

Global Health Promotion

<http://ped.sagepub.com/>

Pilot project of the Nutrition-Friendly School Initiative (NFSI) in Ouagadougou, Burkina Faso and Cotonou, Benin, in West Africa

Hélène F. Delisle, Olivier Receveur, Victoire Agueh and Chizuru Nishida
Global Health Promotion 2013 20: 39
DOI: 10.1177/1757975913476907

The online version of this article can be found at:
<http://ped.sagepub.com/content/20/1/39>

Published by:



<http://www.sagepublications.com>

On behalf of:



International Union for Health Promotion and Education

Additional services and information for *Global Health Promotion* can be found at:

Email Alerts: <http://ped.sagepub.com/cgi/alerts>

Subscriptions: <http://ped.sagepub.com/subscriptions>

Reprints: <http://www.sagepub.com/journalsReprints.nav>

Permissions: <http://www.sagepub.com/journalsPermissions.nav>

>> [Version of Record](#) - Apr 5, 2013

[What is This?](#)

Pilot project of the Nutrition-Friendly School Initiative (NFSI) in Ouagadougou, Burkina Faso and Cotonou, Benin, in West Africa

Hélène F. Delisle¹, Olivier Receveur¹, Victoire Agueh² and Chizuru Nishida³

Abstract: This paper describes the first African experience with the Nutrition-Friendly School Initiative (NFSI) in two large West African cities: Ouagadougou, Burkina Faso and Cotonou, Benin. NFSI was launched by the World Health Organization (WHO) and its partners in 2006, as a means of preventing the double burden of malnutrition: the coexistence of undernutrition and overnutrition among school-children. NFSI pilot-testing is one component of the Partnership Project on the Double Burden of Malnutrition, funded by the Canadian International Development Agency for 6 years (2008–2014). The Project assisted the government in the selection of pilot schools, fostered the installation of health and nutrition committees in selected schools, and helped with the initial school self-assessments. In accordance with the empowering philosophy of health promotion, pilot schools did not follow a pre-defined schedule of interventions, except for the training of teachers in nutrition education and the nutritional (anthropometric) surveillance of schoolchildren. For the latter activities, technical assistance and seminal funds were provided. Yearly planning workshops were held for school committees, with WHO support. In both settings, training was given to street vendors in order to improve the hygiene and nutritional value of food sold to schoolchildren. Other activities included special nutrition events and sanitation measures. In both cities, NFSI showed promising results in terms of school and community mobilization towards improved nutrition and health; however, NFSI must be better understood as an endogenous and self-sustaining approach. Furthermore, household poverty and scarce school resources appear as major barriers to gaining full impact of NFSI in low-income populations. (*Global Health Promotion*, 2013; 20(1): 39–49)

Keywords: children, youth, nutrition, schools, educational programs, health promotion, World Health Organization, Nutrition-Friendly School Initiative, West Africa, Burkina Faso, Benin

Introduction

Improving the health and nutritional status of school-age children and adolescents is an effective investment for the future generation, and ultimately, for the nation. Health, nutrition and education are closely linked (1). Child malnutrition cannot be addressed without attention to education, and vice versa (2). In low- and middle-income countries in

particular, school-age children are a priority target for health and nutrition interventions. School feeding programs have been in existence for a long time, with evidence of impact on energy intake, micronutrient status, and both school enrollment and attendance (3). School feeding is among the strategies implemented to contribute to the achievement of the Millennium Development Goal (MDG) 2, *Achieve universal primary education*, as

1. TRANSNUT, World Health Organization (WHO) Collaborating Centre on Nutrition Changes and Development, Department of Nutrition, University of Montreal, PO Box 6128, Downtown Station, Montreal, QC, Canada H3C 3J7. Correspondence to: Hélène F Delisle; helene.delisle@umontreal.ca
2. Regional Institute of Public Health (Institut Régional de Santé Publique), Ouidah, Benin.
3. Department of Nutrition for Health and Development, WHO, Geneva, Switzerland.

(This manuscript was submitted on 15 November 2011. Following blind peer review, it was accepted for publication on 6 July 2012)

Global Health Promotion 1757-9759; Vol 20(1): 39–49; 476907 Copyright © The Author(s) 2013, Reprints and permissions: <http://www.sagepub.com/uk/journalsPermissions.nav> DOI: 10.1177/1757975913476907 <http://ped.sagepub.com>

among other benefits, it encourages families to enroll their children in school. However, school feeding on its own is not sufficient to achieve MDG 2 nor to fully improve the health and nutrition of school-age children.

