss of 1.5 million lives and the displacement of 4 million people. The country is in the challenging process of rebuilding and the general situation remains desperate for most Angolans. The population is currently estimated to be 18 million and the national average life expectancy is 38.8 years, one of the lowest in the world. Angola also has the highest rate of infant mortality in the world (71, 72) and seventy percent of the population lives on less than $2 per day (72).

Angola has experienced a high growth rate in recent years driven by its oil sector and high international oil prices. Oil production and its supporting activities contribute about 85% of the GDP (71). Angola was admitted into OPEC in 2006.

A postwar reconstruction boom and resettlement of displaced persons has led to high rates of growth in construction and agriculture as well. However, much of the country's infrastructure is still damaged or undeveloped from the nearly three decade-long civil war, which also destroyed much of the country's fertile countryside, leaving it littered with land mines and driving millions of people into the cities.

The agricultural sector is the main livelihood for most Angolan people, but half of the country's food must still be imported (71). The vast majority of farming is done at the subsistence level and thousands of Angolan small-scale farmers are trapped in poverty (73). Additionally, diseases such as cholera, malaria, African hemorrhagic fevers, tuberculosis, and HIV are common in several parts of the country.

NUTRITIONAL CONSIDERATIONS

Angola has become dependent on large-scale importation of staple grains (wheat and rice) and food aid donations mostly in the form of maize and beans. Angola's diversity of climate means that a wide range of crops are able to be grown, and prior to independence, the country was self-sufficient in all crops except wheat (74). However, the agricultural sector was devastated by the war, and poverty, food insecurity, and nutrient depletion of the soil contribute to widespread malnutrition and threaten the nation's rebuilding efforts. Angolan farmers currently produce an array of crops, including maize, millet, sorghum, rice, cassava, and sweet potatoes, albeit at low levels of production. These crops are the main staples of the diet, along with beans and some vegetables. Farmers also produce fruits, coffee, and oil crops for sale (74). Agricultural production is gradually improving in concert with road and infrastructure rehabilitation, but many people remain extremely vulnerable to poverty and malnutrition (72). According to a 2009 Food Security Risk Assessment, Angola was one of the five most-at-risk countries in the world for food shortages, as measured by availability, stability, and access to basic food stocks (75).

The central highlands region in particular is plagued by widespread food insecurity and intense population pressure. There, impoverished soils, poor farming practices and competition for farmland combine to diminish productivity and aggravate malnutrition (76). Households headed by women are among the poorest and most vulnerable, and there also remains a large number of orphaned and displaced children.

Additionally, in Angola, the following malnutrition and micronutrient deficiency statistics have been noted (77, 78):

- 16% of children under five suffer from moderate to severe underweight.
- 8% of children under five suffer from moderate to severe wasting.
- 29% of children under five suffer from moderate to severe stunting.
- 70% of children are anemic.
- Only 33% of households have access to iodized salt.

According to a damage assessment report by Micronutrient Initiative (78), approximately 40% to 60% of the nation's 6-to-24 month-old children are at risk of disrupted brain development due to iron deficiency and more than 250,000 babies are born each year with intellectual impairment caused by iodine deficiency. Additionally, as a result of

vitamin A deficiency, 50% of Angolan children experience ill health and poor growth, and over 30,000 children each year die due to increased susceptibility to infection (78).

NUTRITION STANDARDS

Not surprisingly, no national nutrition standards have been developed in Angola. Food and nutrition interventions to reduce hunger are not well developed in the context of national development, though there does appear to be commitment by the government to the Millennium Development Goals. A 2005 report by the United Nations Standing Committee on Nutrition revealed that policy makers in Angola had no common understanding of the programming and policy components necessary for ensuring the achievement of both food security and nutritional adequacy (79). This report also noted the lack of adequate human resources trained in food and nutrition as one of the main barriers to the formulation of a national nutrition policy and strategic implementation plan.