The World Health Organization (WHO) launched its Global School Health Initiative in 1995, with the purpose of spreading the Health Promoting School (HPS) approach worldwide (4). This initiative was guided by the Ottawa Charter of Health Promotion, promulgated in 1986. It is designed to improve the health of students, school personnel, families and other members of the community through schools at the local, national, regional and global levels. The concept and implementation of health promotion in schools developed progressively to integrate other partial strategies, such as health education, into a thoroughly participatory approach for pupils and schools themselves (5). The definition of a HPS is 'one that constantly strengthens its capacity as a healthy setting for living, learning and working' (6). China was one of the first countries to implement the HPS approach, in 1995 (7). After successful pilot projects in 10 schools, with either tobacco or nutrition interventions as entry points, HPS was scaled up to a whole province. Schools set up special HPS planning committees, launched mobilization meetings, put their priority on health, popularized the HPS concept, cooperated with parents and the community, used participatory teaching and learning strategies, and reshaped assessment to establish a more holistic approach. There was a demonstrated health and educational impact.

As one measure to halt the progression of chronic, non-communicable diseases, WHO called upon countries to adopt school policies and programs that promote a healthy diet and physical activity, and also provided a framework for that purpose (8). In addition, the Nutrition-Friendly Schools Initiative (NFSI) was launched by WHO, following expert consultations on childhood obesity held in Kobe, Japan in 2005 and a follow-up partners' meeting held in Montreux, Switzerland in 2006 (9,10). The partner agencies that are participating and involved in the development and implementation of NFSI include: Food and Agriculture Organization (FAO), United Nations Children Fund (UNICEF), World Food Programme (WFP), World Bank, Education Development Center (EDC), Save the Children (SC), Partnership for Child Development (PCD) and

Standing Committee on Nutrition (SCN), as well as some governmental organizations from Brazil, Finland and Ireland. The NFSI is based on the principle that effectively addressing the increasing global public health problem of the double burden of malnutrition requires common policy options. As such, the NFSI provides a framework for implementing integrated intervention programmes aiming to improve the health and nutritional status of school-age children and adolescents, that are targeted to the school setting (including pre-schools, such as nurseries and kindergartens), bringing together the ongoing efforts and work of all concerned agencies and partners.

This paper's purpose is to describe the experience and lessons learned from the implementation of NFSI pilot projects in Benin and Burkina Faso. We start by describing the NFSI and then describe its context in Benin and Burkina Faso, including our methods and experiences, summarizing the lessons learned based on the NFSI criteria and on the development process. Finally, we present our conclusions and suggestions for future work.

The Nutrition-Friendly Schools Initiative and its rationale

NFSI aims to provide an enabling physical, social and educational environment that contributes to the health and nutritional well-being of children, and also their improved learning and academic achievement. In this paper, we use a broad definition of nutrition promotion from Worsley (11): 'A set of coordinated actions based on tools specifically developed to make food consumption and nutrition more conducive to health'. The NFSI approach is grounded in health promotion, in having close links with parents, local community and health services for promoting the health and nutritional well-being of children. One of the main goals of NFSI is to provide a framework for designing school-based intervention programs which address the double burden of nutrition-related ill-health, that is, the coexistence of undernutrition and 'overnutrition'. For that reason, it is expected that NFSI will serve as a valuable approach and intervention program, specifically in developing countries and areas where the double burden of malnutrition is becoming an increasing public health problem.

Undernutrition and overnutrition (overweight/obesity) are often regarded as opposite problems;

however these two forms of malnutrition are closely connected. For one thing, both undernutrition and obesity may be rooted in poverty (12), and the co-occurrence of undernutrition and overnutrition disorders is increasingly observed in the cities in developing countries (13). Furthermore, nutrition-related non-communicable diseases (NCD) such as obesity, diabetes and cardiovascular disease, are not only associated with overnutrition: there is now growing evidence for the theory of the developmental origins of chronic diseases, whereby undernutrition early in life, and even micronutrient deficiencies, may increase the risk of NCDs (14,15). As malnutrition is often understood as undernutrition and micronutrient deficiencies, there were various attempts to use different terms to encompass all forms of nutritional deficiencies, imbalances and excesses, such as: 'malnutrition in all its forms' or 'dysnutrition' (16).

The NFSI pilot phase that started in 2006–2007 involved selected schools in 21 countries worldwide, including 11 countries in the WHO European region. In developed countries, irrespective of NFSI, the prevention of obesity in children and adolescents is a priority focus of school health programs, but results in this regard have been mitigated (17). It was suggested that multi-component interventions (promoting healthy eating, less sedentary behavior and more physical activity), particularly when they target whole communities and environments rather than merely schoolchildren and education, may be more effective in developed countries (17), as well as in developing countries such as in the Pacific (18). In a metropolitan area in North India, a case-control study among school adolescents shows for the first time that a low-cost nutrition and lifestyle educational intervention was effective in improving participants' diet, reducing abdominal adiposity and reducing fasting blood glucose levels, after only a few months (19). Thus, improving the nutritional status of school-age children in developing countries appears feasible, whether undernutrition or overnutrition is the main problem (18,19). Furthermore, health-promoting school approaches, including NFSI, engages parents and other community members and leaders in actively preventing child malnutrition in all its forms, as is claimed for Africa (20). Indeed, schools offer many opportunities to promote healthy eating and physical activity; they have to be considered as focal points for healthy development, in low-income countries. The NFSI still needs to be

tested and its effectiveness evaluated in developing countries.

The NFSI aims to serve as a stimulating mechanism for interconnecting the various ongoing school-based intervention programs addressing malnutrition in all its forms. It is, therefore, considered that NFSI would provide the following benefits to participating schools (10):

- It helps schools build an enabling environment for promoting the overall health and nutritional well-being of children, which in turn contributes to children's improved learning and academic achievement;
- It strengthens the capacity of schools in addressing the health and nutritional problems of the children, their families and communities through use of a 'whole school approach', which acts both within and beyond the classroom;
- It strengthens the capacity of and network between the school community, including school personnel, students, parents, local community and local health and education authorities, to tackle the increasing double burden of nutrition-related ill-health that is being faced by children in both industrialized and developing countries;
- It enables schools to become accredited as 'Nutrition-Friendly Schools', which will enhance the schools' reputation for making an effective investment in the future generation.

NFSI includes five components, which represent the conditions or criteria for schools to be considered nutrition-friendly:

- A written school policy on nutrition (also named Nutrition-Friendly Schools' policy);
- Awareness and capacity strengthening of the school community;
- Curriculum development and modification;
- Creation of a supportive school environment for optimal nutrition and health; and
- School nutrition and health services.

The process of becoming a nutrition-friendly school was previously outlined (10). The following steps are suggested, beginning with the formation of a school nutrition committee (as the core action group) to undertake the assessment of the school, using the self-appraisal tools developed by WHO

and referring to the requirements under each NFSI criterion. An iterative process of reporting to a national NFSI committee and of re-assessing the school is then undertaken. Finally, accreditation should be granted following an external assessment by an international team, and then the accredited schools will be periodically re-evaluated. The process may not be exactly the same in different country contexts. For instance, national NFSI committees may only be set up once the NFSI has been implemented, at least on a pilot scale.

Based on the framework developed (10), the NFSI was pilot tested in only a few developing countries (i.e. Brazil and India). The Brazilian experience is not yet documented. In India, the New Delhi pilot project that was initiated in 2007 involved four out of the seven schools that were contacted (2 public and 2 private) and this pilot was conducted in collaboration with WHO Department of Nutrition for Health and Development in Geneva. The initial self-assessment showed that the schools did not have a written nutrition policy and that there was no sustainable health education programming within the school curriculum (21). The need for a structured initiative such as NFSI was recognized, but country-specific adaptations were suggested.

Context of NFSI implementation in Benin and Burkina Faso

Pilot-testing of the NFSI is a major action-research component of the Double Nutritional Burden (DFN) Project that is being carried out in Benin and Burkina Faso, with Canadian International Development Agency (CIDA) funding (2008–2014). TRANSNUT (for TRANSition of NUTrition) of the Department of Nutrition at the University of Montreal, a WHO Collaborating Centre on Nutrition Changes and Development, heads this project and collaborates with several academic institutions in Benin and Burkina Faso. Other project components are capacity building and advocacy/communication. Capacity building involves formal training and continuing education in nutrition, with particular focus on the double burden of malnutrition. New formal training programs include a Master's degree in public health nutrition and a professional undergraduate program in Nutrition and Dietetics, for French-speaking West Africa; both programs are offered in Benin. Continuing education primarily

addresses the management of severe malnutrition, nutrition transition and chronic diseases. Advocacy/communication includes the development of an advocacy tool for the programs, to prevent and manage nutrition-related chronic diseases, in particular diabetes (project website: www.poleDFN.org).

Helen Keller International (HKI), a technical non-governmental organization (NGO) with a mandate for coordinating school health activities, has been collaborating in Burkina Faso with the DFN Project, for the implementation of the NFSI. In Benin, the Regional Public Health Institute (Nutrition Programme), which is the main DFN Project partner in Africa, and the Institute of Applied Biomedical Sciences are piloting the NFSI in urban schools.

Methods

A detailed report on the school activities connected with the NFSI since 2008 was prepared for the DFN Project in 2011; it provides the background for this synthesis¹. Qualitative process analyses of NFSI implementations that were conducted between May and July of 2011 in Ouagadougou and Cotonou, by students enrolled in the new Master's program in public health nutrition at the Regional Public Health Institute of Benin, are other sources of information for this paper.

Baseline study (Ouagadougou)

In the Ouagadougou schools only, a baseline study on nutritional status and nutrition-related attitudes and practices was conducted between February and April 2009, in the six pilot schools and in six control schools, among 5th grade pupils (total of 799 pupils, mean age 11.5 ± 1.3 years). It was felt that younger children might not be able to understand the questions nor answer the long self-administered questionnaire. The control schools were paired with the intervention schools, for the type of school (public/private) and their location (urban/peri-urban). This design allows for the impact evaluation to be conducted after 4 years of activities. The methods and some findings of the baseline study are available elsewhere (22). In brief, micronutrient malnutrition was widespread, with anemia present in roughly 40% of the pupils, with a similar rate for vitamin A deficiency. An underweight condition was observed

in 14% of the sample; only a few cases of overweight were observed in private schools. The results were fed back to communities and school authorities, to highlight the urgent need for nutrition-based action in urban schools. The findings were also used in nutrition training sessions for the teachers, with a particular focus on the foods that are good sources of vitamin A and iron.