SCHOOL FEEDING

According to the United Nations World Food Programme (WFP), initiatives to fight poverty, like school feeding, have become critical to the recovery of Angola (80). Many communities have little or no access to basic social services, while more than a third of children are not enrolled in school (72). According to Angolan law, education is compulsory and free for 8 years. However, many students do not attend due to a lack of school buildings and teachers, or because families cannot afford additional school-related expenses, including fees for books and supplies (81). In addition, it is reported that nearly half of all schools were looted and destroyed in the Angolan Civil War, leading to current problems with overcrowding (81).

Various organizations are working in Angola, in partnership with the government, to implement school feeding programs. A total of 147,182 children in the most conflict-affected provinces are benefitting from WFP-assisted programs, and attendance in these schools increased to 94% in 2007/2008 compared to 88% in the previous school year. The WFP has also committed to raising awareness among parents regarding the importance of education, particularly for girls. Recently, the Government of Angola has launched a three-year pilot school feeding program in those provinces previously assisted by WFP, and this project will serve as the baseline foundation for the National school feeding program to help school children countrywide. (80). The Brazilian National Fund for Education Development, with support of the Brazilian Government, has helped support this national school feeding effort in Angola (80).

The Global Child Nutrition Foundation (GCNF) is also working with the Angolan Ministry of Education to create policies and implementation procedures for a national school feeding program. Major aims of the program are to reduce short-term hunger,

while increasing nutrition and health knowledge through education (82). In an attempt to strengthen the capacity of the Angolan government, GCNF has partnered with Joint Aid Management and Humana People to People to provide training and management development for school feeding administrators, along with monitoring and evaluation and nutrition education expertise. GCNF is also working to form Parent-Teacher Associations to assist in school feeding advocacy (82).

Another promising school feeding effort is LIFE Outreach International's (LOI) Mission Feeding Program, which feeds 200,000 Angolan children. Through a partnership with Joint Aid Management (JAM), LIFE's Mission Feeding Program operates on the basis of the Complete Community Assistance (CCA) model, which is founded on a school-based platform and contributes to more holistic community development. This approach attempts to provide a comprehensive foundation for community engagement and development and is comprised of four complimentary interventions: nutritional feeding, water and sanitation programming, agricultural development, and HIV prevention education (83). Additionally, LOI/JAM recently announced plans for the development of a new food processing facility in Angola. This facility will have the capacity to process over 1 million meals per day, and store up to 10,000 metric tones of food, potentially helping to avoid the bottlenecks in the nation's school feeding food supply (83). LOI has committed to the production of fortified foods at this facility, addressing country's need for additional micronutrient-fortified food products.

There are numerous threats to the successful implementation of school feeding in Angola, and the country is far from achieving universal school feeding program coverage. At the most basic level, the education system in Angola continues to be extremely under-funded, and the reconstruction and rehabilitation of the country's extensively destroyed physical, social, and economic infrastructure remains a national challenge. A lack of clean water and insufficient agricultural development compromise the capacity for food production for schools, especially those in the poorest areas. The presence of landmines continues to obstruct the free movement of goods and people. Existing school feeding programs lack sufficient and sustainable sources of funding and additional technical assistance is needed for program oversight and development. Additionally, mechanisms must be put in place to protect against the squandering and theft of what food and resources are available.

As organizations shift their focus from food assistance to capacity development in Angola, the government of Angola must maintain its commitment to and support of school feeding and a national nutrition policy. Specifically, WFP donors believe that the government should be putting more of its own financial resources (from oil, gas, and mineral revenues) toward the provision of social services, like school feeding programs, to the population (72).

MECHANISMS FOR TARGETING CHILDREN MOST IN NEED

WFP has traditionally targeted school feeding activities in the most conflict-affected zones and those with a high concentration of resettled returnees recovering from the war. Food insecurity in these areas is severe, and most targeted families spend 60% of their income on food, allowing for one meal per day (80).

National, regional, and individual targeting mechanisms for school feeding programs have not been formally established.