2.2. Preliminary steps for NFSI implementation in Cotonou and Ouagadougou (2007–2008)

Prior to the launching of the initiative, the NFSI documents were translated into French, including the self-appraisal questionnaire, which was field tested with the help of nutrition interns in Cotonou, Benin and Ouagadougou, Burkina Faso.

The initial steps of pilot-testing the NFSI involved meetings with national health and education authorities, and with other stakeholders, to explain the initiative and to gain their support and involvement. Pilot schools were selected and subsequently, nutrition committees were created with all involved stakeholders in these pilot schools. In Ouagadougou and Cotonou, a sample of six schools from each city, offering the full elementary levels (first six grades), were selected with the help of the Education Department, in order to include public and private schools, as well as city and peri-urban schools. Other selection criteria used were the size of the school (of at least 300 pupils in the elementary level), with a relatively high proportion of girls (at least 40%), as well as the interest and motivation of the school headmaster. The age of the pilot school pupils ranged from 5 to 15 years, with a few younger and older outliers. The schools purposely represented various settings in the city, although they could not be considered entirely representative of the whole city, in the absence of a systematic random sampling process. In both settings, we selected four public schools and two private schools.

Core action groups or nutrition committees were set up in the pilot schools in 2008, with the help of students from a Master's program in nutrition from the University of Montreal in Canada and from Senghor University in Alexandria, Egypt, which is an academic institution for French-speaking Africa. The committees are headed by the school principal and include teachers, parents, health workers from

the school or area, representatives from the municipal administration, food vendors in the schools' vicinity or representatives of the school feeding program, when available, as well as pupils. The number of committee members may vary. In Cotonou, for instance, the committees included one representative for each stakeholder group, except that there were two parents (one man and one woman) and two pupils (one boy and one girl). Graduate students helped the committees to conduct the self-appraisal of the specific nutrition situation in their school, with the questionnaire encompassing all five criteria or conditions for nutrition-friendly schools, using for this purpose the translated guidelines and forms that were developed by the WHO. This self-evaluation exercise is designed to establish a school nutrition (and health) diagnosis, and to facilitate the identification and implementation of nutrition-promoting activities. Results were shared among the nutrition committees of the pilot schools in their first workshops, held between June and November 2009. A summary of the school self-appraisals is provided in Table 1.

Implementation of NFSI in both settings

Early on in the process and based on the school self-appraisal results, the school committees identified the main health and nutrition problems and defined the priority interventions that could be implemented with their own resources or with minimal outside support from the DFN Project or other funding sources. Pilot schools did not follow a pre-designed schedule and set of interventions, in accordance with the empowering philosophy of health promotion. Training and planning workshops on NFSI held in 2009 with all school nutrition committees in Cotonou and Ouagadougou received WHO support. The training workshops were intended for nutrition committees to better understand the NFSI, to identify the main problems in their schools and to select priority activities for the upcoming school year. For instance, in Ouagadougou, community sensitization and mobilization for nutrition was identified as a priority, and three of the six schools took advantage of the last day at the end of the school year in 2010 to hold various sensitization activities around nutrition.

The DFN Project provided technical assistance to the committees and seminal funds primarily for

Table 1. Results of self-appraisal by nutrition committees of pilot schools, in the West African cities of Ouagadougou and Cotonou

<i>NFSI Components</i>	<i>Status and problems raised</i>
1. School nutrition policy	<ul style="list-style-type: none"> • No school has a written nutrition policy; only general ministerial guidelines are available. • One private school (Cotonou) claimed it had an informal nutrition policy.
2. Awareness and capacity-strengthening	<ul style="list-style-type: none"> • Focus on hygiene, more than nutrition: <ul style="list-style-type: none"> ◦ Some educational initiatives for hygiene (handwashing, potable water, etc), but none in nutrition. ◦ Some schools (two in Cotonou and two in Ouagadougou) initiated sensitization of food vendors to hygiene. • Inadequate knowledge and training of teachers in nutrition.
3. Curriculum development and changes	<ul style="list-style-type: none"> • Nutrition not in school curricula, except for some aspects of foods in the course of initiation to science and techniques. Nutrition and food preparation only in the curriculum of one private school in Ouagadougou. • Hygiene, as part of teaching of moral science (Ouagadougou) • Healthy living addressed in some Ouagadougou schools • Two periods of physical activity per week (Ouagadougou), but a lack of trained teachers and material. • Impossible to change the public schools' curriculum, but some nutrition elements could be introduced by teachers, once trained.
4. Promoting a supportive school environment	<ul style="list-style-type: none"> • School canteen in one private school in Cotonou and in one public school in Ouagadougou. • One school garden (private school, Ouagadougou); normally the water supply is a barrier. • No nutrition-related messages (except in one private school in Cotonou and one private school in Ouagadougou). • Messages for hygiene in nearly all schools. • Reportedly inadequate access of children to clean water and hygienic food in over half the schools. • Lack of adequate toilet facilities in over half the schools. • Clean water supply appears to be a priority, for both personal and food hygiene.
5. Providing school health and nutrition services	<ul style="list-style-type: none"> • Few schools have access to health services; one private school in Ouagadougou has a nurse on staff. • No regular growth-monitoring, for lack of equipment, but yearly health monitoring was present in one private school in Ouagadougou.

NFSI: Nutrition-Friendly School Initiative

training and for nutritional surveillance, through yearly anthropometric measurements of school children. In Cotonou and Ouagadougou, a part-time nutrition worker assisted the school committees in implementing priority actions, in identifying the technical and material resources needed, and in coordinating DFN Project support to the committees, including the support provided by graduate students.

The DFN Project also provided support to strengthen nutrition education in the school curriculum, which up to now existed only in Ouagadougou. A nutrition training workshop was offered to school teachers,

following an assessment of nutrition education in the current curriculum and of the materials used for that purpose; two Master's students from the University of Montreal were involved. The same type of technical support was scheduled for Benin.

Providing technical and material support to pilot schools for the nutritional surveillance of pupils through the yearly measurement of heights and weights was planned for in the DFN Project, along with support for nutrition education in schools. In Ouagadougou and Cotonou, training in anthropometrics for teachers and local health workers involved

in the schools was provided by the DFN Project nutrition workers. Scales and measuring boards were provided, as well as forms to register pupils' heights and weights, including WHO BMI-for-age charts. The results of the first set of anthropometric data will soon be available.

Development of a school nutrition and health policy was deemed too difficult to start with, and besides, it was felt that such a policy should be developed at the national, rather than the school level. It was agreed instead that each school should define a set of nutrition rules.

In Cotonou, improving the hygiene and nutritional quality of the street food sold around schools was considered a priority, as there are no school feeding programs in the public, urban schools. A training workshop was given to food vendors by a specialized local NGO, Action Vitale Scolaire. The workshop included practical activities on food grouping, based on: nutritional value, menu planning, improved food handling and preparation.

The salient activities of NFSI in Ouagadougou and Cotonou are summarized in Table 2.

Because of its small scale, the NFSI pilot project has remained low profile. The purpose was not, at this stage, to increase the number of NFSI schools, which may come in a second phase, but rather to demonstrate that the approach is relevant and effective in West Africa. There was no start-up or large mobilization event. Hopefully, the 3-year experience with NFSI in pilot schools will soon be shared in national or regional workshops, in order to sensitize the health and education decision-makers and advocate for a scaling up of NFSI and for the setting up of national school accreditation systems.

Process evaluation

Process evaluation took place in 2011, after slightly more than 2 years of activities. In addition to assessing progress towards meeting the nutrition-friendly school criteria, the evaluation considered the following developmental dimensions, based on previous assessments of health promoting interventions or schools (23,24): ownership and empowerment;

Table 2. NFSI activities of pilot schools of the West African cities of Ouagadougou and Cotonou

<i>NFSI Components</i>	<i>Ouagadougou</i>	<i>Cotonou</i>
1. School nutrition plans (rather than policy)	<ul style="list-style-type: none"> • Diagnosis and planning workshops with committees • Yearly work plans by committees Work plan by teachers 	
2. Awareness and capacity strengthening	<ul style="list-style-type: none"> • Nutrition days in schools for the community • Nutrition education training workshop for teachers 	<ul style="list-style-type: none"> • Training workshop for food vendors in schools, to improve food safety and nutritional quality of food sold to children
3. Curriculum development and changes	<ul style="list-style-type: none"> • Assessment of nutrition education status in pilot schools • Advocacy for school nutrition education with local authorities 	<ul style="list-style-type: none"> • Efforts to integrate various aspects of nutrition, health and physical activity into both the curriculum and non-curriculum activities
4. Promoting a supportive school environment	<ul style="list-style-type: none"> • Cleaning up of school precincts by pupils • Provision of hand washing devices and soap by the parents' association • Government decision to set up school canteens in all urban public schools of Ouagadougou 	
5. Providing school health and nutrition services	<ul style="list-style-type: none"> • Initiation of nutrition surveillance: yearly measurement of children's height and weight • Training of teachers for surveillance • Development of individual BMI charts 	

BMI: Body Mass Index; NFSI: Nutrition Friendly School Initiative

leadership and management; collaboration and integration; and resources.

Several sources of information were used. Structured interviews (with some open-ended questions) were conducted with school principals (4 in Ouagadougou, 6 in Cotonou), teachers (9 in Ouagadougou, 12 in Cotonou), parents and pupils, the school nutrition committee members, school food vendors or cooks, school health workers, and DFN Project partners in charge of NFSI in the field. Direct observation of the pupils, school precincts, food serving (selling) area, sports area, toilets and hand washing areas was performed.