FORMULATED FOODS

Angola currently has a modest salt iodization program, and it is estimated that 1/3 of households have access to iodized salt. However, the goiter rate in Angola is 33%, and this may contribute to a lowering of the national IQ average by 10 to 15 points (78). There is currently no national fortification legislation for the addition of iron and folic acid to wheat flour, though the government has expressed interest in a large-scale fortification program. The World Food Programme in Angola has begun fortification in one wheat mill in the country and is distributing fortified flour to beneficiaries (84).

WFP has also very recently initiated maize fortification in Angola, to combat pellagra, a micronutrient deficiency disease caused by a lack of niacin, commonly occurring among people whose diets are dominated by maize. By providing fortification equipment to a commercial mill at the port of Lobito and using a vitamin and mineral pre-mix provided by UNICEF, this project has overcome many of the difficulties common in countries emerging from conflict. Monthly rations of fortified maize are provided to some 115,000 beneficiaries (85). These efforts demonstrate that local food fortification is possible in Angola, albeit challenging. Such work helps to protect the nation's mental and physical health, prevents the occurrence of birth defects and increases energy and productivity among the population.

Linking fortification efforts to school feeding in Angola will help protect against the micronutrient deficiencies that impair physical and cognitive development of school-age children.

SNAPSHOT ANGOLA

- Angola is in the challenging process of rebuilding following a 27-year civil war.
- Poverty, food insecurity, and nutrient depletion of the soil contribute to widespread malnutrition and threaten the nation's rebuilding efforts.
- 70% of the population lives on less than $2 per day.
- Angola has a very low national average life expectancy and high infant mortality rates.

- The nation depends on food aid and large-scale importation of basic grains and is at high risk for food shortages.
- Agricultural production is gradually improving with road and infrastructure rehabilitation, but most people remain vulnerable to poverty and malnutrition.
- Vitamin and mineral deficiencies continue to affect the growth and development of Angolan children.
- The Angolan Government lacks understanding of the program components necessary for ensuring the achievement of both food security and nutritional adequacy and there is insufficient personnel trained in food and nutrition.
- Though education is compulsory and free for eight years, more than 1/3 of Angolan children remain out of school.
- There is a severe lack of educational funding, resources, buildings, teachers, and overcrowding is a problem.
- Piecemeal school feeding programs supported by various international organizations target Angola's most vulnerable regions.
- The Government of Angola has launched a three-year pilot school feeding program in provinces previously assisted by WFP, to serve as the baseline for a national school feeding program.
- The Global Child Nutrition Foundation is working with the Angolan Ministry of Education to create policies and procedures for a national school feeding program.
- Plans are underway for the development of a new food processing facility in Angola to combat food shortages and bottlenecks in the food distribution chain.
- A lack of clean water, slow agricultural development, and landmines are additional roadblocks to school feeding, and additional technical assistance is needed.
- There is a call for increased support of school feeding from the Angolan government, using oil revenues.
- Improvements are needed in sanitation and hygiene.
- Parent and community support and involvement are necessary for the preparation, cooking, and distribution of meals to children.
- National, regional, and individual targeting mechanisms for school feeding have not been formally established, though activities tend to take place in the most conflict-affected areas.
- There is currently no national food fortification legislation, though Micronutrient Initiative and WFP projects have been successful in introducing fortified salt, maize, and wheat flower to certain segments of the population.