Results: highlights of outcomes and lessons learned

Toward meeting NFSI criteria

According to the teachers interviewed both in Cotonou and Ouagadougou, the factors facilitating the implementation of NFSI were having the support from headmaster and parents, the assistance of other committee members, and external technical and limited financial support from the DFN Project. Providing the training in food and hygiene was also a helpful element. Barriers to implementation of NFSI were primarily considered to be: a lack of funds or materials, insufficient training, the existing curriculum, and to a lesser extent, insufficient time for teaching nutrition. More generally, the identified obstacles to NFSI were: the lack of involvement of some parents and their reluctance to have their children involved in school sanitation, the lack of follow-up by DFN Project nutrition workers, and the lack of communication with resulting lack of motivation.

Progress toward meeting the nutrition-friendly school criteria are analyzed briefly below, along the NFSI five main targets.

School nutrition and health policy

This is the first criteria, and this policy should address all five components of the NFSI, including objectives, an action plan, and a monitoring and evaluation plan for the policy; however, this NFSI requirement runs against the established practices in the study countries, whereby formulating policies for schools is a central government mandate that cannot be performed at the individual school level. Secondly,

it is only once schools have begun developing the other components of the NFSI that they become aware of the need for a nutrition policy and that they comprehend its purpose. Pilot schools in Ouagadougou and Cotonou were encouraged and supported in defining their yearly nutrition/health work plans, instead of having an abstract policy. Besides, few school food and nutrition policies on a national scale have been formulated to date around the world; the existing ones are primarily in developed countries. We already mentioned that in New Delhi, pilot schools for NFSI did not have a written nutrition policy (21). Additionally, data on the effectiveness of school policies on dietary behavior and nutritional status changes are scarce (25) and practically non-existent in developing countries. Evaluative research in this area would be timely, in developed and in developing countries.

Awareness and capacity strengthening of the school community

The lack of awareness of nutrition-related problems in schools and in communities was considered a problem. Furthermore, teachers did not feel well prepared for nutrition education. Another problem that came out in the initial self-assessment of the nutrition and health situation in the surveyed schools was that the sanitation and nutrition standards of street foods sold to pupils were in great need for improvement. Their responses to these issues were: to hold nutrition days in schools (Ouagadougou), to provide some training in nutrition education for teachers (Ouagadougou), and to sensitize and train the school vendors in a workshop (Cotonou).

Curriculum development and modification

This is a critical component, as nutrition education in schools is usually weak and teachers do not feel competent. However, it is not simple to modify the curriculum, as it is centrally developed for all public schools and because it is already overloaded with various disciplines that are in competition for school time. Nevertheless, some food and nutrition concepts can be incorporated into existing courses and it is possible to improve training methods. Ouagadougou teachers felt they also needed more training on behavior change techniques. It was decided to sensitize the inspectors to nutrition, otherwise they would be unlikely to support positive changes in

their schools. It was felt that not only the quantity, but the quality and relevance of school nutrition would have to be monitored.

Supportive school environment

Where there are school canteens, regulation and surveillance of the types of food products sold or served allows schools to work toward improving the nutritional value of school meals, as is shown in Brazil (26). In settings like Ouagadougou or Cotonou, where few school canteens are in operation, the pupils purchase food items, beverages or snacks from vendors. In some instances, vendors have to be registered with the school, in order to have access to school precincts. In such cases, it is easier to improve the food environment of the school through the training of vendors. The food environment was somewhat upgraded since the beginning of NFSI, as illustrated by a noted improvement in the types of foods sold to schoolchildren and in the hygiene practices of food vendors. Vendors have diversified the types of foods sold to pupils, thereby improving the nutritional quality of the food supply. Additionally, hygiene standards have improved, plus vendors add less salt and oil, and they offer more fruit. Some were reticent to change because they feared having less business.

Poverty and food insecurity among pupils were reported as major barriers to nutritional improvement, so it was felt that all schools should provide at least one meal a day. The ministerial decision in Burkina Faso to provide public urban schools with a canteen, in response to the observed and reported nutritional inadequacies in the urban pupils is also a step in the right direction. Similarly, in Benin, an ongoing campaign by the Ministry of Health advocates for at least one school meal per day for every child. Sanitation improved considerably in schools, with input by parents and efforts by pupils themselves, but much has to be done because many schools lack the most basic sanitation equipment.

School nutrition and health services

Few activities other than anthropometric measurements of schoolchildren for the purpose of nutrition surveillance were carried out, primarily from a lack of resources. Providing health and nutrition services in schools and a health reference system requires health personnel, but few schools have access to such

personnel. One step forward is to have all children weighed and measured at least once a year by school teachers (using the provided anthropometric material) and to share any abnormal results with parents, so that appropriate action is taken.