School Feeding Snapshot

	South Africa	Ghana	Kenya	Angola
Program Organization	The South African National School Nutrition Program is run by the Department of Education. A national and provincial monitoring system is in place, though decentralization results in uneven implementation. The program aims to provide 30% of daily energy and nutrient requirements.	The Ghana School Feeding Program (GSFP) was launched in 2005 by the Government of Ghana to reduce poverty and increase food security and school attendance. GSFP remains dependent on outside technical and financial support. In most regions, resources are channeled to School Implementation Committees.	Though there is no nationally established SFP, the Kenyan Ministry of Education and the World Food Programme have been implementing school feeding in targeted areas in pre-primary and primary schools since 1980. The government receives external assistance for purchasing and providing food and is responsible for food distribution.	Various organizations are working in Angola, in partnership with the government, to implement school feeding. Efforts are underway to create policies and procedures for a national program. Major aims of the program are to reduce short-term hunger while improving nutrition and health education.
Targeting Mechanisms	Targeting is used to give priority to low-income schools, particularly rural and farm schools, with certain provinces receiving more funding. Variations exist between schools as to which grade levels receive meals.	Program targets include: districts classified as "deprived" according to Ghana Poverty Reduction Strategy classification; food insecure districts; districts with low literacy levels; districts with low attendance or enrollment rates or high drop-out rates; districts with high "community spirit" or management capabilities.	School feeding targets socioeconomically disadvantaged and nutritionally vulnerable children in pre-primary and primary schools in select districts. Districts with low enrollment and attendance rates and unequal gender ratios are also targeted. More food secure districts participate in the Home Grown School Feeding Program.	WFP has traditionally targeted school feeding activities in the most conflict-affected zones and those with a high concentration of resettled returnees recovering from the war. National, regional, and individual targeting mechanisms for school feeding programs have not been formally established.
Successes	School feeding is outlined in Section 18 of National Constitution, which declares basic education to be a right for all. An estimated 7 out of 12 million public school students benefitted from school feeding in 2008/2009. Established guidelines detail program coverage and nutrition requirements. Health and educational benefits have been demonstrated among beneficiary students.	GSFP provides one hot meal to 22% of public school students and take-home rations for girls in three Northern regions. Other successes include increased enrollment in pilot schools, reductions in truancy and absences, improved school performance, generation of local employment opportunities, and the use of locally grown food products in some districts.	School feeding activities have targeted 1.2 million children in 4,000 schools. Children receive a mid-day meal, with children in slum schools and early childhood development centers receiving take-home rations. The government is also working to bring together school feeding and agricultural development. Attendance rates have risen in assisted schools.	The Government of Angola has launched a 3-year pilot school feeding program to serve as the baseline for a national school feeding program, with technical assistance from the Global Child Nutrition Foundation. Various organizations currently provide school meals to 300,000 schoolchildren.
Challenges	There is a lack of national/regional uniformity in program implementation and meal components; Also, resource shortages, a lack of basic supplies and clean water, insufficient linkages to local agriculture and food vendors, corruption and theft impede the stability of school feeding in South Africa.	There continues to be irregularity in GSFP coverage across regions and districts, food and supply shortages, structural disorganization, and financial dysregulation. Inadequate educational resources are problematic in schools that have experienced an influx of attendees in response to school feeding.	Challenges to school feeding include: seasonal migration affecting school attendance; lack of sustainable funding for maintenance and expansion of school feeding, lack of uniformity in standards and meal provisions, weak institutional arrangements, lack of stable infrastructure and political stability.	Many Angolan students do not attend school due to a lack of school buildings and teachers or because families cannot afford school expenses. Education continues to be extremely underfunded and reconstruction of the country's extensively destroyed physical, social, and economic infrastructure remains a national challenge.
Future Directions	Improvements are needed in the consistency and sustainability of programs and oversight mechanisms. Efforts are in place to provide a larger percentage of daily caloric and nutrient requirements to students. Also, the feasibility of extending program to South African high school students should be investigated.	Alternative sources of funding should be explored to enhance GSFP sustainability. Regional/district/school organizational and oversight mechanisms should be strengthened. Improvements are needed to enhance the regularity of food and school supplies in participating schools.	There continues to be significant regional disparities in access to education, and expansion of current school feeding efforts is necessary. Improvements in cooking and food safety and preparation are also needed. Innovative SFP monitoring tools are currently being developed.	Organizations working in Angola are shifting their focus away from food assistance to capacity development, and the Angolan government must maintain its commitment to school feeding and a national nutrition policy as the country undergoes reconstruction.

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