Developmental processes

Ownership and empowerment

Assisting and training the committees to develop their yearly action plans, if not to design their school nutrition policy, is a means of empowering these committees and contributing to their sense of ownership of the project. Furthermore, having the committees meet and interact together was found to be very positive, motivating school committees and promoting emulation. NFSI is positively perceived by school principals and teachers.

The self-appraisal questionnaire is generic; therefore, the same version appears to be used in all settings. Those involved in the self-assessment with school committees felt that the questionnaire should have been tailored to the school context in Africa, to be conducive to enhanced ownership of the initiative.

Indeed, ownership of the NFSI was not fully achieved, as suggested by the inadequate understanding of the philosophy and principles of the NFSI by several actors. School committees consistently complained about lack of funding from the project, to carry on their activities. This betrays lack of ownership and high expectations with regards to external financial support (see below, in the 'Resources' section), but it also points out dire need.

Leadership and management

School principals or headmasters were systematically appointed as the coordinators of the school nutrition and health committee; therefore, the motivation of the headmaster was key for the successful implementation and continuous support for the NFSI. Follow-up visits by DFN project nutrition workers may not have been regular enough to sustain interest and motivation. Project assistant feedback to those involved in school activities is important for motivation, and the contacts for this purpose would need to be regular: at the very least, once a month. It also proved difficult for the school committees to meet on a regular basis, which was a limitation to NFSI progress.

Even in the absence of a school nutrition policy for individual schools or the whole school system, some schools developed their own guidelines, namely as regards to food vending in the school precincts. For instance, in one public school of Benin, sweets and sweet drinks cannot be sold to pupils.

Involvement of local authorities was considered essential and this is now sought in both settings. The accreditation system, an essential component of the NFSI that serves to give schools a sense of common purpose and promote emulation, is in the process of being set up at the national level.

Collaboration and integration

At all levels, WHO has been supportive of the NFSI pilot-testing in Benin and in Burkina Faso. The respective roles of other concerned NFSI partners and collaborators would have to be better defined, for strengthened and more effective collaboration, Nutrition committees and their individual members (school principals, teachers, parents, pupils, municipal authorities, food vendors and health representatives), and both central and local government services in health and education should be included.

In Benin, where a health-promoting school project was initiated at about the same time as the NFSI, but in different urban and rural schools, the collaboration of the two projects was sought, but the coexistence of two slightly different programs may have been confusing for the schools themselves. In Benin also, it was deemed important that the NFSI become integrated into the national education support program and the national poverty reduction strategy.

Resources

All pilot schools indicated the difficulties of not having the necessary resources to implement the NFSI activities and expressed their expectation to have external funding; however, it is important for them to have the understanding that NFSI is to be self-sustained at the school level, as it should build on existing and ongoing school-based activities. A different expectation may have been the result of inadequate communication at the onset of the DFN Project. This, nevertheless, prompted the need for providing some incentives, such as scheduling more frequent visits to the committees by the project's nutrition workers, giving more freedom to the schools

in managing the small funds devoted to NFSI, giving more feedback on the activities undertaken by the schools and fostering leadership in the committees. Additionally, the seed money for the NFSI in the DFN Project budget might have helped schools to become more empowered to implement NFSI, with its use. Notwithstanding, some schools proved very creative in finding innovative and inexpensive solutions to some of their problems, particularly for sanitation.

Food insecurity and poverty were priority problems in some schools. Obviously, NFSI would not be able to solve this problem directly, other than advocate for the provision of school lunch programs, for instance, where possible. Nevertheless, the lack of resources at the family or school level may indeed represent a major barrier to the successful implementation and impact of the NFSI, particularly in low-income countries.

Conclusions

Based on the experience and lessons learned from pilot-testing the NFSI in two capital cities in French-speaking West Africa, it can be concluded that the NFSI has the potential to mobilize schools and communities for improved nutrition and health, provided the approach is adapted to the local conditions of limited human and material resources. For one thing, the self-appraisal tool itself would have to fit the school context. Efforts should now be devoted to scaling up the initiative and toward that purpose, to both sensitization and advocacy, in order for the local health, education and municipal authorities, as well as potential external funding partners, to support the NFSI. The development of national school nutrition policies would now be timely. Much remains to be accomplished, even in the pilot schools, to strengthen their capacity for nutrition education and to sustain the motivation of school committees, so that they pursue their involvement in the NFSI and sustain its implementation. Information material on NFSI itself, as well as simple tools for nutrition behavior change communication, will need to be developed. The initiative has to be better explained and presented as an endogenous and self-sustaining approach, rather than as an external project bringing in money. Pairing schools at different stages of program self-sufficiency may be a promising strategy. Household poverty and lack of material resources at the school level appear as major barriers

to achieving full impact of NFSI in low-income countries. Securing partnerships to address these infrastructure constraints first may provide the incentive needed for the schools to join the NFSI more constructively and sustainably.

Funding

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Conflict of interest

None declared.

Note

i. Naji G. [Synthesis of activities for the implementation of the NFSI in Burkina Faso and Benin (2008-2011)] (In French). University of Montreal, Canada, June 2011.

References

1. UNESCO World Education Forum. Education for all. 2000 Assessment. Dakar, Senegal; 26 April–28 April 2001.
2. Sridhar D. Linkages between nutrition, ill-health and education. UNESCO paper commissioned for the Education for All (EFA) Global Monitoring Report; 2009.
3. Jomaa LH, McDonnell E, Probart C. School feeding programs in developing countries: Impacts on children's health and educational outcomes. *Nutr Rev*. 2010; 69: 83–98.
4. World Health Organization. Health promoting schools. A healthy setting for living, learning and working. Geneva, Switzerland: WHO; 1998.
5. Young I. La promotion de la santé à l'école, une perspective historique. *Promot Educ*. 2005; 12: 184–190.
6. World Health Organization. What is a health promoting school? who.int/school_youth_health/gshi/hps/en/index.html (accessed 8 September 2010)
7. Aldinger C, Xin-Wei Z, Li-Qun L, Jun-Xiang G, Hai YS, Jones J. Strategies for implementing health-promoting schools in a province in China. *Promot Educ*. 2008; 15: 24–29.
8. World Health Organization. School policy framework. Implementation of the global strategy on diet, physical activity and health. Geneva, Switzerland: WHO; 2008.
9. World Health Organization. Report of the brainstorming meeting on the development of a framework on the Nutrition-Friendly School Initiative, Feb 27–28, 2006, Montreux, Switzerland. Geneva, Switzerland: WHO; 2006.
10. WHO/UNICEF/FAO. Nutrition-Friendly School Initiative. Part I: Conceptual framework. Part II: Self-appraisal tool. Geneva, Switzerland: WHO; 2006.
11. Worsley T. Promotion and communication. In: Lawrence M, Worsley T (eds). *Public health nutrition*. Berkshire, UK: Open University Press and Mc-Graw-Hill; 2007.
12. Tanumihardjo SA, Anderson C, Kaufer Horwitz M, et al. Poverty, obesity, and malnutrition: An international perspective recognizing the paradox. *J Am Dietet Assoc*. 2007; 107: 1966–1972.
13. Zeba A, Delisle H, Renier G, Savadogo B, Banza B. The double burden of malnutrition and cardio-metabolic risk widens the gender and socioeconomic health gap: A study among adults in Burkina Faso (West Africa). *Public Health Nutr*. 2012; 15: 2210–9.
14. Barker DJ. The origins of the developmental origins theory. *J Intern Med*. 2007; 261: 412–417.
15. Gluckman PD, Hanson MA, Cooper C, Thornberg KL. Effect of in utero and early-life conditions on adult health and disease. *N Engl J Med*. 2008; 359: 61–73.
16. Delisle H, Receveur O. Les « dysnutritions » dans les pays en développement. *CMAJ*. 2007; 176: 65.
17. Hillier F, Pedley C, Summerbell C. Evidence-base for primary prevention of obesity in children and adolescents. *Bundesgesundheitsbl*. 2011; 54: 259–264.
18. Fotu KF, Moodie MM, Mavoa HM, et al. Process evaluation of a community-based adolescent obesity prevention project in Tonga. *BMC Public Health*. 2011; 11: 284.
19. Singhal N, Misra A, Shah P, Gulati S. Effects of controlled school-based multi-component model of nutrition and lifestyle interventions on behavior modification, anthropometry and metabolic risk profile of urban Asian Indian adolescents in North India. *Eur J Clin Nutr*. 2010; 64: 364–373.
20. Chiabi A, Obama MT. Nutrition-Friendly Schools Initiative (NFSI): Another brain-storming strategy. *Clin Mother Child Health*. 2009; 6: 1155–1156.
21. Parmar A. Nutrition-Friendly School Initiative – The Indian experience. New Delhi, India: HRIDAY-SHAN; 2009.
22. Daboné C, Delisle H, Receveur O. Poor status of schoolchildren in urban and peri-urban areas of Ouagadougou (Burkina Faso). *Nutrition J*. 2011; 10: 34.
23. Glasgow RE, Vogt TM, Boles SM. Evaluating the public health impact of health promotion interventions: The RE-AIM framework. *Am J Public Health*. 1999; 89: 1322–1327.
24. Inchley J, Muldoon J, Currie C. Becoming a health promoting school: Evaluating the process of effective implementation in Scotland. *Health Promot Int*. 2006; 22: 65–71.
25. Jaime PC, Lock K. Do school-based food and nutrition policies improve diet and reduce obesity? *Prev Med*. 2009; 48: 45–53.
26. Garcia Gabriel C, Guedes de Vasconcelos FA, Francisco de Andrade D, Soarez Schmitz BA. First law regulating school canteens in Brazil: Evaluation after 7 years of implementation. *Arch Latinoameric Nutr*. 2009; 59: 128–138.